RCA VICTOR

SERVICE DATA

VOLUME IV

1947 • 1948

RADIO RECEIVERS

PHONOGRAPHS

TELEVISION

RADIO CORPORATION OF AMERICA

RCA Victor Division

Camden, N. J., U. S. A.

RCA VICTOR
SERVICE DATA

RADIO RECEIVERS
PHONOGRAPHS
TELEVISION

This volume is a compilation of Service Data previously issued for the years 1947, 1948 and early 1949 inclusive, with the latest changes and corrections.

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First Edition-First Printing

Printed in U. S. A.

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The regular Service Data is contained in pages having arabic numerals (1, 2, 3, etc.), supplementary data and last minute information is contained in pages having roman numerals (I, II, III, etc.).

RADIOS, RADIO-PHONOGRAPHS, RECORD PLAYERS

TELEVISION

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MISCELLANEOUS

MODEL vs. RECORD CHANGER

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7QV5	960001-4	Rad. 75ZU	RP 178 or 960276
8TV41	RP 177A	77U	RP 178
8TV321	RP 178	77V1	960260-1
8TV323	RP 178	77V2	960260-1
8V7	RP 178	610V1	960001-5 or -6 or RP 177
8V90	RP 178	610V2	960001-5 or -6 or RP 177
8V91	RP 178	612V1	RP 176A or RP 176B
8V112	RP 178	612V3	RP 176 or RP 176A
8V151	RP 177B	612V4	RP 176 or RP 176A
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1943-1946 BOUND VOLUME MODEL LISTING

Service Data on the instruments listed below will be found in the 1943-1946 Bound Volume of RCA Victor Service Data.

Supplementary information on some of these models is contained in this Bound Volume (1947-1948) as listed below.

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5H2	—	Rad. 65BR9	XIV, XVI
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6JM	—	65U, 65AU	—
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54B1-N	XIV	66X8	—
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INDEX TO CHASSIS NO'S. (MANUFACTURED SINCE 1942)

Every radio, television, amplifier and power supply chassis is rubber stamped with an identification number. Identification numbers beginning with R (RC, RS, etc.) are used with all radios and some television receivers. Identification numbers beginning with K (KCS, KRS, etc.) are used exclusively with television. The tubulation below is for chassis identification numbers which have been used since 1942.

CHASSIS NO.	MODEL NO.	CHASSIS NO.	MODEL NO.
KCS 20A-1	630TS (60 cy)	KCS 21-1	621TS
KCS 20B-1	630TCS (60 cy)	KRS 21-1	648PTK, 648PV, TV Power Supply
KCS 20C-2	630TS (50 cy)	KRS 21A-1	741PCS, 8PCS41, TV Power Supply
KCS 20D-2	630TCS (50 cy)	KCS 24-1	648PTK, TV R-F/I-F Chassis
KCS 20J-1	8TS30 (60 cy)	KCS 24A-1	648PV, TV R-F/I-F Chassis
KCS 20K-2	8TS30 (50 cy)	KCS 24B-1	741PCS, 8PCS41, TV R-F/I-F Chassis
KRS 20-1	648PTK, 648PV, Horiz. Defl. Chassis	KCS 24C-1	8PCS41, TV R-F/I-F Chassis
KRS 20A-1	741PCS, 8PCS41, Horiz. Defl. Chassis		
KRS 20B-1	8PCS41, Horiz. Defl. Chassis		

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KCS 25D-1	8TV41 (60 cy), Television Chassis
KCS 25E-2	8TV41 (50 cy), Television Chassis
KCS 26-1	721TS (60 cy)
KCS 26-2	721TS (50 cy)
KCS 26A-1	721TCS (60 cy)
KCS 26A-2	721TCS (50 cy)
KCS 27-1	730TV1, 730TV2 (60 cy), Television Chassis
KCS 27-2	730TV1, 730TV2, (50 cy), Television Chassis
KCS 28	8T241, 8T243, 8T244
KCS 29	8T270
KCS 29A	8TC270, 8TC271
KCS 30-1	8TV321, 8TV323, Television Chassis
KCS 32	8TR29, Television Section
KCS 32A	8TK29, Television Section
KCS 32B	8TR29, Television Section
KCS 32C	8TK29, Television Section
KCS 33A-1	8TK320, Television Section
RS 111A	CV-112X, Electrifier
RS 115	QB11, QB12, QB13, Power Unit
RK 117	711V1, 711V2, 711V3, R-F/I-F Chassis
RK 117A	641TV, 8TV41, Radio R-F/I-F Chassis
RK 121	612V1, 612V3, 612V4, R-F/I-F Chassis
RK 121A	648PTK, 648PV, Radio R-F/I-F Chassis
RK 121C	8V151, R-F/I-F Chassis
RS 123	612V1, 612V3, 612V4, 711V1, 711V2, 711V3, Audio Amp. & Power Supply
RS 123A	641TV, 648PTK, 8TV41, Audio Amp. & Power Supply
RS 123B	648PV, Audio Amp. & Power Supply
RS 123C	741PCS, 8PCS41, Audio Amp. & Power Supply
RS 123D	8V151 Audio Amp. & Power Supply
RS 126	66E, 66ED, 66E-1
RS 127	63E, 63EM
RK 135	8TK29, 8TR29, Radio Section
RK 135A	8TK29, 8TR29, 8TK320, Radio Section
RC 507	Q22A, Q32 Q121 (EM)
RC 507U	Q121 (PM)
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RC 539E	Q34
RC 563A	QB55
RC 563K	QB55X
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RC 585	Q36
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RC 606	67V1, 67AV1
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RC 608	68R1, 68R2, 68R3, 68R4
RC 610	610V1, 610V2
RC 610A	730TV1, Radio Section
RC 610B	730TV2, Radio Section
RC 610C	610V1, 610V2, 2nd Prod.
RC 612	QB13
RC 613A	710V2
RC 615	77V1, 8V7
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RC 616A	8V91
RC 616B	8TV321, Radio Section
RC 616C	8TV323, Radio Section

CHASSIS NO.	MODEL NO.
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RC 616H	8V91, 2nd Prod.
RC 616J	8TV321, 2nd Prod. Radio Section
RC 616K	8TV323, 2nd Prod. Radio Section
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RC 618A	8V90, 2nd Prod.
RS 1000	CV-42, Electrifier
RS 1001	CV-45, Electrifier
RC 1004E	55F, 65F
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RC 1017	55U, 55AU
RC 1017A	65U, 65AU, 65U-1, Radiola 62-1
RC 1017B	65U, 65AU (50 cycle)
RC 1023	56X5, Radiola 61-5
RC 1023A	56X11
RC 1023B	56X10, Radiola 61-10, Postone (PX) 61-10
RC 1023C	Radiola 61-10, 2nd Prod.
RC 1034	65X1, 65X2, 65X8, 65X9, Radiola 61-8, 61-9
RC 1035	QU72, QU72A
RC 1037	65F1, 64F2
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RC 1037B	8F43
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RC 1040A	66BX (3V4 output)
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RC 1059A	8BX5, 8BX54, 8BX55, 2nd Prod.
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RC 1060A	8R72, 8R76
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RC-320A	8M2
RC-321	8M3
RC-321A	8M4
RC-323	95T, 95T1
RC-325C	5Q2
RC-325D	5Q2X
RC-331	HF-8, HF-8A
RC-331A	HF-6
RC-331B	U-134, U-134A
RC-331C	U-132
RC-332	94X
RC-333	94BK, 94BT
RC-333A	94BT6
RC-333B	94BT1, 94BK1
RC-333C	94BT61
RC-335	911K
RC-335A	98K
RC-335B	99K
RC-335C	11Q4, 11QK
RC-335D	U-126, U-128
RC-335E	11QU
RC-335F	910KG
RC-335H	99T
RC-335K	U-129
RC-335KR	U-30
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RC-337	8Q1
RC-337A	8Q4
RC-337B	10Q1
RC-338	12Q4, 12QK
RC-338A	12QU
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RC-340	94X-1, 94X-2
RC-341	U-111
RC-341C	U-112
RC-345C	95X-1
RC-345D	95X
RC-345E	95XL
RC-345F	95XLW
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RC-348A	96T
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RC-348E	U-115
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RC-348J	U-121
RC-348L	U-127E
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INDEX TO TELEVISION CIRCUIT DESCRIPTION

RCA TEST EQUIPMENT

TEST-EQUIPMENT RACK WS-17A

Tops in Appearance and Utility

- Speeds up TV/FM/AM Service
- Permits factory-quality work
- Creates prestige and good-will
- Sturdy All-Steel Construction
- Instruments can be quickly removed for use in the field
- Attractive Satin-Aluminum and Blue-Gray Hammeroid

Cash in on the lucrative television service market! Modernize your work bench for efficient TV service with this new RCA 3-Place Test Rack... Instruments are at your fingertips for quick, accurate service. Accommodates any three matched RCA Test Instruments to meet your individual TV, FM, or AM service needs.

Its smart, stylish appearance adds prestige and distinction to your store interior—gives it that business-like, professional look... the trademark of the better service shop. The RCA WS-17A test rack with accompanying instruments quickly pays for itself in customer acceptance, and in the time it saves. Large service shops can use several racks to speed up their service operations.

Dimensions: 48 x 21½ x 12

Price: $59.50

TELEVISION CALIBRATOR WR-39A

The WR-39A is a marker signal generator, a dual crystal standard, and a heterodyne frequency meter with built-in audio amplifier and speaker. The marker VFO operates on fundamentals, and produces strong marker pips on scope traces anywhere within its specified frequency ranges. For regular signal-generator and calibrator applications, the VFO also can be used on harmonic frequencies, thus giving increased coverage. For stagger-tuned alignment work, the VFO can be amplitude-modulated by an audio oscillator. The frequency standard uses a 2.5-Mc primary crystal and a 250-kc modulating crystal. This crystal combination will calibrate any signal source over the range of 250-kc to 250-Mc. The heterodyne frequency meter provides audible beats to identify the 2.5-Mc and 0.25-Mc check points. Unit is complete with signal injection cable.

Shipping weight, 22 lbs. Price: $250.00

• SPECIFICATIONS

Variable-Frequency Oscillator
Frequency Ranges (continuous coverage): 19-110 Mc; 170-240 Mc
Output Voltage: Better than 0.28 peck-to-peak volt, 0.1 RMS volt at any frequency
Output Impedance: 100 ohms
Attenuator Range: 100/1
Impedance at "Mad In" Jack: 5000 ohms

Crystal Oscillators:
Basic Crystal Standard Frequency: 2.5-Mc; Accuracy ±0.01%
Modulating Standard Frequency: 0.25-Mc; Adjustable for exact zero-beat with 2.5-Mc crystal

Heterodyne Detector Input Requirements:
External Signal Beating Against VFO: 1 millivolt
External Signal Beating Against Crystals: 10 millivolts

Audio Amplifier:
Gain (approx.): 1000; Output: 0.3 watts max.

Loudspeaker:
3-inch cone, Alnico magnet type.

Dimensions: 10" x 13½" x 7½"

TV SWEEP GENERATOR WR-59A

WR-59A is a frequency - modulated TV sweep-alignment generator. It generates signals of fundamental frequency on TV channels 1 to 13 preset for speed and accuracy. The signals provided include all 13 TV rf channels, picture and sound if, video, pre-war picture if, the standard FM intermediate, and a spare 25-40-Mc channel. Sweep width is continuously variable, and output level is exceptionally flat in all positions. The output cable termination will match balanced or unbalanced lines; the output level is variable over wide limits by means of a coaxial-type piston attenuator. The unit develops a sweep frequency signal for a scope; a phasing control is provided. An additional feature is return-trace blanking which produces a zero-reference line on the cathode-ray tube for measurement of instantaneous voltages. The unit is complete with rf and if/vf output cables. Shipping weight, 35 lbs.

Price: $325.00

• SPECIFICATIONS

Frequency Ranges
Pre-war Picture Intermediate, first band: 5-15 Mc
TV Sound Intermediate: 20.25—22.25 Mc
Picture Intermediate, second band: 20-30 N

Video Band: 100-kc to 10 Mc
Picture Intermediate, spare: 25-40 Mc (adjustable)
FM Radio Intermediate: 10-11. 5 Mc

Television RF Channels 1-13: 44-50, 54-60, 60-66, 66-72, 76-B2, 82-88, 174-180, 180-186, 186-192, 192-198, 198-204, 204-210, 210-216 Mc

Output Impedance:
RF Ranges: 150-0-150 ohms (normal load)
IF and Video Ranges: 100-ohm cable termination

Maximum Attenuator Ratio:
RF Ranges: 20000/1

Maximum Amplitude Variation of Sweep Envelope: All ranges, better than ±1.5 db

Horizontal Sweep:
Phase Range, 0-160°; Frequency, 60 cps; Amplitude, 5.6 peak-to-peak (2 RMS) volts

3" OSCILLOSCOPE WO-55A

The WO-55A oscilloscope incorporates the features of an electronic voltmeter. It is equipped with a calibrating voltage source and a VTVM-type range switch. Voltages can be read directly on the clip-on graph screen at the same time waveforms are being studied. Push-pull vertical and horizontal amplifiers provide good-fidelity and reserve output. This feature permits the trace to be greatly expanded for observation of pattern detail. The scope has a retractable light shield and all usual oscilloscope features. It is a quality instrument, rugged, stable, linear, and well-suited for TV-FM-AM alignment, and general oscilloscope applications in the laboratory, factory, field, and service shop. Shipping weight, 19 lbs.

Price: $129.50

• SPECIFICATIONS

Deflection Factors:
Vertical Amplifier: Better than 0.47 RMS volt/inch* (1.33 peak-to-peak volts/inch)
Vertical Deflecting Electrodes: Better than 42 RMS volts/inch* (120 p-to-p v/in.)
Horizontal Amplifier: Better than 0.53 RMS volts/inch* (1.5 peak-to-peak volts/inch)
Horizontal Deflecting Electrodes: Better than 48 RMS volts/inch* (135 p-to-p v/in.)

Amplifier Gain (both amplifiers): 90

Input Resistance & Capacitance:
Vertical Amplifier: 0.5 meg and 55 μμf
Horizontal Amplifier: 0.5 megohm, shunted by 37 μμf
Vertical Deflecting Electrodes: 5.6 megohms shunted by 15 μμf
Horizontal Deflecting Electrodes: 5.6 megohms, shunted by 12 μμf

Sine-Wave Frequency Response (both amplifiers):
Down less than 50% at 200 kc
Auxiliary Sine-Wave Sweep 60 cps

*For sine-waves

RCA TEST EQUIPMENT

AUDIO OSCILLATOR WA-54A

The WA-54A Audio Oscillator is a portable, ac-operated instrument for generating sinusoidal voltages within the frequency range of 20 to 17,000 cycles. It is used to measure the fidelity of radio receivers, frequency response of audio amplifiers, and modulation characteristics of small transmitters. It is useful to determine frequencies and mechanical speeds and to trouble-shoot TV deflection, sync and video amplifier circuits. Tapped output transformer makes it possible to match the oscillator output to load impedances most frequently encountered...electronic "eye" serves as calibration indicator, output level indicator, and pilot lamp. Frequency settings are read from a large, easy-to-read drum dial. Shipping weight, 19 lbs. Price: $152.50

• SPECIFICATIONS

Frequency Range (continuous): 20 cps to 17 kc
Output Impedance:
High-Level Balanced: 250, 500, 5000 ohms
High-Level Unbalanced: 62.5, 125, 1250 ohms
Low-Level Unbalanced: 10000 min. ohms
Output Voltage (approx.):
No Load (high level): 40 RMS volts
With 5000-Ohm Load: 25 RMS volts
With 500-Ohm Load: 7.9 RMS volts
With 250-Ohm Load: 5.5 RMS volts
No Load (low level): 2.5 RMS volts
Output Voltage Variation (loaded): less than ±2 db
Distortion: Less than 5% RMS
Dimensions: 10" x 13½" x 7½"

FM SWEEP GENERATOR WR-53A

Speeds up FM receiver alignment...regardless of band-width requirements. Brings the recognized advantages of the sweep method of alignment to every FM job. Packed with features which mean speed, accuracy and reliability...if center frequency 8.3 to 10.8-Mc...adjustable if sweep width...facilities for external frequency modulation...rf range continuously variable from 85 to 110-Mc...includes step and fine attenuators...a 'scope phase control permits centering of sweep patterns. Provides the signals you need for fast, accurate FM alignment. Shipping weight 17 lbs. Price: $89.50

• SPECIFICATIONS

Intermediate-Frequency Oscillator:
Center-Frequency Range: 8.3-10.8 Mc
Scale Accuracy: ±2%
Output: Adjustable from 1 μv to 0.1 RMS volt
Sweep Width: 0 to ±200-kc at 8.3 Mc
0 to ±400-kc at 10.7 Mc
Internal Modulation: Line frequency
(External modulation can be applied)
Radio-Frequency Oscillator:
Frequency Range: 85-110 Mc
Scale Accuracy: ±2%
Output: Adjustable from 5 μv to 0.1 RMS volt
Amplitude Modulation: Twice line frequency

AUDIO VOLTMETER WV-73A

A sensitive high-impedance ac VTVM capable of measurements from 0.001 RMS volt to 1000 RMS volts ac over a range of 20 to 20,000 cycles. Logarithmic scale and overlapping attenuator assure accuracy even when pointer is at either end of scale. In combination with a modulated high-frequency generator and rectifying probe, the WV-73A is especially useful in determining characteristics of coaxial cables and slotted lines. Standing-wave ratios can be read in terms of voltage or db ratios, since the meter is equipped with both scales. The high-fidelity amplifier is externally accessible. Shipping weight, 17 lbs. Price: $149.50

• SPECIFICATIONS

AC Voltmeter Ranges (1 millivolt to 1000 RMS volts in 11 ranges): 0.001-0.01, 0.004-0.025, 0.01-0.1, 0.04-0.25, 0.1-1, 0.4-2.5, 1-10, 4-25, 10-100, 40-250, 100-1000 RMS volts
DB Ranges (0-120 db in 11 ranges):
0– to 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120 db
Frequency Response: Flat within ±0.5 db from 20 cps to 20 kc
Input Resistance and Capacitance: 1 megohm shunted by less than 25 $\mu\mu$f
Scale Accuracy: Better than ±5%
Amplifier Gain: 2500 (with 25000-ohm load)

REGULATED POWER SUPPLY WP-23A

A high-quality unit designed for dependable, continuous service in shop, laboratory, and factory. Output voltage is virtually independent of line-voltage variations as well as load-current variations. Maximum load-current capability increases with the output voltage level. Insulated output terminals permit grounding of either the positive or negative terminal. Primarily intended as an extremely stable "B" supply, the WP-23A also can be used as a low-impedance "C" bias supply. Shipping weight, 25 lbs. Price: $130.00

• SPECIFICATIONS

Regulated DC Output
Voltage range (continuously adjustable) 0-300 volts
Current range for 120—300 volts...0-120 ma
60—120 volts...0-80 ma
0—60 volts...0-60 ma
Regulation for line-voltage variation of 105 to 125 volts...Less than 1½%
Regulation above 30 volts from zero load to full load...Less than 1%
Ripple voltage (RMS)...Less than 8 millivolts
Auxiliary Unregulated DC Output
Voltage (approx.)...600 volts
Current Capability...120 ma
Ripple Voltage (RMS)...0.1 volts
Auxiliary Unregulated AC Output
Voltage (RMS)...6.3 volts
Current Capability (RMS)...5 amperes

Accessories

HIGH-VOLTAGE PROBE WG-284 (288)

Extends the dc voltage range of RCA VoltOhmyst* and Chanalyst* Vacuum-Tube Voltmeters to 30,000 volts. Measures dc voltages in television sets, X-ray machines, and other high-voltage devices... useful in measuring the output voltage of pulse-operated and rf power supplies and other high-resistance voltage sources that require high-resistance measuring instruments. Both probes are identical except for the resistance values of the multiplier resistor. VoltOhmysts 195 and 195-A, and Chanalyst 170-A use probe WG-288. Others use probe WG-284. Price: $15.95

CRYSTAL PROBE WG-263

Converts VoltOhmyst* Meters 163, 165, 165-A, 195, 195-A, WV-65A, WV-75A, and WV-95A into VHF voltmeters for use up to 100 Mc; also used with Chanalysts* Types 162, 162-A, 162-B, 162-C, and 170-A. Can be used for relative readings to 175 Mc. Price: $8.95

DIODE PROBE WG-275

The RCA Diode Probe WG-275 is designed to operate in combination with RCA VoltOhmyst* Electronic Meter WV-95A; it enables this instrument to read RMS or peak-to-peak voltages at frequencies from 30 cycles to 250 Mc. The probe fits coaxial "T" connectors, and permits direct measurement of voltages in coaxial lines.

Price: $30.00

FOR MEASUREMENTS YOU CAN TRUST

RCA

TEST-EQUIPMENT RACK WS-16A

Your Complete Answer

to Radio and Television Servicing

The RCA WS-16A all-steel laboratory-type test rack accommodates a choice of any six matched RCA test units to meet individual service requirements. In addition to its display value and businesslike appearance, this rack facilitates use of the test instruments and speeds up service work. Plenty of room below instruments for TV chassis. Any unit can be readily withdrawn for field use. Six units in illustrated rack provide complete factory-quality TV/FM/AM servicing facilities.

Dimensions: 48 x 33 x 12

Price: $90.00

TEST OSCILLATOR WR-67A

The WR-67A provides speed, accuracy, convenience, and over-all dependability in signal injection and alignment work. A range switch allows the quick selection of three fixed frequencies of 1500, 600, and 455 kc...band-spread dial provides continuously variable fundamental frequencies from 100 kc to 30 Mc, plus useful harmonics out to 90 Mc. Add to this—a temperature compensated oscillator...special signal-injection probe...both step and vernier attenuators...double shielding...six-band drum dial with easy-to-read, four-foot scale spread...scale accuracy of ±2%, adjustable modulation level on internal and external modulation positions...power-line filter to minimize rf leakage...and 400-cycle signal source—More features than can be found in most signal generators. Shipping weight, 20 lbs.

Price: $89.50

• **SPECIFICATIONS**

Frequency Range: Continuous from .100 kc to 30 Mc
Band A: 100-260 kc; Band B: 260-650 kc; Band C: 635-1600 kc; Band D: 1.6-4.7 Mc; Band E: 4.4-12.8 Mc; Band F: 10.5-30 Mc
Scale Accuracy, ±2%
Fixed Frequencies: 455, 600, 1500 kc
Output Voltage (RMS): Continuously variable, 5 μv to 1 volt
Internal Modulation: 400 cps; adjustable from 0% to 50%
External Modulation: 2 RMS volts req. for 30% mod.
Audio Output: 25 max. RMS volts across 100,000 ohms
RF Output Impedance: 10-1000 ohms
(Varies with attenuator setting)
Dimensions: 10″ x 13½″ x 7½″

MASTER VOLTOHMYST* WV-95A

The WV-95A is truly the "master" electronic multimeter. It combines in one case an ac voltmeter, dc voltmeter, ohmmeter, dc microammeter, dc milliameter, capacitance meter, and a dc ammeter. The instrument is ac-line operated. The carefully balanced meter is virtually burn-out proof; it has a full-scale accuracy of ±2%, and can be zero-centered for discriminator alignment work. The capacitance measuring circuit includes a polarizing voltage for measurement of electrolytic capacitors. The entire electrical system is insulated from the metal case which may be grounded separately. Accessories available on separate order include a 100-Mc crystal probe WG-263, and a 250-Mc peak-to-peak diode probe, WG-275. Unit is complete with three test leads and two test cables with plugs and clips. Shipping weight, 17 lbs.

Price: $152.50

*Reg. Trade Mark, U.S. Pat. Off.

• **SPECIFICATIONS**

DC Voltmeter Ranges: 0 to 5-10-50-100-500-1000 dc volts
Input Resistance: 11 megohms on all ranges
AC Voltmeter Ranges: 0 to 1-5-10-50-100-500-1000 RMS volts
Frequency Response, 30 cps to 20 kc
Input Resistance and Capacitance: 0.5 megohms shunted by 125 μμf
DC Ammeter Ranges: 0-10, 0-100 μa, 0 to 1-10-100 ma, 0-1, 0-10 amps
Ohmmeter Ranges: 0.1 ohm to 1000 megohms in six ranges
Center-Scale Indications: 10, 100, 1000, 10000 ohms; 0.1, 10 megohms
Capacitance Meter Ranges (4 μμf to 1000 μf in six ranges)
Center-Scale Indications: 100, 1000 μμf; 0.01, 0.1, 1, 10 μf
(Note: The following data apply to the WV-95A when used with RCA Diode Probe WG-275 which is supplied on separate order.)
RF Voltmeter Ranges: 0 to 5-10-50-100 RMS volts from 30 cps to 17.5 Mc
0 to 5-10-30 RMS volts from 17.5 to 75 Mc
0-5, 0-10 RMS volts from 75 to 250 Mc
Input Resistance and Capacitance: 625000 ohms shunted by 15.6 μμf at 1 Mc
32000 ohms shunted by 14.5 μμf at 10 Mc
100 ohms shunted by 13 μμf at 250 Mc
Meter Indications: RMS value of sine-wave voltage, 0.354 peak-to-peak value of recurrent complex-wave voltage
Dimensions: 10″ x 13½″ x 7½″

Accessories

MINIATURE TESTPOINT ADAPTER WG-265

The RCA miniature testpoint adapter makes your trouble-shooting faster, easier, safer by making tube-base connections accessible on the tube side of the chassis. Pins on one end of the adapter fit into a 7-pin miniature socket, and socket facilities on the opposite end accommodate all types of 7-pin miniature tubes. Tabs project for easy probe contact. Shipping weight for 12, 3 lbs. Price: $1.50

RCA ISOTAP

Eliminates shock hazard between ac/dc chassis and ground, speeds detection of receiver faults with high-low line tests, and facilitates testing at 117-volt design-center value. Has six-position primary switch and three secondary receptacles. Height, 5-7/16″; width, 4-3/8″; depth, 4-¼″. Shipping weight, 6 lbs. Price: $8.95

HIGH-LOW ISOLATION TRANSFORMER WP-24A

RACK-ADAPTER PANEL WS-18A

WS-18A Rack Adapter Panel for mounting any of the matched RCA Test Instruments in standard 19-inch relay racks . . . adds convenience and standardization to industrial test setups. Dimensions, 10½″ high, 19″ wide, 1/8″ thick
Finish, Umber Gray
Price: $9.50

RCA TEST EQUIPMENT

STANDARD-VOLTOHMYST* TYPE 195-A

The "work-horse" of electronic meters. Measures RMS ac and dc voltages to 1000 volts, resistance to 1000 megohms, in six ranges. Reads db, dbm, or vu at all audio frequencies. Has zero-center scale for discriminator alignment. 10-megohm dc input resistance minimizes circuit loading. One megohm isolating resistor in probe permits measurement of dc voltages in high-impedance ac circuits. WG-263 accessory Crystal Probe permits rf voltage measurements to 100 Mc. Shipping weight, 10 lbs. Price: $79.50

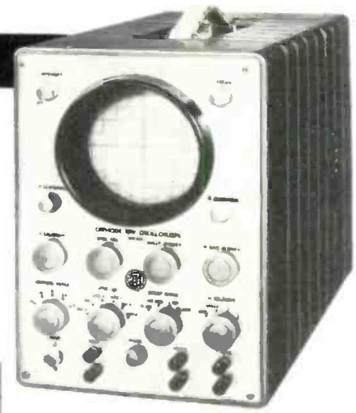
ADVANCED VOLTOHMYST* TYPE WV-75A

A versatile instrument for TV and hf measurements. Accurate to 250 Mc. Can be used for peak-to-peak voltage measurements. Measures RMS ac and dc voltages to 1000 volts, resistance to 1000 megohms. Complete with WG-275 diode probe. Shipping weight, 11 lbs. Price: $125.00

BATTERY VOLTOHMYST* TYPE WV-65A

A completely portable instrument that works anywhere. Batteries last up to 10 months with normal use. Measures RMS ac and dc voltages to 1000 volts, resistance to 1000 megohms, and direct current to 10 amps. Input resistance 11 megohms on dc ranges. Has isolating resistor in dc probe for measurement of dc voltages in high-impedance ac circuits. WG-263 accessory Crystal Probe permits rf voltage measurements to 100 Mc. Shipping weight, 10 lbs. Price $43.75

OSCILLOSCOPE WO-58A



5" oscilloscope affording accurate presentation of synchronizing pulses, deflection waveforms, and composite video signals. Peak-to-peak voltages of waveforms can be read during operation. Deflection waveforms can be traced step-by-step. The crystal probe can be plugged into the kinescope socket of the receiver under test to observe video-amplifier response. Price: $249.50

• SPECIFICATIONS:

Vertical Amplifier:
Deflection Factor 0.18 RMS Volts/in.*(0.5 peak-to-peak volts/inch)
Input Resistance and Capacitance:
Direct input probe 1 megohm shunted by 62 $\mu\mu f$
Compensated probe 2 megohms shunted by 9.5 $\mu\mu f$
Sine-wave Frenquency Response:
Flat within 20% from 5 cycles to 2 Mc.
50% from 1 cycle to 4 Mc.
Square-wave Response:
Tilt and overshoot less than 2% from 30 to 50,000 cycles
Rise time less than 0.15 μ sec from 10% to 90% of total rise.
Horizontal Amplifier:
Sine-wave frequency response:
Flat within 10% from 6 to 100,000 cycles.
*For Sine Waves

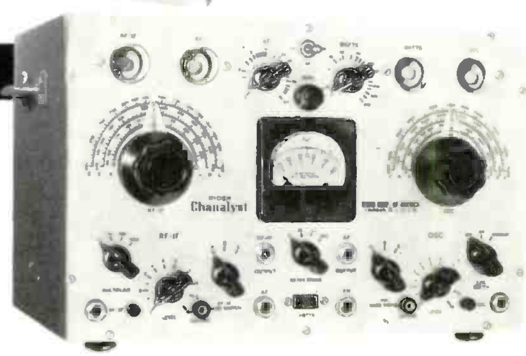
ULTRA-SENSITIVE DC MICROAMMETER WV-84A

Useful for measuring very small values of current; may be used as high-resistance voltmeter or as high-range ohmmeter. Approaches galvanometer sensitivity. Electronically protected, non-burn-out meter. Accuracy, 0.01 range, ±5% of full-scale reading; other ranges ±4%. Excellent for weak-current measurements of phototube, multiplier phototube and similar low-current devices. Shipping weight, 7 lbs. Price: $100.00

• SPECIFICATIONS

Range: 0.001 μa to 1 ma full scale
Full-Scale Indications (6 scales) 0.01; 0.1; 1.0; 10; 100; 1000 μa
Full-Scale Voltage Drop, (all scales) 0.5 volts
Power Supply (Batteries) 2 RCA-VS102, 2 RCA-VS106

RCA RIDER CHANALYST* 162-C



RCA Chanalyst 162-C speeds up those tough service jobs. Monitors intermittent receivers continuously, while service man is working on other jobs. Turns loss items into profits. 52-page instruction book shows test set-ups, circuit diagrams, discusses multitudes of obscure troubles, and explains applications of Chanalyst Analyzer. Height, 9"; width, 16"; depth, 10¾". Shipping weight, 32 lbs. Price: $162.50

• SPECIFICATIONS

RF-IF Channel:
Frequency Range: 96-1700 kc
Sensitivity: Better than 80 μv to close indicator eye without probe lead
Scale Accuracy: ±2%
Oscillator Channel:
Frequency Range: 600-15000 kc
Scale Accuracy: ±2%
Audio Channel:
Frequency Range: 15-50000 cps
Sensitivity (approx.): 0.1 RMS volt to close indicator eye
Electronic Voltmeter Channel:
Ranges: 0 to 5-25-125-500 dc volts
(Center-scale zero reference)
With Crystal Probe: 0 to 5, 0 to 20 RMS volts, (for sine waves)
Frequency Response: ±10% from 1 kc to 100 Mc
Wattmeter Channel:
Range: 50-250 watts
Dimensions: 9" x 16" x 10¾"

*Trade Mark Reg. U.S. Pat. Off.

TEST AND MEASURING EQUIPMENT • RADIO CORPORATION OF AMERICA • HARRISON, N. J.

2F719-R PRINTED IN U.S.A.

5Q31X (RC 1054E)

Service Data:

This instrument uses antenna and oscillator circuits identical to Model 6Q33X. It is otherwise identical to Model 5Q31.

For alignment procedure and tuning circuits refer to Model 6Q33X Service Data and to Model 5Q31 Service Data for other information.

The items listed below are used in Models 5Q31X and 6Q33X but not in Model 5Q31.

Stock No.	Description
S-5022	Coil—"A-C" bands antenna coil
S-5023	Coil—"X" band antenna coil
S-5024	Coil—"A-C" bands oscillator coil
S-5025	Coil—"X" band oscillator coil
S-5020	Switch—Range switch
S-5021	Dial—Dial scale
S-5018	Capacitor—Mica, 470 mmf (C41)
S-5019	Capacitor and Resistor Assembly—56 mmf capacitor and 10 ohm resistor (C14, R5)

8B46 (RC-1069C)

Service Data:

The Service Data previously published for Models 8B41, 8B42 and 8B43 will apply to Model 8B46 except for color and the replacement parts listed below.

REPLACEMENT PARTS

CHASSIS ASSEMBLY

RC-1069C

Same as listed for RC-1069, RC-1069A, RC-1069B
EXCEPT

74366 Fastener—Push fastener to hold loop, (2 required) for Model 8B46—tan

74363 Lid—Case top lid complete with lid support and hinges —less loop—Model 8B46—ivory

74365 Loop—Antenna loop complete with connectors—less lid —Model 8B46—ivory

74367 Nameplate—"RCA" nameplate for top lid—Model 8B46

SPEAKER ASSEMBLIES

Same as listed for Models 8B41, 8B42, 8B43

MISCELLANEOUS ASSEMBLIES

74368 Bottom—Case bottom—Model 8B46—ivory

70457 Catch—Spring catch assembly

74016 Center—Case center complete with spring catch

74369 Handle—Carrying handle—Model 8B46—tan

73970 Link—Handle link (2 required)

73943 Screw—#4-40 x 5/16" binder head screw to hold case center

8X541 TO 8X547 (RC-1065, RC-1065A, RC 1065C, RC 1065D, RC 1065F, RC 1065H)

Substitute Volume Controls:

The original volume control used in these receivers is stamped 970058-26, 970058-30 or 970058-40. It is a 500,000 ohm control with an internal stop at 50,000 ohms.

Substitute control stamped 970058-20 is a 500,000 ohm control without the internal stop. An external 68,000 ohm resistor is connected between the high side of the volume control and #2 lug of the 2nd i.f. transformer.

Substitute control stamped 97900-110 is a 1 megohm control without the internal stop. An external 68,000 ohm resistor is connected between the high side of the volume control and #2 lug of the 2nd i.f. transformer. A one megohm resistor is connected in parallel with the control.

Addition of Resistor:

To eliminate noise caused by parasitics in the oscillator a resistor (R2 100 ohms) has been added in series with the oscillator coupling capacitor. It is connected between the capacitor and the oscillator coil.

8V7, 77V1, 77V2, 710V2

Alternate Speaker:

An alternate speaker (stamped 92569-1K) has been used as a substitute for the listed speaker (or speakers) in the above models.

Addition to Parts List:

Under "Speaker Assemblies" add the following:
92569-1K.

70574 Cone—Cone and voice coil assembly.
31539 Plug—5 prong male plug for speaker.
37899 Transformer—Output transformer.
Replace complete speaker with Stock No. 71961 (92569-1W).

8V91

Change in Parts List:

MISCELLANEOUS

Change:

73753 Pull—

to read:

73753 Pull—Door pull (2 required) for mahogany instruments

Add:

74626 Pull—Door pull (2 required) for blonde instruments

8X53, 65X1, 65X2 (RC-1064)

Substitute Volume Control:

The original volume control used on this chassis is 500,000 ohms with a stop at 50,000 ohms. The substitute control has no such stop—in place of the 50,000 ohm stop an external 47,000 ohm resistor is used. When replacing such a control with Stock No. 70322 the external resistor should be omitted.

The original control is stamped 920400-117.
The substitute control is stamped 97500-117.

8X541, 8X545, (RC 1065F)

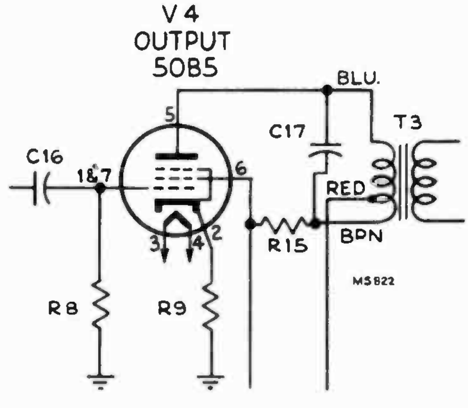
8X542, 8X546, 8X547 (RC 1065H)

Service Data:

These instruments differ from those described in 8X541, 8X542, 8X544, 8X545, 8X546, 8X547 Service Data in that an RCA 50B5 tube is used in the output stage. The tuning condenser and oscillator coil used are those described for the second production of the above models.

Addition to Parts List:

74822 Socket—Tube socket—miniature—for 50B5 tube



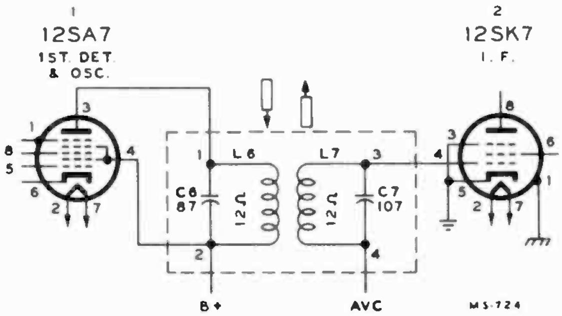
Output Tube Circuit
RC 1065F & RC 1065H

SUPPLEMENTARY INFORMATION

75X11, -12, -14, -15, -16 (RC-1050, -A, -B)

I.F. Transformer Substitution:

In some chassis a substitute 1st I.F. transformer has been used. An adapter plate is riveted to the chassis for mounting purposes. A mounting clip is used to secure the transformer to the mounting plate. The revised schematic diagram is shown below.



Substitute 1st I.F. Transformer—75X Series

Addition to Parts List:

CHASSIS ASSEMBLIES

Add:

73935 Clip—Spring clip for mounting I.F. transformers, type 970441

73036 Transformer—First I.F. transformer, stamped 970441-1 (C6, C7, L6, L7)

75X17, 75X18, 75X19 (RC-1050B)

Service Data:

The Service Data for 75X11, 75X12, 75X14, 75X15, 75X16, will apply to Models 75X17, 75X18 and 75X19 except for the cabinets.

Model 75X17 uses a black cabinet with decorated finish.
Model 75X18 uses a red cabinet with decorated finish.
Model 75X19 uses a white cabinet with decorated finish.

REPLACEMENT PARTS

CHASSIS ASSEMBLY

RC-1050B

Same as listed in 75X11, 75X12, 75X14
75X15, 75X16 Service Data

SPEAKER ASSEMBLY

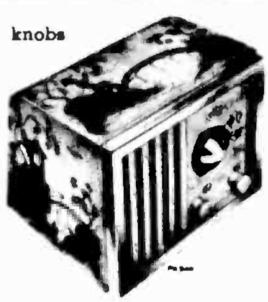
Same as listed in 75X11, 75X12, 75X14
75X15, 75X16 Service Data

MISCELLANEOUS

72884 Baffle—Speaker baffle board and grille cloth
72883 Bezel—Dial scale bezel only—less dial
Y2059 Cabinet—Plastic cabinet (black) for Model 75X17
Y2060 Cabinet—Plastic cabinet (red) for Model 75X18
Y2061 Cabinet—Plastic cabinet (white) for Model 75X19
72868 Dial—Dial scale complete with dial lamp shield
72885 Foot—Mounting foot (bakelite) (2 required)
72869 Indicator—Station selector indicator
74044 Knob—Control knob—black—for Model 75X17
74045 Knob—Control knob—red—for Model 75X18
72890 Knob—Control knob—ivory—for Model 75X19
31480 Lamp—Dial lamp—Mazda 47
73728 Screen—Ventilating screen—black—for back of cabinet for Models 75X17 and 75X18
73729 Screen—Ventilating screen—white—for back of cabinet for Model 75X19
14270 Spring—Retaining spring for knobs

Model 75X17 Black
Model 75X18 Red
Model 75X19 White

Decorations are similar but not necessarily identical on all cabinets.



75ZU (RC-1063A, RC-1063B)

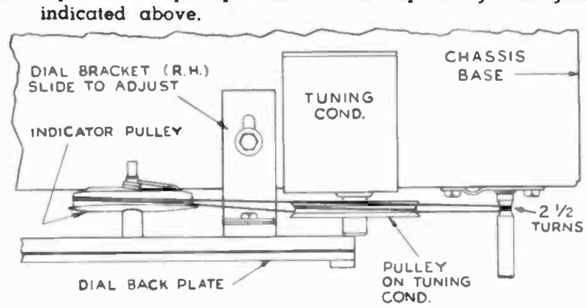
Dial Drive Cord:

A groove approximately 1/16" deep by 1/8" wide is now included on the outer rim of the bakelite station selector indicator pulley, Stock No. 73060. A portion of the first production has pulleys which do not incorporate this groove.

If trouble is encountered with the drive cord coming off this pulley, either of the following corrections may be applied:

(a) Position the pulley in relation to the gang drum by the adjustment provided on the long support bracket for the dial back plate assembly so that the drive cord occupies the position indicated in the illustration below.

(b) Replace the pulley with one incorporating the groove indicated above.



Dial Drive Cord—75ZU

Service Data—50 Cycle Version:

The Service Data for Radiola 75ZU will apply to this instrument except:

RP-178 record changer only is used.

A conversion spring (Stock No. 73158) is added to the motor spindle shaft for 50 cycle operation.

A decal ("RCA Victor" Stock No. 71984) is added to the front of the cabinet.

Blonde Cabinets:

Service Data previously issued for Radiola 75ZU applies instruments using blonde mahogany cabinets except for the parts listed below which are used with blonde mahogany cabinets.

MISCELLANEOUS

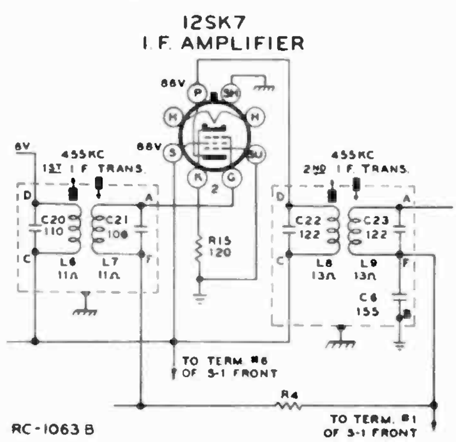
73722 Knob—Power—Phono—radio switch knob—for blonde instruments
73629 Knob—Tuning Knob—for blonde instruments
73630 Knob—Volume control knob—tan—for blonde instruments

Service Data—2nd. Production RC-1063 B

Service Data for Radiola 75ZU (RC-1063A) applies to this model except for the use of different IF transformers, the addition of R15 in the cathode circuit of 12SK7 IF amplifier and the omission of R14 in the diode circuit of 12SQ7 2nd det.

CHASSIS ASSEMBLIES RC-1063B

Same as listed for RC-1063A except:
Resistor—Fixed composition, 120 ohms, ±10% (R15)
70128 Transformer—First I.F. transformer stamped 922246-11 (L6, L7, C20, C21)
70129 Transformer—Second I.F. transformer stamped 922246-12 (L8, L9, C6, C22, C23)



77U (RC-1057A)

Additions to Parts List:

CHASSIS ASSEMBLIES

70383 Condenser—Variable tuning condenser (C3, C4, C6, C7)

MISCELLANEOUS

73631 Knob—Power, radio and phono switch knob—tan—for blonde instruments
73629 Knob—Tuning knob—tan—for blonde instruments
73630 Knob—Volume control knob—for blonde instruments
73109 Nut—Tee nut to mount record changer—3 required
73110 Screw—¼ - 20 x 1¾" fillister head machine screw to mount record changer

Capacitor Substitution:

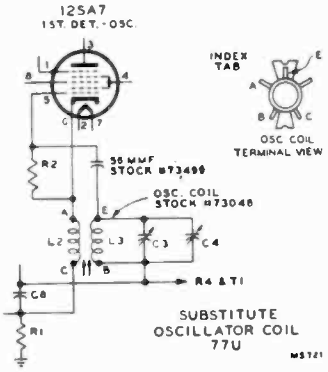
In some chassis C18 is .027 mfd. instead of .025 mfd. as specified in Service Data for Model 77U.

In some chassis two .0035 mf. capacitors are connected in parallel as a substitute for the .007 mf. capacitor C12.

Oscillator Coil Substitution:

In some instruments a substitute oscillator coil has been used. The original coil (Stock No. 70477) uses a capacitive winding (L4) for coupling the oscillator circuit to the oscillator grid (pin #5) of the 12SA7 tube. The substitute coil uses a 56 mmf. ceramic capacitor for the same purpose (L4 is not used).

Oscillator Circuit Model 77U



77V1

Change in Parts List:

MISCELLANEOUS

Add:
74186 Grille—Metal grille

711V1, 711V2, 711V3

Interference:

Certain remote localities have recently reported the presence of interference (generally after dark) at certain frequencies in the broadcast band. This interference, when present, appears in the background of certain stations or between stations, unless unusually severe; and it generally takes the form of code or amateur voice. Accompanying this interference is generally an abnormal quantity of "tweets" or whistles when tuning across the band. External antenna(s) make the condition worse.

To overcome this condition a production change has recently been made in the factory to remove a coil (L3) from the chassis and employ a different loop antenna. Instruments having the above changes incorporated may be identified by a letter "L" following the serial number on the radio chassis.

INSTRUCTIONS FOR CHANGING LOOP ANTENNA CIRCUIT IN MODEL 711V SERIES

(Leads not shown in illustration require no change).

1. Remove radio chassis.
2. Refer to illustration and remove red lead connecting from L3 to terminal 8 of S4.
3. Unsolder the blue lead from L3 and connect same end to terminal 8 on S4. L3 may remain in the chassis without leads connected to it.
4. Remove loop cable from loop and from terminal board on rear of cabinet.
5. Remove lug from end of yellow loop lead and solder this lead to terminal 5 on antenna terminal board on radio chassis.
6. Re-install radio chassis.
7. Clip off Pin 5 on chassis end of 5 conductor flexible antenna cable and file remainder of pin smooth with surface of plug.
8. Plug 5 conductor cable into antenna terminal board on chassis (see sketch). Note that with one pin removed the plug can be moved one pin to the right and plugged in, making incorrect contact.
9. Carefully pull the yellow lead downward along the 5 conductor cable far enough to permit taping it to the plug portion of this cable to prevent the yellow lead from breaking at the soldered joint at terminal 5 when flexed by opening of radio door. "Scotch" or other good tape is suitable.
10. Connect the red and black loop leads to the rear terminals 4 and 5 respectively from which they were originally removed. Close link from 4 to 5 if no outside antenna is used. If an outside antenna is used consult label on rear of cabinet, or instruction sheet or service data for correct connections.
11. Remove the screw from terminal 6 in the antenna board on rear of cabinet to avoid improper connection in the future.
12. Remove old loop and install new loop in its place.
13. Plug loop cable into new loop.
14. Peak the loop trimmer on a weak station around 1400 kc.
15. If a test oscillator is available, the low frequency oscillator core (L12) adjustment should be made while rocking the gang through 600 kc., to obtain maximum output. Repeat loop trimmer again at 1400 kc.
16. Grounding one of the FM antenna terminals (connect terminal 1 to 5) on the board on rear of cabinet may prove advantageous to reduce excess signals if an external FM antenna is used.

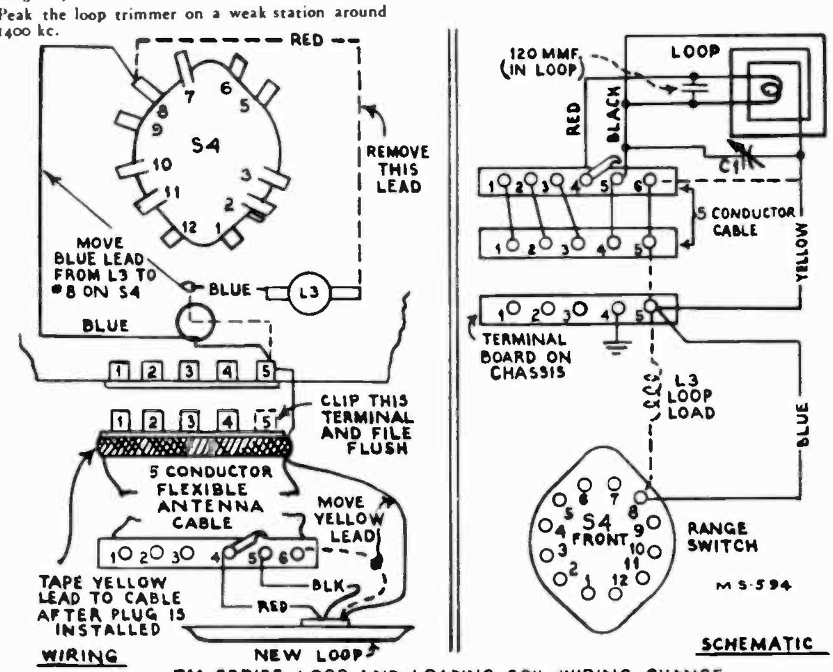
NOTE: The new loop referred to above, may be identified by a green paint dot on one metal mounting bracket. Also, the large coil has 20 turns of wire with only a few turns or no turns visible through the holes near the edge of the loop frame. The original loop contains 13 turns all of which are visible through the holes near the edge.

Change in Parts List:

MISCELLANEOUS

Delete:
71863 Cable . . .

Add:
73250 Cable—5 conductor molded antenna lead in cable.
71614 Capacitor—Ceramic, 120 mmf.—(In shunt with loop primary).
73480 Loop—Antenna loop complete. For instruments without loop loading coil.



711 SERIES LOOP AND LOADING COIL WIRING CHANGE
(BROKEN LINES INDICATE ORIGINAL WIRING REMOVED)

QU-62

Alternate Speakers:

In some instruments the speakers listed below have been used as alternates for the speakers listed in QU-62 Service Data.

SPEAKER ASSEMBLIES
92520-1K

70574 Cone—Cone and voice coil assembly
5118 Plug—3 prong male plug for speaker
70686 Speaker—12" PM speaker complete with cone and voice coil less plug
(Used as alternate for PM speaker stamped 92569-4W)

SPEAKER ASSEMBLIES
92516-2K

70574 Cone—Cone and voice coil assembly
5119 Plug—3 contact female plug for speaker
31539 Plug—5 prong male plug for speaker
70573 Speaker—12" E.M. speaker complete with cone and voice coil less output transformer and plugs
70688 Transformer—Output transformer (T4)
(Used as alternate for EM speaker stamped 92566-3W)

The alternate speakers will not fit on the mounting holts used with the original speakers. If it becomes necessary to use a replacement which differs from the original equipment speaker, it is suggested that the mounting bolts be cut off and the replacement speaker mounted using rubber grommets, spacers and wood screws.

SUPPLEMENTARY INFORMATION

54B1, -2, -3, -5, -6

Battery-Operated Personal Receivers:

When it is expected that a receiver of this type will not be used for a prolonged time—REMOVE THE "A" AND "B" BATTERIES.

Dry cell batteries deteriorate even though not in use. This deterioration will in time result in the chemicals of the battery seeping through the paper covering of the battery. These chemicals will corrode the metal parts of the receiver and may cause extensive damage.

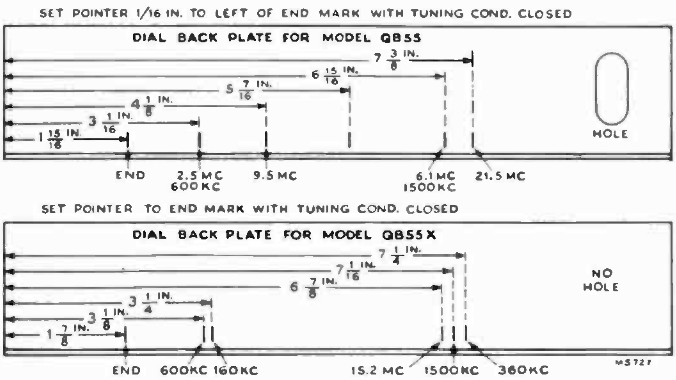
QB55 (RC-563A), QB55X (RC-563K)

Addition of Viscoloid Damper:

A viscoloid damper has been added to the stator plates of the oscillator section of the tuning condenser to reduce microphonics on short wave reception.

Dial Back Plate:

Some of these instruments have used dial back plates without the score marks which may be used as a reference during alignment. The glass dial scale may be removed from the cabinet and used as a reference during alignment or the check points indicated in the illustration (below) may be used.



Alignment Check Points—QB55, QB55X

65BR9 Portable Receiver

Battery Care:

The battery used in this receiver should be regarded as a PERISHABLE PRODUCT that will spoil if not given proper attention. Like all other lead storage batteries of this type, it must be given periodic attention if long life is to be expected. Observe the following:

(1) Maintain liquid level to line indicated on the battery case. Do this by adding distilled water as required.

(2) Do not allow to remain in a discharged condition more than a few days.

(3) Do not overcharge. The charge condition is indicated by two indicator balls—GREEN and RED—which float in the electrolyte.

Both balls up—90 to 100% charged.

GREEN ball down, RED ball up } 20 to 90% charged.

Both balls down—less than 20% charged.

(4) NEVER ADD ACID. Acid should never be added to a battery except to replace that which might be accidently lost by spilling or leakage. Do this only according to instructions.

CAUTION: The acid used in this battery is very destructive. It will corrode metal, destroy clothing and burn the skin.

Failure to observe the above precautions may result in permanent damage or total destruction to the battery.

68R1, -2, -3, -4 (RC-608)
610V1, 610V2 (RC-610, RC-610C)

10.7 mc. Interference on FM:

In locations where intermediate frequency interference (not tunable) is encountered on these receivers the following may eliminate the condition:

1. Check lead dress (and correct if necessary) to minimize antenna coupling into IF amplifier input. Resistor R1 (located on antenna terminal board) should be dressed on the side of the terminal board away from the 6BE6 1st det. socket V1.
2. Dress 6BE6 1st det. plate lead along shelf base and under C2 (330 mmf.) using C2 as a partial shield for this lead.
3. Ground one FM antenna terminal to chassis at terminal board (Dipole still connects normally). This is generally more effective than connecting a 10.7 MC. series tuned trap from FM antenna terminal to chassis.
4. Place a tube shield over the 6BE6 1st det. tube grounding the shield to chassis using as short a ground as possible. Correct for any detuning caused by this method.
5. Correct realignment of circuits is suggested to provide maximum sensitivity since step 3 may reduce sensitivity slightly.

67V1, 67AV1 610V1, 610V2

Alternate Speaker:

An alternate speaker (stamped 92569-1K) has been used as a substitute for the listed speaker (or speakers) in the above models.

Addition to Parts List:

Under "Speaker Assemblies" add the following:
92569-1K.
70574 Cone—Cone and voice coil assembly.
31539 Plug—5 prong male plug for speaker.
37899 Transformer—Output transformer.
Replace complete speaker with Stock No. 71961 (92569-1W).

610V1, 610V2 (RC-610C)

Change in Resistor:

The 68 ohm resistor located in the cathode circuit of the type 6AU6 FM driver stage has been changed in production from 68 ohms to 120 ohms. This change was made because certain 6AU6 tubes were found to draw grid current at the bias value produced by 68 ohms which resulted in a decrease in FM sensitivity.

This resistor is identified as:

R13 in Chassis No. RC-610C—Models 610V1 and 610V2.

The original production (chassis No. RC-610 in Model 610V2) uses a 120 ohm resistor in the above mentioned location and as such requires no change.

Incorrect Loop Antenna:

A small quantity of Model 610V series instruments were shipped through error with incorrect loop antennas.

The incorrect loops contain approximately 14 turns instead of 17 turns. This reduced inductance causes low sensitivity and poor selectivity particularly below 900kc.

Complaint cases of poor sensitivity, poor selectivity or interference in the form of local station(s) repeating at one or several places on "A" band (except response at the image frequency) should have the loop checked as one possible cause.

The incorrect loop may peak at the high end of "A" band but will not peak at lower frequencies. This may be checked by varying the oscillator coil inductance. The correct loop tracks normally across the band.

Correction to Parts List:

The Stock No. of the antenna terminal board is 72058. It was listed incorrectly in the Service Data as 70258.

60 TO 50 CYCLE CONVERSION FOR RIM-DRIVE PHONO MOTORS

50-Cycle Conversion Springs:

(These instructions supersede all past issues, covering the use of shrunk sleeves.)

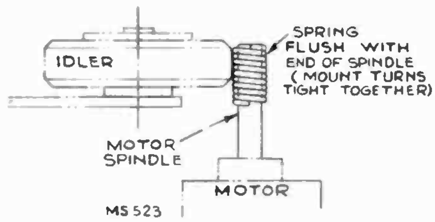
Certain record players and automatic record changers originally designed for operation on 60 cycle power supply can be converted to permit operation on 50 cycle power supply.

A spring sleeve is used to increase the diameter of the motor drive spindle, to oompensate for the slower speed of the motor when used on a 50 cycle supply.

A tabulation of models, motors and conversion springs is given below. Please note, motors other than those listed may not be suitable for operation on 50 cycle power supply.

To apply the spring-sleeve to the motor spindle, lock the rotor manually and press spring gently over end of spindle, twisting the free end of spring counter-clockwise (to unwind coil) until following end of spring is flush with end of spindle.

The ends of spring should not protrude, and all coils should be close together, allowing a flat even surface of the motor spindle to contact the rubber drive. These springs may be supplied with pigtails to aid in installation. After the spring has been placed on the shaft, clip the pigtails so they do not interfere with the drive wheel.



Spring sleeve installed on 60-cycle motor spindle for operation on 50-cycle supply.

MODEL NUMBER (Record changer in parenthesis)	MOTOR		CONVERSION SPRING
	Number on Motor	*Stock No.*	*Stock No.*
QU5 (RP-145E)	91655-6	36254†	39749
6J, 6JM	970470-1	72781	72689
QU51C (RP-145E)	91655-6	36254†	39749
QU51M (RP-152R)	91706-1*	38612	39748
QU52C (RP-152S)	91706-1*	38612	39748
QU52M, QU55 (RP-152R)	91706-1*	38612	39748
QU56C, QU56M	92127-1	——	39681
R56	91647-3	36404	39681
58V, 58AV, 59V1, 59AV1 QU61, QU62 (960001)	L230270	71960	72533
63E, 63EM	970470-1	72781	72689
66E, 66E1, 66ED	L230270	71960	72533
QU72, QU72A	970472-1	70121	72689
V-100, V-101, V-102, V-105	91647-3	36404	39681
V-135, V-140 (RP-162)	91647-5	39031	39750
V-175, V-209, V-210 (RP-158)	91706-1*	38612	39748
V-215 (RP-160) V-219 (RP-160A) V-221 (RP-160B)	91655-1 or 91655-6	36254†	39749
V-225 (RP-151)	91845-1	38557	39749
Radiola R-560P	91647-3	36404	39681
Radiola R-566P (RP-162)	91647-5	39031	39750
610V1, 610V2 (RP-177)	91706-1*	38612	39749
610V1, 610V2 (960001)	L230270	71960	72533
612V1 (RP-176A, RP-176B) 612V3 (RP-176, RP-176A) 612V4 (RP-176)	91706-1*	38612	39749
711V1, 711V2, 711V3 (960001)	L230270	71960	72533

† Stock No. 36254 discontinued. Use Stock No. 38612 for replacement.

* This motor has been manufactured with two different diameter motor spindle shafts. The listed spring is correct for the original equipment motor, but may not be correct for replacement motors.

Motor with spindle .136" dia. uses Stock No. 39748 spring.

Motor with spindle .132" dia. uses Stock No. 39749 spring.

50 Cycle Motors:

The models listed below can be converted to 50 cycle operation only by replacement of the complete motor.

MODEL NO.	RECORD CHANGER	MOTOR NO.	STOCK NO.
55U 55AU	960015	407B1, 407B2, 407B3, 407B9, 407B10	71183 (60 cycle)
Radiola 62-1	960260		
65U, 65AU, 65U-1	960260	407B6, 407B7	72729 (50 cycle)
67V1, 67AV1	960260		

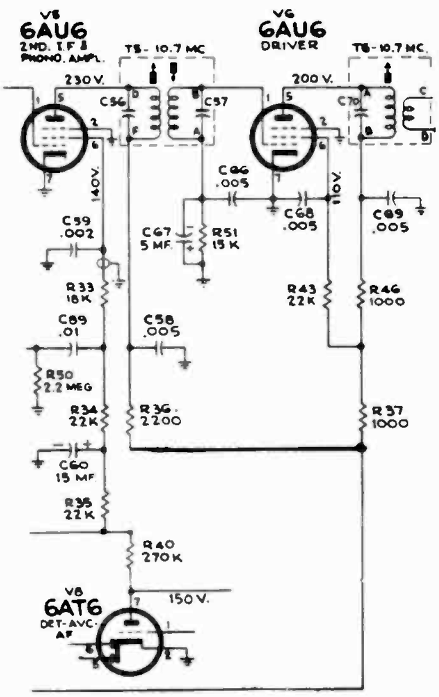
612V1, 612V3, 612V4 (RK-121)

Change in Schematic Diagram:

The schematic diagram of RK-121 chassis is changed as follows.

R36 is no longer connected to the junction of R35-R40-R22-R25. It is now connected to R37 and term. #11 of S5. This change removes the plate voltage from V5 6AU6 when the range switch is in "Phono" position.

The change is illustrated in the partial schematic below. The wiring diagram (Fig. 13) and simplified schematic Fig. 14 are also affected by this change.



Intermittent Noise:

If the shielded lead of the power cable should touch the speaker frame it will cause noise. The power cable should be clamped in such position to prevent contact with the speaker frame.

Change in Parts List:

MISCELLANEOUS

Change:

72590 Back—to read
72580 Back—Cabinet back for 612V3—for center

71868 Frame— . . . to read . . .
71868 Frame—Rollout carriage frame with brackets—less wheels

70167 Hinge— . . . to read
70167 Hinge—Speaker compartment door top hinge—L.H. for 612V4

70166 Hinge— . . . to read
70166 Hinge—Speaker compartment door top hinge—R.H. for 612V4

Add:

72119 Escutcheon — Escutcheon only — less screen, window and marker strips—for blonde instruments

73334 Hinge—Speaker compartment door bottom hinge (2 required) for 612V4

612V4 (Blonde)

Service Data:

Service Data previously published for 612V1, 612V3, 612V4 applies to Model 612V4 using blonde mahogany cabinet except for the following parts:

MISCELLANEOUS

73719 Back — Cabinet back — blonde — for sides—2 required
73720 Back — Cabinet back — blonde — for center
X1825 Cloth — Grille cloth — for 612V4 blonde
The RP-176A record changer is used.

SUPPLEMENTARY INFORMATION

54B5

Addition to Parts List:

70708 Lead—Battery lead assembly

65BR9, Radiola R65BR9

Additions to Parts List:

MISCELLANEOUS

70123 Case — Metal case only for battery and vibrator—less cover, inner vibrator case, etc.
70124 Case—Metal inner vibrator case
70125 Cover—Battery compartment cover

66X11, 66X12, 66X13

Oscillator Coil Substitution:

Some oscillator coils which were specified for the first production (RC-1046A, RC-1046, RC-1046B) of these models have been used on the second production. (RC-1046C, RC-1046D, RC-1046E).

Some oscillator coils and associated coupling capacitors (C19) which were specified for the second production have been used on the first production.

If replacement is necessary—use the specified parts—the range of inductance adjustment may be insufficient if used otherwise.

Defective 6F6G Tubes

Frying or Sizzling Noise:

It has been found that a frying or sizzling noise evident when the volume control is at minimum is often due to defective 6F6G tubes. Since such noise is often associated with defective output transformers, a hurried diagnosis may indicate that the output transformer is at fault when it is actually tube trouble.

RP-176, -A, -B

Change in Parts List:

Ref. #26

Stock No. 70867 Spindle—DISCONTINUED
Add:
Stock No. 72422 Spindle—Turntable spindle including disc, less rubber tire.

610V1

Change in Record Changer:

Some instruments use 960001-6 record changer (blonde) with walnut or mahogany cabinets. These instruments may use blonde carriage guides, bezel and cabinet backs which are listed in 610V1, 610V2 Service Data as applying to 610V2 blonde cabinets.

Change in Chassis:

Some instruments use RC-610 chassis which is described in 610V1, 610V2 Service Data as applying only to some 610V2.

Socket Wrench

Used When Replacing Sapphire Stylus of Crystal Pickups:

A convenient socket wrench to be used when replacing the sapphire stylus of crystal pickups can be easily made from a #10-32 Allen type set screw (preferably 1¼" long).

The set screw should be modified as follows:

1. Grind off the threads for a distance of ¼" to ⅜" from the hexagon socket end.
2. Grind off the hexagon socket end so that the hole is only about ⅛" deep—or partially fill hole so that the nut just goes in until its outer surface is flush with the end.

612V4

Correction to Parts List:

MISCELLANEOUS

72936 Stop—Stop for speaker compartment doors for 612V4 (was incorrectly listed as 72396).

I. F. TRANSFORMERS

Adjustable Cores:

Most I.F. transformers have adjustable cores to resonate the primary and secondary windings. These cores are adjustable from the top and bottom of the chassis. They may or may not have visible screw studs for adjustment. When screw studs are not used the cores have a molded-in slot for adjustment and may be reached through holes in the top and bottom of the transformer. A non-metallic screw driver should be used for adjusting the cores.

I. F. TRANSFORMERS—TYPE 970441

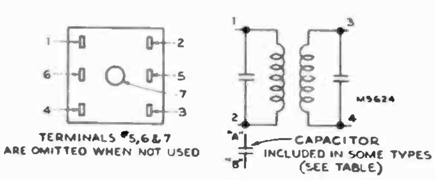
Terminal Identification:

The terminals of this series of I-F transformers have identifying numbers molded into the terminal base and correspond to the numbers indicated on the schematic diagrams of the receivers in which they are used.

These numbers are readily defaced during soldering. There is an additional identification consisting of a spot of paint on the base of No. 1 terminal.

The type number of the transformer is stamped on the side of the shield can.

The terminal view of the base is illustrated at the right.



Terminals

Trans. No.	Stock No.	Plate	B +	Grid or Diode	AVC or Diode load	"A"	"B"
970441-1	73036	1	2	3	4	—	—
1st I. F.	Used in 5Q21 (RC-1053), 77U (RC-1057A), 75ZU (RC-1063A) 65X1, 65X2, 8X53, Radiola 61-8, 61-9 (RC-1064)						
970441-2	73037	3	4	1	2	2	5 or 7
2nd I. F.	Used in 77U (RC-1057A) 75ZU (RC-1063A) 65X1, 65X2, 8X53, Radiola 61-8, 61-9 (RC-1064)						
970441-3	73129	3	4	1	2	—	—
1st I. F.	Used in 8BX5, 8BX54, 8BX55 (RC-1059)						
970441-4	73130	3	4	1	2	2	5
2nd I. F.	Used in 8BX5, 8BX54 8BX55 (RC-1059)						
970441-5		4	3	1	2	—	—
1st I. F.	Used in 65X1, 65X2, Radiola 61-8, 61-9 (RC-1064) (As substitute for 970441-1)						
970441-6	73254	3	4	1	2	2	6 or 7
2nd I. F.	Used in 5Q21 (RC-1053)						

CABINET TOUCHUP

The appearance of a radio or television cabinet is often the deciding factor between customer satisfaction or dissatisfaction. Since your business depends upon customer satisfaction you should always make certain to check appearance as well as performance before regarding a service job or installation as being complete.

A successful service man when questioned why he always polished even the dingiest looking cabinets; explained, "A well polished cabinet makes the radio sound better".

A cabinet that is clean, well-polished and free from scratches will give greater customer satisfaction and will bring good returns on the time and material used.

Every cabinet that is brought into a service shop should be thoroughly cleaned inside and out, all scratches repaired and then carefully polished. After delivery to the customer's home all finger-marks should be wiped off.

In the customer's home every cabinet should be at least wiped with a polishing cloth and scratches repaired or minimized.

Polishing:

A cream type of polish is recommended. Remove all control knobs and apply the polish according to directions on the bottle. Use a clean polishing cloth free from lint and polish with the grain of the wood. Wipe dry with a soft clean cloth.

Removing Scratches and Indentations:

Scratches and indentations cannot be removed by polishing or by the use of so-called "scratch removers." Polishing will merely cause them to be less noticeable "scratch removers" fill up the scratch with a wax which may come off with the next polishing. It is necessary to build up the surface with a durable material. To repair deep scratches the surface must first be cleaned and lightly sanded with No. 360 to No. 400 sandpaper to remove loose particles of finish remaining in the scratch. Stain the wood if necessary—use a stain which is lighter than the finished surface. The scratch is then filled with stick shellac applied with a hot burning-in knife. Stick shellac comes in many shades and one should be selected which is lighter than the surrounding finish, two shades may be blended on the burning-in knife.

The burning-in knife should be heated with an alcohol lamp and the heated knife to melt the stick shellac which is then applied to the scratch. The knife should be heated only enough to melt the shellac easily; rub the heated knife across a clean cloth or paper—if drawn across quickly it should not scorch. The hot knife will damage the surrounding surface if held in one place or if too hot. Avoid building up higher than the surrounding surface or excess rubbing will be required to finish it, the surrounding surface may also be worn thru from this excess rubbing.

After the scratch or indentation has been built up to the level of the surrounding surface it should be sanded down using a hard felt block and No. 360 to No. 400 sandpaper dipped in a light oil, it should be finished by rubbing with 4/0 steelwool. Wipe dry. If spot so repaired shows off-color use an artists brush and stain to blend it with the surrounding finish. The spot and surrounding area should then be finished with a padding lacquer such as "Qualasole."

Use of Padding Lacquer:

Padding lacquer such as "Qualasole" is used to build up the lacquer surface of cabinets where a spray gun is not available. To use:

(1) Clean the surface by wiping lightly with a cloth dampened with the denatured alcohol.
(2) Make a small pad of soft cloth (shaping it to reach corners if necessary) and saturate working area of the pad with a padding lacquer such as "Qualasole."
(3) Rub lightly with sweeping straight and circular motions raising the pad gradually at the end of each stroke. (This permits it to dry slightly between strokes) —(Do not work in one spot.)
(4) To remove rub marks—dampen pad with a few drops of denatured alcohol and rub very lightly as before (straight and circular).

Complete Re-finishing:

This work should be done by experienced cabinet finishers.

Caution

Most cabinets are lacquer finished. Do not use varnish on them as varnish and lacquer will not mix.

Some cabinet repair kits which are available contain a bottle of "french varnish" which is applied in the same manner as padding lacquer. DO NOT USE ON LACQUERED SURFACES.

CONSOLE LOOP ANTENNAS

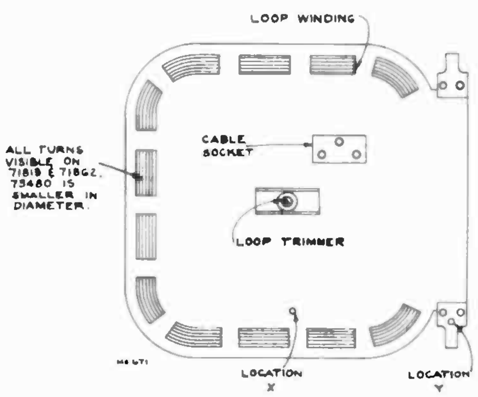
Identification:

The following data will assist in identifying hinge-type console loops on models listed. Color dots adjacent to each socket hole (except black) identify lead colors.

Model	Approx. No. Turns Secondary	Color Dot	Stock No.
58V	16 to 17	White at X	‡71813
59V1	" " "	" " "	"
77V2	" " "	" " "	"
67V1	16 to 17	White at X	‡71813
610V1	" " "	OR	"
610V2	" " "	Blue at Y	"
8V151	13 to 14	Yellow at X	71862
612V1	" " "	" " "	"
612V3	" " "	" " "	"
612V4	" " "	" " "	"
*711V1	13 to 14	Yellow at X	71862
*711V2	" " "	" " "	"
*711V3	" " "	" " "	"
†711V1	20 to 21	Yellow at X	73480
†711V2	" " "	AND	"
†711V3	" " "	Green at Y	"

*Early production instruments **using series** loop loading coil.
†Late production instruments **without loop loading** coil.
‡Stock No. 70544 (58V, 59V1, 610V1 and 610V2) is superceded by Stock No. 71813.

Failure to use the correct loop will result in poor "A" band performance due to improper antenna and oscillator circuit tracking and frequently will introduce added interference particularly when used near local stations. Image response is only slightly affected.



Hinge Type Console Loop Antennas

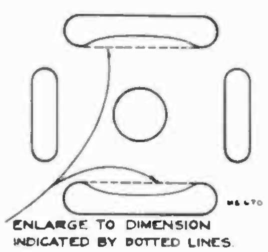
I. F. TRANSFORMERS—TYPE 970441

Change in Terminal Base:

Replacement transformers of this series may require enlargement of the terminal slots in the chassis base to prevent short circuits. The necessary change is illustrated below.

These transformers are Stock Nos. 73036 (970441-1), 73037 (970441-2), 73129 (970441-3), 73130 (970441-4), 73488 (970441-5) and 73254 (970441-6). They have been used in many table model receivers.

Revised Mounting— I.F. Trans. #970441



EXTERNAL ANTENNA CONNECTION

Connection to Receivers Having No Provision For Use of External Antenna on Broadcast Band:

The necessity for the use of an external antenna for the broadcast band is so infrequent that this provision is omitted on most radio receivers.

When an external antenna is required it may be coupled to the receiver using either of the two methods described below. The first is the simplest, while the second may prove best if local noise is present.

METHOD No. I.—Winding primary turns around present loop.

One or two turns of wire such as #18 insulated bell wire wound around the loop antenna along the outer surface, near the outside turn, will provide a suitable means for coupling from an outside antenna. One end of this two-turn loop antenna should be connected to the outside antenna while the opposite of starting end should be connected to the radio receiver chassis or ground. Additional turns will generally not show too much improvement over the use of two turns and in addition may require re-tuning the antenna circuit by adjustment of the trimmer capacitor. When using this method the loop antenna is still effective if the external antenna is disconnected, and when the external antenna is connected the loop still acts as a means for picking up a certain amount of signal and, of course, noise if noise is present in the immediate vicinity.

METHOD No. II.—Using a separate antenna transformer in place of the loop antenna.

The most suitable arrangement when using an external antenna is believed to be a method whereby the loop antenna is removed entirely from the circuit and in its place a conventional antenna transformer, consisting of a primary and secondary is used. The secondary winding should have the proper inductance to track with the gang condenser across the band. A transformer having a variable inductance such as those employing a magnetite core is advantageous to provide proper tracking. When using a separate antenna coil instead of a loop the connecting leads for the circuit should be kept short to avoid pick up on these leads. This method is very advantageous when local noise in the vicinity of the receiver is present which would be picked up on a loop antenna but which would not be picked up near as much on the antenna coil. When such conditions are present the use of a noise reducing antenna is advantageous.

VIBRATOR POWERED RECEIVERS

Vibrator Fails to Start:

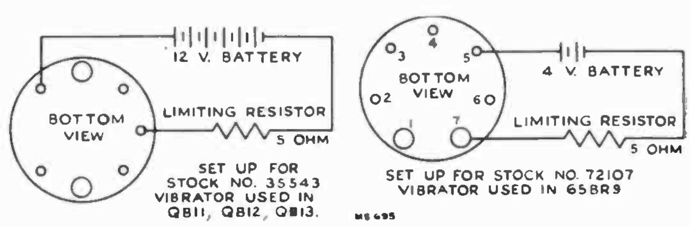
When a vibrator has not been used for several months, it may fail to start when placed in service. This may be due to an insulating film which has formed on the contacts. This film may be broken down and the vibrator restored to operating condition by using the following procedure:

(1) **Remove the vibrator from the receiver.**

(2) **Apply twice normal operating voltage momentarily to the magnet coil of the vibrator through a 5 ohm current limiting resistor. The vibrator should immediately start to operate, this will be noticed as an audible vibration.**

CAUTION: Do not apply excess voltage to the receiver.

(3) **Re-install the vibrator in the receiver, it should then operate with normal voltage.**
NOTE: Be certain that battery is fully charged and that terminals are clean and tight.



Vibrator Connections

RCA Radio Batteries

RADIO-ENGINEERED FOR EXTRA LISTENING HOURS

PORTABLE "AB" BATTERY PACKS

RCA Type	Voltage	Interchangeable With: Eveready	Interchangeable With: Burgess	Std. Pkg. Qty.	Dimensions: L.	Dimensions: W. or Dia.	Dimensions: Hgt.	List Price	Net Price
VS018	7½-9-90	754	G6M60	6	10 5/8	3 7/16	4 1/8	$5.50	**$3.85**
VS019	7½-9-90	753	F6A60	6	9½	2 23/32	4 3/8	5.50	**3.85**
VS038	7½-63	....	G5A42	5	8 5/8	2 3/4	4 1/16	4.20	**2.95**
VS043	1½-90	....	5DA60	5	5½	2 11/16	7 1/8	4.95	**3.45**
VS046	6-75	Zenith Z675	G4B50	6	12 5/8	2 3/4	4 1/8	4.95	**3.45**
VS047	9-90	Zenith Z985	G6B60	6	13 5/8	2 3/4	4 9/16	5.50	**3.85**
VS050	6-7½-75	....	T5Z50	6	8 9/16	2 7/16	3 11/16	4.50	**3.15**
VS052	1½-61½	Phil. 41A4G	4GA41	10	9 3/8	2 11/16	3 7/16	3.95	**2.95**
VS053	1½-63	Phi. 41A4FL	4GA42	5	9 1/8	2	4 3/4	3.95	**2.95**
VS054	1½-90	....	6TA60	5	10	2 3/16	4 7/8	5.50	**3.85**
VS057	7½-9-90	Philco P361	T5Z60	6	9 3/8	2 3/16	3 3/4	5.50	**3.85**
VS058	9-90	Zenith Z909	F6A60P	6	9½	2 23/32	4 3/8	5.50	**3.85**
Kit No. 1	Includes	6-VS036, 1-VS016		12	.....	.....	.....	2.98	**2.06**

PORTABLE "A" BATTERIES

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
VS002	4½	746	G3	6	4	1 3/8	4 11/16	.75	**.53**
VS003	7½	687	G5	5	3 7/8	2 5/8	4 9/16	1.10	**.77**
VS004	1½	742	4F	6	2 5/8	2 5/8	4 1/16	.95	**.68**
VS005	1½	....	4FL	5	3 13/16	1 3/8	5 5/8	.90	**.63**
VS007	1½	743	6F	4	3 15/16	2 5/8	4 1/16	1.25	**.88**
VS008	1½	745	8FL	6	3 7/8	1 7/16	10 3/4	1.75	**1.23**
VS009	6	744	F4PI	6	2 5/8	2 5/8	4 1/8	.95	**.67**
VS010	6	718	2F4	10	3 7/8	2 13/16	5½	1.75	**1.23**
VS011	6	747	2F4L	6	3 7/8	1 7/16	10 3/4	1.75	**1.23**
VS036DP	1½	Sealed-in-Steel Display-Pac		480	....	1 5/16	2 3/8	.10	**.065**
VS036CP	1½	Sealed-in-Steel Carry-Pac		480	....	1 5/16	2 3/8	.10	**.065**
VS065	7½	717	C5	12	2 5/16	2	3 1/16	.95	**.68**
VS067	4½	736	F3	6	4	1 3/8	4 1/8	.75	**.53**
VS129	7½	....	B5	12	4 1/16	15/16	3	.95	**.67**

PORTABLE "B" BATTERIES

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
VS012	45	762	B30	6	4 1/8	2 5/8	5 5/16	2.35	**1.65**
VS013	45	482	M30	12	3 9/16	1 13/16	5½	2.00	**1.40**
VS014	45	....	A30	6	3 7/16	2 1/4	4 9/16	2.15	**1.50**
VS015	45	738	Z30	10	3	2 1/4	4	2.50	**1.75**
VS016	67½	467	XX45	12	2 5/8	1 5/16	‡3 3/4	2.25	**1.58**
VS055	45	456	XX30	12	2 21/32	31/32	‡3 11/16	1.65	**1.16**
VS090	90	490	N60	12	3 11/16	1 3/8	‡3 3/4	2.95	**2.07**

FARM "AB" BATTERY PACKS

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
VS021	1½-90	758	....	6	10 13/16	2 3/4	6 3/8	5.95	**4.46**
VS022	1½-90	759	17GD60	1	15 3/4	4 1/4	6 13/16	5.95	**4.46**
VS045	1½-90	Zenith Z28	18GD60	1	12 9/16	5 3/8	6 11/16	5.95	**4.46**

FARM "A" BATTERIES

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
VS024	1½	740	20F	6	7 11/16	2 13/16	7	3.30	**2.31**
VS025	3	X125	20F2	1	11 11/16	4	6	5.50 5.75*	**3.85** **4.03***

FARM "B" BATTERIES

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
VS026	22½-45	485	2308PI	6	8 1/16	3 3/16	7 3/16	2.88	**2.16**
VS027	22½-45	386	10308PI	4	8 1/16	4 5/16	7 3/16	3.95 4.19*	**2.95** **3.09***

RADIO-HEARING AID "A" BATTERIES

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
**VS070	1½	Zenith Z1-S	TE	20	....	1 5/16	4 1/16	.30	**.19**

FLASHLIGHT BATTERIES

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
VS001	1½	950	2	480	....	1 11/32	2 13/32	.10	**.065**
VS033	1½ (Baby)	935	1	100	....	1 1/32	1 15/16	.10	**.065**
VS034	1½ (Pen.)	915	Z	120	....	37/64	2	.075	**.05**

BATTERIES FOR INDUSTRIAL AND ELECTRONIC APPLICATIONS

RCA Type	Voltage	Eveready	Burgess	Std. Pkg. Qty.	L.	W. or Dia.	Hgt.	List Price	Net Price
VS006S	1½ (Ign.)	6	....	12	....	2 5/8	‡6 9/16	.70 .75*	**.465** **.50***
VS028	4½	781	5360	10	2 3/8	13/16	‡2 7/8	.50	**.35**
VS029	1½-3-4½-6-7½	773	5540	10	3 15/16	7/8	‡3 1/8	.95	**.67**
VS030	3-4½	771	2370PI	15	4 1/16	1 7/16	3 1/16	.81	**.56**
VS031	3-4½-16½-22½	768	5156PI	5	4	2½	3	1.80	**1.26**
VS039	6 (Hot-shot)	1461-2	4F4H	4	10 3/8	2 7/8	‡7 3/8	3.35 3.65*	**2.27** **2.48**
VS040 Spring	6 (Lantern)	409	F4H	25	2 11/16	2 11/16	‡4 5/16	.80	**.525**
VS100	3	....	F2BP	10	2 5/8	1 3/8	‡4 9/16	.71	**.48**
VS102	22½	763	4156	10	3 3/8	2 1/8	‡2 3/4	1.80	**1.26**
VS106	1½	....	4FH	10	2 11/16	2 11/16	‡4 3/16	.70 .75*	**.465** **.50***
VS112	22½-45	762S	5308	5	4 1/8	2 5/8	‡5 5/16	2.15	**1.50**
VS114	22½-45	....	Z30NX	10	2 21/32	1 27/32	‡4 13/16	2.58	**1.80**
•VS127W	22½-45	....	10308SC	5	8	4	‡7 3/8	3.95 4.17*	**2.95** **3.04***
VS130	1½-3-4½	761T	2370BP	10	4	1 7/16	‡3 7/16	.81	**.56**
VS131	3-4½-6-9-10½-16½-22½	778	5156SC	5	4 1/8	2½	‡3 5/16	1.80	**1.26**
VS133	4½	703	532	10	2 3/8	13/16	‡3 1/16	.45	**.31**
VS157	22½-45	794	21308SC	5	8 1/8	4 5/8	‡7 11/16	4.15 4.40*	**3.10** **3.22***

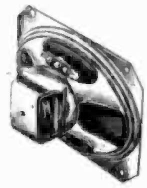
**Exact equivalent of Zenith Z1-S and Ray-O-Vac PFI; slightly larger than Burgess TE and Eveready 1052P. *Pacific Coast price. •Wax dipped. ‡Includes term. height which aver. 3/8".

3F333

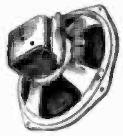
56-49A

RCA SPEAKERS

Quality-Engineered For Dependable Performance — Priced For Replacement Needs

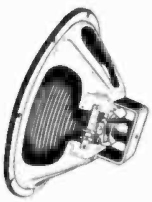


RCA 4"X6" PM SPEAKER



RCA 5" PM SPEAKER

RCA 8" PM SPEAKER



RCA 12" PM SPEAKER

Check these important features

- MOUNTING DESIGNED TO RMA STANDARDS
- DUSTPROOF, RUST-RESISTANT
- UNIVERSAL TRANSFORMER MOUNTING BRACKET ON ALL 4", 4" x 6" and 5" PM's except Type 305S1
- RUGGED MECHANICAL CONSTRUCTION WITH WELDED HOUSING ASSEMBLY
- EXCLUSIVE RCA MAGNET CLAMPING SPRING SECURELY LOCKS MAGNET IN POSITION, except Types 423S1 and 304S2
- FELTED CONE GIVES UNIFORM STRENGTH, DEPENDABILITY AND SMOOTH "FLUTTER-FREE" RESPONSE
- MOISTURE-RESISTANT VOICE-COIL SUSPENSION ASSURES HIGH EFFICIENCY AND DEPENDABILITY

RCA DUO-CONE 15" SPEAKER

SPECIFICATIONS

PERMANENT MAGNET TYPES

SIZE	TYPE NO.	RESONANT FREQUENCY	MAGNET WEIGHT	VOICE COIL IMPEDANCE	MAXIMUM POWER HANDLING CAPABILITY (WATTS)	MOUNTING
2" x 3"	423S1	250—365	1.5	11.8 ohms at 1000 cycles	0.125	RIM
4" (shallow pot type)	304S2	175—225	1.0	3.2 ohms at 400 cycles	3	RIM or POT
4"	404S2	170—225	1.47	3.2 ohms at 400 cycles	3	RIM or POT
4" x 6"	246S2	150—200	0.68	3.2 ohms at 400 cycles	3	RIM or POT
4" x 6"	446S2	150—200	1.47	3.2 ohms at 400 cycles	3	RIM or POT
5"	205S2	150—200	0.68	3.2 ohms at 400 cycles	3	RIM or POT
5"	405S2	150—200	1.47	3.2 ohms at 400 cycles	3	RIM or POT
5"	305S1	150—200	1.0	3.2 ohms at 400 cycles	3	RIM or POT
5" x 7"	257S1	120—140	1.47	3.2 ohms at 400 cycles	6	RIM or POT
8"	208S2	75—95	2.15	3.2 ohms at 400 cycles	8	RIM
8"	208S4	75—95	2.15	6-8 ohms at 400 cycles	8	RIM
12"	312S1	70—85	2.15	3.2 ohms at 400 cycles	12	RIM
12"	412S1	70—85	6.8	3.2 ohms at 400 cycles	12	RIM
12"	412S4	70—85	6.8	6-8 ohms at 400 cycles	12	RIM
15"	515S1	40—55	2 lb.	16 ohms at 400 cycles	25	RIM or FLANGE

FIELD COIL TYPES

SIZE	TYPE NO.	RESONANT FREQUENCY	FIELD	VOICE COIL IMPEDANCE	MAXIMUM POWER HANDLING CAPABILITY (WATTS)	MOUNTING
4" x 6"	746S1	150—200	450 ohms at 65 ma.	3.2 ohms at 400 cycles	3	RIM or POT
5"	705S1	150—200	450 ohms at 65 ma.	3.2 ohms at 400 cycles	3	RIM or POT
12"	712S1	70—85	1000 ohms at 70 ma.	3.2 ohms at 400 cycles	12	RIM

ELECTRONIC COMPONENTS, RADIO CORPORATION OF AMERICA, HARRISON, N. J.

RCA

● SCIENTIFICALLY DESIGNED
● RUGGEDLY CONSTRUCTED

TELEVISION COMPONENTS

TO MEET YOUR REPLACEMENT NEEDS

Each component is the result of RCA's pioneering work in the field of all-electronic television. Each component built to actual set-tested designs. Engineered by America's leading manufacturer of television components—RCA.

TELEVISION COMPONENTS ON THIS PAGE ARE USED IN

BOTH DIRECTLY VIEWED AND PROJECTION RECEIVERS

TELEVISION IF AND VIDEO COIL KIT—TYPE 204X1

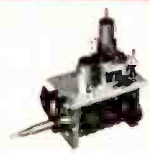
A kit of all the coils used in the picture if (frequency 25.75 Mc), sound if (frequency 21.25 Mc) and video circuits of a high-quality television receiver. The RCA 204X1 kit comprises:

1—Video Series-Peaking Coil type 203L1
1—Video Shunt-Peaking Coil type 203L2
2—Video Series-Peaking Coils type 203L3
2—Video Shunt-Peaking Coils type 203L4
2—1st and 2nd Sound IF Transformers type 201K1
1—Converter Transformer type 202K1
1—1st Picture IF Transformer type 202K2
1—2nd Picture IF Transformer type 202K3
1—Cathode Circuit Trap type 202K4
1—Sound Discriminator type 203K1
2—3rd and 4th Picture IF Transformers type 202L1

PICTURE IF TRANSFORMERS

For staggered-tuned systems operating on a 25.75 Mc picture if and a 21.25 Mc sound if and where the first tuned circuit is broadly tuned and link-coupled to the converter transformer. Such systems are used in RCA Television Receiver Models 8T241, 8T243, 8T244.

202K5	Converter Transformer—Designed to operate in the plate circuit of a 6AG5 mixer in conjunction with 202K6.
202K6	1st Picture IF Transformer—Designed to operate in the grid circuit of a 6AG5 tube in conjunction with 202K5 converter transformer.
202K7	2nd Picture IF Transformer—Designed to operate between two 6AG5 tubes.
202K8	3rd Picture IF Transformer—Designed to operate between two 6AG5 tubes.
202K9	4th Picture IF Transformer—Designed to operate between two 6AG5 tubes.
202K11	Cathode Trap—Designed to operate in the cathode circuit of 4th Picture IF tube.
202K10	5th Picture IF Transformer—Designed to operate between a 6AG5 tube and a 6AL5 tube functioning as the detector.



TELEVISION TUNER TYPE 201E1

This unit is designed especially for use with stagger-tuned if systems. Handling all 12 television channels, it selects the desired picture and sound carriers, amplifies and converts them to provide a picture if carrier frequency of 25.75 Mc, and a sound if carrier of 21.25 Mc. The tuner includes the rf amplifier stage, converter stage, oscillator stage, fine tuning control, channel switch, converter transformer, and all of their aligning adjustments.

HORIZONTAL BLOCKING-OSCILLATOR TRANSFORMER TYPES 208T1-208T3

This transformer is designed for use in horizontal blocking-oscillator circuits for above-chassis mounting. In such circuits it generates the 15750-cps pulses required to drive the grids of the horizontal-discharge tubes. Type 208T3 is similar to the RCA type 208T1 except for differences in mechanical design.

HORIZONTAL SYNC-DISCRIMINATOR TRANSFORMER TYPE 208T8

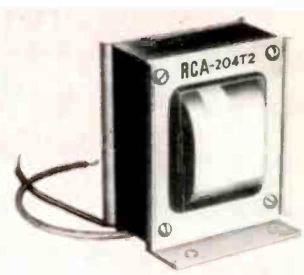
This transformer is designed to couple the 6AL5 horizontal oscillator to the 6AC7 horizontal sync-discriminator for horizontal-frequency control. Both the primary and the secondary have adjustable powdered-iron cores.

VERTICAL BLOCKING-OSCILLATOR TRANSFORMER TYPES 208T2-208T9

Designed for use in vertical blocking-oscillator circuits which generate the 60-cps pulses required to drive the grids of vertical-discharge tubes. These transformers are electrically similar, but differ in mechanical design.

FILAMENT CHOKE TYPE 204L1

The RCA 204L1 with an inductance of 0.8 micro-henries is designed to eliminate undesirable rf currents in the heater circuits of the picture if amplifier tubes. The entire unit is coated with a baked-on varnish to insure long life



VERTICAL DEFLECTION OUTPUT TRANSFORMER TYPES 204T2-204T9

These transformers are designed for use in vertical-deflection circuits using RCA-201D1, 201D3, or 201D12 Deflecting Yoke with directly viewed or projection kinescopes requiring 50° magnetic deflection such as RCA-10BP4, 5TP4 and 16AP4. Operating with either the 6SN7-GT or 6K6-GT, the 204T2-204T9 Vertical Output Transformer couples the vertical output tube to the Deflecting Yoke. Although different in mechanical design, the 204T2 and the 204T9 are electrically similar.

Cont. Page 4

RCA TELEVISION COMPONENTS

FOR DIRECTLY VIEWED TELEVISION RECEIVERS

DEFLECTING YOKE TYPES 201D1-201D3

Designed for use with magnetic-deflection directly viewed kinescopes having deflection angles up to 50°. For circuits employing pulse-operated high-voltage power supplies, may be used with Horizontal Deflection Output and High-Voltage Transformer 211T1 or 211T3 and Vertical Output Transformer 204T2 or 204T9. The 201D3 is the same as the 201D1 but has a built-in 560-ohm damping resistor connected across each vertical coil and a 56-$\mu\mu$f capacitor across terminals 1 and 2 of the horizontal coil, and flexible leads.

DEFLECTING YOKE TYPE 201D12

Designed for use with kinescopes having neck diameters of 1-7/16 inches and deflection angles up to 53 degrees. It has good deflection sensitivity and is especially designed for use with RCA kinescopes 10BP4, 12LP4 and 16AP4.

WIDTH CONTROL TYPE 201R1

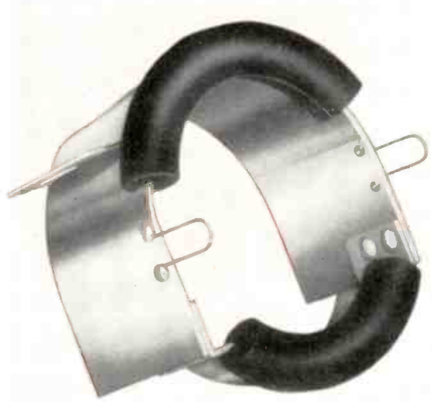
A variable inductor with powdered-iron core, for adjusting the picture width. It is designed for use with either RCA 211T1 or RCA 211T3 Horizontal-Deflection-Output-Transformer in circuits where the kinescope anode potential does not exceed 9 kv.

HORIZONTAL LINEARITY CONTROL—TYPE 201R3

This inductor is designed for use as a Horizontal-Linearity Control in deflection circuits utilizing either RCA 211T1 or 211T3 Horizontal Deflection Output and High-Voltage Transformer.

WIDTH CONTROL TYPE 201R4

A variable inductor constructed with a powdered-iron core and used to adjust the width of the picture on the RCA-16AP4 kinescope. The 201R4 is especially designed to be operated with the RCA-211T5 Horizontal-Deflection-Output and High-Voltage Transformer.



YOKE MOUNTING HOOD TYPE 201X1

This hood holds Deflecting Yoke type 201D1, 201D3, or 201D12 which, in turn, supports such kinescopes as RCA-7DP4 or 10BP4. Provisions are made for both radial and axial adjustment of the yoke, so that the picture can be properly oriented. An improved rubber bumper provides safe support for the kinescope. Spring contacts provide a ground for the conductive coating on the outside of the kinescope.

HORIZONTAL LINEARITY CONTROL TYPE 201R5

This inductor is for use in deflection circuits using an RCA-211T5 Horizontal-Deflection-Output and High-Voltage Transformer.

FOCUSING COIL TYPE 202D1

The RCA 202D1 is designed for magnetically focused kinescopes, such as the RCA-10BP4 operating at anode potentials up to 10 kilovolts. The 202D1 features the use of oversize wire for rugged and corrosion-free operation. The center hole of the focusing coil is enlarged, providing ample clearance between core and kinescope neck to permit skewing the focusing coil.

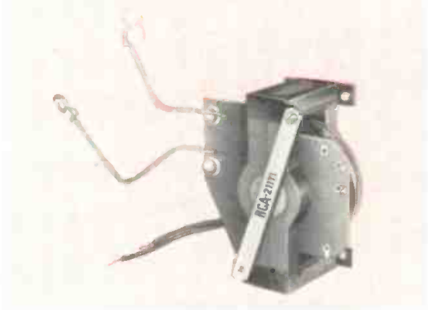
HORIZONTAL-DEFLECTION OUTPUT AND HIGH-VOLTAGE TRANSFORMER TYPE 211T2

Designed for pulse-operated high-voltage power supplies with 201D2 Deflecting Yoke, it is used in circuits employing projection kinescope RCA-5TP4 for anode voltages up to 27 kilovolts. Two 6BG6-G's as driver tubes are used to provide 50° magnetic deflection.

RCA

GENUINE RCA TELEVISION COMPONENTS... FOR YOUR REPLACEMENT NEEDS...

RCA TELEVISION COMPONENTS FOR DIRECTLY VIEWED TELEVISION RECEIVERS



HORIZONTAL DEFLECTION OUTPUT AND HIGH-VOLTAGE TRANSFORMER—TYPE 211T1

Designed for pulse-operated high-voltage power supplies, this transformer is used with Deflecting Yoke type 201D1, 201D3 or 201D12, and with directly viewed kinescopes, such as types 7DP4 and 10BP4 requiring anode voltages up to 10 kilovolts and having 50° magnetic deflection.

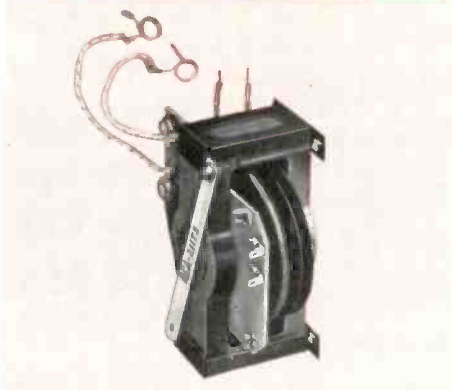
Auto-transformer primary provides voltage for pulse-rectifier tube to supply kinescope anode potential. Filament winding for rectifier tube 1B3-GT is included. Secondary is tapped for connecting Width Control type 201R1. Powdered-iron core insures quiet operation.

ION-TRAP MAGNET TYPE 203D3

A permanent-magnet design for use with kinescopes which utilize ion-trap guns and operate with anode potentials of 7 to 14 kilovolts. It is intended for use with the RCA-10BP4 or 16AP4. The 203D3 will replace the 203D1 provided a 36-ohm resistor is substituted in the circuit in place of the 203D1.

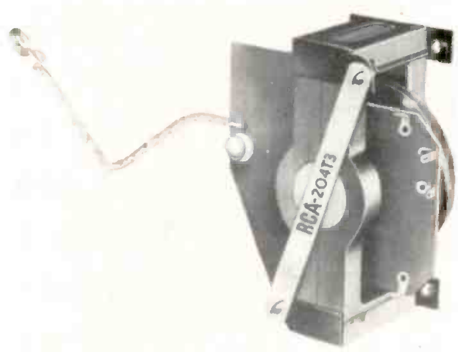
ION-TRAP MAGNET TYPE 203D1

A field-coil design for use with kinescopes which utilize ion-trap guns, have a neck diameter of 1⅜" to 1½" and operate with anode voltages up to 10 kilovolts.



HORIZONTAL DEFLECTION OUTPUT AND HIGH-VOLTAGE TRANSFORMER—TYPE 211T3

This is a new Horizontal-Deflection Output and High-Voltage Transformer to be used in pulse-operated power supplies for television receivers requiring kinescope anode voltages up to 9 kilovolts. Designed for use with RCA Deflecting Yoke 201D1, 201D3 or 201D12, the 211T3 is intended for new television receiver designs employing the 10BP4.

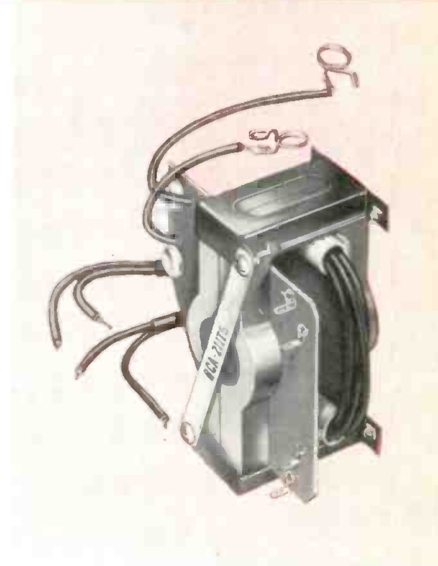


HORIZONTAL DEFLECTION OUTPUT TRANSFORMER TYPE 204T3

Designed for use in television receivers employing separate rf-operated high-voltage power supplies. Is used with Deflecting Yoke RCA-201D1, 201D3 or 201D12, and kinescopes requiring anode voltages up to 10 kilovolts and having 50° magnetic deflection. It is used in combination with a single 6BG6-G tube type as the horizontal-deflection output tube.

POWER TRANSFORMER TYPE 201T10

A high-quality power transformer for use in television receivers employing approximately 27 tubes. It has a 6.3-volt filament winding for a 6W4-GT damper diode, and is especially useful in receivers having a 16AP4 kinescope.



HORIZONTAL-DEFLECTION-OUTPUT AND HIGH-VOLTAGE TRANSFORMER TYPE 211T5

Designed for use in pulse-operated power supplies of television receivers having kinescope potentials up to 13.5 kilovolts at no load. In a typical deflection current, it provides ample deflection with a single driver tube for a 16AP4 kinescope.

POWER TRANSFORMERS TYPES 201T6, 201T7, and 201T8

High-quality power transformers for use in television receivers. They feature a low external magnetic field obtained by the use of a copper shorting-band to provide minimum hum-modulation of the kinescope. Their designs also provide for low operating temperature rise permitting their use in receivers having minimum ventilation. The 201T6 is intended for use with 30-tube receivers; the 201T7, with 24-tube receivers; and the 201T8, with 21-tube receivers.

POWER TRANSFORMER TYPE 201T9

A high-quality power transformer for use in television receivers employing approximately 27 tubes. The 201T9 has a 5.0-volt filament winding for a 5V4-G damper diode, and is especially useful in receivers having a 16AP4 kinescope.

GENUINE RCA TELEVISION COMPONENTS... FOR YOUR REPLACEMENT NEEDS...

RCA TELEVISION COMPONENTS FOR BOTH DIRECTLY VIEWED AND PROJECTION RECEIVERS

Continued from Page 1

HORIZONTAL OSCILLATOR AND SYNCHRONIZING CONTROL COIL—TYPE 203R1

RCA 203R1 is a permeability tuned center-tapped oscillator coil for use in television receivers employing a 6SN7-GT as a combination horizontal blocking oscillator and synchronizing control tube.

HORIZONTAL-BLOCKING-OSCILLATOR COIL AND FREQUENCY-STABILIZING COIL—TYPE 203R2

Consists of a horizontal-blocking-oscillator coil and a shock-excited frequency-stabilizing coil for use in television receivers employing a 6SN7-GT as a combination horizontal-blocking oscillator and synchronizing-control tube.

The 203R2 is similar to the RCA-203R1 except for the addition of a synchronizing stabilizing coil.

VIDEO-CIRCUIT TRAP TYPE 203L5

A 4.5-megacycle video-circuit trap designed to operate in the plate-circuit of the first video amplifier of television receivers. Its function is to attenuate the 4.5-Mc beat frequency which exists in if stages handling both picture and sound if carriers. Permitting beat frequency to pass through video amplifier may result in a beat pattern on the kinescope.

FOR PROJECTION TELEVISION

WIDTH CONTROL TYPE 201R2

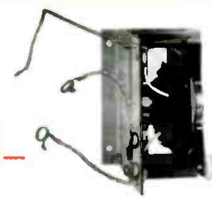
This control is a screwdriver-adjusted variable inductor, specially designed to provide a convenient and simple control of the picture width for projection-type receivers employing the 5TP4. The inductance is varied by means of a powdered-iron core. It is designed for use with either the RCA 211T2 or 204T1 Horizontal Deflection Output and High-Voltage Transformers in circuits requiring a kinescope anode potential up to 27 kilovolts.

OPTICS ALIGNER—TYPE 202B1

A high-quality Optics Aligner which can be substituted for the 5TP4 kinescope in adjusting a television projection system. With this Aligner, accurate adjustment and alignment of the reflective optical system can be made conveniently and safely, without the presence of high voltage.

DEFLECTING YOKE TYPE 201D2

Designed for use with projection kinescopes having 50° magnetic deflection and operating at anode voltages up to 27 kilovolts, such as RCA-5TP4. Provides required retrace time when used in deflection circuits having RCA Horizontal Output and High-Voltage Transformer 211T2 (pulse-operated) or Horizontal Output Transformer 204T1 (rf operated) and Vertical Output Transformer 204T2. Equipped with clamp for gripping kinescope neck.



HORIZONTAL-DEFLECTION-OUTPUT AND HIGH-VOLTAGE TRANSFORMER—TYPE 211T2

Designed for pulse-operated high-voltage power supplies with 201D2 Deflecting Yoke, it is used in circuits employing projection kinescope RCA-5TP4 for anode voltages up to 27 kilovolts. Two 6BG6-G's as driver tubes are used to provide 50° magnetic deflection.

Auto-transformer primary provides pulse voltage for a tripler rectifier. Three filament windings for the pulse rectifier tubes (1B3-GT) are included.

FOR TV TRANSMITTING STATIONS

HORIZONTAL OUTPUT TRANSFORMER—TYPE 204T1

A Horizontal Output Transformer designed for deflection circuits employing rf-operated high-voltage supplies. Intended for 50° magnetic-deflection kinescopes, it is used with such tubes as the RCA Image Orthicons 2P23, 5655, 5769, 5820, Flying Spot CR Tube 5WP15, and Transcriber Kinescope 5WP11. Used with RCA Deflecting Yokes 201D1, 201D2, 201D3 or 201D12.

201D75—Deflecting-Yoke Assembly (includes keyed Jumbo Annular 7-Pin Socket). For use with Image Orthicons, types 2P23, 5655, 5769, 5820.

201D76—Deflecting Yoke for type 1850-A Iconoscope.

201D77—Deflecting Yoke for type 2F21 Monoscope.

202D75—Focusing Coil for Image Orthicons, types, 2P23, 5655, 5769 and 5820.

204D75—Alignment-Coil Assembly for Image Orthicons. Types 2P23, 5655, 5769 and 5820.

201D11—Deflecting Yoke for use with the 5WP15 Flying-Spot CR Tube, and 5WP11 Transcriber Kinescope.

For more durable, lasting replacements—ask your distributor about the full line of genuine RCA Television Components.

COMPLETELY NEW IN DESIGN—BUILT TO LAST

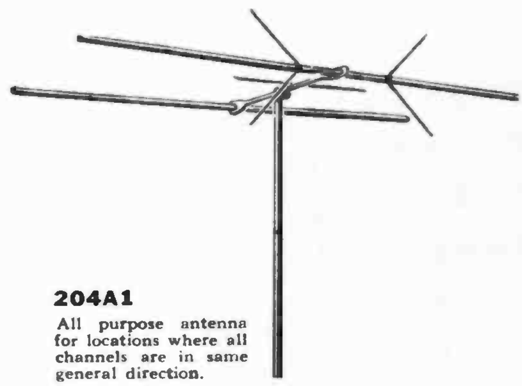
RCA 12-CHANNEL TELEVISION ANTENNA—Type 204A1

BASED UPON YEARS OF FIELD EXPERIENCE

EASILY ASSEMBLED | **RUGGEDLY CONSTRUCTED** | **UNI-DIRECTIONAL**

Features That Mean Greater Customer Satisfaction

- RCA "V" Attachments For Uni-directional
- Reception On All 12 Channels
- More Uniform Response On Channels 2-6 Than A Folded Dipole
- Uniform Gain Over Each Of The Two TV Bands
- Simple Transmission-Line Connections
- Low-Band Antenna Rods Reinforced With Solid Mounting Studs



204A1
All purpose antenna for locations where all channels are in same general direction.

Here's an RCA "Leader" to meet the majority of your everyday antenna needs. Engineered and developed by RCA for plus-value service, RCA-204A1 is intended for use in most receiver locations where both high and low-frequency stations are in the *same general direction.* Unique RCA "V" attachments provide *uniform directional characteristics* for all 12 channels.

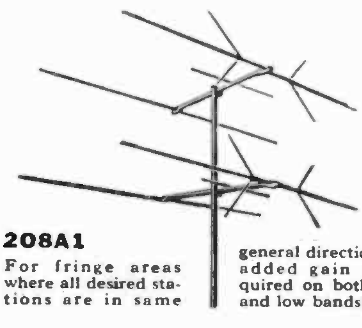
RCA-204A1 12-Channel Television Antenna is simple in design and appearance. Sturdily built of aluminum, it will withstand high winds, sleet, and ice. Designed for use with 300-ohm transmission line, the 204A1 rates "A" for antenna achievement: for overall performance and unusually flat response over each of the two television bands. It can be readily combined with any of the RCA Stacking Kits for fringe or other difficult reception areas.

Supplied with all necessary hardware and sturdy 5 ft. x 1¼" aluminum mast which may easily be extended by addition of RCA-207A1 antenna mast sections. Completely illustrated instructions for installations are included.

For More Gain — Dependable Fringe Area Performance

USE RCA STACKING KIT Type 208A1 Atop 204A1

Simple To Erect And Adjust. Extra Gain For Brighter, Clearer Pictures.



208A1
For fringe areas where all desired stations are in same general direction and added gain is required on both high and low bands.

Now...you can have an antenna "tailor made" for fringe-area reception on all twelve channels. Uni-directional characteristics of a 208A1-204A1 stacked array remain constant over both upper and lower bands.

RCA-208A1 is easily mounted on the 204A1 or similar dipole-reflector antennas. Designed for use with 300-ohm transmission line, it requires no external transformers nor matching stubs.

Complete with harness, hardware, and illustrated instructions for setting up 204A1-208A1 combination.

Something New That Gives You Something Extra

RCA "V" ATTACHMENTS Type 209A1

— for extra Value

In those locations where all stations are in the same general direction these unique "V" attachments, designed by RCA, provide improved reception on Channels 7-13 when mounted on low-band dipole and dipole reflector antennas. Directional characteristics of such antennas equipped with RCA-209A1 "V" attachments will be uniform for all 12 channels. No adjustments are necessary except usual antenna orientation for maximum signal strength.

No fuss—no bother—easily assembled and mounted on antenna rods.

THE LINE THAT RATES "A" FOR ANTENNA ACHIEVEMENT

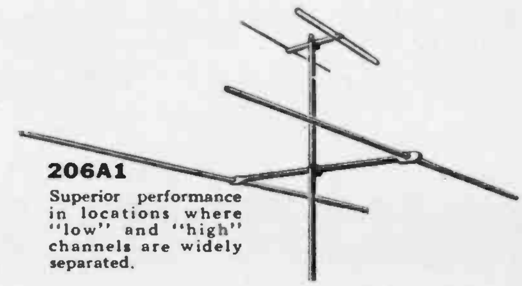
COMPLETELY NEW IN DESIGN . . .

RCA "HIGH-LOW" TELEVISION ANTENNA ARRAY
TYPE 206A1

FOR 12-CHANNEL TELEVISION RECEPTION

• EASY TO ASSEMBLE • RUGGEDLY CONSTRUCTED • IMPROVED PERFORMANCE

- Oriented Separately For Maximum Signal Strength
- High Gain On All 12 Channels
- Scientifically Designed For Efficient, Durable Operation
- Sturdy Aluminum Construction—Low-band Antenna Rods Reinforced With Solid Mounting Studs
- Quality Coupling Harness Provided

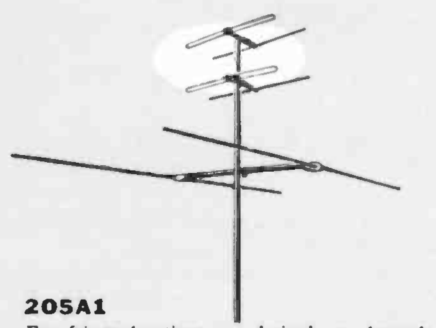


206A1
Superior performance in locations where "low" and "high" channels are widely separated.

Here's an antenna that you can depend upon for optimum performance in locations where high and low-channel stations are widely separated. Sturdily built to provide long, dependable service, the 206A1 will withstand severe weather conditions.

RCA-206A1, thoroughly tested for overall performance characteristics, provides superior reception. When used with 300-ohm transmission line, it requires no external transformers nor matching stubs.

Comes complete with harness, all necessary hardware and sturdy 5 ft. x 1¼" aluminum mast which may be easily extended by addition of RCA-207A1 antenna mast sections. Completely illustrated instructions included.



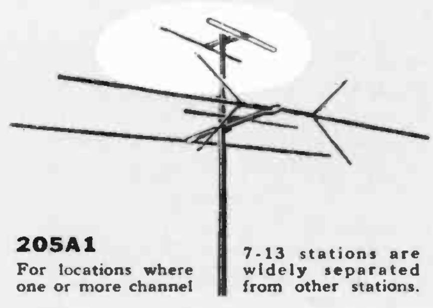
205A1
For fringe locations where extra gain is desired on channels 7-13.

For Increased Gain On Channels 7-13

USE RCA-205A1 HIGH-FREQUENCY STACKING KIT

• Simple To Erect and Adjust

RCA-205A1, in combination with the 206A1 or similar high-low television antenna arrays, provides additional high-band gain for fringe-area reception. It can also be mounted above RCA-204A1, 225A1, and antennas of similar design for independent high-frequency reception on Channels 7-13; in such installations use RCA-213A1 harness kit for the necessary coupling. Ruggedly constructed of aluminum, its simplified design permits easy stacking and use of a single 300-ohm transmission line.

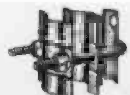


205A1
For locations where one or more channel 7-13 stations are widely separated from other stations.

Use RCA Antennas and Stacking Kits for lasting, dependable performance and increased customer satisfaction

Now you can get the TV Antennas and Accessories you need from one reliable source—your RCA Distributor. RCA's line is engineered to the highest standards . . . designed to meet your requirements.

RCA-210A1
ANTENNA MAST COUPLING
Fits 1" to 1⅜" (O.D.) Masts.



RCA-210A1

RCA-207A1
ANTENNA MAST SECTION TEMPERED ALUMINUM
Length, 5 ft. Diameter, 1¼". Wall thickness, .065".

RCA-207A1

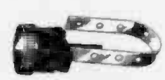
RCA-227A1
ANTENNA MAST MOUNTING BRACKETS
Mounts Masts up to 1⅜" O.D.

RCA-227A1

RCA-201A1 "Bright-Picture" TRANSMISSION LINE
Characteristic Impedance, 300-ohms.

RCA-201A1

RCA-206X1
LIGHTNING ARRESTER
Designed for RCA-201A1 "Bright-Picture" transmission line.



RCA-206X1

RADIO CORPORATION OF AMERICA
ELECTRONIC COMPONENTS HARRISON, N. J.

RCA MODEL QH1

Portable Hand-Wound Phonograph

Mfr. No. 274

SERVICE DATA

—1948 No. X2—

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Cabinet Dimensions (Approx.)

Height	(16 centimeters)	6 inches
Width	(38 centimeters)	$14\frac{3}{4}$ inches
Depth	(30 centimeters)	$11\frac{3}{4}$ inches

Motor.—The drive motor is of simple design and substantial construction. It should require little or no service if properly maintained. Attention to lubrication of the moving parts and occasional cleaning of the mechanism will go far to prevent faulty operation. Should it become necessary to repair the motor, the following procedure should be applied: **CAUTION.—Allow the motor mechanism to run down completely before attempting adjustment, repairs, or replacements.**

Removing Motor from Cabinet.—Remove the winding crank. Remove the wood screws holding the motor board in the cabinet and the two wood screws holding the cabinet lid support. To dismount the motor, remove the C washer which secures the turntable to the spindle shaft and remove turntable, slightly tapping the spindle while exerting an upward lift on the turntable. Loosen the screw holding the speed-regulating lever and remove the latter. The three screws holding motor to motor board should then be removed.

Replacing Main Spring Barrel.—In case of main spring failure, the entire spring barrel and gear should be replaced. Remove the two screws which hold the winding shaft bracket to the top plate and the four nuts holding bottom plate to pillars. Remove bottom plate and spring barrel.

Winding Shaft Spring.—This spring functions as a friction ratchet. It is riveted to the winding shaft bracket.

Speed Regulator Lever.—After assembly, adjust the speed regulator until the turntable rotates at 78 r.p.m.; loosen the speed regulator screw and set pointer to center of speed indicator scale; tighten screw and recheck turntable speed.

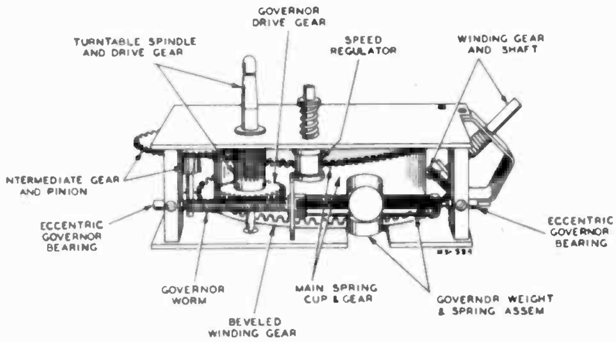
Lubrication.—All moving parts of the motor should be thoroughly cleaned and lubricated every six months to prevent excess wear and to assure proper operation. A small amount of grease should be applied to the worm gear of the governor, the gear of the winding shaft, and on the small pinion gear. All other points, including regulator friction pad, should be lubricated with light oil. All motor parts should be covered with a light film of oil to prevent rusting.

Motor Adjustments:

Speed variations or WOWS may be experienced with these instruments due to a variety of causes. Some of the troubles and corrections are listed below:

1. A regular WOW occurring on every revolution of the turntable, or every few revolutions.

(a) A frequent cause of this difficulty is faulty adjustment of the governor springs. If the governor weights seem to oscillate in and out when the motor is in operation, the spring tension of the three weights may not be evenly balanced. Loosen the spring clamping screws and position the springs so that all three weights are held with the same tension.



(b) Another possible cause of this trouble is faulty adjustment of the governor bearings. To adjust these bearings:

First: Set the speed regulator lever so that the face of the felt friction pad is close to but not touching the governor friction plate.

Second: Loosen both governor bearing set screws and position the governor so that the motor revolves at rated speed (78 r.p.m.).

Third: Adjust the mesh of the worm and the fiber drive gear by turning the eccentric bearings. These should be set so that the worm meshes properly with the fiber gear without binding.

Fourth: Adjust the distance between bearings so that the governor turns freely with a minimum of end-play.

(c) A take-up spring is mounted on the governor friction plate shaft to ensure against lost motion and erratic operation of this plate. It is essential that this spring be in place to provide adequate tension.

(d) Marred or broken teeth on either gear on the turntable shaft or on the intermediate gear shaft may cause this trouble. If inspection shows this to be the case, the defective gear should be replaced.

2. The turntable loses speed or WOWS on the louder parts of a record:

(a) This may be caused by failure of the governor to respond accurately to speed changes, due to excessive or irregular friction between the sliding friction plate and the governor shaft. When this occurs it may be corrected by removing the weights and working the plate back and forth until it frees up. If the governor shaft does not have a smooth surface it may be necessary to smooth it down slightly using "Crocus Cloth" or to replace the governor.

(b) This condition may also be caused by excessive friction in any part of the motor. Be sure that the governor bearings are properly adjusted as described in section 1 (b). Lubricate all bearings in the motor using a high grade light oil such as RCA Stock No. 7227 Spring Motor Oil. The governor shaft, friction plate, and felt friction pad should also be lubricated with this oil. Lubricate the worm with a light grease such as RCA Stock No. 10975 Electric Motor Grease. Remove the main spring and pack it with graphite lubricant such as RCA Stock No. 7228.

3. The turntable speed changes erratically over long periods of time.

(a) This may be caused by binding of the main spring due to improper lubrication. To correct this condition pack the spring with graphite grease as described in section 2 (b).

(b) Inspect the gear teeth on the main spring gear. If these are marred or broken, it may be necessary to replace the spring assembly.

Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	MOTOR ASSEMBLIES	73399	Spring—Speed regulator tension spring
11533	Ball—Steel ball [$1/16''$ dia. (App. 1.6 mm)] for governor bearing	73395	Washer—"C" washer to hold speed regulator assembly
73387	Bearing—Governor bearings (1 set)	73398	Washer—Washer to hold speed regulator spring
73386	Gear—Intermediate gear (94 teeth) and pinion (11 teeth)	73393	Weight—Governor weight and spring assembly
73391	Gear—Beveled winding gear (64 teeth)		
73389	Governor—Governor complete		**MISCELLANEOUS**
73385	Motor—Angle wind spring motor complete—less turntable and speed regulator lever	73403	Brake—Turntable brake and lever assembly
73392	Plate—Bottom plate complete with bronze bearing, winding shaft bracket, spring and winding gear	73400	Handle—Carrying case handle
73394	Plate—Top plate complete with two (2) motor spacers, bronze bearing and governor supports	73407	Key—Winding key
73397	Regulator—Speed regulator assembly	73402	Lever—Speed regulator lever
73396	Spacer—Speed regulator spacer	73410	Screw—Needle screw
73388	Spindle—Turntable spindle, drive gear and governor drive gear (30 teeth-fibre)	73409	Soundbox
73390	Spring—Main spring in cup complete with main gear	73404	Spring—Brake spring
		73401	Support—Carrying case lid support
		73408	Taper tube—Taper tube and support
		73405	Turntable
		73406	Washer—Washer to fasten turntable to spindle shaft

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

MODEL 2S7ED

Transcription Record Player

Mfr. No. 274

SERVICE DATA

— 1948 No. 16 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tube Complement
- 6SC7 .... Amplifier and Phase Inverter
- 6AQ5 .... Push-pull output
- 6AQ5 .... Push-pull output
- 6X4 .... Rectifier

Power Supply .... 115 volts, 60 cycles A.C., 60 watts

Loudspeaker
- Type 92580-1 .... 8 in. P.M.
- V.C. Impedance .... 3.2 ohms at 400 cycles

Power Output
- Maximum .... 7 watts
- Undistorted .... 6 watts

Turntable
- Diameter .... 12½ in.
- Speed .... 33-1/3 or 78 r.p.m.

Dimensions
- Height ..... 10½ in. Width ..... 16⅛ in. Depth ..... 16⅝ in.

Weight .... 28 lbs.

Description

This instrument may be used with either 33-1/3 or 78 r.p.m. records up to 16 in. in diameter.

A speed selector lever causes either of two drive motors to engage with the rim of the turntable and at the same time actuates a switch to supply power to the motor which is being used.

The output of the amplifier is supplied to two jacks—one for speaker and one for head phones. The speaker is disconnected when the phones are being used.

An automatic switch disconnects the motor power supply when the tone arm is in its rest position. The switch on the volume control controls the power input to amplifier and motors.

A receptacle on the motorboard may be used to supply power to a projector if used in conjunction with this instrument.

Replacement Parts

STOCK No.	DESCRIPTION
	AMPLIFIER ASSEMBLY
70627	Capacitor—Tubular, .005 mf., 600 volts (C7)
70648	Capacitor—Tubular, .005 mf., 1000 volts (C9, C10)
70610	Capacitor—Tubular, .01 mf., 200 volts (C6, C13)
70632	Capacitor—Tubular, .02 mf., 600 volts (C8)
56897	Capacitor—Electrolytic, comprising 2 sections of 20 mfd. 350 volts, 1 section of 10 mfd. 350 volts and 1 section of 40 mfd. 25 volts (C12A, C12B, C12C, C12D)
	Resistor—Fixed, composition, 390 ohms, 2 watts (R15)
	Resistor—Fixed, composition, 2200 ohms, 1 watt (R17)
	Resistor—Fixed, composition, 12,000 ohms, ½ watt (R13)
	Resistor—Fixed, composition, 22,000 ohms, ½ watt (R18)
	Resistor—Fixed, composition, 220,000 ohms, ½ watt (R10, R11)
	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R12, R14)
	Resistor—Fixed, composition, 10 megohms, ½ watt (R8, R9)
73847	Socket—Tube socket—7 contact—miniature
33084	Socket—Tube socket—8 contact—octal
73848	Transformer—Output transformer (T1)
70127	Transformer—Power transformer, 115 volt, 60 cycle (T2)
	CONTROL PANEL ASSEMBLY
38409	Control—Tone control—0.5 meg. (R1)
70342	Control—Volume control and power switch, 1.5 meg., tapped at 0.25 meg. and 0.5 meg. (R7, S4)
70601	Capacitor—Tubular, .002 mf., 200 volts (C2, C4)
70627	Capacitor—Tubular, .005 mf., 600 volts (C1)
70572	Capacitor—Tubular, .015 mf., 200 volts (C3, C5)
73836	Knob—Tone control or volume control knob
73831	Panel—Control panel
	Resistor—Fixed, composition, 22,000 ohms, ½ watt (R4, R5)
	Resistor—Fixed, composition, 27,000 ohms, ½ watt (R6)
	Resistor—Fixed, composition, 100,000 ohms, ½ watt (R3)
	Resistor—Fixed composition, 560,000 ohms, ½ watt (R2)
73835	Switch—Speech-Music switch (S1)
	TONE ARM ASSEMBLY
73837	Arm—Tone arm shell only—less crystal cartridge and tone arm base
73838	Base—Tone arm base and swivel assembly
73839	Crystal—Crystal pickup cartridge—less stylus
74021	Spring—Tone arm counterbalance spring
73840	Stylus—Osmium tipped metal stylus
	OUTLET PANEL ASSEMBLY
17570	Jack—Speaker jack (J1)
56103	Jewel—Pilot lamp jewel
11891	Lamp—Pilot lamp—Mazda #44
73832	Panel—Outlet panel
73834	Receptacle—Power outlet receptacle
55718	Resistor—Fixed, wire wound, 3 ohms, 5 watts (R16)
43734	Socket—Pilot lamp socket
	SPEAKER ASSEMBLY (92580-1)
73912	Cone—Cone and voice coil
56899	Speaker—8 in. PM speaker complete with cone and voice coil
	MISCELLANEOUS
71591	Capacitor—Fixed, molded, .02 mf., 600 volts (C11)
73846	Case—Carrying case complete
73830	Clamp—Tone arm retaining clamp
39533	Clip—Retaining clip for idler pulley
73843	Grille—Fabric grille for speaker
73833	Grille—Metal grille (amplifier cover)
73842	Indicator—Speed indicator (retainer for speed shift lever)
73845	Jack—Phones jack (J2)
73841	Lever—Speed shift lever and knob
73823	Motor—Drive motor—78 r.p.m.—115 volts, 60 cycles—less mounting plate
73824	Motor—Drive motor—33-1/3 r.p.m.—115 volts, 60 cycle—less mounting plate
73844	Panel—Phone jack panel
39530	Plate—Motor mounting plate with idler pulley bearing
73825	Plate—Turntable spindle mounting plate
54370	Plug—Plug for speaker cable
39529	Pulley—Turntable drive idler pulley
73829	Rest—Tone arm rest
73826	Spindle—Turntable spindle
39534	Spring—Drive idler pulley tension spring
21630	Switch—Speed selector switch (S2)
73828	Switch—Stop switch (actuated by tone arm) (S3)
73827	Turntable—12½ in. turntable
39531	Washer—"C" washer for turntable spindle
39532	Washer—Turntable spindle fiber washer

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Crystal Pickup

The crystal pickup is equipped with an osmium tipped stylus which is easily replaced.

To replace stylus—gently pry out on the back end of the stylus wire as illustrated. Do not use force or the crystal may be broken.

The position of the stylus guard may be shifted to provide equal clearance on both sides of the stylus.

Lubrication

The turntable spindle should be lubricated with a good grade of light grease. The motors should be lubricated by saturating the felt bearing wicks with a good grade of light oil (similar to S.A.E. 10).

Pickup Pressure

The pickup pressure is adjustable by shifting the position of the clamp (on underside of tone arm) to which the counterbalance spring is attached. It should be approx. 1¼ oz.

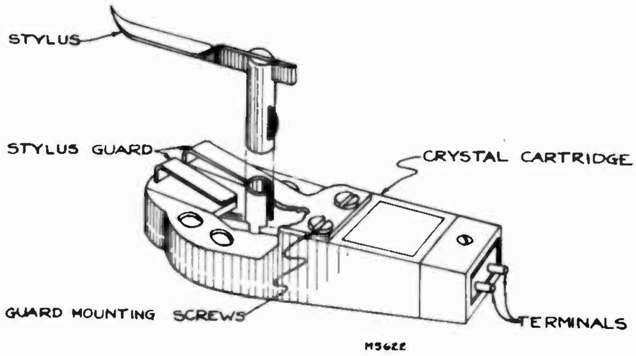
Service Hints

Remove the four screws and amplifier cover for access to tubes.

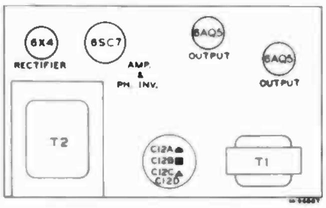
Always place the tone arm on its rest and secure it with the retainer when not in use.

When removing the motorboard use care to prevent breaking wires loose from the phones jack.

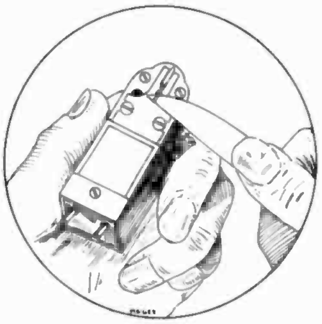
Best head-phone results will be obtained using head-phones of 1000 to 3000 ohms.

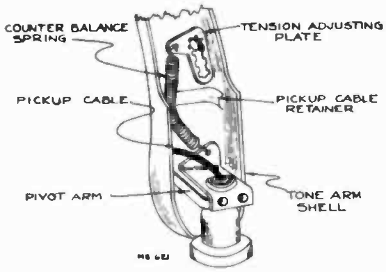


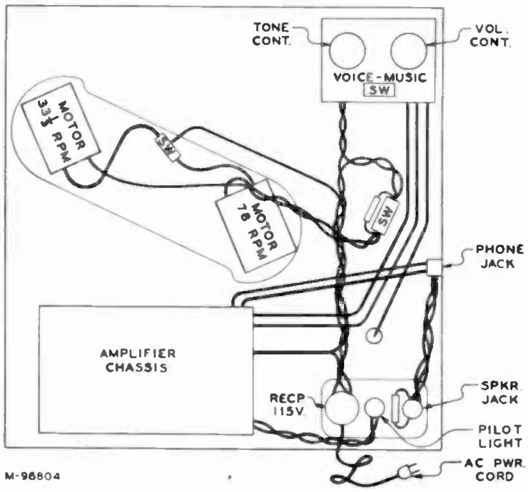
Crystal Cartridge



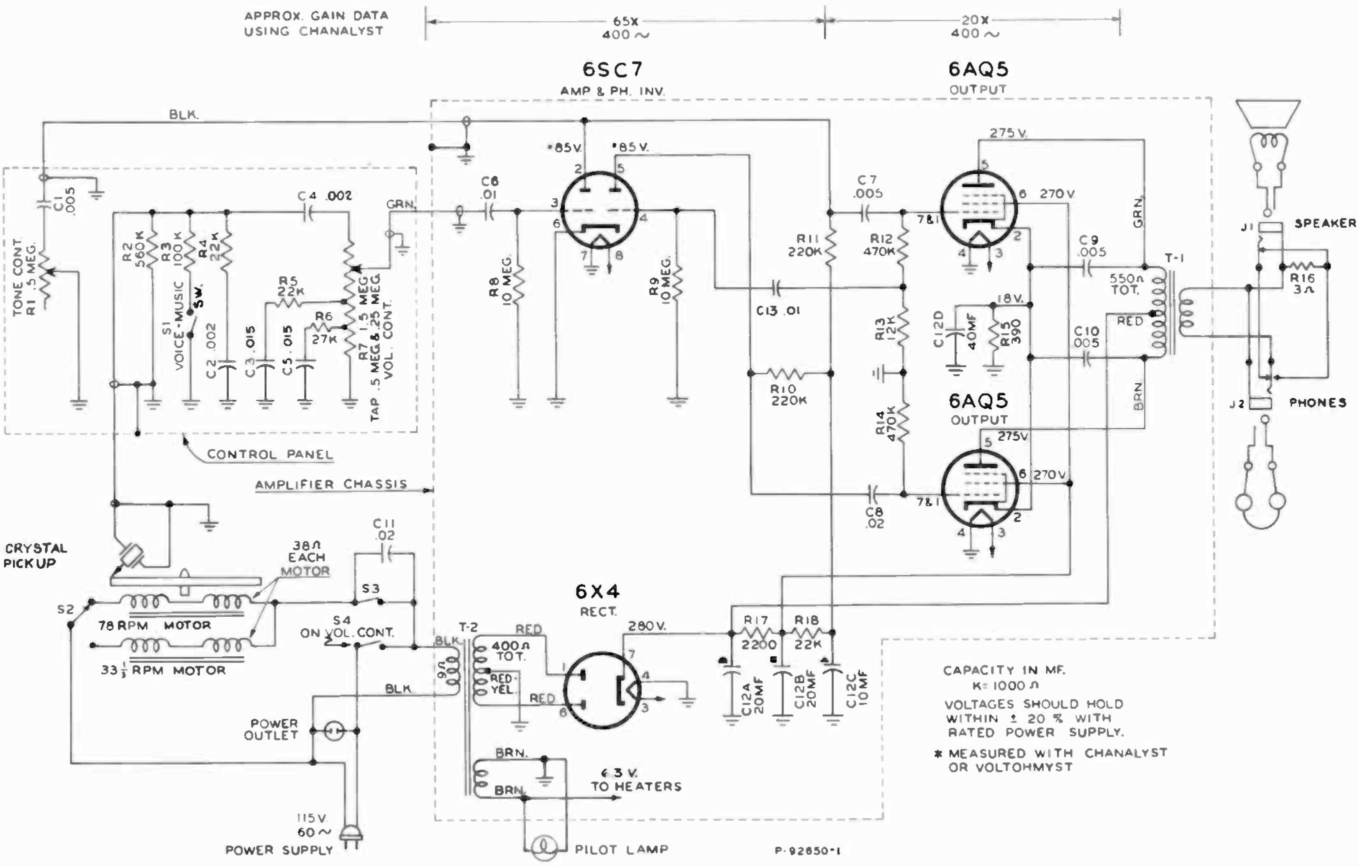
Tube Locations



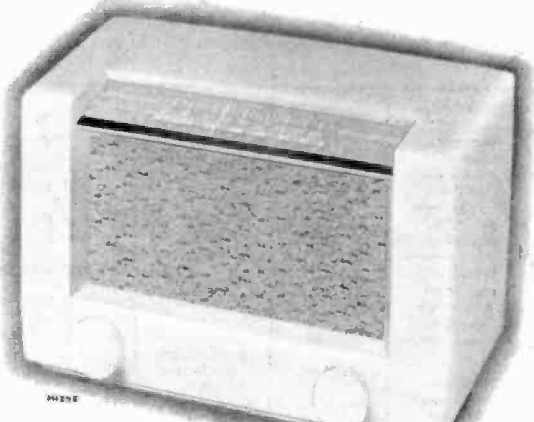




Stylus Removal *Counterbalance Spring* *Connection Diagram*



Schematic Diagram



Model 5Q21 Brown plastic
Model 5Q22 Ivory plastic
Model 5Q27 Bronze plastic

RCA MODELS 5Q21, 5Q22, 5Q27

Chassis Nos. RC-1053 RC-1053A, RC-1053B
Mfr. No. 274

SERVICE DATA

1948....X4
1948....X5
1949 . . . X7

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges

Standard Broadcast ("A" Band) .... 540-1,680 kc. (555-178 m.)
Short Wave ("C" Band) .... 4.7-18 mc. (63.8-16.7 m.)

Intermediate Frequency .... 455 kc.

Tube Complement

(1) RCA-12SA7 .... 1st Detector-Oscillator
(2) RCA-12SK7 .... IF Amplifier
(3) RCA-12SQ7 2nd Detector, A.V.C. and A-F Amplifier
(4) RCA-35L6GT .... Output
(5) RCA-35Z5GT .... Rectifier

Power Supply Ratings (D-C or 25/60 cycles A-C)

105-125 volts .... 30 watts
*135-165 volts .... 40 watts
*210-250 volts .... 60 watts
*With external voltage dropping resistor.

Power Output Rating

Undistorted .... 1.0 watt
Maximum .... 1.5 watts

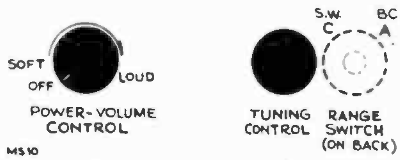
Loudspeaker (92572-3)

Type .... 5-inch Permanent-Magnet Dynamic
Voice Coil Impedance .... 3.2 ohms at 400 cycles
Tuning Drive Ratio .... 18 to 1 (9 turns of knob)

Cabinet Dimensions

Width 11⅜"—Height 6 11/16"—Depth 6¼"

POWER SUPPLY POLARITY—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.



Location of Controls

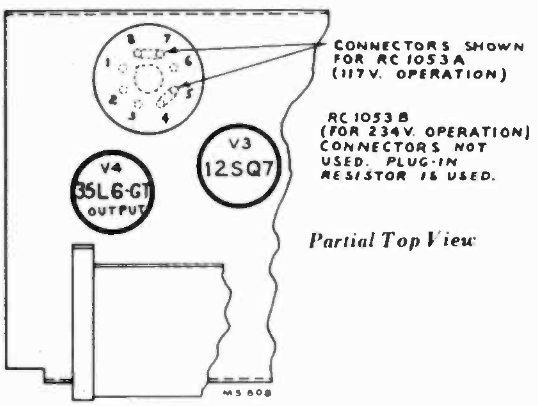
Description

The chassis (stamped RC-1053A or RC-1053B) used in this instrument is nearly identical to the chassis (stamped RC-1053) used in the original production of Model 5Q21. The differences are listed below.

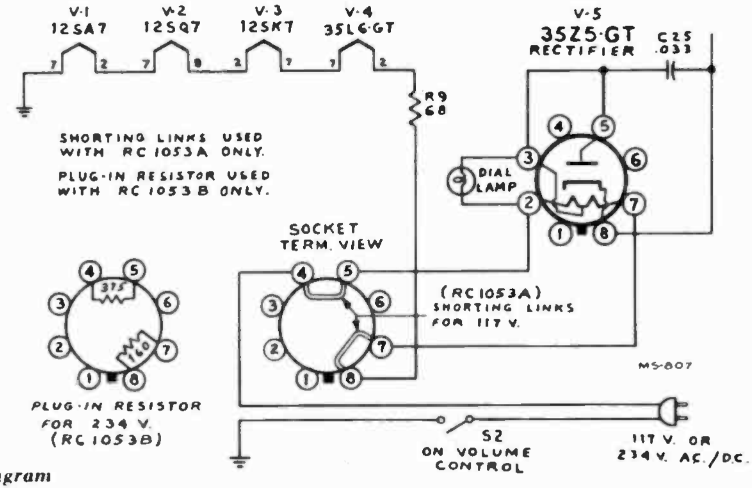
RC-1053 used an external line voltage resistor for 210-250 volt operation. RC-1053A uses a socket with shorting links for 105-125 volt operation. RC 1053B uses a plug-in line voltage resistor for 210-250 volt operation.

The position of the 35L6GT output tube is changed and the circuit position of R9 is different.

A partial schematic diagram and partial chassis top view are shown below; they are otherwise identical



Partial Top View



Partial Schematic Diagram

5Q21, 5Q22, 5Q27

Alignment Procedure

Cathode-Ray Alignment is the preferable metnod. Connections for the oscilloscope are shown in the Schematic Drawing.

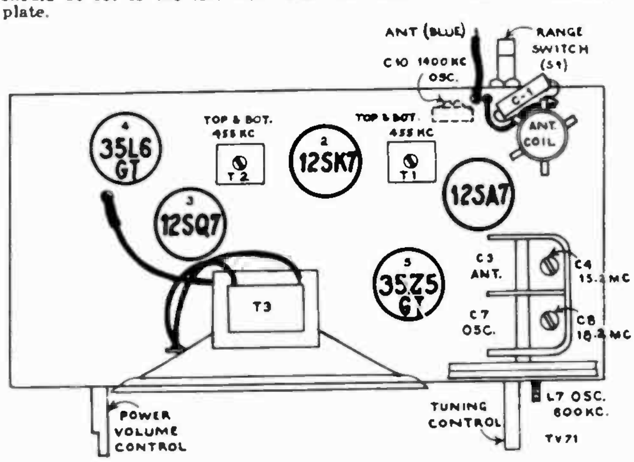
Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output low to avoid a-v-c action.

Note: If the test-oscillator is a-c operated, it may be necessary to use an isolation transformer (117v./117v.) for the receiver during alignment.

Calibration Scale—The glass tuning dial may be easily removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

Dial Pointer—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.



Tube and Trimmer Locations

Dial Backing Plate—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

For additional information refer to booklet "RCA Victor Receiver Alignment."

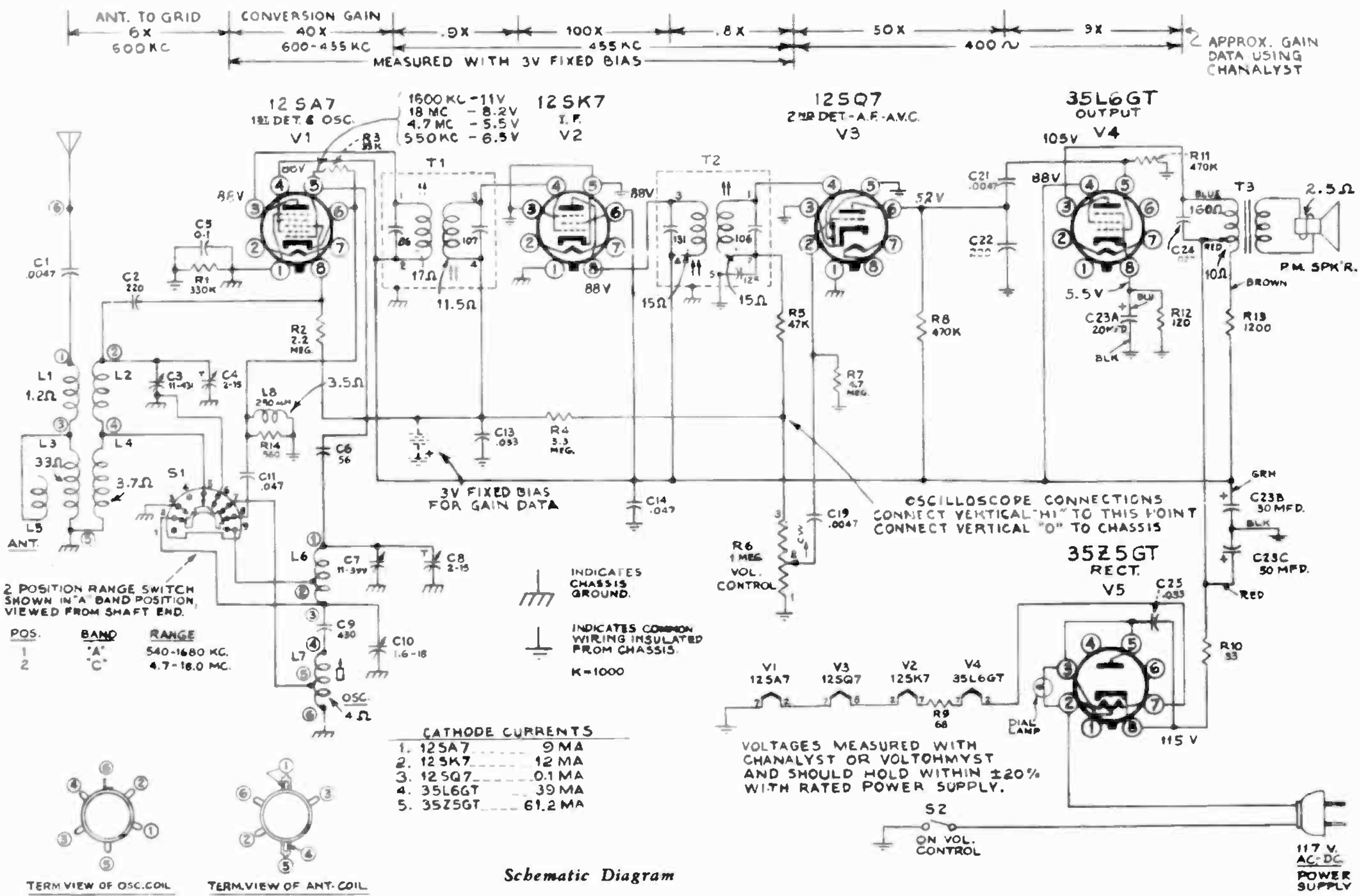
Steps	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust for max. output—
1	12SK7 I-F grid through .01 mfd. capacitor	455 kc	B. C.; quiet point near 600 kc	Top and bottom T-2 (2nd I-F Trans.)
2	Stator of gang cond. C3 through .01 mfd.	455 kc	B. C.; quiet point near 600 kc	Top and bottom T-1* (1st I-F Trans.)
3	Antenna lead through 300 ohm resistor	18.2 mc	S. W.; gang condenser open	C8 (osc.)**
4	Antenna lead through 300 ohm resistor	15.2 mc	S. W.; rock gang at 15.2mc	C4 (ant.)***
5	Antenna lead through 200 mmf. capacitor	600 kc	B. C.; 600 kc	L7 (osc.)
6	Antenna lead through 200 mmf. capacitor	1400 kc	B. C.; rock gang at 1400 kc	C10 (osc.)
7	Antenna lead through 200 mmf. capacitor	600 kc	B. C.; rock gang at 600 kc	L7 (osc.)
8	Repeat steps 6 and 7			

* Do not readjust T2 when test oscillator is connected to C3.

**Use minimum capacity peak if two peaks can be obtained.

*** Image signal of lesser amplitude should occur at 14.3 mc.

NOTE—Oscillator tracks above signals on both bands.



Schematic Diagram

ON EARLY PRODUCTION A 27 MMFD. CAPACITOR (STOCK NO. 70935) IS CONNECTED BETWEEN ANT. COIL TERMINALS NO. 3 AND NO. 5. IT IS NOT REQUIRED ON REPLACEMENT COILS.

Replacement Parts

Model 5Q21, 2nd Prod.

SAME AS LISTED FOR MODEL 5Q21 1ST PROD.
EXCEPT AS LISTED BELOW

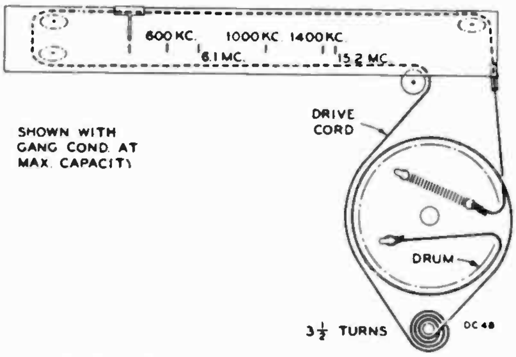
		CHASSIS ASSEMBLIES RC-1053A, RC-1053B
Add:	73935	Clip—Mounting clip for I-F transformers
	70392	Cord—Power cord
	72308	Resistor—Plug-in resistor for 210-250 volt operation (Chassis No. RC-1053B)
		MISCELLANEOUS
Delete:	73272	Back—Cabinet back
Add:	74820	Back—Cabinet back

NOTE—The external voltage dropping resistor should be kept free of surrounding objects to provide adequate ventilation.

PRECAUTIONARY LEAD DRESS

1. Dress output plate capacitor C24 and output transformer leads down next to chassis.
2. Dress green lead from terminal board to volume control down to chassis and away from adjacent parts.
3. Keep grid end of R2 as short as possible.
4. Keep body of C2 away from chassis.
5. Dress R7 and C19 down next to chassis.
6. Twist power cord leads underneath chassis.
7. Dress R9 against back apron of chassis.
8. Dress dial lamp leads between speaker and dial back plate bracket.
9. Dress C1 away from antenna coil winding.
10. Dress output transformer secondary leads away from dial drive cord.

SHOWN WITH GANG COND. AT MAX. CAPACITY



Dial Indicator and Drive Mechanism

Replacement Parts

Models 5Q22, 5Q27

SAME AS LISTED FOR MODEL 5Q21 1st PROD. EXCEPT AS LISTED BELOW

EXCEPT

Stock No.	
Y2056	Cabinet—Ivory plastic cabinet for Model 5Q22.
Y2057	Cabinet—Bronze plastic cabinet for Model 5Q27.
73930	Knob—Volume control or tuning knob (ivory) for Model 5Q22.
73931	Knob—Volume control or tuning knob (bronze) for Model 5Q27.

Model 5Q21 1st Prod. Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1053
73262	Button—Plug button
73252	Capacitor—Variable tuning capacitor (C3, C4, C7, C8)
73261	Capacitor—Mica trimmer, 1.6-18 mmf. (C10)
71924	Capacitor—Ceramic, 56 mmf. (C6)
39636	Capacitor—Mica, 220 mmf. (C2, C22)
39643	Capacitor—Mica, 430 mmf. (C9)
73550	Capacitor—Tubular, molded paper, .0047 mfd., 600 volts, (C1, C19, C21)
73554	Capacitor—Tubular, molded paper, .027 mfd., 400 volts (C24)
73552	Capacitor—Tubular, molded paper, .033 mfd., 400 volts, (C13, C25)
73553	Capacitor—Tubular, molded paper, .047 mfd., 400 volts, (C11, C14)
73551	Capacitor—Tubular, molded paper, 0.1 mfd., 400 volts (C5)
70371	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts; and 1 section of 20 mfd., 20 volts (C23a, C23b, C23c)
73256	Coil—Antenna coil (L1, L2, L3, L4, L5)
73255	Coil—Oscillator coil (L6, L7)
73268	Coil—Peaking coil (L8, R14)
73257	Control—Volume control and power switch (R6, S2)
†72953	Cord—Drive cord (approx. 43" overall length required)
70365	Core—Adjustable core and stud for oscillator coil
16058	Grommet—Rubber grommet for mounting tuning condenser and speaker
73259	Indicator—Station selector indicator
31480	Lamp—Dial lamp, Mazda 47
70364	Nut—Speed nut for mounting oscillator coil core and stud
73251	Plate—Dial back plate assembly complete with five (5) drive cord pulleys
72602	Pulley—Drive cord pulley
	Resistor—Fixed, composition, 33 ohms, ±10%, 1 watt (R10)
73263	Resistor—Wire wound, 68 ohms, 2 watt (R9)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R12)
	Resistor—Fixed, composition, 1200 ohms, ±10%, 1 watt (R13)
	Resistor, Fixed, composition, 33,000 ohms, ±10%, ½ watt (R3)
	Resistor—Fixed, composition, 47,000 ohms, ±20%, ½ watt (R5)
	Resistor—Fixed, composition, 330,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt, (R8, R11)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R2)
	Resistor—Fixed, composition, 3.3 megohm, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 4.7 megohm, ±10%, ½ watt (R7)
73258	Shaft—Tuning knob shaft
73260	Socket—Lamp socket
70827	Socket—Tube socket
31418	Spring—Drive cord tension spring
70358	Switch—Range switch (S1)
73036	Transformer—First I.F. transformer (T1)
73254	Transformer—Second I.F. transformer (T2)
73253	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning knob shaft
	†Stock No. 72953 is a reel containing 250 feet of cord
	SPEAKER ASSEMBLIES 92572-3
73269	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
73272	Back—Cabinet back
73273	Board—Speaker baffle and grille cloth, less emblem
Y1481	Cabinet—Brown plastic cabinet
73271	Clamp—Dial clamps (1 set)
73270	Dial—Glass dial scale
37831	Fastener—Push fasteners for cabinet back (1 set)
35121	Knob—Range switch knob
70473	Knob—Volume control or tuning knob
73274	Moulding—Dial moulding
35126	Spring—Retaining spring for range switch knob
30900	Spring—Retaining spring for volume control or tuning knob

†Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA
MODEL 5Q31

Chassis No. RC-1054—Mfr. No. 274

Service Data

1948....X6

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges
Standard Broadcast ("A" Band) .... 535-1680 kc (560-179 m)
Medium Wave ("B" Band) .... 2.3-7 mc (131-42.8 m)
Short Wave ("C" Band) .... 7-22 mc (42.8-13.7 m)

Intermediate Frequency .... 455 kc

Tube Complement
(1) RCA 12SA7 .... Converter
(2) RCA 12SK7 .... I.F. Amplifier
(3) RCA 12SQ7 .... 2nd Det., A.V.C. and A.F. Amplifier
(4) RCA 35L6GT .... Output
(5) RCA 35Z5GT .... Rectifier

Dial Lamps (2) .... Mazda No. 1490, 3.4 volts, .16 amp.

Power Supply Ratings
105-125 volts D.C. or 25-60 cycles A.C. .... 30 watts
*210-250 volts D.C. or 25-60 cycles A.C. .... 60 watts
*Resistor plug, for which socket is provided on the chassis, is required.

Power Output
Undistorted .... 1.0 watt
Maximum .... 1.5 watts

Loudspeaker (92576-2)
Type .... 4" x 6" permanent-magnet dynamic
Voice-coil impedance .... 3.2 ohms at 400 cycles

Cabinet Dimensions

Height	Width	Depth
9 in. (23 cm)	14⅝ in. (37 cm)	7¾ in. (19.5 cm)

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1054
S-4435	Bracket—Dial cord pulley bracket—R.H.—complete with four pulleys
S-4436	Bracket—Dial cord pulley bracket—L.H.—complete with one pulley
S-4437	Bracket—Tuning shaft bracket
S-4438	Capacitor—Ceramic, 150 mmf (C18)
S-4439	Capacitor—Mica, 220 mmf (C12, C22)
S-4440	Capacitor—Mica, 560 mmf (C9)
S-4441	Capacitor—Mica, 3300 mmf (C8)
S-4442	Capacitor—Mica, 6000 mmf (C14)
S-4443	Capacitor—Tubular, .0047 mf, 600 v (C19, C23, C24)
S-4444	Capacitor—Tubular, .01 mf, 400 v (C1, C21)
S-4445	Capacitor—Tubular, .022 mf, 400 v (C20)
S-4446	Capacitor—Tubular, .027 mf, 400 v (C26)
S-4447	Capacitor—Tubular, .033 mf, 200 v (C27)
S-4448	Capacitor—Tubular, .047 mf, 200 v (C17)
S-4449	Capacitor—Tubular, .056 mf, 400 v (C11, C16)
S-4450	Capacitor—Trimmer capacitor, dual, 1.6-18 mmf (C2, C3)
S-4451	Capacitor—Trimmer capacitor, triple, 3-35 mmf (C4, C5, C6)
S-4452	Capacitor—Electrolytic, comprising one section 80 mfd, 150 v, one section 40 mfd, 150 v, and one section 20 mfd, 25 v (C25A, C25B, C25C)
S-4453	Capacitor and resistor assembly comprising 39 mmf, capacitor and 10 ohm resistor (C13, R5)
S-4454	Clip—I-F transformer mounting clip
S-4455	Coil—Antenna coil (L1, L2, L3, L4)
S-4456	Coil—Oscillator coil (L5, L6, L7)
S-4457	Coil—Peaking coil and resistor assembly (250 micro-henry coil and 560 ohm resistor) (L8, R1)
S-4458	Cord—Drive cord (approx. 49 in. required)
S-4459	Core—Adjustable core and stud for oscillator coil
S-4460	Cord—Power cord
S-4461	Condenser—Variable tuning condenser and pulley assembly (C7, C10, C15)
S-4462	Control—Volume control and power switch (R9, S2)
S-4463	Grommet—Rubber grommet for mounting 12SA7 tube socket (two required)
S-4464	Grommet—Rubber grommet for mounting tuning condenser (four required)
S-4465	Jack—Phono input jack (J1)
S-4466	Plate—Bakelite plate for mounting electrolytic capacitor
S-4467	Plate—Dial back plate
S-4468	Resistor—Fixed, composition, 33 ohms, 1 watt (R15)
S-4469	Resistor—Fixed, wire wound, 68 ohms, 2 watts (R11)
S-4470	Resistor—Fixed, composition, 120 ohms, ½ watt (R13)
S-4471	Resistor—Fixed, composition, 1000 ohms, 1 watt (R14)
S-4472	Resistor—Fixed, composition, 33,000 ohms, ½ watt (R17)
S-4473	Resistor—Fixed, composition, 47,000 ohms, ½ watt (R7)
S-4474	Resistor—Fixed, composition, 56,000 ohms, ½ watt (R4)
S-4475	Resistor—Fixed, composition, 330,000 ohms, ½ watt (R2)
S-4476	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R3, R10, R12)
S-4477	Resistor—Fixed, composition, 820,000 ohms, ½ watt (R18)
S-4478	Resistor—Fixed, composition, 4.7 megohm, ½ watt (R6, R8)
S-4479	Shaft—Tuning shaft
S-4480	Socket—Speaker socket (J2)
S-4481	Socket—Tube socket for 12SA7 tube
S-4482	Socket—Tube socket for 12SK7 and 12SQ7 tubes
S-4483	Socket—Tube socket for plug in resistor, 35L6GT and 35Z5GT tubes
S-4484	Socket—Dial lamp socket assembly
S-4485	Spring—Drive cord spring
S-4486	Switch—Range switch (S1)
S-4487	Transformer—First I.F. transformer (T1)
S-4488	Transformer—Second I.F. transformer (T2)
S-4489	Transformer—Output transformer (T3)
S-4490	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLY
S-4491	Plug—Male pin plug for speaker cable
S-4492	Speaker—4" x 6" PM speaker complete with cone and connecting cable
	MISCELLANEOUS
S-4493	Back—Back cover for cabinet
S-4494	Baffle—Baffle board and grille cloth complete with speaker mounting screws—less emblem
S-4495	Cabinet—Plastic cabinet
S-4496	Clip—Dial scale retaining clip (3 required)
S-4497	Cloth—Grille cloth (6" x 14")
S-4498	Dial—Dial scale
S-4499	Emblem—Trademark emblem (RCA)
S-4500	Emblem—Trademark emblem (RCA Victor)
S-4501	Fastener—Push fastener for back cover (4 required)
S-4502	Grommet—Rubber grommet for chassis mounting (4 required)
S-4503	Grommet—Rubber grommet for speaker mounting (4 required)
S-4504	Indicator—Station indicating pointer
S-4505	Knob—Range switch knob
S-4506	Knob—Tuning knob
S-4507	Knob—Volume control knob
S-4508	Lamp—Dial lamp—Mazda type #1490
S-4509	Plug—Plug and shell for 105-125 volt operation
S-4510	Resistor—Plug in resistor for 210-250 volt operation
S-4511	Spacer—Metal spacer for speaker mounting (4 required)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Cathode-Ray Alignment is the preferable method.

Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output low to avoid a-v-c action.

NOTE—If the test-oscillator is A.C. operated it may be necessary to use an isolation transformer (117v/117v) for the receiver during alignment.

Calibration Scale

The dial scale may be readily removed from the cabinet and used as a reference during alignment—or the marks on the dial back plate which correspond to the frequencies indicated on the illustration "Dial Indicator and Drive Mechanism" may be used for reference.

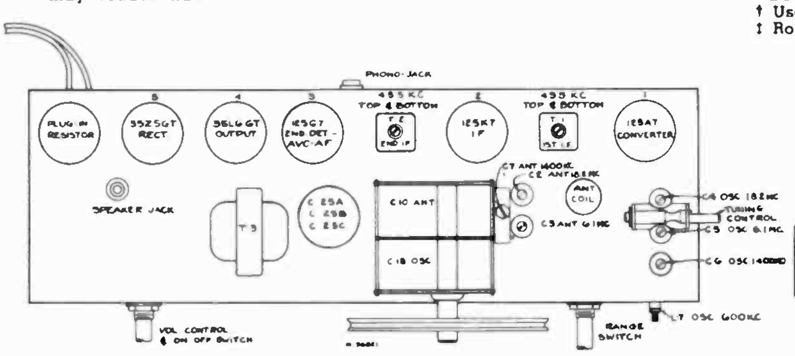
Dial Pointer—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

For additional information refer to booklet "RCA Victor Receiver Alignment."

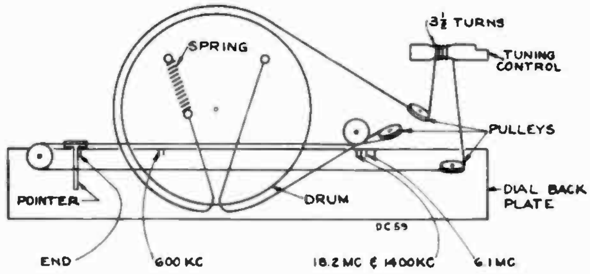
POWER SUPPLY POLARITY—For operation on D.C. the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On A.C. reversal of the plug may reduce hum.

Step	Connect high side of test osc. to—	Tune test osc. to—	Turn radio dial to—	Adjust for maximum output—
1	12SK7 grid thru .01 mfd. capacitor	455 kc	Quiet point near 600 kc	Top & bottom 2nd I.F. trans. T-2
2	12SA7 grid thru .01 mfd. capacitor		"A" Band	Top & bottom 1st I.F. trans. T-1*
3	Ant. lead thru 200 mmf. capacitor	1400 kc	1400 kc "A" Band	C6 (osc.) C7 (ant.)
4		600 kc	600 kc "A" Band	L7 (osc.)
5		Repeat steps 3 and 4		
6	Ant. lead thru 300 ohm resistor	6.1 mc	6.1 mc "B" Band	C5 (osc)† C3 (ant.)‡
7		18.2 mc	18.2 mc "C" Band	C4 (osc.)† C2 (ant.)‡

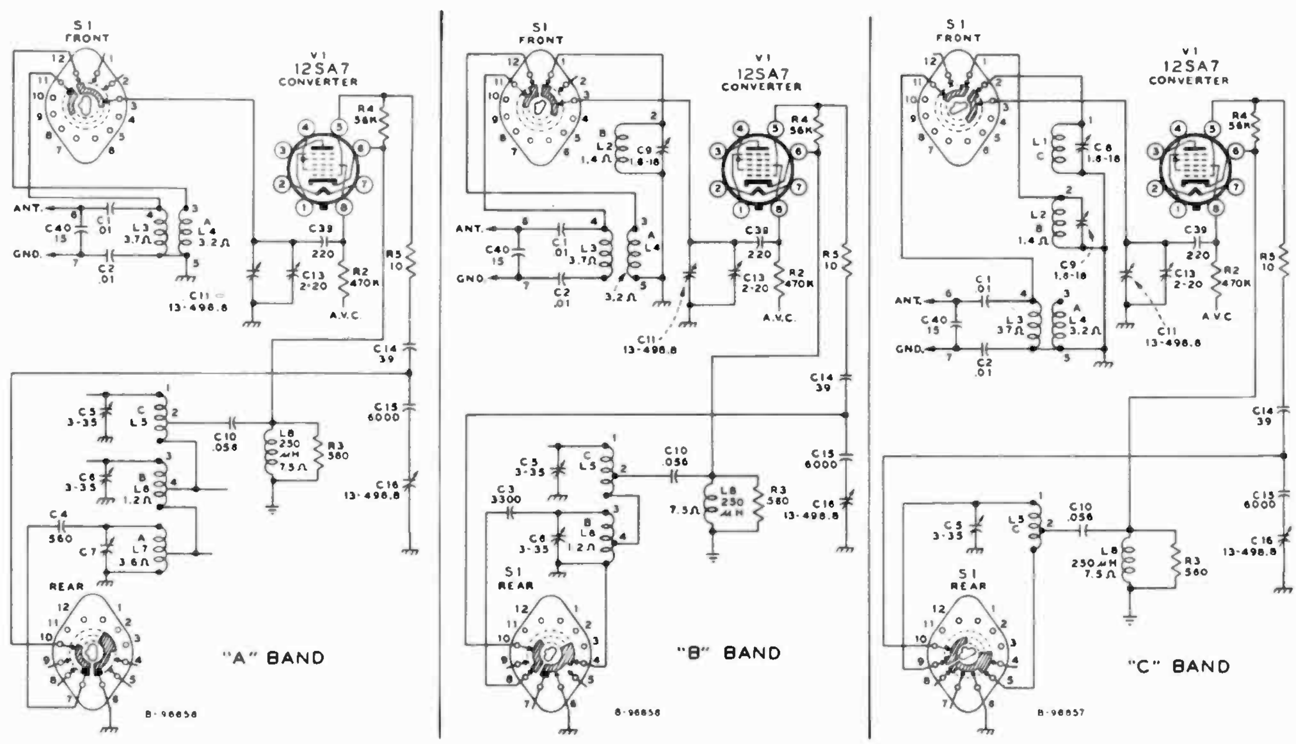
* Do not re-adjust T2.
† Use minimum capacity peak if two peaks can be obtained.
‡ Rock gang.



Tube and Trimmer Locations

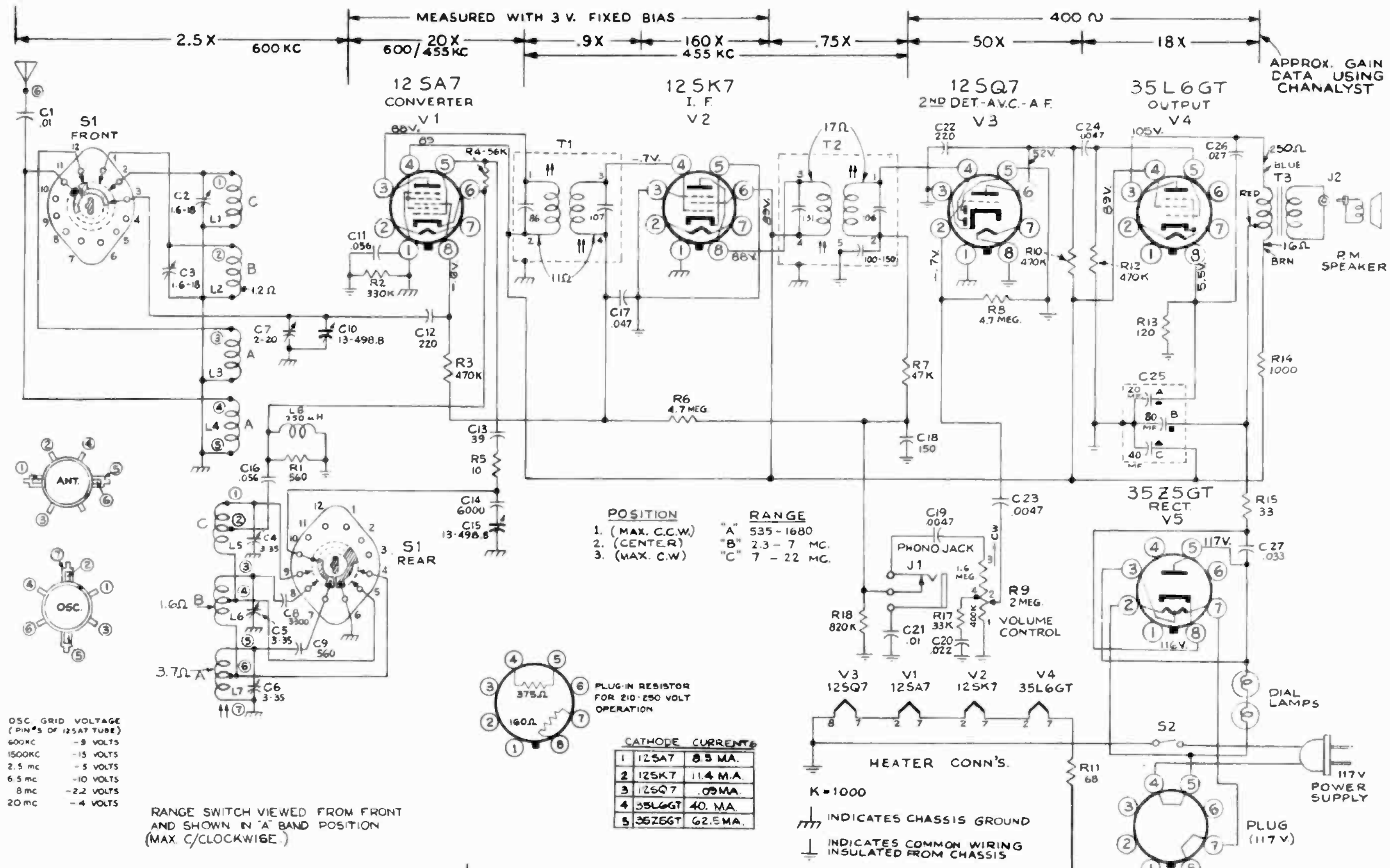


Dial Indicator and Drive Mechanism



Simplified Schematic Diagrams—Antenna and Oscillator Circuits

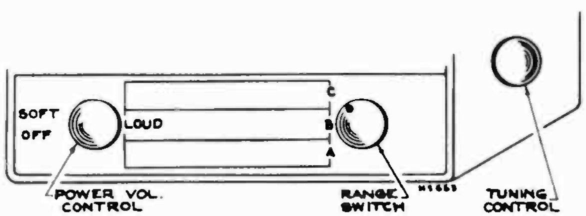
5Q31



	CATHODE	CURRENTS
1	12SA7	8.5 MA.
2	12SK7	11.4 M.A.
3	12SQ7	.09 MA.
4	35L6GT	40. MA.
5	35Z5GT	62.5 MA.

Schematic Diagram

P-925244-2



Location of Controls

Voltages measured with Chanalyst or VoltOhmyst and should hold within ±20%.

PHONOGRAPH ATTACHMENT

A jack is provided on the rear of the chassis for connecting a phonograph attachment. (Note: the socket on top of chassis is for speaker.) The output cable of the attachment should be terminated in a Stock No. 31048 plug. It must be removed for radio reception.

CRITICAL LEAD DRESS

1. Dress blue lead of output transformer close to chassis.
2. Dress C1 away from antenna coil winding.
3. Keep body of C12 away from chassis base.
4. Keep green wire from phono jack to terminal board taut and away from blue lead of output transformer.
5. Dress R11 against back apron of chassis.
6. Keep C23 away from blue lead of output transformer.
7. Dress C19 close to chassis base.

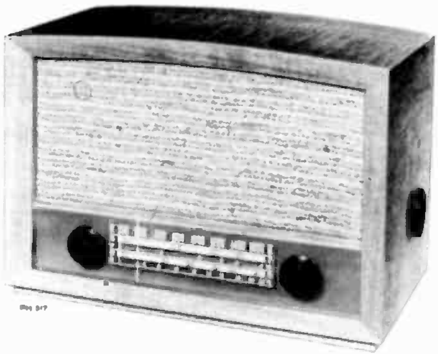
RCA
MODEL 6Q33

Chassis No. RC-1054A—Mfr. No. 274

Service Data

1948....X8

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.



Specifications

Tuning Ranges

Standard Broadcast ("A" Band)	535-1680 kc (560-179 m)
Medium Wave ("B" Band)	2.3-7 mc (131-42.8 m)
Short Wave ("C" Band)	7-22 mc (42.8-13.7 m)

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-12SA7	Converter
(2) RCA-12SF7	I.F. Amp.—Det.—A.V.C.
(3) RCA-12SC7	A.F. Amp.—Ph. Inverter
(4) RCA-35L6GT	Push-pull Output
(5) RCA-35L6GT	Push-pull Output

Dial Lamps (2) .... Mazda No. 47, 6.3 volts, .15 amp.

A selenium rectifier is used.

Power Supply Ratings

105-125 volts D.C. or 25 to 100 cycles A.C.	30 watts
*205-250 volts D.C. or 25 to 100 cycles A.C.	70 watts

* A resistor plug, for which a socket is provided on the chassis, is required.

Power Output

Maximum	3.75 watts
Undistorted	2.6 watts

Tuning Drive Ratio .... 18:1 (9 turns of knob)

Cabinet Dimensions

Height—9 in. (23 cm) Width—14-9/16 in. (37 cm) Depth—7¾ in. (19.5 cm)

Loudspeaker

Type 92573-3 .... 5 in. x 7 in. (12.7 x 17.8 cm) Permanent-Magnet Dynamic

Voice-coil Impedance .... 3.2 ohms at 400 cycles

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1054A
S-4435	Bracket—Dial cord pulley bracket—R.H. complete with four pulleys
S-4436	Bracket—Dial cord pulley bracket—L.H. complete with one pulley
S-4437	Bracket—Tuning shaft bracket
S-4605	Capacitor—Ceramic, 10 mmf (C23)
S-4606	Capacitor—Ceramic, 15 mmf (C40)
S-4439	Capacitor—Mica, 220 mmf (C30, C39)
S-4440	Capacitor—Mica, 560 mmf (C4)
S-4441	Capacitor—Mica, 3300 mmf (C3)
S-4442	Capacitor—Mica, 6000 mmf (C15)
S-4607	Capacitor—Tubular, .0022 mf, 600 v (C28)
S-4541	Capacitor—Tubular, .0033 mf, 600 v (C31)
S-4608	Capacitor—Tubular, .0056 mf, 400 v (C32)
S-4609	Capacitor—Tubular, .01 mf, 600 v (C37, C38)
S-4444	Capacitor—Tubular, .01 mf, 400 v (C1, C2)
S-4610	Capacitor—Tubular, .01 mf, 400 v (C36)
S-4447	Capacitor—Tubular, .033 mf, 400 v (C26)
S-4611	Capacitor—Tubular, .033 mf, 400 v (C25)
S-4448	Capacitor—Tubular, .047 mf, 200 v (C19)
S-4449	Capacitor—Tubular, .056 mf, 400 v (C10, C12, C20, C29)
S-4450	Capacitor—Trimmer capacitor, dual, 1.6-18 mmf (C8, C9)
S-4451	Capacitor—Trimmer capacitor, triple, two sections of 3-35 mmf and one section of 4-70 mmf (C5, C6, C7)
S-4612	Capacitor—Electrolytic, 5 mfd, 25 volts (C33)
S-4613	Capacitor—Electrolytic, comprising one section 80 mfd, 150 volts, and one section 50 mfd, 150 volts (C34A, C34B)
S-4453	Capacitor and resistor assembly—comprising 39 mmf capacitor and 10 ohm resistor (C14, R5)
S-4614	Capacitor and resistor assembly—comprising two 105 mmf capacitors and one 47,000 ohm resistor (C24, C27, R11)
S-4454	Clip—I-F transformer mounting clip
S-4455	Coil—Antenna coil (L1, L2, L3, L4)
S-4660	Coil—Oscillator coil (L5, L6, L7)
S-4457	Coil—Peaking coil and resistor assembly (250 microhenry coil and 560 ohm resistor) (L8, R3)
S-4313	Cord—Drive cord (approx. 49 in. required)
S-4459	Core—Adjustable core and stud for oscillator coil
S-4460	Cord—Power cord
S-4461	Condenser—Variable tuning condenser and pulley assembly (C11, C13, C16)
S-4615	Control—Volume control and power switch (R13, S2)
S-4463	Grommet—Rubber grommet for mounting 12SA7 tube socket (two required)
S-4464	Grommet—Rubber grommet for mounting tuning condenser (four required)
S-4465	Jack—Phono input jack (J1)
S-4466	Plate—Bakelite plate for mounting electrolytic capacitor
S-4467	Plate—Dial back plate
S-4616	Rectifier—Selenium rectifier
S-4617	Resistor—Flexible, wire wound, 50 ohm, 3 watt (R6)
S-4618	Resistor—Voltage regulating, 95 ohm (cold value) (R7)
S-4619	Resistor—Fixed, composition, 120 ohms, 1 watt (R21)
S-4471	Resistor—Fixed, composition, 1000 ohms, 1 watt (R19)
S-4620	Resistor—Fixed, composition, 3900 ohms, ½ watt (R16)
S-4621	Resistor—Fixed, composition, 15,000 ohms, ½ watt (R14)
S-4622	Resistor—Fixed, composition, 18,000 ohms, ½ watt (R18)
S-4623	Resistor—Fixed, composition, 39,000 ohms, ½ watt (R10)
S-4474	Resistor—Fixed, composition, 56,000 ohms, ½ watt (R4)
S-4559	Resistor—Fixed, composition, 270,000 ohms, ½ watt (R9, R15)
S-4475	Resistor—Fixed, composition, 330,000 ohms, ½ watt (R1)
S-4624	Resistor—Fixed, composition, 390,000 ohms, ½ watt (R12)
S-4476	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R2, R17, R20)
S-4478	Resistor—Fixed, composition, 4.7 megohms, ½ watt (R8)
S-4479	Shaft—Tuning shaft
S-4480	Socket—Speaker socket
S-4481	Socket—Tube socket for 12SA7 tube
S-4482	Socket—Tube socket for 12SF7 and 12SC7 tubes
S-4483	Socket—Tube socket for plug-in resistor and 35L6GT tubes
S-4484	Socket—Dial lamp socket assembly
S-4485	Spring—Drive cord spring
S-4486	Switch—Range switch (S1)
S-4625	Switch—Tone control switch (S3)
S-4487	Transformer—First I.F. transformer (T1)
S-4662	Transformer—Second I.F. transformer (T2)
S-4663	Transformer—Output transformer (T3)
S-4490	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLY
S-4665	Cone—Cone and voice coil
S-4491	Plug—Male pin plug for speaker cable
S-4664	Speaker—5" x 7" PM speaker complete with cone and connecting cable
	MISCELLANEOUS
S-4626	Back—Back cover for cabinet
S-4627	Baffle—Baffle board and grille cloth complete with speaker mounting screws—less emblem
S-4628	Cloth—Grille cloth (8" x 15")
S-4498	Dial—Dial scale
S-4499	Emblem—Trademark emblem (RCA)
S-4500	Emblem—Trademark emblem (RCA Victor)
S-4501	Fastener—Push fastener for back cover (4 required)
S-4502	Grommet—Rubber grommet for chassis mounting (4 required)
S-4503	Grommet—Rubber grommet for speaker mounting (4 required)
S-4504	Indicator—Station indicating pointer
S-4629	Knob—Range switch knob
S-4630	Knob—Tuning or tone control knob
S-4631	Knob—Volume control knob
31480	Lamp—Dial lamp, Mazda type 47
S-4632	Plug—Plug and shell for 105-125 volt operation
S-4666	Resistor—Plug-in resistor for 210-250 volt operation

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACMENT PARTS

6Q33

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the Schematic Diagram.

Output Meter Alignment If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output low to avoid a-v-c action.

NOTE If the test-oscillator is A.C. operated it may be necessary to use an isolation transformer (117v 117v) for the receiver during alignment and connect the low side of the test oscillator to common wiring—reversal of the plug may reduce hum.

Calibration Scale

The dial scale may be readily removed from the cabinet and used as a reference during alignment or the marks on the dial back plate which correspond to the frequencies indicated on the illustration "Dial Indicator and Drive Mechanism" may be used for reference.

Dial Pointer—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

For additional information refer to booklet "RCA Victor Receiver Alignment."

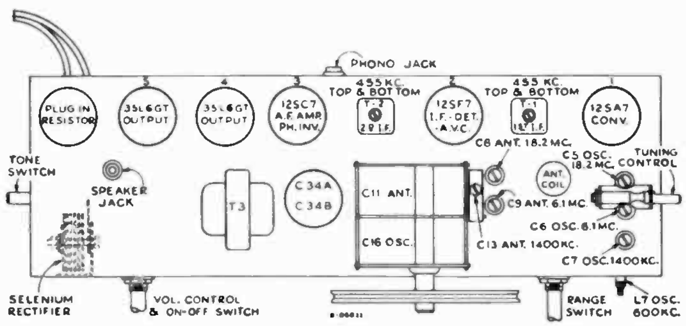
Step	Connect high side of test osc. to—	Tune test osc. to—	Range switch	Turn radio dial to—	Adjust for max. output
1	12SF7 grid (pin #2) in series with .01 mf	455 kc	A	Quiet point near 600 kc	T-2 top & bottom
2	12SA7 grid (pin #8) in series with .01 mf				T-1* top & bottom
3	Antenna lead in series with 220 mmf	1400 kc	A	1400 kc	C7 osc. C13 ant.
4		600 kc		600 kc	L7 osc. (rock gang)
5	Repeat steps 3 and 4				
6	Antenna lead in series with 300 ohms	6.1 mc	B	6.1 mc	C6 osc. C9 ant.
7		18.2 mc	C	18.2 mc	C5 osc.† C8 ant.‡

* Do not readjust T-2.

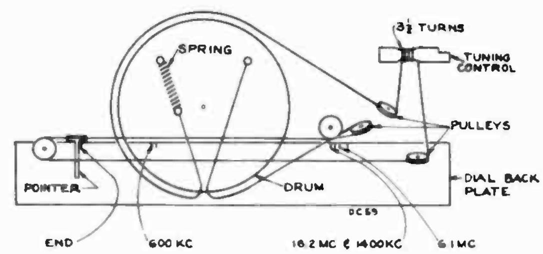
† If two peaks are found adjust C5 at minimum capacity peak.

‡ Rock gang while adjusting C8 use maximum capacity peak.

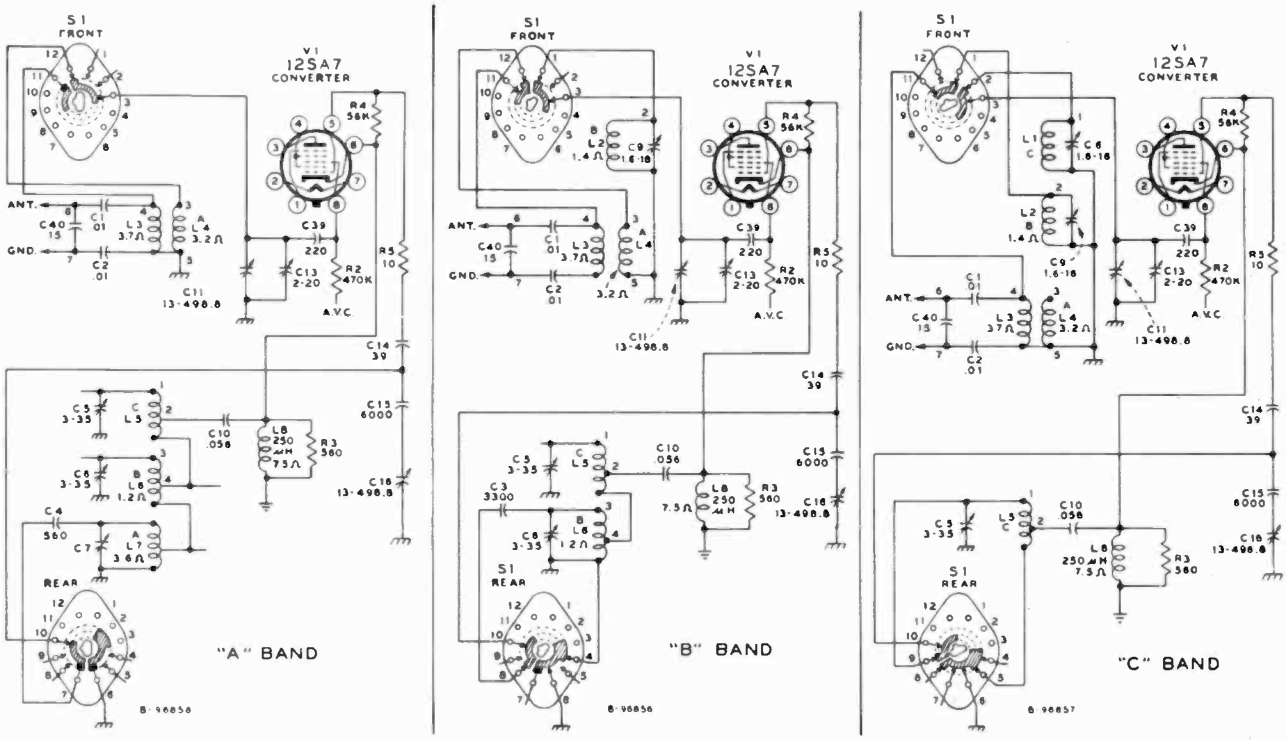
NOTE: Oscillator tracks above signal on all bands.



Tube and Trimmer Location



Dial Indicator and Drive Mechanism

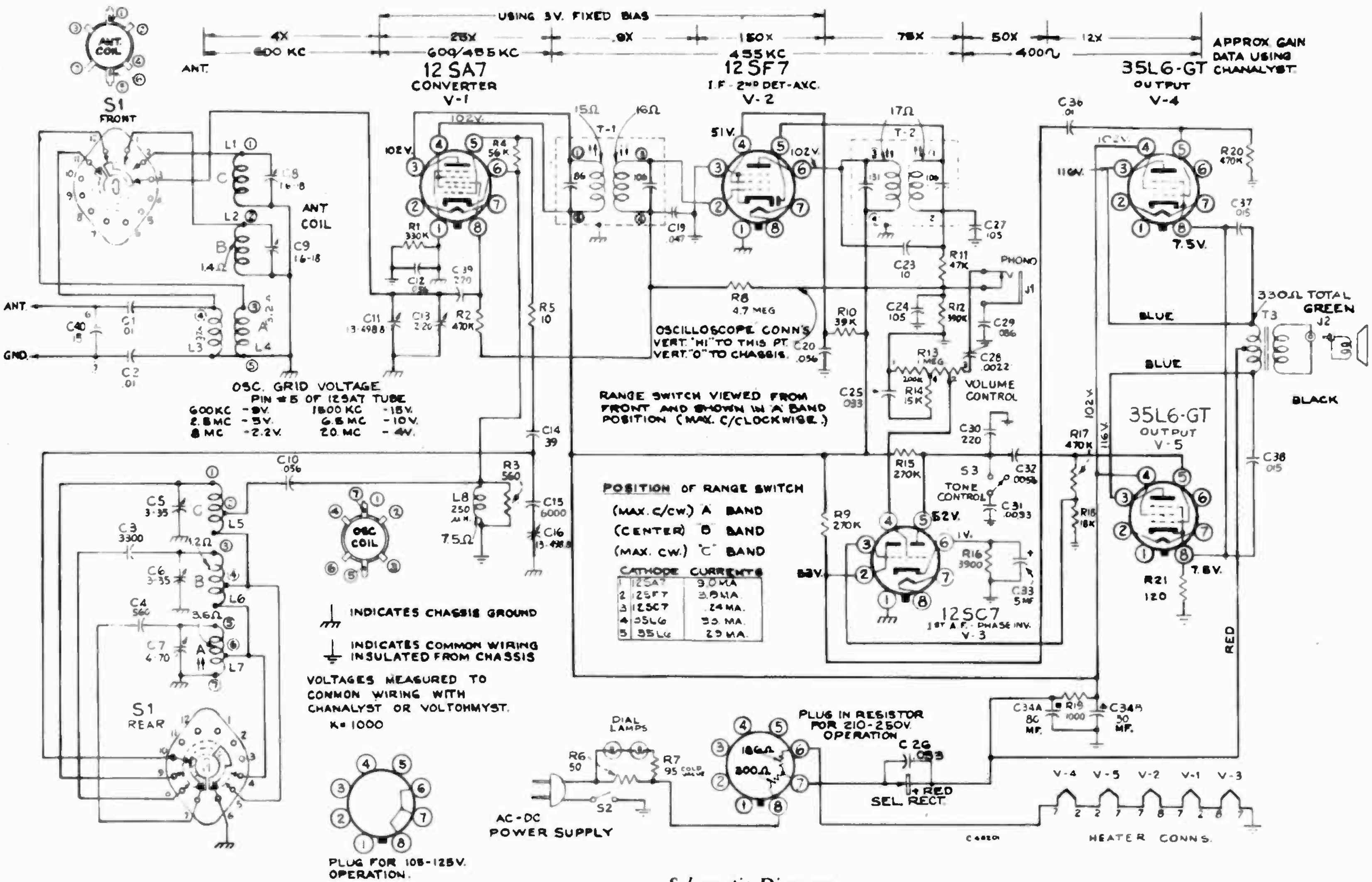


Simplified Schematic Diagrams—Antenna and Oscillator Circuits

PHONOGRAPH ATTACHMENT

A jack is provided on the rear of the chassis for connecting a phonograph attachment. (Note: the socket on top of chassis is for speaker.) The output cable of the attachment should be terminated in a Stock No. 31048 plug. It must be removed for radio reception.

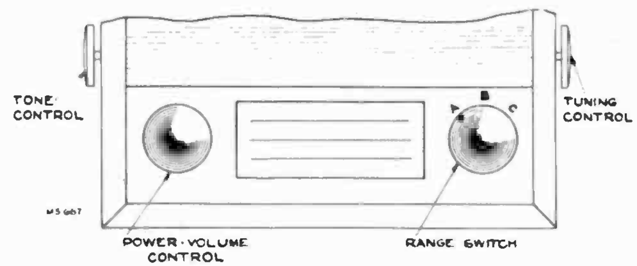
POWER SUPPLY POLARITY—For operation on D.C. the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On A.C. reversal of the plug may reduce hum.



Schematic Diagram

CRITICAL LEAD DRESS

1. Dress C1 away from antenna coil windings.
2. The lead from term. #1 of the antenna coil to term. #2 of S1 should be 3¼ inches in length.
3. All leads from the antenna and oscillator coils should be kept short and away from coil windings.
4. Dress C14-R5 away from chassis base and away from C10.
5. Keep body of C39 away from chassis.
6. Keep green wire from phono jack to terminal board taut and away from other leads.
7. Dress green lead connecting volume control to term. #4 of 12SC7 socket up and away from other leads.
8. Dress C28 against front apron of chassis.
9. Dress C32 away from V4 (35L6GT) socket.
10. Dress output transformer leads down next to chassis.



Location of Controls

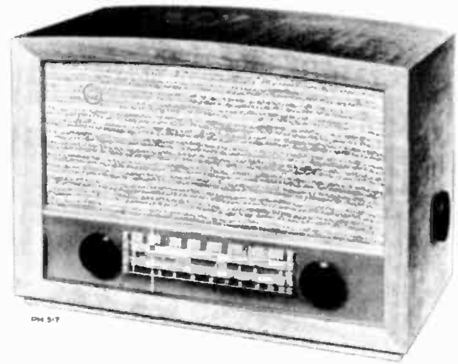
RCA VICTOR MODEL 6Q33X

Chassis No. RC-1054B—Mfr. No. 274

Service Data

1949....X2

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.



Specifications

Tuning Ranges

Long Wave ("X" Band)	150-380 kc (2000-789.5 m)
Standard Broadcast ("A" Band)	525-1605 kc (571-186.9 m)
Short Wave ("C" Band)	5.9-18 mc (50.82-16.66 m)

Intermediate Frequency .... 455 kc

Tube Complement

(1)	RCA-12SA7	Converter
(2)	RCA-12SF7	I.F. Amp.—Det.—A.V.C.
(3)	RCA-12SC7	A.F. Amp.—Ph. Inverter
(4)	RCA-35L6GT	Push-pull Output
(5)	RCA-35L6GT	Push-pull Output

A selenium rectifier is used.

Dial Lamps (2) .... Mazda No. 47, 6.3 volts, .15 amp.

Power Supply Rating

*210-250 volts d.c. or 25 to 100 cycles a.c. .... 70 watts

* This instrument may be operated on 105-125 volts d.c. or 25 to 100 cycles a.c. by replacing the plug-in resistor with a shorting plug.

Loudspeaker (92573-3)

Size and Type	5" x 7" (12.7 x 17.8 cm) P-M Dynamic
Voice-coil Impedance	3.2 ohms at 400 cycles

Power Output

Maximum	3.75 watts
Undistorted	2.6 watts

Tuning Drive Ratio .... 18:1 (9 turns of knob)

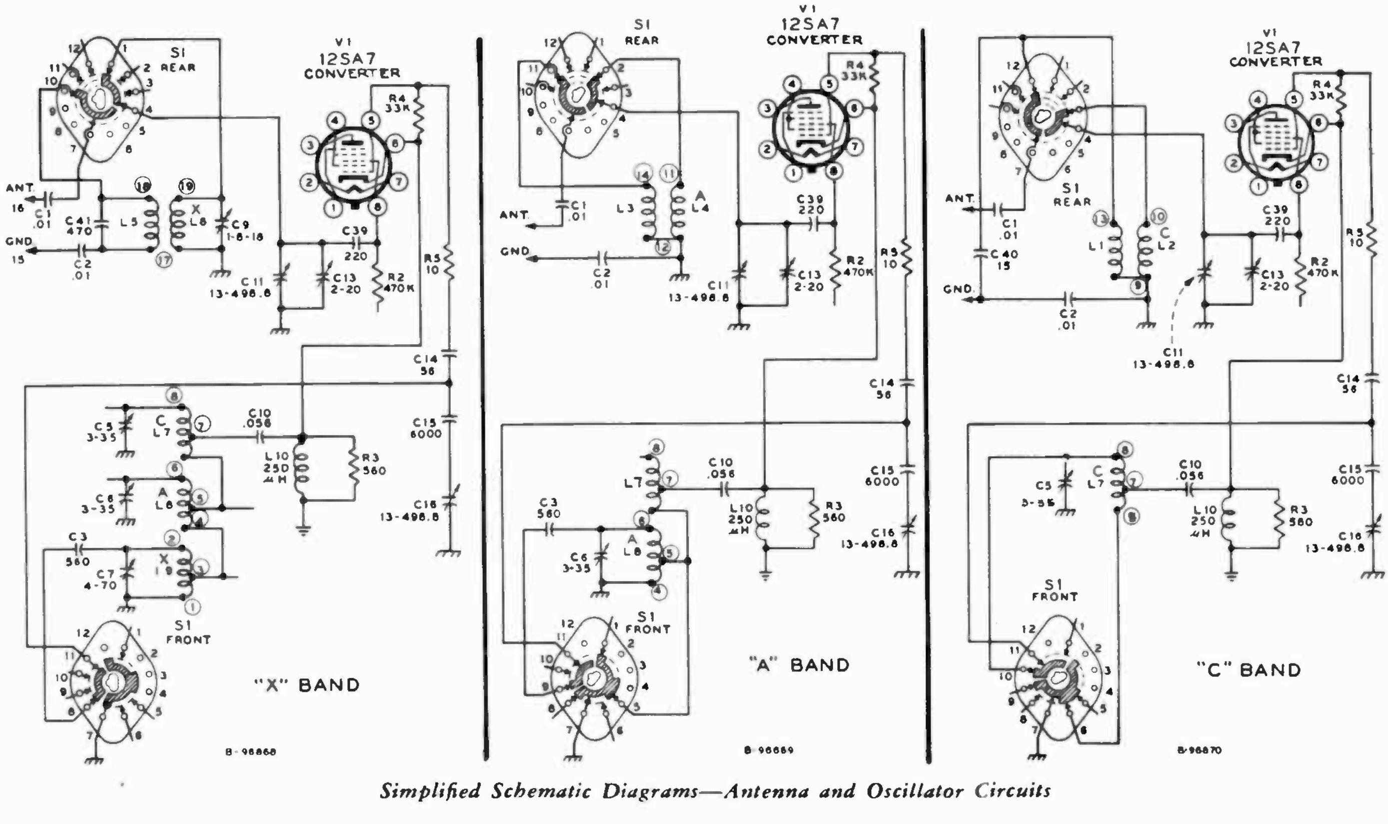
Cabinet Dimensions

Height $10\frac{7}{8}$"	Width $14\frac{15}{16}$"	Depth $7\frac{7}{8}$"
(28 cm)	(38 cm)	(20 cm)

PHONOGRAPH ATTACHMENT

A jack is provided on the REAR OF THE CHASSIS for connecting a phonograph attachment. The attachment must be disconnected for radio reception.

POWER SUPPLY POLARITY—For operation on d.c. the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a.c. reversal of the plug may reduce hum.



Simplified Schematic Diagrams—Antenna and Oscillator Circuits

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown in the Schematic Diagram

Output Meter Alignment—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output low to avoid a-v-c action.

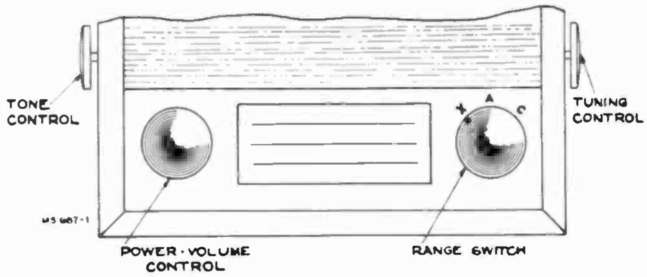
NOTE—If the test-oscillator is a.c. operated it may be necessary to use an isolation transformer for the receiver during alignment and to connect the low side of the test oscillator to common wiring—reversal of the plug may reduce hum.

Calibration Scale

The dial scale may be readily removed from the cabinet and used as a reference during alignment or the marks on the dial back plate which correspond to the frequencies indicated on the illustration "Dial Indicator and Drive Mechanism" may be used for reference.

Dial Pointer—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

For additional information refer to booklet "RCA Victor Receiver Alignment."



Location of Controls

CRITICAL LEAD DRESS

1. Dress output transformer leads down to chassis.
2. Dress heater leads down to chassis.
3. Dress dial lamp leads away from tone control.
4. Dress lead from terminal #3 of S1 rear between C1 and antenna coil.
5. Dress C14—R5 away from C8.
6. Dress lead from terminal #8 of osc. coil L7 away from C8 and its connecting lead.
7. All leads to rubber mounted parts should be kept flexible.
8. Dress C29 away from T2 and down near chassis.

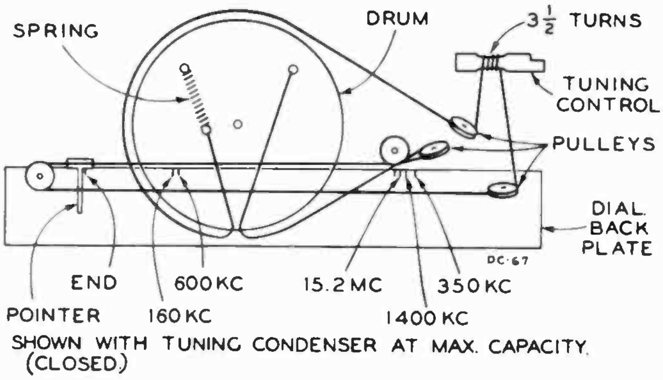
Step	Connect high side of test osc. to—	Tune test osc. to—	Range switch	Turn radio dial to—	Adjust for max. output
1	12SF7 grid (pin #2) in series with .01 mf	455 kc	A	Quiet point near 600 kc	T-2 top & bottom
2	12SA7 grid (pin #8) in series with .01 mf				T-1* top & bottom
3	Ant. lead in series with 220 mmf	1400 kc	A	1400 kc	C6 osc. C13 ant.
4		600 kc		600 kc	L8 osc. (rock gang)
5	Repeat Steps 3 and 4				
6	Ant. lead in series with 300 ohms	15.2 mc	C	15.2 mc	C5 osc.† C8 ant.‡
7	Ant. lead in series with 220 mmf	350 kc	X	350 kc	C7 osc. C9 ant.
8		160 kc		160 kc	L9 osc. L6 ant.
9	Repeat Steps 7 and 8				

* Do not readjust T-2.

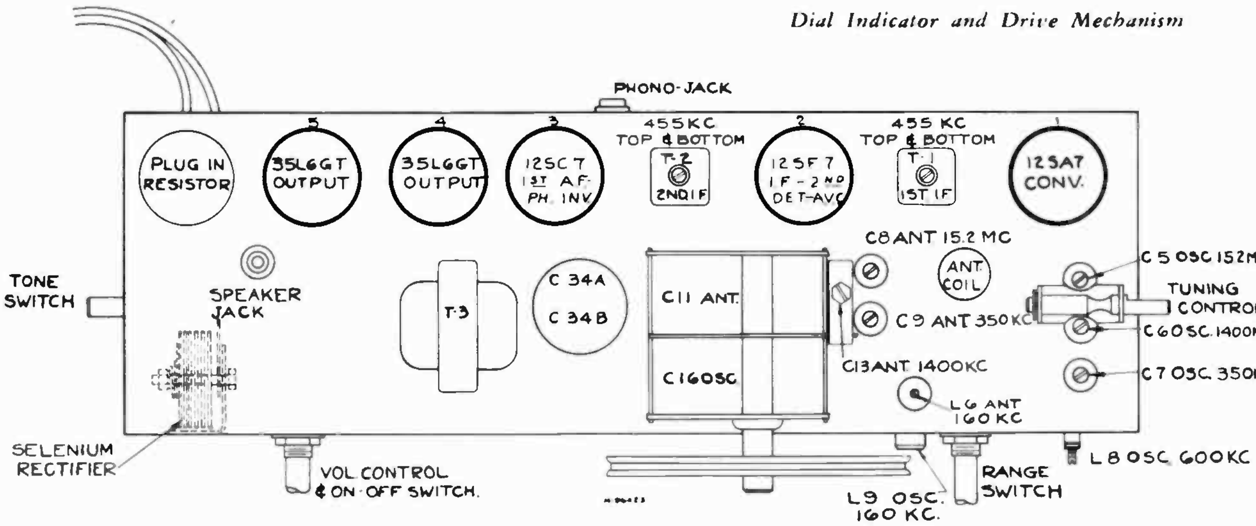
† If two peaks are found adjust C5 at minimum capacity peak.

‡ Rock gang while adjusting C8—use maximum capacity peak.

NOTE: Oscillator tracks above signal on all bands.

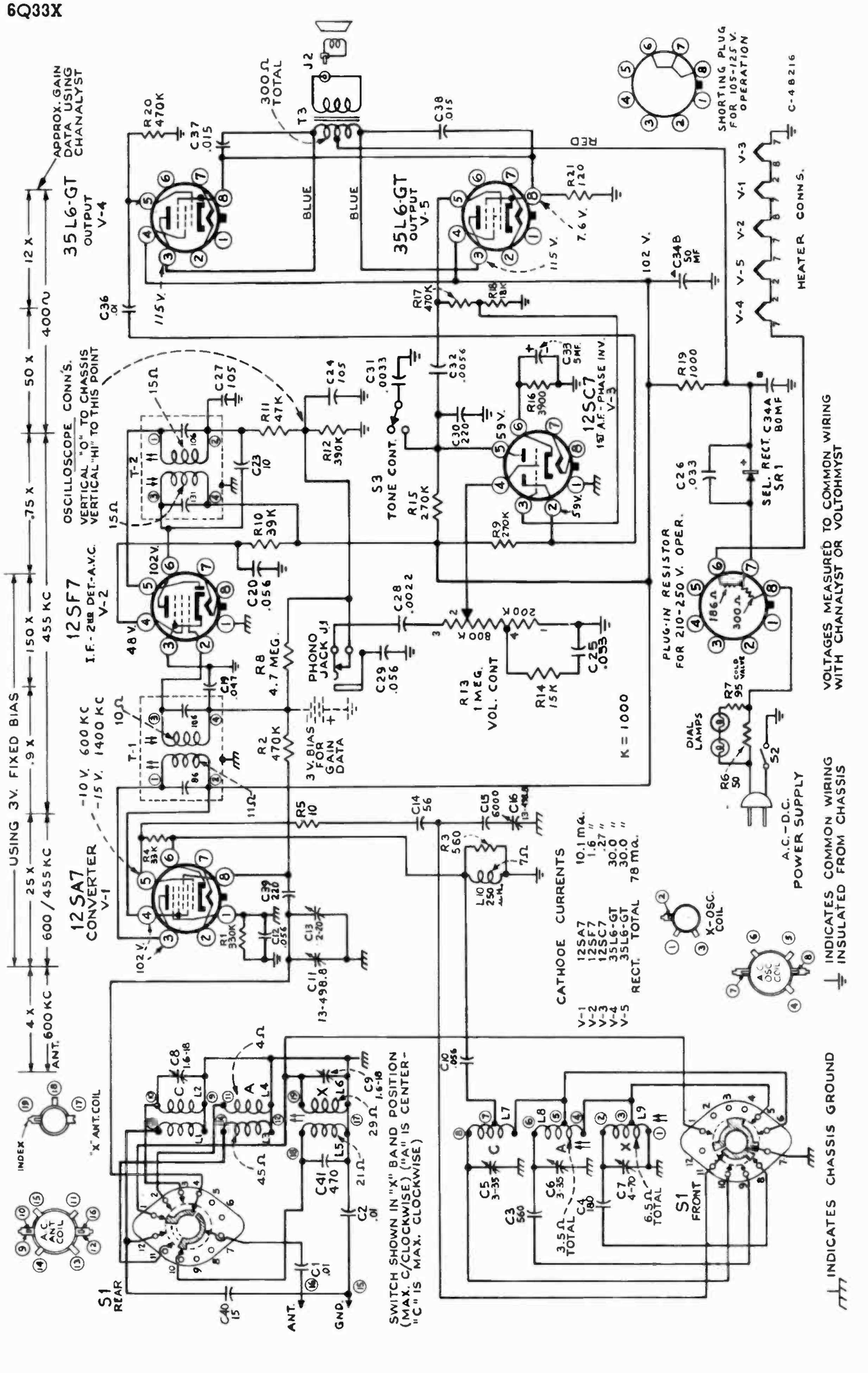


Dial Indicator and Drive Mechanism



Tube and Trimmer Locations

6Q33X



Schematic Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1054B
S-4435	Bracket—Dial cord pulley bracket—R.H. complete with four pulleys
S-4436	Bracket—Dial cord pulley bracket—L.H. complete with one pulley
S-4437	Bracket—Tuning shaft bracket
S-4605	Capacitor—Ceramic, 10 mmf. (C23)
S-4606	Capacitor—Ceramic, 15 mmf. (C40)
S-5017	Capacitor—Mica, 180 mmf. (C4)
S-4439	Capacitor—Mica, 220 mmf. (C20, C39)
S-5018	Capacitor—Mica, 470 mmf. (C41)
S-4440	Capacitor—Mica, 560 mmf. (C3)
S-4442	Capacitor—Mica, 6000 mmf. (C15)
S-4607	Capacitor—Tubular, .0022 mf., 600v (C28)
S-4541	Capacitor—Tubular, .0033 mf., 600v (C31)
S-4608	Capacitor—Tubular, .0056 mf., 400v (C32)
S-4609	Capacitor—Tubular, .01 mf., 600v (C37, C38)
S-4444	Capacitor—Tubular, .01 mf., 400v (C1, C2)
S-4610	Capacitor—Tubular, .01 mf., 400v (C36)
S-4447	Capacitor—Tubular, .033 mf., 400v (C26)
S-4611	Capacitor—Tubular, .033 mf., 400v (C25)
S-4448	Capacitor—Tubular, .047 mf., 200v (C19)
S-4449	Capacitor—Tubular, .056 mf., 400v (C10, C12, C20, C29)
S-4450	Capacitor—Trimmer capacitor, dual, 1.6-18 mmf. (C8, C9)
S-4451	Capacitor—Trimmer capacitor, triple, two sections of 3-35 mmf. and one section of 4-70 mmf. (C5, C6, C7)
S-4612	Capacitor—Electrolytic, 5 mfd., 25 volts (C33)
S-4613	Capacitor—Electrolytic, comprising one section 80 mfd., 150 volts & one section 50 mfd., 150 volts (C34A, C34B)
S-5019	Capacitor & resistor assembly—comprising 56 mmf. capacitor & 10 ohm resistor (C14, R5)
S-4614	Capacitor & resistor assembly—comprising two 105 mmf. capacitors & one 47,000 ohm resistor (C24, C27, R11)
S-4454	Clip—I-F transformer mounting clip
S-5022	Coil—Antenna coil—A and C bands (L1, L2, L3, L4)
S-5023	Coil—Antenna coil—X band—with adjustable core (L5, L6)
S-5024	Coil—Oscillator coil—A and C bands (L7, L8)
S-5025	Coil—Oscillator coil—X band—with adjustable core (L9)
S-4457	Coil—Peaking coil & resistor assembly (250 micro-henry coil & 560 ohm resistor) (L8, R3)
S-4313	Cord—Drive cord (approx. 49 in. required)
S-4459	Core—Adjustable core & stud for A band oscillator coil
S-4636	Cord—Power cord
S-4461	Condenser—Variable tuning condenser & pulley assembly (C11, C13, C16)
S-4615	Control—Volume control & power switch (R13, S2)
S-4463	Grommet—Rubber grommet for mounting 12SA7 tube socket (two required)
S-4464	Grommet—Rubber grommet for mounting tuning condenser (four required)
S-4465	Jack—Phono input jack (J1)
S-4466	Plate—Bakelite plate for mounting electrolytic capacitor
S-4467	Plate—Dial back plate

STOCK No.	DESCRIPTION
S-4829	Rectifier—Selenium rectifier (SR1)
S-4617	Resistor—Flexible, wire wound, 50 ohms, 3 watts (R6)
S-4618	Resistor—Voltage regulating, 95 ohms (cold value) (R7)
S-4619	Resistor—Fixed, composition, 120 ohms, 1 watt (R21)
S-4471	Resistor—Fixed, composition, 1000 ohms, 1 watt (R19)
S-4620	Resistor—Fixed, composition, 3900 ohms, ½ watt (R16)
S-4621	Resistor—Fixed, composition, 15,000 ohms, ½ watt (R14)
S-4622	Resistor—Fixed, composition, 18,000 ohms, ½ watt (R18)
S-4472	Resistor—Fixed, composition, 33,000 ohms, ½ watt (R4)
S-4623	Resistor—Fixed, composition, 39,000 ohms, ½ watt (R10)
S-4559	Resistor—Fixed, composition, 270,000 ohms, ½ watt (R9, R15)
S-4475	Resistor—Fixed, composition, 330,000 ohms, ½ watt (R1)
S-4624	Resistor—Fixed, composition, 390,000 ohms, ½ watt (R12)
S-4476	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R2, R17, R20)
S-4478	Resistor—Fixed, composition, 4.7 megohms, ½ watt (R8)
S-4479	Shaft—Tuning shaft
S-4480	Socket—Speaker socket (J2)
S-4481	Socket—Tube socket for 12SA7 tube
S-4482	Socket—Tube socket for 12SF7 & 12SC7 tubes
S-4483	Socket—Tube socket for plug-in resistor and 35L6GT tubes
S-4484	Socket—Dial lamp socket assembly
S-4485	Spring—Drive cord spring
S-5020	Switch—Range switch (S1)
S-4625	Switch—Tone control switch (S3)
S-4487	Transformer—First I.F. transformer (T1)
S-4662	Transformer—Second I.F. transformer (T2)
S-4663	Transformer—Output transformer (T3)
S-4490	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLY (STAMPED 92573-3)
S-4665	Cone—Cone and voice coil
S-4491	Plug—Male pin plug for speaker cable
S-4664	Speaker—5" x 7" PM speaker complete with cone & connecting cable
	MISCELLANEOUS
S-4626	Back—Back cover for cabinet
S-4627	Baffle—Baffle board & grille cloth complete with speaker mounting screws—less emblem
S-4628	Cloth—Grille cloth (8" x 15")
S-5021	Dial—Dial scale
S-4499	Emblem—Trademark emblem (RCA)
S-4501	Fastener—Push fastener for back cover (4 required)
S-4502	Grommet—Rubber grommet for chassis mounting (4 required)
S-4503	Grommet—Rubber grommet for speaker mounting (4 required)
S-4504	Indicator—Station indicating pointer
S-4629	Knob—Range switch knob
S-4630	Knob—Tuning or tone control knob
S-4631	Knob—Volume control knob
S-4893	Lamp—Dial lamp—Mazda type 47
S-4632	Plug—Plug and shell for 105-125 volt operation
S-4666	Resistor—Plug-in resistor for 210-250 volt operation
S-4511	Spacer—Metal spacer for speaker mounting (4 required)

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA

Radio-Phonograph Combination

Models 6QU3, 6QV3

Chassis No. RC-1054C RC-1054D

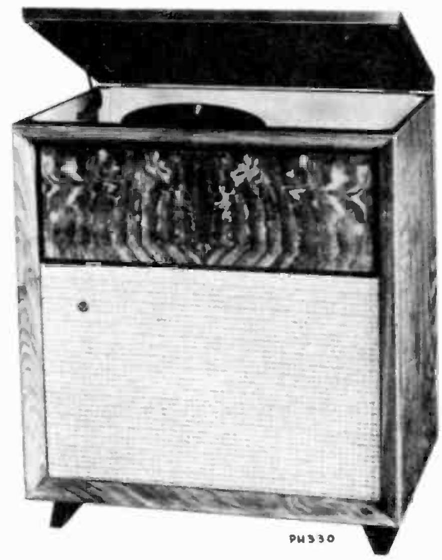
Mfr. No. 274

Service Data

1948....X9

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Model 6QU3



Model 6QV3

FOR RECORD CHANGER INFORMATION REFER TO SERVICE DATA FOR MODEL RP-178 (except for the motor used in the record changer).

Specifications

Tuning Ranges

Standard Broadcast ("A" Band)	535-1680 kc. (560-179 m.)
Medium Wave ("B" Band)	2.3-7 mc. (131-42.8 m.)
Short Wave ("C" Band)	7-22 mc. (42.8-13.7 m.)

Intermediate Frequency .... 455 kc.

Tube Complement

(1) RCA 12SA7	Converter
(2) RCA 12SF7	I.F. Amp.-Det.-A.V.C.
(3) RCA 12SC7	A.F. Amp.-Ph. Inverter
(4) RCA 35L6GT	Push Pull Output
(5) RCA 35L6GT	Push Pull Output

A selenium rectifier is used.

Dial Lamps (2) .... Mazda No. 47, 6.3 volts, .15 amp.

†Power Supply Ratings

105-125 volts, 50 or 60 cycles A.C.	55 watts
*210-250 volts, 50 or 60 cycles A.C.	100 watts

* A resistor plug, for which a socket is provided on the chassis, is required.

† Instruments are shipped for operation on 60 cycle power supply. They may be converted for 50 cycle operation by the addition of a conversion spring to the record changer motor (spring is supplied with the instrument).

Loudspeaker

Type 92573-3 (For Model 6QU3)	5 x 7 in. (12.7 x 17.8 cm.) PM dynamic
Type 92581-3 (For Model 6QV3)	12 in. (30.5 cm.) PM dynamic
Voice coil impedance (Model 6QU3)	3.2 ohms at 400 cycles
Voice coil impedance (Model 6QV3)	2.2 ohms at 400 cycles

Power Output

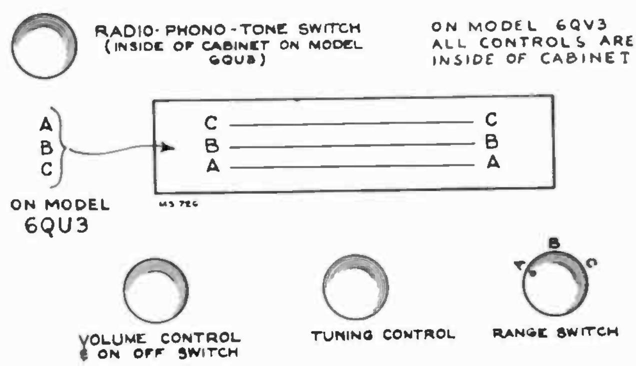
Undistorted	2.6 watts
Maximum	3.75 watts

Tuning Drive Ratio .... 18:1 (9 turns of knob)

Cabinet Dimensions

	Height	Width	Depth
Model 6QU3	10¼ in. (26 cm.)	16⅝ in. (42.2 cm.)	20½ in. (52 cm.)
Model 6QV3	29-7/16 in. (74.8 cm.)	24½ in. (62.2 cm.)	17 in. (43.2 cm.)

Record Changer	Model RP-178-3
Record capacity	Ten 12 in. (30.5 cm.) or twelve 10 in. (25.4 cm.) records



Location of Controls

CRITICAL LEAD DRESS

1. Dress C1 away from antenna coil windings.
2. The lead from term. #1 of the antenna coil to term. #2 of S1 should be 3¼ inches in length.
3. All leads from the antenna and oscillator coils to the range switch should be kept short and away from coil windings.
4. Dress C14-R5 away from chassis base and away from C10.
5. Keep body of C39 away from chassis.
6. Keep blue lead of radio-phono switch cable taut and away from other leads.
7. Dress green lead, connecting volume control to terminal #4 of 12SC7 socket, up and away from other leads.
8. Dress C28 against front apron of chassis.
9. Dress C32 away from V4 (35L6GT) socket.
10. Dress output transformer leads down next to chassis.

Alignment Procedure

Test-Oscillator For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output low to avoid a-v-c action.

Note: If the test-oscillator is a-c operated, it may be necessary to use an isolation transformer (117v./117v.) for the receiver during alignment and connect the low side of the test-oscillator to common wiring reversal of the plug may reduce hum.

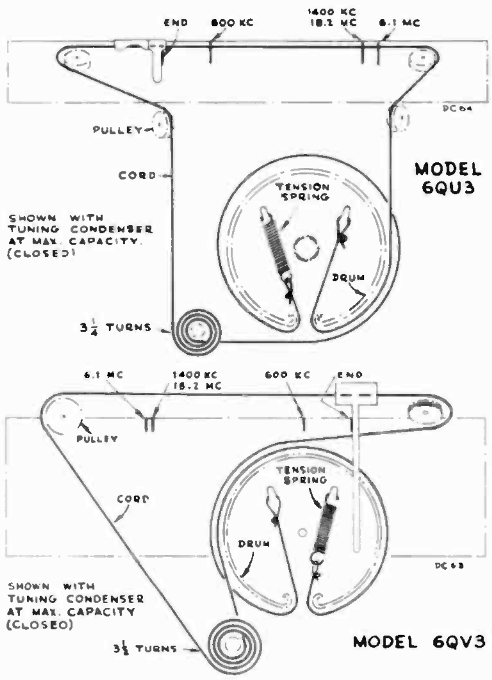
Calibration Scale The dial scale may be readily removed from the cabinet and used as a reference during alignment—or the marks on the dial back plate which correspond to the frequencies indicated on the illustration "Dial Indicator and Drive Mechanism" may be used for reference.

Dial Pointer With the gang condenser in full mesh the dial pointer should be set to the end reference mark on the dial backing plate.

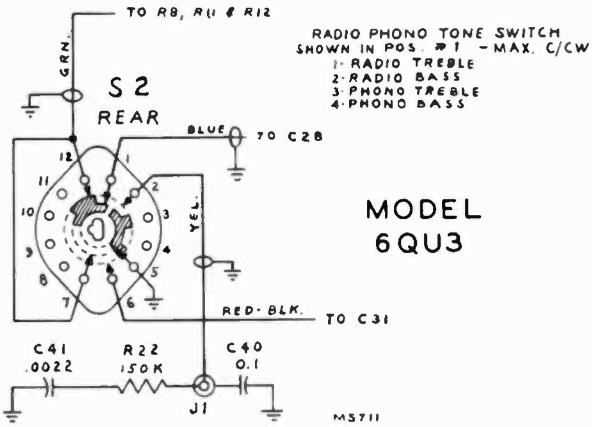
For additional information refer to booklet "RCA Victor Receiver Alignment."

Step	Connect high side of test osc. to—	Tune test osc. to—	Range switch	Turn radio dial to—	Adjust for max. output
1	12SF7 grid (pin #2) in series with .01 mf	455 kc	A	Quiet point near 600 kc	T-2 top & bottom
2	12SA7 grid (pin #8) in series with .01 mf				T-1* top & bottom
3	Antenna lead in series with 220 mmf	1400 kc	A	1400 kc	C7 osc. C13 ant.
4		600 kc		600 kc	L7 osc. (rock gang)
5	Repeat steps 3 and 4				
6	Antenna lead in series with 300 ohms	6.1 mc	B	6.1 mc	C6 osc. C9 ant.
7		18.2 mc	C	18.2 mc	C5 osc.† C8 ant.‡

* Do not readjust T-2.
† If two peaks are found—adjust C5 at minimum capacity peak.
‡ Rock gang while adjusting C8—use maximum capacity peak.
NOTE: Oscillator tracks above signal on all bands.

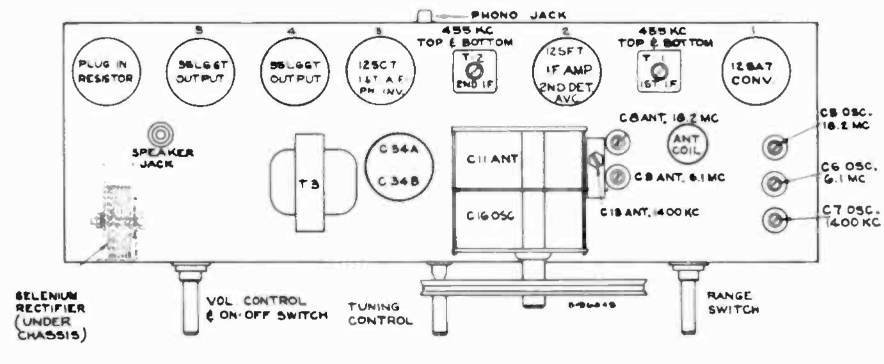


Dial Indicator and Drive Mechanism

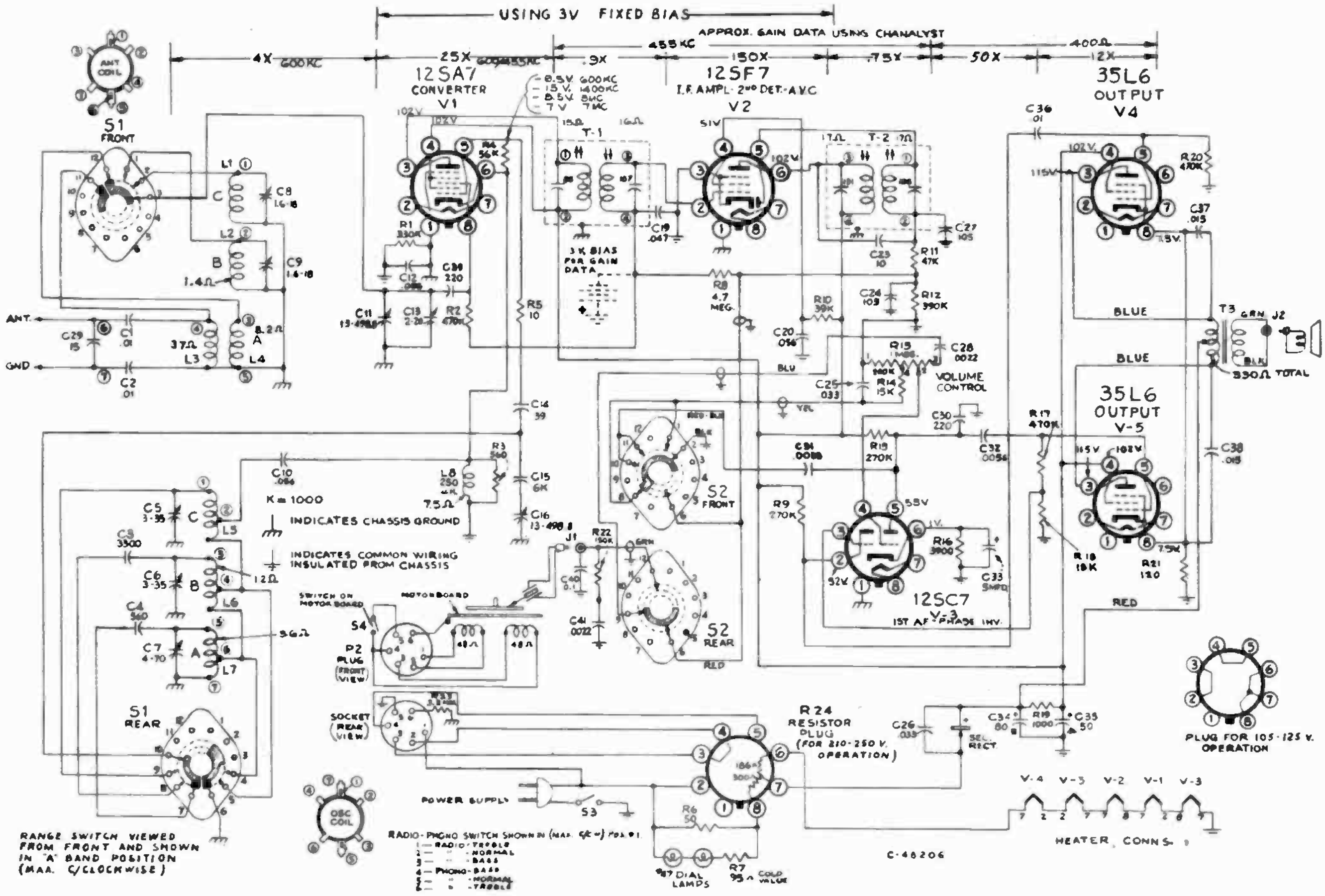


Model 6QU3 Radio-Phono-Tone Switch

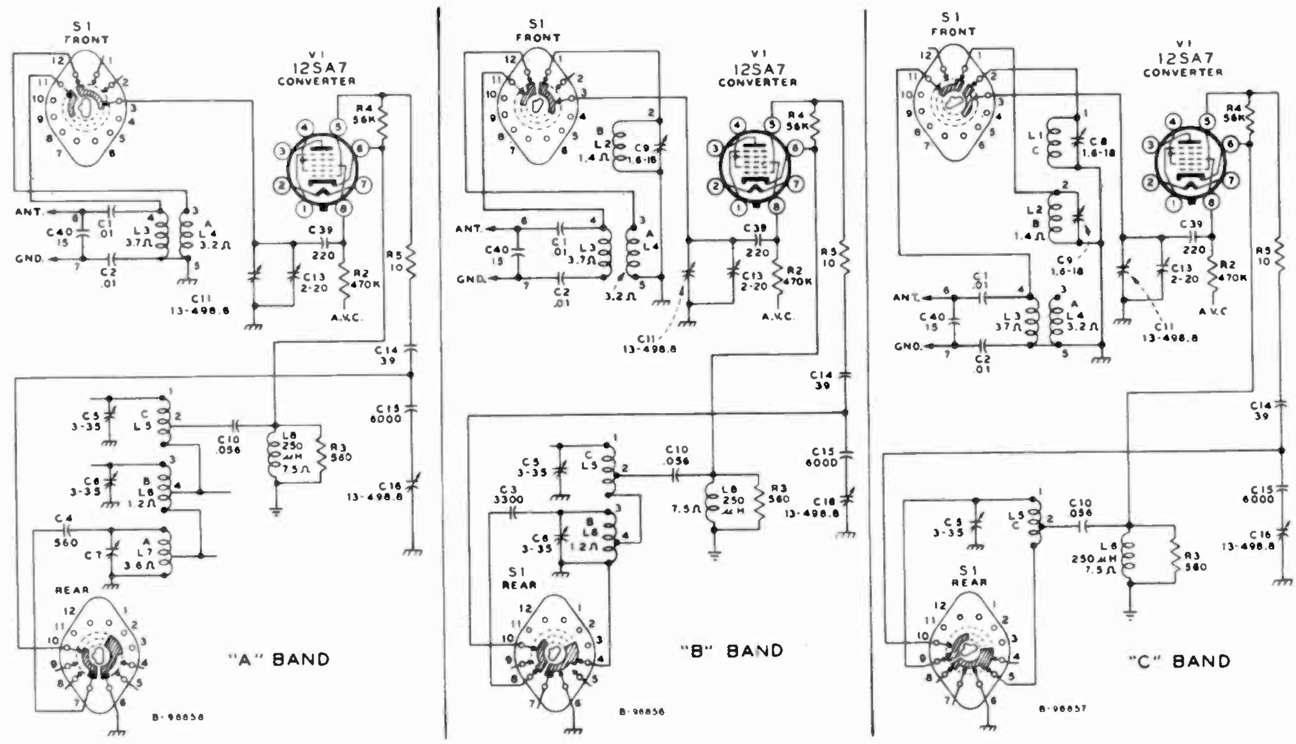
The Radio-Phono-Tone switch used on Model 6QU3 has four positions (Model 6QV3 has six positions). Note that no connections are made to the front section of the switch or to the junction of C25-R14. Otherwise both chassis are schematically identical.



Tube and Trimmer Locations



Schematic Diagram **Model 6QV3 Chassis No. RC-1054D**



Simplified Schematic Diagrams—Antenna and Oscillator Circuits

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC-1054 C—Model 6QU3
	RC-1054 D—Model 6QV3
S-4437	Bracket—Tuning shaft bracket—Model 6QU3
S-4605	Capacitor—Ceramic, 10 mmf. (C23)
S-4606	Capacitor—Ceramic, 15 mmf. (C29)
S-4439	Capacitor—Mica, 220 mmf. (C30, C39)
S-4440	Capacitor—Mica, 560 mmf. (C4)
S-4441	Capacitor—Mica, 3300 mmf. (C3)
S-4442	Capacitor—Mica, 6000 mmf. (C15)
S-4607	Capacitor—Tubular, .0022 mf., 600 v. (C28, C41)
S-4541	Capacitor—Tubular, .0033 mf., 600v. (C31)
S-4608	Capacitor—Tubular, .0056 mf., 400v. (C32)
S-4609	Capacitor—Tubular, .01 mf., 600v. (C37, C38)
S-4444	Capacitor—Tubular, .01 mf., 400v. (C1, C2)
S-4610	Capacitor—Tubular, .01 mf., 400v. (C36)
S-4447	Capacitor—Tubular, .033 mf., 400v. (C26)
S-4611	Capacitor—Tubular, .033 mf., 400v. (C25)
S-4448	Capacitor—Tubular, .047 mf., 200v. (C19)
S-4449	Capacitor—Tubular, .056 mf., 400v. (C10, C12, C20)
S-4634	Capacitor—Tubular, .1 mf., 400v. (C40)
S-4450	Capacitor—Trimmer capacitor, dual, 1.6-18 mmf. (C8, C9)
S-4451	Capacitor—Trimmer capacitor, triple, two sections of 3-35 mmf. and one section of 4-70 mmf. (C5, C6, C7)
S-4612	Capacitor—Electrolytic, 5 mfd., 25 volts (C33)
S-4613	Capacitor—Electrolytic, comprising one section 80 mfd., 150 volts and one section 50 mfd., 150 volts (C34A, C34B)
S-4453	Capacitor and resistor assembly—comprising 39 mmf. capacitor and 10 ohm resistor (C14, R5)
S-4614	Capacitor and resistor assembly—comprising two 105 mmf. capacitors and one 47,000 ohm resistor (C24, C27, R11)
S-4454	Clip—I-F transformer mounting clip
S-4455	Coil—Antenna coil (L1, L2, L3, L4)
S-4660	Coil—Oscillator coil (L5, L6, L7)
S-4661	Coil—Peaking coil and resistor assembly (250 micro-henry coil and 560 ohm resistor) (L8, R3)
S-4313	Cord—Drive cord (approx. 50 in. required)
S-4635	Core—Adjustable core and stud for oscillator coil
S-4636	Cord—Power cord—Model 6QU3
S-4682	Cord—Power cord—Model 6QV3
S-4461	Condenser—Variable tuning condenser and pulley assembly (C11, C13, C16)
S-4637	Control—Volume control and power switch—Model 6QU3 (R13, S3)
S-4683	Control—Volume control and power switch—Model 6QV3 (R13, S3)
S-4463	Grommet—Rubber grommet for mounting 12SA7 tube socket (two required)
S-4464	Grommet—Rubber grommet for mounting tuning condenser (four required)
S-4466	Plate—Bakelite plate for mounting electrolytic capacitor
S-4638	Plate—Dial back plate and pulley assembly—Model 6QU3
S-4684	Plate—Dial back plate and pulley assembly—Model 6QV3
S-4616	Rectifier—Selenium rectifier (SR1)
S-4617	Resistor—Flexible, wire wound, 50 ohm, 3 watt (R6)
S-4618	Resistor—Voltage regulating, 95 ohm (cold value) (R7)
S-4619	Resistor—Fixed, composition, 120 ohms, 1 watt (R21)
S-4471	Resistor—Fixed, composition, 1000 ohms, 1 watt (R19)
S-4620	Resistor—Fixed, composition, 3900 ohms, ½ watt (R16)
S-4621	Resistor—Fixed, composition, 15,000 ohms, ½ watt (R14)
S-4622	Resistor—Fixed, composition, 18,000 ohms, ½ watt (R18)
S-4623	Resistor—Fixed, composition, 39,000 ohms, ½ watt (R10)
S-4474	Resistor—Fixed, composition, 56,000 ohms, ½ watt (R4)
S-4639	Resistor—Fixed, composition, 150,000 ohms, ½ watt (R22)
S-4559	Resistor—Fixed, composition, 270,000 ohms, ½ watt (R9, R15)
S-4475	Resistor—Fixed, composition, 330,000 ohms, ½ watt (R1)
S-4624	Resistor—Fixed, composition, 390,000 ohms, ½ watt (R12)
S-4476	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R2, R17, R20)
S-4640	Resistor—Fixed, composition, 3.3 megohms, ½ watt (R23)
S-4478	Resistor—Fixed, composition, 4.7 megohms, ½ watt (R8)
S-4641	Shaft—Tuning shaft—Model 6QU3
S-4685	Shaft—Tuning shaft—Model 6QV3
S-4784	Socket—6 contact female socket and motor power cable
S-4480	Socket—Speaker socket or phono input socket (J1, J2)
S-4481	Socket—Tube socket for 12SA7 tube
S-4482	Socket—Tube socket for 12SF7 and 12SC7 tubes
S-4483	Socket—Tube socket for plug-in resistor or 35L6GT tubes
S-4462	Socket—Dial lamp socket assembly—Model 6QU3
S-4686	Socket—Dial lamp socket assembly—Model 6QV3
S-4485	Spring—Drive cord spring
S-4643	Switch—Range switch—Model 6QU3 (S1)
S-4687	Switch—Range switch—Model 6QV3 (S1)
S-4644	Switch—Radio-phono switch—Model 6QU3 (S2)
S-4688	Switch—Radio-phono switch—Model 6QV3 (S2)
S-4487	Transformer—First I.F. transformer (T1)
S-4662	Transformer—Second I.F. transformer (T2)
S-4663	Transformer—Output transformer—Model 6QU3 (T3)
S-4828	Transformer—Output transformer—Model 6QV3 (T3)
S-4490	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLY (92573-3) Model 6QU3
S-4665	Cone—Cone and voice coil
S-4491	Plug—Male pin plug for speaker cable
S-4664	Speaker—5" x 7" PM speaker complete with cone and connecting cable
	SPEAKER ASSEMBLY (92581-3) Model 6QV3
S-4689	Cone—Cone and voice coil
S-4491	Plug—Male pin plug for speaker cable
S-4690	Speaker—12 In. PM speaker complete with cone and connecting cable
	MODEL 6QU3—MISCELLANEOUS
S-4626	Back—Back cover for cabinet
S-4645	Baffle—Baffle board and grille cloth complete with speaker mounting screws
S-4646	Clamp—Dial clamp (two required)
S-4628	Cloth—Grille cloth (8" x 15")
S-4647	Decal—Radio-phono switch decal
S-4648	Dial—Dial scale
S-4499	Emblem—Trademark emblem (RCA)
S-4500	Emblem—Trademark emblem (RCA Victor)
S-4502	Grommet—Rubber grommet for chassis mounting (4 required)
S-4649	Grommet—Rubber grommet for record changer mounting (3 required)
S-4503	Grommet—Rubber grommet for speaker mounting (4 required)
S-4783	Hinge—Lid hinge
S-4650	Indicator—Station indicating pointer
S-4651	Knob—Range switch knob
S-4652	Knob—Radio-phono switch knob
S-4630	Knob—Volume control or tuning knob
S-4893	Lamp—Dial lamp—Mazda type 47
S-4653	Molding—Dial molding
S-4654	Nut—Tee nut for mounting record changer (3 required)
S-4655	Partition—Record changer compartment
S-4656	Plug—Plug and shell for 105-125 volt operation
S-4657	Resistor—Plug in resistor for 210-250 volt operation
S-4658	Screw—Fillister head machine screw (¼ x 20) for mounting record changer
S-4511	Spacer—Metal spacer for speaker mounting (4 required)
S-4659	Support—Lid support
	MODEL 6QV3—MISCELLANEOUS
S-4646	Clamp—Dial clamp (two required)
S-4691	Cloth—Grille cloth
S-4692	Decal—Radio-phono switch decal
S-4693	Dial—Dial scale
S-4499	Emblem—Trademark emblem (RCA)
S-4500	Emblem—Trademark emblem (RCA Victor)
S-4699	Grommet—Rubber grommet for chassis mounting (4 required)
S-4649	Grommet—Rubber grommet for record changer mounting (3 required)
S-4901	Grommet—Rubber grommet for speaker mounting (4 required)
S-4906	Hinge—Lid hinge (2 required)
S-4694	Indicator—Station indicating pointer
S-4695	Knob—Range switch knob
S-4652	Knob—Radio-phono switch knob
S-4596	Knob—Volume control or tuning knob
S-4893	Lamp—Dial lamp—Mazda type 47
S-4654	Nut—Tee nut for mounting record changer (3 required)
S-4656	Plug—Plug and shell for 105-125 volt operation
S-4657	Resistor—Plug in resistor for 210-250 volt operation
S-4658	Screw—Fillister head machine screw (¼ x 20) for mounting record changer
S-4511	Spacer—Metal spacer for speaker mounting (4 required)
S-4697	Support—Lid support
	RP-178-3 RECORD CHANGER REPLACEMENT PARTS
Identical to those listed in Service Data for RP-178.	
	EXCEPT
DELETE	
Item 46	Stock No. 72394 Motor
Item 47	Stock No. 30870 Plug
ADD	
S-4698	Medallion—Trademark medallion (RCA)
S-4773	Motor—105 to 125 volt or 210 to 250 volt 60 cycle motor
S-4907	Plug—Six prong male plug for motor cable
S-4774	Spring—Spring sleeve to convert 60 cycle motor to 50 cycle operation

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACMENT PARTS

RCA
MODEL 7Q51

Chassis No. RC-1055, RC-1055C—Mfr. No. 274

Service Data

1948 · · · · X7

RADIO CORPORATION OF AMERICA

RCA INTERNATIONAL DIVISION

745 FIFTH AVE., NEW YORK 22, N. Y.

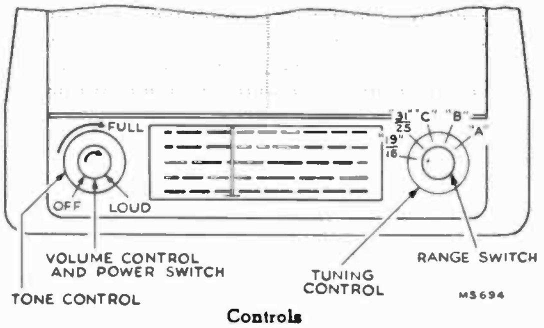
Description

This instrument is a seven-tube five-band receiver of conventional design with the exception of the spread-band tuning.

A two-section gang condenser one section for antenna and one for oscillator circuit, is used for the A, B, and C bands. The 31-25 Meter and the 19-16 Meter spread bands are tuned by a specially designed permeability tuning system actuated by a cam and rocker assembly which is mechanically fastened to the gang condenser shaft. The core assembly of the permeability tuning system is molded to insure the required tolerances, and tunes both the 31-25 Meter and the 19-16 Meter bands with different circuit constants.

In the 31-25 Meter band position the 31-25 Meter coils (antenna and oscillator) are used. In the 19-16 Meter band position the 31-25 Meter and 19-16 Meter band coils are used in parallel.

The inductances of the A-B-C windings of the multiple antenna coil are all fixed, but the inductances of all other coils in the antenna and oscillator circuits are permeability adjusted. Ungrounded screw-type cores are used for these coils and adjustments are made with a non-metallic screwdriver.



Controls

Electrical and Mechanical Specifications

Frequency Ranges

Standard Broadcast ("A" Band) .... 525-1600 kc (571-187 m)
Medium Wave ("B" Band) .... 2.3-7 mc (130-42.9 m)
Short Wave ("C" Band) .... 7-22 mc (42.9-13.6 m)
"31-25 Meter" Spread Band .... 9.5-12 mc (31.6-25m)
"19-16 Meter" Spread Band .... 15.1-17.9 mc (19.8-16.7 m)
Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA 6BE6 .... Converter
(2) RCA 6BA6 .... I.F. Amplifier
(3) RCA 6SQ7 .... Det.-A.V.C.-A.F. Amp.
(4) RCA 6F6G .... Output
(5) RCA 6F6G .... Output
(6) RCA 5Y3GT .... Rectifier
(7) RCA 6AT6 .... Phase Inverter

Loudspeaker

For Chassis No. RC-1055 .... Type 92570-4 Permanent-Magnet Dynamic
For Chassis No. RC-1055C .... Type 92517-1 Electro Dynamic
Size .... 6½ in. (16.5 cm)
V. C. Impedance .... 3.2 ohms @ 400 cycles

Power Output

Undistorted .... 4 watts
Maximum .... 4.25 watts

Power Supply Ratings

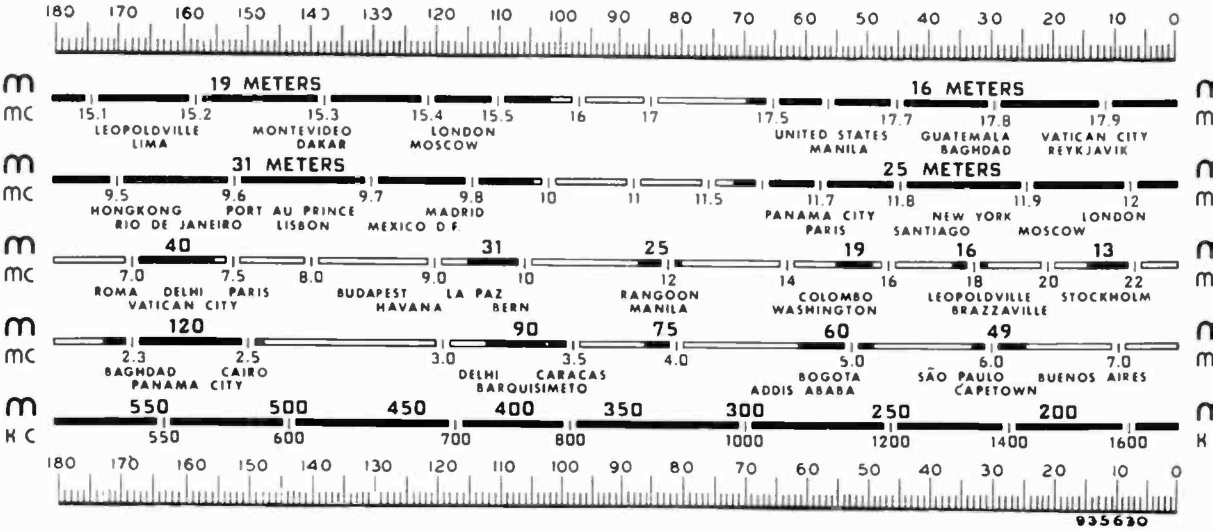
Symbol	Voltage	Frequency	Watts
Rating A	105-125	50-60	60
Rating B	105-125	25-60	60
Rating C	105-125, 210-250	50-60	60

Instruments of Rating C have a switch on the chassis to select 105-125 or 210-250 volt operation (switch marked 117v—235v). (Shipped with switch in 235v position.)

Dial Lamps (2) .... Mazda No. 44, 6.3 volts, .25 amp.

Cabinet Dimensions

Height .... 10-13/16 in. (27.4 cm)
Width .... 16¼ in. (41.3 cm)
Depth .... 8¼ in. (21 cm)
Tuning Drive Ratio .... 13½ to 1 (6¾ turns of knob)



Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 143° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedures."

Alignment Procedure

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the end calibration mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

Spread-Band Alignment.—For spread-band alignment an extremely high degree of accuracy is required of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials.

Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by one of the following methods:

1. Zero-beat the test-oscillator against short-wave stations of known frequency.
2. Check test-oscillator signals with a crystal controlled oscillator.

A final check should be made on actual reception of short-wave stations of known frequency.

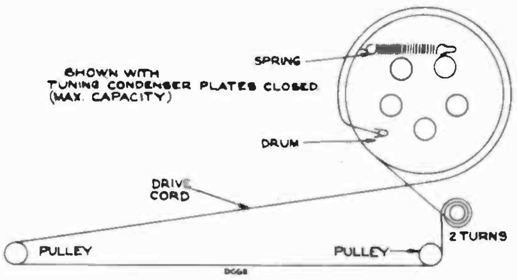
For additional information, refer to booklet "RCA Victor Receiver Alignment."

Step	Connect high side of test oscillator to—	Test oscillator frequency	Turn radio dial to—	Adjust for maximum output
1	Pin #1 of 6BA6 thru .01 mfd. capacitor	455 kc	Quiet point near 600 kc A Band	T-3 2nd I.F. trans.—top and bottom
2	Pin #7 of 6BE6 thru .01 mfd. capacitor	455 kc	Quiet point near 600 kc A Band	T-2 1st I.F. trans.—top and bottom
3	Ant. terminal thru 200 mmfd capacitor	1400 kc	A Band 27.3°	C14 osc. C5 ant.
4	Ant. terminal thru 200 mmfd capacitor	600 kc	A Band 142.6°	L7 osc.
5	Ant. terminal thru 200 mmfd capacitor	Repeat steps 3 and 4		
6	Ant. terminal thru 300 ohm resistor	6.1 mc	B Band 28.2°	C15 osc. C4 ant.
7	Ant. terminal thru 300 ohm resistor	2.5 mc	B Band 148.9°	L9 osc.
8	Ant. terminal thru 300 ohm resistor	Repeat steps 6 and 7		
9	Ant. terminal thru 300 ohm resistor	17.75 mc	C Band 34.4°	†C16 osc. C3 ant.
10	Ant. terminal thru 300 ohm resistor	7.2 mc	C Band 160.3°	L11 osc.
11	Ant. terminal thru 300 ohm resistor	Repeat steps 9 and 10		
12	Ant. terminal thru 300 ohm resistor	9.5 mc	31-25 Meter Band 169.6°	*C13 osc. *C2 ant.
13	Ant. terminal thru 300 ohm resistor	11.8 mc	31-25 Meter Band 44.8°	†L12 osc.‡ L5 ant.‡
14	Ant. terminal thru 300 ohm resistor	Repeat steps 12 and 13		
15	Ant. terminal thru 300 ohm resistor	17.75 mc	19-16 Meter Band 37.5°	†C19 osc. C8 ant.
16	Ant. terminal thru 300 ohm resistor	15.2 mc	19-16 Meter Band 157.2°	†L13 osc. L6 ant.
17	Ant. terminal thru 300 ohm resistor	Repeat steps 15 and 16		

† Oscillator frequency is higher than signal frequency on all bands. Use minimum capacity or minimum inductance peak on oscillator adjustments if two peaks can be obtained.

* Pre-set L12 and L5, with tuning condenser at minimum capacity (0°), so that the cores are exactly ⅛ in. (3.175 mm) from the bottom end of their respective coils (coil end to bottom end of iron core—not the insulating rod of the core assembly).

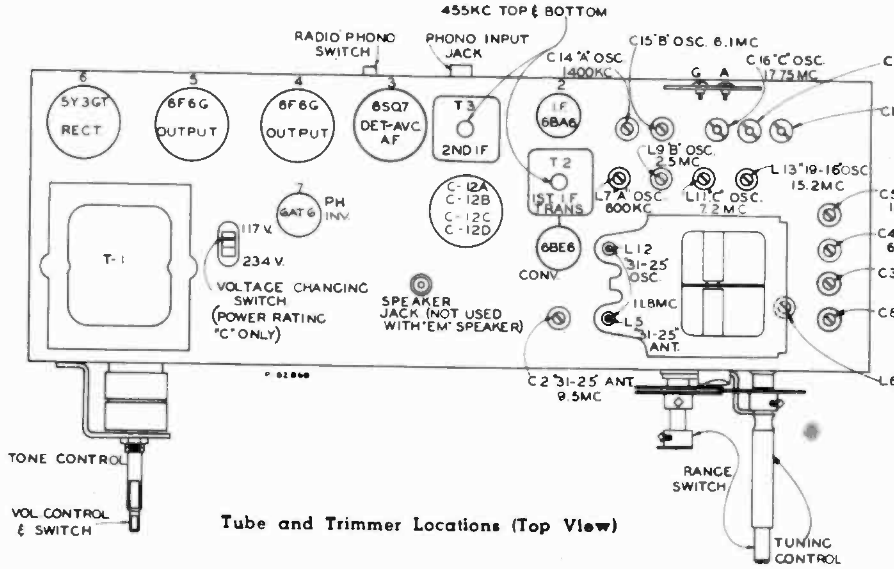
‡ If dial reading for maximum output at 11.8 mc is lower than 11.8 mc, rotate studs approx. ½ turn clockwise—if higher rotate approx. ½ turn counterclockwise.



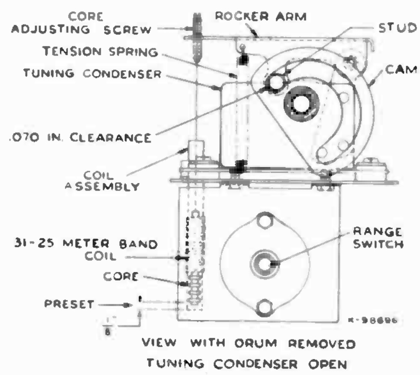
Dial-Indicator and Drive Mechanism

Critical Lead Dress

1. The 6BA6 screen by-pass capacitor C27 should be dressed close to the chassis with short leads.
2. The grid resistors R12 and R20 should be dressed close to the chassis with short leads.
3. The speaker wires should be dressed as far away from the 6SQ7 and 6AT6 sockets as possible.

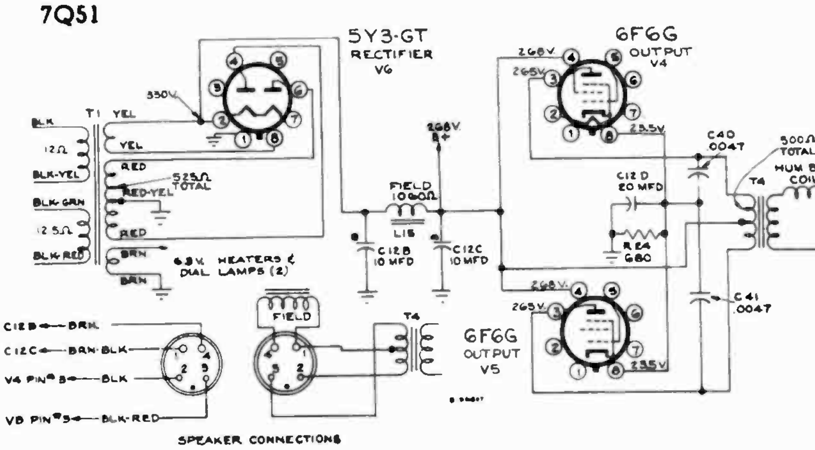


Tube and Trimmer Locations (Top View)



Spread-Band Tuning (Front View)

7Q51



Partial Schematic Diagram—RC-1055C

The above Schematic Diagram shows the power supply and speaker circuits of Chassis No. RC-1055C which uses an EM speaker. Except as described elsewhere on this page it is identical to Chassis No. RC-1055.

Chassis No. RC-1055C

*Trimmer capacitors C14, C15 are of different value Bracket is stamped 940415-2 (940401-8 in RC-1055 chassis).

*Trimmer capacitors C13, C16, C19 are of different value. Bracket is stamped 940415-5 (924463-4 in RC-1055 chassis).

C20 is used in place of C17; C21 is used in place of C18. Circuit and values are unchanged. The identifying color code is shown above.

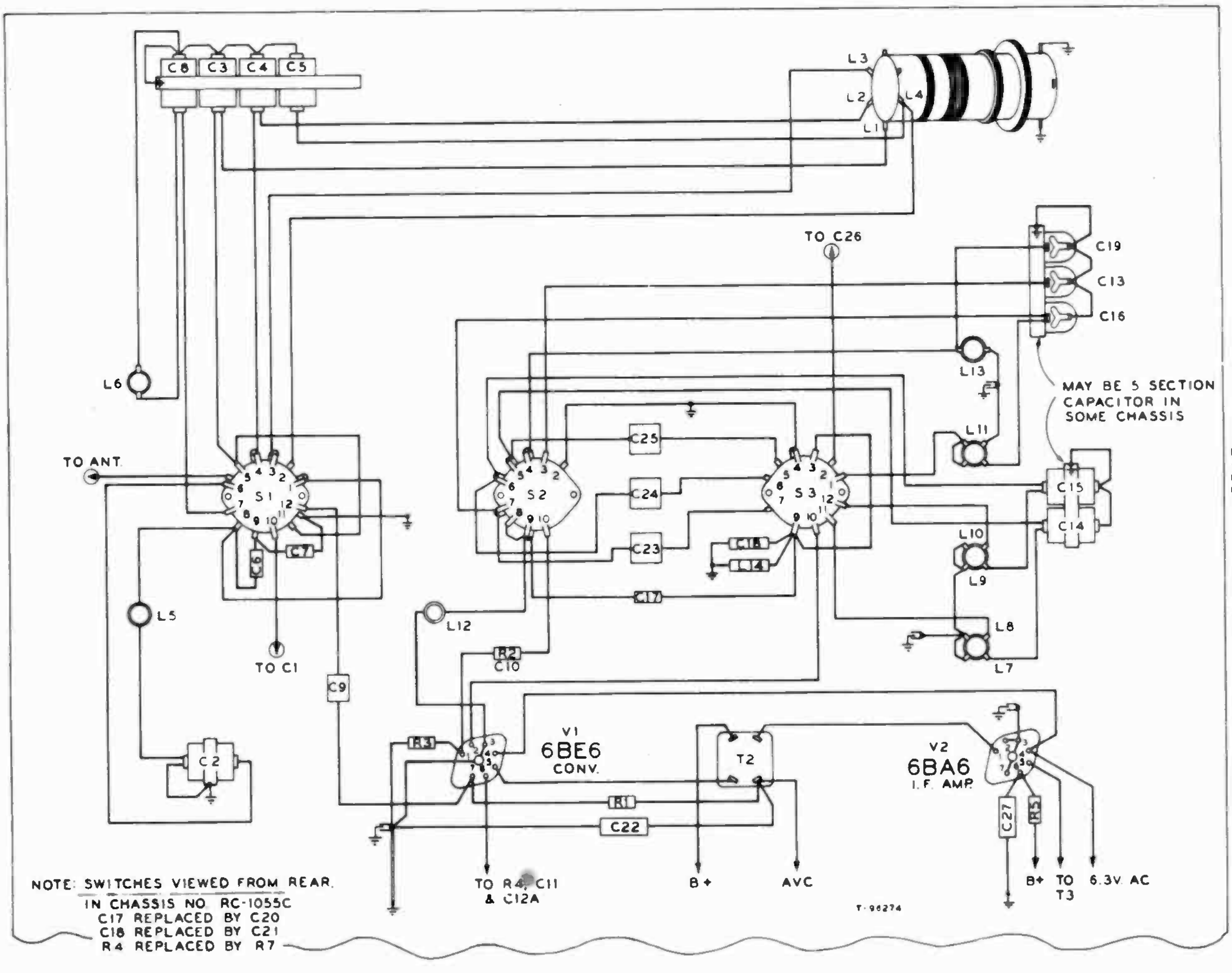
R24 (680 ohms) is used in place of R18 (560 ohms); R7 (22,000 ohms) is used in place of R4 (18,000 ohms); R23 (100,000 ohms) is used in place of R5 (82,000 ohms). The speaker field coil (L15 1060 ohms) replaces R19 (2200 ohms). The revised power supply circuit is shown above.

*In some chassis a five section capacitor (C13, C14, C15, C16, C19) is used.

Socket Voltages and Cathode Currents

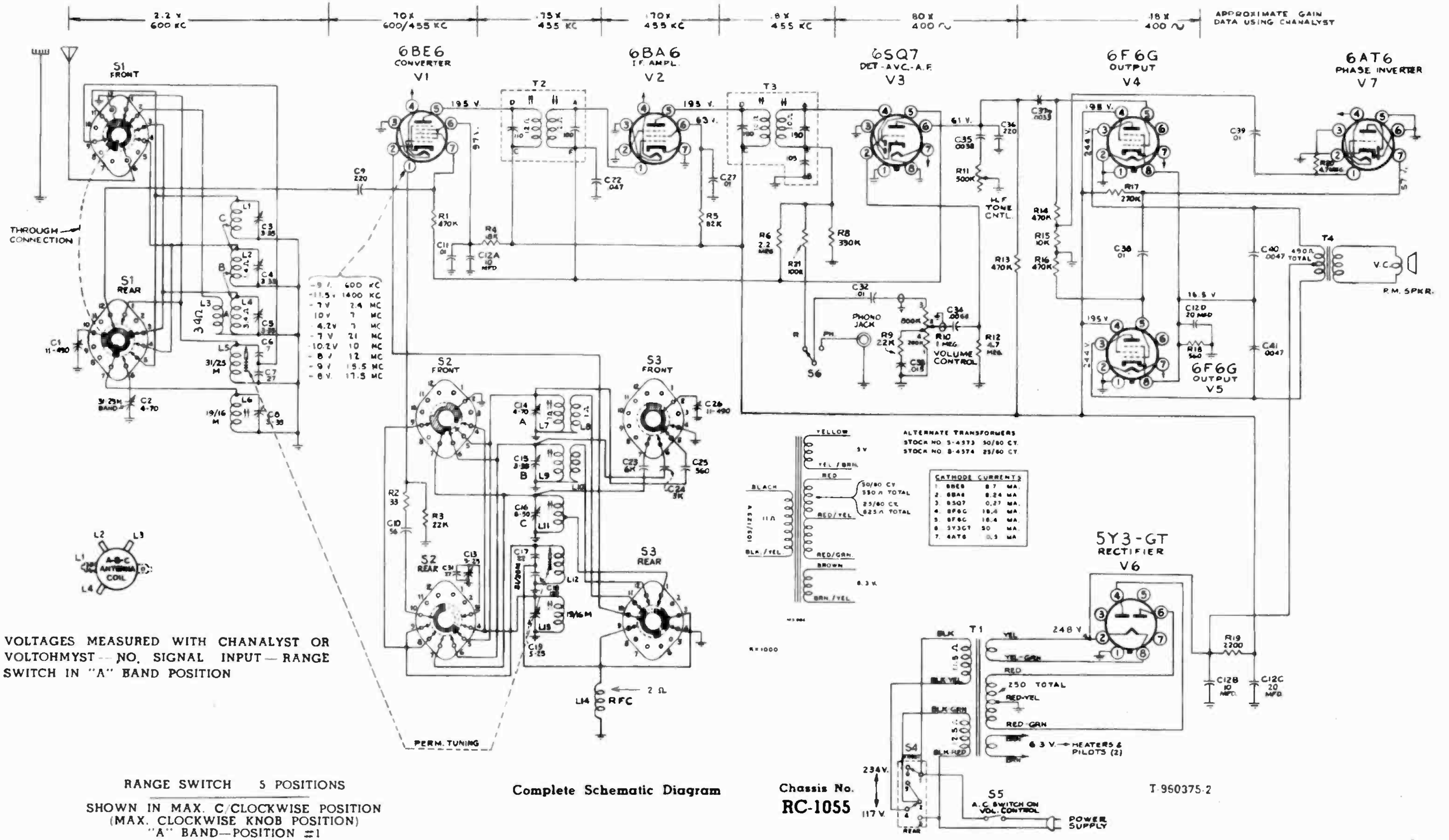
Tube	Plate V.	Screen V.	Cathode V.	Current
1. 6BE6	268	93	....	9.5 ma.
2. 6BA6	268	62	....	7.6 ma.
3. 6SQ7	77	....	....	0.3 ma.
4. 6F6G	265	268	23.5	20.0 ma.
5. 6F6G	265	268	23.5	20.0 ma.
6. 5Y3GT	....	....	330	57.5 ma.
7. 6AT6	65	....	....	0.5 ma.

Capacitors



R. F. Wiring Diagram (Bottom View)

Using 3 v. fixed bias.



VOLTAGES MEASURED WITH CHANALYST OR VOLTOHMYST—NO. SIGNAL INPUT—RANGE SWITCH IN "A" BAND POSITION

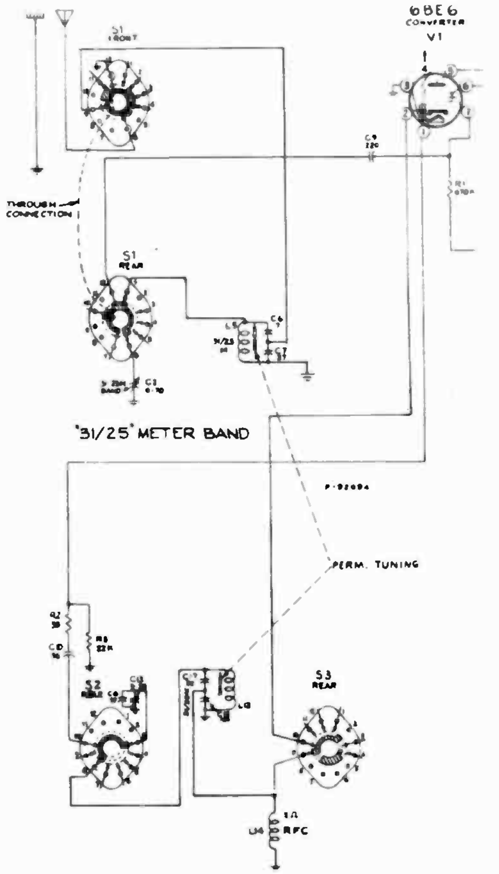
RANGE SWITCH 5 POSITIONS

SHOWN IN MAX. C/CLOCKWISE POSITION
(MAX. CLOCKWISE KNOB POSITION)
"A" BAND—POSITION #1

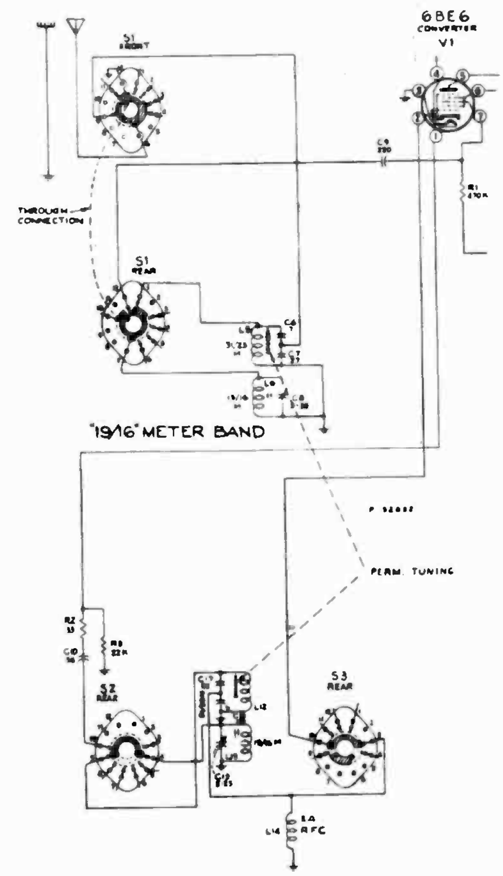
Complete Schematic Diagram

Chassis No.
RC-1055

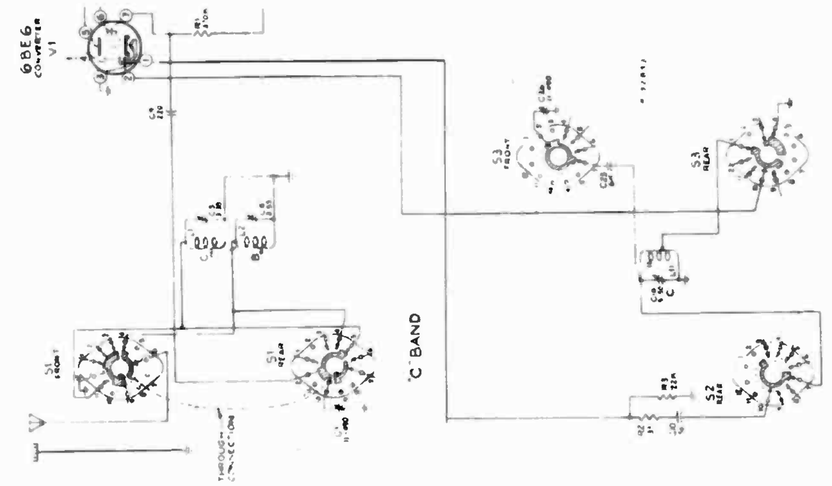
7Q51



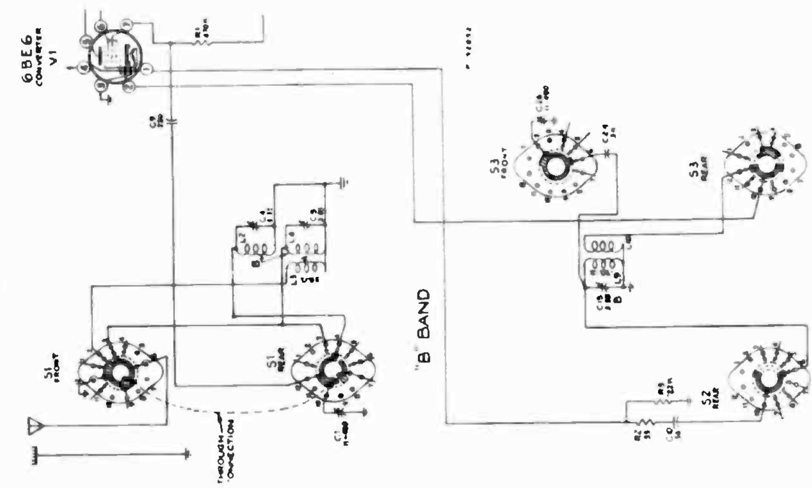
"31/25" METER BAND



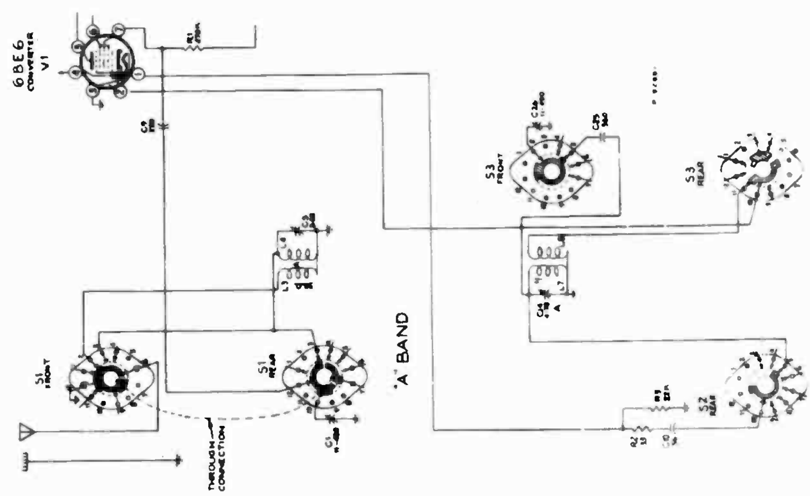
"19/16" METER BAND



"C" BAND



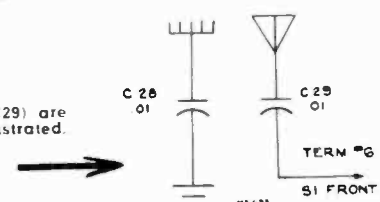
"B" BAND



"A" BAND

Simplified Schematic Diagrams

Note:
In some chassis series capacitors (C28 and C29) are added in the antenna and ground circuits as illustrated.



Replacement Parts

STOCK No.	DESCRIPTION
	R-F PLATE SUB-ASSEMBLY
S-4512	Board—Antenna-Ground terminal board
S-4513	Capacitor—Trimmer capacitor, single, 4-70 mmf (C2)
✢S-4514	Capacitor—Trimmer capacitor, dual, 4-70 mmf and 3-35 mmf (C14, C15)
•S-4770	Capacitor—Trimmer capacitor, dual, 30-65 mmf and 5-50 mmf (C14, C15)
✢S-4515	Capacitor—Trimmer capacitor, triple, two sections of 5-25 mmf and one section of 8-50 mmf (C13, C16, C19)
•S-4769	Capacitor—Trimmer capacitor, triple, three sections of 5-50 mmf (C13, C16, C19)
S-4516	Capacitor—Trimmer capacitor, quadruple, four sections of 3-35 mmf (C3, C4, C5, C8)
S-4517	Capacitor—Ceramic, 7 mmf (C6)
✢S-4518	Capacitor—Ceramic, 22 mmf (C17)
•S-4771	Capacitor—Ceramic, 22 mmf (C20)
S-4519	Capacitor—Ceramic, 27 mmf (C7)
S-4520	Capacitor—Ceramic, 27 mmf (C31)
✢S-4521	Capacitor—Ceramic, 120 mmf (C18)
•S-4772	Capacitor—Ceramic, 120 mmf (C21)
S-4439	Capacitor—Mica, 220 mmf (C9)
S-4440	Capacitor—Mica, 560 mmf (C25)
S-4522	Capacitor—Mica, 3000 mmf (C24)
S-4442	Capacitor—Mica, 6000 mmf (C23)
S-4820	Capacitor—Ceramic, .01 mf. (C28)
S-4448	Capacitor—Tubular, .047 mf, 200 v (C22)
S-4523	Capacitor and Resistor Assembly—56 mmf capacitor and 33 ohm resistor (C10, R2)
S-4524	Choke—Cathode choke coil (L14)
S-4525	Coil—"A" band oscillator coil with adjustable core and stud (L7, L8)
S-4526	Coil—"B" band oscillator coil with adjustable core and stud (L9, L10)
S-4527	Coil—"C" band oscillator coil with adjustable core and stud (L11)
S-4528	Coil—"31-25 Meter" band antenna or oscillator coil (L5, L12)
S-4529	Coil—"19-16 Meter" band antenna or oscillator coil with adjustable core and stud (L6, L13)
S-4530	Condenser—Tuning condenser (C1, C26)
S-4531	Core—Adjustable core and stud for 31-25 meter band antenna or oscillator coil
S-4532	Drum—Tuning condenser drum, hub and cam assembly
S-4533	Grommet—Rubber grommet to mount tuning condenser
S-4534	Plate—Rocker arm plate and stud assembly, less adjustable cores
S-4535	Resistor—Fixed, composition, 22,000 ohms, ½ watt (R3)
S-4476	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R1)
S-4536	Screw—Rocker arm plate bearing screw
S-4894	Socket—Tube socket
S-4537	Spring—Rocker arm plate tension spring
S-4538	Switch—Range switch
S-4539	Transformer—First I.F. transformer (T2)
	✢ Used on Chassis No. RC-1055.
	• Used on Chassis No. RC-1055C.

✢• These capacitors may be interchanged as a group but should not be interchanged individually.

On some Chassis No. RC-1055C a five-section trimmer capacitor is used in place of Stock Nos. S-4769 and S-4770.

STOCK No.	DESCRIPTION
	RC-1055 MAIN CHASSIS ASSEMBLY
S-4540	Bracket—Dial cord bracket and pulley assembly (two required)
S-4439	Capacitor—Mica, 220 mmf (C36)
S-4541	Capacitor—Tubular, .0033 mf, 600 v (C35, C37)
S-4542	Capacitor—Tubular, .0047 mf, 1000 v (C40, C41)
S-4543	Capacitor—Tubular, .0068 mf, 400 v (C34)
S-4820	Capacitor—Ceramic, .01 mf. (C27)
S-4444	Capacitor—Tubular, .01 mf, 400 v (C11, C29, C32, C38, C39)
S-4544	Capacitor—Tubular, .015 mf, 400 v (C33)
S-4545	Capacitor—Electrolytic, comprising one section of 20 mfd, 400 volts, two sections of 10 mfd, 400 volts, and one section of 20 mfd, 25 volts (C12A, C12B, C12C, C12D)
S-4546	Coil—"A", "B" and "C" bands antenna coil (L1, L2, L3, L4)
S-4547	Control—Volume control, tone control and power switch (R10, R11, S5)
S-4313	Cord—Dial drive cord (approx. 45" required)
S-4548	Cord—Power cord
S-4549	Gear—Gear and hub for range switch shaft
S-4550	Gear—Gear and hub for range switch control shaft
S-4551	Lever—Range indicator lever and hub
S-4552	Resistor—Fixed, composition, 560 ohms, 1 watt (R18)
S-4553	Resistor—Fixed, composition, 2200 ohms 2 watt (R19)
S-4554	Resistor—Fixed, composition, 10,000 ohms, ½ watt (R15)
S-4555	Resistor—Fixed, composition, 18,000 ohms, 1 watt (R4)
S-4556	Resistor—Fixed, composition, 22,000 ohms, ½ watt (R9)
S-4557	Resistor—Fixed, composition, 82,000 ohms, ½ watt (R5)
S-4558	Resistor—Fixed, composition, 100,000 ohms, ½ watt (R21)
S-4559	Resistor—Fixed, composition, 270,000 ohms ½ watt (R17)
S-4560	Resistor—Fixed, composition, 330,000 ohms, ½ watt (R8)
S-4476	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R13, R16)
S-4561	Resistor—Fixed, composition, 470,000 ohms, ½ watt (R14)
S-4562	Resistor—Fixed, composition, 2.2 megohm, ½ watt (R6)
S-4478	Resistor—Fixed, composition, 4.7 megohm, ½ watt (R12, R20)
S-4563	Socket—Dial lamp socket and lead assembly
S-4564	Spring—Dial drive cord tension spring
S-4565	Shaft—Range switch control shaft
S-4566	Shaft—Tuning control shaft
S-4480	Socket—Phono input or speaker output socket
S-4567	Socket—Tube socket, octal, for 6SQ7 tube
S-4482	Socket—Tube socket, octal, for 5Y3GT or 6F6G tubes
S-4568	Socket—Tube socket, miniature, for 6AT6 tube
S-4569	Switch—Radio-phono switch (S6)
S-4570	Switch—Voltage change switch (S4)
S-4571	Transformer—Second I.F. transformer (T3)
S-4572	Transformer—Output transformer (T4)
S-4573	Transformer—Power transformer, 105-125 volts, 50/60 cycles (T1)
S-4574	Transformer—Power transformer, 105-125 volts, 25/60 cycles (T1)
S-4575	Transformer—Power transformer, 105-125 or 210-250 volts 50/60 cycles (T1)
S-4576	Washer—"C" washer for range switch shaft (inside)
S-4577	Washer—"C" washer to retain tuning shaft on range switch shaft
	RC-1055C MAIN CHASSIS ASSEMBLY
	(Refer to listing of RC-1055)
DELETE	
S-4545	Capacitor—Electrolytic capacitor
S-4552	Resistor—560 ohms (R18)
S-4553	Resistor—2200 ohms (R19)
S-4555	Resistor—18,000 ohms (R4)
S-4557	Resistor—82,000 ohms (R5)
S-4480	Socket—Speaker socket (used for phono in both chassis)
S-4573	Transformer—Power transformer
S-4574	Transformer—Power transformer
S-4575	Transformer—Power transformer
S-4572	Transformer—Output transformer
ADD	
S-4596	Capacitor—Electrolytic capacitor, comprising three sections of 10 mfd, 450 volts, and one section of 20 mfd, 25 volts (C12A, C12B, C12C, C12E)
S-4597	Plug—Four contact female plug for speaker cable
S-4765	Resistor—Fixed, composition, 680 ohms, 1 watt (R24)
S-4766	Resistor—Fixed, composition, 22,000 ohms, 2 watt (R7)
S-4767	Resistor—Fixed, composition, 100,000 ohms, 1 watt (R23)
S-4598	Transformer—Power transformer, 105-125 or 210-250 volts, 50/60 cycles (T1)
	Other items identical to listing for RC-1055
	SPEAKER ASSEMBLIES—92570-4
S-4578	Cone—Speaker cone
S-4579	Plug—Male pin plug for speaker cable
S-4580	Speaker—6½" P.M. speaker complete with cone and connecting cable
	SPEAKER ASSEMBLIES—92517-1
S-4768	Cone—Speaker cone
S-4599	Coil—Field coil
S-4600	Plug—Four-prong male plug
S-4601	Speaker—6½" E.M. speaker complete
S-4602	Transformer—Output transformer
	MISCELLANEOUS
S-4581	Back—Back cover for cabinet
S-4582	Baffle—Baffle board and grille cloth assembly
S-4583	Bezel—Dial bezel
S-4584	Cabinet—Plastic cabinet
S-4585	Cover—Plastic dial cover
S-4586	Dial—Glass dial scale
S-4439	Emblem—Trademark emblem (RCA)
S-4500	Emblem—Trademark emblem (RCA Victor)
S-4587	Grille—Metal grille
S-4588	Grommet—Rubber grommet for chassis mounting
S-4503	Grommet—Rubber grommet for speaker mounting
S-4589	Indicator—Station selector indicator
S-4590	Knob—Range switch knob
S-4591	Knob—Volume control knob
S-4895	Knob—Tuning control knob
S-4896	Knob—Tone control knob
S-4897	Lamp—Dial lamp, Mazda type No. 44
S-4592	Plate—Dial back plate
S-4593	Screw—Chassis mounting screw
S-4511	Spacer—Metal spacer for speaker mounting
S-4595	Shield—Dial lamp shield

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA MODELS 7QV5, QU68

Radio-Phonograph Combinations

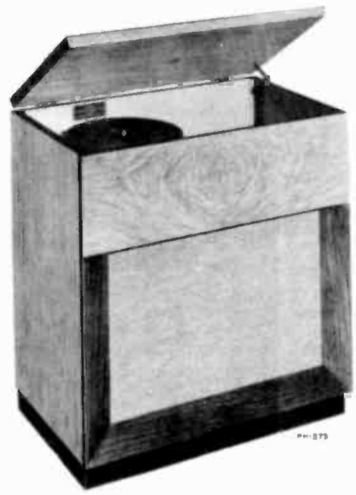
Chassis No. RC-601 B **Mfr. No. 274**

FOR INFORMATION ON RECORD CHANGER REFER TO SERVICE DATA FOR MODEL 960001

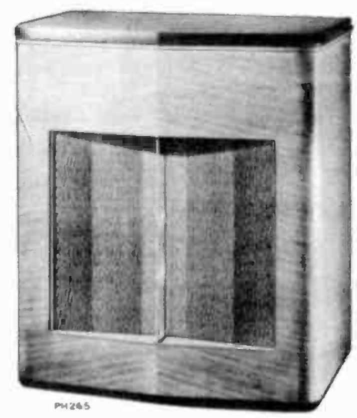
Service Data

1948 . . . . . X 3

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.



MODEL 7QV5



MODEL QU68

Specifications

Frequency Ranges

Standard Broadcast ("A" Band)	540—1600 kc.	(556—187 m)
Medium Wave ("B" Band)	2.45—6.3 mc.	(122—47.7 m)
"31-25 Meter" Spread Band	9.5 — 12 mc.	(31.6—25 m)
"19-16 Meter" Spread Band	15.1 — 18 mc.	(19.8—16.6 m)
"13-11 Meter" Spread Band	21.4 — 27 mc.	(14 —11.1 m)

Intermediate Frequency .... 455 kc.

Tube Complement

(1) RCA 6SA7	Converter
(2) RCA 6SG7	I-F Amplifier
(3) RCA 6SQ7	2nd Detector, A.V.C., A-F Amplifier
(4) RCA 6AT6	Phase Inverter
(5) RCA 6F6G	Power Output
(6) RCA 6F6G	Power Output
(7) RCA 5Y3 GT	Rectifier

Power Supply Rating

Symbol	Voltages	Frequency (cycles)	Watts
Rating C	105-125, 210-250	50 or 60	90

Instruments of Rating C have a switch on the chassis to select 105-125 or 210-250 volt operation (switch marked 117v.-235v.). (Shipped with switch in 235v. position.)

Instruments are shipped for operation on 60 cycle power supply. They may be converted for 50 cycle operation by the addition of a conversion spring to the record changer motor (spring is supplied with the instrument).

Power Output Rating

Undistorted	5.2 watts
Maximum	5.7 watts

Loudspeaker (92569-3)

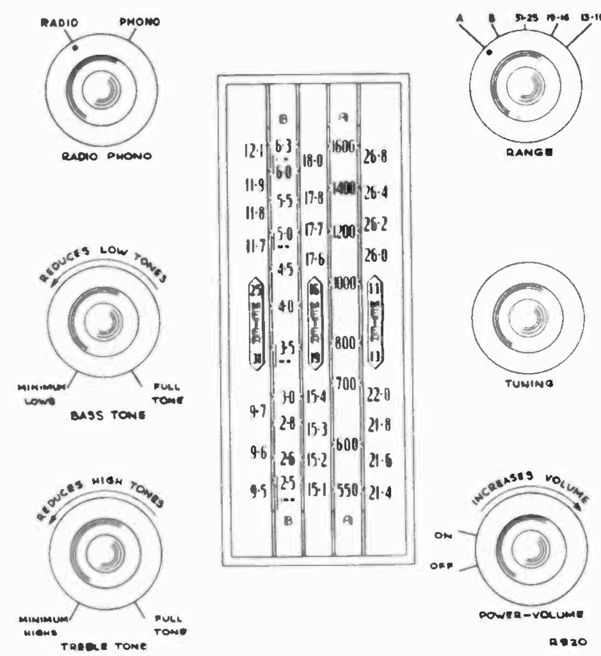
Type	12 in. PM
V-C Impedance (400 c.p.s.)	2.2 ohms

Cabinet Dimensions	7QV5	QU68
Height	32½"	33"
Width	29½"	30⅛"
Depth	17¾"	18¾"

Tuning Drive Ratio .... 25:1 (12½ turns of knob)

Dial Lamp	1 type 51, 6.3 volts, 0.2 amp.
Compartment Lamp	1 type 55, 6.3 volts, 0.4 amp.
Indicator Lamp	1 type 44, 6.3 volts, 0.25 amp.

Record Changer	Type 960001-4
Capacity	ten 12 in. or twelve 10 in. records



Controls

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Diagram.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the end calibration mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

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Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by one of the following methods:

1. Zero-beat the test-oscillator against short-wave stations of known frequency.
2. Check test-oscillator signals with a crystal controlled oscillator.

A final check should be made on actual reception of short-wave stations of known frequency.

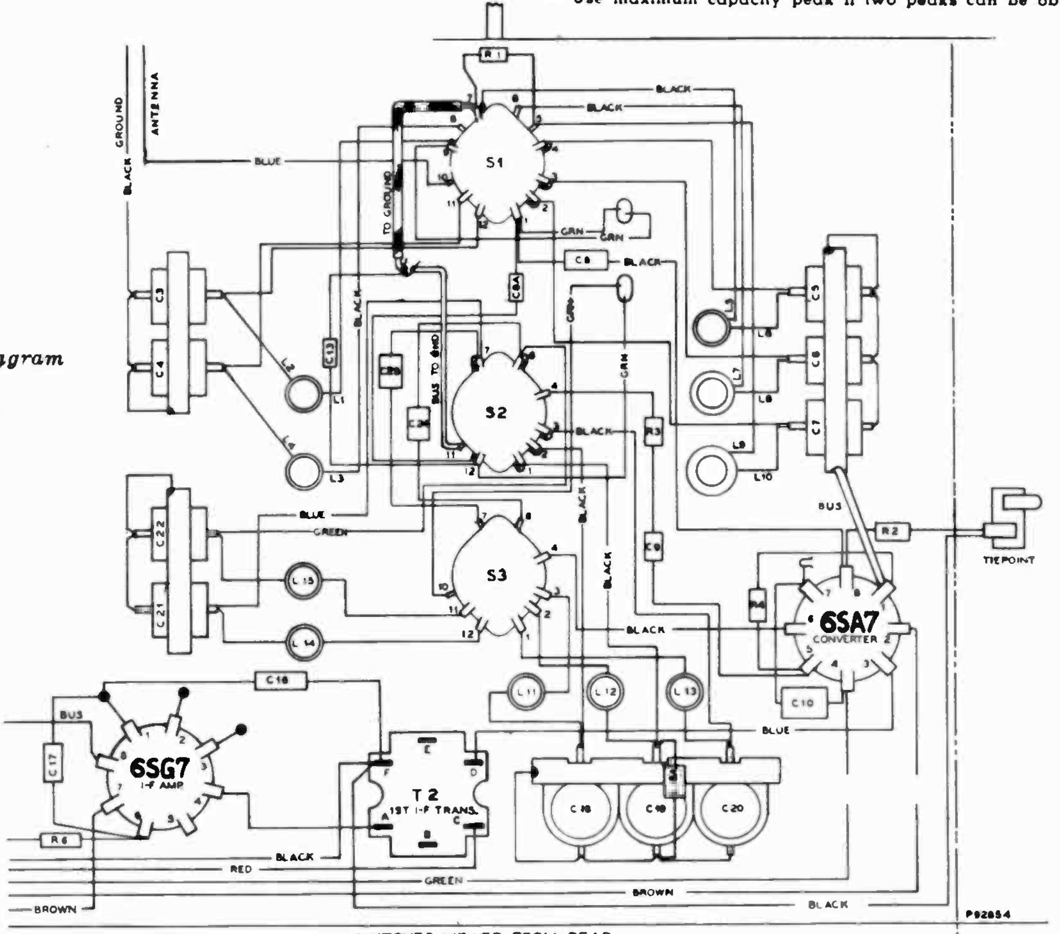
For additional information, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn Radio dial to—	Adjust the following for max. peak output
1	6SG7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L19, L18 2nd I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L17, L16, 1st I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (18°)	C22 osc. C7 ant.
4		600 kc		600 kc (148°)	L15 osc. L10 ant.
5	Repeat Steps 3 and 4				
6	Antenna terminal in series with 300 ohms	6.2 mc	"B" Band	6.2 mc (14°)	C21 osc. C6 ant.
7		2.6 mc		2.6 mc (152°)	L14 osc. L8 ant.
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C20 osc.* C5 ant. Rock in**
10		9.5 mc		9.5 mc (170°)	L13 osc. L6 ant.
11		17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C19 osc.* C4 ant. Rock in**
12		15.2 mc		15.2 mc (155°)	L12 osc. L4 ant.
13		26.25 mc	"13-11 Meter" Band	26.25 mc (42°)	C18 osc.* C3 ant. Rock in**
14		21.25 mc		21.25 mc (180°)	L11 osc. L2 ant.

Oscillator tracks above signal on all bands.
* Use minimum capacity peak if two peaks can be obtained.
** Use maximum capacity peak if two peaks can be obtained.

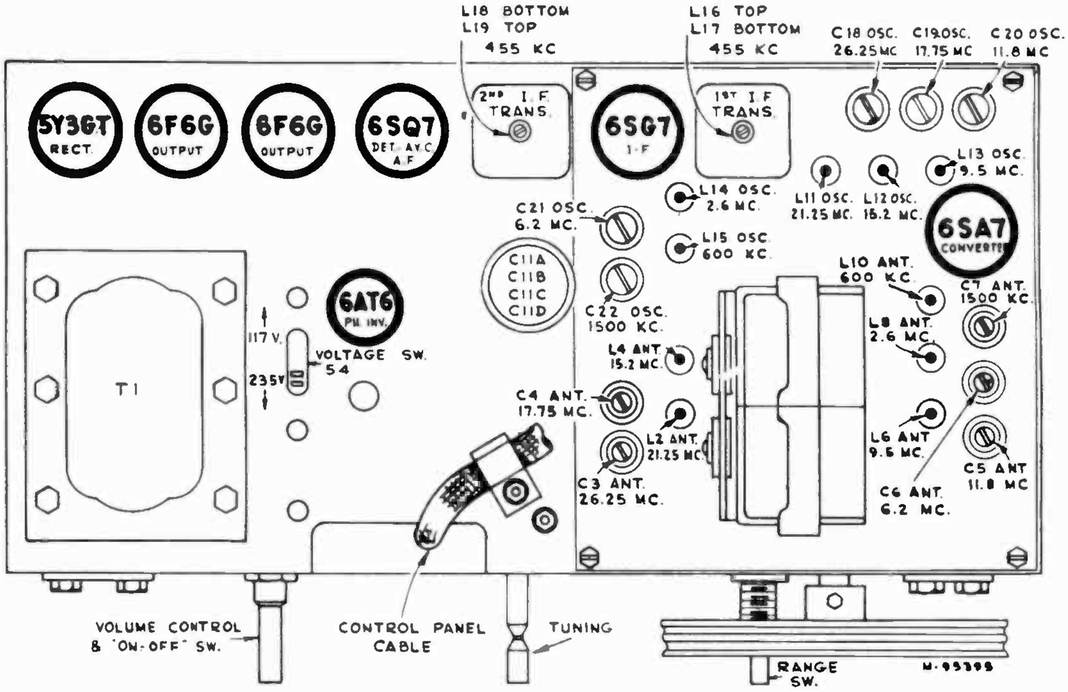
R. F. Wiring Diagram

(Bottom View)



SWITCHES VIEWED FROM REAR

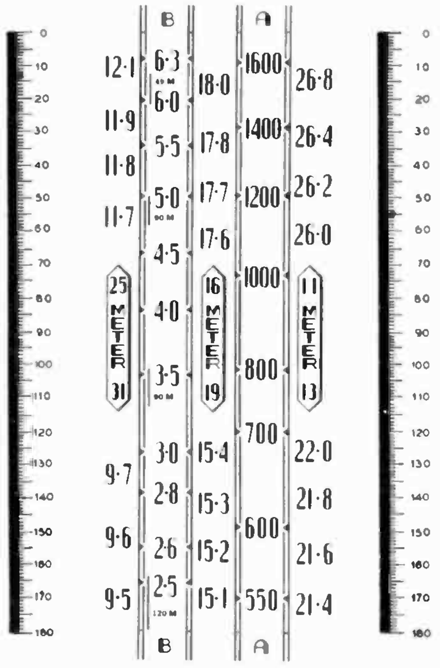
7QV5, QU68

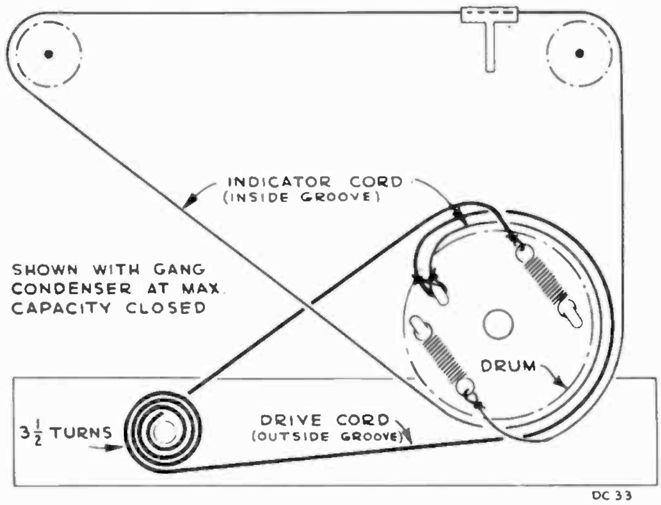


Tube and Trimmer Locations (Top View)

Critical Lead Dress

1. The green and black leads to the Volume Control should be tightly twisted and dressed down towards the chassis away from the 110/220 volt switch and away from the A.C. switch leads.
2. The A.C. switch leads should be twisted and dressed up away from all other leads.
3. The capacitor (C33) from the terminal board to Pin #2 of the 6SQ7 socket should be dressed down against the chassis. The capacitor leads to be cut as short as possible.
4. The capacitor (C30) from the terminal board on the front apron to the high side of the Volume Control should be dressed against the front apron.
5. The capacitor (C8) from Pin #8 of the 6SA7 socket to the range switch should be dressed away from the chassis, range switch and coils.
6. The capacitor and resistor assembly C9 and R3 should be dressed mid-way between the coils L13 and L9 and dressed away from all parts and leads.
7. The capacitor (C16) from the terminal board, on end apron, to the trimmer strip, should be dressed against the end apron.
8. All leads and parts to the 6SA7 socket should have sufficient length to insure flexibility of socket.
9. All resistor and capacitor leads should be as short as possible.
10. All leads from the coils to range switch should be dressed away from each other and other parts.
11. All leads from the trimmer to range switch should be dressed away from coils and other parts.
12. All excess power transformer leads should be dressed against the chassis and away from the tube sockets.
13. The resistor (R12) from Pin #1 to Pin #2 of the 6SQ7 socket should be as short as possible.
14. The resistor (R20) from Pin #1 to Pin #2 of the 6AT6 socket should be as short as possible.
15. All leads from range switch to stator section of gang should be dressed away from each other and should center in the cut-out.
16. The leads to Pin #2, and #4 of the 6SA7 socket should be dressed down against the chassis and behind the trimmer strip.
17. The lead from Pin #3 of the 6SA7 socket to terminal "D" of the 1st I-F Transformer should be dressed down against the chassis and between the oscillator coils and trimmer strip.
18. The lead from terminal "F" of the 1st I-F Transformer to the terminal board on end apron should be dressed behind the trimmer strip.
19. Brown and black leads to the electrolytic capacitor should be dressed away from green and black Volume Control leads.
20. Pilot lamp lead should be dressed against the chassis under all other leads to 110/220 volt switch.

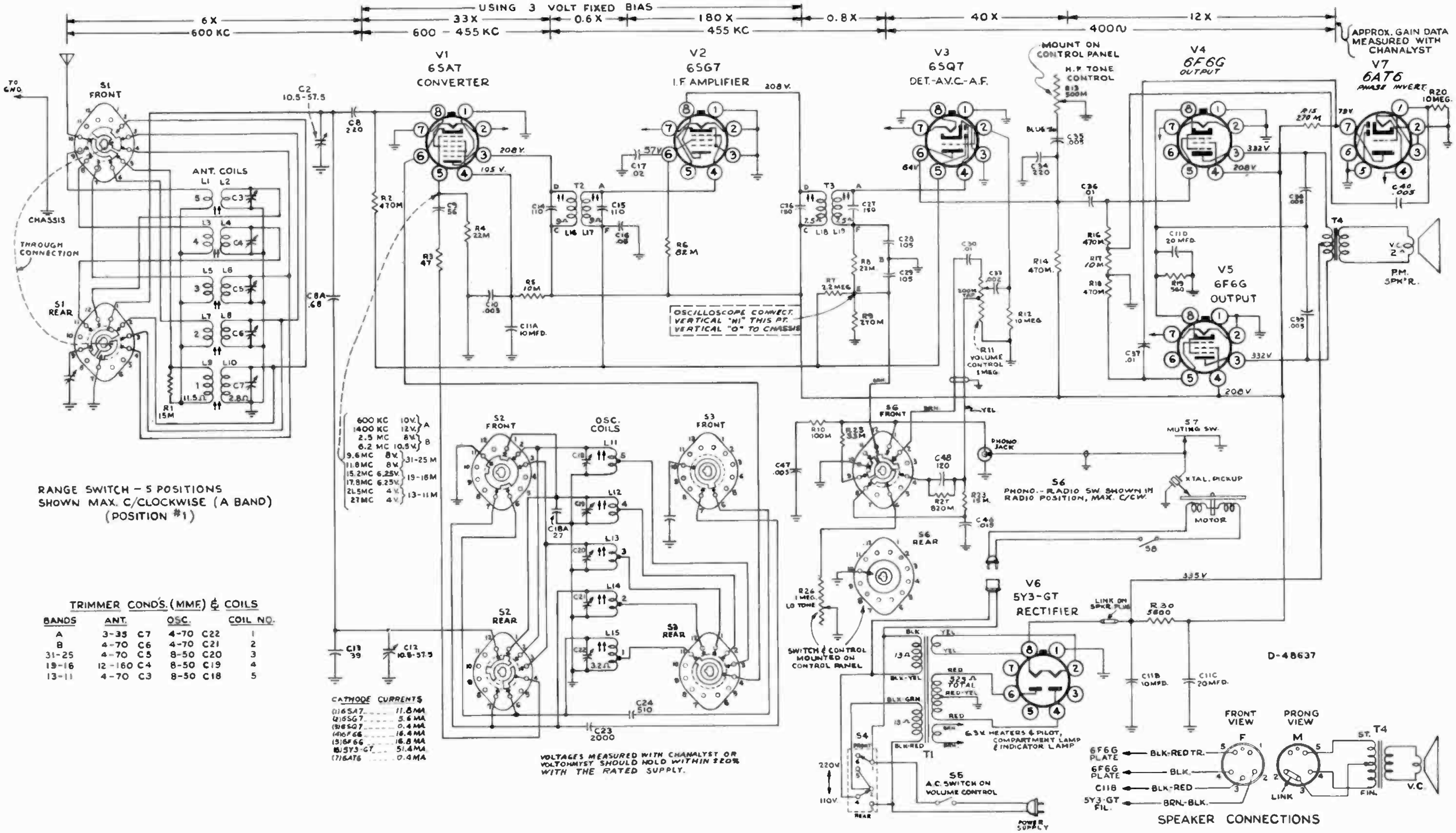




Dial-Indicator and Drive Mechanism

Reduced Reproduction of Receiver Dial, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on top calibration scale. For example 148° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



TRIMMER CONDS. (MMF.) & COILS

BANDS	ANT.		OSC.		COIL NO.
A	3-35	C7	4-70	C22	1
B	4-70	C6	4-70	C21	2
31-25	4-70	C5	8-50	C20	3
19-16	12-160	C4	8-50	C19	4
13-11	4-70	C3	8-50	C18	5

Complete Schematic Diagram

NOTE: In some sets on some replacement units, the power transformer color code may vary from that shown. On universal transformers (Rating C), the primary No. 1 start may be red; primary No. 1 finish red/black; primary No. 2 start red/yellow; primary No. 2 finish black/red. Secondaries would be: rectifier filament, green/red; high-voltage, brown; high-voltage center tap, black/brown; amplifier filament, blue. In case of doubt, identify windings by resistance or voltage measurements.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 601B
35642	Calibrator—Drive drum calibrator
71088	Capacitor—Ceramic, 0.68 mmf. (C8a)
72947	Capacitor—Mica trimmer, dual 4-70 mmf. (C21, C22)
70932	Capacitor—Mica trimmer, comprising 2 sections of 4-70 mmf. and 1 section of 3-35 mmf. (C5, C6, C7)
72948	Capacitor—Ceramic trimmer, triple 8-50 mmf. (C18, C19, C20)
70745	Capacitor—Mica trimmer, comprising 1 section of 12-160 mmf. and 1 section of 4-70 mmf. (C3, C4)
70935	Capacitor—Ceramic, 27 mmf. (C19a)
70934	Capacitor—Ceramic, 39 mmf. (C13)
71924	Capacitor—Ceramic, 56 mmf. (C9)
39630	Capacitor—Mica, 120 mmf. (C48)
39636	Capacitor—Mica, 220 mmf. (C8, C34)
71932	Capacitor—Mica, 510 mmf. (C24)
72526	Capacitor—Mica, 2000 mmf. (C23)
72222	Capacitor—Moulded paper, .001 mfd., 400 volts (C47)
71592	Capacitor—Moulded paper, .002 mfd., 200 volts (C33)
72221	Capacitor—Moulded paper, .005 mfd., 200 volts (C40)
71587	Capacitor—Moulded paper, .005 mfd., 600 volts (C10)
71593	Capacitor—Moulded paper, .005 mfd., 600 volts (C35)
72220	Capacitor—Moulded paper, .005 mfd., 1000 volts (C38, C39)
71594	Capacitor—Moulded paper, .015 mfd., 200 volts (C46)
71585	Capacitor—Moulded paper, .01 mfd., 200 volts (C30)
72219	Capacitor—Moulded paper, .01 mfd., 600 volts (C36, C37)
71591	Capacitor—Moulded paper, .02 mfd., 600 volts (C17)
71586	Capacitor—Moulded paper, .05 mfd., 200 volts (C16)
33195	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts; 2 sections of 10 mfd., 450 volts; and 1 section of 20 mfd., 25 volts (C11A, C11B, C11C, C11D)
38201	Clamp—Cord clamp
70923	Coil—Antenna coil, 13 meter band (L1, L2)
70924	Coil—Antenna coil, 19 meter band (L3, L4)
70925	Coil—Antenna coil, 31 meter band (L5, L6)
70926	Coil—Antenna coil, "B" band (L7, L8)
70927	Coil—Antenna coil, "A" band (L9, L10)
70920	Coil—Oscillator coil, 13 meter band (L11)
70823	Coil—Oscillator coil, 19 meter band (L12)
70825	Coil—Oscillator coil, 31 meter band (L13)
70829	Coil—Oscillator coil, "B" band (L14)
70789	Coil—Oscillator coil, "A" band (L15)
70727	Condenser—Variable tuning condenser (C1, C2, C12, C25)
70826	Control—Volume control and power switch (R11, 85)
38409	Control—Tone control—H.F. (R13)
38405	Control—Tone control—L.F. (R26)
†72953	Cord—Drive cord (approx. 27" overall length required)
†72913	Cord—Indicator cord (approx. 47" overall length required)
35627	Drum—Drive drum less calibrator
35638	Flywheel—Tuning knob shaft flywheel
70429	Grommet—Rubber grommet to mount tube socket (2 required)
70930	Grommet—Rubber grommet to mount variable tuning condenser (4 required)
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
35641	Pulley—Drive cord pulley
30732	Resistor—47 ohms, ½ watt (R3)
38884	Resistor—560 ohms, 1 watt (R19)
72218	Resistor—5600 ohms, 4 watts (R30)
44294	Resistor—10,000 ohms, 2 watts (R5)
36714	Resistor—15,000 ohms, ½ watt (R1, R28)
30492	Resistor—22,000 ohms, ½ watt (R4, R8)
30685	Resistor—33,000 ohms, ½ watt (R25)
8064	Resistor—82,000 ohms, ½ watt (R6)
3252	Resistor—100,000 ohms, ½ watt (R10)
30651	Resistor—270,000 ohms, ½ watt (R9, R15)
30648	Resistor—470,000 ohms, ½ watt (R2, R14, R16, R18)
30161	Resistor—820,000 ohms, ½ watt (R27)
30649	Resistor—2.2 megohms, ½ watt (R7)
30992	Resistor—10 megohms, ½ watt (R12, R17, R20)
14350	Screw—#8-32 square head set screw for drive drum
70832	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
35787	Socket—Phono input socket
31319	Socket—Tube socket with mounting plate
9914	Socket—Tube socket, miniature
70827	Socket—Tube socket, octal
31418	Spring—Drive or pointer cord tension spring
38923	Support—Drive cord pulley support bracket complete with pulley—L. H.
38924	Support—Drive cord pulley support bracket complete with pulley—R. H.
35622	Support—Tuning shaft and flywheel support
72028	Switch—Radio-phono switch (S6)
70732	Switch—Range switch (S1, S2, S3)
32827	Switch—Voltage change switch (S4)
32852	Transformer—Power transformer, 105/125 or 210/250 volt, 50/60 cycle (T1)
70917	Transformer—First I. F. transformer [T2 (C14, C15, L16, L17)]
70918	Transformer—Second I. F. transformer [T3 (L18, L19, C26, C27, C28, C29)]
33726	Washer—"C" washer to hold drive cord pulley on L. H. bracket
2917	Washer—"C" washer for tuning shaft flywheel
	SPEAKER ASSEMBLIES 92569-3W (RL 103-3)
13867	Cap—Dust cap
36145	Cone—Cone complete with voice coil
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" P. M. speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T4)
	NOTE: If stamping on speaker does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
72025	Bracket—Indicator lamp bracket for QU68
70590	Bracket—Indicator lamp bracket for 7QV5
36461	Button—Plug button for 7QV5
72455	Clamp—Indicator glass clamp
X1626	Cloth—Grille cloth for QU68
X1806	Cloth—Grille cloth for 7QV5
72023	Cover—Compartment lamp lead cover (2" long) (50.8 mm) for QU68
70547	Cover—Compartment lamp lead cover (3½" long) (88.9 mm)
36155	Decal—Bass tone control decal
35387	Decal—Power switch decal
36074	Decal—Radio-phono switch decal
72448	Decal—Range switch decal
72449	Decal—Trade mark decal (RCA-Victor)
72451	Decal—Trade mark decal (RCA)
36156	Decal—Treble tone control decal
35391	Decal—Tuning decal
72021	Dial—Glass dial scale
38928	Frame—Dial frame complete less indicator and dial
72027	Glass—Indicator glass for QU68
30698	Hinge—Cabinet lid hinge
36039	Indicator—Station selector indicator
72024	Knob—Range switch or phono switch knob
70836	Knob—Volume control, tone control or tuning knob
5117	Lamp—Compartment lamp—Mazda #55
11765	Lamp—Dial lamp—Mazda #51
11891	Lamp—Indicator lamp—Mazda #44—for QU68
70546	Mounting—One set of hardware for mounting record changer—consisting of four (4) upper springs, four (4) lower springs and four (4) clamp nuts
37800	Shade—Lamp shade
72454	Spring—Cabinet lid support spring for QU68
73026	Spring—Cabinet lid support spring for 7QV5
14270	Spring—Retaining spring for knobs
72026	Strip—Metal strip moulding for QU68
72453	Support—Cabinet lid support for QU68
73025	Support—Cabinet lid support for 7QV5

† Stock No.'s 72953 and 72913 are reels containing 250 ft. (76.2 meters) of cord.

Apply to your RCA Distributor for prices of replacement parts.

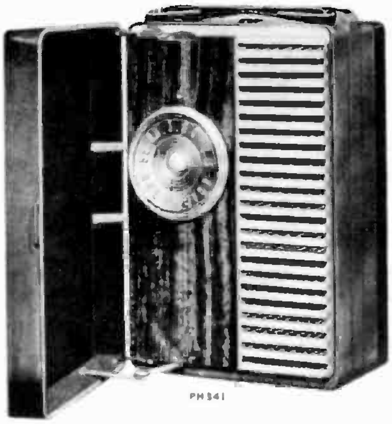
7QV5

Addition to Parts List:

MISCELLANEOUS

Add:

73180 Emblem—"RCA Victor" emblem.



8B41 ...... Black
8B42 .... Brown
8B43 .... Red

RCA VICTOR

Battery Personal Receiver

MODELS 8B41, 8B42, 8B43

Chassis No. RC-1069, RC-1069A, RC-1069B
Mfr. No. 274

SERVICE DATA

—1948 No. 18—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Range .... 540-1600 kc
Intermediate Frequency .... 455 kc

Tube Complement:
1. RCA 1R5 .... Converter
2. RCA 1U4 .... I.F. Amplifier
3. RCA 1U5 .... 2nd Det.-A.F. Amp.-A.V.C.
4. RCA 3S4 .... Output

Loudspeaker (92523-4W):
Size and type .... 2" x 3" P.M.
Voice coil impedance .... 11¾ ohms at 1000 cycles

Batteries Required:

Type of Battery	Current Consumption	Approx. Life (Intermittent Service)
"A"—1.5 volt RCA VS 036 or VS 001	0.25 amp.	7 to 10 hrs.
"B"—67.5 volts RCA VS 016	8.5 ma.	40 to 60 hrs.

Power Output:
Undistorted .... 0.05 watt
Maximum .... 0.10 watt

Dimensions (overall) .... 6¼" x 4⅜" x 3⅜"
Weight (with batteries) .... 3½ lbs.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1069—8B41, RC 1069A—8B42, RC 1069B—8B43
73937	Baffle—Speaker baffle and grille cloth
70444	Board—Terminal board (5 contact)
70445	Board—Terminal board (1 contact)
73947	Capacitor—Variable tuning capacitor (C1, C3, C4)
73153	Capacitor—Ceramic, 4 mmf. (C8)
73962	Capacitor—Ceramic, 33 mmf. (C11)
73901	Capacitor—Ceramic, 51 mmf. (C2)
73963	Capacitor—Ceramic, 75 mmf. (C14)
56653	Capacitor—Ceramic, 180 mmf. (C16)
74093	Capacitor—Ceramic, 1500 mmf. (C20)
73960	Capacitor—Ceramic, .01 mf. (C5)
72315	Capacitor—Tubular, .002 mf., 200 volts (C15)
73961	Capacitor—Tubular, .003 mf., 200 volts (C9)
70606	Capacitor—Tubular, .005 mf., 400 volts (C18)
71928	Capacitor—Tubular, .02 mf., 200 volts (C17)
70615	Capacitor—Tubular, .05 mf., 400 volts (C10)
73964	Capacitor—Electrolytic, 10 mf., 70 volts (C19)
70425	Clip—Spring clip for tuning knob
70443	Coil—Oscillator coil (L1, L2)
70452	Connector—Loop connectors (1 set) complete with eyelets
73948	Control—Volume control (R6)
73957	Fastener—Push fastener to hold loop (2 required) for Model 8B41—black
73958	Fastener—Push fastener to hold loop (2 required) for Model 8B42—brown
73959	Fastener—Push fastener to hold loop (2 required) for Model 8B43—red
70429	Grommet—Rubber grommet to mount tube support shelf (2 required)
73950	Hinge—Lid hinge—L.H.—less mounting studs
73951	Hinge—Lid hinge—R.H.—less mounting studs
72229	Holder—"A" battery holder
73941	Insulator—Loop connector insulator
73936	Knob—Calibrated tuning knob
73946	Knob—Volume control knob
70708	Lead—"B" Battery lead complete
73924	Lid—Case top lid complete with lid support and hinges—less loop—Model 8B41—black
73925	Lid—Case top lid complete with lid support and hinges—less loop—Model 8B42—brown
73926	Lid—Case top lid complete with lid support and hinges—less loop—Model 8B43—red
73954	Loop—Antenna loop complete with connectors—less lid—Model 8B41—black
73955	Loop—Antenna loop complete with connectors—less lid—Model 8B42—brown
73956	Loop—Antenna loop complete with connectors—less lid—Model 8B43—red
73949	Nameplate—"RCA" nameplate for top lid
73940	Nut—Speed nut to lock screw clamping speaker to face panel

STOCK No.	DESCRIPTION
73938	Panel—Chrome and mahogany face panel
	Resistor—Fixed, composition, 820 ohms ±10%, ½ watt (R11)
	Resistor—Fixed, composition, 15,000 ohms ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 68,000 ohms ±20%, ½ watt (R5)
	Resistor—Fixed, composition, 100,000 ohms ±10%, ½ watt (R1)
	Resistor—Fixed, composition, 1 megohm ±20%, ½ watt (R9)
	Resistor—Fixed, composition, 3.3 megohms ±20%, ½ watt (R4, R10)
	Resistor—Fixed, composition, 4.7 megohms ±20%, ½ watt (R3, R7)
	Resistor—Fixed, composition, 10 megohms ±20%, ½ watt (R8)
73944	Screw—#2-56 x 3/16" machine screw to hold lid hinges to face panel (2 required)
73939	Screw—#4-40 x 5/16" binder head machine screw to clamp speaker to face panel
73943	Screw—#4-40 x 3/16" binder head screw to fasten face panel to chassis (3 required)
70446	Screw—#6 x ¼" hex head self-tapping screw to mount battery holder
70436	Socket—Tube socket
70423	Spacer—Rubber shock spacer (cemented to case center strip)
73942	Stud—Lid support stud (face panel end)
73952	Stud—L.H. lid hinge mounting stud
73953	Stud—R.H. lid hinge mounting stud
70451	Support—Lid support complete with lid end mounting stud
72230	Support—Tube support shelf less tube sockets and transformer
73945	Switch—Power switch (S1)
70442	Transformer—First I.F. transformer (T1 [C6, C7])
70437	Transformer—Second I.F. transformer (T2 [C12, C13])
70440	Transformer—Output transformer (T3)
	SPEAKER ASSEMBLIES
	92523-4W
70428	Speaker—2" x 3" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
73965	Bottom—Case bottom—Model 8B41—black
73966	Bottom—Case bottom—Model 8B42—brown
73967	Bottom—Case bottom—Model 8B43—red
70457	Catch—Spring catch assembly
74016	Center—Case center complete with spring catch
73968	Handle—Carrying handle—Model 8B41—black
74022	Handle—Carrying handle—Model 8B42—brown
73969	Handle—Carrying handle—Model 8B43—red
73970	Link—Handle link (2 required)
73943	Screw—#4-40 x 3/16" binder head screw to hold case center

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

8B41, 8B42, 8B43

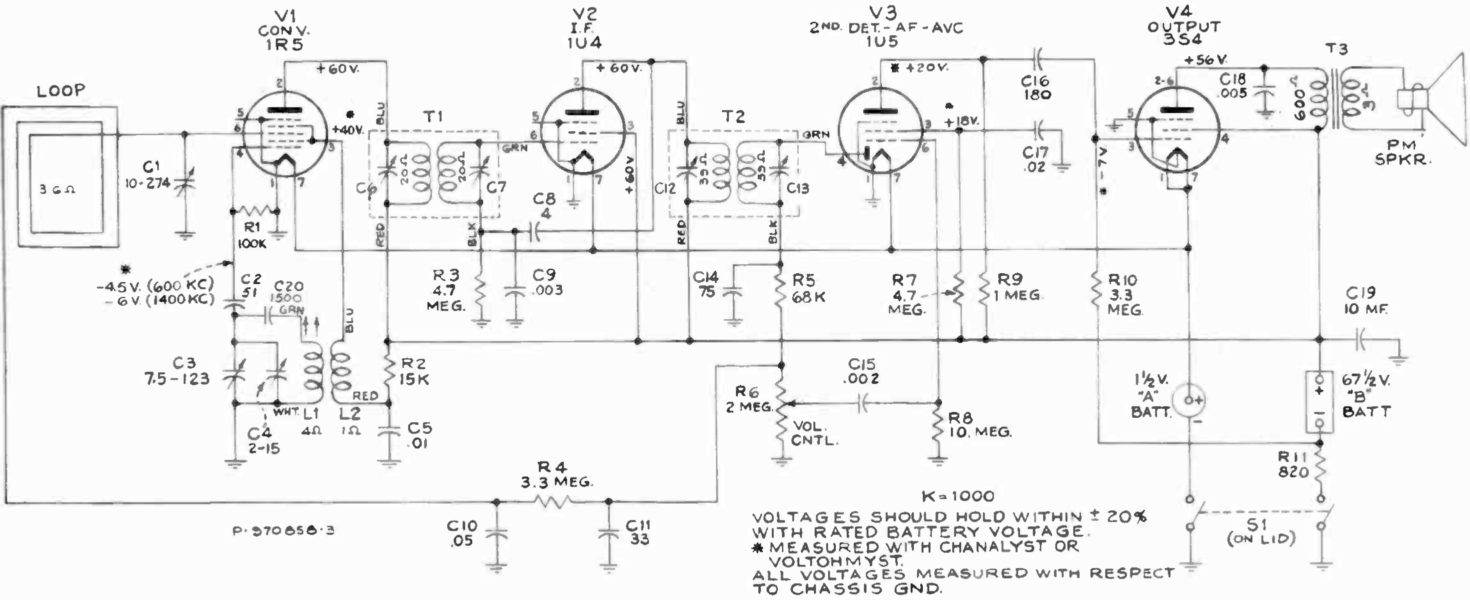


Fig. 1—Schematic Diagram

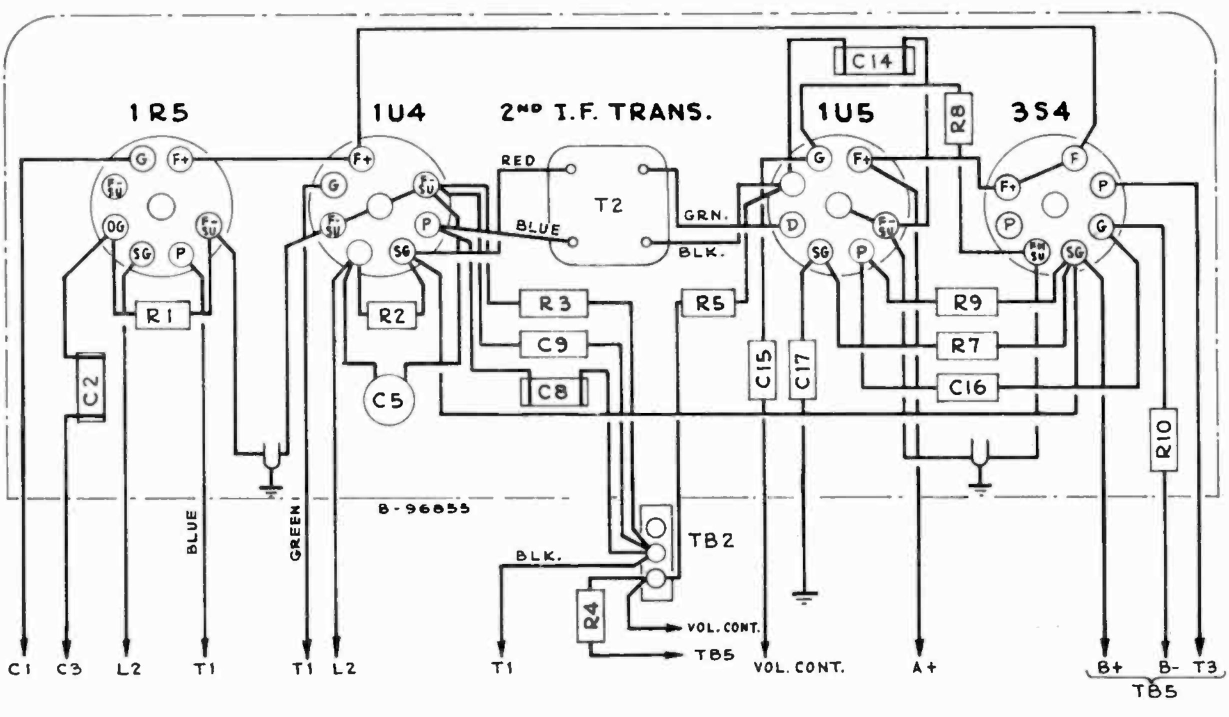


Fig. 2—Tube Shelf Wiring Diagram

Alignment Procedure

Output Meter.—Connect meter from top lug of TB5 (plate of 3S4) to ground. Turn volume control to maximum position.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Alignment Shield.—It is necessary to use a shield during oscillator alignment.

Fig. 3 shows the modifications necessary to convert the center strip portion of a case into a convenient shield to be used as a substitute for the regular case center strip during oscillator alignment.

If a substitute case is not available, a shield may be improvised using a sheet of aluminum (DO NOT USE STEEL) to approximate the shielding effect of the case on the 1L5 tube, tuning condenser and oscillator coil.

CRITICAL LEAD DRESS

1. Dress blue, green, and black leads of second I.F. transformer as direct as possible. If excess lead exists, dress down side of socket and flat against chassis to transformer opening.
2. Dress audio screen bypass capacitor (C17), and the lead to the volume control, up and underneath the shelf supporting the output transformer.
3. Dress audio coupling capacitor (C15), directly in front of C17, and against the side of the 1st I.F. transformer.
4. Wire in the three capacitors pyramided behind the speaker with enough space at the end of battery holder to allow holder to move when battery is replaced. Dress the ground leads of these capacitors to keep from shorting "+A" to chassis ground.
5. Observe the outside foil connections on all paper capacitors, also the polarity of the electrolytic capacitor, C19.
6. Keep blue and red leads of output transformer above the mounting shelf.
7. Dress leads to gang as far as possible from all metal parts.
8. Dress neutralization bypass capacitor, C9, as near metal chassis as possible.
9. Dress bypass C5 over bottom end of V2 (1U4), tube socket.
10. Dress neutralization capacitor, C8, as near metal chassis as possible.

Steps	Connect the high side of test osc. to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output—
1	Connection lug of C1 located on rear of gang in series with .01 mf.	455 kc	Quiet point near 1,600 kc	C12, C13 2nd I-F trans.
2				C6, C7 1st I-F trans.
3		Repeat steps 1 and 2		
4	*Antenna coupling loop	1,400 kc	14 Rock gang	C4 (osc.) †
5		600 kc	60 Rock gang	L1 (osc.) †
6		Repeat steps 4 and 5		

* Steps 4 and 5 require a coupling loop from the signal generator to feed a signal into the receiver loop located in the lid. This loop should be loosely coupled to the receiver loop antenna so as not to disturb the receiver loop inductance.

† ALIGNMENT SHIELD MUST BE USED. (See text.)

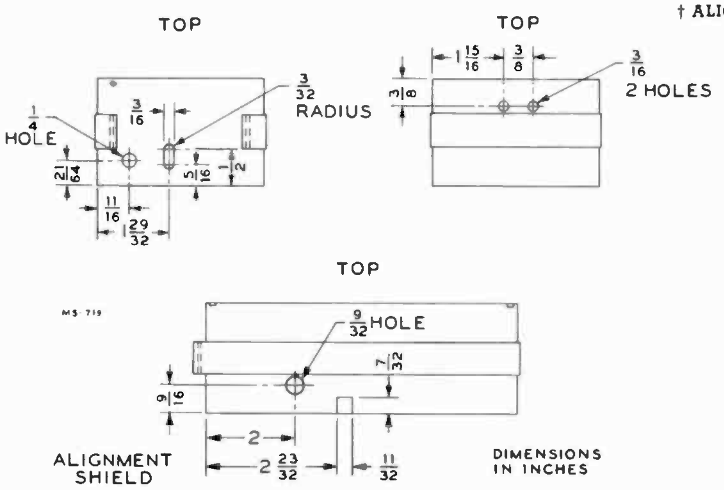


Fig. 3—Alignment Shield

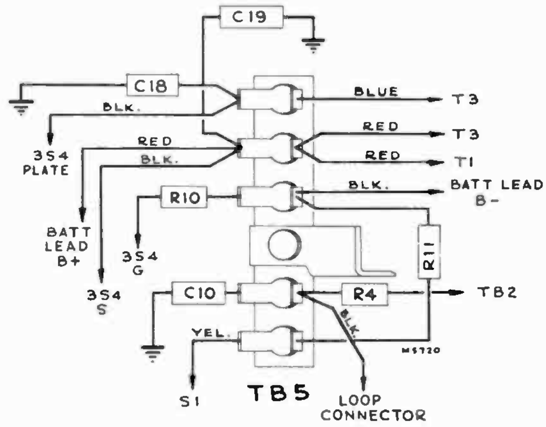


Fig. 4—Terminal Board Wiring

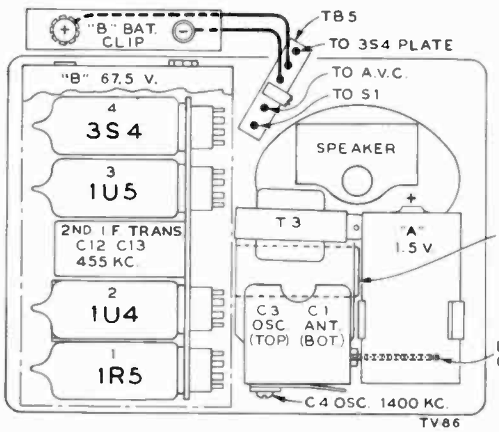


Fig. 5—Tube and Trimmer Locations

A rubber band should be placed around each tube for cushioning.

Replacement of Component Parts

I. **To remove bottom cover:**
a. Depress locking spring clip through hole in top of case.
b. With spring clip depressed, pull cover carefully out and up off the retaining lugs in the bottom of the case center strip.

II. **To replace batteries:**
a. Remove bottom cover.
b. Remove, either or both, the "A" and "B" battery as may be necessary. The "B" battery snap fasteners can best be removed by inserting a screwdriver under the snap fastener strip and prying upward.

III. **To remove the case center strip:**
a. Remove bottom cover.
b. Remove one screw (A) on the inside at the handle end.
c. Tilt case center strip and lift.

IV. **To replace tubes:**
a. Remove bottom cover.
b. Remove "B" battery.
c. Remove case center strip.
d. Remove and replace tubes as required.

V. **To remove face panel from chassis plate:**
a. Remove dial knob (pull off).
b. Remove bottom cover (I), batteries (II) and case center strip (III).
c. Unsolder leads to loop connectors.
d. Remove the four Phillips head screws (B) located at three corners and end close to 2nd I.F. transformer, which hold the chassis to face panel.
e. The face panel may now be folded back into the case top lid.

VI. **To remove speaker:**
a. Remove face panel (see item V).
b. Unsolder voice coil leads.
c. Remove two Phillips head screws (C) on chassis plate holding speaker.

VII. **To remove output transformer:**
a. Remove speaker (see item VI).
b. Unsolder transformer leads.
c. Remove rivet (use bolt for replacement).
d. Unsolder mounting lug.

VIII. **To remove chassis subassemblies from chassis plate:**
a. Remove tubes (see item IV).
b. Unsolder grounding strap (E) which connects tube shelf to chassis plate.
c. Unsolder two wires which connect to speaker.
d. Unsolder two wires attached to switch.
e. Unsolder leads to loop connectors.
f. Remove dial knob (pull off).
g. Remove two screws (F) holding tube shelf to chassis plate.
h. Remove nut (G) between I.F. transformers.
i. Remove screw (G) beneath the negative terminal of "A" battery holder, and also screw (G) adjacent to volume control below "A" battery holder.

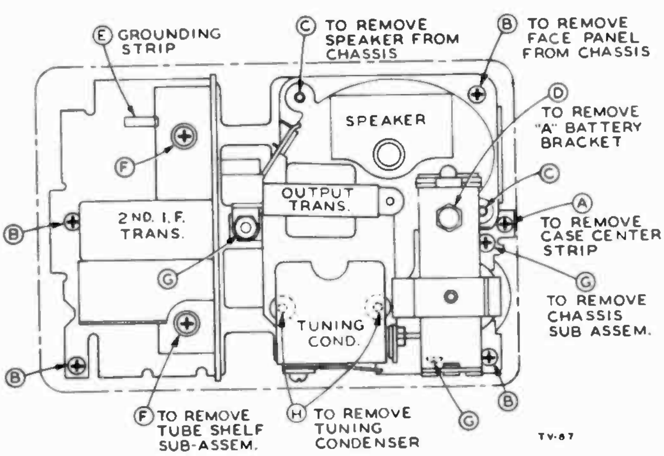


Fig. 6—Chassis Disassembly

IX. **To remove volume control:**
a. Remove chassis subassembly from chassis plate (see item VIII).
b. Unsolder the two leads to the "A" battery holder.
c. Lift up the "A" battery holder by removing the one screw (C) in its base. This holder has a hinge action and must be lifted up and back to remove.
d. Unsolder volume control leads.
e. Remove volume control knob (attached to shaft with set screw)
f. Remove volume control assembly by bending back four lugs.

X. **To remove oscillator coil:**
a. Same procedure and steps as covered in item VIII for removal of chassis subassembly plus the following.
b. Unsolder oscillator coil leads.
c. Remove coil by unsnapping spring mounting clips from angle bracket.

XI. **To remove tuning condenser:**
a. Remove case center strip (III).
b. Unsolder two leads and two ceramic capacitors (C2, C20) from tuning condenser.
c. Remove tuning knob (pull off).
d. Remove the two screws (H) (accessible through dial knob opening) which hold the tuning condenser to the chassis subassembly.

XII. **To remove 1st I-F transformer:**
a. Remove chassis subassemblies (see item VIII).
b. Unsolder four leads from 1st I-F transformer.
1. Blue to screen of 1R5 tube.
2. Green to grid of 1U4 tube.
3. Red to B+ terminal of 5 lug terminal board TB5.
4. Black to terminal board TB2.
c. Unsolder and bend mounting lugs straight on the I-F transformer can.

XIII. **To remove 2nd I-F transformer:**
a. Remove chassis subassemblies (see item VIII).
b. Unsolder four leads from 2nd I-F transformer.
c. Unsolder and bend mounting lugs straight on the I-F transformer can.

XIV. **To remove loop assembly:**
a. Remove case center strip (see item III).
b. Unsolder leads to loop connectors.
c. Remove snap fasteners holding loop in cover.
d. Carefully pry out on edge next to catch (opposite hinges).
e. When reassembling press loop assembly into top lid on the side next to the connectors to cause the plastic projections on the loop assembly to engage in the detents in the top lid.

XV. **To remove switch:**
a. Remove case center strip (III).
b. Remove screw (I) which holds switch to chassis plate.
c. Unsolder the two wires which connect to the switch.
d. Unsolder switch from chassis plate.

XVI. **To adjust latching of top lid:**
a. The hinges are attached to the face panel with Phillips head screws (one to each hinge). The mounting holes of the hinges are sufficiently large to permit adjustment of the hinges when the mounting screws are loosened. Tighten screws after adjustment.

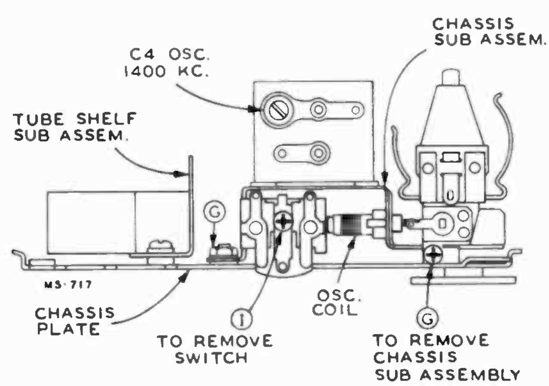
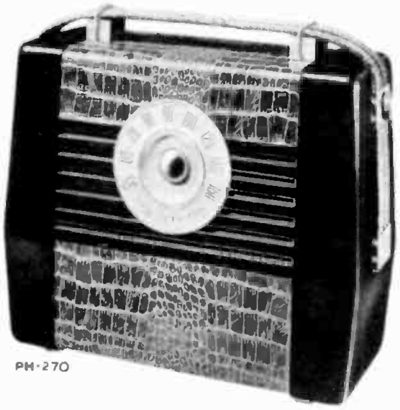
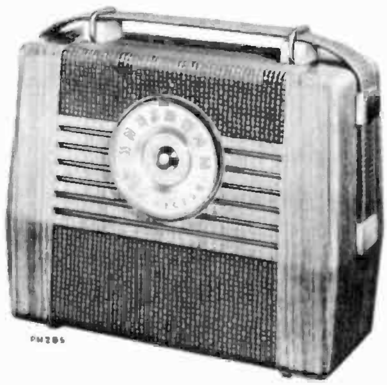


Fig. 7—Chassis Disassembly



Model 8BX5

Model 8BX54



Model 8BX55

RCA VICTOR

AC-DC-Battery Portable Receivers

8BX5, 8BX54, 8BX55

Chassis No. RC-1059—1st. Production
Chassis No. RC-1059A—2nd. Production
Mfr. No. 274

SERVICE DATA

—1948 No. 4—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range .... 540-1,600 kc

Intermediate Frequency .... 455 kc

Power Supply Rating
110 to 125 volts, AC 50 or 60 cycles, or DC.... 18 watts

Batteries required .... One RCA Battery Pack VS050

Tube Complement
(1) RCA—1R5 .... Converter
(2) RCA—1T4 .... I. F.-Amplifier
(1U4 in RC-1059A)
(3) RCA—1U5 ...... 2nd Det. AVC. & A.F.-Amplifier
(4) RCA—3V4 .... Power Output
(5) RCA—117Z3 .... Rectifier

Current Consumption
Battery Operation.......... "A" 60 ma., "B" 10 ma.
(Average life of RCA VS050 Battery
100 hrs. intermittent service.)
Total Rect. Current (117 volt, 60 cycle) .... 60 ma.

Power Output (AC Operation)
Undistorted .... .15 watt
Maximum .... .25 watt
(Output is slightly lower on battery operation)

Loudspeaker .... 4 in. P.M. 3.4 ohms at 400 cycles

Cabinet Dimensions
Height.....9½ in. Width.....11 in. Depth.....5 in.

CAUTION.—

Do not remove any tubes from the chassis with the set operating and the plug connected to the power line. Damage to tubes may result.

NOTE: These instruments are designed to be operated with a battery in position inside the cabinet. Reception will be below normal unless the battery is in its normal location. A substitute may be used—see page 2.

AC-DC Operation

This receiver will operate on 105 to 125 volts, AC 50 or 60 cycles, or DC.

A power cord is stored inside the cabinet. To open the cabinet, push upward on the two metal ball catches at the top rear of the cabinet. Remove the plug of the power cord from its socket on the chassis and insert the plug into a convenient electrical outlet. A slot in the bottom of the back cover allows the back to be closed with the cord passing through.

NOTE: If reception is not obtained on DC, reverse plug in outlet receptacle. This may also reduce hum on AC operation.

When returning to battery operation replace the plug in the socket provided on the chassis, roll up the cord and place under the raised portion of the battery holder bracket.

NOTE: Make certain that the plug is fully inserted (base of plug touching chassis) to assure proper operation of the Batt-Line switch.

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Battery operation of the receiver is preferable during alignment; on AC operation an isolation transformer (117v./117v.) may be necessary for the receiver if the test oscillator is also AC operated.

NOTE: Battery or substitute must be in place for ant. alignment (step 5).

Alignment Tabulation

Step	Connect high side of test oscillator to—	Test oscillator output—	Turn receiver dial to—	Adjust for maximum peak output
1	Disconnect loop—remove chassis—remove bottom plate, connect a 10,000 ohm resistor from C1 stator terminal to tuning condenser frame.			
2	Stator terminal of C1 thru .01 mf. capacitor	455 kc	55	*Top and bottom T2 (2nd. I-F trans.) *Top and bottom T1 (1st. I-F trans.)
3	Remove the 10,000 ohm resistor. Replace bottom cover and install chassis in cabinet. Re-connect loop.			
4	Short wire placed near receiver (for radiated signal)	1600 kc	160	†C5 (osc.)
5		1400 kc	140	†C2 (ant.)
6		600 kc	60	*L2 (osc.) while rocking gang
7		Repeat steps 4, 5 and 6		

NOTES:
*The magnetite cores of L2 and some T2 and T1 do not have visible adjusting screws. The cores have screw driver slots to permit adjustment (use non-metallic screwdriver).
†Adjustable thru hole in side of case which is accessible after unfastening one end of the carrying handle.

Critical Lead Dress

1. Dress output plate bypass C20 capacitor against chassis
2. Dress output plate lead to output transformer against chassis.
3. Dress audio coupling capacitor C14 (volume control to grid of 1U5) away from chassis, away from audio limiting resistor R8 and to permit adjustment of second I.F. Transformer.
4. Dress all exposed leads away from each other, and away from chassis to prevent short circuits.
5. Dress all filament and ground leads against chassis.
6. Dress filament bypass capacitor C23 and accompanying compensating resistor R15 (volume control to IT4 [or 1U4] socket) against volume control.
7. Dress power line cord away from line-battery switch mechanism.
8. Dress all capacitors and wiring away from oscillator coil.
9. Dress 4 mmf. neutralizing capacitor C7 against A.V.C. bypass capacitor C8 (IT4 [or 1U4] filament to first I.F. trans.).

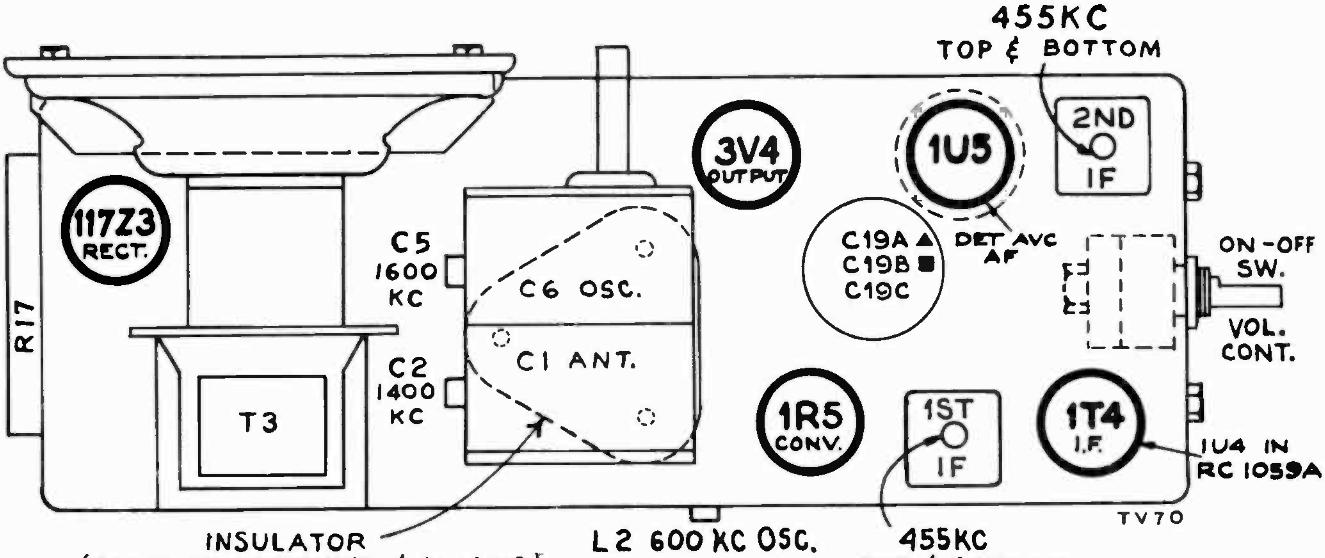
Substitute for Battery:

The position of the battery pack affects the loop inductance. Therefore, when the battery is removed, the loop inductance will change (increase) and the sensitivity will be slightly worse because of improper electrical tracking of the loop circuit with the heterodyne oscillator.

Where a battery is temporarily unavailable, a sheet of aluminum 8½" long x 3⅝" wide and from .020 to .050" thick may be placed in the cabinet in the position occupied by the battery so that it is lying flat down on the bottom. This sheet of aluminum has an effect on the loop inductance similar to the effect caused by the battery and will, therefore, return the performance of the loop to approximately the same as obtained when a battery is installed. If aluminum is not available, brass may be substituted with approximately the same performance. DO NOT USE STEEL OR IRON since the performance will be adversely affected. If desired, the sheet of aluminum may be waxed to the inside bottom of the case. DO NOT PLACE ANY WAX, CEMENT OR OTHER MATERIAL ON THE LOOP WINDINGS.

Insulating Washers:

The tuning condenser is insulated from the chassis with an insulating plate and insulating washers (rubber grommets in Chassis No. RC-1059A). In servicing make certain that these are in place and properly positioned.

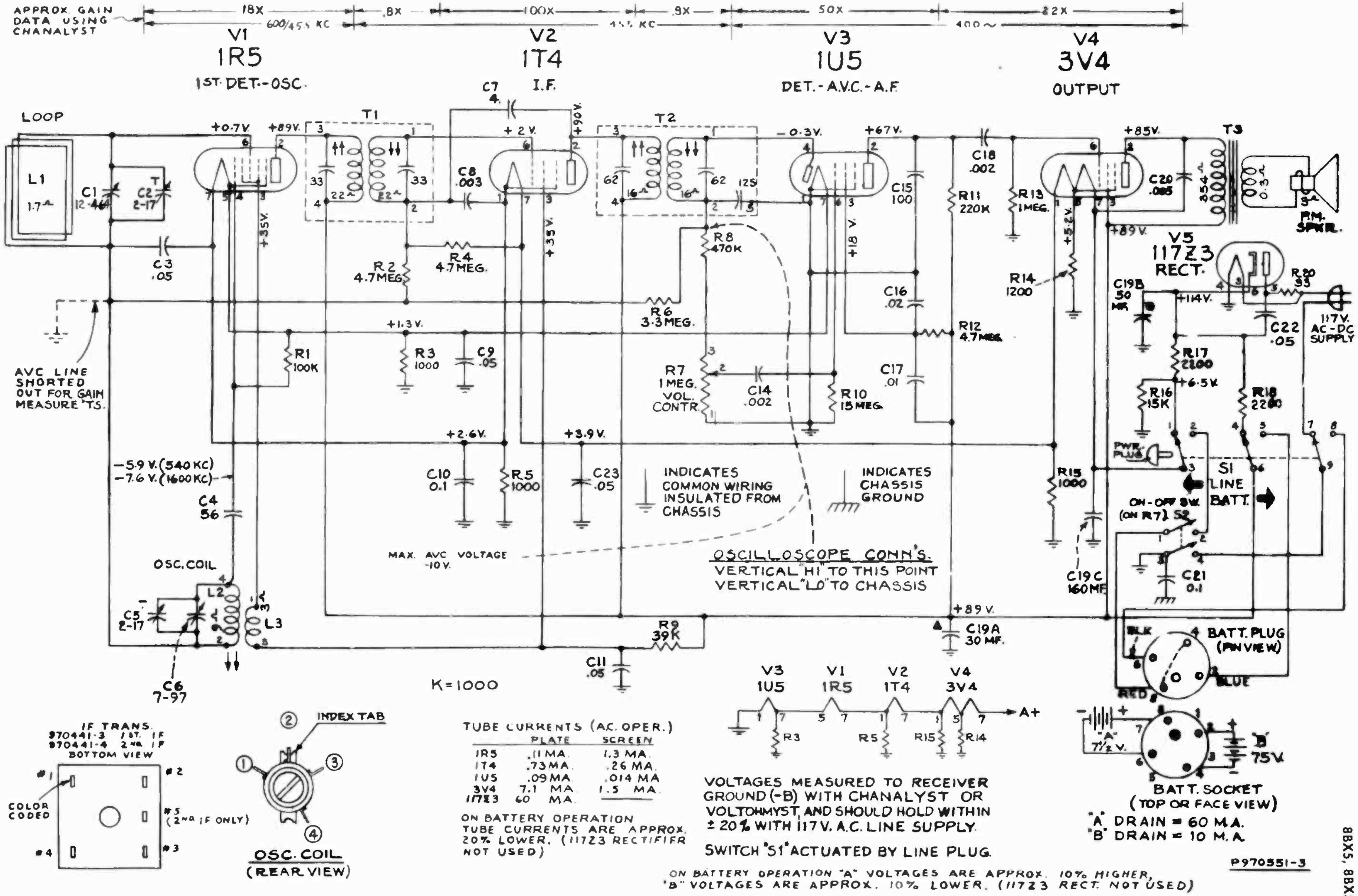


Tube and Trimmer Locations

I-F Alignment:

It has been found that the value of resistor (10,000 ohms) and capacitor (.01 mf) specified to be used for use during I-F alignment results in mis-alignment (1 to 1.5 kc) of the 1st I-F primary.

For more accurate alignment, it is suggested a 1000 ohm resistor and a 39 mmf capacitor be used during I-F alignment.

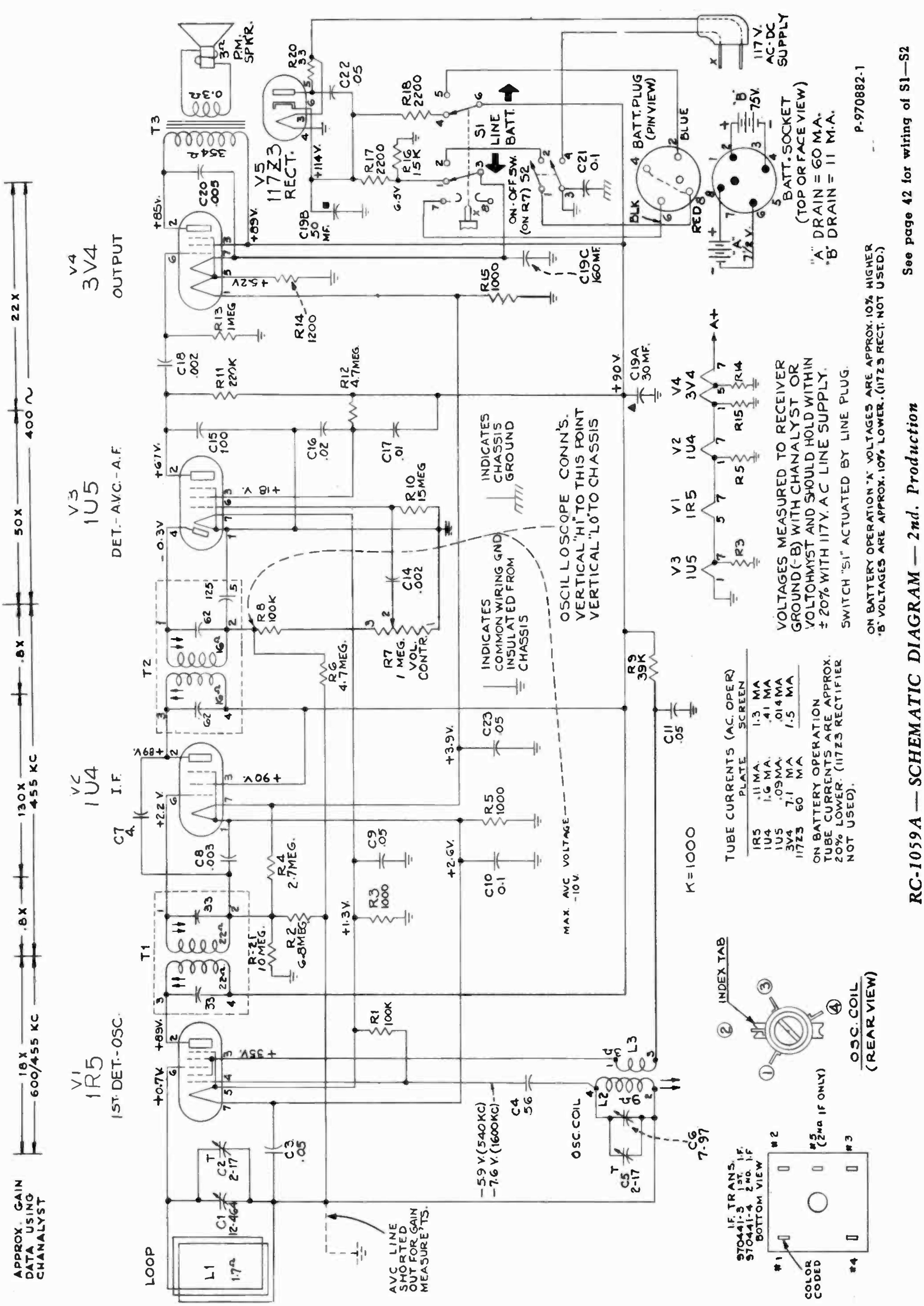


TUBE CURRENTS (A.C. OPER.)

	PLATE	SCREEN
1R5	.11 MA.	1.3 MA.
1T4	.73 MA.	.26 MA.
1U5	.09 MA.	.014 MA.
3V4	7.1 MA.	1.5 MA.
117Z3	60 MA.	

See page 42 for wiring of S1—S2

RC-1059 — SCHEMATIC DIAGRAM — 1st. Production



RC-1059A — SCHEMATIC DIAGRAM — 2nd. Production

See page 42 for wiring of S1—S2

To Remove Carrying Handle

1. Pull off the volume control knob.
2. Insert a small knife blade between one side of a spring clip and the cabinet as shown below, push upward on the slip shield to disengage the locking of the slip shield to the spring clip. Repeat this procedure on the other side of the spring clip. The slip shield may then be removed by pushing it upward thus disengaging it from the spring clip.
3. Repeat step 2 for each slip shield.
4. Remove the four screws (2 on each side) which hold the carrying handle to the case.

Caution: When re-assembling—make certain that the slip shield and the spring clip is assembled with their locks in the correct relation to each other.

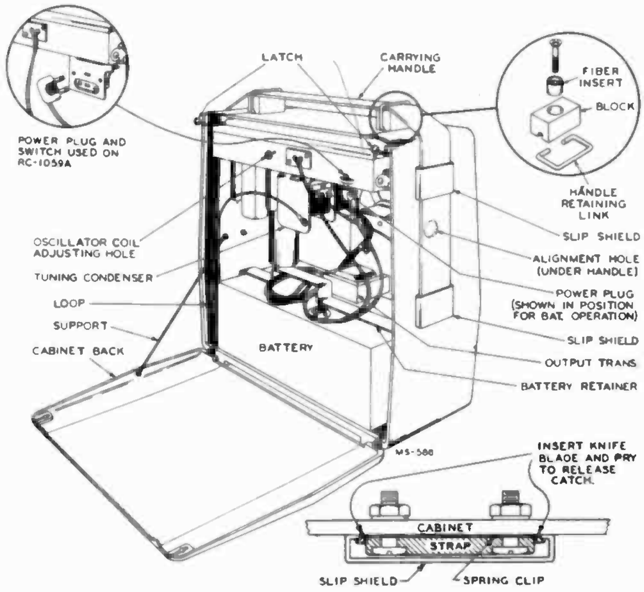
To Remove Chassis

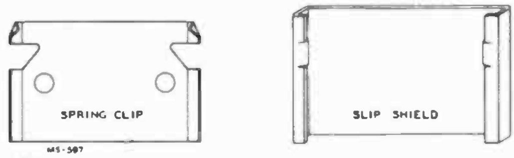
1. Pull off the volume control knob.
2. Close tuning condenser (dial at 55) to prevent possible damage to tuning condenser.
3. Remove dial knob by grasping both sides with the tips of the fingers of both hands and pull to the front —or—close the tuning condenser, open the back, reach in and push outward on the hub of the dial knob.

NOTE: When re-assembling—press inward on the back of the tuning condenser and on the front of the knob to properly seat the hub on the shaft.

4. Remove the two slip shields on the R.H. side of the cabinet (opposite the volume control) and unfasten the end of the carrying handle using the procedure described under, "To Remove Carrying Handle."
5. Unsolder the loop leads.
6. Remove the two screws holding the bottom edge of the speaker to the cabinet.
7. Remove the plug from the battery.
8. Remove the two screws at the top of the cabinet while supporting the chassis with one hand.

NOTE: When re-installing—replace speaker holding screws first but do not securely tighten until the two screws at the top of the cabinet have been tightened.





Cabinet Hinges

The cabinet hinges may be readily removed, they are secured to the cabinet and back by force fit. To remove back from cabinet—pull straight outward on both hinges at the same time.

Replacement Parts—1st. Production

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1059
73153	Capacitor—Ceramic, 4 mmf. (C7)
71924	Capacitor—Ceramic, 56 mmf. (C4)
73152	Capacitor—Ceramic, 100 mmf. (C15)
72315	Capacitor—Tubular, .002 mfd., 200 volts (C14, C18)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C8)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C20)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C17)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C16)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C9, C23)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C3, C11, C22)
54788	Capacitor—Tubular, 0.1 mfd., 200 volts (C10)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C21)
73127	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts and 1 section of 160 mfd., 25 volts (C19A, C19B, C19C)
73114	Coil—Oscillator coil complete with core and stud (L2, L3)
73126	Condenser—Variable tuning condenser (C1, C2, C5, C6)
73125	Control—Volume control and power switch (R7, S2)
73128	Cord—Power cord and plug (72" long)
73482	Insulator—Mounting insulator for tuning condenser
73275	Plug—5 prong male plug for battery cable
73237	Resistor—Wire wound, 33 ohms, 150 MA (R20)
	Resistor—Fixed composition, 1000 ohms, ±10%, ½ watt (R3, R5, R15)
	Resistor—Fixed composition, 1200 ohms, ±10%, ½ watt (R14)
73132	Resistor—Voltage divider, 2200 ohms, 7 watt (R17)
	Resistor—Fixed composition, 2200 ohms, ±10%, ½ watt (R18)
	Resistor—Fixed composition, 15,000 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed composition, 39,000 ohms, ±10%, ½ watt (R9)
	Resistor—Fixed composition, 100,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R11)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R8)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R13)
	Resistor—Fixed composition, 3.3 megohms, ±10%, ½ watt (R6)
	Resistor—Fixed composition, 4.7 megohms, ±10%, ½ watt (R2, R4)
	Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R12)
	Resistor—Fixed composition, 15 megohms, ±20%, ½ watt (R10)

STOCK No.	DESCRIPTION
73103	Shield—Tube shield for 1U5
73117	Socket—Tube socket
73133	Switch—"Line Battery" change switch T.P.D.T. (S1)
73129	Transformer—First I-F transformer (T1)
73130	Transformer—Second I-F transformer (T2)
71047	Transformer—Output transformer (T3)
73131	Washer—Insulating washer—extruded—to mount tuning condenser (3 required)
	SPEAKER ASSEMBLIES 92577-1
71059	Gasket—Speaker gasket (black tubing)
73123	Speaker—4" PM speaker complete with cone and voice coil
	MISCELLANEOUS
73134	Back—Cabinet back—less hinges—for Model 8BX5
73721	Back—Cabinet back—blonde—less hinges—for Model 8BX54
73723	Back—Cabinet back—walnut—less hinges—for Model 8BX55
73147	Ball—Metal ball with groove for back cover latch mechanism
73137	Block—Chassis mounting block (with groove for link)—less fiber insert (2 required)—fits on top of cabinet
73136	Button—Center button for dial knob
73142	Button—Station selector indicator button
Y1464	Case—Carrying case with loop—less hinges, latch mechanism, back cover and carrying handle—for Model 8BX5
Y2016	Case—Carrying case—blonde—with loop—less hinges, latch mechanism, back cover and carrying handle—for Model 8BX54
Y2017	Case—Carrying case—walnut—with loop—less hinges, latch mechanism, back cover and carrying handle—for Model 8BX55
73195	Clip—Spring clip for slip shield (3 required)
70425	Clip—Spring clip for volume control and power switch knob
73143	Handle—Carrying handle—for Model 8BX5
73724	Handle—Carrying handle—tan—for Model 8BX54
73725	Handle—Carrying handle—light brown—for Model 8BX55
73144	Hinge—Cabinet hinge (2 required)
73149	Insert—Fibre insert for chassis mounting block (2 required)
73135	Knob—Dial knob complete with center button and calibrations
73138	Knob—Volume control and power switch knob
73459	Link—Carrying handle retaining link (2 required)
73141	Loop—Antenna loop (L1)
73145	Nut—Hex nut with groove for back cover latch mechanism
73139	Shield—Slip shield for carrying strap—(bottom R. H. and L.H. and upper L. H.)
73140	Shield—Slip shield for carrying strap—with hole for volume control knob shaft (upper R. H.)
73146	Spring—Extension spring for back cover latch mechanism—R. H.
73148	Spring—Extension spring for back cover latch mechanism—L. H.
30900	Spring—Retaining spring for dial knob
73483	Support—Flexible drop support for back cover

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Replacement Parts—2nd. Production

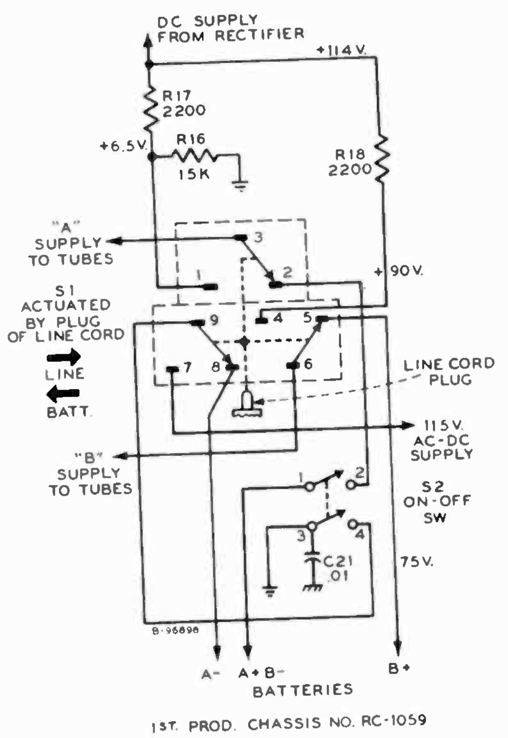
STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1059A
73153	Capacitor—Ceramic, 4 mmf. (C7)
71924	Capacitor—Ceramic, 56 mmf. (C4)
73152	Capacitor—Ceramic, 100 mmf. (C15)
72315	Capacitor—Tubular, .002 mfd., 200 volts (C14, C18)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C8)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C20)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C17)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C16)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C9, C23)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C3, C11, C22)
73784	Capacitor—Tubular, 0.1 mfd., 200 volts (C10)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C21)
73127	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 30 mfd., 150 volts and 1 section of 160 mfd., 25 volts (C19A, C19B, C19C)
73935	Clip—Mounting clip for I.F. transformers
73114	Coil—Oscillator coil complete with core and stud (L2, L3)
73126	Condenser—Variable tuning condenser (C1, C2, C5, C6)
73125	Control—Volume control and power switch (R7, S2)
70022	Cord—Power cord and plug
72283	Grommet—Rubber grommet for mounting tuning condenser (3 required)
73275	Plug—5 prong male plug for battery cable
73237	Resistor—Wire wound, 33 ohms, 150 MA (R20)
	Resistor—Fixed composition, 1000 ohms, ±10%, ½ watt (R3, R5, R15)
	Resistor—Fixed composition, 1200 ohms, ±10%, ½ watt (R14)
	Resistor—Fixed composition, 2200 ohms, ±10%, ½ watt (R18)
73132	Resistor—Voltage divider, 2200 ohms, 7 watts (R17)
	Resistor—Fixed composition, 15,000 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed composition, 39,000 ohms, ±10%, ½ watt (R9)
	Resistor—Fixed composition, 100,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R8)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R11)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R13)
	Resistor—Fixed composition, 2.7 megohms, ±10%, ½ watt (R4)
	Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R12)
	Resistor—Fixed composition, 4.7 megohms, ±10%, ½ watt (R6)
	Resistor—Fixed composition, 6.8 megohms, ±10%, ½ watt (R2)

STOCK No.	DESCRIPTION
	Resistor—Fixed composition, 10 megohms, ±10%, ½ watt (R21)
	Resistor—Fixed composition, 15 megohms, ±20%, ½ watt (R10)
73103	Shield—Shield for 1U5 tube
73117	Socket—Tube socket
71039	Switch—"Line-Battery" change switch (S1)
73129	Transformer—First I.F. transformer (T1)
73130	Transformer—Second I.F. transformer (T2)
71047	Transformer—Output transformer (T3)
	SPEAKER ASSEMBLY 92577-1
71059	Gasket—Speaker gasket (black tubing)
73123	Speaker—4" PM speaker complete with cone and voice coil
	MISCELLANEOUS
73134	Back—Cabinet back—less hinges—Model 8BX5
73721	Back—Cabinet back—less hinges—Model 8BX54
73723	Back—Cabinet back—less hinges—Model 8BX55
73147	Ball—Metal ball with groove for back cover latch mechanism
73137	Block—Chassis mounting block (with groove for link)—less fiber insert (2 required)—fits on top of cabinet
73136	Button—Center button for dial knob
73142	Button—Station selector indicator button
Y1464	Case—Carrying case complete with loop—less hinges, latch mechanism, back cover and carrying handle—Model 8BX5
Y2016	Case—Carrying case complete with loop—less hinges, back cover, latch mechanism and carrying handle—Model 8BX54
Y2017	Case—Carrying case complete with loop—less hinges, back cover, latch mechanism and carrying handle—Model 8BX55
70425	Clip—Spring clip for volume control and power switch knob
73195	Clip—Spring clip for slip shield (4 req'd)
73143	Handle—Carrying handle—Model 8BX5
73724	Handle—Carrying handle—Model 8BX54
73725	Handle—Carrying handle—Model 8BX55
7418C	Hinge—Cabinet hinge (2 required)
73149	Insert—Fibre insert for chassis mounting block (2 required)
73135	Knob—Dial knob complete with center button and calibrations
73138	Knob—Volume control and power switch knob
73459	Link—Carrying handle retaining link (2 required)
73141	Loop—Antenna loop (L1)
73145	Nut—Hex nut with groove for back cover latch mechanism
73139	Shield—Slip shield for carrying strap (bottom R.H. and L.H. and upper L.H.)
73140	Shield—Slip shield for carrying strap—with hole for volume control shaft (upper R.H.)
30900	Spring—Retaining spring for dial knob
73146	Spring—Extension spring for back cover latch mechanism—R.H.
73148	Spring—Extension spring for back cover latch mechanism—L.H.
73483	Support—Flexible drop support for back cover

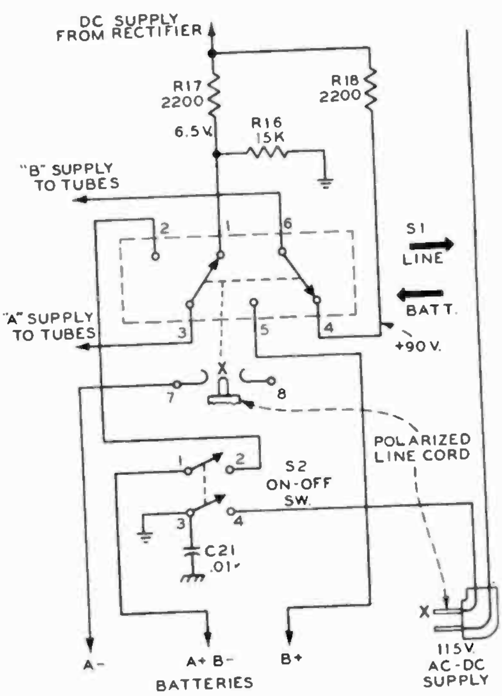
APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

LINE-BATT. Switch:

The LINE-BATT. switch used in these receivers is of the "slide" type. The actual switch does not have numbered terminals although the schematic diagrams have numbers indicated. The numbers on the schematic diagrams do not indicate the actual sequence of the terminals on the switch. The illustrations below show the actual sequence of the switch terminals and the corresponding numbers which appear on the schematic diagrams.



1ST. PROD. CHASSIS NO. RC-1059



2ND. PROD. CHASSIS NO. RC-1059 A

Model 8BX6

RCA VICTOR

MODEL 8BX6

AC-DC-Battery Portable

Chassis No. RC-1040C Mfr. No. 274

SERVICE DATA

—1948 No. 2—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range ....540-1,600 kc

Intermediate Frequency ....455 kc

Power Supply Rating

110 to 125 volts, AC 50 or 60 cycles, or DC.....18 watts

Batteries required

One RCA Battery Pack VS019 or equivalent

Tube Complement

(1) RCA—1T4 ..............................R.F.
(2) RCA—1R5 ....Converter
(3) RCA—1T4 .......................I.F.-Amplifier
(4) RCA—1U5 ......2nd Det. AVC. & A.F.-Amplifier
(5) RCA—3V4 ....Power Output
(6) RCA—117Z3 ....Rectifier

Current Consumption

Battery Operation............"A" 50 ma., "B" 13 ma.
(Average life of RCA VS019 Battery
125 hrs. intermittent service.)
Total Rect. Current (117 volt, 60 cycle).........61 ma.

Power Output

Undistorted ....150 watt
Maximum ....275 watt

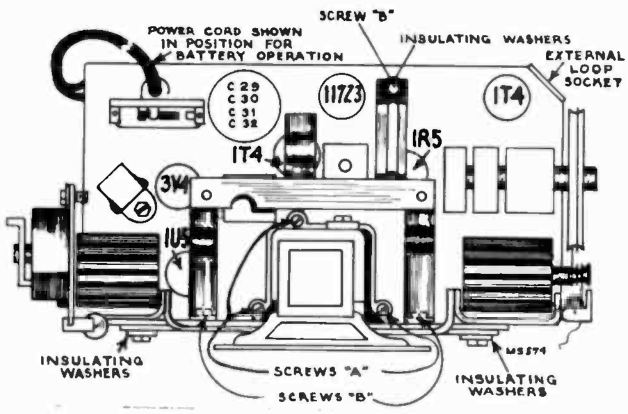
Loudspeaker............4 in. P.M. 3.4 ohms at 400 cycles

Cabinet Dimensions

Height...13¼ in. Width...9½ in. Depth...5½ in.

CAUTION.—

1. **Do not remove any tubes from the chassis with the set operating and the plug connected to the power line. Damage to tubes may result.**
2. **When cleaning the aluminum portion of the case use soap and water or cleaning fluid. Do not use abrasive cleansers.**



Insulating Washers:

The mounting bracket and dial frame are insulated from the chassis with insulating washers. This serves to insulate the case from the chassis. In servicing make certain that these washers are in place and properly positioned.

To Remove Chassis from Cabinet:

1. Disconnect battery plug and remove battery.
2. Disconnect antenna in cabinet.
3. Remove the two screws in the top of the cabinet (beneath handle).
4. Remove the two battery clips.
5. Remove the chassis from the cabinet.

To Remove Speaker:

1. Remove tubes 3V4 and 1U5.
2. Remove the three screws "B" holding power cord bracket assembly and remove bracket.
3. Remove the three screws "A" holding speaker bracket assembly.
4. Disconnect voice coil leads.
5. The speaker and speaker bracket may now be removed.

Using External Loop.—

A loop antenna is mounted inside the cabinet. Under normal conditions this will give satisfactory reception. If however, the receiver is used in a shielded compartment such as an automobile, airplane or railroad train, an RCA VICTOR EXTERNAL LOOP ANTENNA can be used.

This external loop antenna has a strap connector cord with identical two prong plugs on either end, this makes it convenient in connecting it to the circuit through the receptacle located in the left hand side of the chassis.

Open the case, plug the external loop antenna cord into the socket (it will only go in one way), bring the strap out through the slot in the case and attach the external loop antenna by means of the suction cup to any convenient vertical surface.

This external loop antenna can be stored in the cabinet, in the compartment below the battery pack, and the cord in the small compartment in the lower right hand corner of the cabinet.

AC-DC Operation.—

This receiver will operate on 105 to 125 volts, AC 50 or 60 cycles, or DC.

A power cord is stored in the fiber tube which is clamped above the chassis inside the cabinet. To open the cabinet, push the wire latch on the bottom of the case to the right, and raise the back cover upward on its hinges. Then pull the power cord plug out of the socket on the top of the chassis as shown, and take out and unroll the power cord. A slot in the bottom of the cabinet allows the closing of the cabinet with the power cord passing through. Close the cabinet with the cord extending through the slot and insert the plug into a convenient electrical outlet.

When returning to battery operation, be sure to replace the power plug in its socket inside the case with the cord stored in the fiber tube.

NOTE. If reception is not obtained on DC, reverse plug in oulet receptacle. This may also reduce hum on AC operation.

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test oscillator to the receiver chassis and keep the oscillator output as low as possible to avoid AVC action.

Battery operation of the receiver is preferable during alignment; on AC operation an isolation transformer (117v./117v.) may be necessary for the receiver if the test oscillator is also AC operated.

Calibration Scale.—The calibrated dial scale is attached to the chassis. It can be used directly as a reference for alignment.

With the gang at full mesh set the dial pointer so that the pointer is in line with the left hand vertical of the first figure 5 of the figures 55 on the dial scale as illustrated below.

Alignment Tabulation

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Pin No. 6 of 1T4 I.F. Amplifier thru .01 mfd.	455 kc	Quiet point near 1600 kc	2nd I.F. Trans. L8, L9 top† & bottom
2	Pin No. 6 of 1R5 Converter thru .01 mfd.			1st I.F. Trans. L6, L7 top† & bottom
3				2nd I.F. Trans. L8 bottom core
4	High side of loop (Blue lead) in series with .01 mfd. Bottom shield cover in place	1600 kc	1600 kc	C11 (osc.)
5		1400 kc	1400 kc	C10 (r.f.)
6		600 kc	600 kc	L4 (osc.) L3 (r.f.)
7	Repeat steps 4, 5 and 6			
8	Short wire placed near loop. (Chassis in cabinet and internal loop connected)	1400 kc	1400 kc	C1†† (loop) (Cabinet closed)

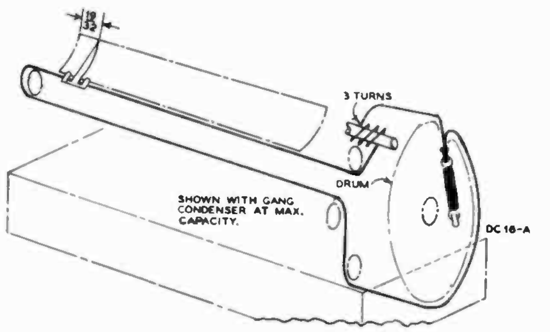
† Two peaks may be found, the correct peak is that with the core in the outer position (counter-clockwise).

†† Accessible thru slot in case provided for cable of external loop.

NOTE: Adjustments L8, L9, L6, L7, L4 and L3 do not have visible adjusting screws. The magnetite cores have a screw driver slot to permit adjustment (use non-metallic screw driver).

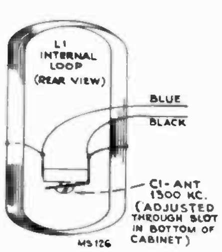
Critical Lead Dress

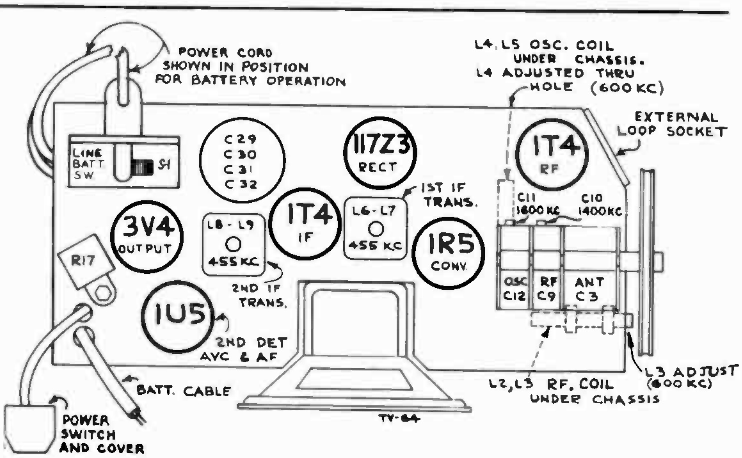
1. Dress all filament leads next to chassis.
2. Keep the leads short on the end of the three components which connect to the grid terminal (#6) of the r.f. socket. (R-1, R-2, C-2).
3. Keep lead to center section of gang as short as possible.
4. Dress loop leads away from tuning drum and battery.
5. Dress lead to pin #4 of 1U5 tube away from other wiring.
6. Dress r.f. plate lead away from r.f. grid circuit.
7. Dress components and wiring near external loop socket to clear external loop pins.
8. Dress avc lead away from 2nd IF transformer and associated components.
9. Dress converter plate lead away from chassis and away from output leads.
10. Dress output leads up and away from other wiring.
11. Dress neutralizing capacitor C36, flat against chassis.
12. Dress 1st audio plate lead up and away from other wiring.
13. Dress 33 ohm resistor (R3) over bottom of rectifier socket and clear of other wiring.
14. Dress R.F. tube plate lead slightly away from chassis base.



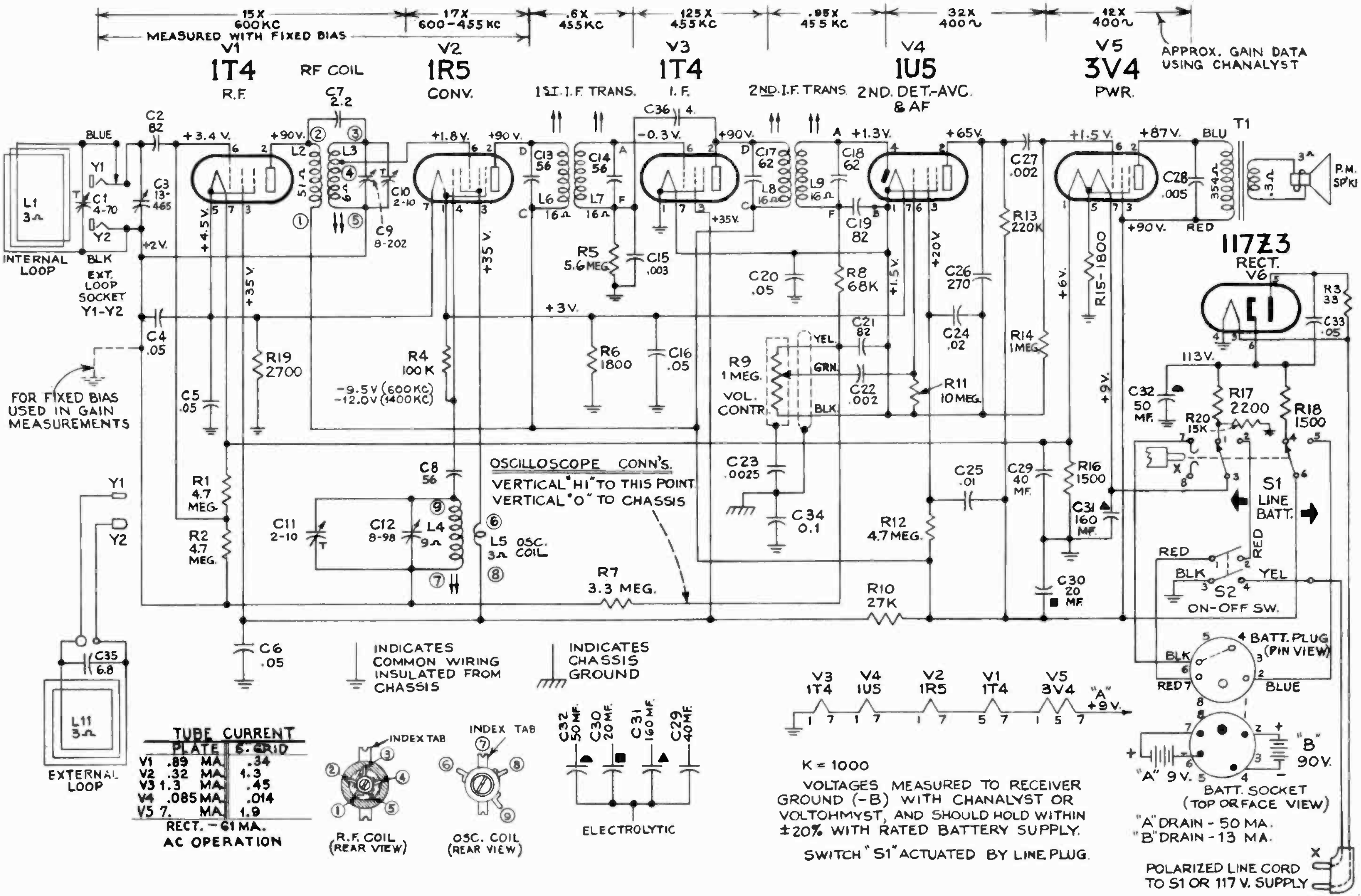
Dial-Indicator and Drive Mechanism

Dial Pointer Setting





Tube and Trimmer Locations



8BX6 (RC-1040D)

SCHEMATIC DIAGRAM

See page 46 for wiring of S1—S2

Service Data:

Model 8BX6 using Chassis No. RC-1040D is identical to those using Chassis No. RC-1040C except that the external loop antenna socket is omitted on RC-1040D.

Capacitor Substitution:

In some chassis C23 is .003 mfd instead of .0025 as specified

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1040C
71056	Bracket—Drive cord pulley bracket complete with pulley (volume control side)
71054	Bracket—Drive cord pulley bracket complete with two (2) pulleys
71044	Bracket—Power switch bracket complete with actuating lever less switch
71042	Button—Plug button
71502	Capacitor—Ceramic, 2.2 mmf. (C7)
73153	Capacitor—Ceramic, 4 mmf. (C36)
71924	Capacitor—Ceramic, 56 mmf. (C8)
71514	Capacitor—Ceramic, 82 mmf. (C2, C21)
71540	Capacitor—Ceramic, 270 mmf. (C26)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C23)
71552	Capacitor—Tubular, .002 mfd., 400 volts (C22, C27)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C15)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C28)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C25)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C24)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C5, C16, C20)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C4, C6, C33)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C34)
73113	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts; 1 section of 20 mfd., 150 volts; 1 section of 160 mfd., 25 volts and 1 section of 40 mfd., 25 volts (C29, C30, C31, C32)
73176	Coil—R-F coil complete with core and stud (L2, L3)
73114	Coil—Oscillator coil complete with core and stud (L4, L5)
73112	Condenser—Variable tuning condenser (C3, C9, C10, C11, C12)
71057	Control—Volume control (R9)
†72953	Cord—Drive cord (approx. 38" overall required)
70022	Cord—Power cord
73118	Dial—Dial scale and window assembly
72283	Grommet—Rubber grommet for mounting tuning condenser (3 required)
71031	Holder—Power cord holder (fiber tube)
73111	Indicator—Station selector indicator
73121	Knob—Tuning knob (roller-type) or volume control knob (roller-type)
18469	Plate—Mounting plate for electrolytic capacitor
71041	Plug—5 prong male plug for battery cable
36230	Pulley—Drive cord pulley
73237	Resistor—Wire wound, 33 ohms, 150 MA (R3)
	Resistor—Fixed composition, 1500 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed composition, 1500 ohms, ±10%, 1 watt (R18)
	Resistor—Fixed composition, 1800 ohms, ±10%, ½ watt (R6, R15)
73238	Resistor—Ballast resistor, 2200 ohms, 6 watts (R17)
	Resistor—Fixed composition, 2700 ohms, ±10%, ½ watt (R19)
	Resistor—Fixed composition, 15,000 ohms, ±20%, ½ watt (R20)
	Resistor—Fixed composition, 27,000 ohms, ±10%, ½ watt (R10)
	Resistor—Fixed composition, 68,000 ohms, ±20%, ½ watt (R8)
	Resistor—Fixed composition—100,000 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R13)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R14)
	Resistor—Fixed composition, 3.3 meg., ±10%, ½ watt (R7)
	Resistor—Fixed composition, 4.7 meg., ±10%, ½ watt (R1, R2, R12)
	Resistor—Fixed composition, 5.6 meg., ±10%, ½ watt (R5)
	Resistor—Fixed composition, 10 meg., ±20%, ½ watt (R11)
73122	Shaft—Tuning knob shaft
73119	Shield—L.H. end shield for dial

STOCK No.	DESCRIPTION
73120	Shield—R.H. end shield for dial
73115	Socket—Tube socket—miniature—⅞" mounting center—moulded (no center shield)
73116	Socket—Tube socket—miniature—⅞" mounting center—moulded (center shield)
73117	Socket—Tube socket—minature—1" mounting center—wafer
70390	Spring—Drive cord tension spring
30900	Spring—Retaining spring for knob
71039	Switch—"Line-Battery" change switch (S1)
71045	Switch—Power switch (S2)
73174	Transformer—First I-F transformer (L6, L7, C13, C14)
73175	Transformer—Second I-F transformer (L8, L9, C17, C18, C19)
71047	Transformer—Output transformer (T1)
71081	Washer—"C" washer for tuning knob shaft
73332	Washer—Insulating washer (flat) for mounting base holder bracket (1 required) and dial support to chassis base (4 required)
73333	Washer—Insulating washer (extruded) for mounting base holder bracket (1 required) and dial support to chassis base (4 required)
71049	Window—Dial window only
	SPEAKER ASSEMBLY
	92577-3
	Use Stock No. 71058 Speaker (4" x 6") as replacement.
	SPEAKER ASSEMBLY
	922258-2
71059	Gasket—Speaker gasket (black tubing)
71058	Speaker—4"x6" PM speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71074	Arm—Shutter arm lever.
73243	Back—Case back complete with center strip, feet and case spring latch
71073	Bracket—Bearing bracket for shutter arm lever
71070	Bracket—Mounting bracket for capacitor
71069	Capacitor—Adjustable trimmer, 3-35 mmf. (C1)
71080	Clip—Case side spring clip & screw (2 required)
71061	Foot—Case foot for rear section of case (2 required)
71068	Foot—Case foot for front section of case—(2 required)
73124	Front—Case front complete less shutter
71063	Handle—Carrying handle
73244	Latch—Latch to mount rear feet (2 required)
71065	Link—Carrying handle link consisting of two (2) links, two (2) shafts and four (4) drive screws (2 required)
71079	Loop—Antenna loop (L1)
71064	Retainer—Battery retainers spring bracket (2 required)
71066	Screw—No. 8—32x5/16" long screw to hold case together (located under carrying handle) (2 required)
71077	Screw—Screw complete with washer and nut to secure case side to case front or to mount rear feet
71071	Shutter—Case shutter
72980	Side—Case side—L.H.
72979	Side—Case side—R.H. (loop side)—less capacitor and bracket
71072	Spring—Case shutter compression spring
31608	Washer—"C" washer for shutter shafts
71078	Washer—Dampening washer for shutter shafts (2 required)

†Stock No. 72953 is a reel containing 250 feet of cord.

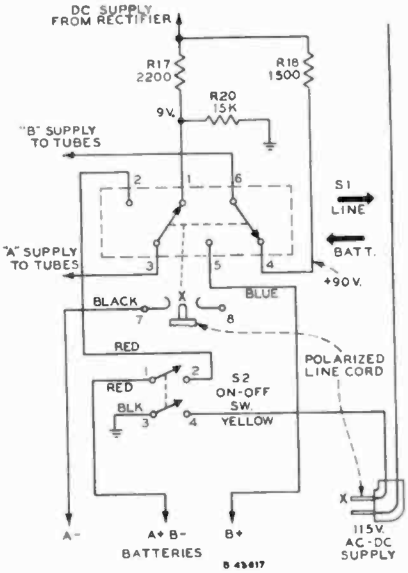
APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Change in Parts List:

Add:
71040 Socket—2 contact female socket for external loop

LINE-BATT. Switch:

The LINE-BATT. switch used in these receivers is of the "slide" type. The actual switch does not have numbered terminals although the schematic diagrams have numbers indicated. The numbers on the schematic diagrams do not indicate the actual sequence of the terminals on the switch. The illustrations below show the actual sequence of the switch terminals and the corresponding numbers which appear on the schematic diagrams.



8BX65 (RC-1040C)

Service Data:

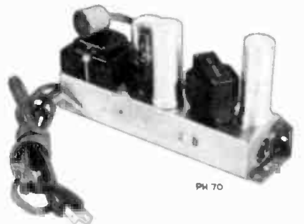
The Service Data previously issued for Model 8BX6 will apply to Model 8BX65. The only difference is in the finish of the metal case parts. Model 8BX6 has an aluminum finish and Model 8BX65 has a gold finish. Replacement parts are identical except for the following which are used on Model 8BX65 only.

Stock No.	Description
73879	Back—Case back complete with center strip, feet and spring latch
73878	Front—Case front complete—less shutter
73875	Link — Carrying handle link group; consisting of two links, two shafts and four drive screws. (two groups required)
73876	Screw—No. 8-32x5/16" screw to hold case together (located under carrying handle two required)
73877	Shutter—Case shutter

RCA VICTOR

Model 8F43 ↑

CV-45 Electrifier →



Model 8F43

Chassis No. RC-1037B Mfr. No. 274

and CV45 Electrifier

Chassis No. RS-1001 Mfr. No. 274

SERVICE DATA

—1948 No. 15—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Range .... 540 KC.—1600KC.
Intermediate Frequency .... 455 KC.

Tube Complement
(1) RCA—1A7 GT .... Converter
(2) RCA—1N5 GT .... IF Amplifier
(3) RCA—1H5 GT 2nd Det., A.V.C., and A-F Amplifier
(4) RCA—3Q5 GT .... Output
RCA—6X5 GT .... (in CV-45) .... Rectifier

Power Output Rating
Undistorted .... 160 MW.
Maximum .... 270 MW.

Loudspeaker
Type 922258-2 .... 4 x 6 inch PM
V.C. impedance at 400 cycles .... 3.4 ohms

Power Supply
(1) RCA Battery Pack—VS022.
"A" Battery, 1½ volts, Drain—0.24 amperes.
"B" Battery, 90 volts, Drain—10.5 ma.
(2) Electrifier—(CV-45)
105 to 125 volts, 60 cycles, AC.

Cabinet Dimensions
Height ..... 9 7/16 in. Width ..... 17⅞ in. Depth ..... 9½ in.

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1037B
73884	Capacitor—Variable tuning capacitor (C11, C11a, C12, C12a)
73901	Capacitor—Ceramic, 51 mmf. (C10)
39630	Capacitor—Mica, 120 mmf. (C8, C9)
72571	Capacitor—Mica, 330 mmf. (C4)
70622	Capacitor—Tubular, .002 mfd., 600 volts (C3)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C5, C6)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C1)
38593	Capacitor—Electrolytic, 10 mfd., 90 volts (C7)
71404	Coil—Antenna coil complete with adjustable core and stud (L1, L2)
71401	Coil—Oscillator coil complete with adjustable core and stud (L3, L4)
71168	Control—Volume control and power switch (R9, S1)
†72953	Cord—Drive cord. (approx. 52" overall length required)
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
73886	Indicator—Station selector indicator
73885	Plate—Dial back plate complete with pulleys, less dial
71162	Plug—Battery shorting plug—3 prong male
30550	Plug—4 prong male plug for battery cable
	Resistor—Fixed, composition, 470 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 68,000 ohms, ±20%, ½ watt (R2)
	Resistor—Fixed, composition, 220,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R5)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R6)
	Resistor—Fixed, composition, 3.3 megohm, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 10 megohm, ±20%, ½ watt (R7, R8)
73887	Shaft—Tuning knob shaft
70377	Shield—Shield for 1A7GT tube
71163	Socket—Battery shorting socket—3 contact female
37605	Socket—Tube socket
70390	Spring—Drive cord spring
71403	Transformer—First I.F. transformer (T1)
71400	Transformer—Second I.F. transformer (T2)
71047	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 922258-2
71058	Speaker—4" x 6" elliptical P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
70398	Clamp—Dial clamp (2 required)
X1660	Cloth—Grille cloth
73888	Dial—Glass dial scale
39002	Foot—Rubber foot (4 required)
70473	Knob—Tuning knob
71164	Knob—Volume control knob
72649	Motif—Decorative motif
38458	Nut—Speed nut to fasten motif
30900	Spring—Retaining spring for knobs
	CV-45 ELECTRIFIER RS-1001
71840	Capacitor—Electrolytic, dual, 2,000 mfd., 6 volts (C3, C4)
71844	Capacitor—Electrolytic, dual, 20 mfd., 150 volts (C1, C2)
35069	Fastener—Push fastener for bottom cover
71838	Reactor—Filter reactor
71839	Rectifier—Rectifier complete with mounting bracket
72787	Resistor—1.2 ohms, ½ watt (R3)
12453	Resistor—27 ohms, ¼ watt (R1)
30788	Resistor—4,700 ohms, 1 watt (R2)
71841	Socket—3 contact female socket
31027	Socket—4 contact female socket for battery cable
37605	Socket—Tube socket
71837	Transformer—Power transformer, 117 volt, 60 cycle (T1)

†Stock No. 72953 is a reel containing 250 ft. of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

8F43

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil and turn the receiver volume control to maximum.

Test Oscillator.—Connect the low side of the test oscillator to the receiver chassis, and keep the output low to avoid AVC action.

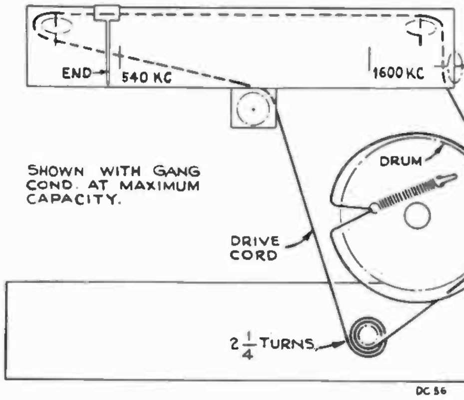
Pre-Setting Dial.—With gang condenser in full mesh, the pointer should be set at the left-hand end dial calibration mark.

Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust for maximum output
1	1N5GT grid in series with .1 mfd.	455 kc.	Quiet point near 600 kc.	T-2 2nd I.F. trans.
2	1A7GT grid in series with .1 mfd.			T-1* 1st I.F. trans.
3	Antenna lead in series with 220 mmfd.	1600 kc.	1600 kc. mark	C12A
4		540 kc.	540 kc. mark	L3
5		Repeat Steps 3 and 4.		
6		1400 kc.	1400 kc. signal	C11A
7		600 kc.	600 kc. signal	L2
8		Repeat Steps 6 and 7.		

*Do not readjust T-2.

Critical Lead Dress

1. Keep output plate capacitor dressed close to the chassis.
2. Keep lead from lug A of second IF transformer down and dressed close around the 1H5GT tube socket.
3. Dress 1N5GT plate lead close to chassis.
4. Dress C1 down and away from the antenna coil.
5. Dress C3 and C5 away from each other.
6. Dress the lead from 2nd. IF transformer to the volume control clear of other components.

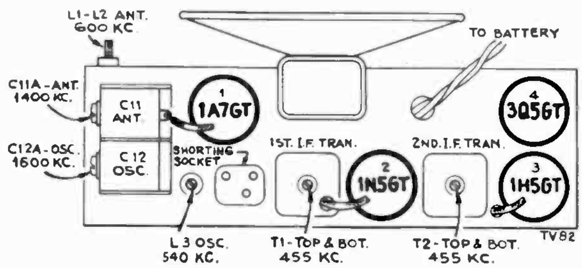


Dial Indicator and Drive Mechanism Showing Alignment Check Points

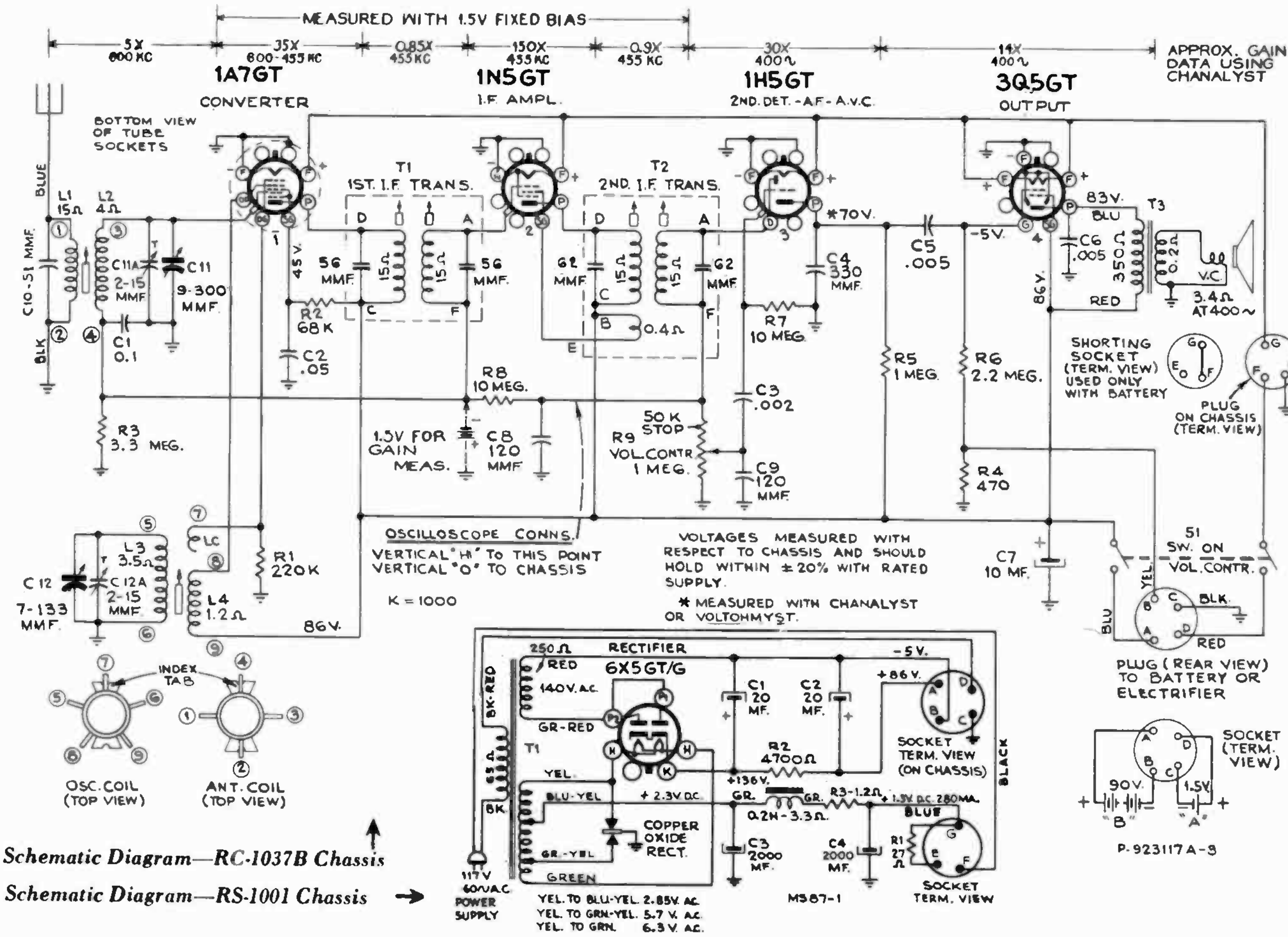
NOTE:—

When using the electrifier, remove the shorting plug on the chassis (adjacent to the 1A7GT tube) and replace it with a similar plug, attached to the electrifier. Also connect the remaining plug attached to the electrifier, in place of the normal battery plug. The receiver will operate in the normal manner, using the same control for turning the set on and off.

Do not plug electrifier into a DC outlet.



Tube and Trimmer Locations



Schematic Diagram—RC-1037B Chassis ↑

Schematic Diagram—RS-1001 Chassis →

RCA VICTOR

AM-FM Radio Receivers

8R71, 8R74, 8R75

Chassis No. RC-1060

8R72, 8R76

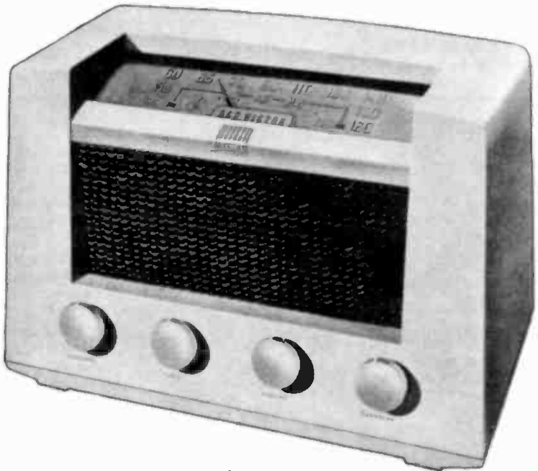
Chassis No. RC-1060A

—Mfr. No. 274—

SERVICE DATA

—1948 No. 7—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.



8R71—Maroon Plastic
8R72—Ivory Plastic
8R74—Mahogany Plastic } *Simulated Wood*
8R75—Walnut Plastic
8R76—Blonde Plastic

Specifications

Tuning Ranges

Standard Broadcast (AM) .... 540-1,600 kc.
Frequency Modulation (FM) .... 88-108 mc.

Intermediate Frequency .....AM—455 kc., FM—10.7 mc.

Tube Complement

(1) RCA 6J6 .... Mixer and Oscillator
(2) RCA 6BA6 .... I. F. Amplifier
(3) RCA 6AU6 .... Driver
(4) RCA 6AL5 .... Ratio Detector
(5) RCA 6AV6 ...... AM Det.—AVC—A. F. Amp.
(6) RCA 6V6GT .... Output
(7) RCA 6X5GT .... Rectifier

Power Supply Rating ...... 115 volts, 60 cycles, 50 watts

Circuit Description

The chassis used in these receivers have a 6J6 tube (V1) (twin triode), one section of which is used as mixer and the other section as oscillator. The FM antenna coil and the FM oscillator coil are placed in such position as to provide coupling between them. A section of the AM oscillator coil is connected in series with the mixer grid input when the range switch is in AM position.

Dual I-F transformers are used, each transformer containing both AM and FM windings. The I-F amplifier is V2 (6BA6).

The range switch has four functions:

(1) Selection of AM or FM ranges.

(2) Selection of AVC supply voltages to be applied to the controlled tubes. Simple AVC is applied to the grids of V1 and V2 on AM. Delayed AVC is used on FM and is applied only to the grid of V2.

(3) Controls application of B+ voltage to the plate circuits of V1 (disconnected for PHONO operation).

(4) Controls audio input to volume control.

The driver V3 (6AU6) and ratio detector V4 (6AL5) circuits are similar to those used in other RCA Victor AM-FM receivers.

The audio voltage controlled by the volume control is amplified by V5 (6AV6) and V6 (6V6GT).

The rectifier V7 is type 6X5GT.

Loudspeaker

Type 92572-2 .... 5 in. P.M.
Voice coil impedance at 400 cycles .... 3.2 ohms

Tuning Drive Ratio .... 7¼:1 (3⅝ turns of knob)

Dial Lamps (2) .... Type No. 44, 6-8 volts, 0.25 amp.

Power Output

Maximum .... 3 watts
Undistorted .... 2 watts

Cabinet Dimensions

Height....9¾ in. Width....14¼ in. Depth....8 in.

Antennas:

These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

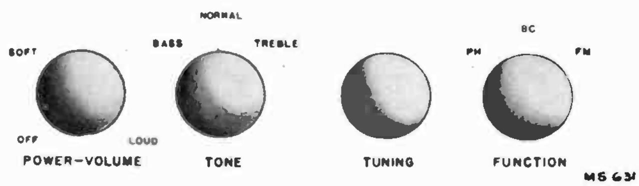
Under average conditions these antennas will provide satisfactory reception. However, provision is made for the use of external antennas if desired — connect as indicated below:

Ground: Connect external ground to "G" terminal. Under some conditions an external ground is detrimental to FM reception.

AM Antenna: Connect a single wire antenna to terminal "A."

FM Antenna: Connect the transmission line from an external FM dipole antenna to "FM" and "G" terminals. Remove the internal FM antenna wire from terminal "FM."

NOTE: *For satisfactory reception on FM—when using the built-in FM antenna—the power cord must be fully extended and must not be coiled or hanked up.*



CONTROLS

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Oscilloscope Alignment:

The FM I. F. alignment may be checked using a sweep generator and an oscilloscope. Shunt terminals B and C of T3 with a 1200 ohm resistor. Connect the high side of the oscilloscope to term. C of T3 in series with a diode probe. Apply the output of the sweep generator (10.7 mc with ±250 kc sweep) to pin No. 1 of V2 (6BA6) in series with .01 mf., low side of the oscilloscope and sweep generator to chassis. This will show the response of T2.

To check the combined response of T1 and T2; connect the sweep generator to the antenna terminal board—high side to "FM" term. in series with 300 ohms and low side to "G" terminal. Oscilloscope connections as previously connected.

To check the ratio detector response; remove the 1200 ohm resistor previously used, connect the high side of the oscilloscope direct to term. No. 9 of S1, low side to chassis. Apply the output of the sweep generator to pin No. 1 of V3 (6AU6) in series with .01 mf. Note: It is difficult to observe marker signals in this step—center frequency and sweep width should be previously observed.

CRITICAL LEAD DRESS

1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The ground lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis and on front apron side of the output transformer.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. The lead from the high side of the loop should be dressed away from tubes.
7. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
8. Connect C40 directly between the gang condenser and pin No. 1 of V1.
9. Make all FM leads as short as possible.
10. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
11. Dress resistor R15 near chassis base.
12. Dress all A. C. leads away from volume control.
13. The lead from the "FM" terminal of the antenna terminal board to the tap of L1 should be dressed near the chassis between T2 and the tuning condenser and away from 6BA6 I. F. amp.
14. The taps on L1 and L2 are critical. L1 tap should be ¾ turn from the ground end. L2 tap should be 2⅓ turns from the gang condenser C8.
15. The lead from R32 to terminal No. 9 of S1 should be dressed away from the output transformer.
16. Dress C25 and C26 against the chassis with the shortest lead length possible
17. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.
18. The FM osc. coil must be cemented to its support to prevent microphonic howl on FM. Amphenol No. 912 cement is recommended for this purpose. Amphenol No. 916 solvent may be used if it becomes necessary to loosen the coil.
19. C41 should be waxed or cemented to the chassis apron to prevent microphonic howl.

REFER TO "CHASSIS BOTTOM VIEW"—PAGE 7

AM Alignment

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	C3 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T3 bottom core (sec.). T3 top core (pri.).
2				AM windings.† T2 top core (sec.). T2 bottom core (pri.).
3	"A" terminal of terminal board at rear of chassis in series with 220 mmf.	1400 kc.	1400 kc.	C13 osc. C4 ant.
4		600 kc.	600 kc.	L4 osc. (Rock gang.)
5	Repeat Steps 3 and 4.			

† Use alternate loading.

Alternate loading involves the use of a 47,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 47,000 ohm resistor after T3 and T2 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

FM Alignment

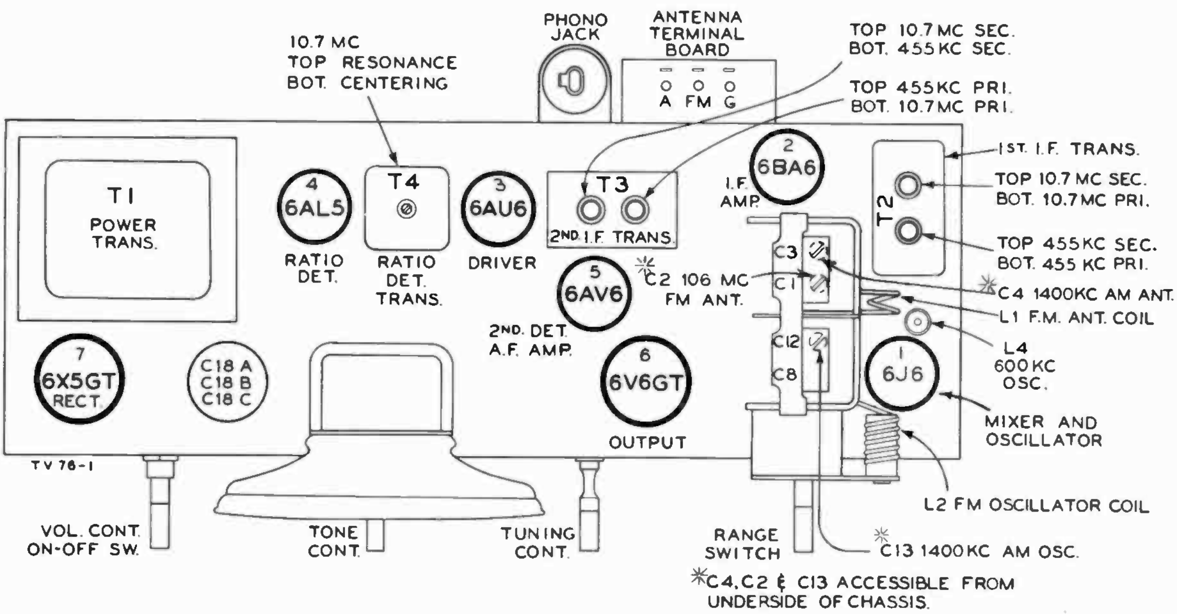
RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect tbe d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C33 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	Pin 1 of 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .05 volt).	Max. capacity (fully meshed).	T4 top core for max. d-c voltage across C33. T4 bottom core for min. audio output.*
3	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	10.7 mc. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.		FM windings.†† T3 top core (sec.). T3 bottom core (pri.).
4				FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
5		106 mc.	106 mc.	L2 osc.** C2 ant. Set C2 at max. capacity while adjusting L2.
6		90 mc.	90 mc.	L1 ant.** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T3 and T2 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 47,000 ohm resistor and load the FM windings.

** L1 and L2 are adjustable by increasing or decreasing the spacing between turns.



Tube and Trimmer Locations

VOLTAGE CHART

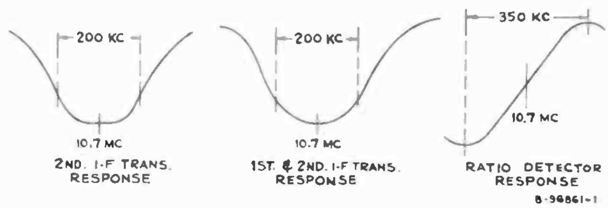
Tube	Type		Pin No.	"A"	"FM"	Phono
1	6J6	Plate Plate Grid Grid	1 2 6 5	108 94 -6.8 -3.0	106 109 -6.7 -2.5	— — — -1.0
2	6BA6	Plate Screen Cathode Grid	5 6 7 1	185 110 0.75 -1.6	180 94 0.88 -0.5	195 105 0.94 -0.8
3	6AU6	Plate Screen Cathode	5 6 7	184 132 1.1	180 130 1.1	195 140 1.2
4	6AL5	—	—	—	—	—
5	6AV6	Plate Grid	7 1	74 -0.8	74 -0.8	76 -0.8
6	6V6GT	Plate Screen Cathode	3 4 8	243 193 9.7	242 190 9.5	245 205 10.5
7	6X5GT	Cathode	8	250	250	253
CATHODE CURRENTS (MA)						
1	6J6		7	8.6	8	—
2	6BA6		7	12	13	13.1
3	6AU6		7	13.5	13.2	14.3
4	6AL5		1 & 2	—	—	—
5	6AV6		2	0.3	0.3	0.35
6	6V6GT		8	28.2	27.6	30.4
7	6X5GT		8	67	67	65

Voltages and currents measured with tuning condenser closed and no signal input should hold within ±20% with rated line voltage.

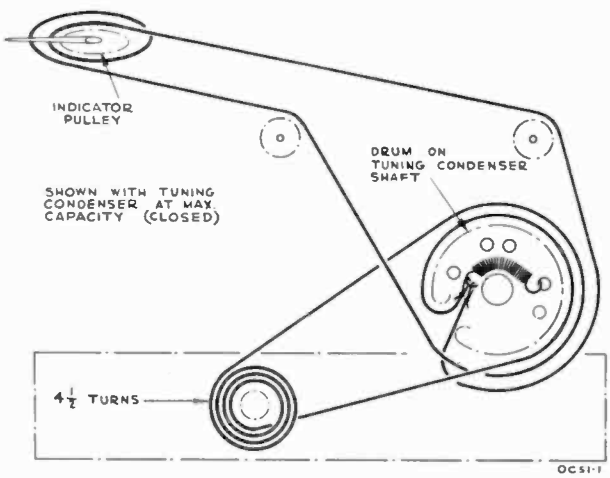
Note: Plate voltage removed from 6J6 mixer and oscillator tube during "Phono" operation.

Note: FM mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The position of the coils and location of the taps are critical (refer to "Critical Lead Dress").

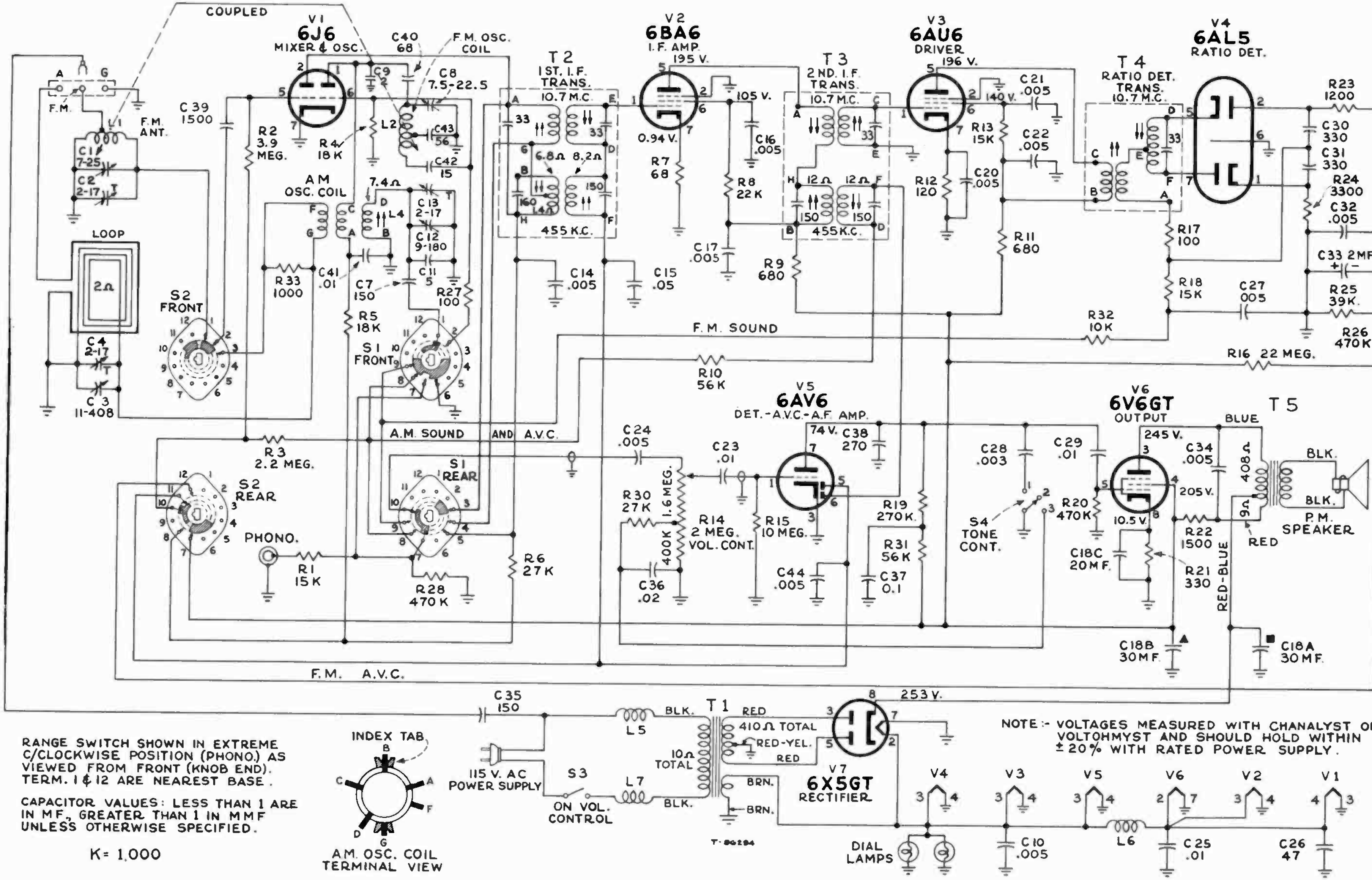
In some chassis the FM osc. coil support (illustrated) is not used, two polystyrene rods cemented to the chassis and to the coil are used instead.



FM Response Curves



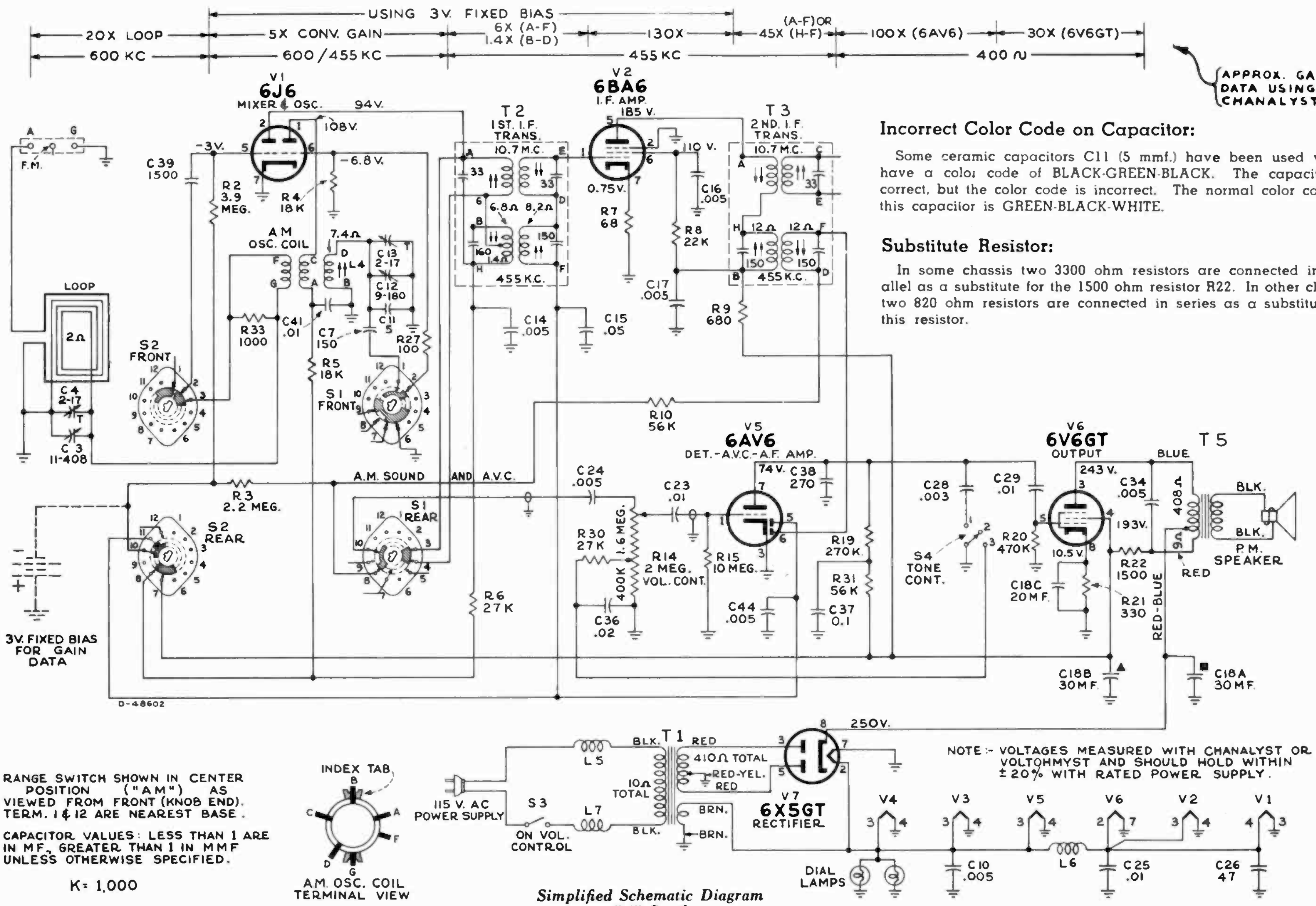
Dial Indicator and Drive Mechanism



Complete Schematic Diagram

CIRCUIT CHANGES

R1, R33, C10, C11, C20, C44 and L6 are omitted in some chassis, they were added at different times. In some chassis a 68 ohm resistor is used in the I. F. amp. grid circuit (term. E of T2 to pin 1 of V2). The 455 kc. windings of 2nd I. F. trans. stamped 970435-2 use resonating capacitors of 235 mmf. each, the d.c. resistance of each winding is 8.2 ohms; the transformer indicated in the schematic diagram is stamped 970435-5.



Simplified Schematic Diagram
"A" Band

Incorrect Color Code on Capacitor:

Some ceramic capacitors C11 (5 mmf.) have been used which have a color code of BLACK-GREEN-BLACK. The capacitor is correct, but the color code is incorrect. The normal color code of this capacitor is GREEN-BLACK-WHITE.

Substitute Resistor:

In some chassis two 3300 ohm resistors are connected in parallel as a substitute for the 1500 ohm resistor R22. In other chassis two 820 ohm resistors are connected in series as a substitute for this resistor.

CIRCUIT CHANGES

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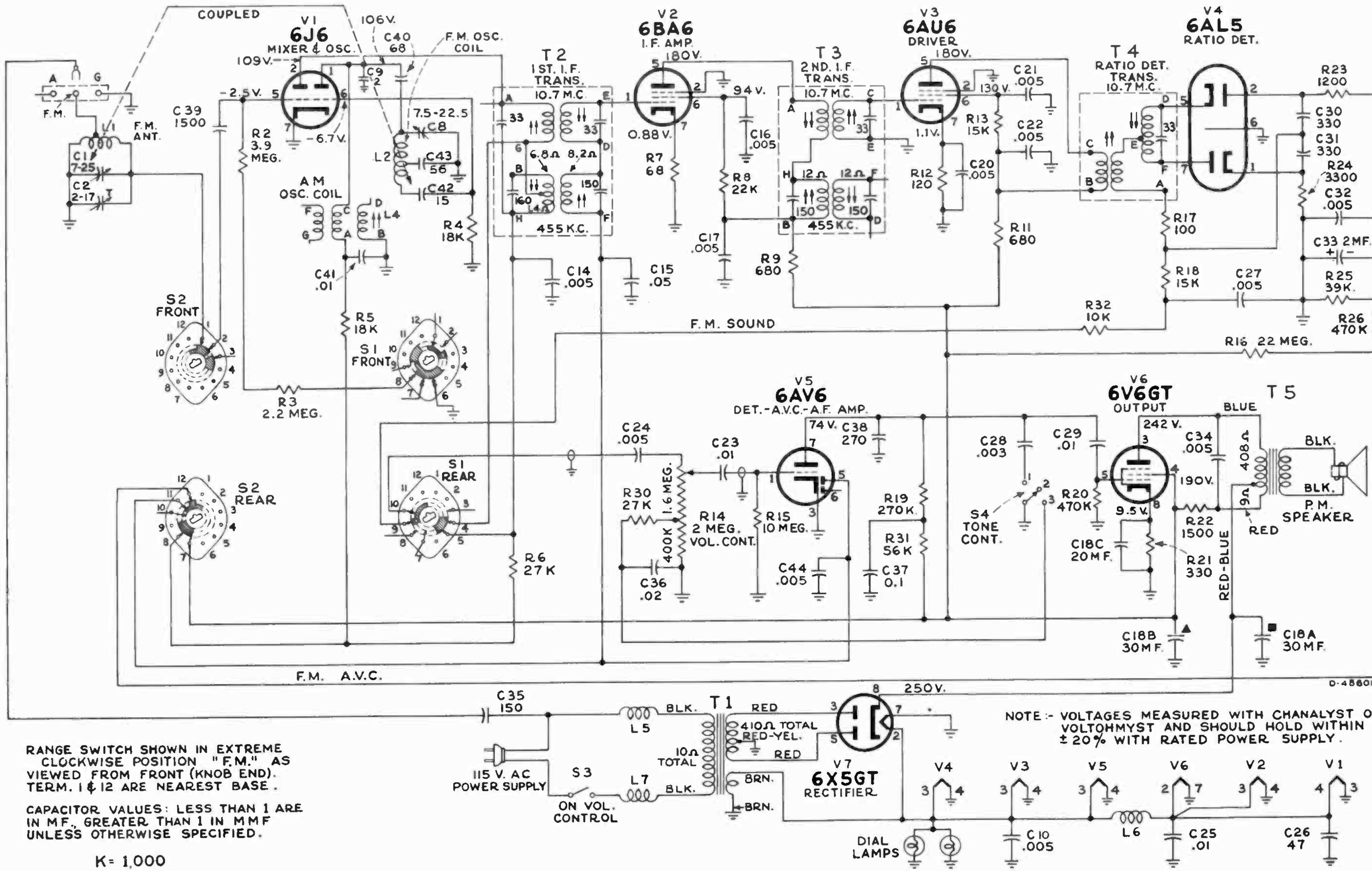
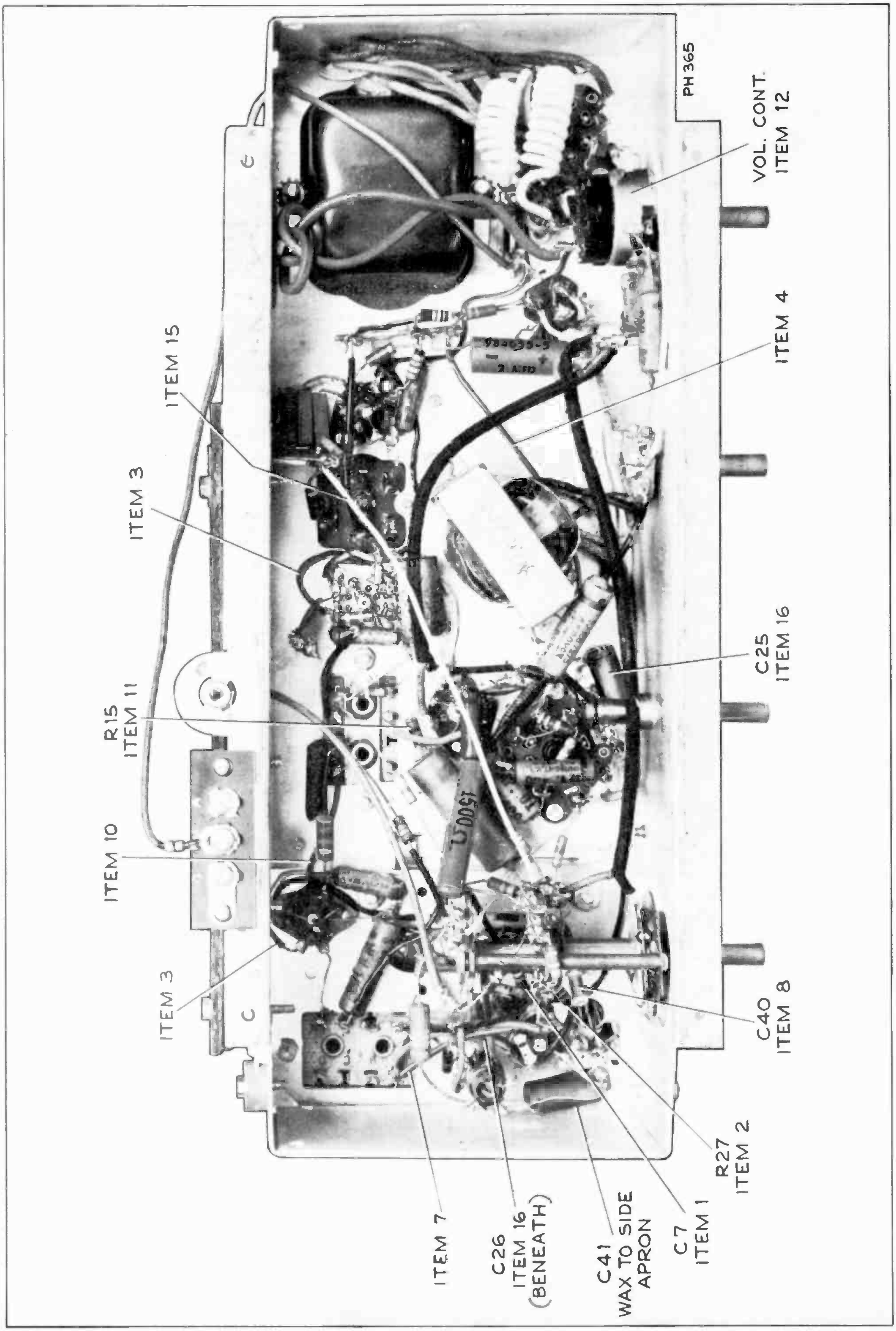


Simplified Schematic Diagram
"FM" Band

CIRCUIT CHANGES

R1, R33, C10, C11, C20, C44 and L6 are omitted in some chassis, they were added at different times. In some chassis a 68 ohm resistor is used in the I. F. amp. grid circuit (term. E of T2 to pin 1 of V2). The 455 kc. windings of 2nd I. F. trans. stamped 970435-2 use resonating capacitors of 235 mmf. each, the d.c. resistance of each winding is 8.2 ohms; the transformer indicated in the schematic diagram is stamped 970435-5.



Chassis Bottom View

REFER TO "CRITICAL LEAD DRESS"—PAGE 2

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1060—Models 8R71, 8R74, 8R75
	RC 1060A—Models 8R72, 8R76
73369	Board—"Antenna - FM - Ground" board
73866	Capacitor—Ceramic, 2 mmf. (C9)
93056	Capacitor—Ceramic, 5 mmf. (C11)
31353	Capacitor—Ceramic, 15 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19)
39632	Capacitor—Mica, 150 mmf. (C35)
47617	Capacitor—Ceramic, 270 mmf. (C38)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
73748	Capacitor—Ceramic, 1,500 mmf. (C39)
73473	Capacitor—Ceramic, .005 mfd. (C10, C44)
72573	Capacitor—Tubular, .003 mfd., 400 v. (C28)
71553	Capacitor—Tubular, .005 mfd., 400 v. (C14, C16, C17, C21, C22)
72791	Capacitor—Tubular, .005 mfd., 400 v. (C34)
71926	Capacitor—Tubular, .005 mfd., 200 v. (C20, C24, C27, C32)
71923	Capacitor—Tubular, .01 mfd., 200 v. (C23, C25)
71925	Capacitor—Tubular, .01 mfd., 400 v. (C29, C41)
71928	Capacitor—Tubular, .02 mfd., 200 v. (C36)
72596	Capacitor—Tubular, .05 mfd., 200 v. (C15)
70617	Capacitor—Tubular, 0.1 mfd., 400 v. (C37)
73747	Capacitor—Electrolytic, 2 mfd., 50 v. (C33)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)
73916	Coil—FM oscillator coil—No. 16 tinned bus wire, 7 turns per inch, 4¾ turns R. H., 15/32" I. D. (L2)
73918	Coil—FM antenna coil—No. 16 tinned bus wire, 8 turns per inch, 1¾ turns L. H., 15/32" I. D. (L1)
71942	Coil—Filament choke coil (L6)
	Coil—Line choke coil—No. 18 gauge solid hook-up wire, 1/32" plastic insulation, 10 turns (close wind), ¼" I. D. (L5, L7)
73744	Coil—AM oscillator coil complete with adjustable core and stud (L4)
73375	Condenser—Variable tuning condenser (C1, C2, C3, C4, C8, C12, C13)
73373	Control—Tone control (S4)
38404	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 40" overall length required)
73365	Dial—Dial scale
16058	Grommet—Rubber grommet for mounting R-F shelf (4 required)
73366	Indicator—Station selector indicator
11891	Lamp—Dial lamp—Mazda 44
73357	Loop—Antenna loop complete
73364	Plate—Dial back plate complete with lamp bracket and drive cord pulleys for Models 8R71, 8R74 and 8R75
73371	Plate—Dial back plate complete with lamp bracket and drive cord pulleys for Models 8R72 and 8R76
73368	Pulley—Station selector indicator drive pulley and shaft
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R17, R27)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R12)
	Resistor—Fixed, composition, 330 ohms, ±10%, ½ watt (R21)
	Resistor—Fixed, composition, 680 ohms, ±20%, ½ watt (R9, R11)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R33)
	Resistor—Fixed, composition, 1,200 ohms, ±5%, ½ watt (R23)
52436	Resistor—Wire wound, 1,500 ohms, 5 watt (R22)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R24)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ watt (R1, R13, R18)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, 1 watt (R5)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R8)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R6, R30)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R10, R31)
	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ watt (R20, R26, R28)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohm, ±20%, ½ watt (R15)
	Resistor—Fixed, composition, 22 megohm, ±20%, ½ watt (R16)
73370	Ring—Retaining ring for indicator pulley and shaft
73367	Shaft—Tuning knob shaft
31364	Socket—Dial lamp socket
73374	Socket—Phono input socket
72516	Socket—Tube socket, 7 prong, miniature
73606	Socket—Tube socket, 7 prong, miniature, mica filled rubber
31251	Socket—Tube socket, octal
72540	Spring—Drive cord spring
74202	Support—Polystyrene support for FM osc. coil—complete with mounting bracket
73377	Switch—Range switch (S1, S2)
70127	Transformer—Power transformer, 115 volt, 60 cycle (T1)
73745	Transformer—First I. F. transformer, dual (T2)
74019	Transformer—Second I.F. transformer, dual (T3)
73743	Transformer—Ratio detector transformer (T4)
73415	Transformer—Output transformer (T5)
33726	Washer—"C" washer for tuning knob shaft
73333	Washer—Insulating washer—extruded—for mounting output transformer (2 required)
73332	Washer—Insulating washer—flat—for mounting output transformer (2 required)
	SPEAKER ASSEMBLIES
	92572-2
72201	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
73380	Baffle—Speaker baffle board and grille cloth
73381	Bottom—Bottom cover for cabinet
Y1485	Cabinet—Maroon plastic cabinet for Model 8R71
Y1486	Cabinet—Ivory plastic cabinet for Model 8R72
Y2030	Cabinet—Mahogany plastic cabinet for Model 8R74
Y2031	Cabinet—Walnut plastic cabinet for Model 8R75
Y2032	Cabinet—Blonde plastic cabinet for Model 8R76
73382	Clamp—Clamp for fastening baffle board (3 required)
73384	Decal—Control panel decal
73378	Knob—Control knob — maroon — for Models 8R71, 8R74 and 8R75
73379	Knob—Control knob—ivory—for Model 8R72
73742	Knob—Control knob—tan—for Model 8R76
72649	Motif—Decorative motif for cabinet
72765	Nut—Speed nut to fasten motif
14270	Spring—Retaining spring for knobs

†Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Substitute Speaker:

In some instruments speakers stamped 92572-4W have been used as a substitute for the specified speaker (92572-2W). For replacement use the specified speaker (Stock No. 72201).

RCA VICTOR

MODEL 8V7

Radio-Phonograph Combination

Chassis No. RC-615 Mfr. No. 274

REFER TO SERVICE DATA FOR MODEL RP-178 FOR RECORD CHANGER INFORMATION

SERVICE DATA

— 1948 No. 5

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range
Standard Broadcast "A" .... 540-1,600 kc
Intermediate Frequency .... 455 kc
Tube Complement
(1) RCA-6SA7 .... Converter
(2) RCA-6SK7 .... I-F Amplifier
(3) RCA-6SQ7 .... 2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7 .... A-F Amplifier
(5) RCA-6V6GT .... Output
(6) RCA-6V6GT .... Output
(7) RCA-6X5GT .... Rectifier
Power Supply Rating (including record changer)
105-125 volts, 60 cycles .... 70 watts
Cabinet Dimensions
Height 34⅝" Width 30⅝" Depth 16⅝"

Tuning Drive Ratio .... 16:1 (8 turns of knob)
Lamps (3)
Dial, indicator or compartment lamp .. Mazda 51, 6-8 volts, 0.2 amp.
Loudspeaker (92569-1)
Type .... 12-inch P.M.
V. C. impedance at 400 cycles .... 2.2 ohms
Power Output Rating
Undistorted .... 5 watts
Maximum .... 5.5 watts
Record Changer (RP-178)
Record Capacity .... Twelve 10-in., or Ten 12-in.
Turntable Speed .... 78 r.p.m.
Type Pickup .... Crystal

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 615
70137	Bracket—Dial bracket—L.H.—complete with drive cord pulley
70136	Bracket—Dial bracket—R.H.—complete with drive cord pulley
71924	Capacitor—Ceramic, 56 mmf. (C5)
71614	Capacitor—Ceramic, 120 mmf. (C18)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C9, C12)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C19, C20)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C7)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C13)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C6, C10, C17)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C11, C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C8)
71976	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts; 1 section of 30 mfd., 350 volts; and 1 section of 20 mfd., 25 volts (C21A, C21B, C21C)
70133	Coil—Oscillator coil (L2, L3)
70139	Condenser—Variable tuning condenser (C1, C2, C3, C4)
70342	Control—Volume control and power switch (R6, S2)
†72953	Cord—Drive cord (approx. 49" overall length required)
70930	Grommet—Rubber grommet to mount variable condenser (3 required)
71608	Indicator—Station selector indicator
70138	Plate—Dial back plate
30868	Plug—2 contact female plug for Motor cable
12493	Plug—5 contact female plug for speaker cable
72602	Pulley—Drive cord pulley
	Resistor—Fixed composition, 330 ohms, ±10%, 1 watt (R19)
	Resistor—Fixed composition, 2200 ohms, ±10%, 2 watts (R20)
	Resistor—Fixed composition, 8200 ohms, ±10%, ½ watt (R17)
	Resistor—Fixed composition, 15,000 ohms, ±10%, 2 watts (R2)
	Resistor—Fixed composition, 18,000 ohms, ±10%, ½ watt (R4)
	Resistor—Fixed composition, 22,000 ohms, ±10%, ½ watt (R1)
	Resistor—Fixed composition, 27,000 ohms, ±10%, ½ watt (R5, R7)
	Resistor—Fixed composition, 56,000 ohms, ±10%, ½ watt (R8)
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R21)
	Resistor—Fixed composition, 270,000 ohms, ±10%, ½ watt (R10, R11, R13, R14)
	Resistor—Fixed composition, 330,000 ohms, ±10%, ½ watt (R3)
	Resistor—Fixed composition, 470,000 ohms, ±10%, ½ watt (R16, R18)
	Resistor—Fixed composition, 2.2 megohms, ±20%, ½ watt (R9)
	Resistor—Fixed composition, 10 megohms, ±20%, ½ watt (R12, R15)
70135	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
35787	Socket—Phono input socket
31251	Socket—Tube socket
31418	Spring—Drive cord tension spring

STOCK No.	DESCRIPTION
70134	Switch—Range switch (S1)
70128	Transformer—First I. F. transformer (T1)
70129	Transformer—Second I. F. transformer (T2)
70127	Transformer—Power transformer, 117 volt, 60 cycles (T4)
35969	Washer—"C" Washer for tuning shaft
	SPEAKER ASSEMBLIES 92569-1W RL 103-1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" P.M. speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T3)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71599	Bracket—Indicator lamp bracket
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Indicator lamp jewel
70142	Clamp—Dial clamp
X1796	Cloth—Grille cloth
73413	Decal—Control panel decal for blonde instruments
73084	Decal—Control panel decal for walnut or mahogany instruments
71966	Decal—Trade mark decal (Victrola)
71910	Decal—Trade mark decal (RCA Victor)
70141	Dial—Glass dial scale
72856	Grommet—Rubber grommet for mounting record changer (3 required)
30698	Hinge—Cabinet lid hinge (4 required)
72824	Knob—Radio-phono-tone switch knob — brown — for blonde instruments
71822	Knob—Radio-phono-tone switch knob—maroon—for walnut or mahogany instruments
72800	Knob—Tuning or volume control knob—brown—for blonde instruments
71821	Knob—Tuning or volume control knob—maroon—for walnut or mahogany instruments
11765	Lamp—Dial, indicator or compartment lamp—Mazda 51
70140	Loop—Antenna loop complete
73109	Nut—Tee nut for mounting record changer (3 required)
31048	Plug—Pin plug for shielded pickup cable
73110	Screw—¼-20 fillister head screw for mounting record changer (3 required)
30900	Spring—Retaining spring for knobs
73411	Support—Cabinet lid support—L.H.
73412	Support—Cabinet lid support—R.H.

† Stock No. 72953 is a reel containing 250 ft. of cord.

8V7

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Diagram.

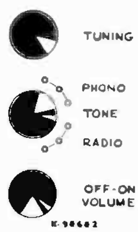
Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

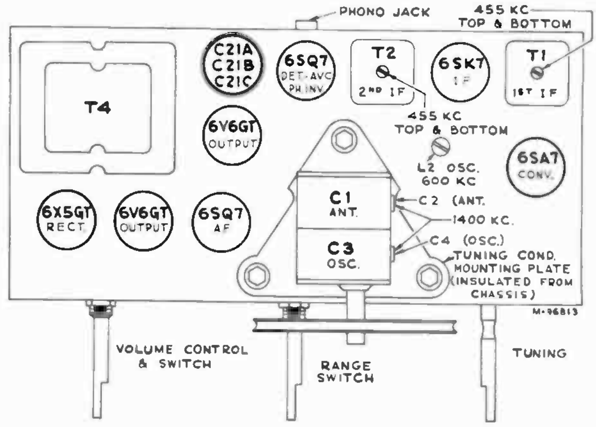
Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SK7 grid in series with .01 mfd.	455 kc.	Quiet Point at 550 kc. end of dial	Top and bottom (2nd I-F Trans.) T-2
2	6SA7 grid in series with .01 mfd.			Top and bottom (1st I-F Trans.) T-1
3	Primary lead on loop in series with 200 mmfd.	1,400 kc.	1,400 kc.	C4 (osc.) C2 (ant.)
4		600 kc.	600 kc.	L2 (osc.) Rock gang
5		Repeat steps 3 and 4		

Critical Lead Dress:

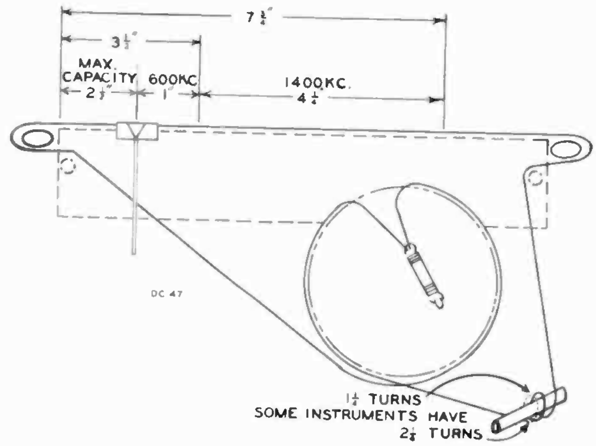
1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate lead of output tube away from grid of audio amplifier.
4. Dress all a-c leads away from volume control down next to chassis.
5. Dress lead from top tap of volume control to range-tone switch along front apron of chassis.
6. Dress R12 and R15 down near chassis base.



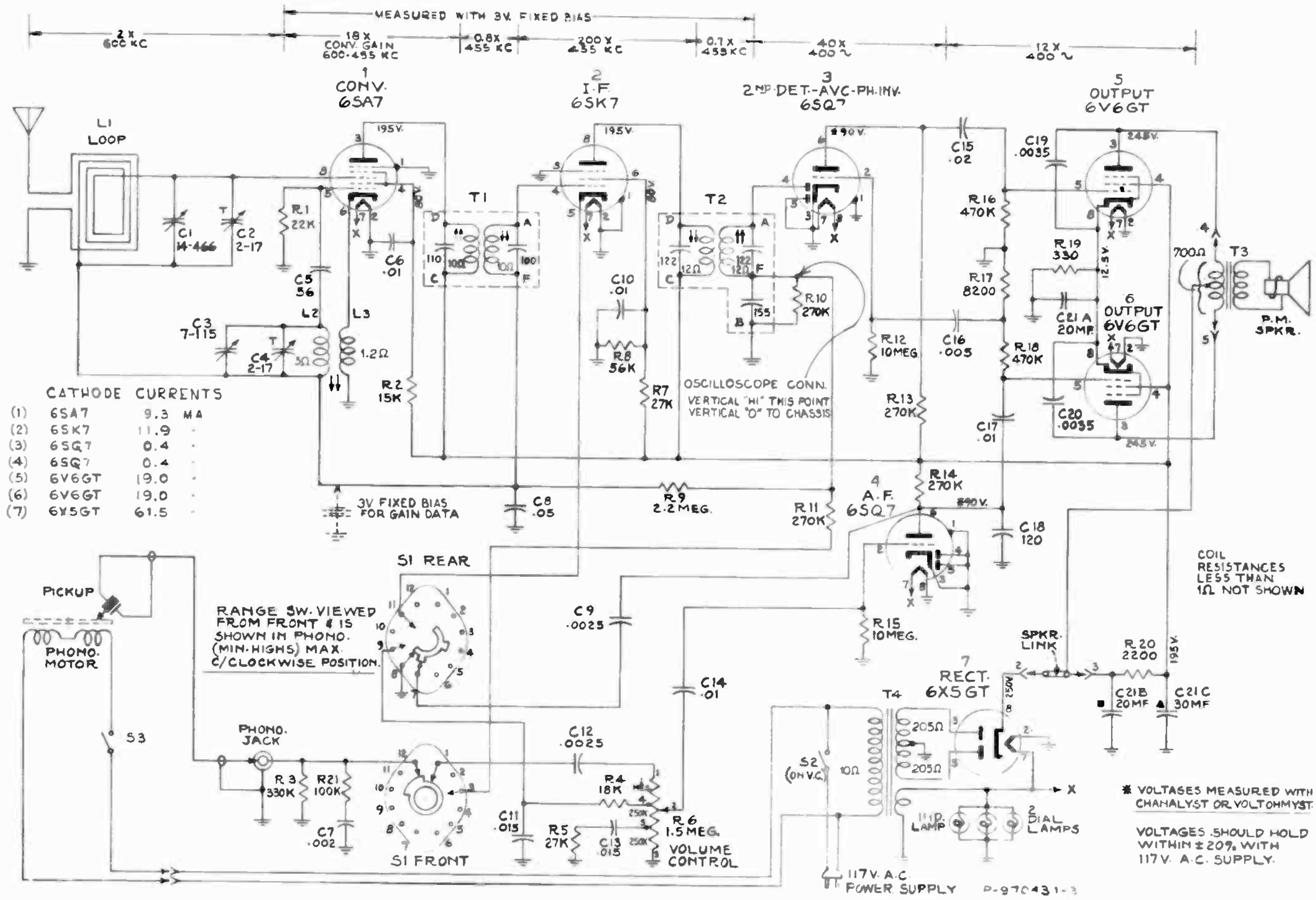
Controls



Tube and Trimmer Locations (Top View)



Dial Indicator and Drive Mechanism



Schematic Diagram

Model 8V90

Model 8V91

RCA VICTOR

AM-FM Radio-Phonograph Combination

Models 8V90, 8V91

1st Prod. Chassis No. RC-618 RC-616A
2nd Prod. Chassis No. RC-618A RC-616H
Mfr. No. 274

Refer to RP-178 Service Data for Record Changer Information

SERVICE DATA

—1948 No. 14—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Ranges

Standard Broadcast (AM) .... 540-1,600 kc.
Frequency Modulation (FM) .... 88-108 mc.

Intermediate Frequencies ... AM—455 kc., FM—10.7 mc.

Tube Complement

(1) RCA 6J6 .... Mixer and Oscillator
(2) RCA 6BA6 .... I. F. Amplifier
(3) RCA 6AU6 .... Driver
(4) RCA 6AL5 .... Ratio Detector
(5) RCA 6AV6 .... A. F. Amp.
(6) RCA 6V6GT .... Output
(7) RCA 6AV6 .... AM Det.—AVC—Ph. Inv.
(8) RCA 6V6GT .... Output
(9) RCA 6X5GT .... Rectifier

Tuning Drive Ratio .... 18:1 (9 turns of knob)

Record Changer (RP-178)

Record Capacity .... Twelve 10-in. or ten 12-in.
Turntable Speed .... 78 r.p.m.

Power Supply Rating ...... 115 volts, 60 cycles, 90 watts

Circuit Description

The chassis used in these receivers have a 6J6 tube (V1) (twin triode), one section of which is used as mixer and the other section as oscillator. The FM antenna coil and the FM oscillator coil are placed in such position as to provide coupling between them. A section of the AM oscillator coil is connected in series with the mixer grid input when the range switch is in AM position.

Dual I-F transformers are used, each transformer containing both AM and FM windings. The I-F amplifier is V2 (6BA6).

The range switch has four functions:

(1) Selection of tuning range.
(2) Selection of AVC supply voltages to be applied to the controlled tubes. Simple AVC is applied to the grids of V1 and V2 on AM. Delayed AVC is used on FM and is applied only to the grid of V2.
(3) Controls application of B+ voltage to V1, V2, V3.
(4) Controls audio input to volume control.

The driver V3 (6AU6) and ratio detector V4 (6AL5) circuits are similar to those used in other RCA Victor AM-FM receivers.

The audio system is conventional. It consists of V5 (6AV6 a.f. amp.), V7 (6AV6 ph. inv.), V6 and V8 (6V6GT p. p. output).

The rectifier is V9 (6X5GT).

Loudspeaker

Type 92579-2W (8V90 1st Prod.) .... 8-in. P.M.
Type 92569-5W (8V90 2nd Prod.) .... 12 in. P.M.
Type 92569-1KX or 92569-5W (8V91) .... 12 in. P.M.
Voice coil impedance—
92579-2W .... 3.2 ohms at 400 cycles
92569-1KX .... 2.2 ohms at 400 cycles
92569-5W .... 3.2 ohms at 400 cycles

Cabinet Dimensions	Height	Width	Depth
Model 8V90	33¼ in.	31$\frac{1}{16}$ in.	16⅜ in.
Model 8V91	34⅜ in.	36$\frac{7}{16}$ in.	18 in.

Dial Lamps (2) .... Type No. 51, 6-8 volts, 0.2 amp.

Jewel Lamp .... Type No. 51, 6-8 volts, 0.2 amp.

Power Output

Maximum .... 7 watts
Undistorted .... 6 watts

Antennas:

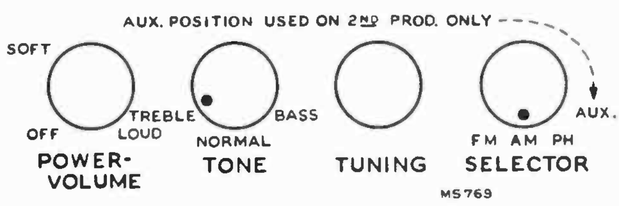
These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Under average conditions these antennas will provide satisfactory reception. However, provision is made for the use of external antennas if desired — connect as indicated below:

AM Antenna: Connect a single wire antenna to terminal "A" (used on Model 8V91 only).

FM Antenna: Remove the built-in FM antenna lead from the "FM" terminals of the terminal board. Connect the transmission line of an external FM dipole antenna to these two "FM" terminals.

Ground: Connect external ground to "G" terminal (used on Model 8V91 only). Under certain conditions the use of an external ground is detrimental to FM reception.



Controls

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Oscilloscope Alignment:

The FM I. F. alignment may be checked with the use of a sweep generator and an oscilloscope.

Shunt terminals B and C of T3 (driver trans.) with a 1200 ohm resistor. Connect the output of the sweep generator (10.7 mc. with ±250 kc. sweep) to the grid of V2 (6BA6 I. F.) in series with .01 mfd. Connect the high side of the oscilloscope to terminal C of T3 in series with a diode probe. Low side of the sweep generator and oscilloscope to chassis. This will show the response of T2.

With the oscilloscope connected as before connect the output of the sweep generator to the "FM" antenna terminal board in series with a 300 ohm resistor (disconnect FM antenna); it may be necessary to reverse the connections of the sweep generator since one "FM" terminal is connected to chassis. This will show the combined response of T1 and T2.

To observe the Ratio Detector response, remove the 1200 ohm resistor which was shunted across terminals B and C of T3. Connect the output of the sweep generator to the grid of the driver tube (V3 6AU6) in series with .01 mfd. and connect the high side of the oscilloscope direct to terminal No. 9 of S1.

Note: It is difficult to observe marker signals in this step; center frequency and sweep width should be previously observed.

CRITICAL LEAD DRESS

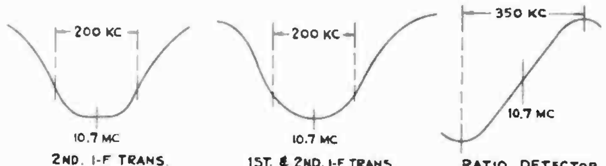
1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The ground lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis and away from 6AU6 driver tube socket.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. The lead from the high side of the loop should be dressed away from tubes.
7. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
8. Connect C40 directly between the gang condenser and pin No. 1 of V1.
9. Make all FM leads as short as possible.
10. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
11. Dress resistor R15 near chassis base.
12. Dress all A. C. leads away from volume control.
13. The lead from "FM" terminal of antenna terminal board to L1 tap should be dressed away from V2.
14. The taps on L1 and L2 are critical. L1 tap should be ¾ turn from the ground end. L2 tap should be 2½ turns from the gang condenser C8.
15. Dress C25 and C26 against the chassis with the shortest lead length possible.
16. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.
17. The FM oscillator coil should be cemented to its support. Amphenol No. 912 cement is recommended for this purpose. If it is necessary to loosen the coil, use Amphenol No. 916 solvent.
18. Capacitor C41 should be waxed or cemented to the chassis apron.

SEE CHASSIS BOTTOM VIEW—PAGE 10.

Dial Indicator

With the tuning condenser fully meshed (closed) the indicator should be set to the reference mark on the dial back plate.

Refer to the dial scale reproductions on page 9.



2ND. I-F TRANS RESPONSE — 1ST. & 2ND. I-F TRANS RESPONSE — RATIO DETECTOR RESPONSE

B-98861-1

FM Response Curves

AM Alignment

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	C3 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T3 bottom core (sec.). T3 top core (pri.).
2				AM windings.† T2 top core (sec.). T2 bottom core (pri.).
3	* "A" terminal of terminal board at rear of chassis in series with 220 mmf.	1400 kc.	1400 kc.	C13 osc. C4 ant.
4		600 kc.	600 kc.	L4 osc. (Rock gang.)
5	Repeat Steps 3 and 4.			

† Use alternate loading.

Alternate loading involves the use of a 47,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 47,000 ohm resistor after T3 and T2 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

* "A" terminal used on Model 8V91 only. Use radiated signal for Model 8V90.

FM Alignment

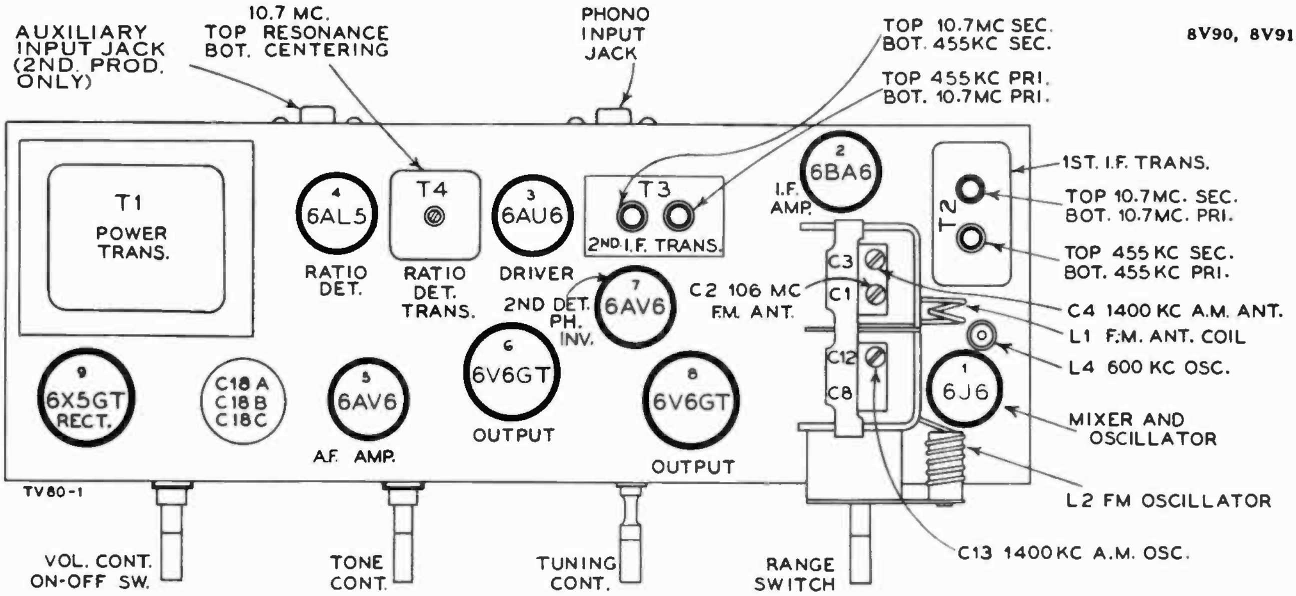
RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C33 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	Pin 1 of 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .05 volt).	Max. capacity (fully meshed).	T4 top core for max. d-c voltage across C33. T4 bottom core for min. audio output.*
3	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	10.7 mc. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.		FM windings.†† T3 top core (sec.). T3 bottom core (pri.).
4				FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
5		106 mc.	106 mc.	L2 osc.** C2 ant. Set C2 at max. capacity while adjusting L2.
6		90 mc.	90 mc.	L1 ant.** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T3 and T2 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 47,000 ohm resistor and load the FM windings.

** L1 and L2 are adjustable by increasing or decreasing the spacing between turns.

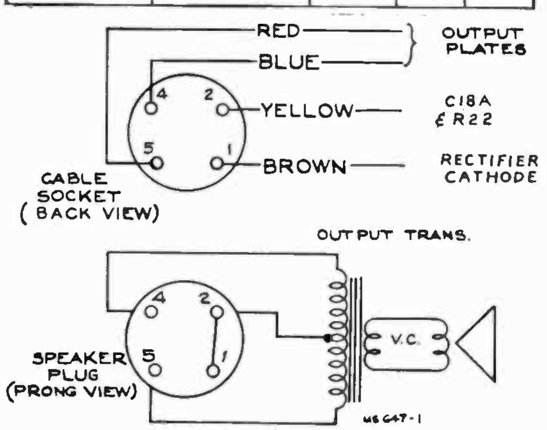


Tube and Trimmer Locations

SOCKET VOLTAGES

Voltages measured with Chanalyst or VoltOhmyst and should hold within ±20% with rated line voltage. Tuning condenser closed—no signal input.

Tube	Terminal		Voltage Phono	A.M.	F.M.
(1) 6J6	Plate	1	—	102	98
	Grid	6	−0.4	−6.8	−6.0
	Plate	2	—	96	110
	Grid	5	−0.8	−2.7	−2.5
(2) 6BA6	Plate	5	—	196	192
	Screen	6	—	100	83
	Cathode	7	—	0.7	0.84
	Grid	1	−0.9	−1.3	−0.2
(3) 6AU6	Plate	5	—	190	185
	Screen	6	—	145	141
	Cathode	7	—	1.25	1.21
(4) 6AL5	——	—	—	—	—
(5) 6AV6	Plate	7	125	85	84
	Grid	1	−0.6	−0.6	−0.6
(6) 6V6GT	Plate	3	299	282	280
	Screen	4	295	220	217
	Cathode	8	21.4	15.5	15.4
(7) 6AV6	Plate	7	168	125	125
	Grid	1	−0.5	−0.5	−0.5
(8) 6V6GT	Plate	3	299	282	280
	Screen	4	295	220	217
	Cathode	8	21.4	15.5	15.4
(9) 6X6GT	Cathode	8	313	300	299



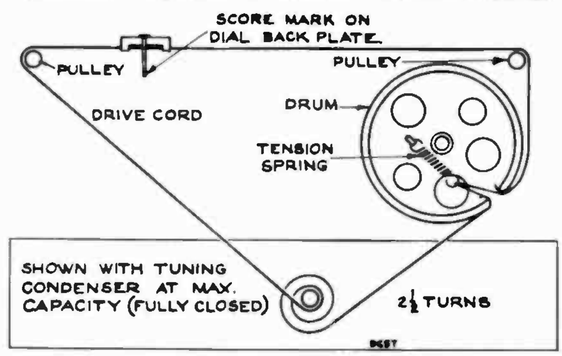
Speaker Connections

Note: FM mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The position of the coils and location of the taps are critical (refer to "Critical Lead Dress").

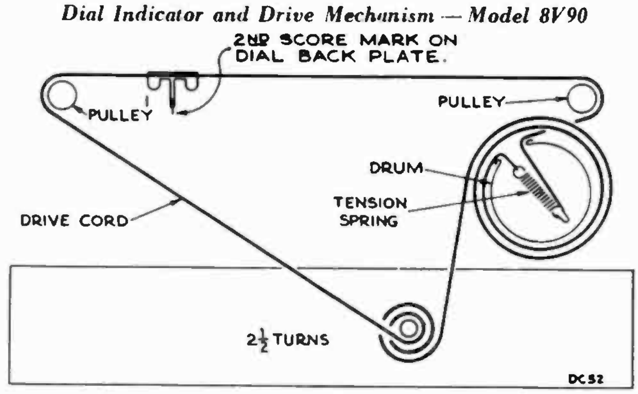
In some chassis the FM osc. coil support (illustrated) is not used, two polystyrene rods cemented to the chassis and to the coil are used instead.

CATHODE CURRENTS (MA)

Tube	Terminal	Phono	A.M.	F.M.
(1) 6J6	7	—	8.2	8.7
(2) 6BA6	7	—	11.6	13.4
(3) 6AU6	7	—	10	9.7
(4) 6AL5	1 & 5	—	—	—
(5) 6AV6	2	0.75	0.5	0.5
(6) 6V6GT	8	25.1	19.1	18.5
(7) 6AV6	2	1.7	1.1	1.1
(8) 6V6GT	8	25.1	19	18.5
(9) 6X5GT	8	53	70	70.5

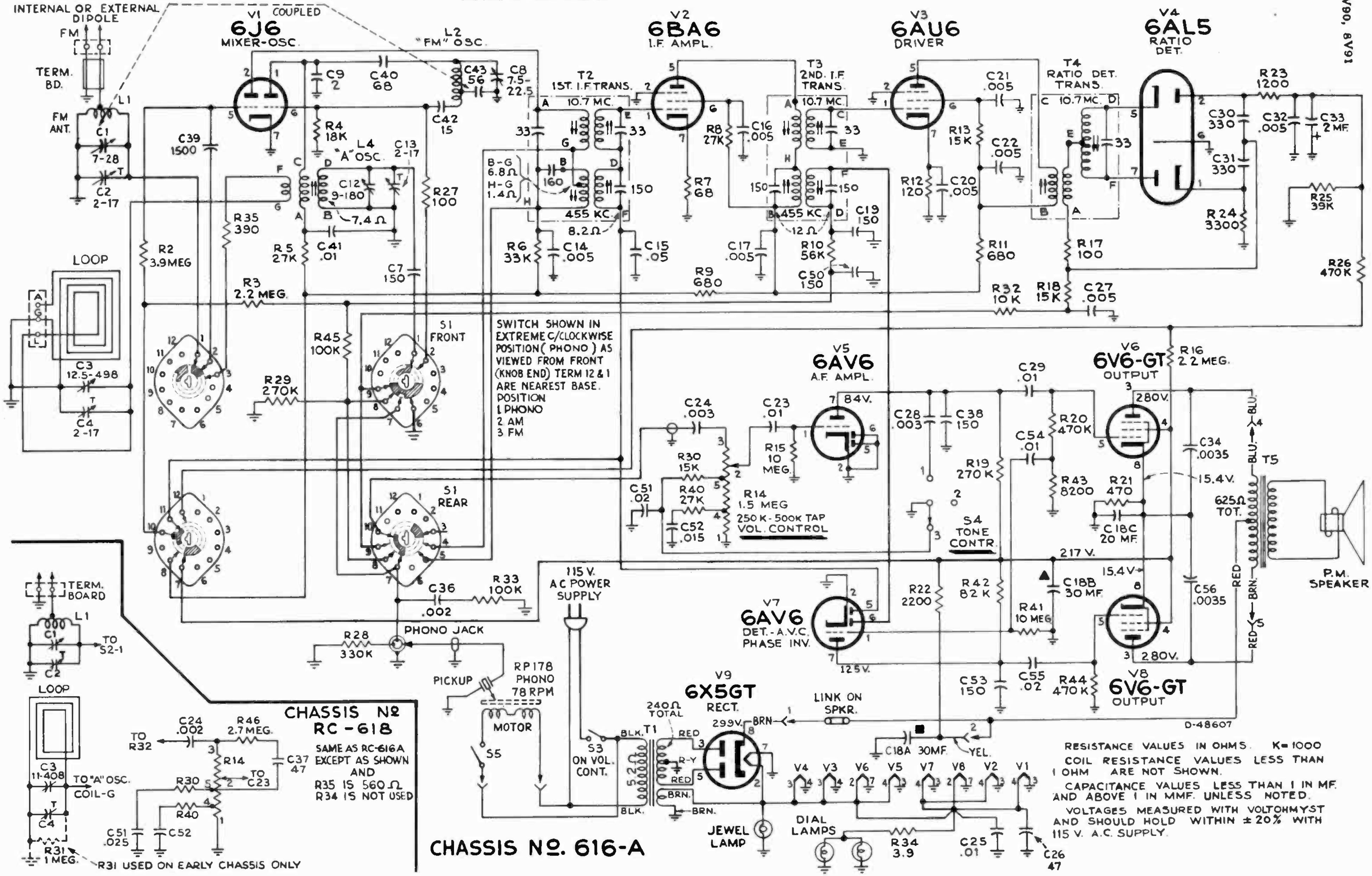


Dial Indicator and Drive Mechanism — Model 8V90



Dial Indicator and Drive Mechanism — Model 8V91

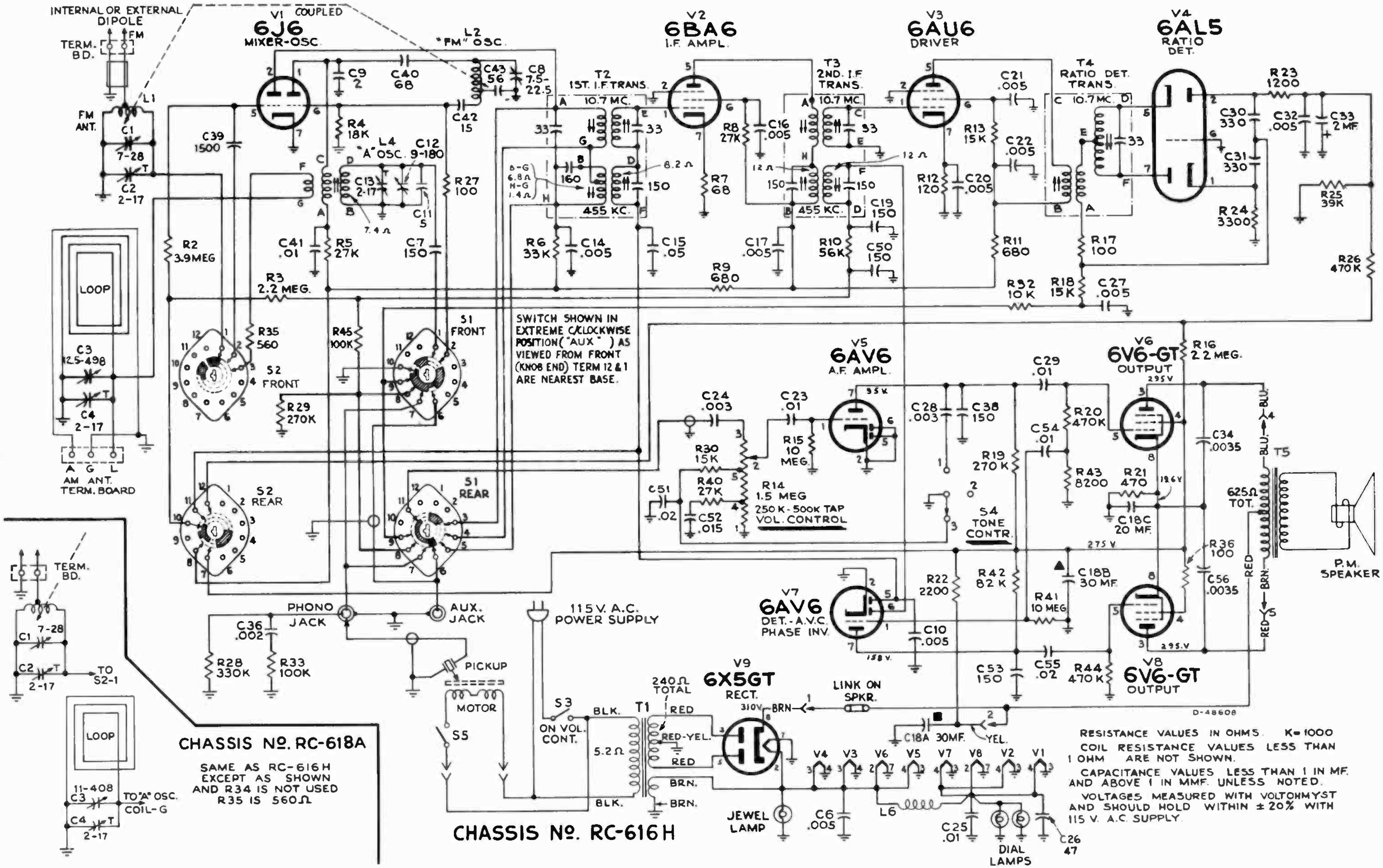
NOTE: In some chassis R4 is 22K and C42 is 22 mmf. R35 is omitted in some chassis.



Complete Schematic Diagram

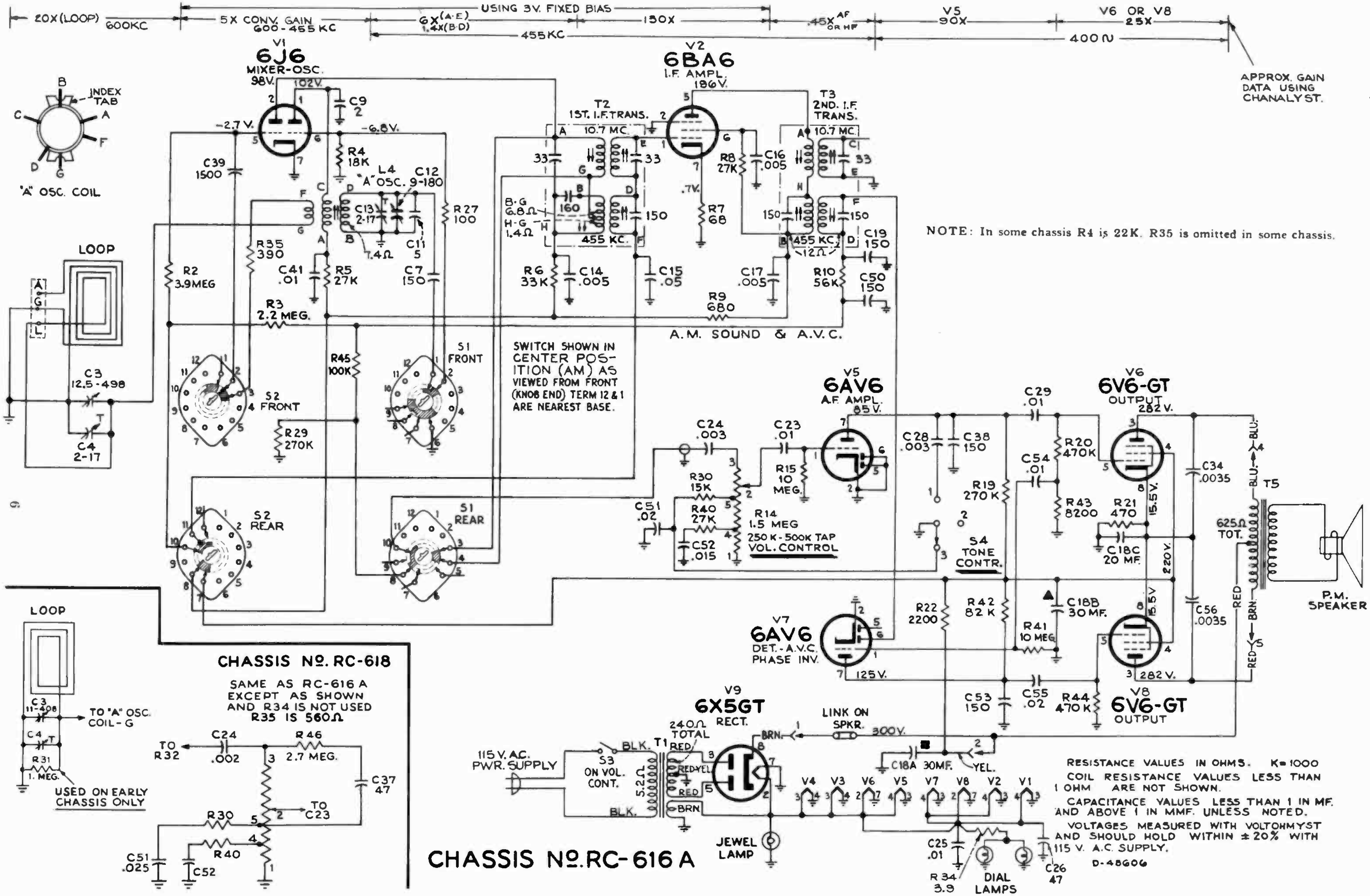
NOTE—2nd I.F. Transformer:

Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).



Complete Schematic Diagram

NOTE: C6, C10, C11, L6 and R36 are used only is some RC-618A (Model 8V90); never used in RC-616H (Model 8V91).

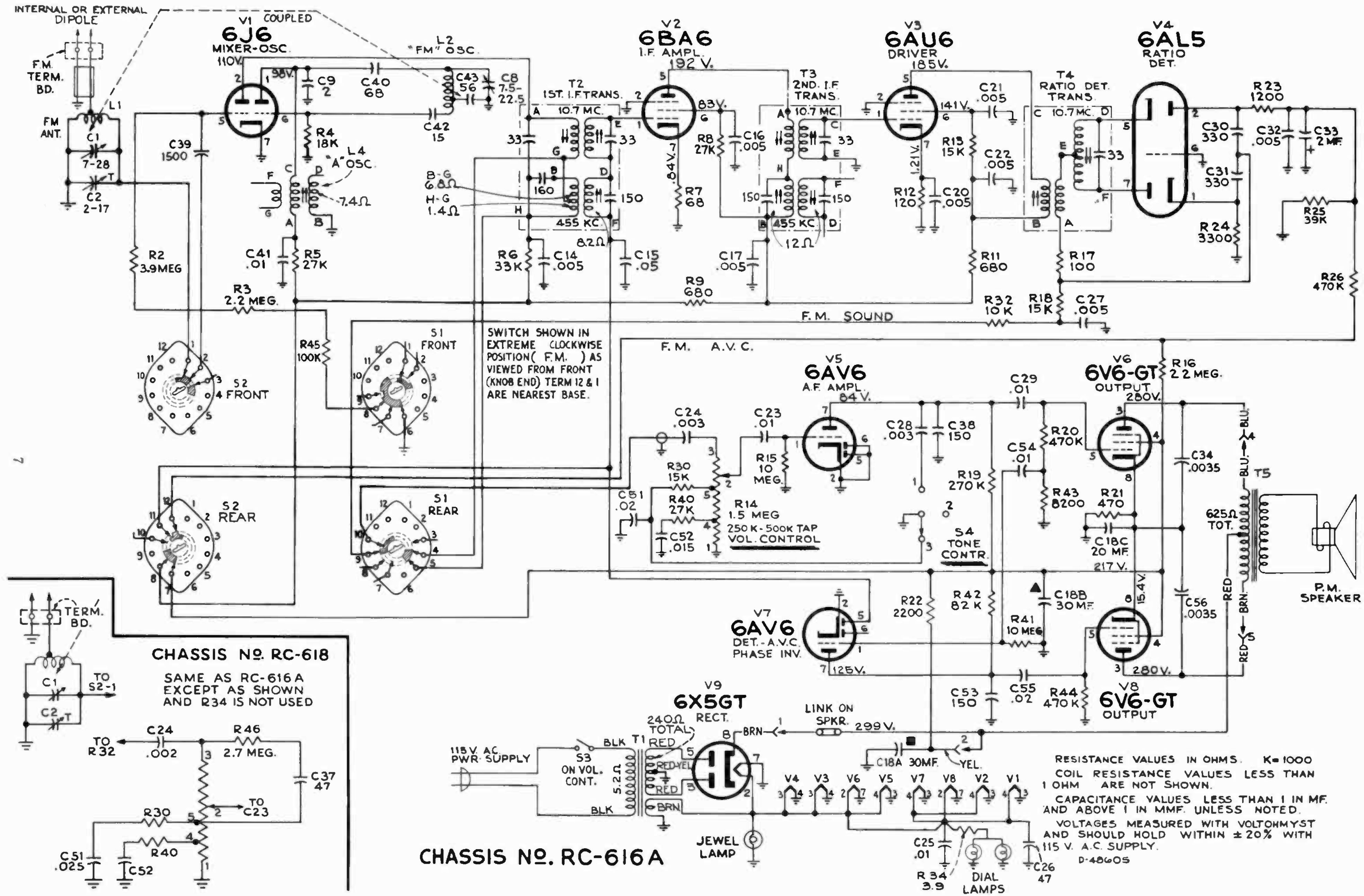


NOTE: In some chassis R4 is 22K. R35 is omitted in some chassis.

Simplified Schematic Diagram
"A" Band

NOTE—2nd I.F. Transformer:
Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).

NOTE: In some chassis R4 is 22K and C42 is 22 mmf.



Simplified Schematic Diagram
"FM" Band

NOTE—2nd I.F. Transformer:

Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).

Model 8V90 2nd Production Chassis No. RC-618A

1ST PRODUCTION RC-616A and RC-618	2ND PRODUCTION RC-616H and RC-618A
Three position selector switch (PHONO—AM-FM)	Four position selector switch (AUX.-PHONO—AM-FM)
AUX. input jack is not used	AUX. input jack is used
RC-618 only	RC-618A only
8-in. speaker (92579-2)	12-in. speaker (92569-5)
C37 and R46 are used	C37 and R46 are not used
C6, C10, C11, L6 and R36 are not used	C6, C10, C11, L6 and R36 are used in some chassis
C24 is .002 mfd	C24 is .003 mfd
C51 is .025 mfd	C51 is .02 mfd

Replacement Parts — 8V91 — 2nd Prod. Identical to those listed for 1st Prod.

EXCEPT

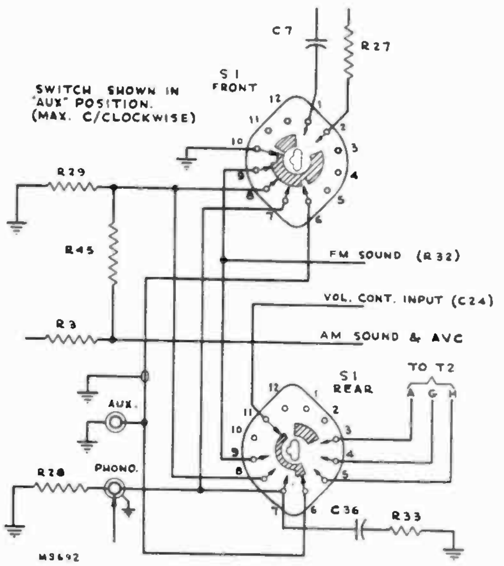
Stock No.	DESCRIPTION
Add:	CHASSIS ASSEMBLIES (RC-616H)
74173	Switch—Selector switch (S1, S2)
Delete:	
73609	Switch
Add:	MISCELLANEOUS
74175	Decal—Control panel decal for mahogany or walnut instruments
74176	Decal—Control panel decal for blonde instruments
Delete:	
73755 and 73756 Decals	

Model 8V91 2nd Production Chassis No. RC-616H

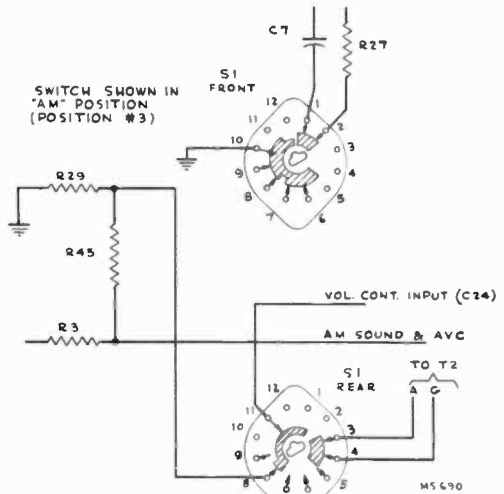
Replacement Parts — 8V90 — 2nd Prod. Identical to those listed for 1st Prod.

EXCEPT

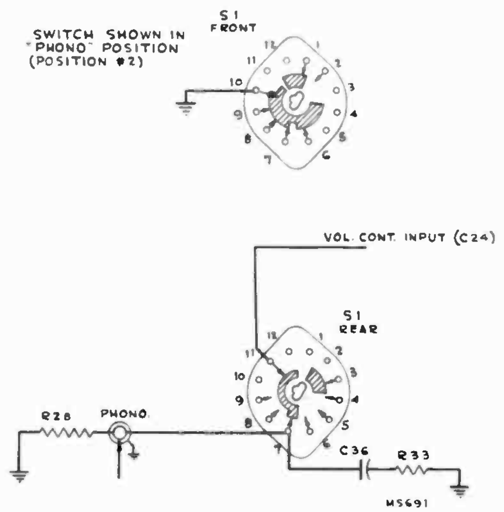
Stock No.	DESCRIPTION
Add:	CHASSIS ASSEMBLIES (RC-618A)
93056	Capacitor—Ceramic, 5 mmf. (C11)
73659	Capacitor—Tubular, .003 mfd., 200 volts (C24)
73473	Capacitor—Ceramic, .005 mmf. (C6, C10)
71942	Coil—Filament choke coil (L6)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R36)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C51)
74129	Switch—Selector switch (S1, S2)
Delete:	C24, C37, C51, R46, S1, S2
Add:	SPEAKER ASSEMBLIES
	92569-5W RL 103 B5
	As listed for Model 8V91
Delete:	SPEAKER ASSEMBLIES
	92579-2W RL 105 A1
Add:	MISCELLANEOUS
74130	Decal—Control panel decal for mahogany finish or walnut instruments
74131	Decal—Control panel decal for blonde instruments
Delete:	73904 and 73905 Decals.



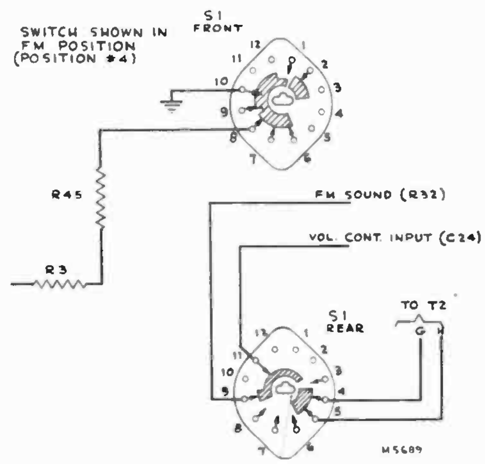
SWITCH WIRING RC-616H & RC-618A



AM SIMPLIFIED SCHEMATIC

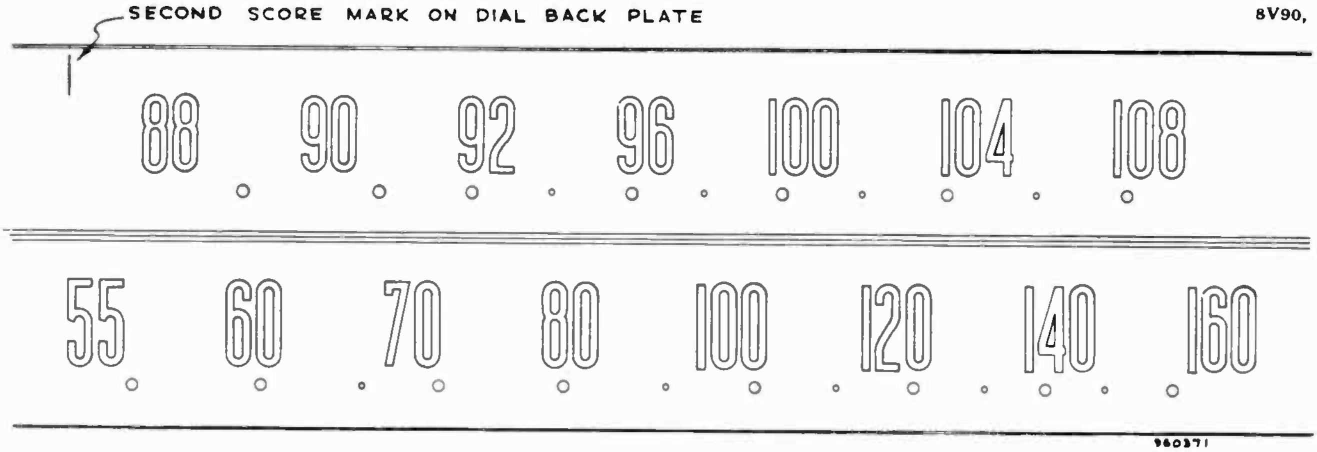


PHONO SIMPLIFIED SCHEMATIC



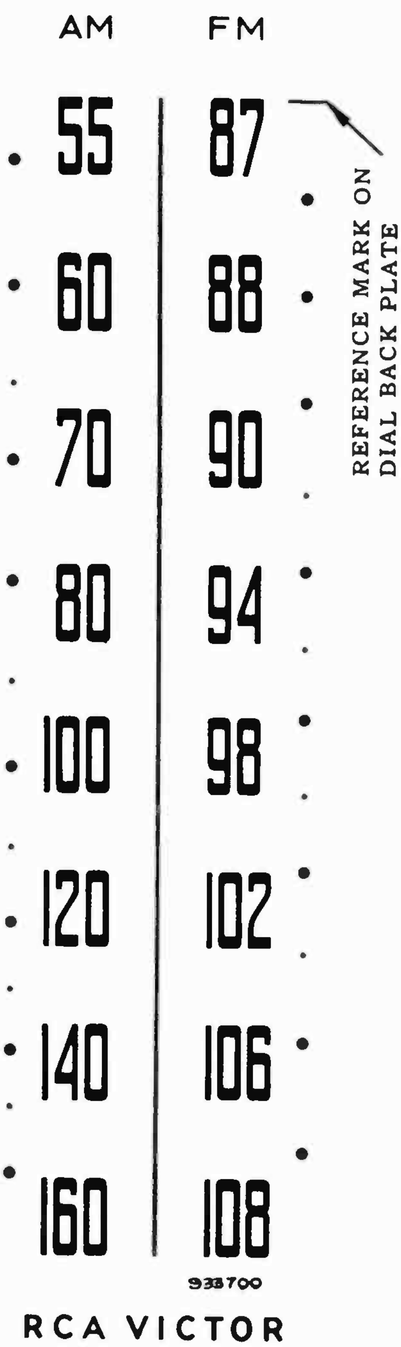
FM SIMPLIFIED SCHEMATIC

The schematic diagrams above show the selector switch (S1) used in RC-616H and RC-618A. The connections to S2 are identical in all chassis — note that position No. 2 (PHONO) of RC-616H and RC-618A corresponds to position No. 1 (PHONO) of RC-616A and RC-618. No connections are made through S2 when in AUX. position.



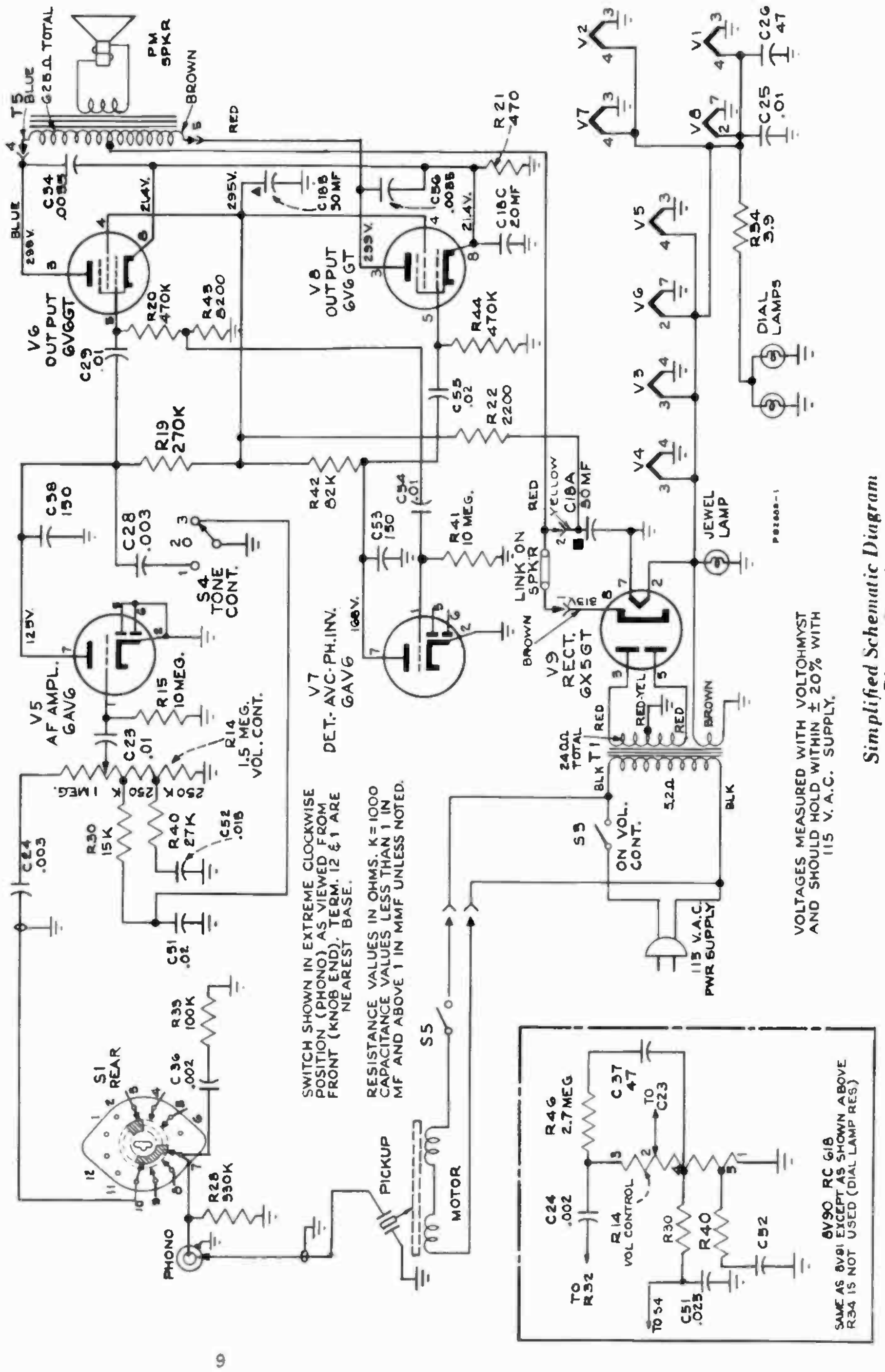
The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

Dial Scale — Model 8V91

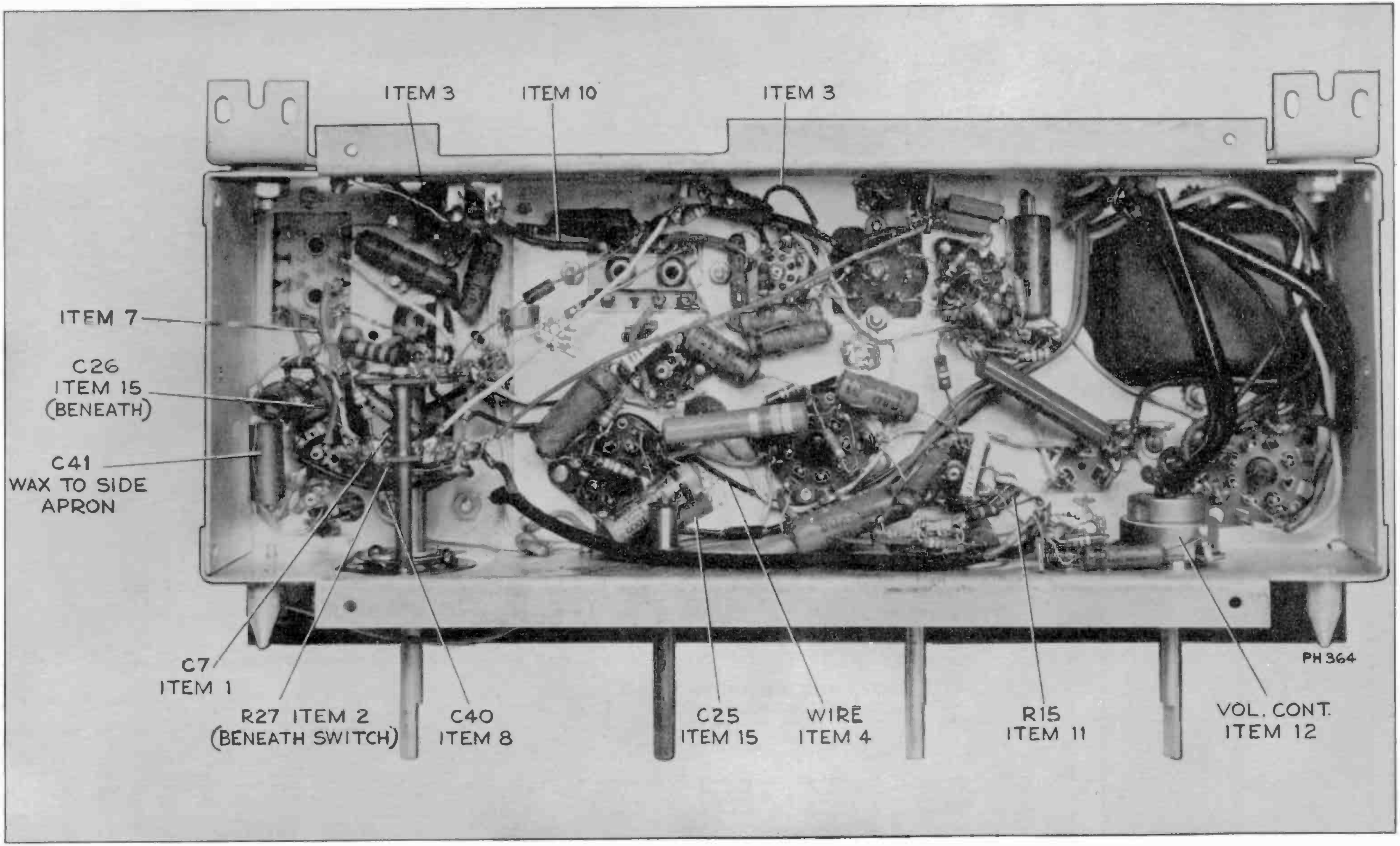


Dial Scale—Model 8V90

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.



Simplified Schematic Diagram Phono Position



Chassis Bottom View—Model 8V90

REFER TO "CRITICAL LEAD DRESS" ON PAGE 2.

Replacement Parts—Model 8V90—First Prod.

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 618
73893	Board—"FM" antenna board
73889	Capacitor—Variable tuning capacitor (C1, C2, C3, C4, C8, C12, C13)
73866	Capacitor—Ceramic, 2 mmf. (C9)
31353	Capacitor—Ceramic, 15 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26, C37)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19, C38, C50, C53)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
73748	Capacitor—Ceramic, 1500 mmf. (C39)
73750	Capacitor—Tubular, .002 mfd., 200 volts (C24, C36)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C34, C56)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C20, C27, C32)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16, C17, C21, C22)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C23, C25)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C29, C41, C54)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C52)
73638	Capacitor—Tubular, .02 mfd., 400 volts (C55)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C51)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C15)
73747	Capacitor—Electrolytic, 5 mfd., 50 volts (C33)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)
73918	Coil—Antenna coil—F.M. (No. 16 tinned bus wire, 8 turns per inch, 1¾ turns L. H.—.469 in. I. D.) (L1)
73916	Coil—Oscillator coil—F.M. (No. 16 tinned bus wire, 7 turns per inch, 4¾ turns R. H.—.469 in. I. D.) (L2)
73744	Coil—Oscillator coil—"A" band (L4)
70342	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 48" overall length required)
70392	Cord—Power cord and plug
16058	Grommet—Rubber grommet to mount R.F. shelf (4 required)
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
73895	Indicator—Station selector indicator
73892	Plate—Dial back plate complete with two (2) drive cord pulleys, less dial
30868	Plug—2 contact female plug for motor cable
5040	Plug—4 contact female plug for speaker cable
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R17, R27)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R12)
	Resistor—Fixed, composition, 470 ohms, ±10%, 2 watts (R21)
	Resistor—Fixed, composition, 560 ohms, ±10%, ½ watt (R35)
	Resistor—Fixed, composition, 680 ohms, ±20% ½ watt (R9, R11)
	Resistor—Fixed, composition, 1200 ohms, ±5%, ½ watt (R23)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R22)
	Resistor—Fixed, composition, 3300 ohms, ±5%, ½ watt (R24)
	Resistor—Fixed, composition, 8200 ohms, ±10%, ½ watt (R43)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ watt (R13, R18, R30)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R8, R40)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, 1 watt (R5)
	Resistor—Fixed, composition, 33,000 ohms, ±10%, ½ watt (R6)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R42)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R33, R45)
	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R28)
	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ watt (R20, R26, R44)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 2.7 megohm, ±10%, ½ watt (R46)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R15, R41)
	Resistor—Fixed, composition, 22 megohms, ±20%, ½ watt (R16)
73894	Shaft—Tuning knob shaft
31364	Socket—Dial lamp socket
35787	Socket—Phono input socket
73606	Socket—Tube socket, miniature, for tubes V1, V2 and V3
72516	Socket—Tube socket, miniature, for tubes V4, V5 and V7
31251	Socket—Tube socket, wafer, octal, for tubes V6, V8 and V9
31418	Spring—Drive cord spring
74202	Support—FM oscillator coil support, complete with mounting bracket
73890	Switch—Selector switch (S1, S2)
73891	Switch—Tone control switch (S4)
73601	Transformer—Power transformer, 115 volts, 60 cycle (T1)
73745	Transformer—First I.F. transformer—dual (T2)
74019	Transformer—Second I.F. transformer—dual (T3)
73743	Transformer—Ratio detector transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES
	92579-2W
	RL 105A1
74181	Cap—Dust cap
73912	Cone—Cone and voice coil assembly
5039	Plug—4 prong male plug for speaker
73911	Speaker—8" P.M. speaker complete with cone and voice coil—less output transformer and plug
73636	Transformer—Output transformer (T5)
	MISCELLANEOUS
72555	Antenna—F.M. antenna
71599	Bracket—Pilot lamp bracket
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
71892	Catch—Bullet catch and strike for doors
73897	Clamp—Dial clamp (2 required)
X1894	Cloth—Grille cloth for blonde instruments
X1893	Cloth—Grille cloth for mahogany finish or walnut instruments
73904	Decal—Control panel decal for mahogany finish or walnut instruments
73905	Decal—Control panel decal for blonde instruments
71984	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
73898	Dial—Glass dial scale
11889	Grommet—Rubber grommet for front apron of chassis (2 required)
72856	Grommet—Rubber grommet for mounting record changer (3 required)
73903	Hinge—Phono compartment door or radio compartment door hinge (1 set)
71822	Knob—Selector switch or tone control knob—maroon—for mahogany finish or walnut instruments
72824	Knob—Selector switch or tone control knob—brown—for blonde instruments
71821	Knob—Tuning or volume control knob—maroon—for mahogany finish or walnut instruments
72800	Knob—Tuning or volume control knob—brown—for blonde instruments
11765	Lamp—Dial lamp—Mazda 51
73896	Loop—Antenna loop complete
73109	Nut—Tee nut for mounting record changer (3 required)
*73902	Pull—Phono compartment or radio compartment door pull
73110	Screw—¼-20 x 1¾ fillister head machine screw for mounting record changer (3 required)
30900	Spring—Retaining spring for knobs
72936	Stop—Phono compartment or radio compartment door stop

†Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Replacement Parts—Model 8V91—First Prod.

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 616A
73610	Board—Terminal board (F.M.-G) with link
73866	Capacitor—Ceramic, 2 mmf. (C9)
31353	Capacitor—Ceramic, 15 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19, C38, C50, C53)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
73748	Capacitor—Ceramic, 1500 mmf. (C39)
73750	Capacitor—Tubular, .002 mfd., 200 volts (C36)
70646	Capacitor—Tubular, .0035 mfd., 1000 v. (C34, C56)
73659	Capacitor—Tubular, .003 mfd., 200 volts (C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C20, C27, C32)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16, C17, C21, C22)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C52)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C23, C25)
72827	Capacitor—Tubular, .01 mfd., 400 volts (C29, C41, C54)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C51)
73638	Capacitor—Tubular, .02 mfd., 400 volts (C55)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C15)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C33)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)
73918	Coil—Antenna coil—F.M. (No. 16 tinned bus wire—8 turns per inch—1¾ turns L. H.—.469 in. I. D.) (L1)
73916	Coil—Oscillator coil—F.M. (No. 16 tinned bus wire—8 turns per inch—4¾ turns R. H.—.469 in. I. D.) (L2)
73744	Coil—Oscillator coil—"A" band (L4)
73607	Condenser—Variable tuning condenser (C1, C2, C3, C4, C8, C12, C13)
70342	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 38" overall length required)
73690	Cord—Power cord and plug
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
16058	Grommet—Rubber grommet to mount R-F shelf (4 required)
73710	Indicator—Station selector indicator
71607	Plate—Dial back plate
30868	Plug—2 contact female plug for motor cable
5040	Plug—4 contact female plug for speaker cable
70250	Resistor—Wire wound, 3.9 ohms, 1 watt (R34)
	Resistor—Fixed, composition, 68 ohms ± 10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms ± 10%, ½ watt (R17, R27)
	Resistor—Fixed, composition, 120 ohms ± 10%, ½ watt (R12)
	Resistor—Fixed, composition, 390 ohms, ±10% ½ watt (R35)
	Resistor—Fixed, composition, 470 ohms ± 10%, 2 watt (R21)
	Resistor—Fixed, composition, 680 ohms ± 20%, ½ watt (R9, R11)
	Resistor—Fixed, composition, 1200 ohms ± 5%, ½ watt (R23)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R22)
	Resistor—Fixed, composition, 3300 ohms ± 5%, ½ watt (R24)
	Resistor—Fixed, composition, 8200 ohms ± 10%, ½ watt (R43)
	Resistor—Fixed, composition, 10,000 ohms ± 10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms ± 10%, ½ watt (R13, R18, R30)
	Resistor—Fixed, composition, 18,000 ohms ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, ½ watt (R8, R40)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, 1 watt (R5)
	Resistor—Fixed, composition, 33,000 ohms ± 10%, ½ watt (R6)
	Resistor—Fixed, composition, 39,000 ohms ± 10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms ± 10%, ½ watt (R10)
	Resistor—Fixed, composition, 82,000 ohms ± 10%, ½ watt (R42)
	Resistor—Fixed, composition, 100,000 ohms ± 10%, ½ watt (R33, R45)
	Resistor—Fixed, composition, 270,000 ohms ± 10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 330,000 ohms ± 10%, ½ watt (R28)
	Resistor—Fixed, composition, 470,000 ohms ± 10%, ½ watt (R20, R26, R44)
	Resistor—Fixed, composition, 2.2 megohm ± 20%, ½ watt (R3)
	Resistor—Fixed, composition, 3.9 megohm ± 10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohms ± 20%, ½ watt (R15, R41)
	Resistor—Fixed, composition, 22 megohms ± 20%, ½ watt (R16)
73605	Shaft—Tuning knob shaft

Stock No.	DESCRIPTION
31364	Socket—Lamp socket
35787	Socket—Phono input socket
72516	Socket—Tube socket, miniature, for tubes V4, V5 and V7
73606	Socket—Tube socket, miniature, for tubes V1, V2 and V3
31251	Socket—Tube socket, octal, for tubes V6, V8 and V9
74305	Spring—Drive cord spring
73603	Support—Dial plate mounting support complete with pulley—R.H.
73604	Support—Dial plate mounting support complete with pulley—L.H.
74202	Support—FM oscillator coil support, complete with mounting bracket
73609	Switch—Range switch (S1, S2)
73602	Switch—Tone control switch (S4)
73601	Transformer—Power transformer, 115 volts 60 cycle (T1)
73745	Transformer—First I-F transformer—dual (T2)
74019	Transformer—Second I-F transformer—dual (T3)
73743	Transformer—Ratio detector transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92569-5W RL 103B5
13867	Cap—Dust cap
73934	Cone—Cone complete with voice coil
5039	Plug—4 prong male plug for speaker
73635	Speaker—12" P.M. speaker complete with cone and voice coil—less output transformer and plug
71145	Suspension—Metal cone suspension
73636	Transformer—Output transformer (T5)
	SPEAKER ASSEMBLIES 92569-1KX
70574	Cone—Cone and voice coil assembly
5039	Plug—4 prong male plug for speaker
37899	Transformer—Output transformer
	NOTE: When replacing complete speaker, order RCA 73635 (92569-5W)
	MISCELLANEOUS
71864	Antenna—F.M. antenna
73622	Back—Back cover for blonde instruments
73621	Back—Back cover for mahogany or walnut instruments
71599	Bracket—Pilot lamp bracket
73626	Bumper—Rubber bumper for actuating link
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
73613	Carriage—Record changer mounting carriage complete with runners
71892	Catch—Bullet catch and strike for radio or phono compartment doors
71820	Check—Radio compartment door check
X1815	Cloth—Grille cloth for blonde instruments
X1814	Cloth—Grille cloth for mahogany instruments
X1816	Cloth—Grille cloth for walnut instruments
73755	Decal—Control panel decal for mahogany or walnut instruments
73756	Decal—Control panel decal for blonde instruments
71966	Decal—Trade mark decal (Victrola)
71910	Decal—Trade mark decal (RCA Victor)
73628	Dial—Glass dial scale
73627	Escutcheon—Dial escutcheon less dial
73757	Grille—Metal grille
11889	Grommet—Rubber grommet for front apron of chassis
73614	Grommet—Rubber grommet to mount record changer (3 required)
37396	Grommet—Rubber grommet to mount speaker (3 required)
73751	Hinge—Radio or phono compartment door hinge (2 required for each door)
71945	Hinge—Record storage compartment door hinge (2 required for each door)
71822	Knob—Tone control or range switch knob—maroon—for mahogany or walnut instruments
72824	Knob—Tone control or range switch knob—brown—for blonde instruments
71821	Knob—Tuning or volume control knob—maroon—for mahogany or walnut instruments
72800	Knob—Tuning or volume control knob—brown—for blonde instruments
11765	Lamp—Dial lamp—Mazda 51
73616	Link—Actuating link assembly for record changer carriage—R.H.
73617	Link—Actuating link assembly for record changer carriage—L.H.
73611	Loop—Antenna loop complete
73109	Nut—Tee nut to mount record changer (3 required)
71819	Plate—Radio compartment door check mounting plate
31048	Plug—Pin plug for shielded pickup cable
30868	Plug—2 contact female plug for power cable
73752	Pull—Door pull (2 required) for walnut instruments
73753	Pull—Door pull (2 required) for mahogany or blonde instruments
73615	Screw—¼-20 x 1½" fillister head machine screw to mount record changer (3 required)
73618	Spring—Connecting spring between link and record changer carriage
71818	Spring—Radio compartment door check spring
30900	Spring—Retaining spring for knobs
73185	Stop—Carriage mechanism stop (2 required)
73612	Track — Carriage mechanism track complete with mounting plate (2 required)
71814	Washer—Rubber washer for radio compartment door check

†Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

FOR RECORD CHANGER SERVICE INFORMATION—REFER TO RP-178 SERIES SERVICE DATA.

RCA VICTOR

AM-FM Radio-Phonograph Combination

Model 8V112

1st Prod. Chassis No. RC-616

2nd Prod. Chassis No. RC-616F

Mfr. No. 274

SERVICE DATA

—1948 No. 12—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Ranges

Standard Broadcast (AM) .... 540-1,600 kc.
Frequency Modulation (FM) .... 88-108 mc.

Intermediate Frequencies...AM—455 kc., FM—10.7 mc.

Tube Complement

(1) RCA 6J6 .... Mixer and Oscillator
(2) RCA 6BA6 .... I. F. Amplifier
(3) RCA 6AU6 .... Driver
(4) RCA 6AL5 .... Ratio Detector
(5) RCA 6AV6 .... A. F. Amp.
(6) RCA 6V6GT .... Output
(7) RCA 6AV6 .... AM Det.—AVC—Ph. Inv.
(8) RCA 6V6GT .... Output
(9) RCA 6X5GT .... Rectifier
(10) RCA 6AV6 .... M. M. Amp.
(11) RCA 6BA6 .... M. M. Reactor

Power Supply Rating ...... 115 volts, 60 cycles, 90 watts

Circuit Description

The chassis used in this receiver has a 6J6 tube (V1) (twin triode), one section of which is used as mixer and the other section as oscillator. The FM antenna coil and the FM oscillator coil are placed in such position as to provide coupling between them. A section of the AM oscillator coil is connected in series with the mixer grid input when the selector switch is in AM position.

Dual I-F transformers are used, each transformer containing both AM and FM windings. The I-F amplifier is V2 (6BA6).

The selector switch has five functions:

(1) Selection of tuning range.
(2) Selection of AVC supply voltages to be applied to the controlled tubes. Simple AVC is applied to the grids of V1 and V2 on AM. Delayed AVC is used on FM and is applied only to the grid of V2.
(3) Controls application of B+ voltage to V1, V2, V3 and V11.
(4) Controls audio input to volume control.
(5) Controls circuit loading of M.M. reactor tube V11 (6BA6).

The driver V3 (6AU6) and ratio detector V4 (6AL5) circuits are similar to those used in other RCA Victor AM-FM receivers.

The audio system is conventional. It consists of V5 (6AV6 a.f. amp.), V7 (6AV6 ph. inv.), V6 and V8 (6V6GT p. p. output).

The rectifier is V9 (6X5GT).

The Magic Monitor system uses V10 (6AV6 M. M. amp.) and V11 (6BA6 M. M. reactor). Its operation is described on page 9.

Loudspeaker

Type 92569-5 .... 12 in. P.M.
Voice coil impedance at 400 cycles .... 3.2 ohms

Tuning Drive Ratio .... 18:1 (9 turns of knob)

Dial Lamps (2) .... Type No. 51, 6-8 volts, 0.2 amp.

Jewel Lamp .... Type No. 51, 6-8 volts, 0.2 amp.

Power Output

Maximum .... 7 watts
Undistorted .... 6 watts

Cabinet Dimensions

Height...34½ in. Width...38¼ in. Depth...17¾ in.

Record Changer (RP-178)

Record Capacity .... Twelve 10-in. or ten 12-in.
Turntable Speed .... 78 r.p.m.

Antennas:

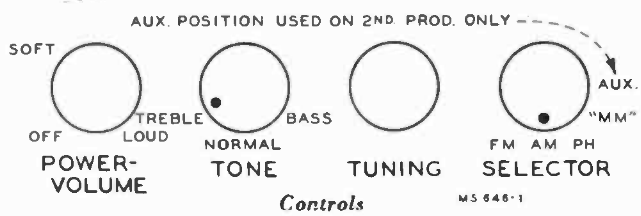
These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Under average conditions these antennas will provide satisfactory reception. However, provision is made for the use of external antennas if desired — connect as indicated below:

Ground: Connect external ground to "G" terminal. Under certain conditions the use of an external ground is detrimental to FM reception.

AM Antenna: Connect a single wire antenna to terminal "A."

FM Antenna: Remove the built-in FM antenna lead from the "FM" terminals of the terminal board. Connect the transmission line of an external FM dipole antenna to these two "FM" terminals.



Controls

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Oscilloscope Alignment:

The FM I. F. alignment may be checked with the use of a sweep generator and an oscilloscope.

Shunt terminals B and C of T3 (driver trans.) with a 1200 ohm resistor. Connect the output of the sweep generator (10.7 mc. with ±250 kc. sweep) to the grid of V2 (6BA6 I. F.) in series with .01 mfd. Connect the high side of the oscilloscope to terminal C of T3 in series with a diode probe. Low side of the sweep generator and oscilloscope to chassis. This will show the response of T2.

With the oscilloscope connected as before connect the output of the sweep generator to the "FM" antenna terminal board in series with a 300 ohm resistor (disconnect FM antenna); it may be necessary to reverse the connections of the sweep generator since one "FM" terminal is connected to chassis. This will show the combined response of T1 and T2.

To observe the Ratio Detector response, remove the 1200 ohm resistor which was shunted across terminals B and C of T3. Connect the output of the sweep generator to the grid of the driver tube (V3 6AU6) in series with .01 mfd. and connect the high side of the oscilloscope direct to terminal No. 9 of S1.

Note: It is difficult to observe marker signals in this step; center frequency and sweep width should be previously observed.

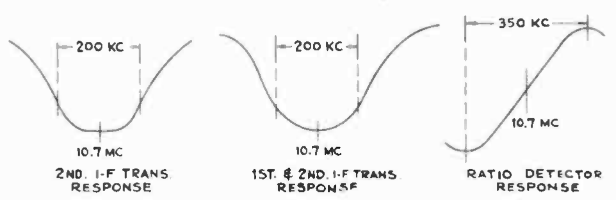
CRITICAL LEAD DRESS

1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The ground lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis and away from 6AU6 driver tube socket.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. The lead from the high side of the loop should be dressed away from tubes.
7. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
8. Connect C40 directly between the gang condenser and pin No. 1 of V1.
9. Make all FM leads as short as possible.
10. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
11. Dress resistor R15 near chassis base.
12. Dress all A. C. leads away from volume control.
13. The lead from "FM" terminal of antenna terminal board to L1 tap should be dressed away from V2.
14. The taps on L1 and L2 are critical. L1 tap should be ¾ turn from the ground end. L2 tap should be 2¼ turns from the gang condenser C8.
15. Dress C25 and C26 against the chassis with the shortest lead length possible.
16. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.
17. The FM oscillator coil should be cemented to its support. Amphenol No. 912 cement is recommended for this purpose. If it is necessary to loosen the coil, use Amphenol No. 916 solvent.
18. Capacitor C41 should be waxed or cemented to the chassis apron.

Dial Indicator

With the tuning condenser fully meshed (closed) the indicator should be set to the SECOND REFERENCE MARK from the left hand edge of the dial back plate.

Refer to the dial scale reproduction on page 9.



FM Response Curves

AM Alignment

RANGE SWITCH IN BC POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	C3 in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T3 bottom core (sec.). T3 top core (pri.).
2				AM windings.† T2 top core (sec.). T2 bottom core (pri.).
3	"A" terminal of terminal board at rear of chassis in series with 220 mmf.	1400 kc.	1400 kc.	C13 osc. C4 ant.
4		600 kc.	600 kc.	L4 osc. (Rock gang.)
5	Repeat Steps 3 and 4.			

† Use alternate loading.

Alternate loading involves the use of a 47,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 47,000 ohm resistor after T3 and T2 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

FM Alignment

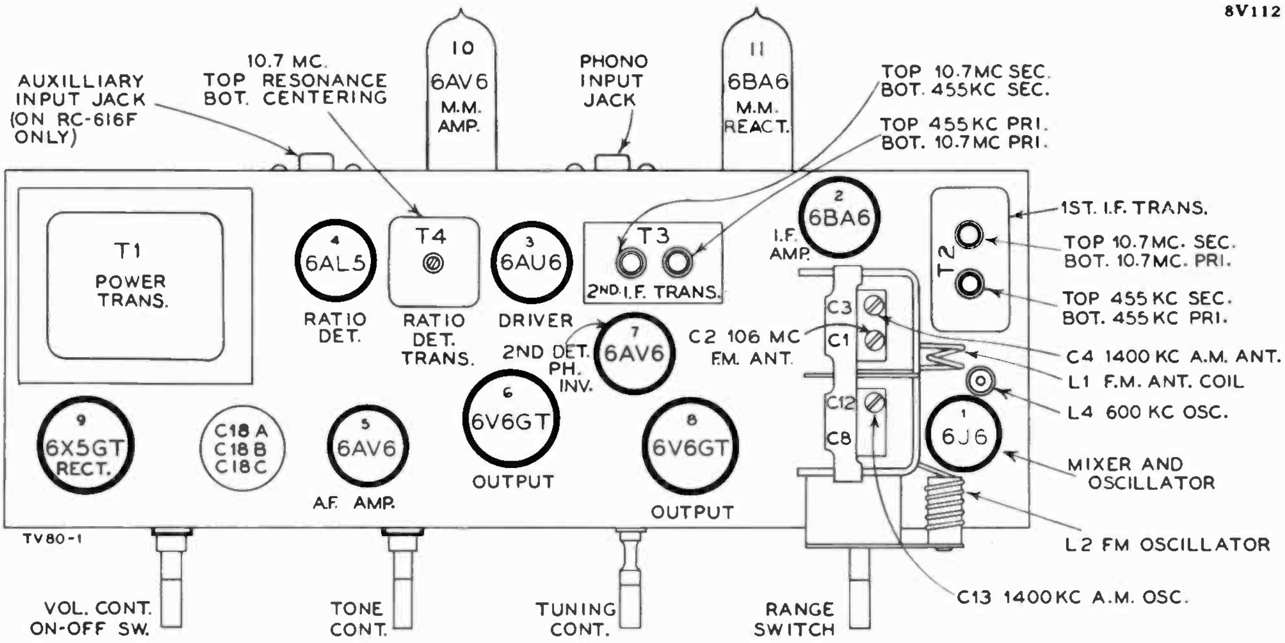
RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C33 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	Pin 1 of 6AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM (Approx. .05 volt).	Max. capacity (fully meshed).	T4 top core for max. d-c voltage across C33. T4 bottom core for min. audio output.*
3	FM ant. term. in series with a 300 ohm resistor. (Remove ant. lead from "FM" term.)	10.7 mc. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.		FM windings.†† T3 top core (sec.). T3 bottom core (pri.).
4				FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
5		106 mc.	106 mc.	L2 osc.** C2 ant. Set C2 at max. capacity while adjusting L2.
6		90 mc.	90 mc.	L1 ant.** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T3 and T2 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 47,000 ohm resistor and load the FM windings.

** L1 and L2 are adjustable by increasing or decreasing the spacing between turns.



Tube and Trimmer Locations

Note: FM mixer and oscillator coils are adjustable by increasing or decreasing the spacing between turns. The position of the coils and location of the taps are critical (refer to "Critical Lead Dress").

In some chassis the FM osc. coil support (illustrated) is not used, two polystyrene rods cemented to the chassis and to the coil are used instead.

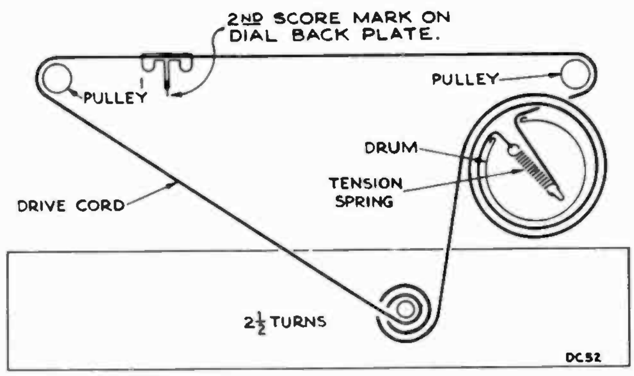
SOCKET VOLTAGES

Voltages measured with Chanalyst or VoltOhmyst and should hold within ±20% with rated line voltage. Tuning condenser closed—no signal input.

Tube	Terminal		Voltage M.M.	Phono	A.M.	F.M.
(1) 6J6	Plate	1	—	—	102	98
	Grid	6	-0.4	-0.4	-6.8	-6.0
	Plate	2	—	—	96	110
	Grid	5	-0.7	-0.8	-2.7	-2.5
(2) 6BA6	Plate	5	—	—	196	192
	Screen	6	—	—	100	83
	Cathode	7	—	—	0.7	0.84
	Grid	1	-1.0	-0.9	-1.3	-0.2
(3) 6AU6	Plate	5	—	—	190	185
	Screen	6	—	—	145	141
	Cathode	7	—	—	1.25	1.21
(4) 6AL5	———	—	—	—	—	—
(5) 6AV6	Plate	7	95	125	85	84
	Grid	1	-0.6	-0.6	-0.6	-0.6
(6) 6V6GT	Plate	3	295	299	282	280
	Screen	4	275	295	220	217
	Cathode	8	19.6	21.4	15.5	15.4
(7) 6AV6	Plate	7	158	168	125	125
	Grid	1	-0.5	-0.5	-0.5	-0.5
(8) 6V6GT	Plate	3	295	299	282	280
	Screen	4	275	295	220	217
	Cathode	8	19.6	21.4	15.5	15.4
(9) 6X5GT	Cathode	8	310	313	300	299
(10) 6AV6	Plate	7	171	184	131	130
	Cathode	2	1.85	1.98	1.55	1.53
(11) 6BA6	Plate	5	195	—	—	—
	Screen	6	56.5	—	—	—
	Cathode	7	0.65	—	—	—
	Grid	1	-0.2	-0.8	-0.8	-0.8

Socket voltages with switch in "AUX" position are the same as listed for "PHONO" position.

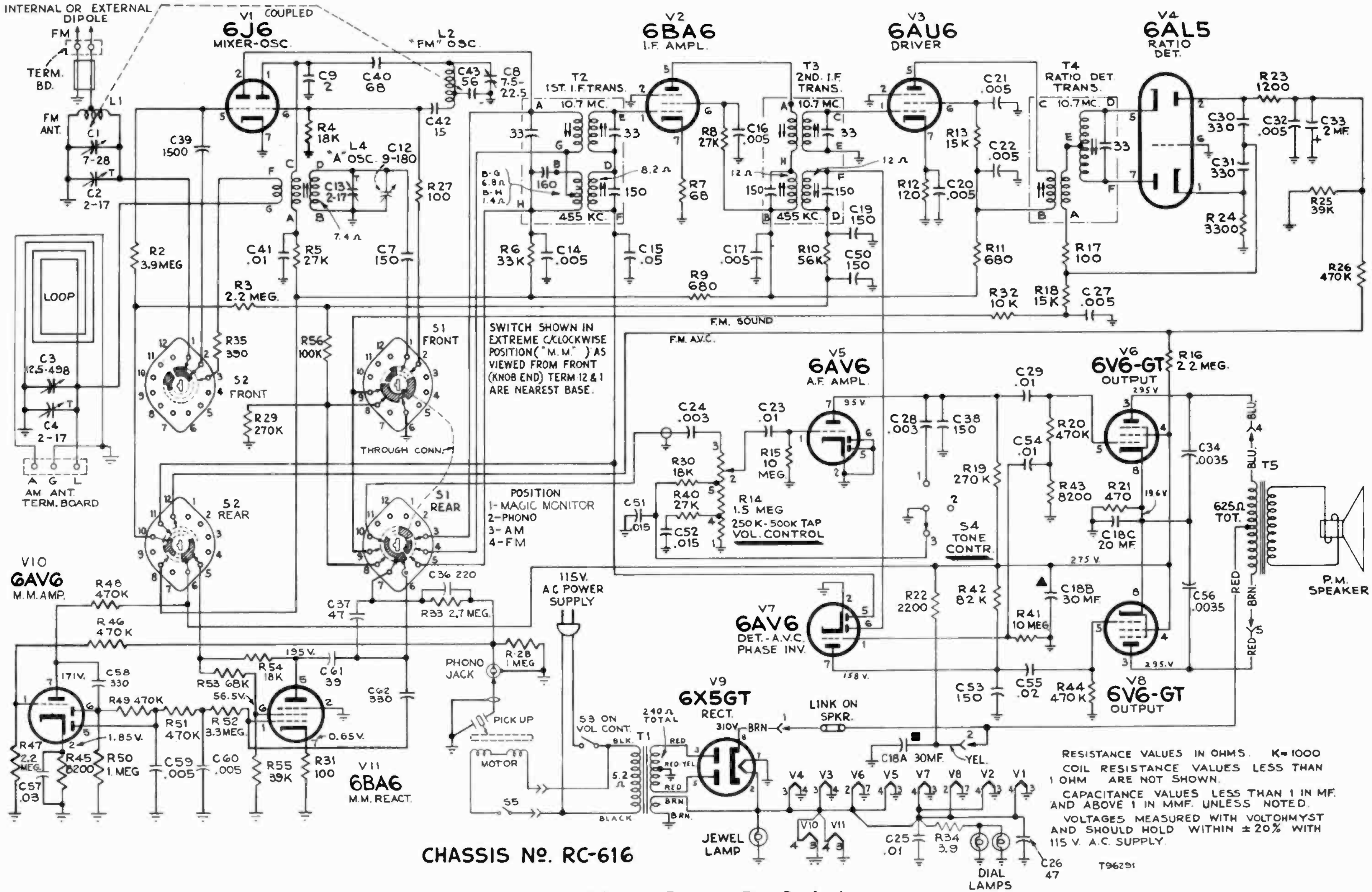
SHOWN WITH TUNING CONDENSER AT MAXIMUM CAPACITY (FULLY CLOSED)



Dial Indicator and Drive Mechanism

CATHODE CURRENTS (MA)

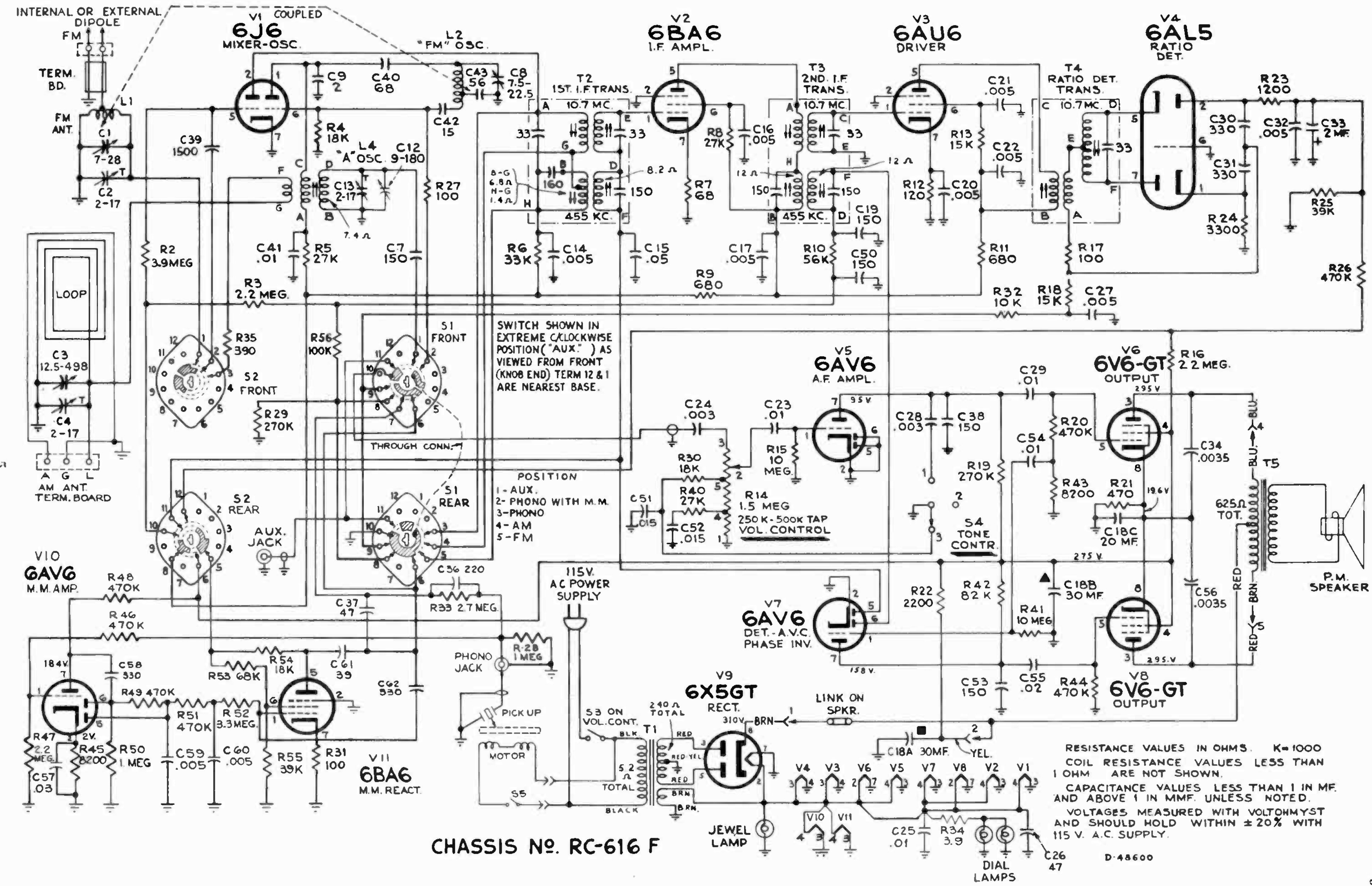
Tube	Terminal	M.M.	Phono	A.M.	F.M.
(1) 6J6	7	—	—	8.2	8.7
(2) 6BA6	7	—	—	11.6	13.4
(3) 6AU6	7	—	—	10	9.7
(4) 6AL5	1 & 5	—	—	—	—
(5) 6AV6	2	0.7	0.75	0.5	0.5
(6) 6V6GT	8	23.2	25.1	19.1	18.5
(7) 6AV6	2	1.6	1.7	1.1	1.1
(8) 6V6GT	8	23.2	25.1	19	18.5
(9) 6X5GT	8	57	53	70	70.5
(10) 6AV6	2	0.2	0.25	0.2	0.2
(11) 6BA6	7	8.0	—	—	—



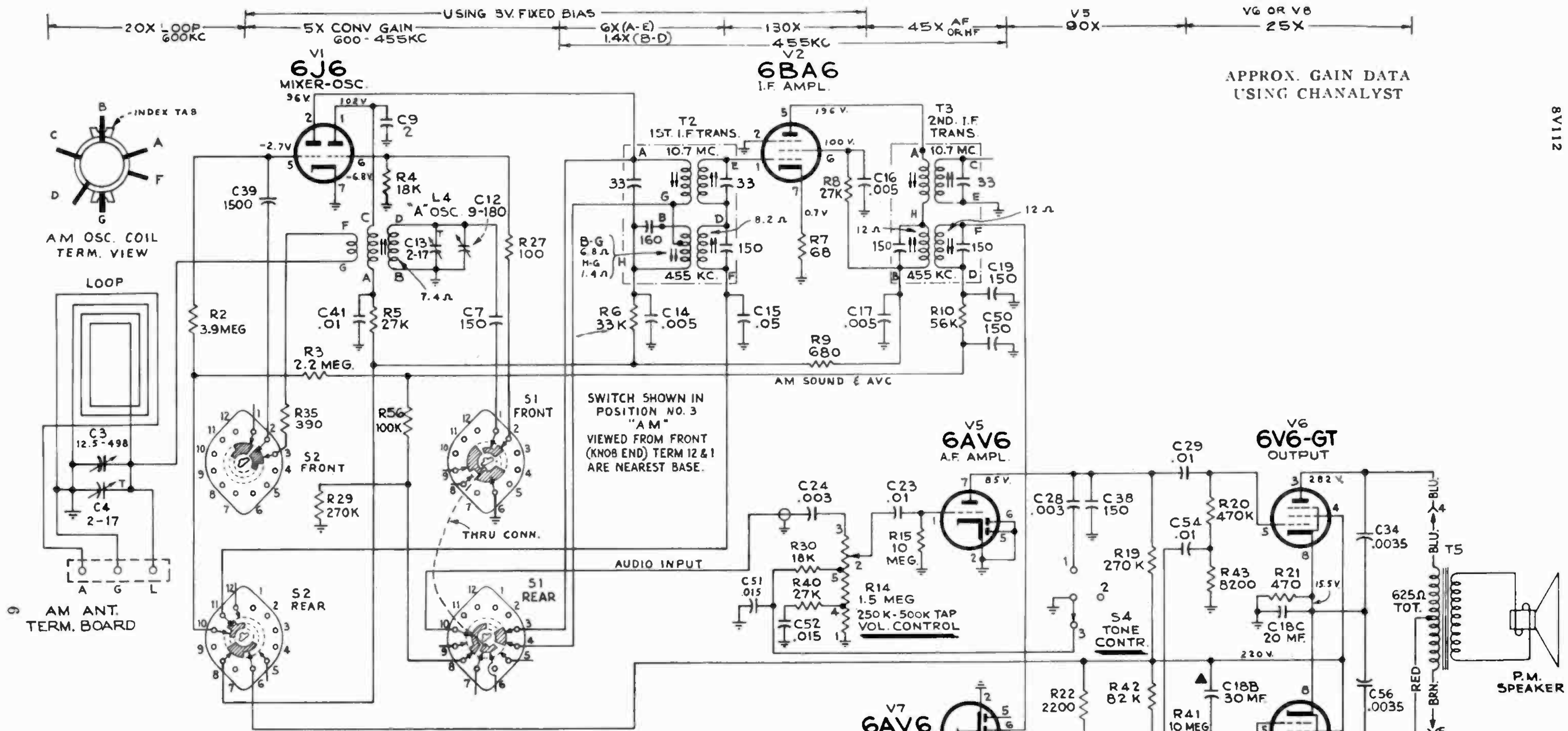
Complete Schematic Diagram—First Production

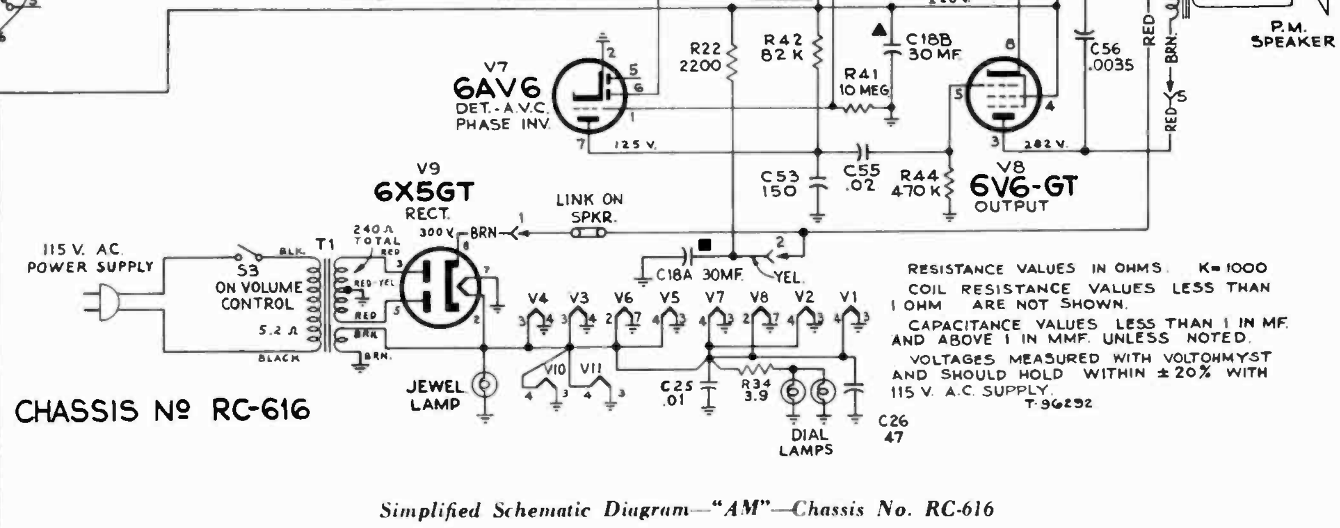
CHANGES—In some chassis R35 is omitted, in others it is 330 ohms. In early chassis R4 is 22,000 ohms and C42 is 22 mmf.

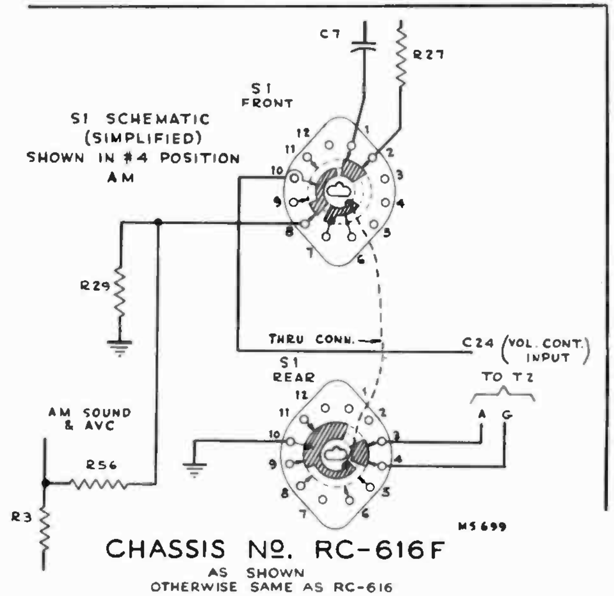
Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).



Complete Schematic Diagram—Second Production



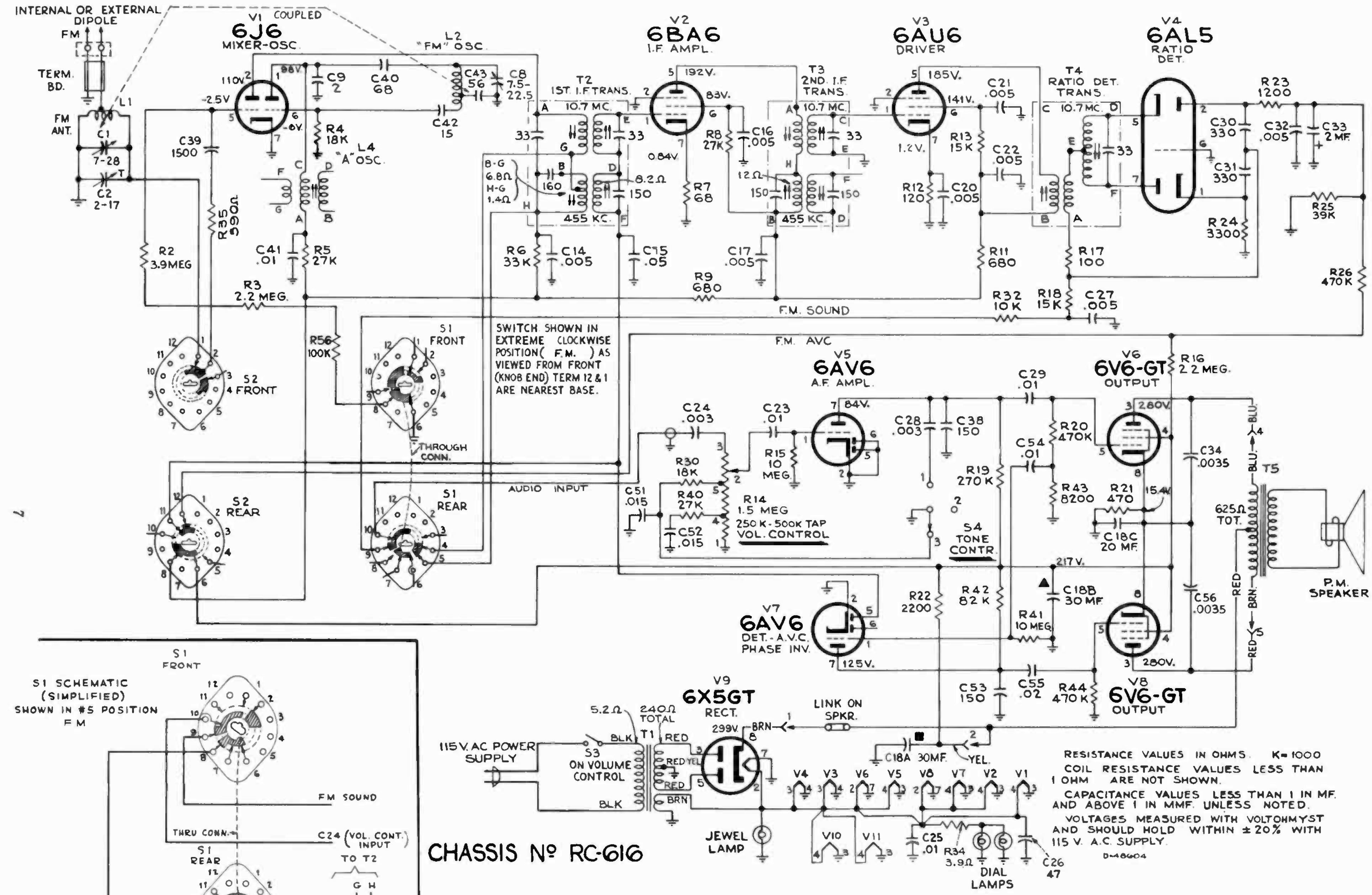


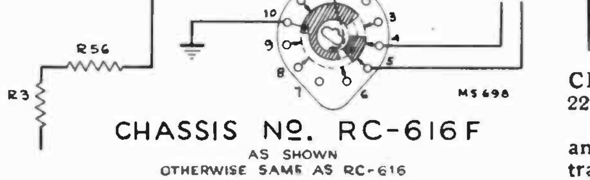


Simplified Schematic Diagram—"AM"—Chassis No. RC-616

CHANGES—In some chassis R35 is omitted, in others it is 330 ohms. In early chassis R4 is 22,000 ohms and C42 is 22 mmf.

Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).





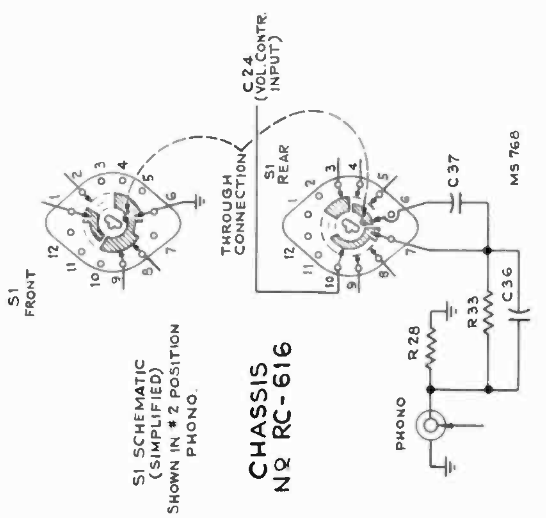
Simplified Schematic Diagram—"FM"—Chassis No. RC-616

CHANGES—In some chassis R35 is omitted, in others it is 330 ohms. In early chassis R4 is 22,000 ohms and C42 is 22 mmf.

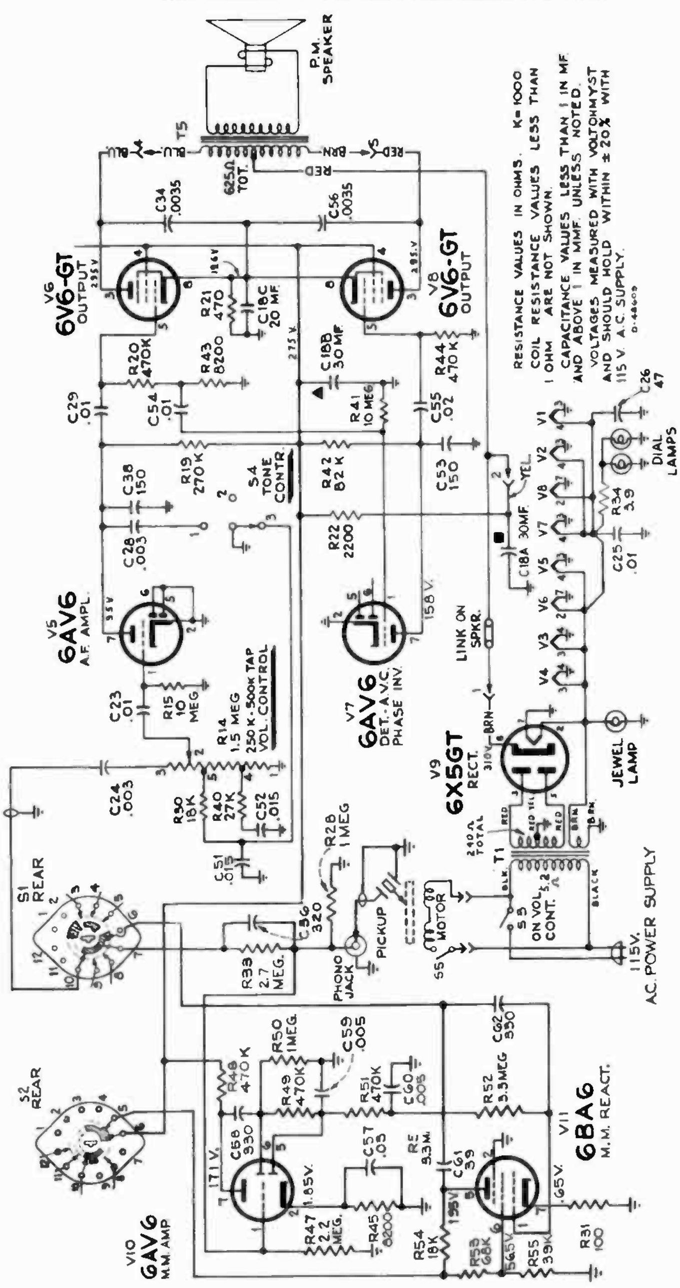
Some chassis may use 2nd I.F. trans. stamped 970435-5 (Stock No. 74019), the 455 k.c. windings have a d.c. resistance of 12 ohms each, the resonating capacitors are 150 mmf. instead of 235 mmf. They are interchangeable with transformers stamped 970435-2 (Stock No. 73363).

Chassis No. RC-616 vs RC-616F

The essential difference between the two chassis is the addition of an AUX. audio input jack on Chassis No. RC-616F. The connections to this AUX. jack are controlled by the selector switch. Chassis No. RC-616 (without AUX. jack) has a four position switch. Chassis No. RC-616F (with AUX. jack) has a five position switch.

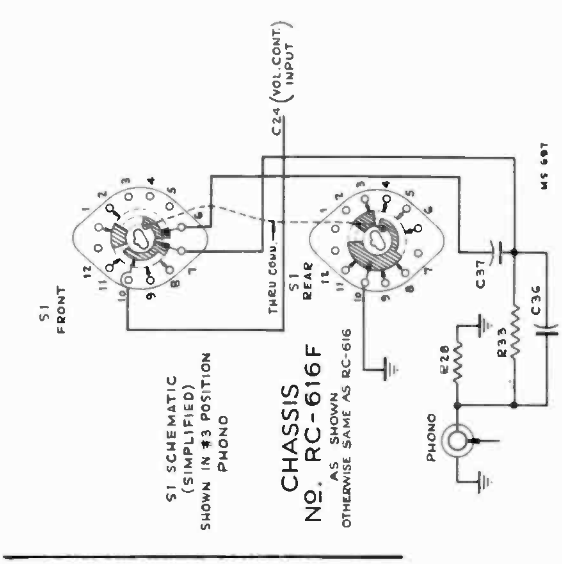


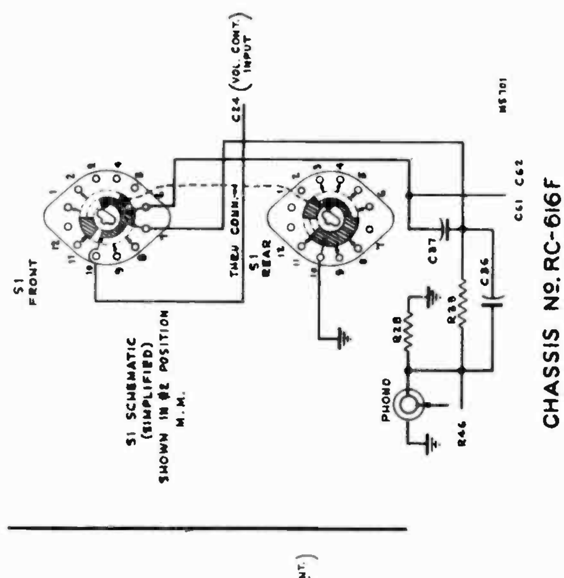
Phono Position

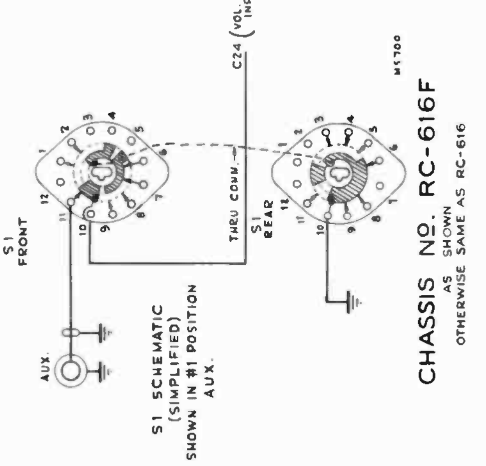


Magic Monitor Position

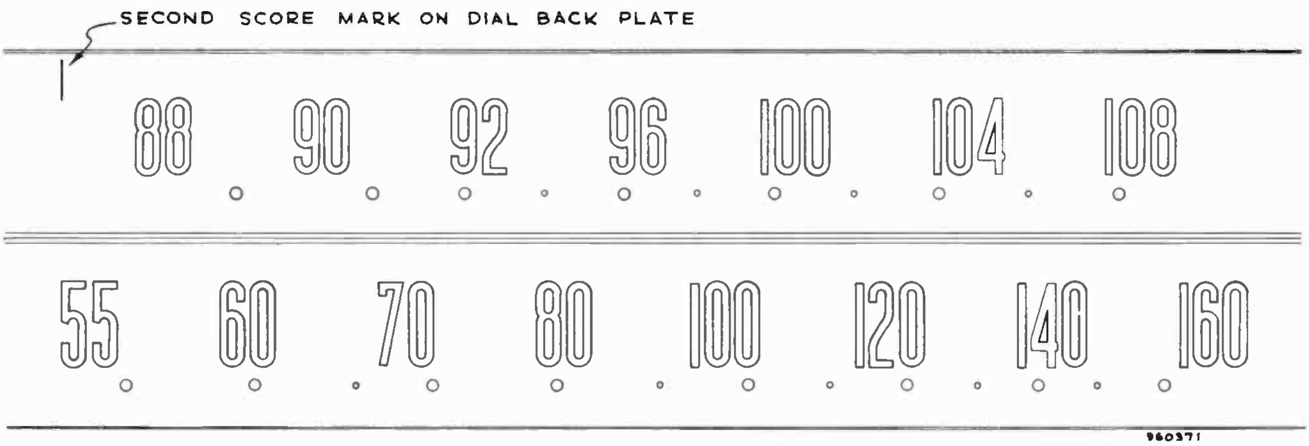
Simplified Schematic Diagrams—Chassis No. RC-616







Simplified Schematic Diagrams—Chassis No. RC-616F



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

MAGIC MONITOR

Circuit Description

The Magic Monitor circuit acts as a capacity shunt across the audio input to the volume control when the selector switch is turned to M. M. position. This shunt is not effective when the developed grid voltage applied to the grid of V11 (6BA6 M. M. Reactor) is high enough to cause plate current cut-off.

The phono signal input is applied to the grid of V10 (6AV6 M. M. amp.), is amplified and fed through a resistance-capacity network to the diode plates of V10 which rectifies it and produces a grid voltage on V11 in proportion to the level of the high frequencies contained in the audio signal.

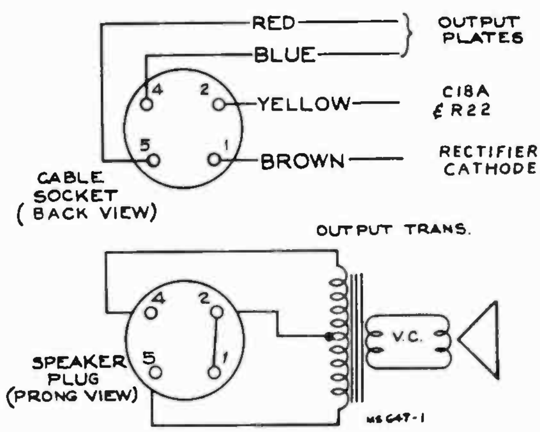
Tests

(1) Feed a .04 volt 400 cycle signal from a low impedance source into the phono jack. Adjust the volume control for maximum output with selector switch in PHONO position. Set switch to M. M. The output level should decrease to approximately one-half.

(2) Repeat Step 1 except using 2 volt signal. The output level should decrease only slightly when the selector switch is turned to M. M. position.

(3) Repeat Step 2 except using 3,000 cycle signal. The output level should not decrease when the selector switch is turned to M. M. position.

(4) Repeat Step 3 except using .04 volt signal. The output level should decrease to approximately one-fourth when the selector switch is turned to M. M. position.



Speaker Connections

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-616, RC-616 F
73610	Board—Terminal board (FM - G) with link
73866	Capacitor—Ceramic, 2 mmf. (C9)
31353	Capacitor—Ceramic, 15 mmf. (C42)
73664	Capacitor—Ceramic, 39 mmf. (C61)
39042	Capacitor—Ceramic, 47 mmf. (C26, C37)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19, C38, C50, C53)
71920	Capacitor—Ceramic, 220 mmf. (C36)
39640	Capacitor—Mica, 330 mmf. (C30, C31, C58, C62)
73748	Capacitor—Ceramic, 1,500 mmf. (C39)
70646	Capacitor—Tubular, .0035 mfd., 1,000 volts (C34, C56)
73659	Capacitor—Tubular, .003 mfd., 200 volts (C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C20, C27, C32, C59, C60)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16, C17, C21, C22)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C51, C52)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C23, C25)
72827	Capacitor—Tubular, .01 mfd., 400 volts (C29, C41, C54)
73638	Capacitor—Tubular, .02 mfd., 400 volts (C55)
73639	Capacitor—Tubular, .03 mfd., 400 volts (C57)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C15)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C33)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)
73918	Coil—FM antenna coil (No. 16 tinned bus wire, 8 turns per inch, 1¾ turns L. H., .469 I. D.) (L1)
73916	Coil—FM oscillator coil (No. 16 tinned bus wire, 7 turns per inch, 4¾ turns R. H., .469 I. D.) (L2)
73744	Coil—Oscillator coil, "A" band (L4)
73607	Condenser—Variable tuning condenser (C1, C2, C3, C4, C8, C12, C13)
73602	Control—Tone control (S4)
70342	Control—Volume control and power switch (R14, S3)
†72953	Cord—Drive cord (approx. 38" overall length required)
73690	Cord—Power cord and plug
28451	Cover—Insulating cover for electrolytic capacitor
16058	Grommet—Rubber grommet to mount R. F. shelf (4 required)

(Continued on following page)

Replacement Parts (continued)

Stock No.	DESCRIPTION
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
73710	Indicator—Station selector indicator
71607	Plate—Dial back plate
30868	Plug—2 contact female plug for motor cable
5040	Plug—4 contact female plug for speaker cable
70250	Resistor—Wire wound, 3.9 ohms, 1 watt (R34)
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R17, R27, R31)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R12)
	Resistor—Fixed, composition, 390 ohms, ±10%, ½ watt (R35)
	Resistor—Fixed, composition, 470 ohms, ±10%, 2 watt (R21)
	Resistor—Fixed, composition, 680 ohms, ±20%, ½ watt (R9, R11)
	Resistor—Fixed, composition, 1,200 ohms, ±5%, ½ watt (R23)
73637	Resistor—Wire wound, 2,200 ohms, 5 watts (R22)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R24)
	Resistor—Fixed, composition, 8,200 ohms, ±10%, ½ watt (R43, R45)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ watt (R13, R18)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R4, R30)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, 1 watt (R54)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R8, R40)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, 1 watt (R5)
	Resistor—Fixed, composition, 33,000 ohms, ±10%, ½ watt (R6)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R25, R55)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, 1 watt (R10)
	Resistor—Fixed, composition, 68,000 ohms, ±10%, 1 watt (R53)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R42)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R56)
	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ watt (R20, R26, R44, R46, R48, R49, R51)
	Resistor—Fixed, composition, 1 megohm, ±10%, ½ watt (R28, R50)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R3, R47)
	Resistor—Fixed, composition, 2.7 megohm, ±10%, ½ watt (R33)
	Resistor—Fixed, composition, 3.3 megohm, ±20%, ½ watt (R52)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohm, ±20%, ½ watt (R15, R41)
	Resistor—Fixed, composition, 22 megohm, ±20%, ½ watt (R16)
73605	Shaft—Tuning knob shaft
31364	Socket—Dial or jewel lamp socket
73606	Socket—Tube socket, 7 prong, miniature, for tubes V1, V2 and V3
35787	Socket—Phono input socket
72516	Socket—Tube socket, 7 prong, miniature, for tubes V4, V5 and V7
73117	Socket—Tube socket, 7 pin, miniature, for tubes V10 and V11
31251	Socket—Tube socket, octal, for tubes V6, V8 and V9
74305	Spring—Drive cord spring
73603	Support—Dial plate mounting support complete with pulley — R. H.
73604	Support—Dial plate mounting support complete with pulley — L. H.
74202	Support—Polystyrene support for FM oscillator coil complete with mounting bracket
73608	Switch—Selector switch for Chassis No. RC-616 (without "AUX" position) (S1, S2)
74163	Switch—Selector switch for Chassis No. RC-616F (with "AUX" position) (S1, S2)
73601	Transformer—Power transformer, 115 volts, 60 cycle (T1)
73745	Transformer—First I. F. transformer—dual (T2)
74019	Transformer—Second I. F. transformer—dual (T3)
73743	Transformer—Ratio detector transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92569-5W RL 103B5
13867	Cap—Dust cap
73934	Cone—Cone and voice coil assembly
31826	Plug—4 prong male plug for speaker
73635	Speaker—12" PM speaker complete with cone and voice coil—less output transformer and plug
71145	Suspension—Metal cone suspension
73636	Transformer—Output transformer (T5)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71864	Antenna—FM antenna
73880	Back—Cabinet back—burgundy—for mahogany or walnut instruments
73881	Back—Cabinet back—tan—for blonde instruments
71599	Bracket—Jewel lamp bracket
73626	Bumper—Rubber bumper for carriage actuating link
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Jewel lamp cap
73613	Carriage—Record changer mounting carriage complete with runners
71892	Catch—Bullet catch and strike for speaker compartment or record storage compartment door
73623	Check—Radio compartment door check
X1898	Cloth—Grille cloth for blonde instruments
X1897	Cloth—Grille cloth for mahogany or walnut instruments
73764	Decal—Control panel decal for walnut or mahogany finish instruments (1st prod. — without "AUX" position)
73765	Decal—Control panel decal for blonde instruments (1st prod.—without "AUX" position)
74164	Decal—Control panel decal for walnut or mahogany finish instruments (2nd prod. — with "AUX" position)
74354	Decal—Control panel decal for blonde instruments (2nd prod.—with "AUX" position)
71984	Decal—Trade mark decal (RCA-Victor)
71966	Decal—Trade mark decal (Victrola)
73628	Dial—Glass dial scale
73627	Escutcheon—Dial scale escutcheon
11889	Grommet—Rubber grommet for front apron of chassis
73614	Grommet—Rubber grommet to mount record changer (3 required)
37396	Grommet—Rubber grommet to mount speaker (3 required)
73735	Hinge—Hinge for phono compartment or radio compartment door (2 required for each door)
36817	Hinge—Record storage compartment door hinge (1 set)
36610	Hinge—Speaker compartment door hinge (1 set)
71822	Knob—Tone control or range switch knob—maroon—for mahogany or walnut instruments
72824	Knob—Tone control or range switch knob—brown—for blonde instruments
71821	Knob—Tuning or volume control knob—maroon—for mahogany or walnut instruments
72800	Knob—Tuning or volume control knob—brown—for blonde instruments
11765	Lamp—Dial or jewel lamp—Mazda 51
73616	Link—Actuating link assembly for record changer carriage—R. H.
73617	Link—Actuating link assembly for record changer carriage—L. H.
73611	Loop—Antenna loop complete
73869	Nut—Speed nut for "MM" plate
73109	Nut—Tee nut to mount record changer (3 required)
73868	Plate—"Magic Monitor" nameplate
71819	Plate—Radio compartment door check mounting
30868	Plug—2 contact female plug for record changer power cable
31048	Plug—Pin plug for shielded pickup cable
72937	Pull—Phono compartment or radio compartment door pull (2 required for each door)
73909	Pull—Speaker compartment or record storage compartment door pull
73615	Screw—¼-20 x 1½" fillister head machine screw to mount record changer (3 required)
73618	Spring—Connecting spring between actuating link and record changer carriage
71818	Spring—Radio compartment door check spring
30900	Spring—Retaining spring for knobs
73185	Stop—Carriage mechanism stop (2 required)
70164	Stop—Stop for phono compartment, speaker compartment or record storage compartment door
73612	Track—Carriage mechanism track complete with mounting plate (2 required)

†Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

RCA VICTOR

AM-FM Radio Phonograph Combination

Model 8V151

RK-121C RF-IF Chassis
RS-123D Power Supply & AF Chassis
Mfr. No. 274

SERVICE DATA

—1948 No. 9—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

PH303

Specifications

Tuning Ranges

Broadcast	540-1600 kc
Shortwave "C" Band	9.2-16.0 mc
Frequency Modulation	88-108 mc

Intermediate Frequency AM .....455 kc

Intermediate Frequency FM .....10.7 mc

Tube Complement of RK-121C

1.	RCA-6BA6	RF Amplifier
2.	RCA-6BA6	Mixer
3.	RCA-6BE6	Oscillator
4.	RCA-6BA6	1st IF
5.	RCA-6AU6	2nd IF and Phono. Amp.
6.	RCA-6AU6	Driver
7.	RCA-6AL5	Ratio Detector
8.	RCA-6AT6	AM-DET-AVC-AF
9.	RCA-6BA6	M. M. Band-Pass Amp.
10.	RCA-6BF6	M. M. Amp. and Rect.
11.	RCA-6BA6	M. M. Reactor

Tube Complement of RS-123D

1.	RCA-5U4G	Rectifier
2.	RCA-6SN7GT	Amp. and Phase Inverter
3.	RCA-6F6G	Output
4.	RCA-6F6G	Output

Record Changer (RP-177B)

Turntable Speed	78 r.p.m.
Record Capacity	Ten 12" or twelve 10" records

Undistorted Power Output .....10 watts

Maximum Power Output .....14 watts

Loudspeaker (92567-2)

Type	12 inch Electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles

Dial Lamps (6) .....Type No. 51, 6-8 volts, 0.2 amp.

Victrola Indicator Lamp.Type No. 44, 6-8 volts, 0.25 amp.

Jewel Lamp .....Type No. 51, 6-8 volts, 0.2 amp.

Cabinet Dimensions
Height.....36 7/16" Width.....40 1/8" Depth.....17 15/16"

Tuning Drive Ratio .....18.4:1 (4.6 turns of knob)

Power Supply Rating .....115 volts, 60 cycles, 180 watts

FOR RECORD CHANGER INFORMATION REFER TO SERVICE DATA FOR MODEL RP-177B

Circuit Description

Built-in antennas are provided for Standard Broadcast ("A" Band), Short Wave ("C" Band) and Frequency Modulation ("FM"); connected through the range switch to the R.F. amplifier tube (V1). The output of the R.F. amplifier and the oscillator (V3) is fed into the grid of the mixer tube (V2). The intermediate frequency output of the mixer is coupled through transformers T1 (10.7 mc.) and T2 (455 kc.) (series connected) to the 1st I.F. amplifier tube. The output of the I.F. amplifier is coupled through trans. T3 (10.7 mc.) and T4 (455 kc.) whose secondaries are connected to the grid of V5 (2nd I.F.) and the detector diode of V8 (AM Det.) respectively. The 10.7 mc. output of V5 is coupled through trans. T5 to the grid of the driver tube (V6) whose output is coupled through the driver trans. (T6) and the ratio detector trans. to the ratio detector tube (V7).

Simple A.V.C. is used on "A" and "C" bands, delayed A.V.C. is used on FM.

The audio voltages developed in the detector circuits of V7 (FM) and V8 (AM) are coupled through the range switch and volume control to V8 (AF amp.)

When the range switch is turned to PHONO position the input from the PHONO input jack is fed into the grid of V5 (this tube serves as 2nd I.F. on FM); the output of V5 (as phono. amp) is the screen grid (pin No. 6) and is coupled through the range switch and volume control to V8 (A.F. amp.) and also to the "Magic Monitor" which varies the audio output during phono operation. The audio output of V8 is coupled to the AMP output jack.

When the selector switch is turned to max. counterclockwise position this instrument may be used as an audio amplifier. The audio input for this purpose is connected to the AUX jack (middle) at the rear (or bottom) of the chassis. The input from this jack is coupled through the range switch and volume control to the grid of V8.

Note: Plate voltage supplied to V5 (2nd I.F.) on FM only. Plate and screen voltages supplied to V6 (driver) on FM only. Plate and screen voltages supplied to V3 (osc.) on FM, A and C bands only.

The circuit of the A.F. amplifier chassis is conventional consisting of a 6SN7GT which serves as audio amplifier and phase inverter feeding into two 6F6G tubes connected in push-pull. A 5U4G rectifier supplies B+ voltage for both chassis (RK-121C and RS-123D).
The operation of the "Magic Monitor" is described on page 9.

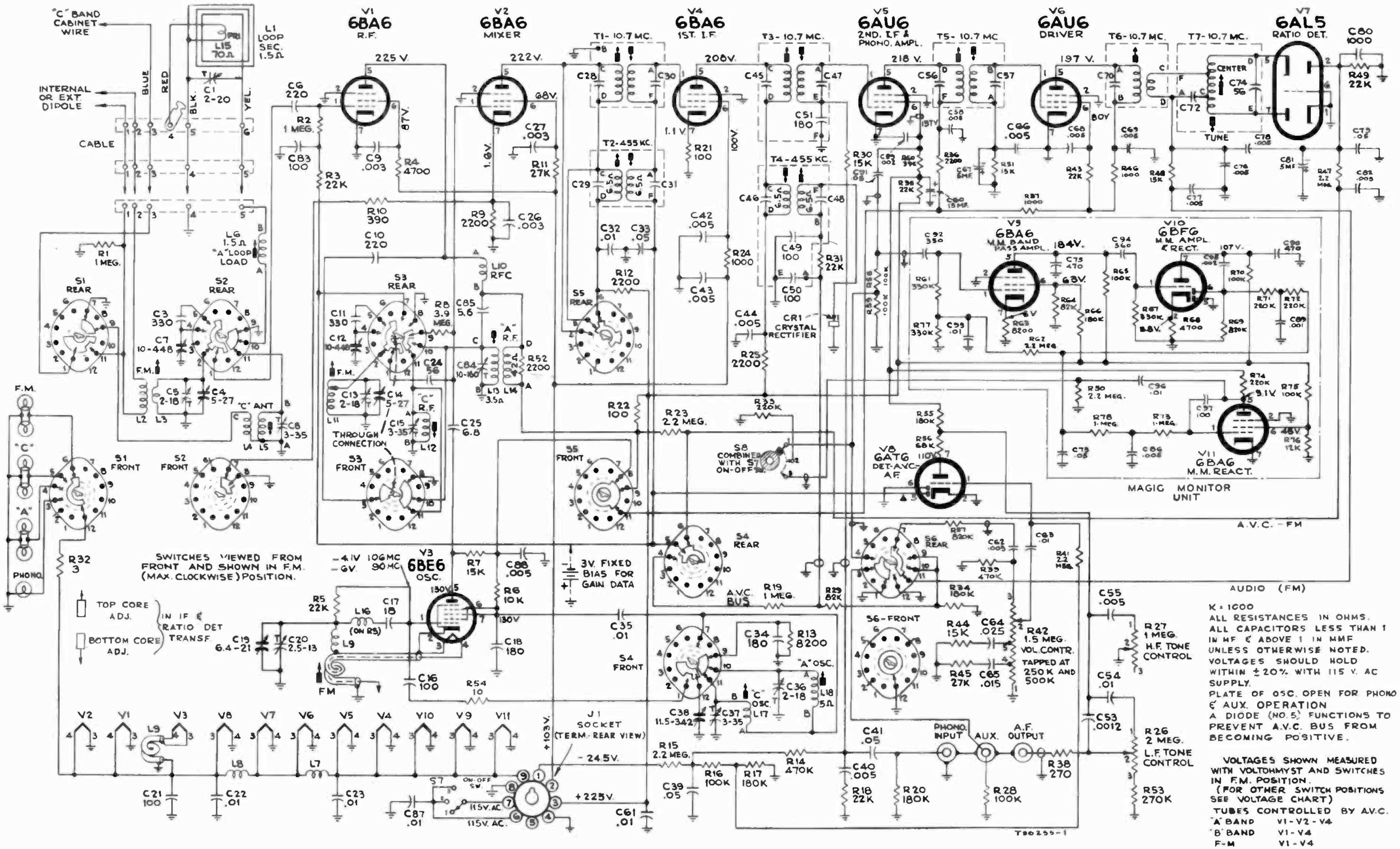


Fig. 1. Complete Schematic Diagram RK-121C — Range Switch shown in FM position. For Simplified Schematic Diagrams of Range Switch Positions see Figs. 7, 8, 9, 10 and 11.

Crystal rectifier used on late production only. Early production used a diode (pin #6) of V8 (6AT6) for AM detection

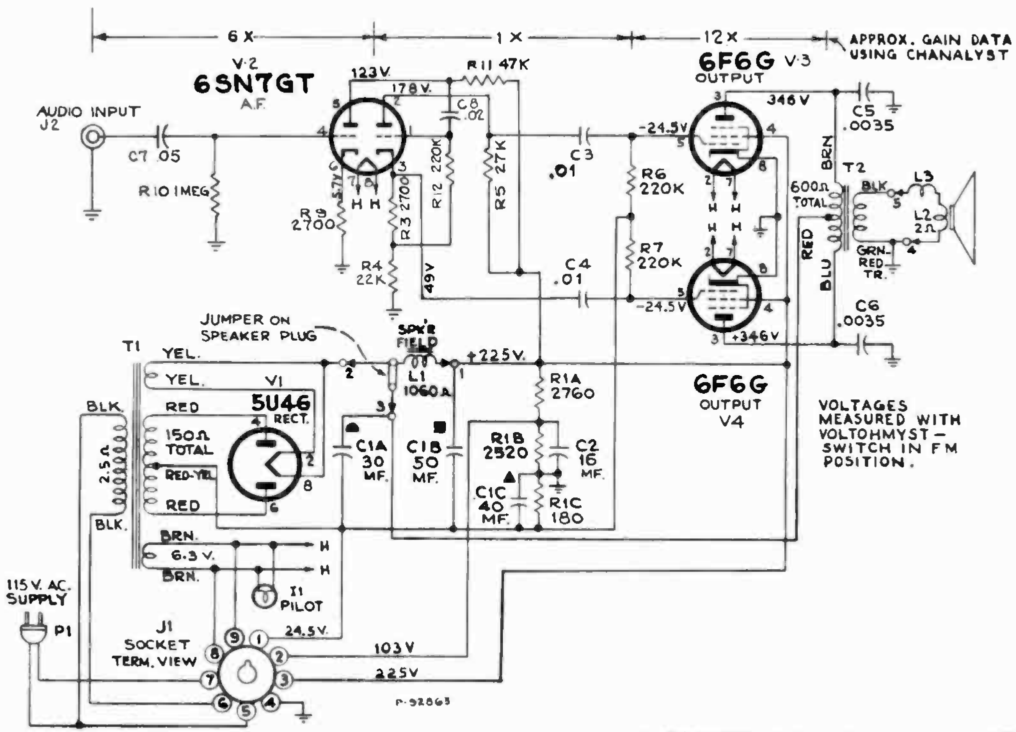


Fig. 2. Schematic Diagram RS-123D.

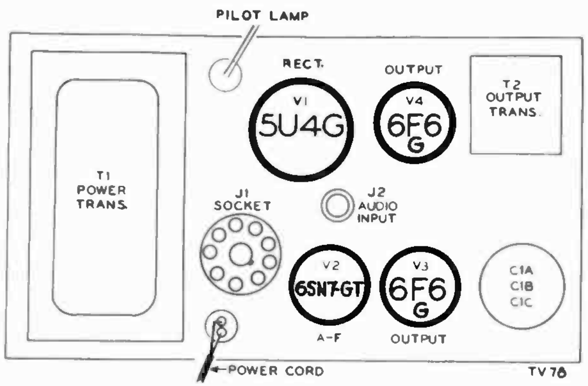


Fig. 3. Top View RS-123D.

AMPLIFIER (RS123D) VOLTAGE CHART

Tube	Type	Terminal	Aux or PH	BC or SW	FM
V1	5U4G Rect.	Fil. No. 8	360	355	350
V2	6SN7 A. F. & Ph. Inv.	Plate No. 2 Plate No. 5 Cathode No. 3 Cathode No. 6	201 142 56 6.4	190 134 53 6.1	178 123 49 5.7
V3	6F6G Output	Plate No. 3 Screen No. 4 Grid No. 5	353 268 −24	351 245 −24.1	346 225 −24.5
V4	6F6G Output	Same as V3			

AMPLIFIER CATHODE CURRENTS (MA)

V1	5U4G	†	133	137	141
V2	6SN7	No. 3	2.1	2.0	1.9
		No. 6	2.3	2.2	2.0
V3	6F6G	No. 8	23	19	13.5
V4	6F6G	No. 8	23	19	13.5

†Measured at No. 2 terminal of speaker plug.

RADIO CHASSIS (RK-121C) VOLTAGE CHART

Tube	Type	Terminal	Aux or PH	BC	SW	FM
V1	6BA6 R.F.	Plate No. 5 Screen No. 6	260 100	247 96	245 94	225 87
V2	6BA6 Mixer	Plate No. 5 Screen No. 6 Cathode No. 7	260 96 6.1	245 87 7	240 71 1.9	222 68 1.6
V3	6BE6 Osc.	Plate No. 5 Screen Nos. 6 & 7 *Grid No. 1 †Grid No. 1	.. ..	160 160 −28 −18	157 157 −11 −10.5	130 130 −4.1 −6
V4	6BA6 1st I.F.	Plate No. 5 Screen No. 6 Cathode No. 7	240 118 1.2	232 110 1.2	225 108 1.2	208 100 1.1
V5	6AU6 2nd I.F.	Plate No. 5 Screen No. 6	.. 115	.. 112	.. 112	218 137
V6	6AU6 Driver	Plate No. 5 Screen No. 6	.. ..	.. ..	.. ..	197 80
V7	6AL5 R. Det.	......	..	..	..	..
V8	6AT6 Det.-AF.	Plate No. 7	110	108	108	110
V9	6BA6 M.M. Amp.	Plate No. 5 Screen No. 6 Cathode No. 7	210 70 7	200 68 6.6	200 68 6.6	184 63 6
V10	6BF6 M.M. Amp.&Rect.	Plate No. 7 Cathode No. 2	121 6.6	117 6.4	117 6.4	107 5.8
V11	6BA6 Reactor	Plate No. 5 Screen No. 6	2.6 36	2.6 35	2.6 35	3.1 45

*Tuning condenser at high frequency end.
†Tuning condenser at low frequency end.

RADIO CHASSIS CATHODE CURRENTS (MA)

V1	6BA6	No. 7	16.9	16.5	16.5	14
V2	6BA6	No. 7	3.1	3.2	3.8	4.9
V3	6BE6	No. 2	0	14.1	14.1	15.8
V4	6BA6	No. 7	14	13.8	13.8	13.2
V5	6AU6	No. 7	1.8	1.8	1.8	3.9
V6	6AU6	No. 7	0	0	0	18.3
V7	6AL5	....	0	0	0	0
V8	6AT6	No. 2	.25	.25	.25	.25
V9	6BA6	No. 7	.9	.9	.9	.88
V10	6BF6	No. 2	1.3	1.3	1.3	1.2
V11	6BA6	No. 7	1.36	1.35	1.35	1.3

Voltages measured with Chanalyst or VoltOhmyst and should hold within ± 20% with rated power supply. No signal. Tuning condenser closed except as stated.

ALIGNMENT PROCEDURE

Before aligning set, completely mesh the gang and set the dial pointer on the mechanical maximum calibration point at the extreme left hand end of the dial.

When making a complete alignment follow in proper sequence the tabulated form below.

If only a portion of the circuit is to be aligned select the portion required, followed by the remaining steps in the chart. Any adjustments made on the FM 10.7 mc. IF's make it necessary to realign the AM 455 kc. IF's.

For "A" and "C" band alignment use output meter across voice coil keeping Test Oscillator output as low as possible to prevent AVC action.

CRITICAL LEAD DRESS

(Make lead dress before alignment)

1. Lead from pin 5, tube V2, to terminal "C" on transformer T1 should be dressed close to chassis.
2. Leads to terminals "C" and "D" on transformer T2 should be dressed close together.
3. The following capacitors must be dressed close to the chassis with leads kept as short as possible: C32, C33, C66, C69, C79, and C80.
4. All FM coil connections must be soldered in exact place as the original. (One-sixteenth inch difference in length may be excessive).
5. Lead from pin 7, tube V8, must be dressed away from lead to terminal "D" of transformer T7.
6. ALL wiring in the receiver is critical as to length and placement. It is therefore important when servicing, that extreme care should be taken so as not to disturb more of the wiring than absolutely necessary.

Note: Keep tuning capacitor rotor grounding brushes clean and making good contact.

FM RATIO DETECTOR ALIGNMENT

SET RANGE SWITCH TO FM POSITION

Steps	Connect High Side of Test Osc. To—	Tune the Osc. To—	Turn Vol. Cont. To—	Adjust
1.	Connect a 680 ohm Resistor between lugs D and E of the ratio detector transformer T7. Connect DC probe of a voltohmyst to the negative lead of the 5 mfd. Electrolytic capacitor C81. The common lead of the meter to chassis.			
2.	Driver grid pin 1, of 6AU6 (V6) in series with a .01 MFD capacitor.	10.7 MC 30% Mod. 400 Cycles AM	Maximum Volume	Driver transformer T6 for maximum DC voltage across C-81
3.	Remove Meter Leads and disconnect the 680 ohm resistor from D and E on T7. Connect two 68,000 ohm resistors (within 1% of each other) in series, across C81. Connect the common lead of the Voltohmyst to the center point of the 68,000 ohm resistors and the DC probe to contact No. 7 on rear of Switch wafer S6. Use the 30 volt scale.			
4.	Same as Step 2	Same as Step 2	Volume Control Maximum	†T7 Bottom core for Zero DC Balance on Voltohmyst ††T7 top core for minimum audio output. (Output meter across voice coil)
5.	Reconnect voltohmyst as in step 1, omitting the 680 ohm resistor.			
6.	Repeat step 2 omitting 680 ohms.			
7.	Remove all connections.			

†Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

††The zero DC balance and the minimum AF output should occur at the same point: if such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the voltohmyst, and an output meter connected across the voice coil for the point at which both zero DC and minimum output occurs.

Note:—Two or more points may be found which will satisfy the condition required in step 4. T7 top core should be correctly adjusted when approximately ⅛ inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum AF and minimum DC is reached.

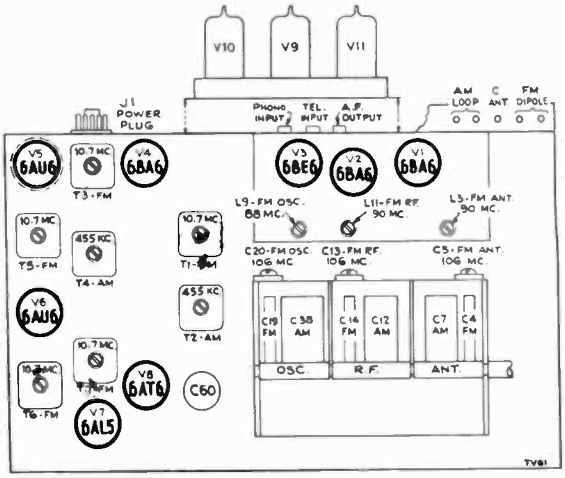


Fig. 4. Tube and Trimmer Locations — Top View.

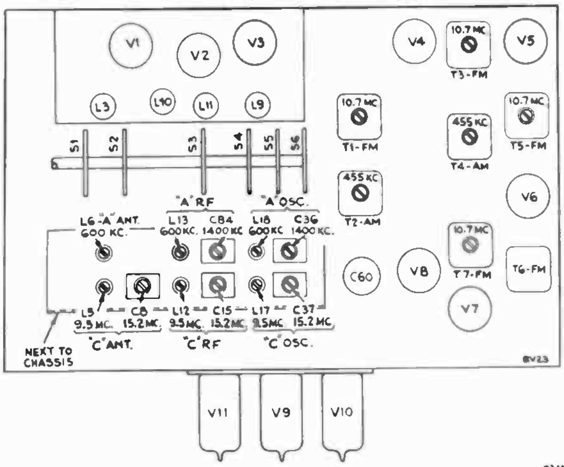


Fig. 5. Tube and Trimmer Locations — Bottom View.

ANT.—RF.—IF. ALIGNMENT

"FM" IF Alignment

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
1.	Connect the DC probe of a voltohmyst to the negative lead of the 5 MFD electrolytic capacitor C 81, and the common lead of the meter to chassis ground				
2.	Mixer grid pin #1 of 6BA6, (V2) in series with a .01 MFD capacitor (Adjust test osc. output for 6-10 volts developed across C81) (Range switch in FM position) (Use very short lead)	To RF Tube shelf ground near mixer tube (use very short leads)	10.7 MC 30% modulated at 400 cycles AM.	Max. cap. (Fully meshed)	*T5, T3, T1 top and bottom cores alternately loading primary & secondary of each transformer with 680 ohms while the opposite side of the same transformer is being adjusted. Adjust all transformers for maximum voltage across C81.

*This method is known as alternate loading which involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680 ohm resistor while the plate winding is being peaked.

When the windings are loaded, it is necessary to increase the 10.7 MC input since the gain will decrease and the voltage across C81 will be less.

ANT—RF—IF—ALIGNMENT (Continued)

"AM" IF Alignment

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
3.	Mixer grid pin #1 of (V2) in series with a .01 MFD Capacitor. (Turn band switch to "A" or "C" band)	To chassis ground	455KC	High Freq. end of Dial	**Top and bottom Cores of T2 and T4. (For maximum voltage across voice coil)

"C" Band OSC.—RF.—ANT. Alignment

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
4.	"C" Band Ant. Terminal #3 Through a dummy Ant. comprising a 150 ohm resistor in series with a 25 to 30 mmf capacitor	To Chassis ground	15.5 MC	15.5 MC	Osc.—C37*** RF.—C15 Ant.—C8 (For maximum voltage across voice coil)
5.			9.5 MC	9.5 MC	Osc.—L17*** RF—L12 Ant.—L5 (For maximum voltage across voice coil)
6.	Repeat steps 4 and 5 for accurate alignment				

"A" Band OSC.—RF.—ANT.

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
7.	High Side (Red Lead) of Loop Primary with link open through a Dummy Ant. comprising a 200 mmf. Capacitor	To Chassis ground	1400 KC	1400 KC	Osc.—C36 RF.—C84 Ant.—C1 (For maximum voltage across voice coil)
8.			600 KC	600 KC	Osc.—L18 RF—L13 Ant.—L6 (For maximum voltage across voice coil)
9.	Repeat steps 7 and 8 for Max. output.				

**It is necessary to alternately load the primary and secondary of each 455 KC I. F. transformer with 10,000 ohms while the opposite side of the same transformer is being adjusted.

***To guard against the possibility of alignment of L17 and C37 to image frequencies, tune the test oscillator to 15.5 MC and turn the radio dial to 15.5 MC. Then adjust the test oscillator to 16.41 MC (image frequency). By increasing the test oscillator output, a signal should be heard.

Tune the test oscillator to 9.5 MC and turn the radio dial to 9.5 MC, then adjust the test oscilliator to 10.41 MC (image frequency). By increasing the test oscillator output, a signal should be heard.

(If these image frequencies cannot be heard, the set is incorrectly aligned, therefore repeat steps 4 and 5)).

"FM" Band OSC.—RF.—ANT. Alignment

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. To—	Radio Dial Tuned to—	Adjust
10.	FM antenna terminal #1 in series with a 120 ohm resistor	To FM antenna terminal #2 in series with a 120 ohm resistor	106 MC	106 MC	Osc.—C20 for maximum voltage across C81.
11.			88 MC	88 MC	**** Osc.—L9 for maximum voltage across C81.
12.	Repeat steps 10 and 11 for exact calibration.				
13.	Remove or turn test oscillator off.			106 MC No Carrier	***** RF, C13 for maximum voltage across C81 (Noise Voltage)
14.				90 MC No Carrier	**** RF, L11 for maximum voltage across C81. (Noise Voltage)
15.	Repeat steps 13 and 14 for maximum output.				
16.	Same as step 10	Same as step 10	106 MC	106 MC	Ant. C5 for maximum voltage across C81.
17.	Same as step 10	Same as step 10	90 MC	90 MC	Ant. L3 for maximum voltage across C81.
18.	Repeat steps 16 and 17 for maximum output.				
19.	Disconnect dummy antenna and adjust Ant. trimmer C1 on loop when set is installed in cabinet.				

****Two points may be found to fulfill the requirements. Use the one with the longest threaded end extending out of the transformer.

*****Two points can be found having the greatest noise voltage developed. Use the one with the greater capacity (tighter adjustment).

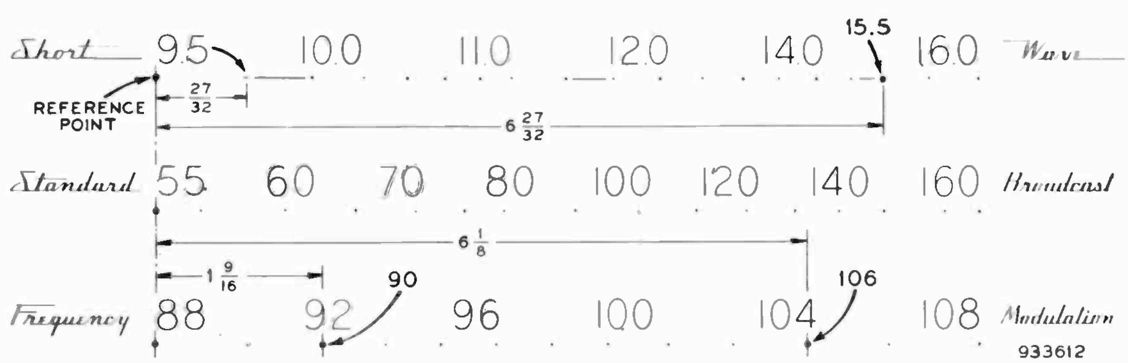


Fig. 6. Dial Scale Drawing.

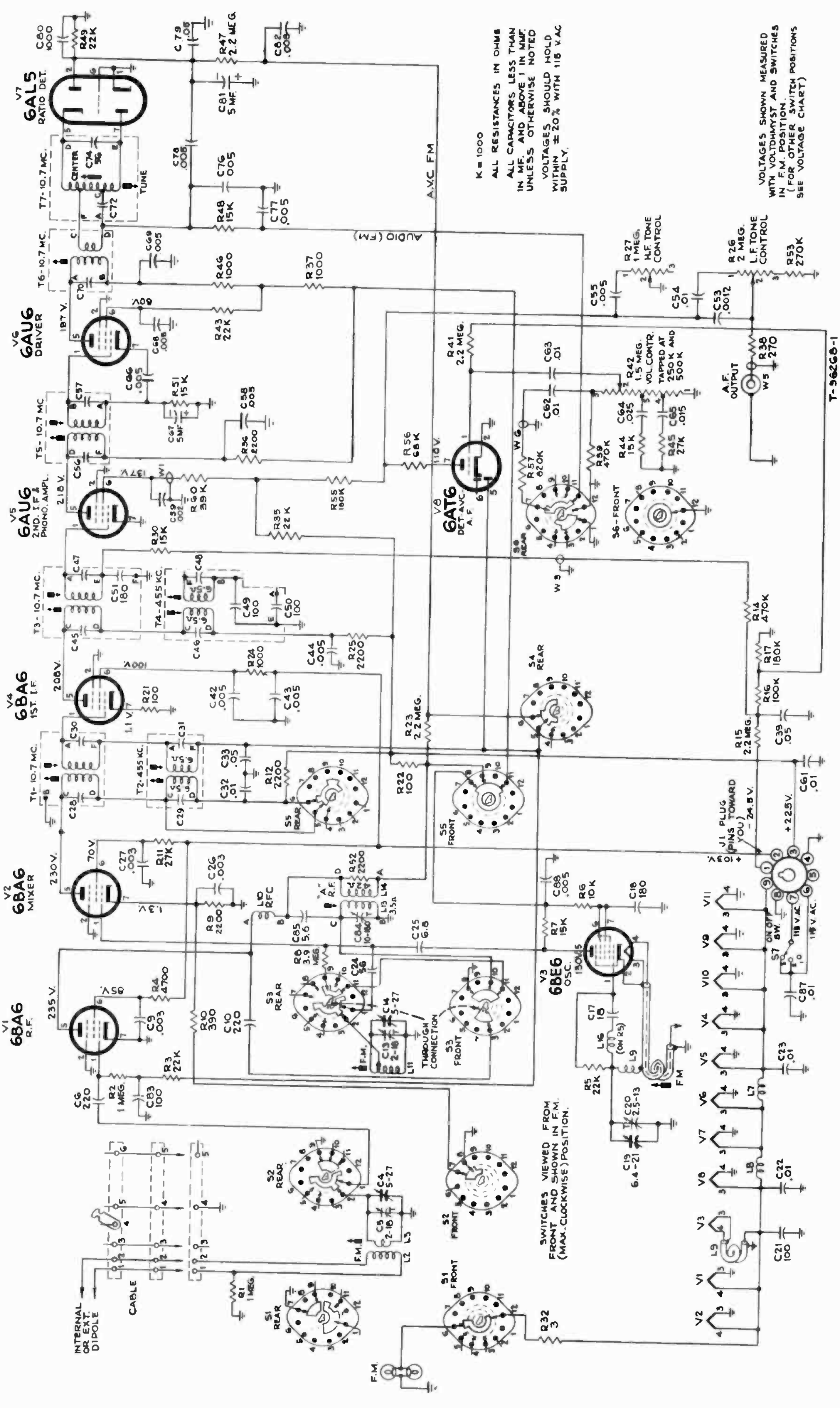


Fig. 7. Simplified Schematic Diagram — FM Position.

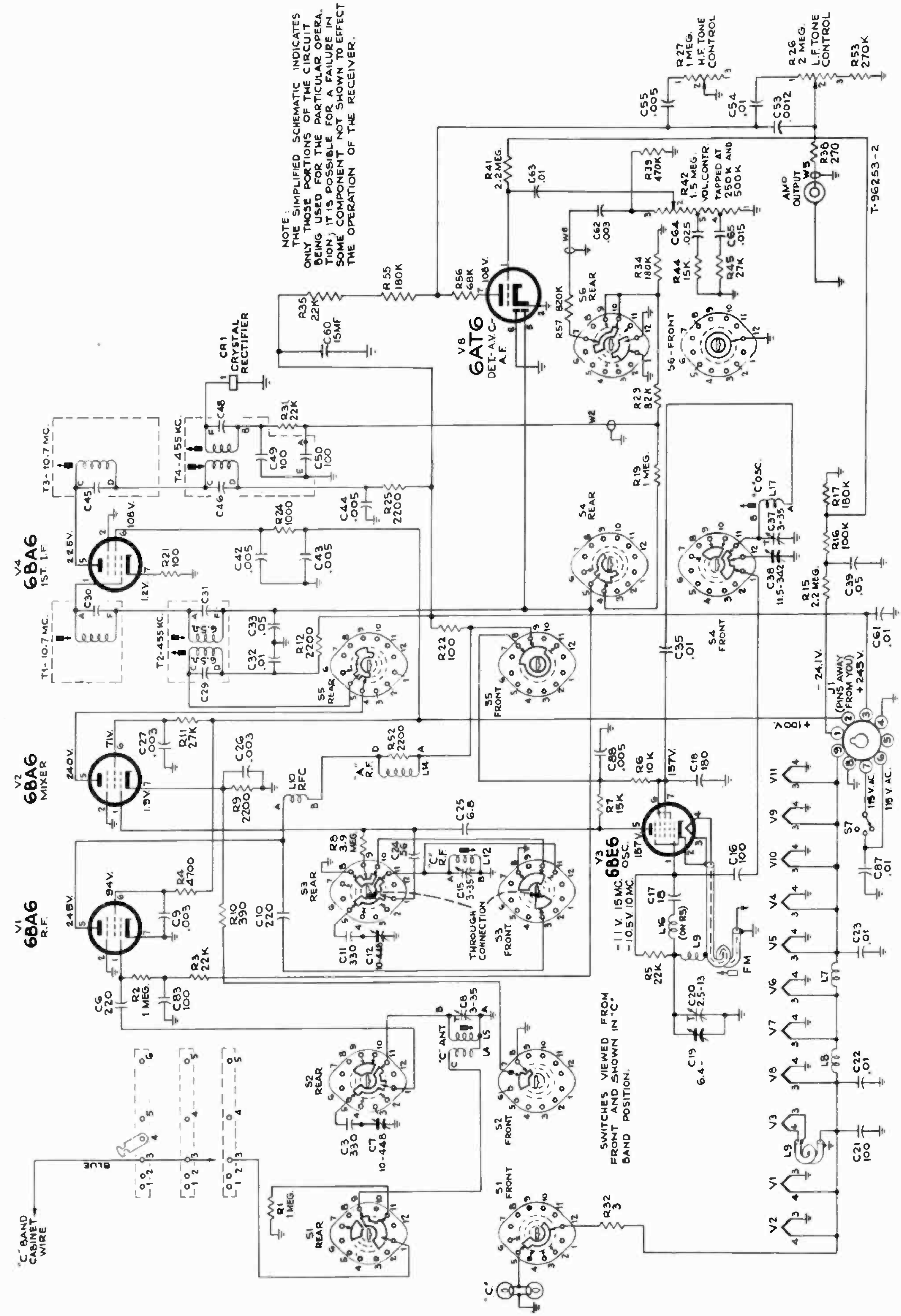


Fig. 8. Simplified Schematic Diagram — SW Position.

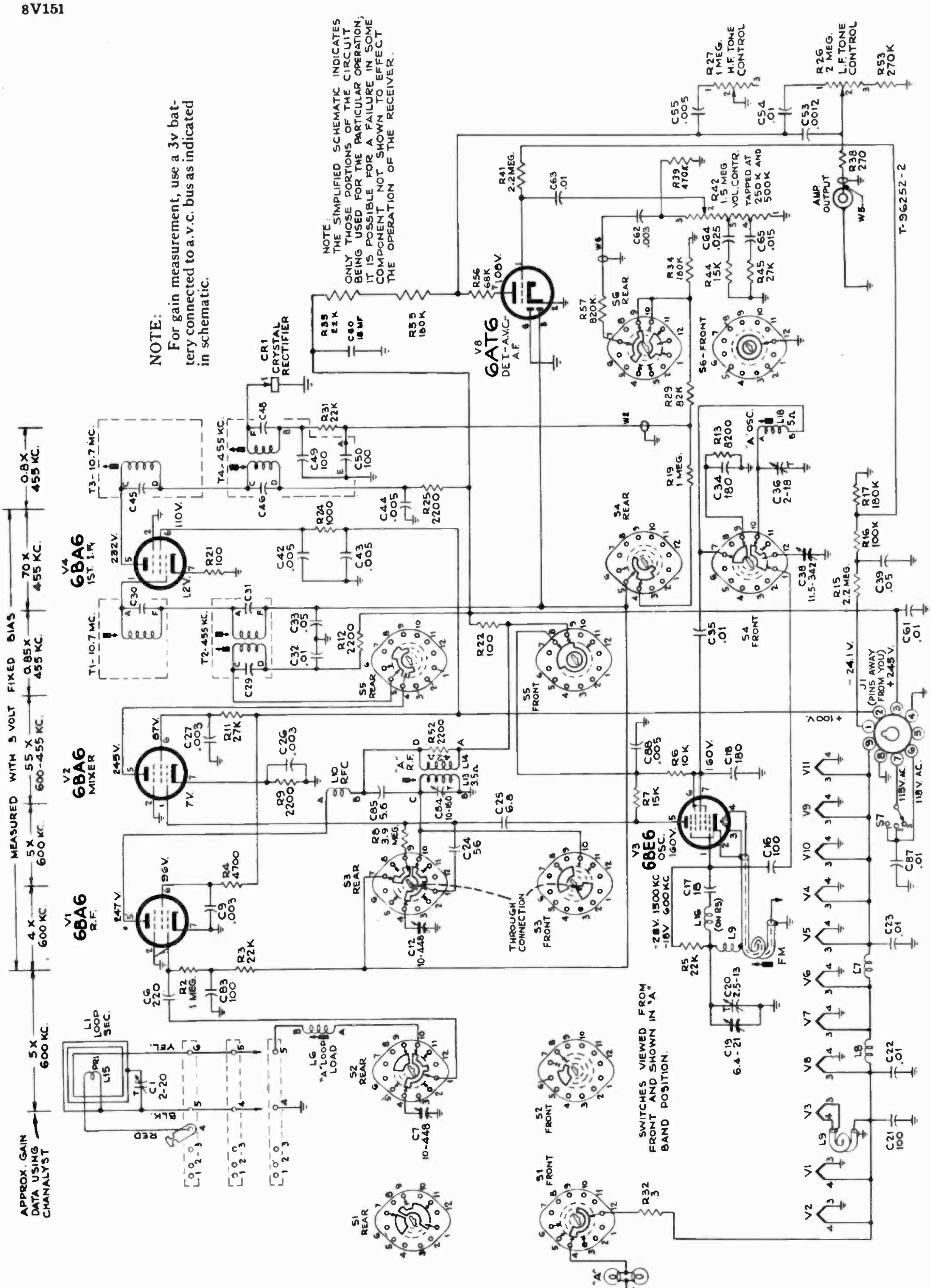


Fig. 9. Simplified Schematic Diagram—BC Position.

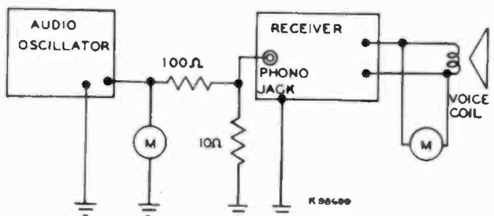
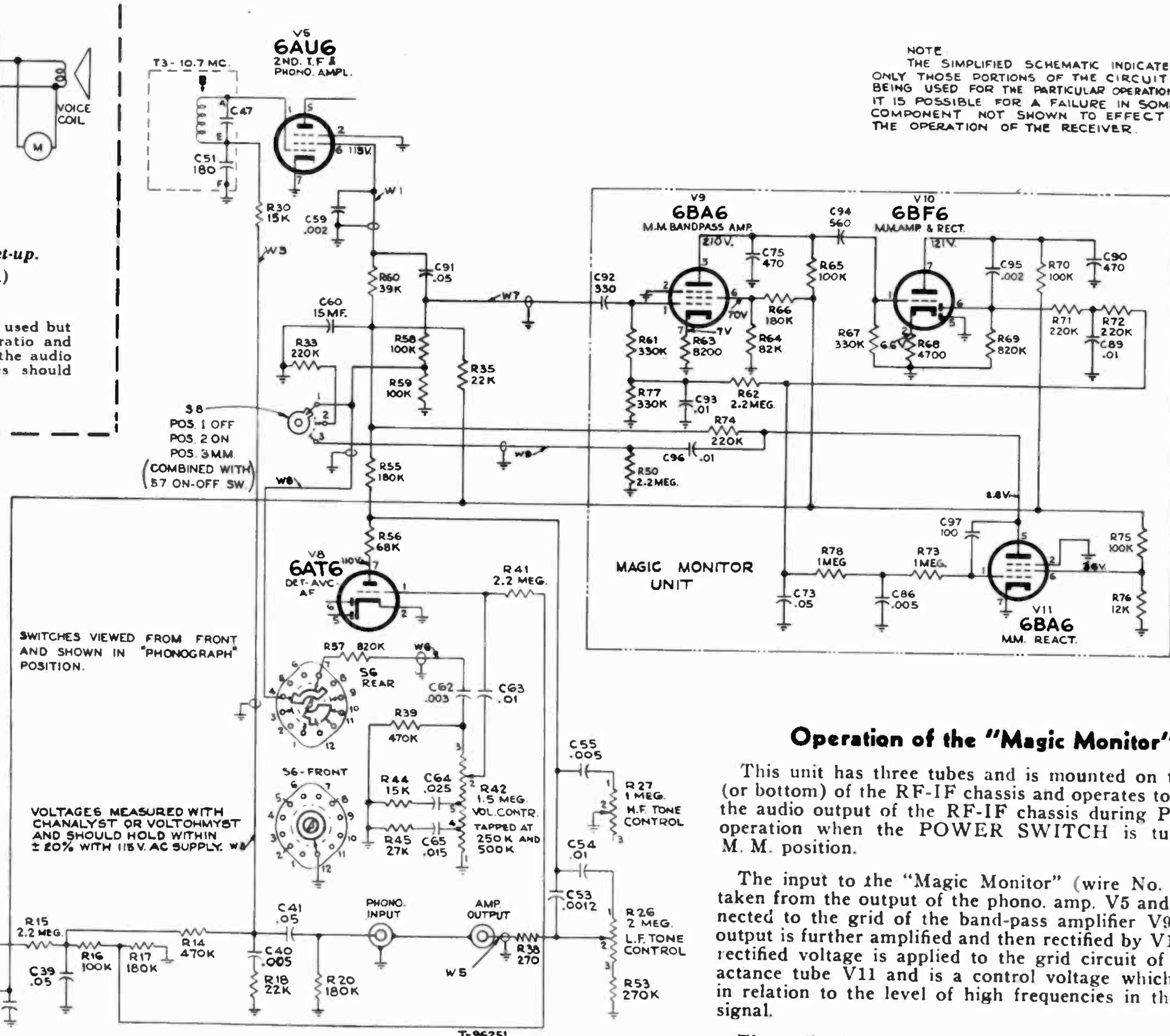


Fig. 10. Magic Monitor Test Set-up.
(See page 10 for procedure.)

Resistors of different values may be used but should be selected to give the same ratio and approximate the output impedance of the audio oscillator. The two resistors in series should not exceed 500 ohms.



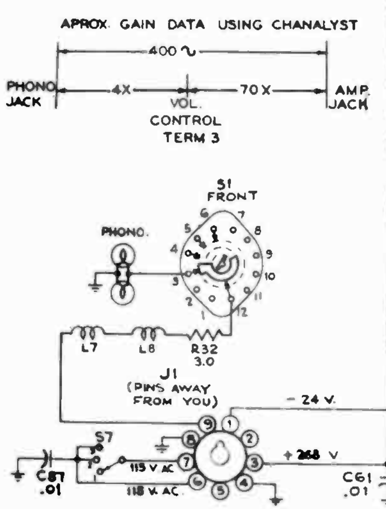


Fig. 11. Simplified Schematic Diagram — PH Position.

Operation of the "Magic Monitor"

This unit has three tubes and is mounted on the rear (or bottom) of the RF-IF chassis and operates to control the audio output of the RF-IF chassis during PHONO operation when the POWER SWITCH is turned to M. M. position.

The input to the "Magic Monitor" (wire No. W7) is taken from the output of the phono. amp. V5 and is connected to the grid of the band-pass amplifier V9 whose output is further amplified and then rectified by V10. This rectified voltage is applied to the grid circuit of the reactance tube V11 and is a control voltage which varies in relation to the level of high frequencies in the audio signal.

The audio signal input is also applied to the plate of the reactance tube V11 through C96 and wire No. W9.

When the control voltage on V11 is below a predetermined level the tube will act as a shunt capacity between the audio signal and chassis thereby attenuating the high frequency portion of the audio signal.

8V151

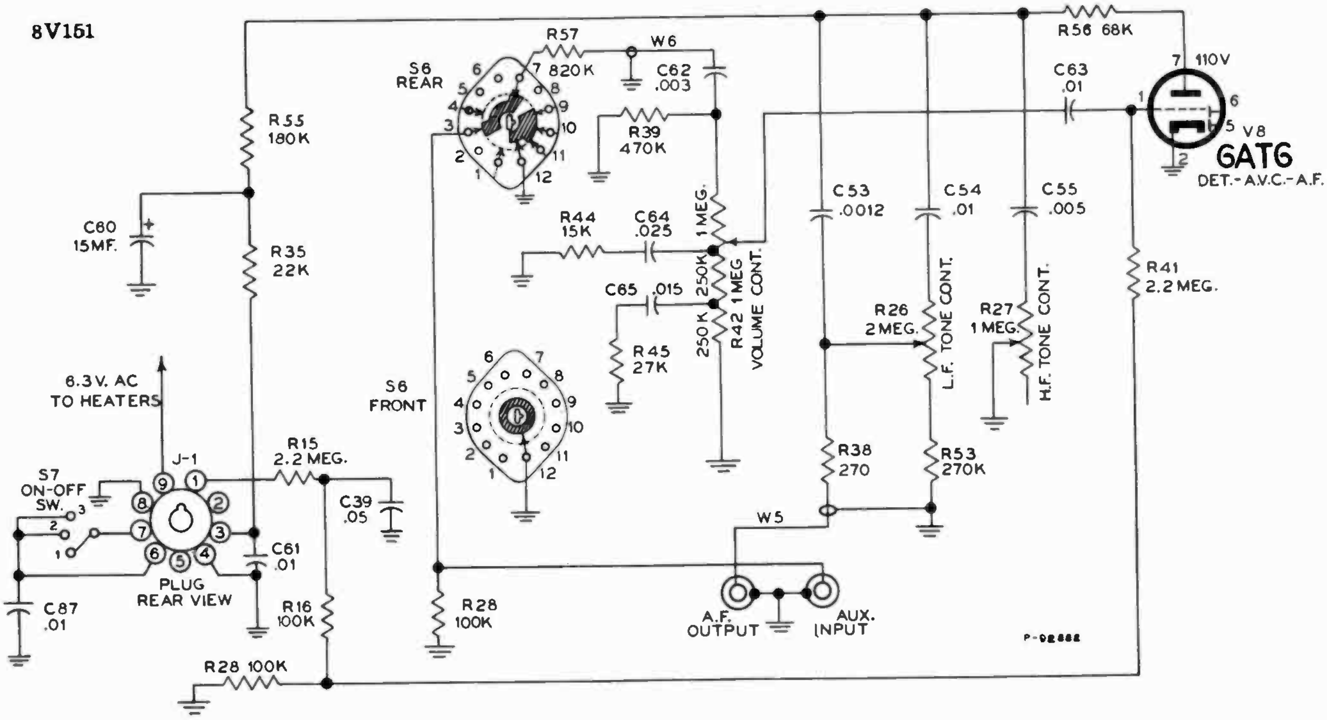


Fig. 12. Simplified Schematic Diagram — ● Position. (AUX.).

Testing the Magic Monitor:

Any serious defects in Magic Monitor operation will be made evident by the following tests. An audio oscillator and an a-c voltmeter flat to 3,000 cycles are needed for the tests.

Procedure:

1. Set up the equipment as shown in Fig. 10. Although two voltmeters are shown, one can be used in both positions.
2. Turn the receiver function switch to PHONO and turn S8 to ON position. Set the audio oscillator to 400 cycles and adjust its output to 0.2 volt (measured across the oscillator output terminals). Adjust the receiver volume control for a reading of 1 volt (measured at the voice coil). There should be little or no change in receiver output when S8 is turned to "M.M." position.
3. Repeat Step 2 except using oscillator output of 1 volt, 400 cycles. There should be little or no change in receiver output when S8 is turned to "M.M." position.
4. Repeat Step 2 except using oscillator output of 1 volt, 3,000 cycles. There should be little or no change in receiver output when S8 is turned to "M.M." position.
5. Repeat Step 2 except using oscillator output of 0.2 volt, 3,000 cycles. When S8 is turned to "M.M." position the output should decrease to approximately 1/5 of that obtained with S8 in ON position.

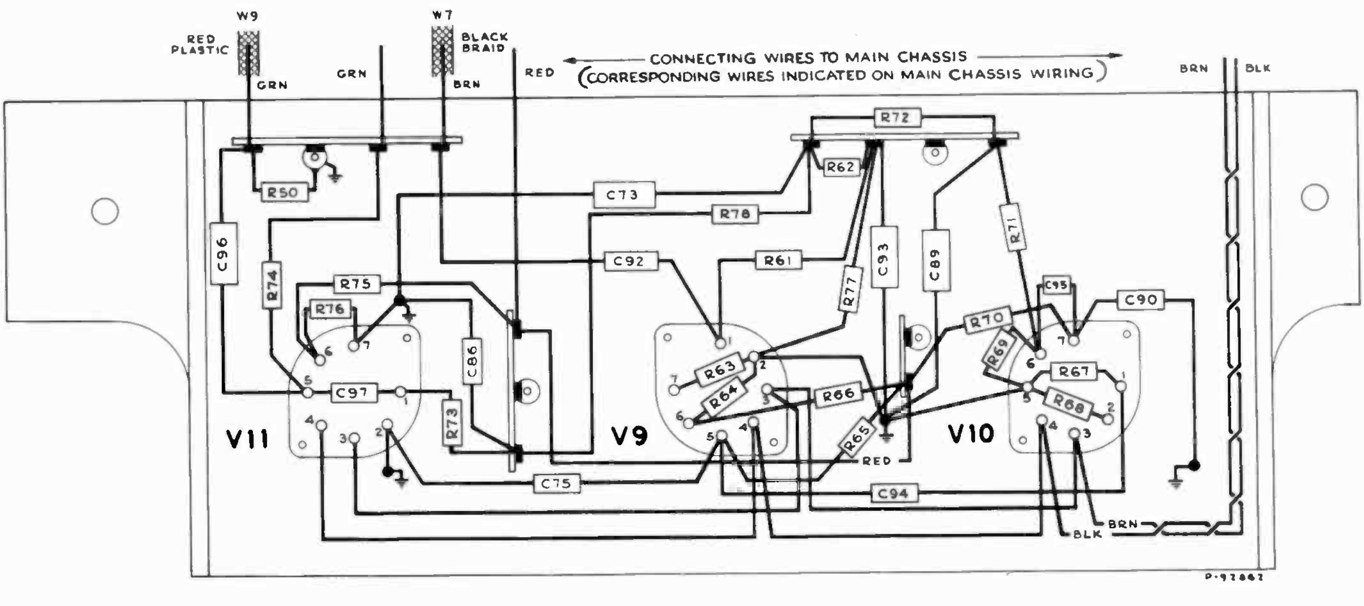


Fig. 13. Wiring Diagram — Magic Monitor Unit.

Crystal rectifier (CR1) used on late production only. On early production term. F of T4 was connected to pin #6 of V8.

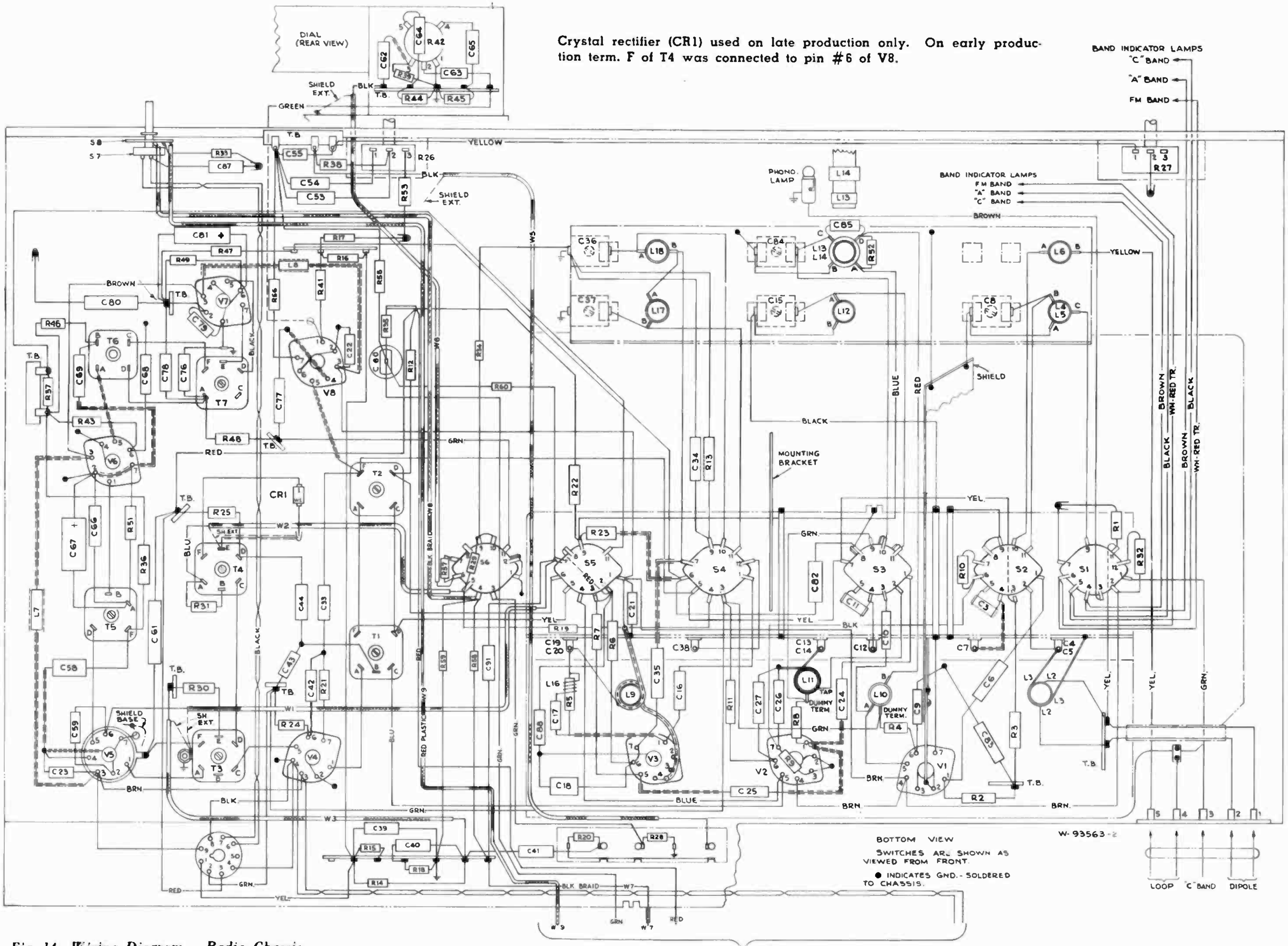


Fig. 14. Wiring Diagram — Radio Chassis.
(See Fig. 13 for Magic Monitor Wiring.)

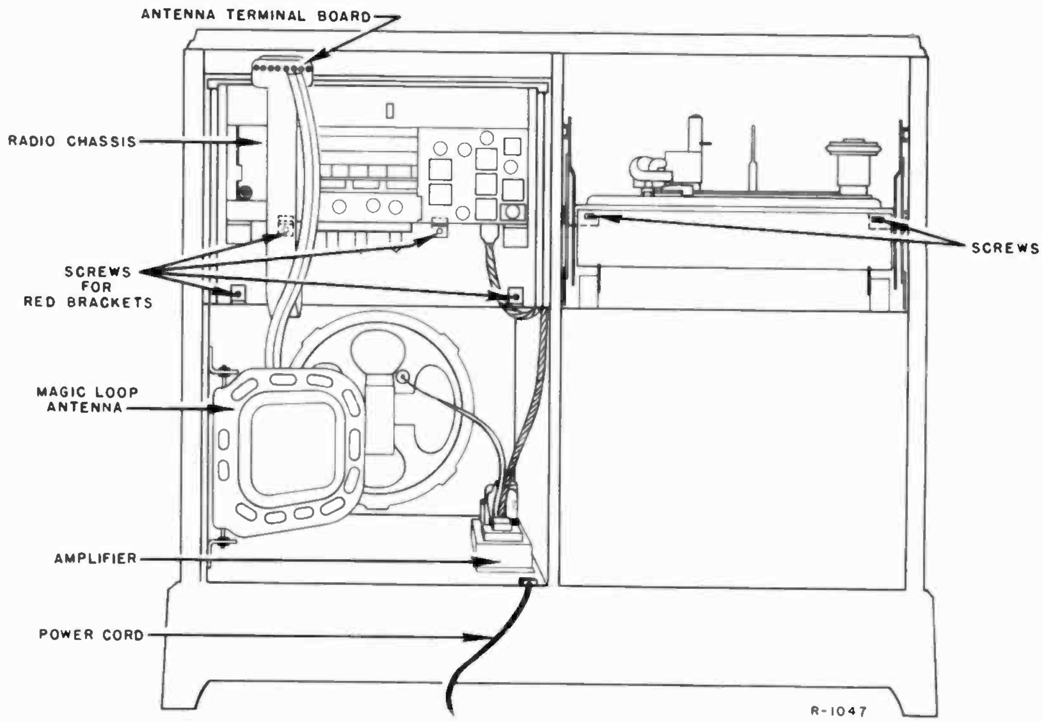


Fig. 15.
Back View.

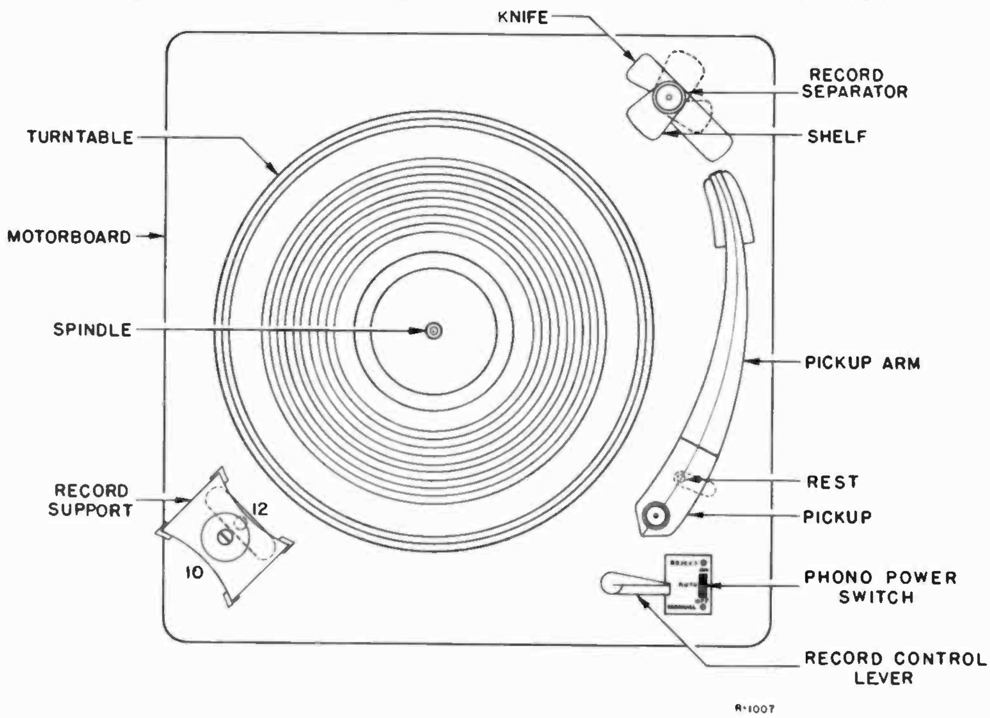


Fig. 16.
Record Changer—
Top View.

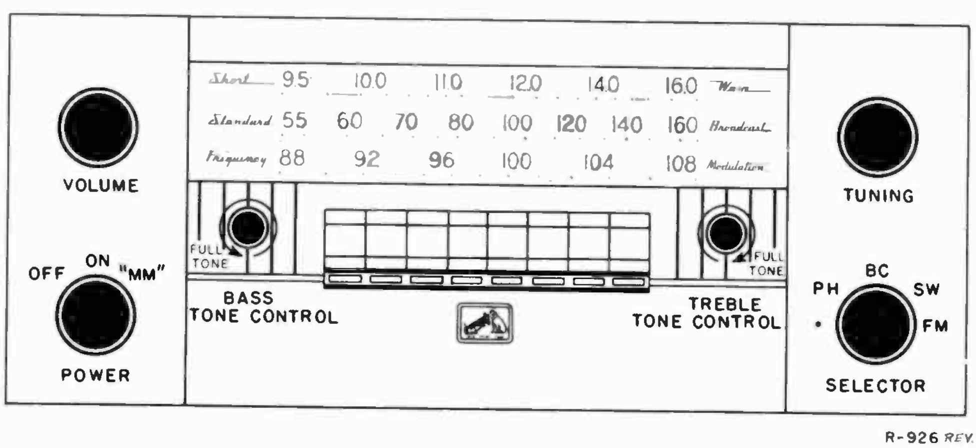


Fig. 17.
Control Panel.

Push-Button Adjustment

The push-buttons should be adjusted for eight favorite stations after the receiver is operating, and has had a 5 or 10 minute warm-up period.

Any standard broadcast or frequency modulation stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Remove the first PUSH-BUTTON (Just pull) and note the adjustment screw beneath.
2. Loosen the adjustment screw.
3. Manually tune very accurately for the desired station.
4. Push the PUSH-BUTTON rod in till it is against stop.
5. Tighten adjustment screw.
6. Make adjustment for the other buttons, setting up and checking each for the chosen station in a similar manner.
7. Recheck all PUSH-BUTTONS and reset if found necessary.

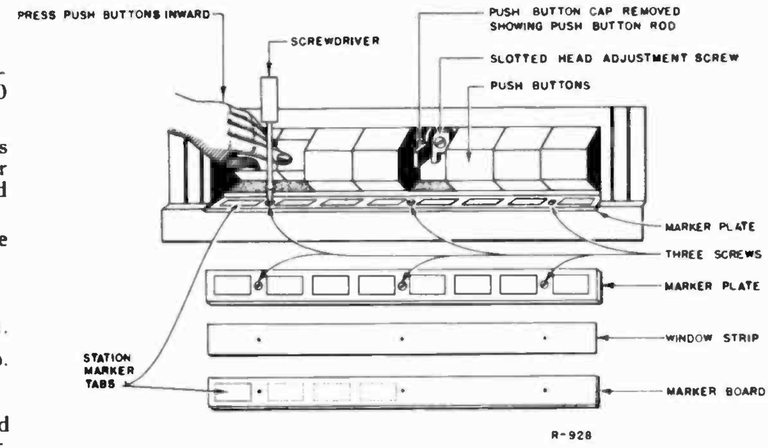


Fig. 19 Push-Button set-up

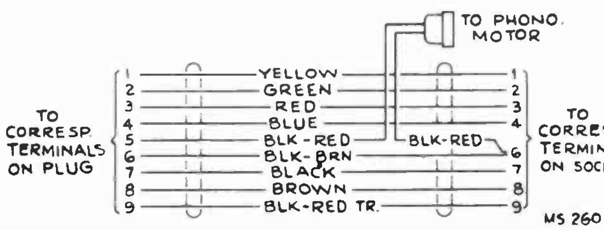


Fig. 18. Power Cable.
Some may not have the color code indicated.

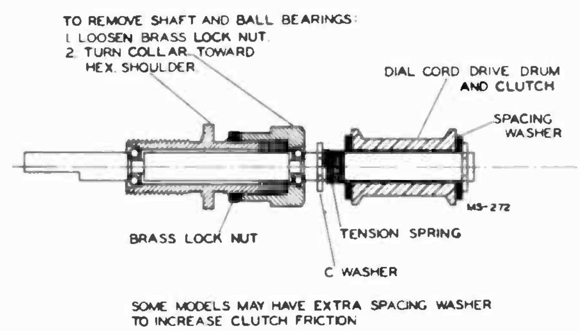


Fig. 20. Tuning Shaft and Clutch Assembly.

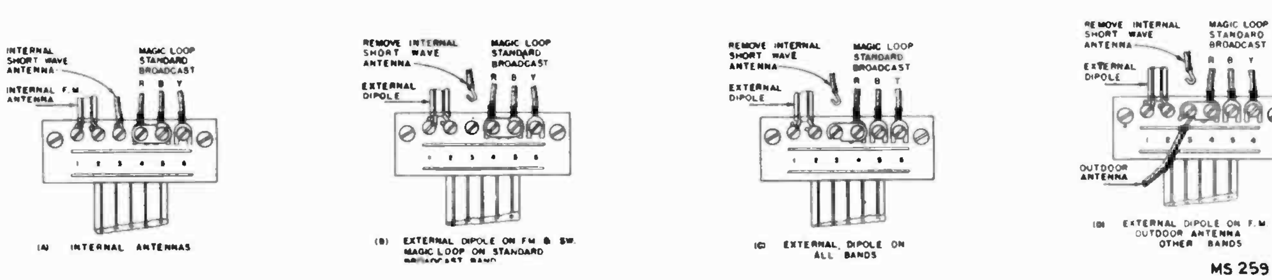


Fig. 21. Antenna Terminal Board Connections

EXTERNAL ANTENNAS—If reception is not satisfactory on one or more of the three bands, using the built-in cabinet antennas, an external antenna may be used. The Magic Loop Antenna will usually provide sufficient pickup on the Standard Broadcast band, but if an external dipole is installed to improve reception on Frequency Modulation it may be used for Standard Broadcast and Short Wave as well. Connections are made to the antenna terminal board in the back of the cabinet. External antennas may be erected indoors or outdoors and should be oriented in direction for requirements of best reception. RCA Television Antenna, Stock No. 225 or 226, or the equivalent with 300-ohm transmission line is recommended for an external antenna.

Figure 21 (A) shows the *Antenna Terminal Board* with connections for *internal* cabinet *antennas*.

Figure 21 (B) shows connections for the RCA Television Antenna replacing those for the *internal FM antenna* on terminals 1 and 2, and the *internal SW antenna* disconnected at terminal 3. The external dipole antenna is now the antenna for FM and SW bands.

Figure 21 (C) shows the additional change for connecting the Standard Broadcast band to make use of the external RCA Television Antenna. The link across terminals 4 and 5 is changed to terminals 4 and 3. The external antenna is now effective on all bands. Tighten terminals and be sure that the red, black and yellow leads (R.B.Y.) to terminals 4, 5 and 6 are still in place and securely connected.

Figure 21 (D) shows connections for a separate outdoor antenna on SW and SB reception, and the external dipole on FM. This outdoor antenna should consist of a wire 30 to 60 feet or so in length mounted in a convenient location as high as possible. Connect lead-in from the antenna to terminal 3 on the antenna terminal board. This outdoor antenna is effective on SB and SW bands. If this connection makes the SB signal too strong, causing overload and distortion, replace the link across terminals 4 and 5 as in Figure 21 (A) and (B). This outdoor antenna is now effective on SW only

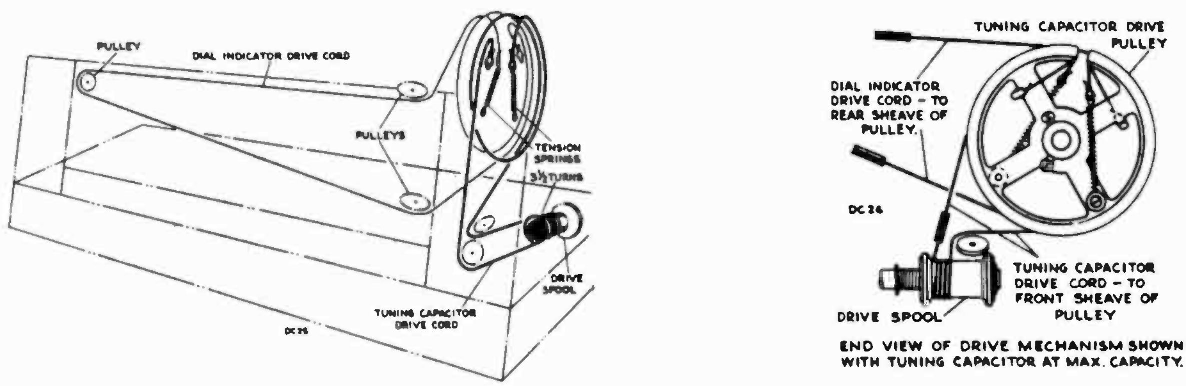


Fig. 22. Dial Cord Assembly.

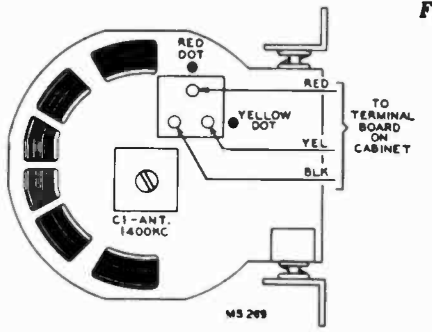


Fig. 23. Loop Antenna.

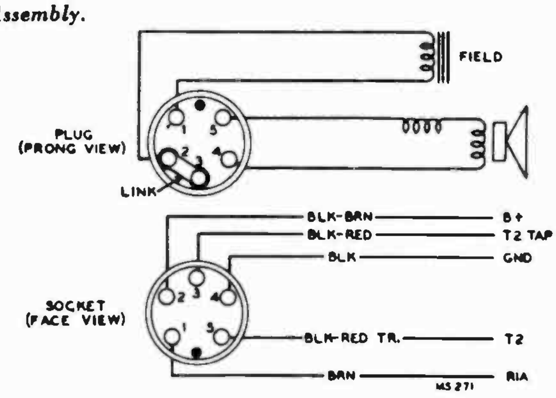


Fig. 24. Speaker Connections.

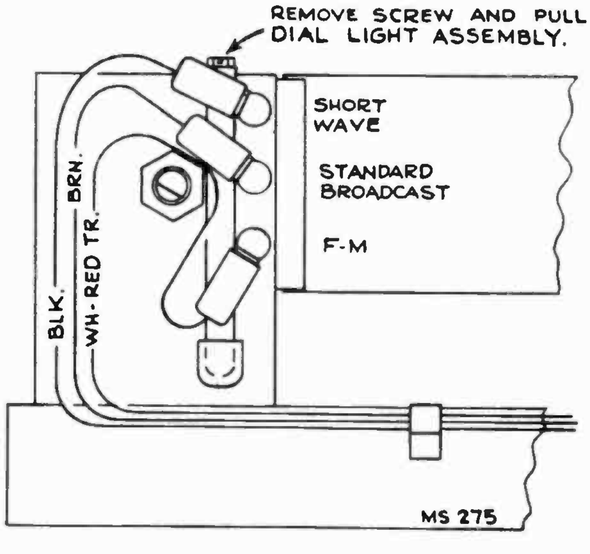


Fig. 25. Dial Lamp Assembly.

Chassis Removal:

As shipped from the factory the R-F/I-F chassis is clamped to the radio compartment door with a shipping bracket which is not visible from the back. The instructions (packed with each instrument) specify that it be removed at the time of unpacking.

Since this bracket is not visible, its removal has been generally overlooked. If it is not removed, the purpose of the rubber mounting for the chassis is defeated and causes microphonics.

To remove bracket:

(1) Remove the six knobs.

(2) Remove the four hex nuts (threaded bushings) which hold the escutcheon in place.

(3) Pull off the two push button knobs located above the phono indicator lamp.

(4) Remove phono indicator lamp.

(5) Remove the bracket which is now visible in the chassis opening for the phono indicator lamp.

(6) Replace the lamp, push buttons, escutcheon, nuts and knobs.

Removal of Dial Lamps

1. Remove the six control knobs.
2. Remove the four "T" bushings which hold the escutcheon to the control shafts—remove escutcheon.
3. Remove the screw which holds the dial light assembly to the chassis (accessible from back with radio compartment closed)—pull the assembly out of its retaining slot. (See Fig. 25.)

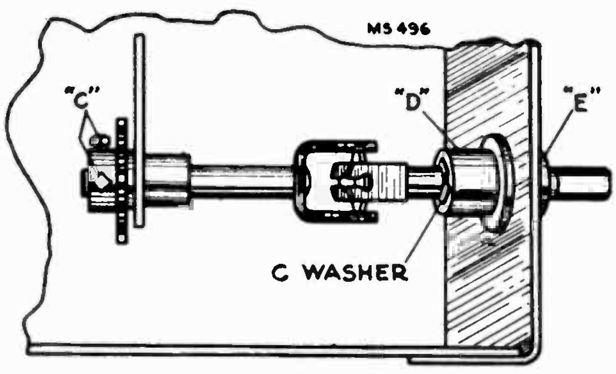


Fig. 26. Range Switch Coupling Shaft.

To Remove Shaft: Loosen square head set screws "C" in collar of gear. Remove nut "E" (on front apron of chassis) from bushing "D." Push shaft and bushing to the rear so that shaft and bushing are clear of the chassis apron. Flex the shaft and pull forward.

To Remove Bushing from Shaft: Remove "C" washer from shaft at inside end of bushing, push shaft through bushing to permit removal of "C" washer normally recessed inside bushing. Pull shaft through bushing to inside of chassis.

Replacement Parts

Stock No.	DESCRIPTION
	HEAD END UNIT RK 121C
71964	Arm—Push arm and cam for tuning capacitor
71651	Ball—Steel ball (3/32″ dia.) for manual tuning shaft
3658	Ball—Steel ball (3/32″ dia.) for tuning capacitor
10705	Ball—Steel ball (5/32″ dia.) for tuning capacitor
71638	Board—5 contact terminal board for antenna lead-in
71811	Bracket—Idler bracket less pulley
71642	Bracket—Dial plate support bracket R.H.
71643	Bracket—Dial plate support bracket L.H.
72986	Bushing—Threaded bushing for knob end of switch coupling shaft
71809	Capacitor—Adjustable, 1.6-18 mmf. (C36)
71804	Capacitor—Adjustable, 1.6-18 mmf. (C5, C13)
71803	Capacitor—Adjustable, 2.5-13 mmf. (C20)
71808	Capacitor—Adjustable, 3-35 mmf. (C37, C84)
71930	Capacitor—Ceramic, 5.6 mmf. (C85)
39043	Capacitor—Ceramic, 6.8 mmf. (C25)
71807	Capacitor—Adjustable, 10-160 mmf. (C8, C15)
71924	Capacitor—Ceramic, 56 mmf. (C24)
39396	Capacitor—Ceramic, 100 mmf. (C16, C21, C83, C97)
71922	Capacitor—Ceramic, 180 mmf. (C34)
71933	Capacitor—Mica, 180 mmf. (C18)
71920	Capacitor—Ceramic, 220 mmf. (C6, C10)
71919	Capacitor—Ceramic, 330 mmf. (C3, C11)
39640	Capacitor—Mica, 330 mmf. (C92)
39644	Capacitor—Mica, 470 mmf. (C75, C90)
39646	Capacitor—Mica, 560 mmf. (C94)
71929	Capacitor—Ceramic, 1000 mmf. (C80)
72117	Capacitor—Tubular, .0012 mfd., 400 v. (C53)
71927	Capacitor—Tubular, .002 mfd., 400 v. (C59, C95)
71921	Capacitor—Tubular, .003 mfd., 200 v. (C9, C26, C27, C62, C82)
71926	Capacitor—Tubular, .005 mfd., 200 v. (C40, C42, C43, C66, C76, C77, C78, C86)
72791	Capacitor—Tubular, .005 mfd., 400 v. (C44, C55, C58, C68, C69, C88, C91)
72120	Capacitor—Tubular, .015 mfd., 200 v. (C65)
70612	Capacitor—Tubular, .025 mfd., 200 v. (C64)
71923	Capacitor—Tubular, .01 mfd., 200 v. (C22, C23, C63, C93)
72827	Capacitor—Tubular, .01 mfd., 400 v. (C32, C35, C54, C89, C96)
70631	Capacitor—Tubular, .01 mfd., 600 v. (C61)
71588	Capacitor—Moulded paper, .01 mfd., 600 v. (C87)
72596	Capacitor—Tubular, .05 mfd., 200 v. (C33, C39, C41, C73, C79)
72121	Capacitor—Electrolytic, 5 mfd., 50 v. (C67, C81)
32223	Capacitor—Electrolytic, 15 mfd., 300 v. (C60)
71646	Clamp—Dial clamp (2 required)
71940	Coil—Antenna coil—F.M.—Complete with adjustable core and stud (L2, L3)
71856	Coil—Antenna coil—"C" band—complete with adjustable core and stud (L4, L5)
71942	Coil—Filament choke coil (L7, L8)
71855	Coil—Loop loading coil—"A" band—complete with adjustable core and stud (L6)
71937	Coil—Oscillator coil—F.M.—complete with adjustable core and stud (L9)
71853	Coil—Oscillator coil—"C" band—complete with adjustable core and stud (L17)
71852	Coil—Oscillator coil—"A" band—complete with adjustable core and stud (L18)
71854	Coil—R. F. coil—"C" band—complete with adjustable core and stud (L12)
71939	Coil—R. F. choke coil (L10)
71857	Coil—R. F. coil—"A" band—Complete with adjustable core and stud (L13, L14)
71938	Coil—R. F. coil—F.M.—complete with adjustable core and stud (L11)
38405	Control—Tone control—H.F. (R27)
38401	Control—Tone control—L.F. (R26)
71596	Control—Volume control (R42)
†72987	Cord—Manual drive cord (approx. 42″ overall required) or indicator drive cord (approx. 30″ overall required)
71941	Coupling—F.M. coupling unit (L16, C17, R5)
71654	Dial—Glass dial scale—F.M.
71653	Dial—Glass dial scale—Standard Broadcast
71652	Dial—Glass dial scale—Short Wave
71805	Drum—Tuning condenser drive drum
71800	Gear—12 tooth gear fastened to selector switch coupling shaft
71801	Gear—18 tooth gear fastened to selector switch shaft
35844	Gear—Scissor gear for tuning capacitor
71799	Grommet—Rubber grommet to mount R.F. unit cradle (6 required)
70429	Grommet—Rubber grommet to mount tube socket (4 required)
72674	Grommet—Rubber grommet for chassis front mounting (2 required)
72069	Grommet—Rubber grommet for chassis rear mounting (2 required)
71647	Guide—Indicator slide guide
71832	Indicator—Station selector indicator
11765	Lamp—Dial lamp—Mazda 51

Stock No.	DESCRIPTION
11891	Lamp—Pilot lamp—Mazda 44
71962	Pinion—Pinion and shaft for tuning capacitor
71963	Plate—Bearing plate for tuning capacitor pinion
72984	Plate—Connecting plate for selector switch extension shafts
71644	Plate—Dial back plate only, less dial window, dials, supports, indicator slide, indicator and pulleys
71648	Pulley—Idler pulley (2 required) or indicator cord pulleys
71650	Pulley—Manual tuning shaft cord pulley
71636	Receptacle—9 prong male plug for power cable (J1)
71637	Receptacle—AMP-AUX-PHONO jacks
72323	Resistor—Wire wound, 3 ohms, ½ watt (R32)
	Resistor—Fixed, composition, 10 ohms, ±20%, ½ watt (R54)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R21, R22)
	Resistor—Fixed, composition, 270 ohms, ±10%, ½ watt (R38)
	Resistor—Fixed, composition, 390 ohms, ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R24, R37, R46)
	Resistor—Fixed, composition, 2,200 ohms, ±20%, ½ watt (R12, R25, R36)
	Resistor—Fixed, composition, 2,200 ohms, ±10%, ½ watt (R9, R52)
	Resistor—Fixed, composition, 4,700 ohms, ±20%, ½ watt (R4, R68)
	Resistor—Fixed, composition, 8,200 ohms, ±10%, ½ watt (R13, R63)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, 1 watt (R6)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, ½ watt (R76)
	Resistor—Fixed, composition, 15,000 ohms, ±20%, ½ watt (R30, R51)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ watt (R44, R48)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, 1 watt (R7)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R3, R31, R35, R49)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R18)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, 1 watt (R43)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R11, R45)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R60)
	Resistor—Fixed, composition, 68,000 ohms, ±20%, ½ watt (R56)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R29, R64)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ watt (R28, R58, R59, R65, R70)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, 1 watt (R75)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, ½ watt (R17, R20, R34, R55, R66)
	Resistor—Fixed, composition, 220,000 ohms, ±20%, ½ watt (R33, R71, R72, R74)
	Resistor—Fixed, composition, 270,000 ohms, ±10%, ½ watt (R53)
	Resistor—Fixed, composition, 330,000 ohms, ±20%, ½ watt (R61, R67)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R77)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R14, R39)
	Resistor—Fixed, composition, 820,000 ohms, ±10%, ½ watt (R57, R69)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R1, R2, R19, R73, R78)
	Resistor—Fixed, composition, 2.2 megohm, ±10%, ½ watt (R15, R41, R47, R50, R62)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R8)
	Resistor—Fixed, composition, 22 megohm, ±20%, ½ watt (R23)
71798	Screw—No. 8—32 x 5/32″ set screw
71965	Screw—Push arm locking screw
71812	Shaft—Manual tuning shaft less spring and pulley
73726	Shaft—Selector switch coupling shaft—switch end
73727	Shaft—Selector switch coupling shaft—knob end—less threaded bushing
72951	Shield—Lead tube shield
71833	Socket—Dial lamp socket—R.H.
71834	Socket—Dial lamp socket—L.H.
71931	Socket—Pilot lamp socket
71850	Socket—Tube socket complete with base and shield
73117	Socket—Tube socket
72516	Socket—Tube socket, miniature
71649	Spring—Coil spring for manual tuning shaft

Addition to Parts List:

CHASSIS ASSEMBLY

Add:

54374 Rectifier—Crystal rectifier (CR1)

Replacement Parts (Continued)

Stock No.	DESCRIPTION
71936	Spring—Drive cord spring
33622	Spring—Push button arm return spring
73658	Switch—"Magic Monitor" and power switch (S7, S8)
71802	Switch—Selector switch (S1, S2, S3, S4, S5, S6)
71645	Support—Glass support (rubber) (2 required)
71845	Transformer—First I.F. transformer — F.M. (T1) (C28, C30)
71846	Transformer—First I.F. transformer — A.M. (T2) (C29, C31)
71847	Transformer—Second I.F. transformer — F.M. (T3) (C45, C47, C51)
71848	Transformer—Second I.F. transformer — A.M. (T4) (C46, C48, C49, C50)
71849	Transformer—Third I.F. transformer — F.M. (T5) (C56, C57)
71935	Transformer—Driver transformer (T6) (C70)
71934	Transformer—Ratio detector transformer (T7) (C72, C74)
37435	Washer—"C" washer for holding threaded bushing to selector switch shaft
31608	Washer—Spring washer for drive cord pulleys or idler pulley
71875	Washer—Spring washer for chassis front mounting
2917	Washer—Spring washer for selector switch coupling shaft and bushing (knob-end) or manual tuning shaft
71810	Window—Dial window (clear glass)
	AMPLIFIER ASSEMBLIES RS 123D
70646	Capacitor—Tubular, .0035 mfd., 1,000 volts (C5, C6)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C3, C4)
70632	Capacitor—Tubular, .02 mfd., 600 volts (C8)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C7)
31323	Capacitor—Electrolytic, 16 mfd., 150 volts (C2)
72955	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts; 1 section of 50 mfd., 400 volts; and 1 section of 40 mfd., 25 volts (C1A, C1B, C1C)
11765	Lamp—Jewel lamp—Mazda 51
18469	Plate—Mounting plate (bakelite) for electrolytic capacitor
12493	Plug—5 contact female plug for speaker cable
	Resistor—Fixed, composition, 2,700 ohms, ±10%, ½ watt (R3, R9)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R5)
	Resistor—Fixed, composition, 47,000 ohms, ±20%, ½ watt (R11)
	Resistor—Fixed, composition, 220,000 ohms, ±20%, ½ watt (R6, R7, R12)
71660	Resistor—Voltage divider, comprising 1 section of 180 ohms, 3.5 watts, 1 section of 2,520 ohms, 3.97 watts, and 1 section of 2,760 ohms, 9.3 watts (R1a, R1b, R1c)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R10)
35787	Socket—Audio input socket
71659	Socket—9 prong power socket (J1)
31364	Socket—Jewel lamp socket
31319	Socket—Tube socket
37048	Transformer—Power transformer, 115 volts, 60 cycle (T1)
71661	Transformer—Output transformer (T2)
	SPEAKER ASSEMBLIES 92567-2W RL 70R1
13867	Cap—Dust cap
71147	Clamp—Clamp to hold metal cone suspension (2 required)
71146	Coil—Field coil—1,060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
31539	Plug—5 prong male plug for speaker
71144	Speaker—12" EM speaker complete with cone and voice coil less plug
71145	Suspension—Metal cone suspension
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
72555	Antenna—Dipole antenna
73714	Back—Cabinet back—burgundy—for mahogany or walnut instruments
73715	Back—Cabinet back—tan—for blonde instruments
71599	Bracket—Jewel lamp bracket
71874	Bushing—Bushing and washer for large knobs
73626	Bumper—Rubber bumper for record changer carriage actuating link
71884	Button—Push button
71863	Cable—5 wire moulded lead-in cable
72583	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
38684	Capacitor—Mica trimmer, 2-20 mmf. (C1)
73695	Carriage—Record changer mounting carriage complete with runners
71892	Catch—Bullet catch and strike for lower doors
72434	Check—Radio compartment door check
X1813	Cloth—Grille cloth for mahogany or walnut instruments
X1666	Cloth—Grille cloth for blonde instruments
71966	Decal—Trade mark decal (Victrola)
71910	Decal—Trade mark decal (RCA-Victor)
73716	Escutcheon—Escutcheon only less window, screen and marker strips for mahogany instruments
73717	Escutcheon—Escutcheon only less window, screen and marker strips for walnut instruments
73718	Escutcheon—Escutcheon only less window, screen and marker strips for blonde instruments
73712	Gasket—Rubber gasket—tan—for under escutcheon for blonde instruments
73713	Gasket—Rubber gasket—black—for under escutcheon for mahogany or walnut instruments
73870	Grille—Metal grille for mahogany or walnut instruments
73873	Grille—Metal grille for blonde instruments
73699	Grommet—Rubber grommet for mounting record changer (4 required)
73702	Grommet—Rubber grommet for loop mounting (2 required)
16058	Grommet—Rubber grommet for speaker mounting (3 required)
73871	Hinge—Speaker compartment door or record storage compartment door hinge (2 required for each door)
73735	Hinge—L.H. hinge for phono compartment door or R.H. hinge for radio compartment door
73751	Hinge—R.H. hinge for phono compartment door or L.H. hinge for radio compartment door
73711	Knob—Selector switch or power switch knob—brown—for blonde instruments
71822	Knob—Selector switch or power switch knob—maroon—for mahogany or walnut instruments
72761	Knob—Tone control knob—brown—for blonde instruments
71883	Knob—Tone control knob—maroon—for mahogany or walnut instruments
72118	Knob—Volume control or tuning knob—brown—for blonde instruments
71821	Knob—Volume control or tuning knob—maroon—for mahogany or walnut instruments
73616	Link—Actuating link assembly for record changer carriage—R.H.
73617	Link—Actuating link assembly for record changer carriage—L.H.
71862	Loop—Antenna loop complete (L1, L15, C1)
71969	Marker—Station markers
72765	Nut—Speed nut to fasten transparent screen to escutcheon (2 required)
71879	Plate—Backing plate for transparent screen
71881	Plate—Call letter marker plate
71819	Plate—Radio compartment door check mounting plate
30868	Plug—2 contact female plug for power cable
30870	Plug—2 prong male plug for power cable
32641	Plug—3 prong male plug for loop cable
31048	Plug—Pin plug for shielded pickup cable
73872	Pull—Door pull
71878	Screen—Transparent screen (Victrola indicator)
36422	Socket—3 contact socket for loop cable
73618	Spring—Connecting spring between link and record changer carriage
73697	Spring—Conical spring for mounting record changer
71818	Spring—Radio compartment door check spring
30900	Spring—Retaining spring for knobs
71867	Spring—Retaining spring for push button
73185	Stop—Metal stop for record changer carriage
72936	Stop—Stop for lower doors
70164	Stop—Stop for phono compartment door
71880	Strip—Backing strip for call letter marker plate
73612	Track—Record changer carriage mechanism track complete with mounting plate (2 required)
71814	Washer—Rubber washer for radio compartment door check
71882	Window—Window for call letter markers

†Stock No. 72987 is a spool containing 150 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Addition to Parts List:

MISCELLANEOUS

74312 Ornament—Wood fibre ornament for front of cabinet

RCA VICTOR

Model 8X53

Model 8X53

Chassis No. RC-1064—Mfr. No. 274

SERVICE DATA

1948 . . No. 1

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range .... 540-1600 kc

Intermediate Frequency .... 455 kc

Power Output
Undistorted .... 1.0 watt
Maximum .... 1.5 watts

Tube Complement
(1) RCA-12SA7 .... Converter
(2) RCA-12SK7 .... I.F. Amplifier
(3) RCA-12SQ7 .... 2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-50L6GT .... Power Output
(5) RCA-35Z5GT .... Rectifier

Pilot Lamp .... Mazda No. 51, 6-8 volts, 0.2 amp.

Loudspeaker
Type .... 4" x 6" PM
V. C. Impedance .... 3.4 ohms at 400 cycles

Cabinet Dimensions	Height	Width	Depth
Cabinet (Outside)	7¾"	11¾"	7½"

Shipping Weight .... 9 lbs.
Tuning Drive Ratio 20:1

Power Supply Rating
105-125 volts, AC, 50 or 60 cycles, or DC .... 30 watts

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Critical Lead Dress

1. Dress all heater leads next to chassis.
2. Dress power cord away from volume control and audio circuits.
3. Dress capacitor (C14) toward switch and parallel to chassis length.
4. Dress capacitor (C16) back against rear chassis apron.
5. Dress capacitor (C17) over and towards 50L6 socket perpendicular to capacitor (C14) and (C16).
6. Dress pilot lamp leads over second I-F transformer and away from tubes.
7. Dress blue lead from output transformer against front apron and away from I-F leads.

Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLY RC-1064		Resistor—Fixed composition, 3.3 megohms, ±20%, ½ watt (R4)
			Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R6)
39622	Capacitor—Mica, 56 mmf. (C5)	70467	Shaft—Tuning knob shaft
39632	Capacitor—Mica, 150 mmf. (C13)	34449	Socket—Lamp socket
72571	Capacitor—Mica, 330 mmf. (C23)	37605	Socket—Tube socket, molded
70606	Capacitor—Tubular, .005 mfd., 400 volts (C16)	70390	Spring—Drive cord tension spring
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14, C17)	73036	Transformer—First I.F. transformer (T1)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C12, C18)	73037	Transformer—Second I.F. transformer (T2)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)	72296	Transformer—Output transformer (T3)
70408	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C19A, C19B)	33726	Washer—"C" washer for tuning knob shaft
73048	Coil—Oscillator coil (L1, L2)		SPEAKER ASSEMBLY 922258-1
73047	Condenser—Variable tuning condenser complete with drive drum (C1, C2, C3, C4)		
70322	Control—Volume control and power switch (R5, S1)	70470	Speaker—4" x 6" elliptical speaker complete with cone and voice coil
	Cord—Drive cord (approx. 40" overall length required)		
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order by referring to model number of instrument, and number stamped on speaker.
70469	Indicator—Station selector indicator		
11765	Lamp—Dial lamp—Mazda No. 51		
73049	Loop—Antenna loop complete		
70462	Plate—Dial back plate complete with drive cord pulleys less dial		MISCELLANEOUS
36230	Pulley—Drive cord pulley		
	Resistor—Fixed composition, 120 ohms, ±10%, ½ watt (R9)	73209	Back—Cabinet back
	Resistor—Fixed composition, 1200 ohms, ±10%, 1 watt (R15)	70398	Clamp—Dial clamp (1 set)
	Resistor—Fixed composition, 22,000 ohms, ±20%, ½ watt (R1)	X1660	Cloth—Grille cloth
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R7, R16)	70476	Dial—Glass dial scale
		11771	Foot—Rubber foot (4 required)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R8)	71821	Knob—Control knob—maroon
		30900	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

8X53

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn receiver the volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The glass tuning dial may be removed from the cabinet and mounted above the pointer for reference during alignment. The extreme left hand mark of the Standard Broadcast scale must be in line with the left hand mark on the dial backing plate.

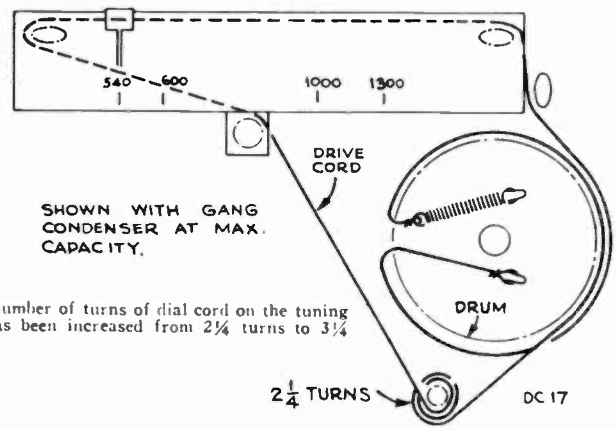
Dial Backing Plate.—In the event that only the chassis is returned for service, the marks on the dial backing plate may be used during alignment; refer to the Dial Indicator and Drive Mechanism drawing for corresponding frequencies.

Dial Pointer.—With the gang condenser in full mesh the dial pointer should be set to the left hand reference mark on the dial backing plate.

For additional information refer to booklet, "RCA Victor Receiver Alignment."

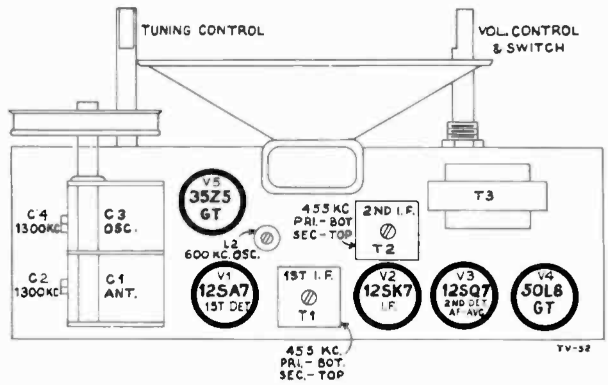
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	T2 Top & bottom 2nd. I-F trans.
2	Stator of C1 through 0.1 mfd.			*T1 Top & bottom 1st. I-F trans.
3	Short wire placed near loop antenna	1,300 kc	1,300 kc	C4 (osc.) C2 (ant.)
4		600 kc	600 kc "A" Band	L2 (osc.) Rock gang
5	Repeat steps 3 and 4			

*Do not readjust T2 when test oscillator is connected to C1.

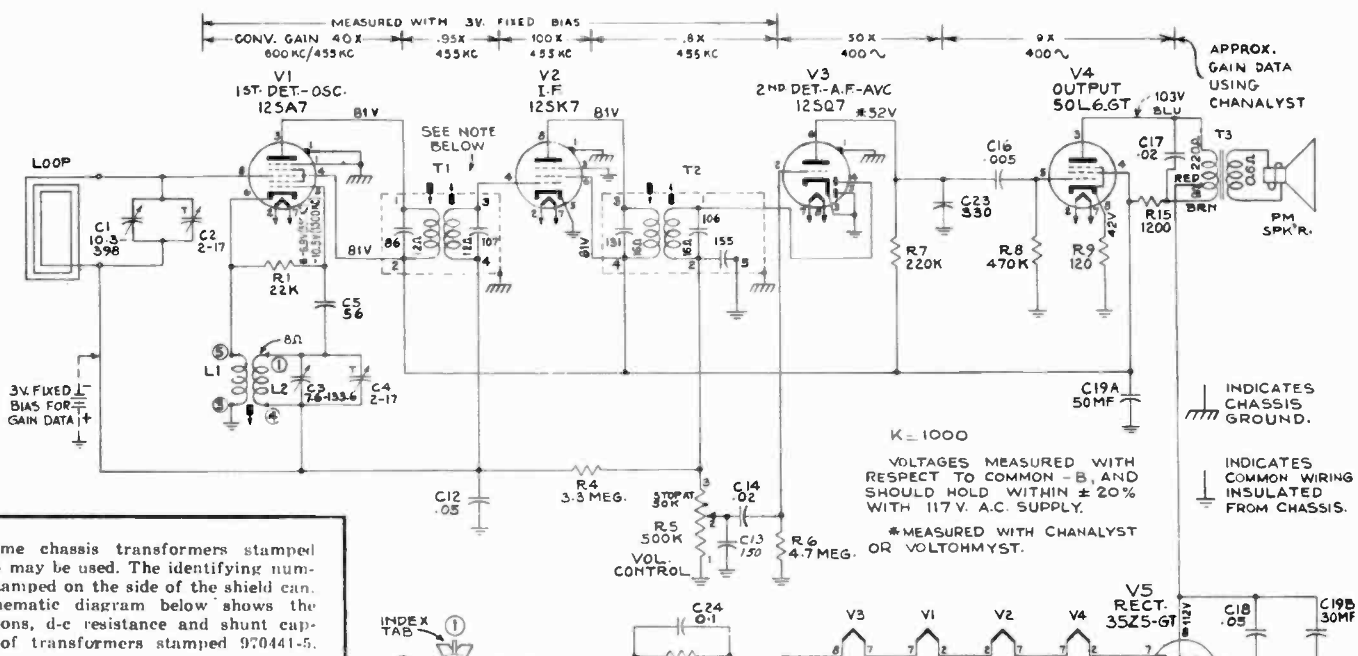


The number of turns of dial cord on the tuning shaft has been increased from 2¼ turns to 3¼ turns.

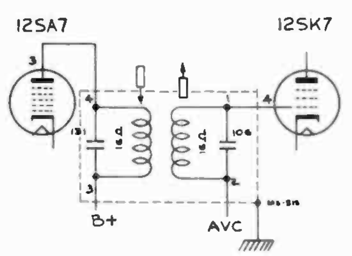
Dial-Indicator and Drive Mechanism

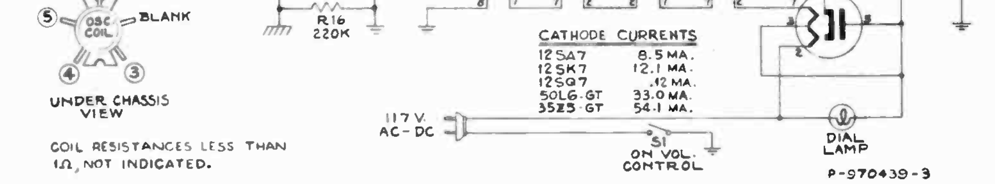


Tube and Trimmer Locations



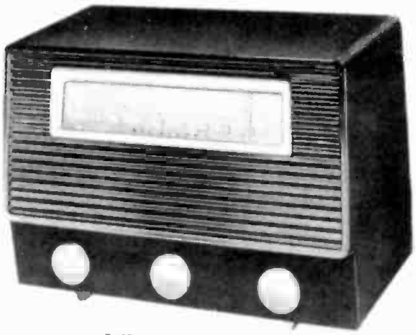
In some chassis transformers stamped 970441-5 may be used. The identifying number is stamped on the side of the shield can. The schematic diagram below shows the connections, d-c resistance and shunt capacitors of transformers stamped 970441-5.





Schematic Circuit Diagram

RCA VICTOR



Model 8X71 — Maroon

Model 8X72 — Ivory

AM-FM Radio Receiver

MODELS 8X71, 8X72

Chassis No. RC-1070

—Mfr. No. 274—

SERVICE DATA

—1948 No. 19—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Ranges

Standard Broadcast (AM)	540-1,600 kc.
Frequency Modulation (FM)	88-108 mc.

Intermediate Frequencies .... AM—455 kc., FM—10.7 mc.

Tube Complement

(1) RCA 19J6	Mixer and Oscillator
(2) RCA 6BJ6	I. F. Amplifier
(3) RCA 12AU6	Driver
(4) RCA 12AL5	Ratio Detector
(5) RCA 6AQ6	AM Det.—A. F. Amp.
(6) RCA 35C5	Output
(7) RCA 35W4	Rectifier

Dial Lamp .... Type No. 47, 6-8 volts, 0.15 amp.

Loudspeaker

Type 92572-4W	5 inch P.M.
Voice coil impedance	3.2 ohms at 400 cycles

Tuning Drive Ratio .... 11½:1 (5¾ turns of knob)

Power Supply Rating

115 volts d.c. or 50 to 60 cycles a.c. .... 30 watts

Power Output

Maximum	1.65 watts
Undistorted	1.0 watt

Cabinet Dimensions

Height . . . 8⅝ in. Width . . . 12⅞ in. Depth . . . 7 5/16 in.

Power Supply:

This instrument will operate on 115 volts d.c. or 50 to 60 cycles a.c.

If the receiver does not operate on d.c., reverse the power cord. On a.c., reversal of the cord may reduce hum or improve FM reception.

Antennas:

These receivers have built-in antennas for standard broadcast (AM) and frequency modulation (FM) reception.

Under average conditions these antennas will provide satisfactory reception—however provision is made for the use of an external antenna for FM reception if desired.

To use external FM antenna:

1. Remove the wire from under the No. 2 terminal screw of the antenna terminal board. The bare end of this wire should be taped to prevent contact with the antenna terminal screws.
2. Connect the transmission line from an external FM dipole antenna to the No. 1 and No. 2 terminals of the antenna terminal board.

To use built-in FM antenna:

1. The wire extending thru the back of the cabinet must be connected to No. 2 terminal of the antenna terminal board.
2. The power cord should be fully extended and must not be coiled or hanked up.
3. Reversal of the line cord plug may improve reception.

DO NOT USE EXTERNAL GROUND.

CAUTION:

THE CHASSIS IS CONNECTED TO ONE SIDE OF THE POWER SUPPLY. Use caution to prevent contact with pipes, radiators, etc. when servicing with chassis removed from cabinet.

Control Knobs:

DO NOT ATTEMPT TO REMOVE THE CONTROL KNOBS FROM THE CABINET. The knobs have spring retainers on the inside of the cabinet to prevent their removal. The retainers are accessible only after the chassis has been removed from the cabinet.

Removal of Chassis:

1. Remove the four screws at the corners of the back cover—pull back cover off carefully—the power cord plug and socket at the bottom right-hand corner will pull apart but the antenna leads remain connected.
2. Unhook the dial cord from the pointer.
3. Remove the four screws which hold the chassis to the cabinet (two at sides of chassis base and two on dial cord pulley brackets above the chassis base).
4. Pull the chassis to the rear—the knobs will be retained with the cabinet.

If removal of the chassis is not necessary when servicing, the back cover may be placed on the supports molded into the upper part of the cabinet.

Alignment Procedure

CORRECT ALIGNMENT OF THE FM BAND REQUIRES THAT THE AM BAND BE ALIGNED FIRST

Output Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation. An output meter is also necessary to indicate minimum audio output during FM Ratio Detector alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations except as stated in the tabulation connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

CAUTION:

The chassis is connected to one side of the power supply. On a.c. operation it is recommended that an isolation transformer (115 v./115 v.) be used for the receiver when servicing.

Oscilloscope Alignment:

The FM I. F. alignment may be checked using a sweep generator and an oscilloscope. Shunt terminals B and C of T3 with a 1,200 ohm resistor. Connect the high side of the oscilloscope to terminal C of T3 in series with a diode probe. Apply the output of the sweep generator (10.7 mc with ±250 kc. sweep) to pin No. 1 of V2 (6BJ6) in series with .01 mf. Low side of the oscilloscope and sweep generator to chassis. This will show the response of T2.

To check the combined response of T1 and T2; connect the sweep generator to the antenna terminal board—high side to No. 2 terminal in series with 300 ohms and low side to No. 1 terminal. Oscilloscope connections as previously connected.

To check the ratio detector response; connect the high side of the oscilloscope direct to terminal No. 8 of S1 rear, low side to chassis, apply the output of the sweep generator to pin No. 1 of V3 (12AU6) in series with .01 mf. Driver plate circuit connected for normal operation (1200 ohm resistor removed). **Note:** It is difficult to observe marker signals in this step—center frequency and sweep width should be previously observed.

Alignment Indicator:

The dial and dial back plate are not attached to the chassis. During alignment a substitute frequency indication must be used. We suggest attaching a paper clip to the dial drive cord so that its movement may be measured—refer to the "Dial Scale" illustration on page 5.

CRITICAL LEAD DRESS

1. All connections in the mixer-oscillator circuit are extremely critical both in regard to lead length and lead dress. Do not disturb unless necessary—make careful notation before servicing if it becomes necessary to disturb this wiring.
2. The ground lead from pin No. 2 of V3 (12AU6 Driver) is critical in length and must be dressed down against chassis.
3. Dress audio coupling capacitor C23 away from output transformer.
4. Dress diode filter unit away from alignment hole in T-2.
5. Dress grid lead of V3 (pin No. 1 of 12AU6) against chassis apron.
6. Dress plate lead of V1 (pin No. 2 of 19J6) against chassis.
7. Dress loop antenna leads so as to prevent contact with external antenna terminal board.
8. All ground connections to chassis should be restored to the original places of connection if disturbed.
9. Dress capacitor C13 down close to range switch so as to clear the projection on the bottom of the cabinet.
10. The FM ant. and osc. coils must be cemented to the coil support to prevent microphonic howl on FM. Amphenol No. 912 cement is recommended for this purpose. Amphenol No. 916 solvent is recommended as solvent if it becomes necessary to loosen the windings.

AM Alignment

RANGE SWITCH IN AM POSITION

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	AM ant. section (C3) of tuning cond. in series with .01 mfd.	455 kc.	Quiet point at low freq. end.	AM windings.† T2 bottom core (sec.). T2 top core (pri.).
2				AM windings.† T1 top core (sec.). T1 bottom core (pri.).
3	Short wire placed near loop antenna for radiated signal.	1620 kc.	Extreme high frequency end.	C12 osc.
4		1400 kc.	1400 kc.	C4 ant.
5		600 kc.	600 kc.	L4 osc. (Rock gang.)
6	Repeat Steps 3, 4 and 5.			

† Use alternate loading.

Alternate loading involves the use of a 10,000 ohm resistor to load the AM plate winding while the AM grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 10,000 ohm resistor after T2 and T1 have been aligned.

Oscillator frequency is above signal frequency on both AM and FM.

FM Alignment

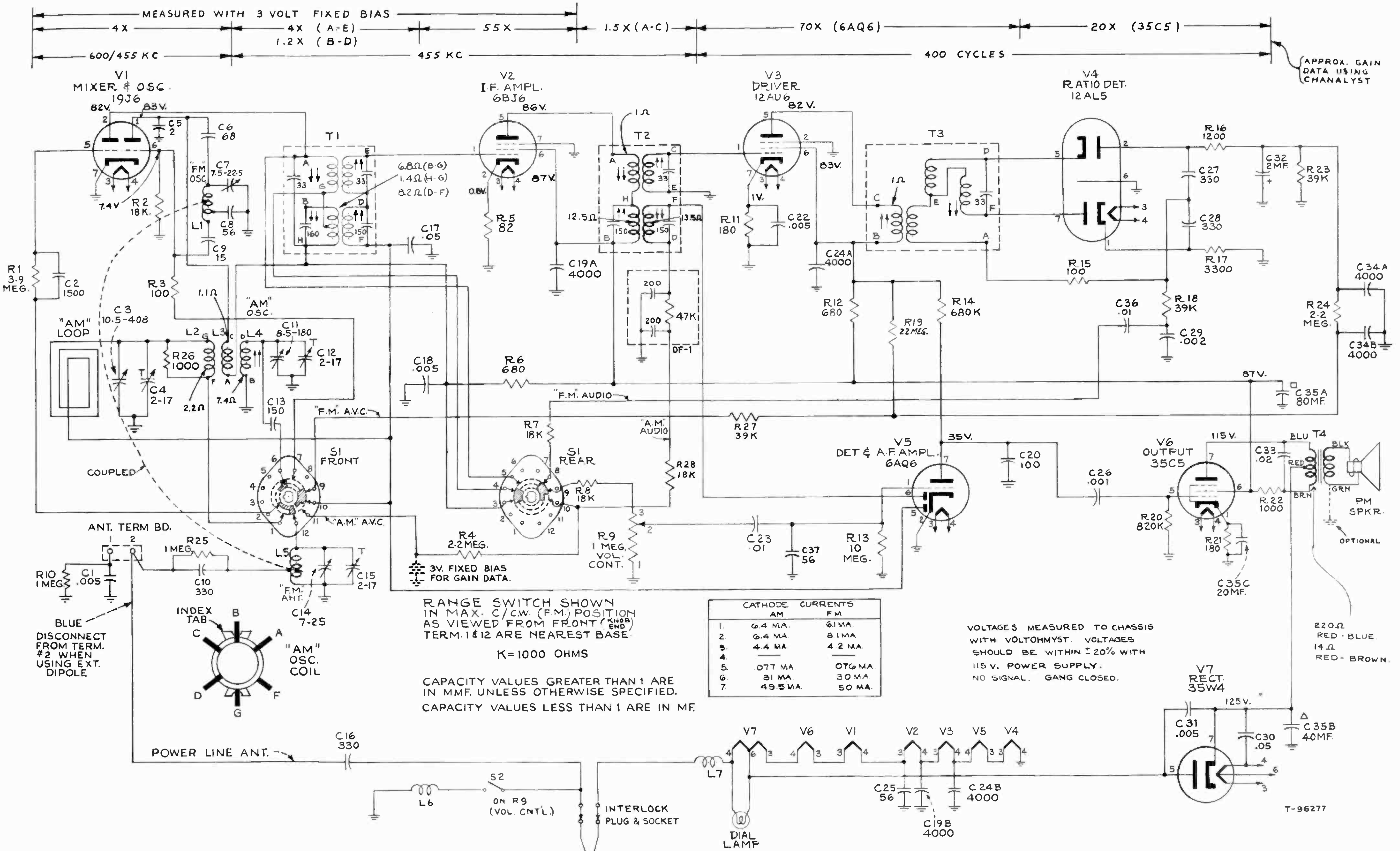
RANGE SWITCH IN FM POSITION — VOLUME CONTROL MAXIMUM

Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 2 mfd. capacitor C32 and the common lead to chassis. Adjust sig. gen. output to provide approx. —3 v. indication during alignment.			
2	Pin 1 of 12AU6 in series with .01 mfd.	10.7 mc. modulated 30% 400 cycles AM.	Max. capacity (fully meshed).	T3 top core for max. d-c voltage across C32. T3 bottom core for min. audio output.*
3	No. 2 ant. term in series with a 300 ohm resistor. Connect low side to No. 1 terminal. (Remove ant. lead from No. 2 term.)			FM windings.†† T2 top core (sec.). T2 bottom core (pri.).
4				FM windings.†† T1 top core (sec.). T1 bottom core (pri.).
5		106 mc.	106 mc.	L1 osc.** C15 ant.
6		90 mc.	90 mc.	L5 ant.** (Rock gang.)
7	Repeat Steps 5 and 6 until further adjustment does not improve calibration.			

* Two or more points may be found which lower the audio output. At the correct point the minimum audio output is approached rapidly and is much lower than at any incorrect point.

†† Align T2 and T1 by means of alternate loading as explained under AM alignment. Use a 680 ohm resistor instead of a 10,000 ohm resistor and load the FM windings.

** L1 and L5 are adjustable by increasing or decreasing the spacing between turns.



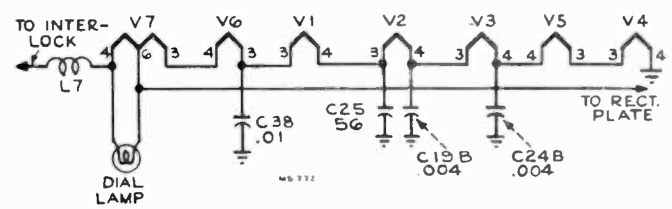
CATHODE	CURRENTS AM	CURRENTS FM
1.	6.4 MA.	6.1 MA
2.	6.4 MA	8.1 MA
3.	4.4 MA	4.2 MA
4.	—	—
5.	.077 MA	.076 MA
6.	31 MA	30 MA
7.	49.5 MA	50 MA.

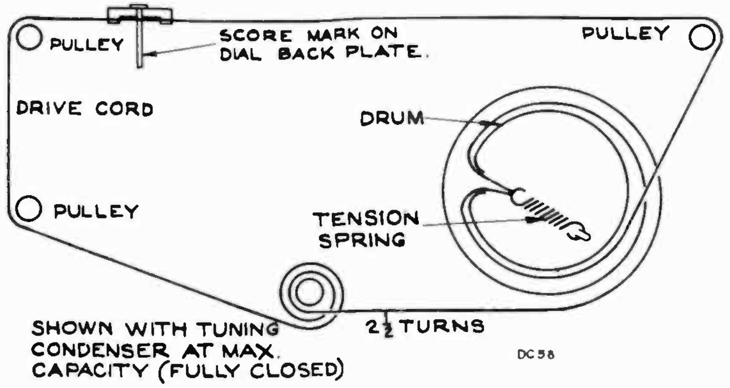
Change in Resistor:

The driver tube (12AU6) cathode resistor (R11) has been changed from 180 ohms to 330 ohms.

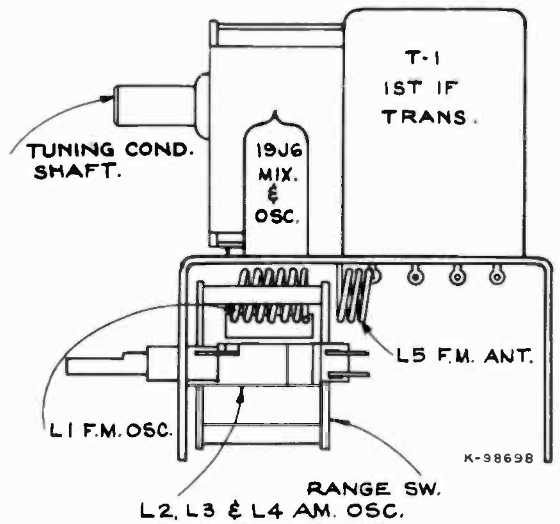
Added Capacitor:

A capacitor (.01 mf.—C38) has been added between pin #3 of V6 (35C5) and chassis. The revised heater connection schematic diagram is illustrated below.

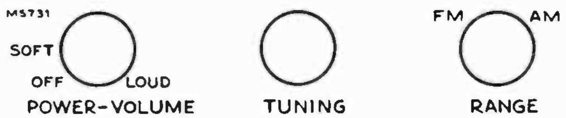




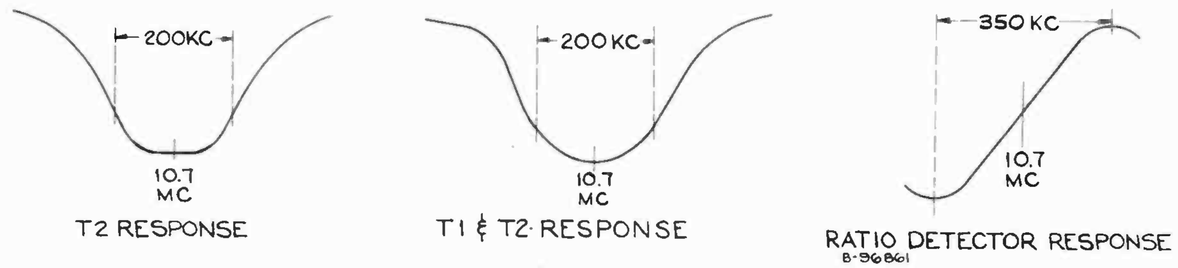
Dial Indicator and Drive Mechanism



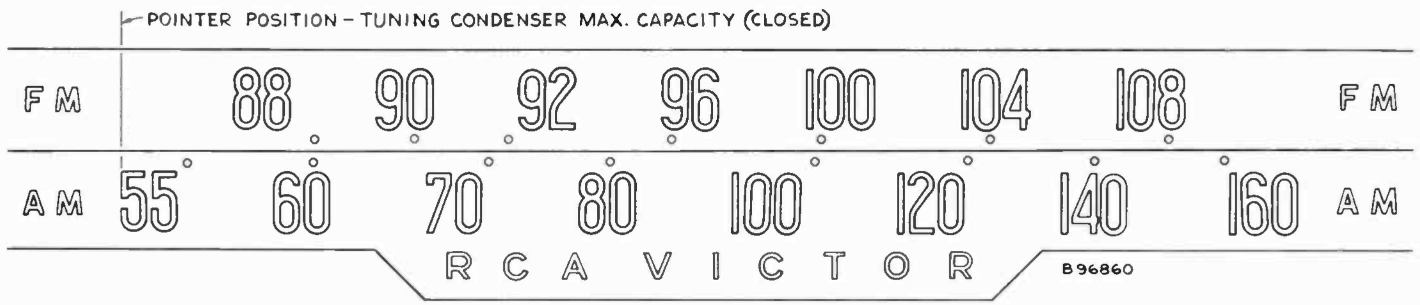
Ant. and Osc. Coil Locations (Side View)



Controls

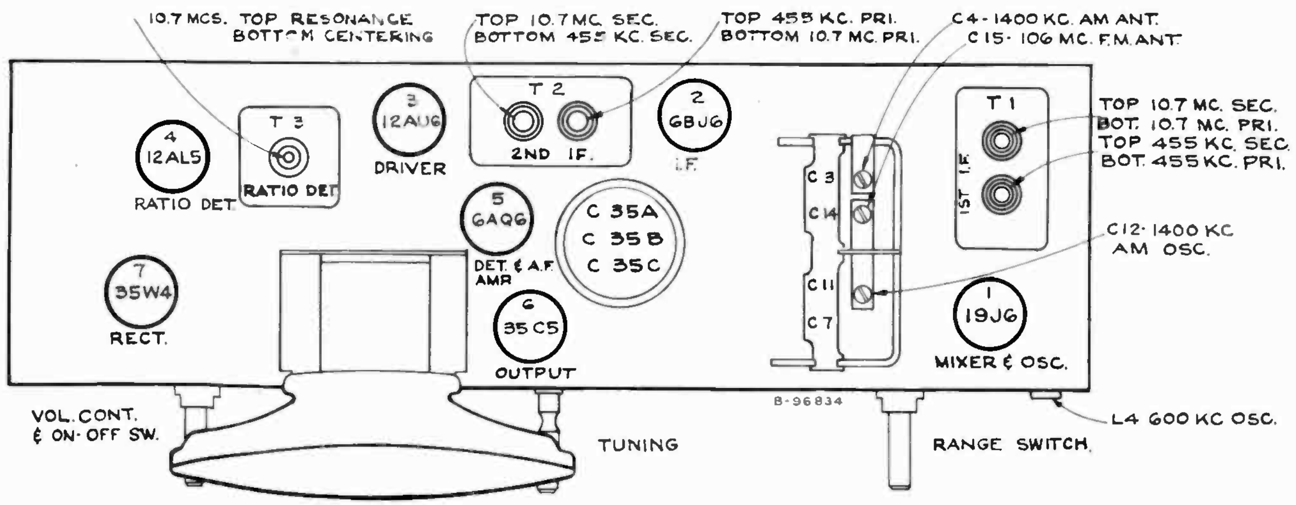


FM Response Curves



Dial Scale

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.



Tube and Trimmer Locations (Top View)

Replacement Parts

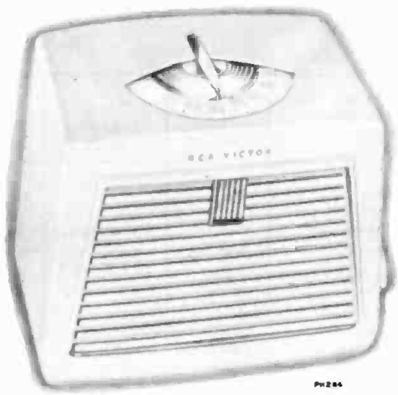
Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1070
73973	Capacitor—Variable tuning capacitor (C3, C4, C7, C11, C12, C14, C15)
73866	Capacitor—Ceramic, 2 mmf. (C5)
31353	Capacitor—Ceramic, 15 mmf. (C9)
73867	Capacitor—Ceramic, 56 mmf. (C8)
73499	Capacitor—Ceramic, 56 mmf. (C25, C37)
33103	Capacitor—Ceramic, 68 mmf. (C6)
39628	Capacitor—Mica, 100 mmf. (C20)
48125	Capacitor—Ceramic, 150 mmf. (C13)
39640	Capacitor—Mica, 330 mmf. (C10, C16, C27, C28)
71501	Capacitor—Ceramic, 1,500 mmf. (C2)
74009	Capacitor—Ceramic, .004 mf., dual (C19A, C19B) (C24A, C24B) (C34A, C34B)
73473	Capacitor—Ceramic, .005 mf. (C1, C18, C31)
73186	Capacitor—Tubular, .001 mf., 400 volts (C26)
73750	Capacitor—Tubular, .002 mf., 200 volts (C29)
71926	Capacitor—Tubular, .005 mf., 200 volts (C22)
71923	Capacitor—Tubular, .01 mf., 200 volts (C23, C36)
74010	Capacitor—Tubular, .02 mf., 400 volts (C33)
70615	Capacitor—Tubular, .05 mf., 400 volts (C17, C30)
73747	Capacitor—Electrolytic, 2 mf., 50 volts (C32)
73975	Capacitor—Electrolytic, comprising 1 section of 80 mf., 150 volts, 1 section of 40 mf., 150 volts, and 1 section of 20 mf., 25 volts (C35A, C35B, C35C)
74012	Coil—Oscillator coil—F.M. (No. 16 tinned buss wire, 9 turns per inch, 4⅞ turns L.H. .469 I.D.) (L1)
73744	Coil—Oscillator coil—A.M. (L2, L3, L4)
74013	Coil—Antenna coil—F.M. (No. 16 tinned buss wire, 7 turns per inch, 2¾ turns L.H. .375 I.D.) (L5)
	Coil—Line choke coil (No. 18 gauge solid wire, 1/32" plastic insulation, standard hook-up wire, 10 turns, close wind) (L6, L7)
38406	Control—Volume control and power switch (R9, S2)
†72953	Cord—Drive cord (approx. 50" overall length required)
74011	Filter—Diode filter, consisting of two 200 mmf. capacitors and one 47,000 ohm resistor (DF1)
72283	Grommet—Rubber grommet to mount tuning capacitor (4 required)
73981	Plug—Power input plug (2 prong male)
	Resistor—Fixed, composition, 82 ohms, ±10%, ½ watt (R5)
	Resistor—Fixed, composition, 100 ohms, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 100 ohms, ±5%, ½ watt (R15)
	Resistor—Fixed, composition, 180 ohms, ±10%, ½ watt (R11, R21)
	Resistor—Fixed, composition, 680 ohms, ±20%, ½ watt (R6, R12)
	Resistor—Fixed, composition, 680 ohms, ±10%, ½ watt (R14)
	Resistor—Fixed, composition, 820 ohms, ±10%, ½ watt (R20)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, 1 watt (R22)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R26)
	Resistor—Fixed, composition, 1,200 ohms, ±5%, ½ watt (R16)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R17)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R2, R7, R8, R28)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R18, R27)
	Resistor—Fixed, composition, 39,000 ohms, ±5%, ½ watt (R23)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R10, R25)
	Resistor—Fixed, composition, 2.2 megohm, ±20%, ½ watt (R4, R24)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R1)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R13)
	Resistor—Fixed, composition, 22 megohms, ±20%, ½ watt (R19)
73978	Shaft—Tuning knob shaft
74014	Socket—Dial lamp socket
73117	Socket—Tube socket for V2, V3, V4, V5, V6, V7
74179	Socket—Tube socket for V1
74038	Spring—Drive cord spring
73979	Support—Dial drive cord pulley support complete with two (2) pulleys—L. H.
73980	Support—Dial drive cord pulley support complete with pulley—R. H.
73977	Switch—Range switch (S1)
73745	Transformer—First I.F. transformer—dual (T1)
73974	Transformer—Second I.F. transformer—dual (T2)
73743	Transformer—Ratio detector transformer (T3)
73976	Transformer—Output transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLY 92572-4W
73900	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
73984	Back—Cabinet back—maroon—complete with loop, terminal boards, power socket and power cord for Model 8X71
73985	Back—Cabinet back—ivory—complete with loop, terminal boards, power socket and power cord for Model 8X72
73988	Bezel—Dial bezel less dial
74104	Board—FM antenna terminal board
Y2051	Cabinet—Maroon plastic cabinet for Model 8X71
Y2052	Cabinet—Ivory plastic cabinet for Model 8X72
73990	Dial—Polystyrene dial scale
73991	Indicator—Station selector indicator
73982	Knob—Control knob—brown—for Model 8X71
73983	Knob—Control knob—ivory—for Model 8X72
31480	Lamp—Dial lamp—Mazda 47
73986	Loop—Antenna loop (winding only)
72765	Nut—Speed nut for bezel and dial scale
73989	Plate—Dial back plate
73992	Retainer—Knob retainer (knob to cabinet)
73987	Socket—2 contact power input socket (part of back cover and loop assembly)
14270	Spring—Retaining spring for knobs (knob to shaft)

†Stock No. 72953 is a reel containing 250 feet of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Addition to Parts List:

71923 Capacitor—Tubular, .01 mf., 200 v. (C38) [same as C23, C36]



8X521
(Maroon)

8X522
(Ivory)

RCA VICTOR

8X521, 8X522

Chassis No. RC-1066 RC-1066A
Mfr. No. 274

SERVICE DATA

—1948 No. 10—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Range ....540-1600 kc
Intermediate Frequency ....455 kc
Power Output
Undistorted ....1.0 watt
Maximum ....1.4 watts
Tube Complement
(1) RCA-12BE6 ....Converter
(2) RCA-12BA6 .........................I.F. Amplifier
(3) RCA-12AT6...2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-50C5 ....Output
(5) RCA-35W4 ....Rectifier
Pilot Lamp............Mazda No. 51, 6-8 volts, 0.2 amp.
Loudspeaker (92577-1)
Type.......................................4-inch PM
V. C. Impedance..................3.2 ohms at 400 cycles

Cabinet Dimensions
Height......5⅝" Width......7⅞" Depth......5"
Power Supply Rating
115 volts, AC, 50 or 60 cycles, or DC............30 watts

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse, the plug. On a-c, reversal of the plug may reduce hum.

Critical Lead Dress
1. Dress all heater leads close to chassis.
2. Dress output plate bypass capacitor C11 inside of terminal board.
3. Dress all exposed leads away from each other and away from chassis.

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1066—8X521 RC 1066A—8X522
73499	Capacitor—Ceramic, 56 mmf. (C5)
73501	Capacitor—Ceramic, 150 mmf. (C14)
72571	Capacitor—Mica, 330 mmf. (C8)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C9)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C7, C11)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C6, C12)
70617	Capacitor—Tubular, 0.1 mfd., 400 Volts (C13)
73500	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C10A, C10B)
73935	Clip—Spring clip for mounting I.F. transformers (2 required)
70133	Coil—Oscillator coil (L1, L2)
73495	Condenser—Variable tuning condenser (C1, C2, C3, C4)
73498	Control—Volume control and power switch (R4, S1)
73496	Loop—Antenna loop and back cover—for Model 8X521
73497	Loop—Antenna loop and back cover—for Model 8X522
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R2)
	Resistor—Fixed, composition, 150 ohms, ±10%, ½ watt (R8)
	Resistor—Fixed, composition, 1,200 ohms, ±10%, 1 watt (R9)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 220,000 ohms, ±20%, ½ watt (R6, R10)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R7)
	Resistor—Fixed, composition, 3.3 megohm, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 4.7 megohm, ±20%, ½ watt (R5)
34449	Socket—Lamp socket
73117	Socket—Tube socket
73488	Transformer—First I.F. transformer (T1)
73037	Transformer—Second I.F. transformer (T2)
72296	Transformer—Output transformer (T3)
	SPEAKER ASSEMBLY 92577-1W
73123	Speaker—4" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
73502	Bezel—Decorative bezel
Y2001	Cabinet—Ivory plastic cabinet complete with dial back plate, indicator, escutcheon and wire trim for Model 8X522
Y1499	Cabinet—Maroon plastic cabinet complete with dial back plate, indicator, escutcheon and wire trim for Model 8X521
73508	Clip—Spring clip to fasten dial knob
73507	Dial—Calibrated dial knob
73511	Fastener—Push fastener to hold dial back plate (3 required)
73510	Fastener—Push fastener to hold loop (2 required)
73504	Indicator—Station selector indicator
73506	Knob—Volume control and power switch knob—ivory—for Model 8X522
73505	Knob—Volume control and power switch knob—maroon—for Model 8X521
11765	Lamp—Dial lamp—Mazda 51
71095	Nut—Speed nut to fasten wire trim (2 required)
73509	Plate—Dial back plate
73503	Rod—Wire trim rod
30900	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Alignment Procedure

Cathode Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the schematic diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

On AC operation an isolation transformer (115 v./115 v.) may be necessary for the receiver if the test oscillator is also AC operated.

For additional information refer to booklet "RCA Victor Receiver Alignment."

NOTE.—If the speaker should be removed in servicing, its position should be checked when re-assembling. The distance between the front of the speaker and the rear chassis apron should be maintained at 3½ inches.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	12BA6 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	T-2 (top and bottom) 2nd I-F trans.
2	Stator of C1 through 0.1 mfd.			*T-1 (top and bottom) 1st I-F trans.
3	Short wire placed near loop to radiate signal.*	1,600 kc	1,600 kc	C4 (osc.)
4		1,400 kc	1,400 kc	C2 (ant.)
5		600 kc	600 kc	L2 (osc.) Rock gang
6		Repeat steps 3, 4 and 5.		

*Do not readjust T-2 when test oscillator is connected to C1.

Adjustment for Dial:

On late production slotted holes are provided in the tuning condenser mounting bracket and washers (max. of 5 req'd.) are used on the tuning condenser shaft (between dial knob and condenser) to permit adjustment of the dial. If the cabinet or tuning condenser should be replaced, it may be necessary to adjust the mounting of the tuning condenser or change the number of washers to prevent rubbing of the dial on the cabinet.

Change in Parts List:

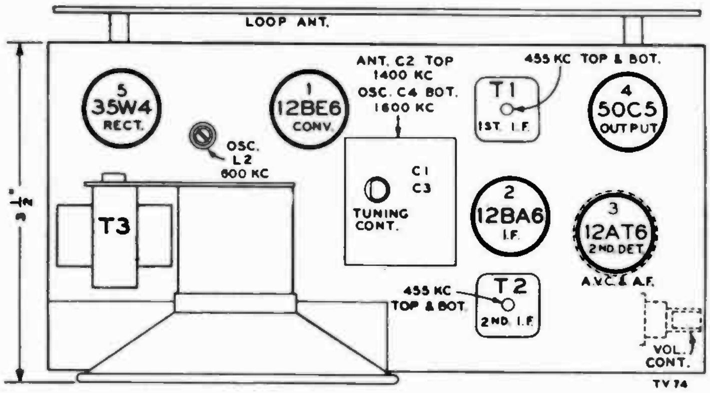
CHASSIS ASSEMBLIES

Delete:

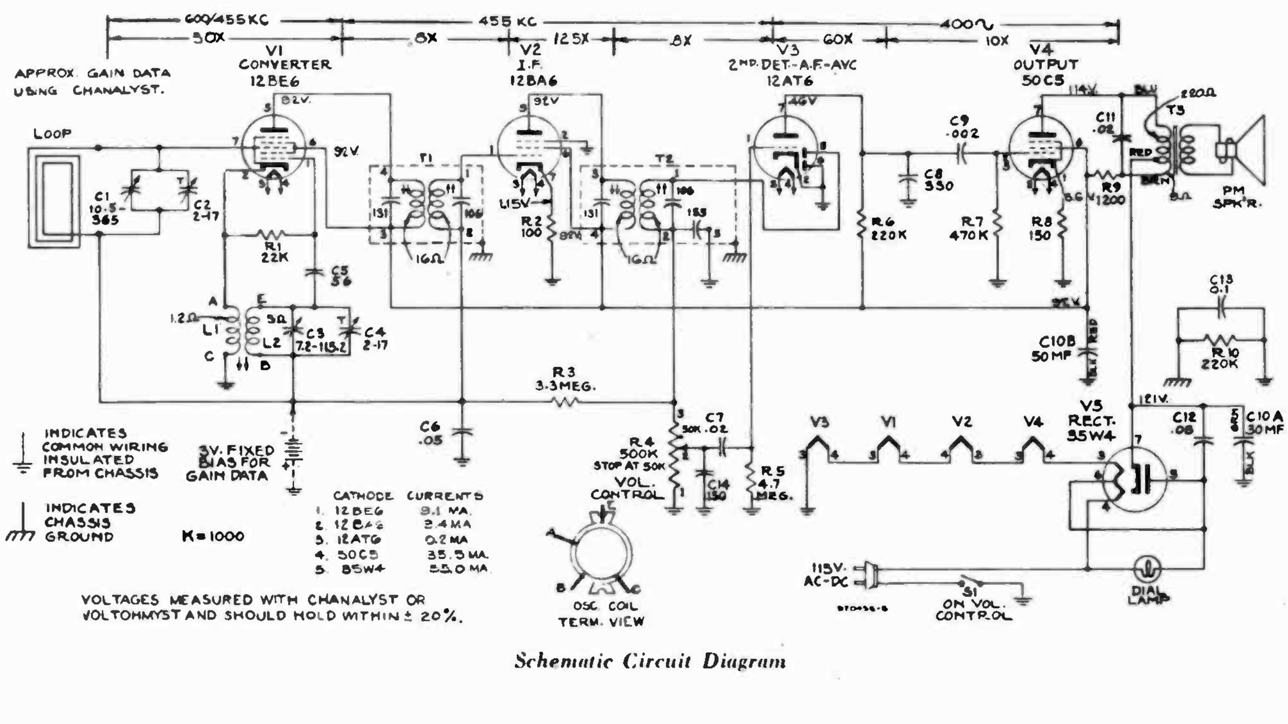
70601	Capacitor—Tubular .002 mfd (C9)	

Add:

74063	Capacitor—Ceramic 2000 mmf (C9)	
74183	Washer—Vellutex washer for dial knob clearance	

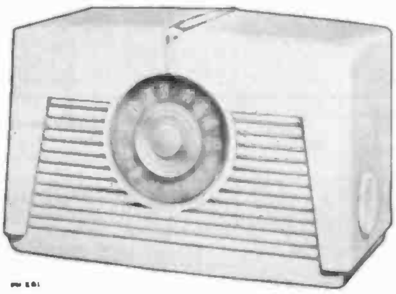


Tube and Trimmer Locations



Schematic Circuit Diagram

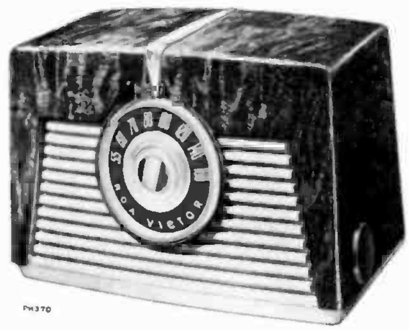
RCA VICTOR



8X541
(Maroon)

8X542
(Ivory)

8X547
(White)



8X544
(Mahogany)

8X545
(Walnut)

8X546
(Blonde)

8X541, 8X542, 8X544, 8X545, 8X546, 8X547

Chassis No. RC-1065, RC-1065A 1st Prod.
RC-1065C, RC-1065D 2nd Prod.

Mfr. No. 274

SERVICE DATA

—1948 No. 11—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Tuning Range .... 540-1600 kc

Intermediate Frequency .... 455 kc

Power Output
Undistorted .... 1.0 watt
Maximum .... 1.5 watts

Tube Complement
(1) RCA-12SA7 .... Converter
(2) RCA-12SK7 .... I.F. Amplifier
(3) RCA-12SQ7 .... 2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-50L6GT .... Output
(5) RCA-35Z5GT .... Rectifier

Pilot Lamp .... Mazda No. 47, 6-8 volts, 0.15 amp.

Loudspeaker (92577-5)
Type .... 4-inch PM
V. C. Impedance .... 3.2 ohms at 400 cycles

Cabinet Dimensions
Height ...... 7" Width ...... 10¾" Depth ...... 5⅞"

Power Supply Rating
115 volts, AC, 50 or 60 cycles, or DC .... 30 watts

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 1065—8X541, 8X544, 8X545 (1st Prod.)
	RC 1065A—8X542, 8X546, 8X547 (1st Prod.)
	RC 1065C—8X541, 8X544, 8X545 (2nd Prod.)
	RC 1065D—8X542, 8X546, 8X547 (2nd Prod.)
73499	Capacitor—Ceramic, 56 mmf. (C5)
73501	Capacitor—Ceramic, 150 mmf. (C13)
72571	Capacitor—Mica, 330 mmf. (C23)
73803	Capacitor—Tubular, .002 mfd., 400 volts (C16)
73550	Capacitor—Tubular, .005 mfd., 400 volts (C6)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C14)
70613	Capacitor—Tubular, .03 mfd., 400 volts (C17)
73553	Capacitor—Tubular, .05 mfd., 400 volts (C12, C18)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)
73500	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C19A, C19B)
73935	Clip—Spring clip for mounting I.F. transformers (2 required)
70133	Coil—Oscillator coil—1st Production (L1, L2)
74448	Coil—Oscillator coil—2nd Production (L1, L2)
73485	Condenser—Variable tuning condenser—1st Production (C1, C2, C3, C4)
74447	Condenser—Variable tuning condenser—2nd Production (C1, C2, C3, C4)
38410	Control—Volume control and power switch (R5, S1)
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
73486	Loop—Loop and back cover assembly for Models 8X541, 8X544 or 8X545
73487	Loop—Loop and back cover assembly for Models 8X542, 8X546 or 8X547
	Resistor—Fixed, composition, 150 ohms, ±10%, ½ watt (R9)
	Resistor—Fixed, composition, 1,200 ohms, ±10%, 1 watt (R15)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 220,000 ohms, ±20%, ½ watt (R7, R16)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R8)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R3)
	Resistor—Fixed, composition, 3.3 megohm, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 4.7 megohm, ±20%, ½ watt (R6)

Stock No.	DESCRIPTION
34449	Socket—Lamp socket
54414	Socket—Tube socket
73036	Transformer—First I-F transformer (T1)
73037	Transformer—Second I-F transformer (T2)
71111	Transformer—Output transformer (T3)
	SPEAKER ASSEMBLY 92577-5W
73919	Speaker—4" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
Y1495	Cabinet—Plastic cabinet — maroon — complete with station indicator and dial backing disc for Model 8X541
Y1496	Cabinet—Plastic cabinet — ivory — complete with station indicator and dial backing disc for Model 8X542
Y2096	Cabinet—Plastic cabinet—mahogany—complete with station indicator and dial backing disc—for Model 8X544
Y2097	Cabinet—Plastic cabinet — walnut — complete with station indicator and dial backing disc — for Model 8X545
Y2098	Cabinet—Plastic cabinet — blonde — complete with station indicator and dial backing disc — for Model 8X546
Y2053	Cabinet—Plastic cabinet—white—complete with station indicator and dial backing disc—for Model 8X547
73494	Clip—Spring clip to hold cabinet back and loop assembly to cabinet (4 required)
73489	Dial—Dialing knob
73493	Disc—Dial backing disc
70429	Grommet—Rubber grommet to mount speaker (4 required)—1st Prod. only
73492	Indicator—Station selector indicator
73490	Knob—Volume control and power switch knob—maroon—for Models 8X541, 8X544 and 8X545
73491	Knob—Volume control and power switch knob—ivory—for Model 8X542
74247	Knob—Volume control and power switch knob—tan—for Model 8X546
74007	Knob—Volume control and power switch knob — white — for Model 8X547
31480	Lamp—Dial lamp—Mazda 47
38458	Nut—Speed nut to fasten indicator to cabinet (2 required)
73914	Spring—Retaining spring for dial knob
14270	Spring—Retaining spring for volume control knob

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES ON REPLACEMENT PARTS

Alignment Procedure

Critical Lead Dress

1. Dress all heater leads close to chassis.
2. Dress pilot light leads away from speaker cone.
3. Dress lead to low side of loop between the two gang condenser leads.
4. Dress C5 (AVC by-pass) close to the bend in the base and clear of the 2nd I.F. transformer.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

On AC operation an isolation transformer (115 v./115 v.) may be necessary for the receiver if the test oscillator is also AC operated.

Dial Centering:

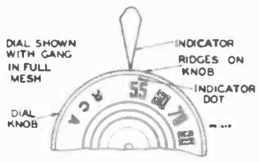
If the mounting of the tuning condenser has been disturbed, it may be necessary to adjust its position after replacing the chassis in the cabinet. This may be done in the following manner:

1. Install chassis and tighten the three mounting screws.
2. Replace tuning knob.
3. Loosen the two screws which hold the tuning condenser mounting bracket to the chassis.
4. Adjust the position of the tuning condenser mounting bracket so that the tuning knob may be rotated without binding on the cabinet. With tuning condenser plates fully meshed the dial should be in the position indicated below.
5. The two screws should then be tightened to maintain this position.

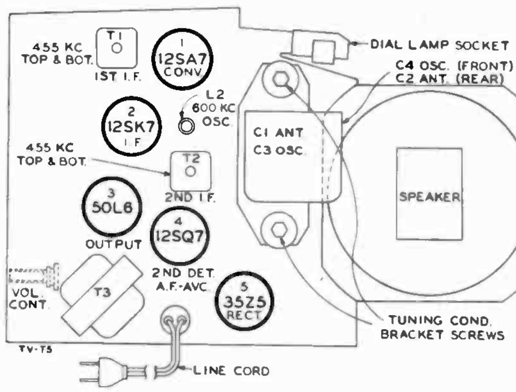
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1600 kc end of dial	T2 (Top and bottom) 2nd I-F trans.
2	Stator of C1 through 0.1 mfd.	455 kc	Quiet-point 1600 kc end of dial	*T1 (top and bottom) 1st I-F trans.
3	Short wire placed near loop to radiate signal	1600 kc	1600 kc	C4 (osc.)
4	Short wire placed near loop to radiate signal	1400 kc	1400 kc	†C2 (ant.)
5	Short wire placed near loop to radiate signal	600 kc	600 kc	L2 (osc.) Rock gang
6	Short wire placed near loop to radiate signal	Repeat steps 3, 4 and 5.		

*Do not readjust T2 when test oscillator is connected to C1.

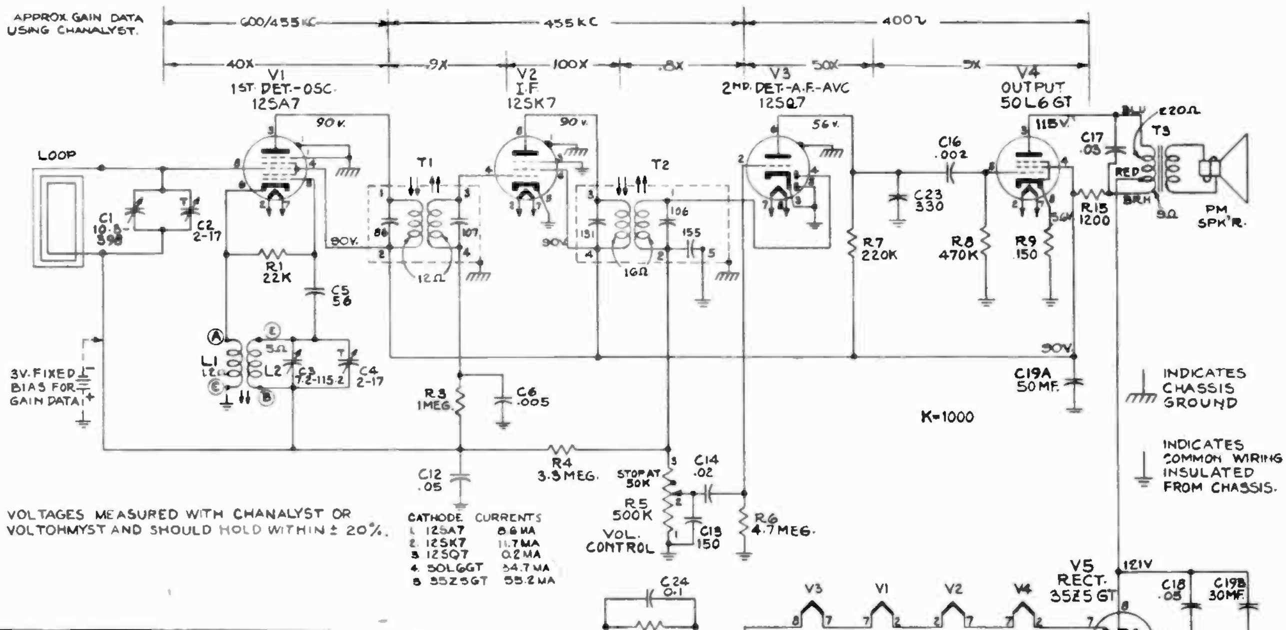
†When adjusting C2 (ant. trimmer) it is necessary to have the loop in the same position and spacing as it will have when assembled in the cabinet. This spacing is 3¼" from chassis to loop.



Dial and Indicator



Tube and Trimmer Locations



SECOND PRODUCTION CHASSIS No. RC 1065C, RC 1065D

C3 IS 9.1-113.8 MMF.

OTHERWISE AS SHOWN ABOVE

Schematic Circuit Diagram—Chassis No. RC-1065, RC-1065A

RCA VICTOR

MODELS 8X681, 8X682

Chassis No. RC-1061--Mfr. No. 274

SERVICE DATA

1948 . . No. 13

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

PH291

8X681—(Maroon Plastic) *8X682—(Ivory Plastic)*

Specifications

Tuning Ranges

Standard Broadcast ("A" Band) .... 540-1600 kc
Short Wave ("C" Band) .... 9.4-12 mc

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA 12BA6 .... R. F. Amplifier
(2) RCA 12BE6 .... Converter
(3) RCA 12BA6 .... I. F. Amplifier
(4) RCA 12AT6 .... Det. - A.F. - A.V.C.
(5) RCA 35C5 .... Output
(6) RCA 35W4 .... Rectifier

Dial Lamp .... Type 47, 6.3 volts, 0.15 amp.

Power Supply Rating

115 volts, D.C. or 50 to 60 cycles, A.C. .... 30 watts

Loudspeaker

Type 92572-5 .... 5 in. P.M.
V. C. Impedance .... 3.2 ohms at 400 cycles

Power Output

Undistorted .... 0.7 watts
Maximum .... 1.1 watts

Cabinet Dimensions

Height .... 8 in. Width ..... 12¾ in. Depth ..... 7¼ in.

Tuning Drive Ratio .... 7½:1 (3¾ turns of knob)

NOTE: If reception is not obtained on DC, reverse plug in outlet receptacle. This may also reduce hum on AC operation.

To Remove Chassis from Cabinet

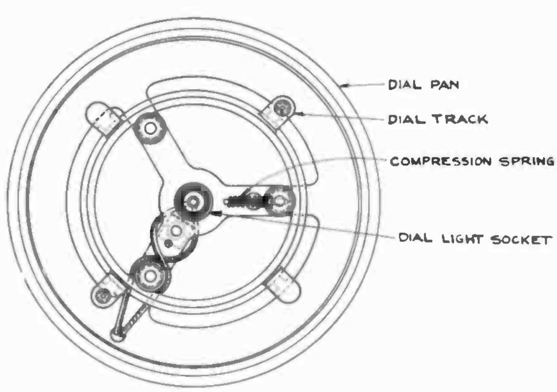
Remove the four screws at the corners of the bottom cover (accessible through holes in the cabinet base). Do not remove the hex head screws which hold the base to the bottom cover. The cabinet may now be lifted off the cabinet base.

Dial Positioning

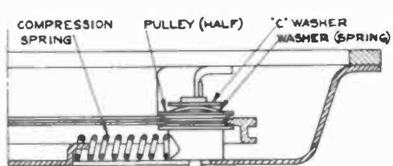
If the speaker should be replaced, it will be necessary to readjust the speaker mounting bracket position so that the dial pan will fit against the cabinet when the chassis is re-installed in the cabinet.

Insulating Washers

The cabinet base is insulated from the chassis bottom cover. When servicing make certain that the insulating washers are in place and properly positioned.

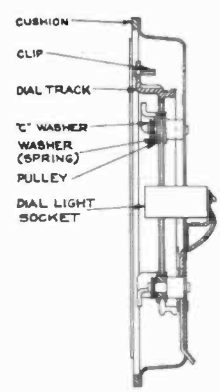


FRONT VIEW



DETAIL OF COMPRESSION SPRING

NOTE: See page 4 regarding changes in late production pan and track assembly.



SIDE VIEW

Dial Pan and Track Assembly

Alignment Procedure

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side to chassis. Keep the output low to avoid A.V.C. action.

Note.—If the test oscillator is AC operated it may be necessary to use an isolation transformer (115v./115 v.) for the receiver during alignment, and the low side of the test oscillator connected to common wiring at pin No. 2 of 12AT6 socket—reverse line plug if hum is excessive.

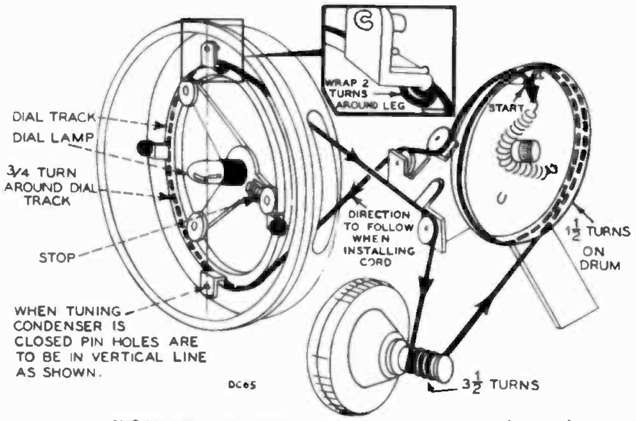
Output Meter.—Connect meter across speaker voice coil. Turn volume control to maximum.

Dial Pointer Adjustment.—Rotate tuning condenser to maximum capacity position (plates fully meshed). Adjust dial to position indicated in drawing.

With the dial adjusted as described above mark the dial pan assembly with a pencil to provide a tuning indicator during alignment.

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust for max. output
1	Pin No. 1 of 12BA6 I.F. amp. tube in series with 0.1 mfd.	455 kc	"A"	Quiet point 1600 kc end of dial	Top and bottom T2 2nd I. F. trans.
2	Pin No. 7 of 12BE6 converter tube in series with 0.1 mfd.				Top and bottom T1* 1st I. F. trans.
3	Antenna lead in series with 100 mmfd.	1600 kc	"A"	1600 kc	C14 "A" osc.
4		1400 kc		1400 kc	C2 "A" ant. C10 "A" R. F.
5		600 kc		600 kc	†L8 "A" osc. †L3 "A" R. F.
6	Repeat Steps 3, 4 and 5.				
7	Pin No. 7 of 12BE6 converter in series with 0.1 mfd. capacitor	11.8 mc	"C"	11.8 mc	**C16 "C" osc.
8		9.5 mc		9.5 mc	†L6 "C" osc.
9	Repeat Steps 7 and 8.				
10	Antenna lead in series with 50 mmfd.	11.8 mc	"C"	11.8 mc	**C3 "C" ant.
11		9.5 mc		9.5 mc	†L4 "C" ant.
12	Repeat Steps 10 and 11.				

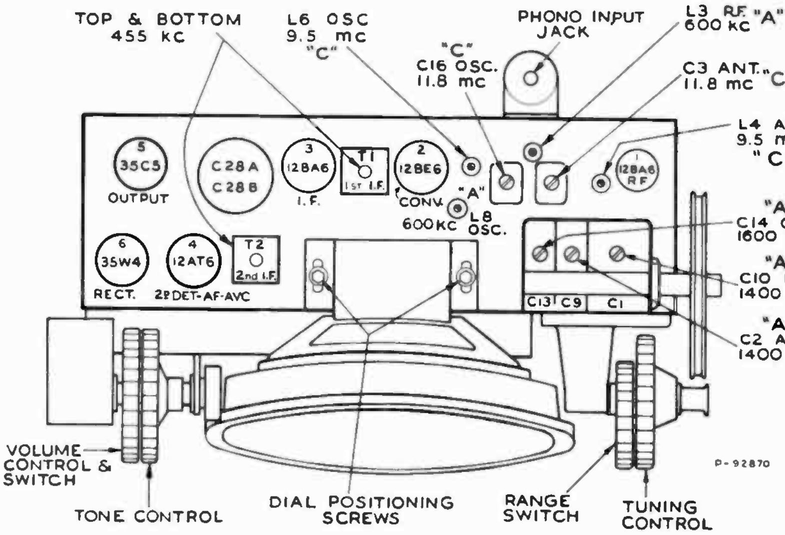
*Do not readjust T2.
†Rock gang.
**If two peaks are found use minimum capacity peak on C16 (osc.) and maximum capacity peak on C3 (ant.).



Dial-Indicator and Drive Mechanism

Lead Dress

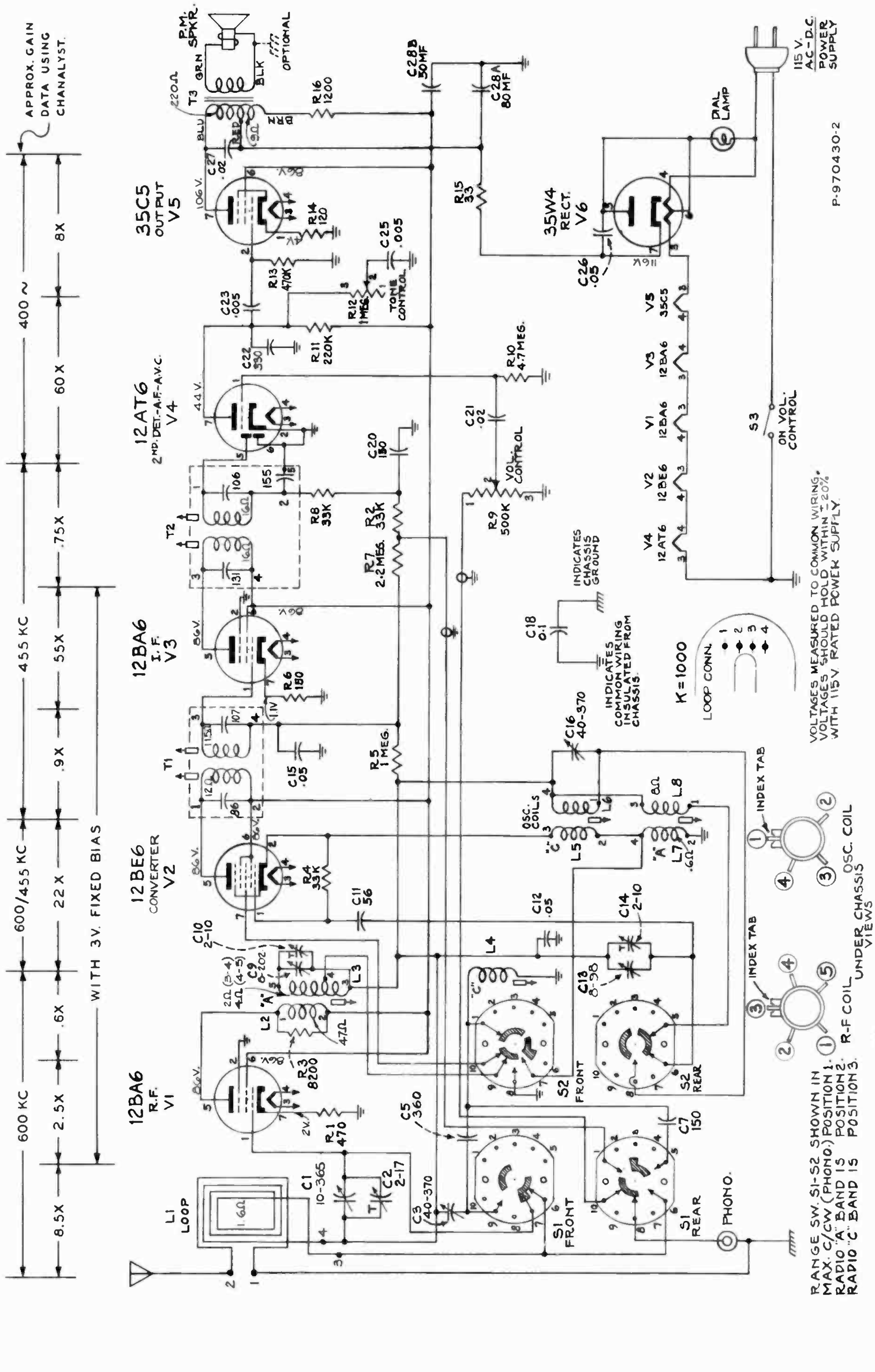
1. Dress all heater leads down to chassis and as far as possible from all audio grid and plate wiring.
2. Dress power cord to side apron away from coupling capacitors.
3. Dress pilot lamp leads toward chassis bottom and away from audio coupling capacitor.
4. Dress all leads and components away from all coils.
5. Dress lead from range switch to phono socket against switch shield and chassis apron.
6. The antenna lead should be taped up when not in use.



Tube and Trimmer Locations

Cathode Currents

		"A" Band	"C" Band
(1)	12BA6	4.1 ma	6.9 ma
(2)	12BE6	7.3 ma	7.2 ma
(3)	12BA6	6.7 ma	7.4 ma
(4)	12AT6	0.2 ma	0.2 ma
(5)	35C5	34.7 ma	33.5 ma
(6)	35W4	52 ma	53 ma



Schematic Diagram

Replacement Parts

Stock No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1061
73536	Arm—Range switch actuating arm and hub
71924	Capacitor—Ceramic, 56 mmf. (C11)
39632	Capacitor—Mica, 150 mmf. (C7, C20)
72571	Capacitor—Mica, 330 mmf. (C22)
64641	Capacitor—Mica, 360 mmf. (C5)
73075	Capacitor—Adjustable, 40-370 mmf. (C3, C16)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C23, C25)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C21)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C27)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C12, C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C26)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C18)
73520	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C28A, C28B)
73526	Clip—Tubular clip for fastening dial—located on dial mounting track (2 required)
73518	Coil—R-F coil—"A" band—complete with adjustable core and stud (L2, L3)
73519	Coil—Antenna coil—"C" band—complete with adjustable core and stud (L4)
73517	Coil—Oscillator coil—"C" band—complete with adjustable core and stud (L5, L6)
73516	Coil—Oscillator coil—"A" band—complete with adjustable core and stud (L7, L8)
73513	Condenser—Variable tuning condenser (C1, C2, C9, C10, C13, C14)
73544	Control—Tone control (R12)
73543	Control—Volume control and power switch (R9, S3)
†72913	Cord—Drive cord (approx. 48" overall length required)
28451	Cover—Insulating cover for electrolytic capacitor
73522	Dial—Dial and screen assembly
72283	Grommet—Rubber grommet for mounting tuning condenser (3 required) or for mounting capacitor (C3, C16) and bracket (1 required)
33139	Grommet—Rubber grommet for range switch connecting rod (2 required)
73538	Knob—Range switch knob (thumb wheel type)
73541	Knob—Tone control knob (thumb wheel type)
73537	Knob—Tuning knob (thumb wheel type)
73542	Knob—Volume control and power switch knob (thumb wheel type)
73512	Loop—Antenna loop complete (L1)
73484	Pan—Dial pan and cushion—less track, pulleys and lamp socket
73530	Pulley—Dial track drive pulley (2 required)
73531	Pulley—Dial track idler pulley (2 half pulleys)
73237	Resistor—Wire wound, 33 ohms, 150 MA (R15)
	Resistor—Fixed, composition, 120 ohms ± 10%, ½ watt (R14)
	Resistor—Fixed, composition, 150 ohms ± 10%, ½ watt (R6)
	Resistor—Fixed, composition, 470 ohms ± 10%, ½ watt (R1)
	Resistor—Fixed, composition, 1200 ohms ± 10%, 1 watt (R16)
	Resistor—Fixed, composition, 8200 ohms ± 10%, ½ watt (R3)
	Resistor—Fixed, composition, 33,000 ohms ± 10%, ½ watt (R2, R4, R8)
	Resistor—Fixed, composition, 220,000 ohms ± 20%, ½ watt (R11)
	Resistor—Fixed, composition, 470,000 ohms ± 20%, ½ watt (R13)
	Resistor—Fixed, composition, 1 megohm ± 20%, ½ watt (R5)
	Resistor—Fixed, composition, 2.2 megohm ± 20%, ½ watt (R7)
	Resistor—Fixed, composition, 4.7 megohm ± 20%, ½ watt (R10)
73539	Rod—Connecting rod between range switch knob and actuating arm
73545	Screen—Dial screen only
73534	Shaft—Range switch and tuning knobs mounting shaft
73521	Shield—Tube shield
73529	Socket—Dial lamp socket
73374	Socket—Phono input socket
36069	Socket—Tube socket—for tubes V1, V2, V3, V4
9914	Socket—Tube socket—for tubes V5, V6
74038	Spring—Drive cord spring
73527	Spring—Pressure spring for dial track idler pulley
73528	Stud—Dial track idler pulley mounting stud
73514	Support—Drive cord pulley support complete with three (3) pulleys
73535	Switch—Selector switch (S1, S2)
73525	Track—Die cast pulley track and dial mounting ring less fastener clip
73036	Transformer—First I-F transformer (T1)
73037	Transformer—Second I-F transformer (T2)
72296	Transformer—Output transformer (T3)
33726	Washer—"C" washer to hold pulleys
2917	Washer—"C" washer to hold range switch and tuning knobs shaft
73524	Washer—Insulating washer for mounting chassis bottom cover to cabinet base (4 required)
73533	Washer—Spring washer to prevent pulleys from rattling or to prevent rattle in range switch and tuning knobs shaft
73540	Washer—Spring washer between tuning knob and mounting bracket
	SPEAKER ASSEMBLY 92572-5W
74103	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
73515	Base—Metal base for cabinet—less chassis bottom cover or rubber feet
73547	Button—Dial crystal button to diffuse dial lamp light
Y2002	Cabinet—Maroon plastic cabinet only for Model 8X681—less emblem, bezel ring or metal base
Y2003	Cabinet—Ivory plastic cabinet only for Model 8X682—less emblem, bezel ring or metal base
73546	Crystal—Dial crystal
73549	Emblem—"RCA-Victor" emblem
73523	Foot—Rubber foot (4 required)
31480	Lamp—Dial lamp—Mazda 47
73548	Ring—Bezel ring for dial crystal
73971	Screen—Ventilating screen—black—for back of cabinet for Model 8X681
73972	Screen—Ventilating screen—ivory—for back of cabinet for Model 8X682

†Stock No. 72953 is a spool containing 250 ft. of cord.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

DIAL PAN AND TRACK ASSEMBLY
(Late Production)

In late production the dial pan and track assembly is changed as follows:

(1) The studs (fixed and idler) are shorter — 19/32" vs. 5/8" overall length.

(2) The two half pulleys are replaced by 1 full pulley (Stock No. 73530).

(3) Spring washers are not used.

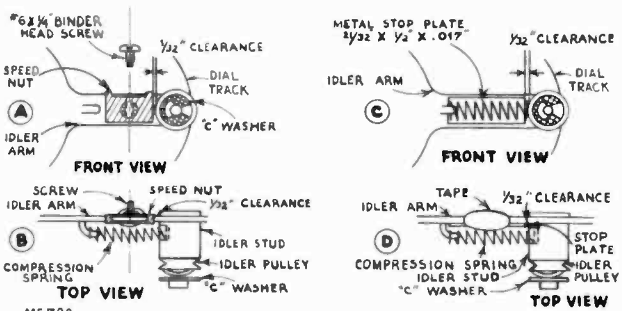
The parts are interchangeable as follows:

(1) Original stud or original pan using 5/8" studs — USE SPRING WASHER — original idler stud (Stock No. 73528) is carried in stock.

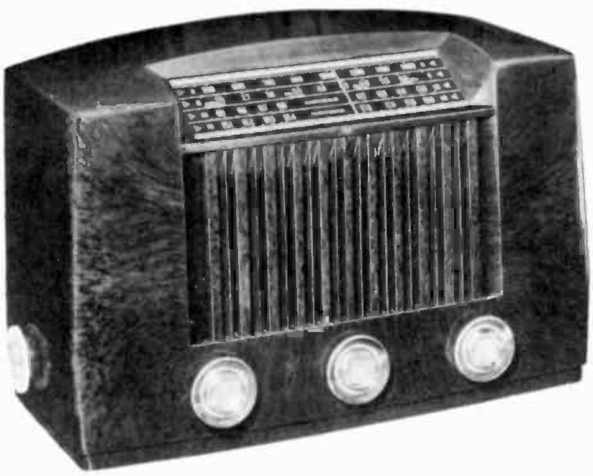
(2) Short stud or new pan using 19/32" studs — OMIT SPRING WASHER—new pan (Stock No. 73484) is carried in stock.

(3) The two half pulleys may be replaced by one full pulley—both are carried in stock.

A stop is used to limit the movement of the idler stud, thus preventing the pulleys from jumping off the dial track due to rough handling during shipment. This stop may be either a speed nut and screw (A & B) or a plate taped to the idler arm (C & D).



ALL PULLEYS MUST BE ON TRACK



RCA
MODEL QB60

Chassis No. RC-607—Mfr. No. 274

Service Data

1948 . . . . X1

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Electrical and Mechanical Specifications

Frequency Ranges
Standard Broadcast ("A" Band) .... 540-1600 kc (550-187 meters)
Medium Wave ("B" Band) .... 2.45-6.3 mc (122-47.5 Meters)
"31-25 Meter" Spread Band .... 9.5-12 mc (31.6-25 meters)
"19-16 Meter" Spread Band .... 15.1-18 mc (19.9-16.6 meters)

Intermediate Frequency .... 455 kc

Tube Complement
(1) RCA-1N5GT .... R-F Amplifier
(2) RCA-1A7GT .... Converter
(3) RCA-1N5GT .... I-F Amplifier
(4) RCA-1U5 .... 2nd Det.-AVC-1st A-F
(5) RCA-3Q5GT .... Output

Phonograph Attachment
A jack is provided on the rear of the chassis for connecting a phonograph attachment. When it is in use adjust the tuning to a point where no station is received. When not in use it should be disconnected from the radio.

Power Supply (Battery Operation)
Battery required 1-RCA VSO-22 .... 1½ volts "A", 90 volts "B"
or equivalent: 1-RCA VSO-24 .... 1½ volts "A"
and 2-RCA VSO-26 .... 45 volts "B"

Battery Currents	Normal	Battery Saver
"A" Battery	.3 ampere	.25 ampere
"B" Battery	13.6 milliamperes	7.2 milliamperes

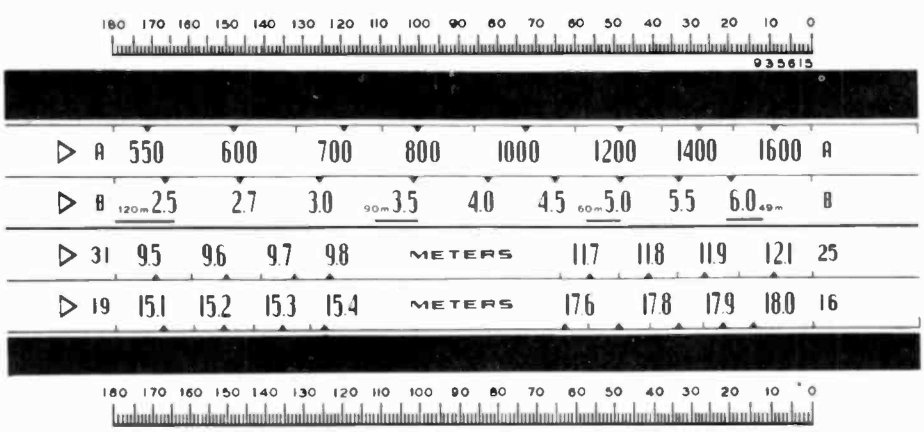
Power Supply (Alternating Current Operation)
Electrifier CV-112X .... 105/125 volts or 210/250 volts 50 to 60 cycles
Power consumption .... approximately 15 watts

Loudspeaker (92570-2)
Type—6½ inch (16.5 cm) permanent magnet dynamic
Voice coil impedance .... 3.2 ohms at 400 cycles

Power Output	Normal	Battery-Saver
Undistorted	.24 watts	.04 watts
Maximum	.48 watts	.15 watts

Tuning Drive Ratio .... 25:1 (12½ turns of knob)

Cabinet Dimensions
Height 10⅞ inches (28 cm), Width 16¼ inches (41 cm), Depth 7⅝ inches (19 cm)



Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on the top calibration scale. For example: 148° on the calibration scale corresponds to approximately 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

QB60

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscilloscope are shown on the Schematic Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

Receiver Dial with Calibration Scale.—To determine the corresponding frequency for any setting of the calibration scales, refer to the dial with calibration scale drawing.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark, and gang condenser fully meshed. The indicator has a clip for attachment to the cable.

Spread-Band Alignment.—For spread-band alignment an extremely high degree of accuracy is required of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials.

Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by one of the following methods:

1. Zero-beat the test-oscillator against short-wave stations of known frequency.
2. Check test-oscillator signals with a crystal controlled oscillator.

A final check should be made on actual reception of short-wave stations of known frequency.

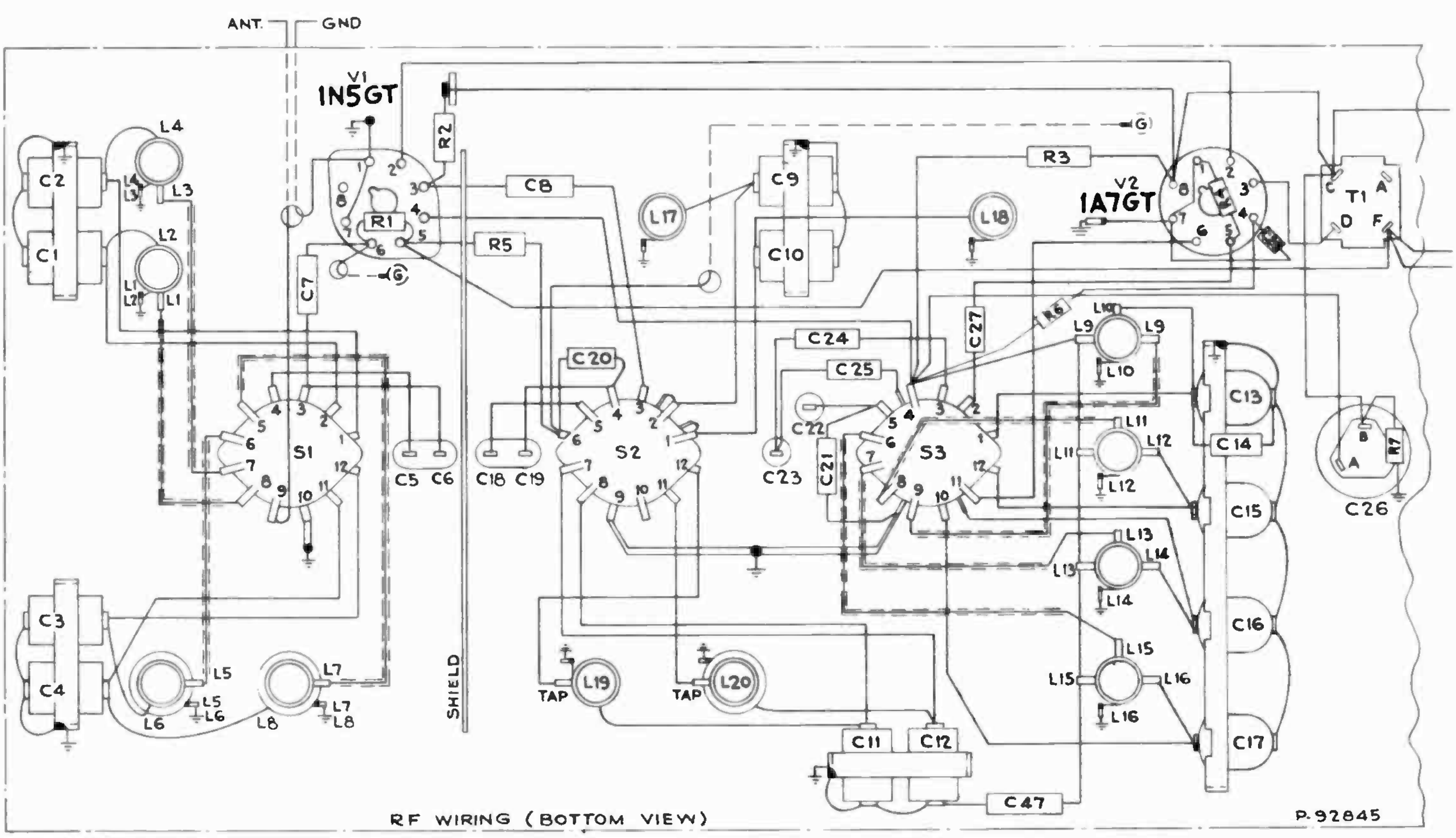
For additional information, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Range switch	Turn radio dial to—	Adjust the following for max. peak output
1	I-F grid cap, in series with .01 mfd.	455 kc	A	Quiet point near 180°	L23—L24 2nd I-F transformer
2	Conv. Grid, in series with .01 mfd.				L21—L22 1st I-F transformer
3	Ant. lead in series with 200 mmf.	1,500 kc	A	19°	C17 (OSC.) C12 (RF.) C4 (ant.)
4		600 kc		148°	L16 (OSC.)** L20 (RF.) L8 (ant.)
5		Repeat steps 3 and 4			
6	Ant. lead in series with 300 ohms	6.1 mc.	B	16.8°	C16 (OSC.)* C11 (RF.) C3 (ant.)
7		2.5 mc.		165.7°	L14 (OSC.)** L-19 (RF.) L-6 (ant.)
8		Repeat steps 6 and 7			
9		11.8 mc.	31-25 meter band	41.4°	C15 (OSC.)* C10 (RF.) C2 (ant.)
10		9.6 mc.		150.5°	L12 (OSC.)** L18 (RF.) L4 (ant.)
11		Repeat steps 9 and 10			
12		17.75 mc.	19-16 meter band	41°	C13 (OSC.)* C9 (RF.) C1 (ant.)
13		15.4 mc.		125.5°	L10 (OSC.)** L17 (RF.) L2 (ant.)
14		Repeat steps 12 and 13			

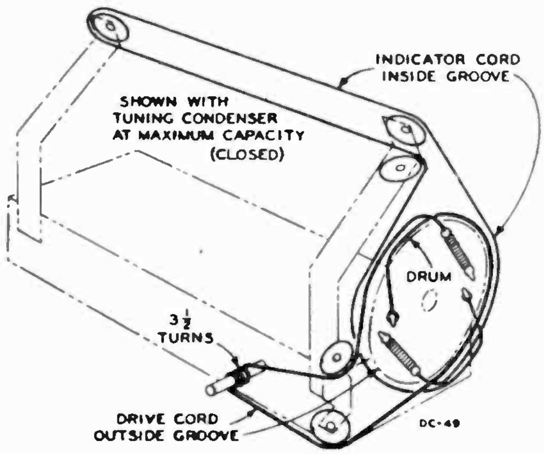
* Use minimum capacity peak if two can be obtained.

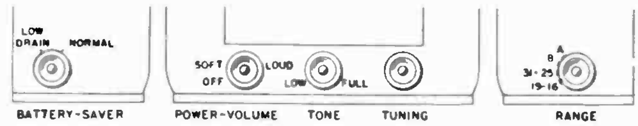
** If two peaks can be obtained, use the one obtained when the core screw is farthest out (counter-clockwise).

NOTE: Oscillator tracks above signal on all bands.



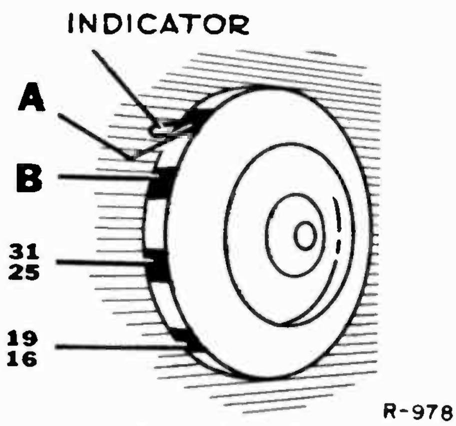
R. F. Wiring Diagram (Bottom View)



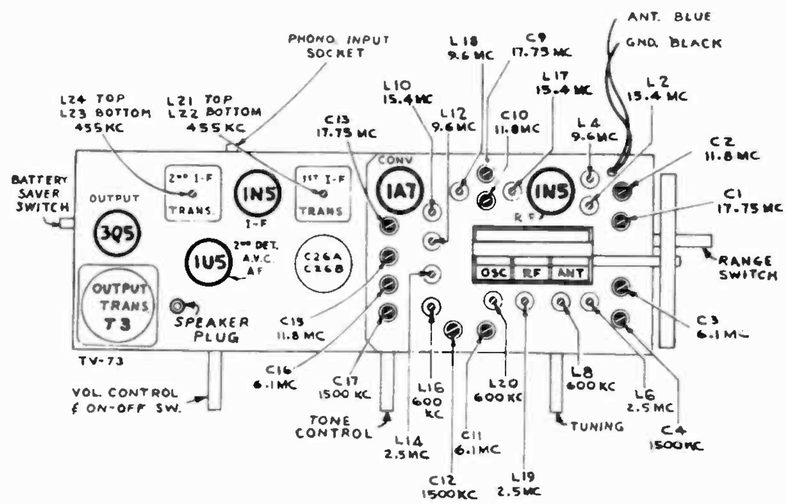


Controls

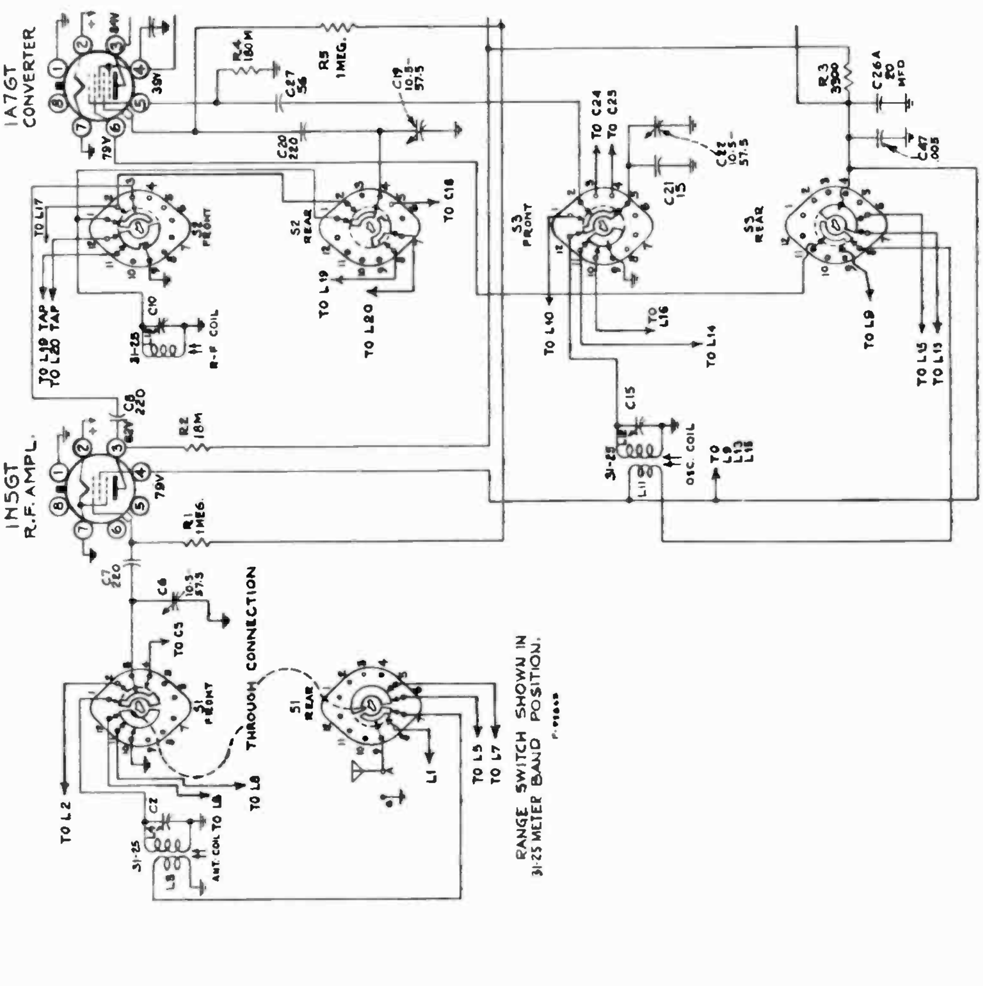
Dial-Indicator and Drive Mechanism



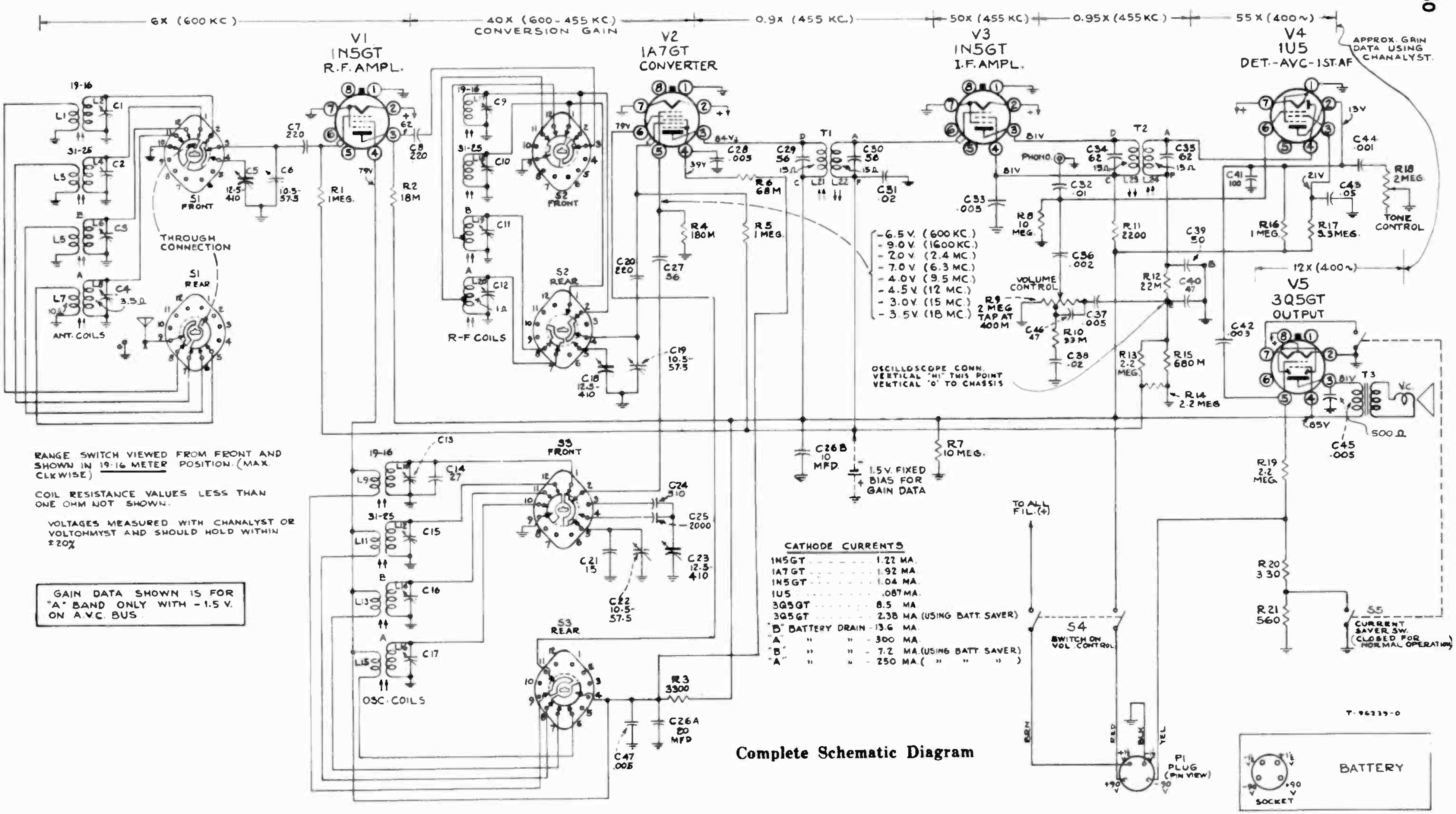
Range Control



Tube and Trimmer Locations (Top View)



Simplified Schematic Diagram 31-25 Meter Band



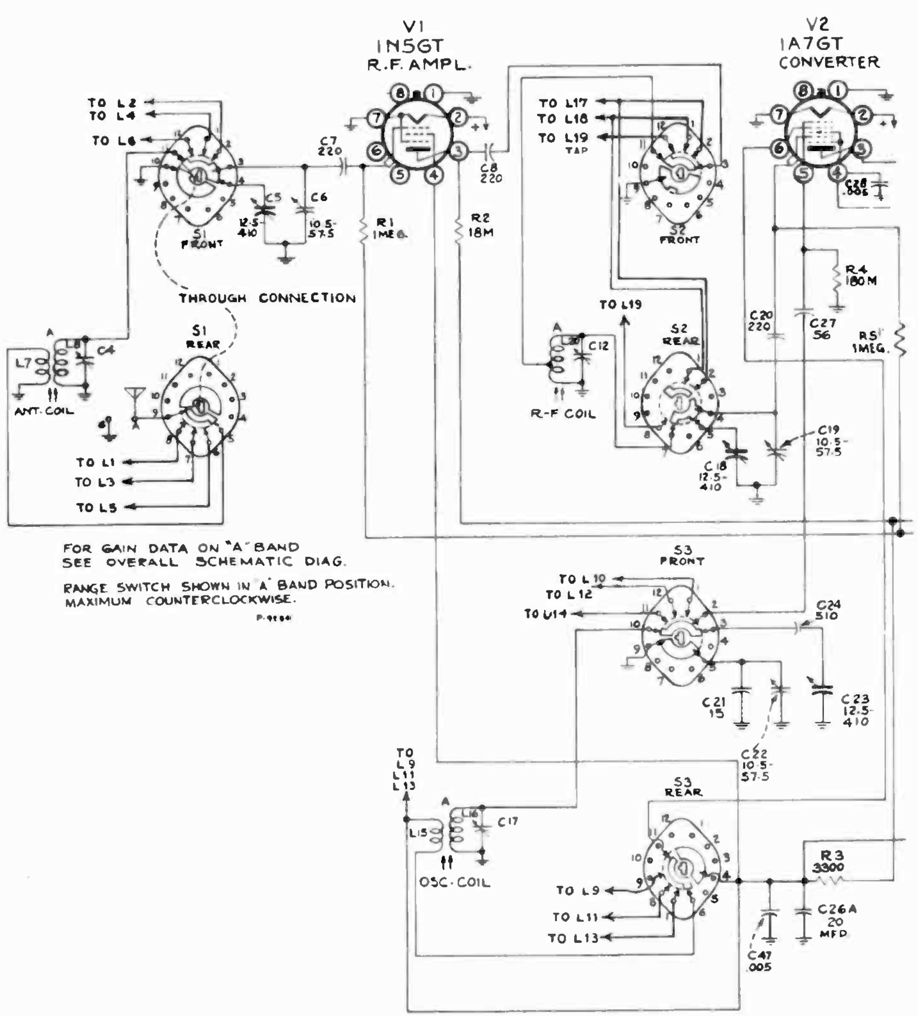
Complete Schematic Diagram

Resistor Substitution:

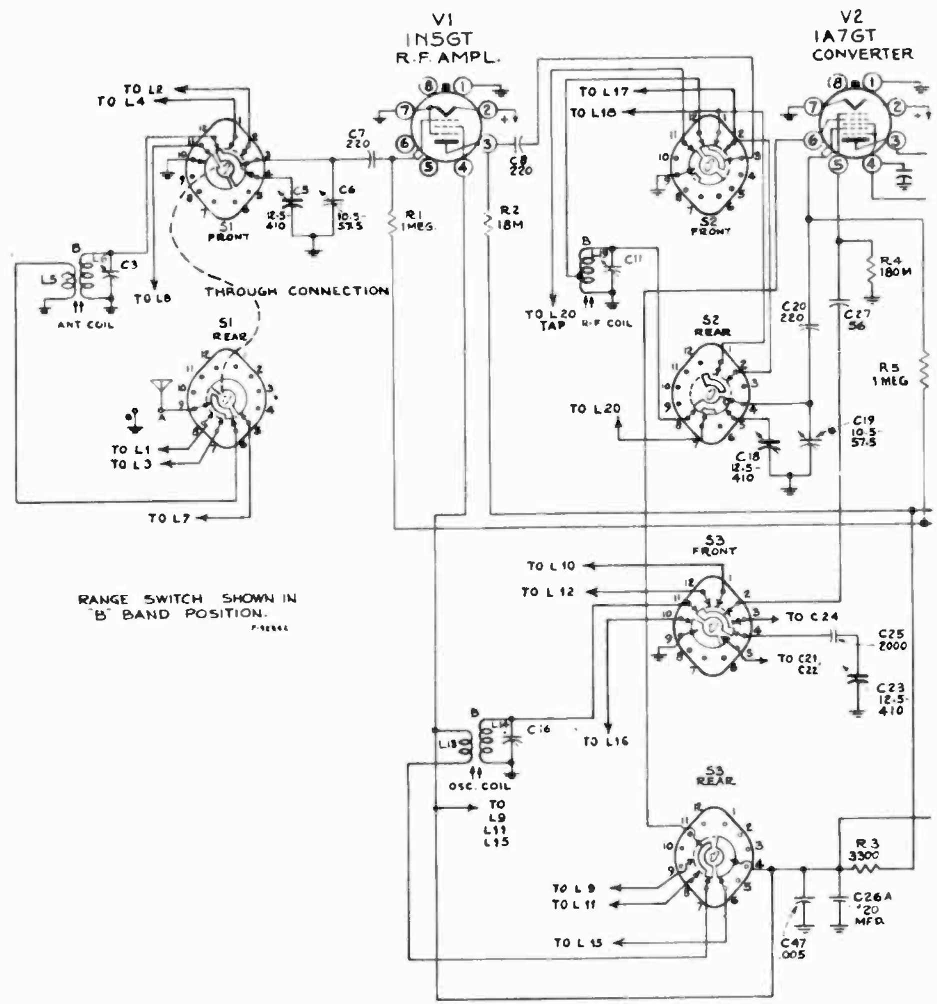
In some chassis two 1000 ohm resistors are connected in parallel as a substitute for the 560 ohm resistor R21.

Capacitor Substitution:

In some chassis the 47 mmf capacitor C40 is a mica capacitor instead of a ceramic capacitor.

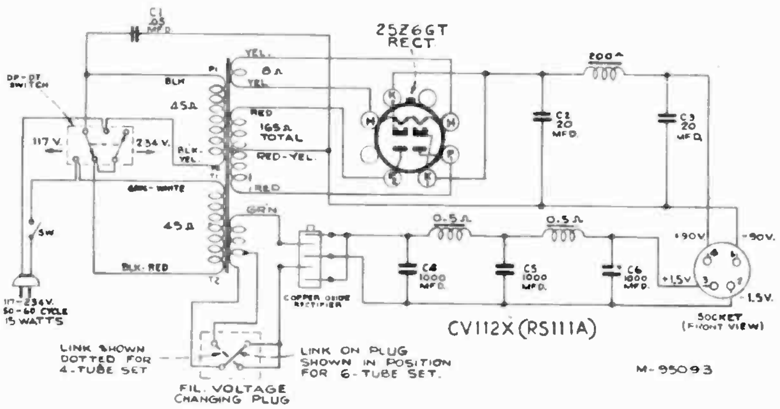


Simplified Schematic Diagram "A" Band



Simplified Schematic Diagram "B" Band

CV-112X Electrifier Chassis No. RS-111A



Filament Voltage Changing Plug should be in 4 TUBE position.

Battery Saver Switch should be in NORMAL position.

Replacement Parts

CV-112X (RS-111A)

4886 Capacitor—.05 mfd.—400 volts (C1).
30873 Capacitor—Electrolytic, 2 sections 20 mfd., 150 volts. (C2, C3)
36553 Capacitor—Electrolytic, 1,000 mfd., 3 volts. (C4, C5, C6)
36547 Coil—High voltage choke coil—200 ohms.
36548 Coil—Low voltage choke coil—marked 1B84.
36549 Coil—Low voltage choke coil—marked 1B85.
38353 Plug—2-contact filament voltage changing plug.
36551 Rectifier—1.5 volt rectifier.
36552 Socket — 4-contact power output socket.
18008 Socket—Tube socket.
36550 Switch—Power cord switch.
33491 Switch—Voltage change switch.
38393 Transformer—Power transformer—110-220 volts, 50-60 cycle.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-607
72247	Bracket—Support bracket for battery saver switch
35642	Calibrator—Drive drum calibrator
71921	Capacitor—Tubular, .003 mfd., 200 volts (C42)
45465	Capacitor—Ceramic, 15 mmf. (C21)
70935	Capacitor—Ceramic, 27 mmf. (C14)
39042	Capacitor—Ceramic, 47 mmf. (C46)
72843	Capacitor—Mica, 47 mmf. (C40)
71924	Capacitor—Ceramic, 56 mmf. (C27)
72810	Capacitor—Mica, 100 mmf. (C41)
39636	Capacitor—Mica, 220 mmf. (C7, C8, C20)
71932	Capacitor—Mica, 510 mmf. (C24)
72526	Capacitor—Mica, 2000 mmf. (C25)
70745	Capacitor—Mica trimmer, comprising 1 section of 12-160 mmf. and 1 section of 4-70 mmf. (C1, C2, C9, C10)
72255	Capacitor—Mica trimmer, comprising 1 section of 3-35 mmf., and 1 section of 4-70 mmf. (C3, C4, C11, C12)
72256	Capacitor—Ceramic trimmer, comprising 4 sections of 5-50 mmf. (C13, C15, C16, C17)
72792	Capacitor—Tubular, .001 mfd., 200 volts (C44)
72315	Capacitor—Tubular, .002 mfd., 200 volts (C36)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C28, C33, C37, C45, C47)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C32)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C31, C38)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C43)
72253	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 150 volts and 1 section of 10 mfd., 150 volts (C26A, C26B)
72263	Coil—Antenna coil, 19-16 meter band (L1, L2)
72264	Coil—Antenna coil, 31-25 meter band (L3, L4)
72262	Coil—Antenna coil, "B" band (L5, L6)
72261	Coil—Antenna coil, "A" band (L7, L8)
72267	Coil—Oscillator coil, 19-16 meter band (L9, L10)
72268	Coil—Oscillator coil, 31-25 meter band (L11, L12)
72257	Coil—Oscillator coil, "B" band (L13, L14)
72258	Coil—Oscillator coil, "A" band (L15, L16)
72265	Coil—R. F. coil, 19-16 meter band (L17)
72266	Coil—R. F. coil, 31-25 meter band (L18)
72260	Coil—R. F. coil, "B" band (L19)
72259	Coil—R. F. coil, "A" band (L20)
70957	Condenser—Variable tuning condenser (C5, C6, C18, C19, C22, C23)
38401	Control—Tone control (R18)
38404	Control—Volume control and power switch (R9, S4)
†72953	Cord—Drive cord (approx. 53" [135 cm] overall length required)
†72913	Cord—Pointer cord (approx. 33" [84 cm] overall length)
35627	Drum—Drive drum less calibrator
70429	Grommet—Rubber grommet to mount 1U5 tube socket (2 required)
37396	Grommet—Rubber grommet to mount R. F. shelf (4 required)
70391	Insulator—Input socket insulator
30568	Plug—4 prong male plug for battery cable
32289	Pulley—Drive cord pulley (small)
35630	Pulley—Drive cord pulley (large)
8063	Resistor—330 ohms, ½ watt (R20)
5164	Resistor—560 ohms, ½ watts (R21)
34767	Resistor—2200 ohms, ½ watt (R11)
30733	Resistor—3300 ohms, ½ watt (R3)
3219	Resistor—18,000 ohms, ½ watt (R2)
30492	Resistor—22,000 ohms, ½ watt (R12)
30685	Resistor—33,000 ohms, ½ watt (R10)
14138	Resistor—68,000 ohms, ½ watt (R6)
11959	Resistor—180,000 ohms, ½ watt (R4)
30562	Resistor—680,000 ohms, ½ watt (R15)
30652	Resistor—1 megohm, ½ watt (R1, R5, R16)
30649	Resistor—2.2 megohms, ½ watt (R13, R14, R19)
31417	Resistor—3.3 megohms, ½ watt (R17)
30992	Resistor—10 megohms, ½ watt (R7, R8)
14350	Screw—#8-32 square head set screw for drive drum
72248	Shaft—Tuning shaft and flywheel
70377	Shield—Protective shield for 1A7GT tube
35787	Socket—Phono or speaker input socket
70827	Socket—Tube socket—wafer
31319	Socket—Tube socket—molded for 1A7 tube
72251	Socket—Tube socket complete with mounting plate for 1U5 tube
31518	Spring—Tension spring for pointer and drive cords
72250	Support—L. H. pulley support complete with drive cord pulley
72249	Support—R. H. pulley support complete with four (4) drive cord pulleys
72246	Switch—Battery saver switch (S5)
72254	Switch—Range switch (S1, S2, S3)
71403	Transformer First I. F. transformer (T1, L21, L22, C29, C30)
72252	Transformer—Second I. F. transformer (T2, L23, L24, C34, C35, C39)
72245	Transformer—Out put transformer (T3)
2917	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES 92570-2J
72520	Cone—Cone and voice coil assembly
31048	Plug—Pin plug for speaker cable
72724	Speaker—6½" (16½ cm) P.M. speaker complete with cone and voice coil less cable and plug
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS ASSEMBLIES
70833	Board—Baffle board and grille cloth
Y1384	Cabinet—Cabinet for Model QB60
36103	Decal—Power switch decal
35388	Decal—Tone control decal
71089	Decal—Trade mark decal
35391	Decal—Tuning control decal
72270	Dial—Glass dial scale
35647	Frame—Dial frame less indicator and dial
70580	Indicator—Station selector indicator
72269	Knob—Range switch knob
70836	Knob—Volume control, tone control, tuning or battery switch knob
14270	Spring—Retaining spring for knobs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

†Stock Nos. 72953 and 72913 are reels containing 250 ft. (76.2 meters) of cord.

RCA MODEL QU62

Chassis No. RC-602B Mfr. No. 274

FOR INFORMATION ON RECORD CHANGER REFER TO SERVICE DATA FOR MODEL 960001

Service Data

1947.....X 5

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Range

Standard Broadcast ("A" Band)	540-1600 kc (556-187 m)
Medium Wave ("B" Band)	2.45-6.3 mc (122-47.7 m)
"31-25 Meter" Spread Band	9.5-12 mc (31.6-25 m)
"19-16 Meter" Spread Band	15.1-18 mc (19.8-16.6 m)
"13-11 Meter" Spread Band	21.4-27 mc (14-11.1m)

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA 6SG7	R-F Amplifier
(2) RCA 6SA7	1st Detector
(3) RCA 6SK7	I-F Amplifier
(4) RCA 6U5/6G5	Tuning Indicator
(5) RCA 6SQ7	2nd Detector, A.V.C., A-F Amplifier
(6) RCA 6F6G	Power Output
(7) RCA 6F6G	Power Output
(8) RCA 5U4G	Rectifier
(9) RCA 6AT6	Phase Inverter

Loudspeakers (2)

Type 92569-4 (RL103-4)	12 in. PM
Type 92566-3 (RL70N1)	12 in. EM
V-C Impedance (400 c.p.s.)	2.2 ohms

Power Output Rating

Undistorted	10 watts
Maximum	12 watts

Tuning Drive Ratio 22:1

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating D	(See below)	60†	150

110 position—100 min.—115 max.
125 position—115 min.—135 max.
150 position—135 min.—165 max.
210 position—190 min.—230 max.
240 position—220 min.—260 max.

Note: Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.

CAUTION: Remove power cord from line receptacle before changing link position.

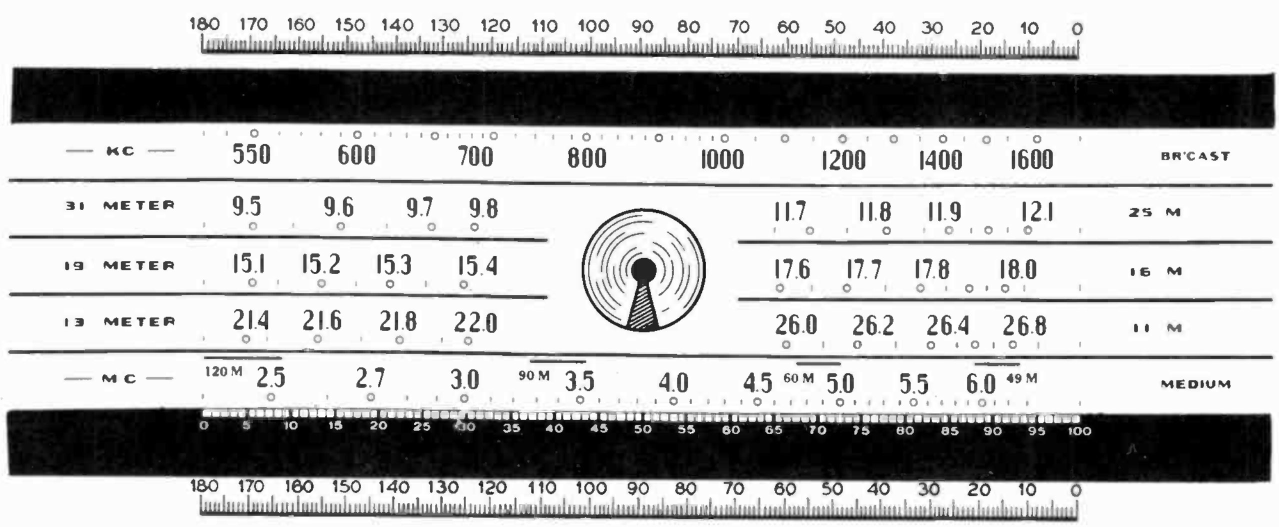
†This instrument may be operated from 50 cycle power supply if the record changer is modified—refer to 960001 Service Data.

Record Changer	Type 960001-4
Capacity	ten 12 in. or twelve 10 in. records

Lamps

Dial lamps	2 Type 51, 6.3 volts 0.20 amp.
Vol. Cont. lamp	1 Type 47, 6.3 volts 0.15 amp.
Band Indicator lamp	1 Type 55, 6.3 volts 0.40 amp.
Rec. Changer Comp. lamp	1 Type 55, 6.3 volts 0.40 amp.

	Height	Width	Depth
Cabinet Dimensions (Inches)	36	38¼	17
Overall Chassis Dimensions	7¼	15¾	9⅞



Reduced Reproduction of Receiver Dial and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on top calibration scale. For example 148° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord-Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" band to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

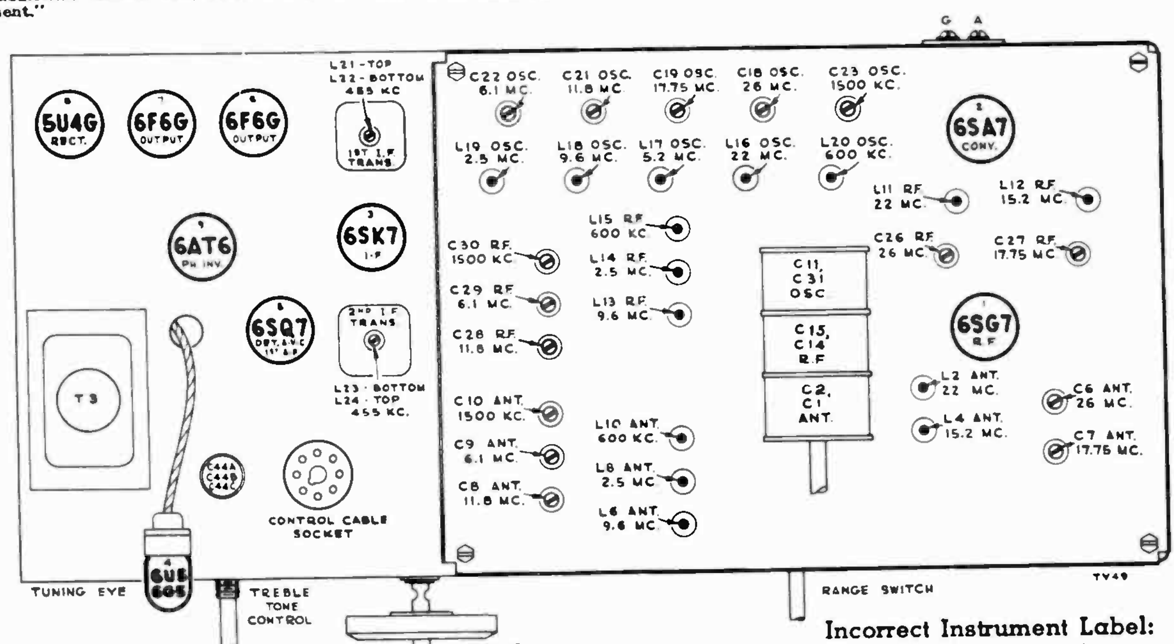
1. **Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.**
2. **Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.**

When a test-oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L23, L24 2nd. I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L21, L22 1st. I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (19°)	C23 osc. C30 rf. C10 ant.
4		600 kc		600 kc (148°)	L20 osc. L15 rf.† L10 ant.†
5	Repeat Steps 3 and 4				
6	Antenna terminal in series with 300 ohms	6.2 mc	"B" Band	6.2 mc (14°)	C22 osc.* C29 rf. C9 ant.
7		2.6 mc		2.6 mc (152°)	L19 osc.† L14 rf.† L8 ant.†
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C21 osc.* C28 rf.** C8 ant.
10		9.5 mc		9.5 mc (170°)	L18 osc.† L13 rf.† L6 ant.†
11		17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C19 osc.* C27 rf.** C7 ant.
12		15.2 mc		15.2 mc (155°)	L17 osc.† L12 rf.† L4 ant.†
13		26.25 mc	"13-11 Meter" Band	26.25 mc (42°)	C18 osc.* C26 rf.** C6 ant.
14		21.25 mc		21.25 mc (180°)	L16 osc.† L11 rf.† L2 ant.†

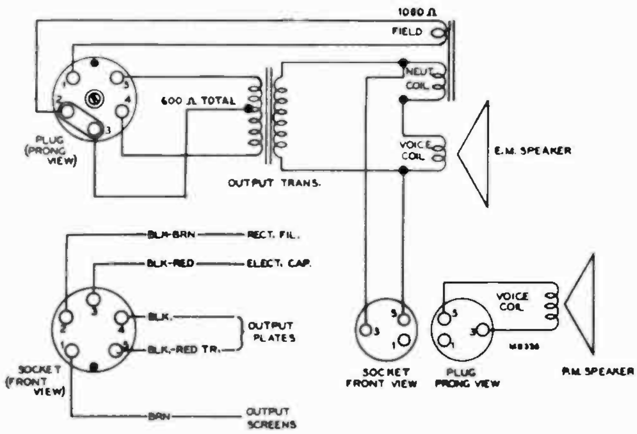
Oscillator tracks above signal on all bands.
*Use minimum capacity peak if two peaks can be obtained.
†These adjustments are pre-set and should not require re-adjustment except when components of the tuning section are changed.
**Rock in—use maximum capacity peak if two peaks can be obtained.



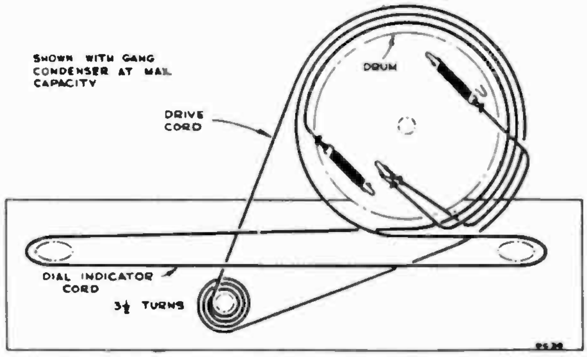
Tube and Trimmer Locations (Top View)

Incorrect Instrument Label:

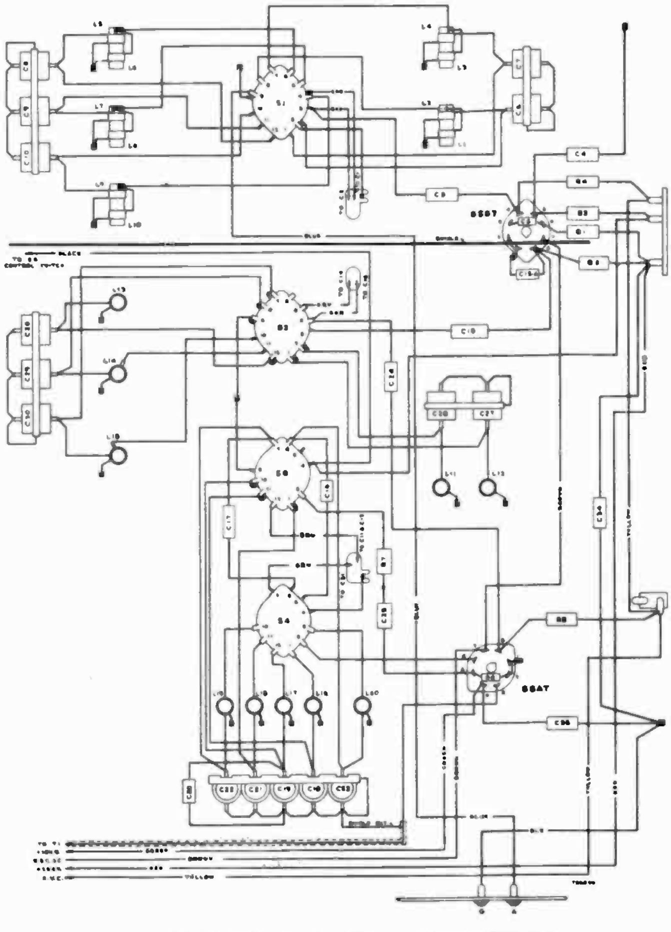
The instrument label used on some instruments is incorrect in showing tube locations. The r-f shelf assembbly which contains tubes 6SG7 and 6SA7 should be turned 90° clockwise. The correct tube locations are illustrated



Loudspeaker Connections



Dial-Indicator and Drive Mechanism

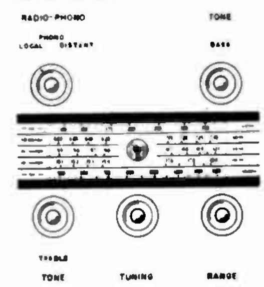


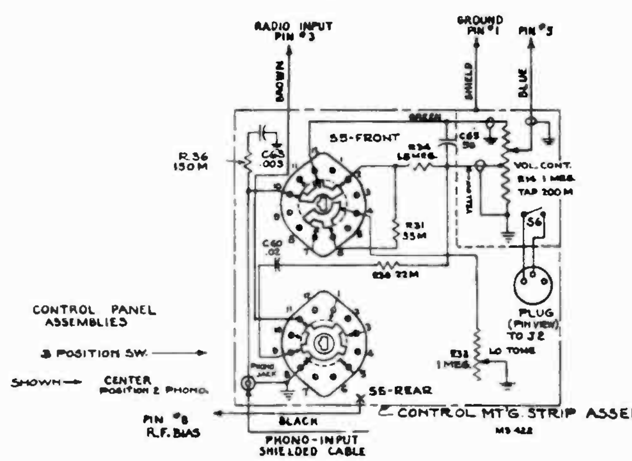
R. F. Wiring Diagram (Bottom View)

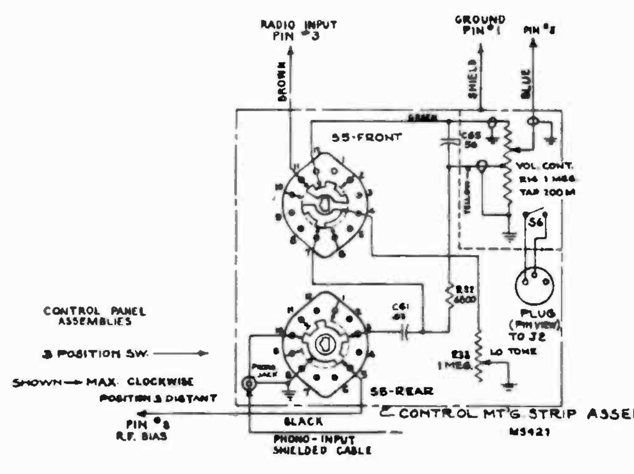
Critical Lead Dress

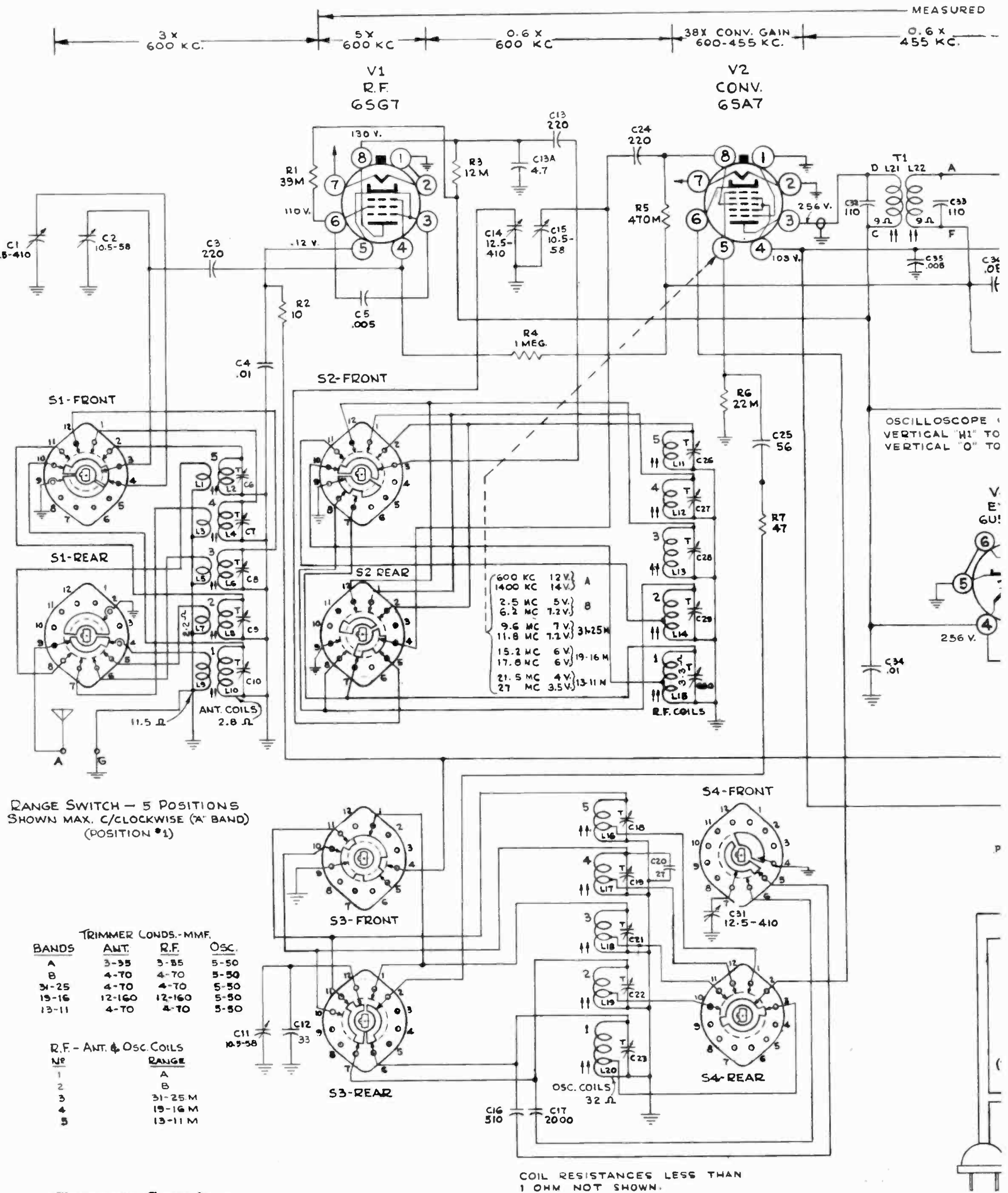
1. Dress C47 and R16 against chassis.
2. Dress R23 against chassis.
3. Dress C48 on power transformer side of terminal board.
4. All resistor and capacitor leads should be as short as practical.
5. Twist electrolytic capacitor leads and dress between chassis and electrolytic capacitor.
6. Twist all A.C. leads and keep close to chassis and away from other component parts and wires.
7. Dress blue treble tone control (R18) lead along intersection of chassis and rear apron and under electrolytic capacitor.
8. Keep tuning indicator and pilot lamp leads away from 6SQ7 tube.
9. Dress C35 against RF plate assembly.
10. Dress C25 and R7 and C24 midway between range switch and RF coil.
11. Keep coil leads to switch and trimmers with minimum slack but not stretched tight.
12. Flexibility of RF plate assembly must be maintained.
13. Dress black lead from phono-radio switch to range switch close to chassis.
14. Dress C13A away from RF shield.
15. Dress C34 against RF plate assembly.
16. Keep all gang leads as short as practical.
17. A loop must be maintained in ground braid connecting RF plate assembly to chassis.
18. Dress blue lead to antenna terminal against RF shield.

Controls →









TRIMMER CONDS.-MMF.

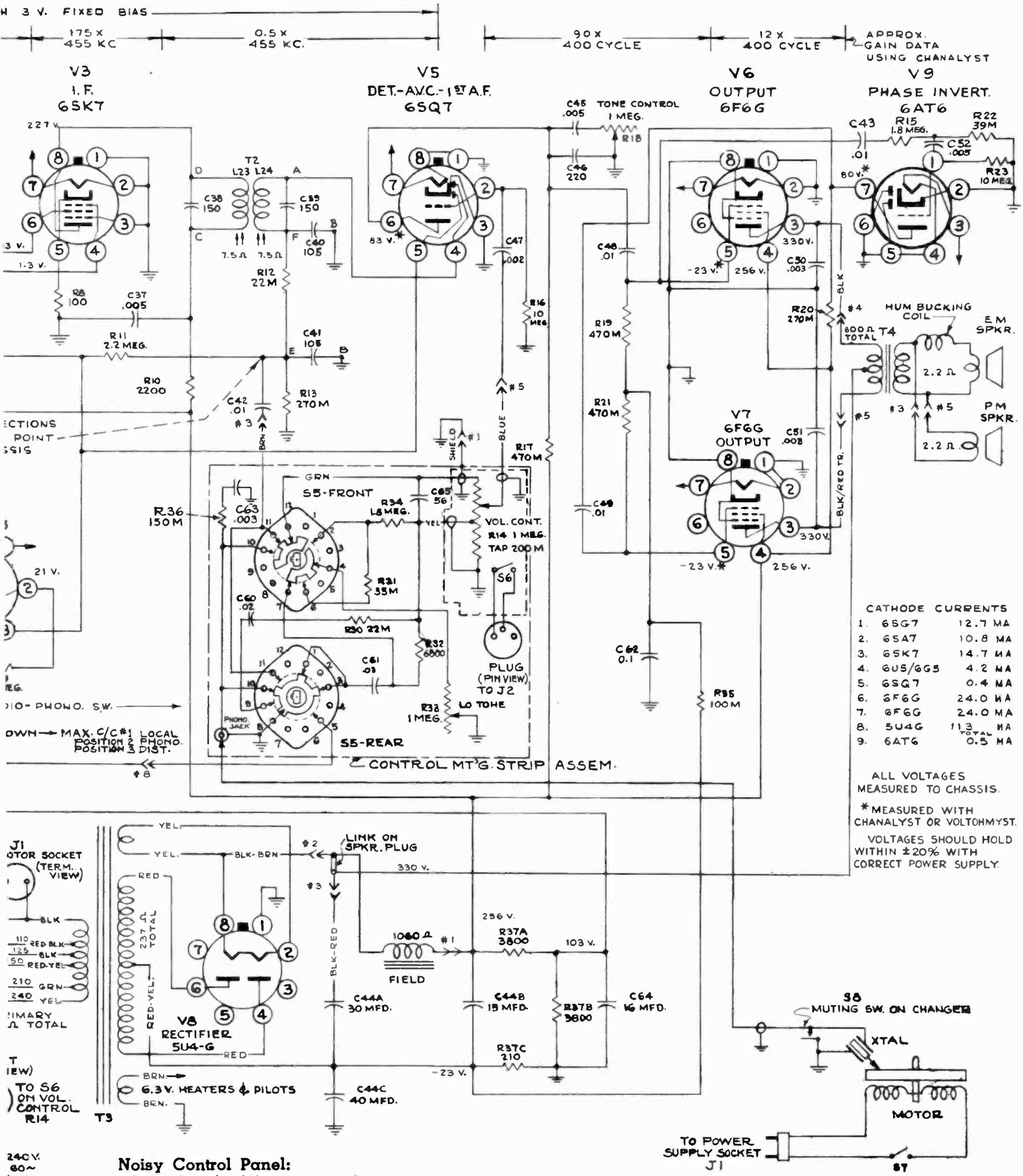
BANDS	ANT.	R.F.	OSC.
A	3-35	3-35	5-50
B	4-70	4-70	5-50
31-25	4-70	4-70	5-50
19-16	12-160	12-160	5-50
13-11	4-70	4-70	5-50

R.F. - ANT. & OSC. COILS

No	RANGE
1	A
2	B
3	31-25 M
4	19-16 M
5	13-11 M

Change in Capacitor:

Capacitor C12 has been changed from 39 mmf. to 33 mmf. (It is used in the oscillator circuit and connected to term. #12 of S3 rear.)



CATHODE CURRENTS

1.	6SG7	12.7 MA
2.	6SA7	10.8 MA
3.	6SK7	14.7 MA
4.	6U5/6G5	4.2 MA
5.	6SQ7	0.4 MA
6.	6F6G	24.0 MA
7.	6F6G	24.0 MA
8.	5U4G	113 TOTAL MA
9.	6AT6	0.5 MA

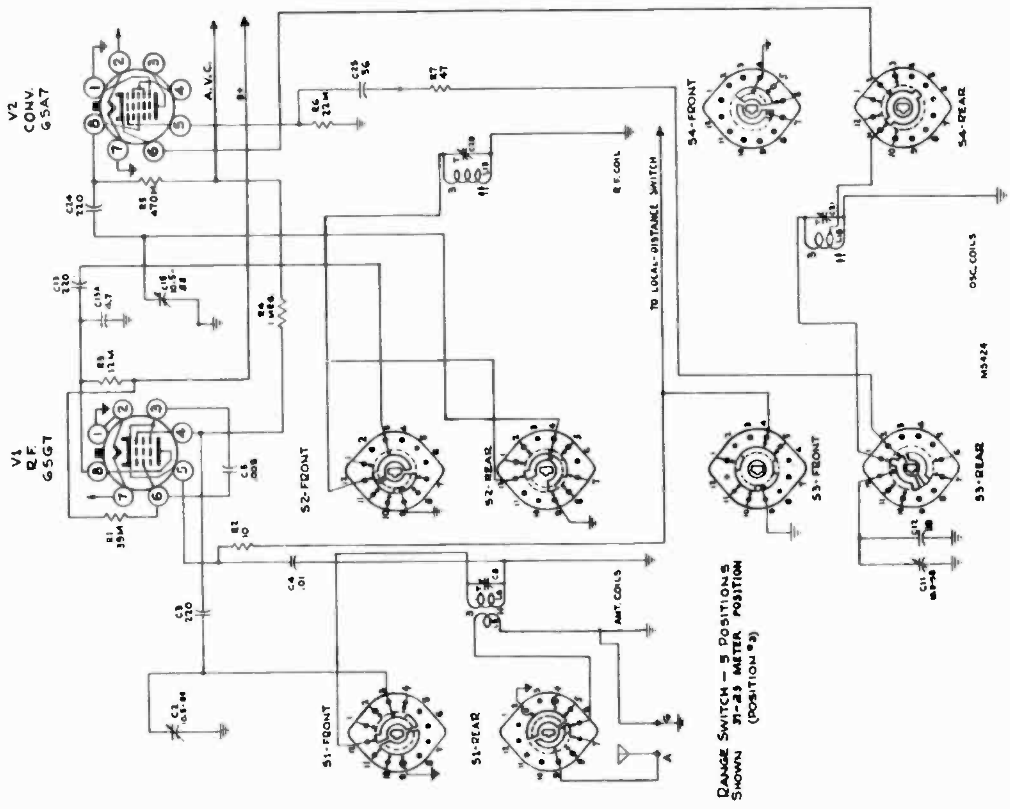
ALL VOLTAGES MEASURED TO CHASSIS.

*MEASURED WITH CHANALYST OR VOLTOHMYST.

VOLTAGES SHOULD HOLD WITHIN ±20% WITH CORRECT POWER SUPPLY.

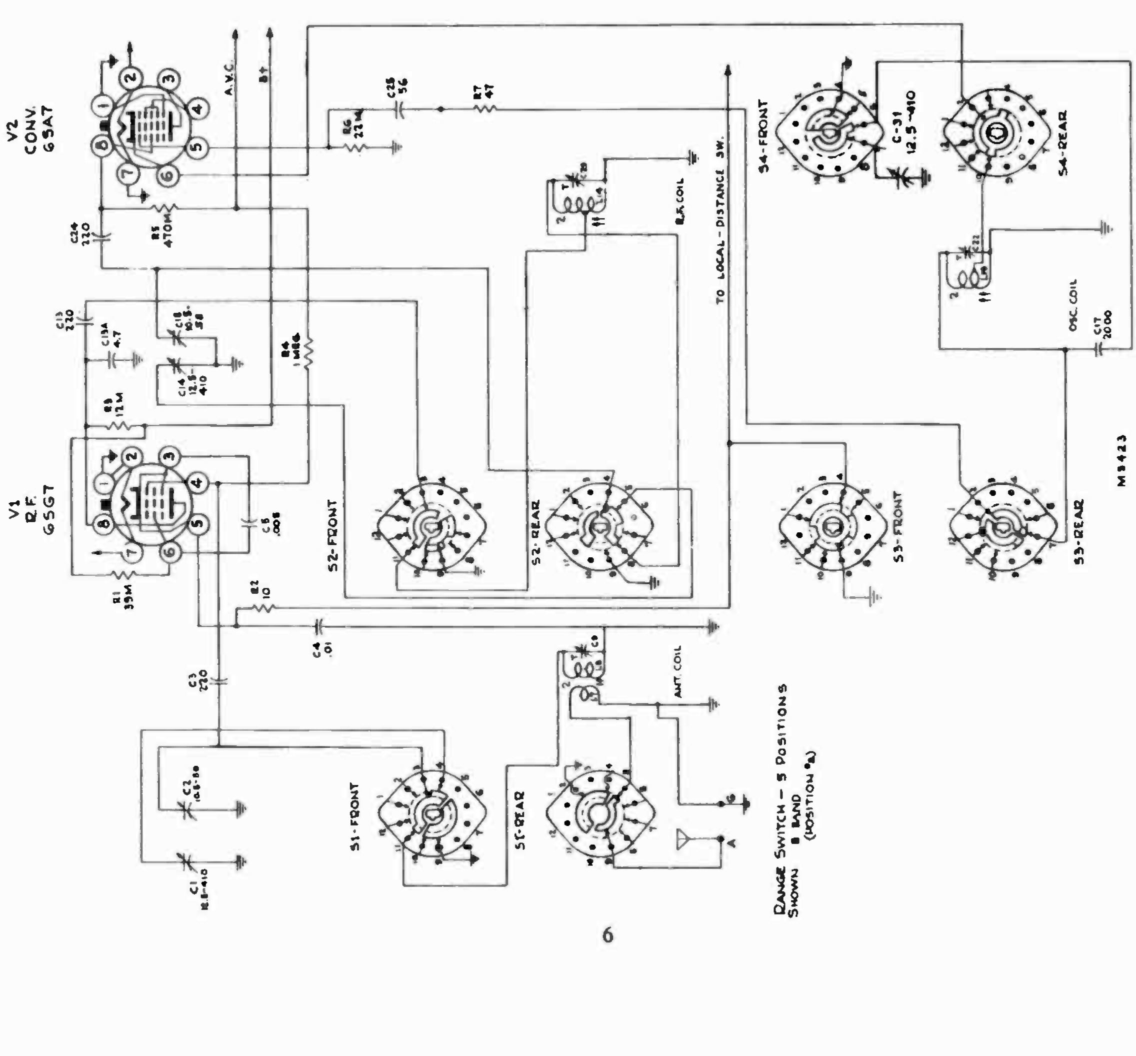
Noisy Control Panel:

It has been found in some cases that the shielded wire (GREEN) connecting to term. #12 of S-5 Front has been making intermittent contact with other terminals resulting in a "noisy when tapped" condition. To prevent future cases of such trouble a piece of insulated sleeving is added to this shielded wire.

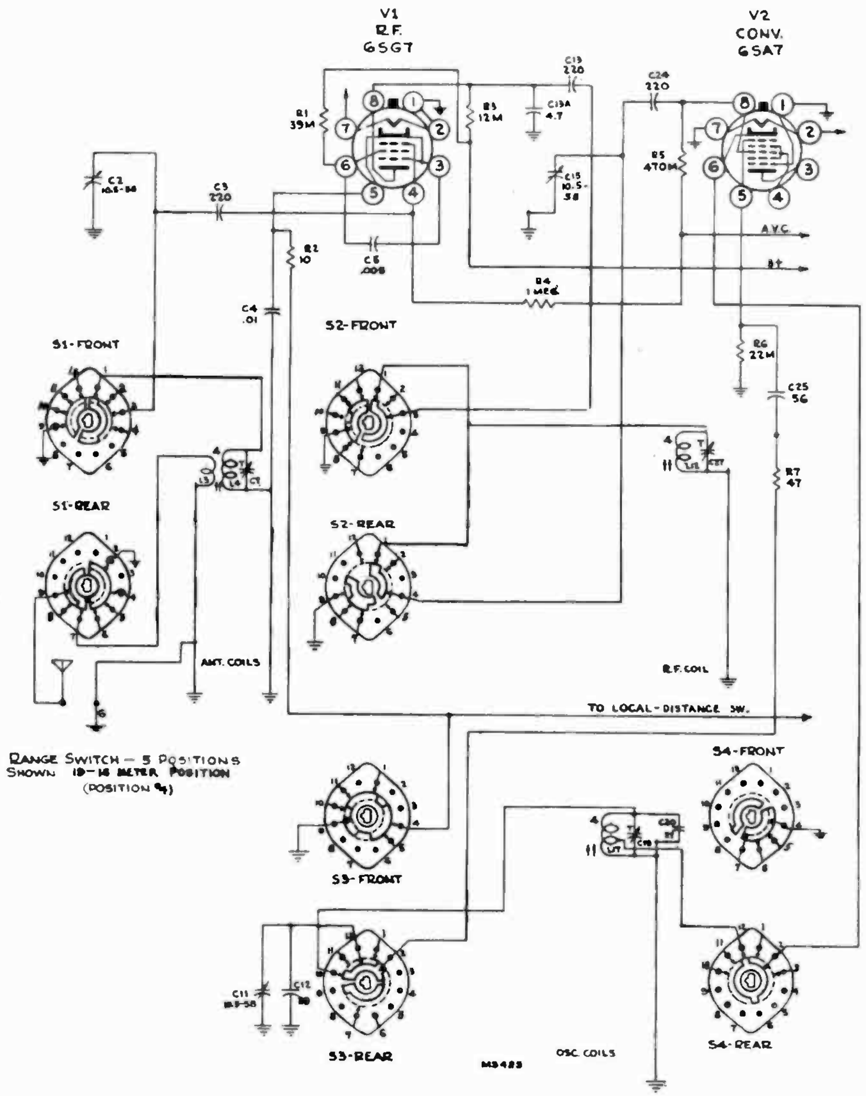


R. F. Section
Simplified Schematic Diagram

NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.

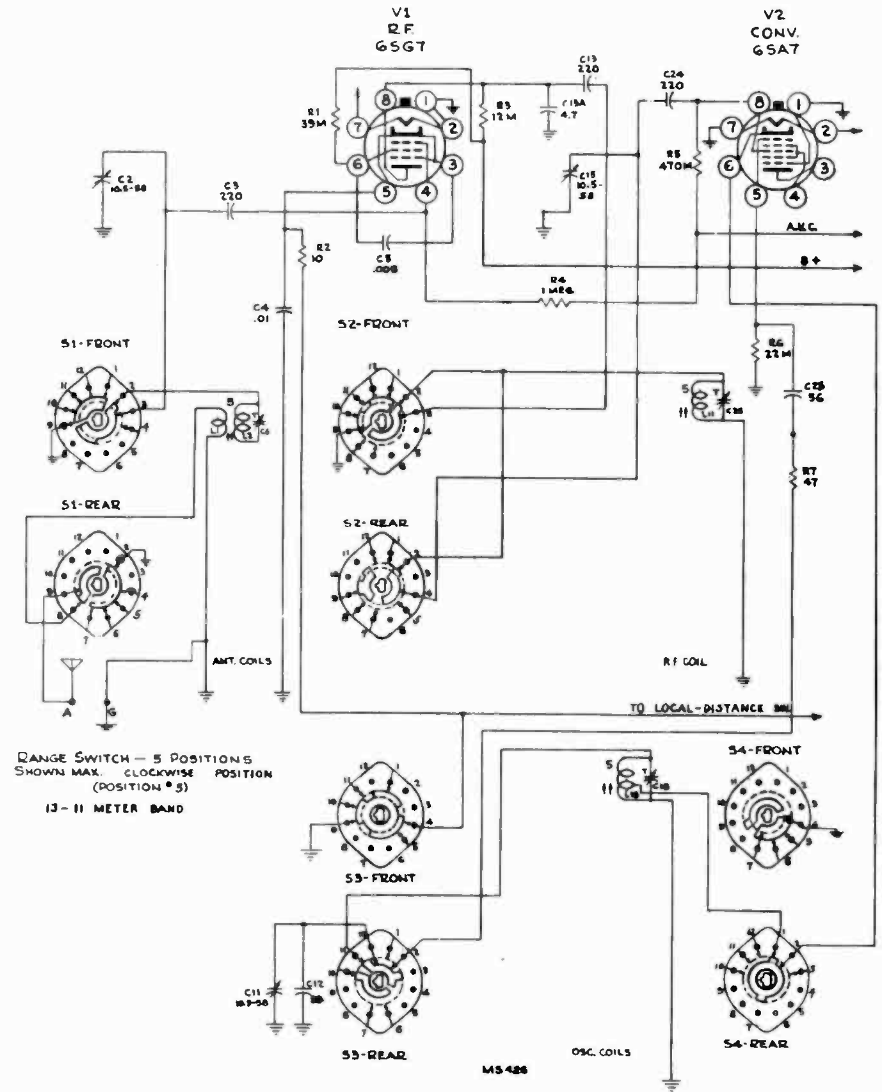


R. F. Section
Simplified Schematic Diagram



R. F. Section
Simplified Schematic Diagram

NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.



R. F. Section
Simplified Schematic Diagram

QU62

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-602B
12930	Board—"Antenna-Ground" terminal board
72016	Bracket—Bracket (L.H.) complete with one (1) Drive cord pulley
72015	Bracket—Bracket (R.H.) complete with two (2) Drive cord pulleys
70840	Cable—Bronze cable for band indicator mechanism
71086	Capacitor—Ceramic, 4.7 mmf. (C13A)
70965	Capacitor—Ceramic trimmer, comprising 5 sections of 5-50 mmf. (C18, C19, C21, C22, C23)
70935	Capacitor—Ceramic, 27 mmf. (C20)
71924	Capacitor—Ceramic, 56 mmf. (C25)
39636	Capacitor—Mica, 220 mmf. (C3, C13, C24, C46)
71932	Capacitor—Mica, 510 mmf. (C16)
72526	Capacitor—Mica, 2000 mmf (C17)
70931	Capacitor—Mica trimmer, comprising 1 section of 3-35 mmf. and 2 sections of 4-70 mmf. (C8, C9, C10, C28, C29, C30)
70745	Capacitor—Mica trimmer, comprising 1 section of 12-160 mmf. and 1 section of 4-70 mmf. (C6, C7)
70754	Capacitor—Mica trimmer, comprising 1 section of 4-70 mmf. and 1 section of 12-160 mmf. (C26, C27)
71592	Capacitor—Moulded, .002 mfd., 200 volts (C47)
71087	Capacitor—Moulded, .003 mfd., 1000 volts (C50, C51)
72221	Capacitor—Moulded, .005 mfd., 200 volts (C52)
71587	Capacitor—Moulded, .005 mfd., 600 volts (C5, C35, C37)
71593	Capacitor—Moulded, .005 mfd., 600 volts (C45)
72529	Capacitor—Moulded, .01 mfd., 100 volts (C43)
71585	Capacitor—Moulded, .01 mfd., 200 volts (C42)
72219	Capacitor—Moulded, .01 mfd., 600 volts (C4, C34, C48, C49)
72527	Capacitor—Moulded, .05 mfd., 100 volts (C36)
72528	Capacitor—Moulded, 0.1 mfd., 100 volts (C62)
72019	Capacitor—Electrolytic, 16 mfd., 450 volts (C64)
36599	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts, 1 section of 15 mfd., 350 volts and 1 section of 40 mfd., 25 volts (C44a, C44b, C44c)
70726	Clip—Retaining clip for coils' core and studs
30716	Clip—Tuning tube clip
70923	Coil—Antenna coil, 13-11 meter band (L1, L2)
70924	Coil—Antenna coil, 19-16 meter band (L3, L4)
70925	Coil—Antenna coil, 31-25 meter band (L5, L6)
70926	Coil—Antenna coil, "B" band (L7, L8)
70927	Coil—Antenna coil, "A" band (L9, L10)
70964	Coil—R. F. coil, 13-11 meter band (L11)
70963	Coil—R. F. coil, 19-16 meter band (L12)
70962	Coil—R. F. coil, 31-25 meter band (L13)
70960	Coil—R. F. coil, "B" band (L14)
70959	Coil—R. F. coil, "A" band (L15)
70920	Coil—Oscillator coil, 13-11 meter band (L16)
70823	Coil—Oscillator coil, 19-16 meter band (L17)
70825	Coil—Oscillator coil, 31-25 meter band (L18)
70829	Coil—Oscillator coil, "B" band (L19)
70789	Coil—Oscillator coil, "A" band (L20)
70957	Condenser—Variable tuning condenser (C1, C2, C11, C14, C15, C31)
72012	Control—H. F. tone control (R18)
72913	Cord—Drive cord (approx. 30" overall length)
72913	Cord—Indicator cord (approx. 66" overall length)
70969	Core—Adjustable core and stud for "A" band R.F. coil
70939	Core—Adjustable core and stud for "A" band oscillator coil
70970	Core—Adjustable core and stud for 13-11 meter band R.F. coil
70943	Core—Adjustable core and stud for 19-16 meter band antenna coil
70941	Core—Adjustable core and stud for 13-11 meter band antenna coil
70937	Core—Adjustable core and stud for 19-16 meter band R.F. and oscillator coils, and 13-11 meter band oscillator coil
70944	Core—Adjustable core and stud for 31-25 meter band antenna coils, "B" band antenna coil
70938	Core—Adjustable core and stud for "A" band antenna coils, 31-25 meter band oscillator and R. F. coils and "B" band oscillator coil
70977	Disc—Band indicator actuating disc
72011	Drum—Band indicator actuating drum
31273	Drum—Condenser drive drum
72017	Frame—Dial frame and back plate less dial, tube clip, indicator disc, spring, indicator and "C" washer
37396	Grommet—Rubber grommet for mounting R. F. assembly (4 required)
72018	Indicator—Station selector indicator
5117	Lamp—Band indicator lamp—Mazda #55
11765	Lamp—Dial lamp—Mazda #51
18469	Plate—Bakelite mounting plate for electrolytic #36599
30868	Plug—2 Contact female plug for motor cable (J1)
31572	Plug—3 contact female plug for power switch cable (J2)
12493	Plug—5 contact female plug for speaker cable
35630	Pulley—Drive cord pulley (1⅛" dia.)
35641	Pulley—Drive cord pulley (1⅜" dia.)
34761	Resistor—10 ohms, ½ watt (R2)
30732	Resistor—47 ohms, ½ watt (R7)
34765	Resistor—100 ohms, ½ watt (R8)
34767	Resistor—2200 ohms, ½ watt (R10)
71085	Resistor—12,000 ohms, 2 watts (R3)
30492	Resistor—22,000 ohms, ½ watt (R6, R12)
71084	Resistor—39,000 ohms, 1 watt (R1)
30147	Resistor—39,000 ohms, ½ watt (R22)
3252	Resistor—100,000 ohms, ½ watt (R35)
30651	Resistor—270,000 ohms, ½ watt (R13, R20)
30648	Resistor—470,000 ohms, ½ watt (R5, R17, R19, R21)
72014	Resistor—Voltage divider, comprising 1 section of 3800 ohms, 6 watts, 1 section of 3800 ohms, 3 watts and 1 of 210 ohms, 2.75 watts (R37a, R37b, R37c)
30652	Resistor—1 megohm, ½ watt (R4, R9)
11769	Resistor—1.8 megohm, ½ watt (R15)
30649	Resistor—2.2 megohms, ½ watt (R11)
30992	Resistor—10 megohms, ½ watt (R16, R23)
70976	Screen—Band indicator screen—green
14350	Screw—#8-32 square head set screw
33438	Screw—Thumb screw for tuning tube clip
6647	Shade—Lamp shade
72013	Shaft—Tuning knob shaft and flywheel
31364	Socket—Lamp socket (clip opening toward lamp)
34909	Socket—Lamp socket (clip opening toward lead)
70827	Socket—Tube socket—octal
9914	Socket—Tube socket for 6AT6
71554	Socket—Tuning tube socket
70978	Spring—Band indicator disc spring
31418	Spring—Tension spring for drive cords
72020	Switch—Range switch (S1, S2, S3, S4)
70917	Transformer—First I.F. transformer T1 (L21, L22, C32, C33)
70918	Transformer—Second I. F. transformer T2 (L23, L24, C38, C39, C40, C41)
34183	Transformer—Power transformer, 110/125/150/210/240 volts, 60 cycle (T3)
71143	Washer—"C" washer for actuating disc
34373	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLY 92569-4W (RL 103-4)
32852	Cap—Dust cap
36145	Cone—Cone complete with voice coil
5118	Plug—3 contact male plug for speaker
72223	Speaker—12" P.M. speaker complete with cone and voice coil less plug
71145	Suspension—Metal cone suspension
	SPEAKER ASSEMBLY 92566-3W (RL 70N1)
32852	Cap—Dust cap
11469	Coil—Neutralizing coil
12079	Coil—Field coil, 1060 ohms
36145	Cone—Cone complete with voice coil
5119	Plug—3 contact female plug for speaker
71560	Plug—5 prong male plug for speaker
36204	Speaker—12" E.M. speaker complete with cone and voice coil less output transformer and plugs
71145	Suspension—Metal cone suspension
37997	Transformer—Output transformer (T4)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	CONTROL PANEL ASSEMBLIES
39622	Capacitor—Mica, 56 mmf. (C65)
72532	Capacitor—Moulded, .003 mfd., 200 volts (C63)
72530	Capacitor—Moulded, .02 mfd., 100 volts (C60)
72531	Capacitor—Moulded, .03 mfd., 100 volts (C61)
72328	Control—L.F. tone control (R33)
72330	Control—Volume control and power switch (R14, S6)
31480	Lamp—Volume control lamp—Mazda #47
31567	Plug—3 prong male plug for control cable
35383	Plug—8 prong male plug for control cable
14659	Resistor—6800 ohms, ½ watt (R32)
30492	Resistor—22,000 ohms, ½ watt (R30)
30685	Resistor—33,000 ohms, ½ watt (R31)
30493	Resistor—150,000 ohms, ½ watt (R36)
31449	Resistor—1.5 megohms, ½ watt (R34)
35787	Socket—Phono input socket
72329	Switch—Local-distance-phono switch (S5)
	MISCELLANEOUS ASSEMBLIES
36462	Clamp—Dial clamp
X1624	Cloth—Grille cloth
72902	Decal—Control panel decal
71089	Decal—Trade mark decal
72326	Dial—Glass dial scale
72901	Hinge—Lid hinge—invisible type (4 required)
72900	Hinge—Lid hinge—spring type (4 required)
71905	Knob—Local distance and phono switch knob
70836	Knob—Tone control, range switch or tuning knob
72331	Knob—Volume control knob
5117	Lamp—Record changer compartment lamp—Mazda #55
70546	Mounting—One set of hardware consisting of four upper springs, four lower springs and four clamp nuts to mount record changer
6647	Shade—Compartment lamp shade
14270	Spring—Retaining spring for knobs

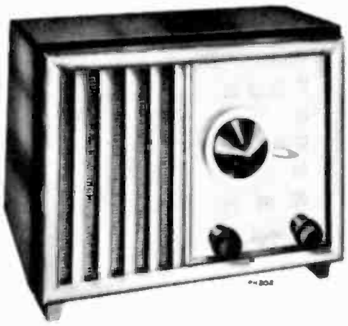
APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Change in Parts List:

CHASSIS ASSEMBLIES

Add:
73247 Capacitor—Ceramic, 33 mmf. (C12)

For Information on Record Changer Refer to Service Data on Model 960001



75X11 Maroon
75X12 Ivory
75X14 Mahogany
75X15 Walnut
75X16 Blonde

RCA VICTOR
75X11, 75X12

Chassis No. RC-1050, RC-1050A, RC-1050B

75X14, 75X15, 75X16

RC-1050A RC-1050B — RC-1050A — RC-1050B

—Mfr. No. 274—

SERVICE DATA

1947 . . No. 7

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range .... 540-1600 kc
Intermediate Frequency .... 455 kc

Power Output
Undistorted .... 1.0 watt
Maximum .... 1.5 watts

Tube Complement
(1) RCA-12SA7 .... Converter
(2) RCA-12SK7 .... I.F. Amplifier
(3) RCA-12SQ7 .... 2nd Det., A.V.C., and A.F. Amplifier
(4) RCA-50L6GT .... Power Output
(5) RCA-35Z5GT .... Rectifier

Pilot Lamp .... Mazda No. 47, 6-8 volts, 0.15 amp.

Loudspeaker (92572-2)
Type .... 5-inch PM
V. C. Impedance .... 3.2 ohms at 400 cycles

Cabinet Dimensions
Height, 7-1/4"; Width, 10"; Depth, 7-3/16"

Tuning Drive Ratio .... 10:1 (5 turns of knob)

Power Supply Rating
105-125 volts, AC, 50 or 60 cycles, or DC .... 30 watts

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Critical Lead Dress

1. Dress all heater leads close to chassis.
2. Dress AVC resistor R4 away from 12SK7 tube socket.
3. Dress diode load resistor R3 away from 12SQ7 tube socket.
4. Dress 12SQ7 plate resistor R7 over 2nd IF transformer terminal.
5. Dress output plate bypass capacitor C17 close to rear of chassis.
6. Dress power cord lead along rear and bottom of chassis between 35Z5GT and 50L6GT tubes.
7. Dress audio coupling capacitor C14 close to bottom of chassis.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1050, RC-1050A, RC-1050B
72880	Bracket—Dial lamp bracket
72878	Bracket—Mounting bracket for indicator pulley assembly
73499	Capacitor—Ceramic, 56 mmf., for RC-1050B (C5)
39632	Capacitor—Mica, 150 mmfd. (C13)
39640	Capacitor—Mica, 330 mmf. (C23)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C16)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C14, C15)
70613	Capacitor—Tubular, .03 mfd., 400 volts (C17)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C12, C18)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C24)
70408	Capacitor—Electrolytic, comprising 1 section of 50 mfd., 150 volts and 1 section of 30 mfd., 150 volts (C19, C20)
70477	Coil—Oscillator coil (L3, L4, L5) for RC-1050 & RC-1050A
73048	Coil—Oscillator coil (L3, L5) for RC-1050B
72992	Condenser—Variable tuning condenser complete with drive pulley (C1, C2, C3, C4)
38410	Control—Volume control and power switch (R5, S1)
†72953	Cord—Drive cord (approx. 29" required)
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
72867	Loop—Antenna loop complete (L1, L2) for RC-1050 & RC-1050A
73706	Loop—Antenna loop complete (L1, L2) for RC-1050B
72882	Pulley—Dial indicator pulley
72313	Resistor—Wire wound, fuse type, 33 ohms (R17)
	Resistor—Fixed composition, 150 ohms, ±10%, ½ watt (R9)
	Resistor—Fixed composition, 1200 ohms, ±10%, 1 watt (R15)
	Resistor—Fixed composition, 22,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 47,000 ohms, ±20%, ½ watt (R3)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R7, R16)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R8)
	Resistor—Fixed composition, 3.3 megohms, ±20%, ½ watt (R4)
	Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R6)

STOCK No.	DESCRIPTION
72881	Ring—Retaining ring for indicator pulley assembly
72877	Shaft—Tuning knob shaft
72879	Socket—Dial lamp socket
32299	Socket—Tube socket—wafer—for RC-1050 & RC-1050A
54414	Socket—Tube socket—molded—for RC-1050B
72540	Spring—Drive cord spring
71558	Transformer—First I. F. transformer (L6, L7, C6, C7) for RC-1050
71631	Transformer—Second I. F. transformer (L8, L9, C8, C9, C11) for RC-1050
70128	Transformer—First I. F. transformer (L6, L7, C6, C7) for RC-1050A & RC-1050B
70129	Transformer—Second I. F. transformer (L8, L9, C8, C9, C11) for RC1050A & RC-1050B
72296	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLY 92572-2W RL 101-3
72201	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
72884	Baffle—Speaker baffle board and grille cloth
72883	Bezel—Dial scale bezel only—less dial
Y1428	Cabinet—Maroon plastic cabinet for 75X11
Y1431	Cabinet—Ivory plastic cabinet for 75X12
Y2013	Cabinet—Mahogany plastic cabinet for 75X14
Y2014	Cabinet—Walnut plastic cabinet for 75X15
Y2015	Cabinet—Blonde plastic cabinet for 75X16
72871	Cover—Bottom cover
72868	Dial—Dial scale complete with dial lamp shield
72885	Foot—Mounting foot (bakelite) (2 required)
72869	Indicator—Station selector indicator
72870	Knob—Control knob (maroon) for 75X11, 75X14 & 75X15
72890	Knob—Control knob (ivory) for 75X12
73707	Knob—Control knob (tan) for 75X16
31480	Lamp—Indicator lamp—Mazda #47
73728	Screen—Ventilating screen for back of cabinet for 75X11, 75X14 & 75X15
73729	Screen—Ventilating screen for back of cabinet for 75X12 & 75X16
14270	Spring—Retaining spring for knobs

† STOCK NO. 72953 IS A REEL CONTAINING 250 FEET OF CORD.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACMENT PARTS

75X11, 75X12, 75X14, 75X15, 75X16

Alignment Procedure

Output Meter Alignment.—Connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

On AC operation an isolation transformer (117v./117v.) may be necessary for the receiver if the test oscillator is also AC operated.

Dial Pointer.—With the tuning condenser in full mesh the dial pointer should be adjusted to approx. 17.0° counterclockwise from the vertical position. It should be adjusted before re-assembling the bezel to the cabnet. Check on actual reception of stations.

Dis-assembly.—To remove bezel assembly:

Remove the two knobs and the four hex head screws in the feet, pull the bottom of the bezel outward and upward.

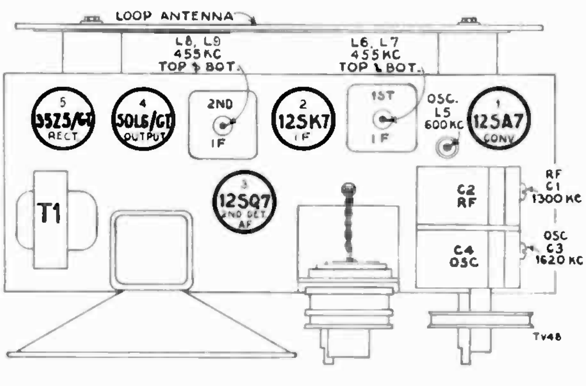
To remove chassis from cabinet:

Remove bezel assembly as described above, remove the dial by prying assembly outward on the bottom edge, remove the pointer by pulling straight to the front, remove the dial lamp, remove the round head screws which hold the chassis to the cabinet.

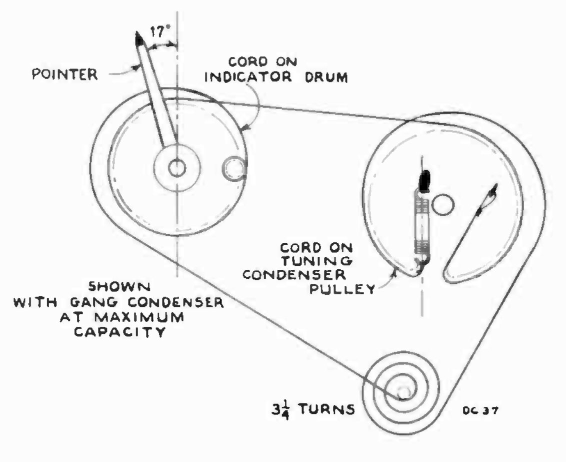
For additional information refer to booklet "RCA Victor Receiver Alignment."

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	12SK7 I-F grid through 0.1 mfd. capacitor	455 kc	Quiet-point 1,600 kc end of dial	L8 and L9 2nd I-F transformer
2	Stator of C2 through 0.1 mfd.	455 kc	Quiet-point 1,600 kc end of dial	L6 and L7 1st I-F transformer
3	Ant. lead in series with 200 mmfd.	1,620 kc	full clock-wise	C3 (osc.)
4	Ant. lead in series with 200 mmfd.	1,400 kc	1,400 kc signal	C1 (ant.)
5	Ant. lead in series with 200 mmfd.	600 kc	600 kc signal	L5 (osc.) Rock gang
6	Repeat steps 3, 4 and 5.			

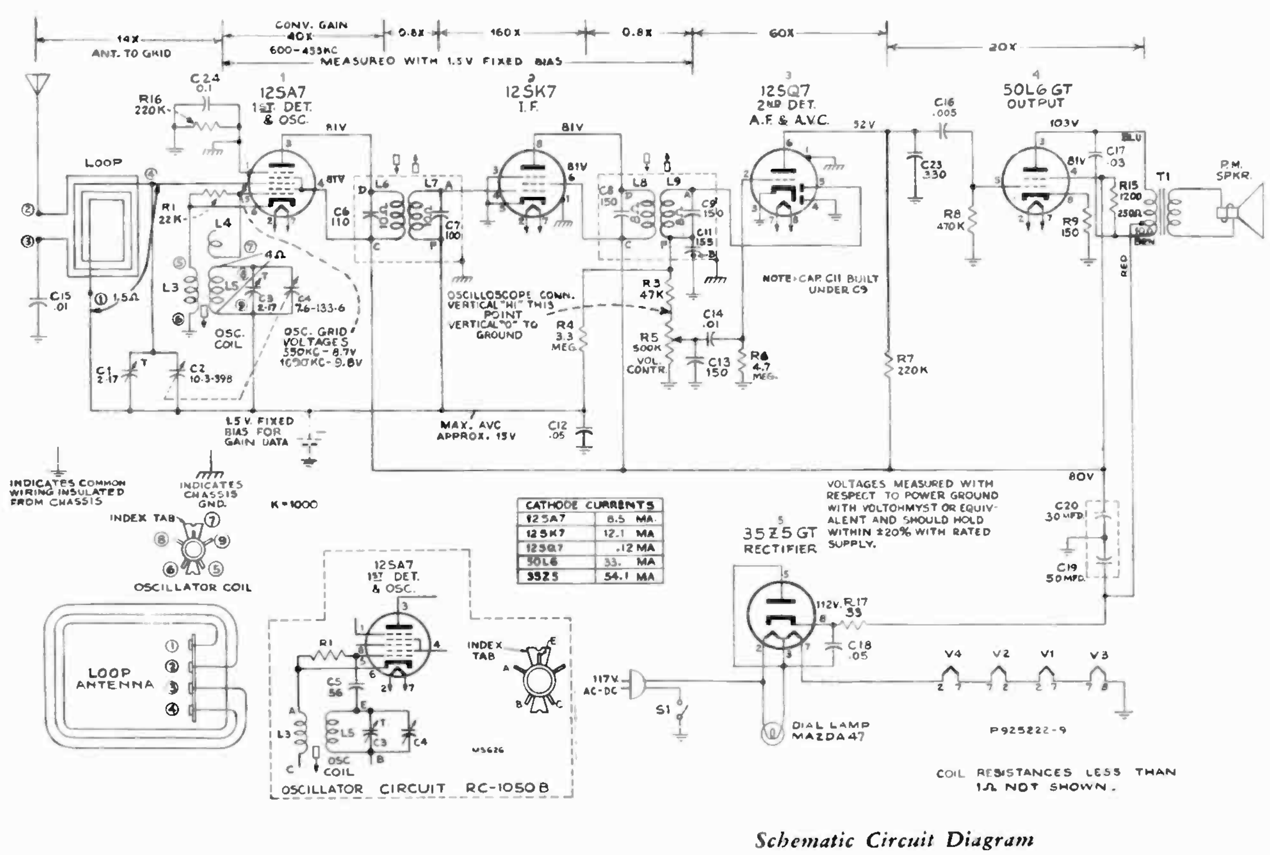
* Do not readjust L8 or L9 when test oscillator is connected to C2.



Tube and Trimmer Locations



Dial-Indicator and Drive Mechanism



Schematic Circuit Diagram

Radiola 75ZU

RADIO-PHONOGRAPH COMBINATION

Chassis No. RC-1063A

Mfr. No. 274

SERVICE DATA

— 1947 No. R3 —

RADIO CORPORATION OF AMERICA

HOME INSTRUMENT DIVISION

CAMDEN, N. J., U. S. A.

REFER TO SERVICE DATA FOR MODEL RP-178 OR MODEL 960276 FOR INFORMATION AND PARTS ON RECORD CHANGER

Electrical and Mechanical Specifications

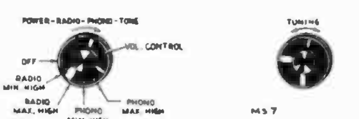
Frequency Range .... 540-1,600 kc
Intermediate Frequency .... 455 kc
Tube Complement
(1) RCA Radiotron 12SA7 .... Converter
(2) RCA Radiotron 12SK7 .... I-F Amplifier
(3) RCA Radiotron 12SQ7 .... 2nd Det., A.V.C., and A-F Amplifier
(4) RCA Radiotron 50L6GT .... Power Output
(5) RCA Radiotron 35Z5GT .... Rectifier
Pilot Lamp .... Mazda No. 51, 6-8 volts, 0.2 amp.
Power Output
Undistorted .... 1.5 watts
Maximum .... 2.4 watts
Loudspeaker
Type 922258-2 .... "PM" 4 x 6 inch elliptical
V.C. Impedance .... 3.4 ohms at 400 cycles
Power Supply Rating
105-125 volts, A-C, 60 cycles .... 60 watts

IMPORTANT: Do not plug instrument into a d-c supply.

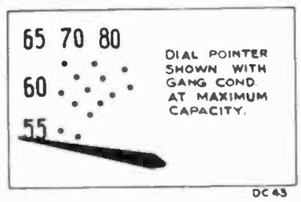
Access to dial lamp may be obtained by removing sloping panel in record changer compartment.

	Height	Width	Depth
Cabinet dimensions (inches)	10¼	17¼	19
Chassis overall (inches)	9	14	6¼
Chassis base (inches)	1⅝	14	3¾
Tuning Drive Ratio			11:1

Phonograph
Type .... RP-178 or Type 960276-1
Record Capacity .... Twelve 10-in., Ten 12-in.
Turntable Speed .... 78 r.p.m.
Type Pickup .... Crystal



Control Positions



DC 43

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1063A
70407	Button—Plug button to cover holes for i-f transformers adjustment
70997	Capacitor—Ceramic, 5.6 mmf. (C24)
39650	Capacitor—Mica, 820 mmf. (C15)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C5, C9)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1, C11)
70612	Capacitor—Tubular .025 mfd. 400 volts (C10)
70611	Capacitor—Tubular .02 mfd. 400 volts (C8)
70615	Capacitor—Tubular .05 mfd. 400 volts (C2, C14)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C3, C4)
72312	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts, and 1 section of 80 mfd., 150 volts (C25, C26)
70403	Coil—Oscillator coil (L3, L4, L5)
73056	Condenser—Variable tuning condenser and drive drum (C16, C17, C18, C19)
73057	Control—Volume control (R10)
70392	Cord—Power cord and plug
72953	Cord—Drive cord (approx. 38" overall length required)
73063	Dial—Dial scale
70397	Gear—Power, radio and phono switch gear
73014	Gear—Volume control gear—less spring
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
73059	Indicator—Station selector indicator
73010	Loop—Antenna loop complete (L1, L2)
73055	Plate—Dial back plate less dial
30868	Plug—2 contact female plug for motor cable
73060	Pulley—Station selector indicator pulley
72313	Resistor—Wire wound, 33 ohms, ¼ watt (R11)
	Resistor—Fixed composition, 150 ohms, ±10%, ½ watt (R7)
	Resistor—Fixed composition, 1200 ohms ±10%, 1 watt (R9)
	Resistor—Fixed composition, 22,000 ohms ±20%, ½ watt (R2)
	Resistor—Fixed composition, 33,000 ohms ±20%, ½ watt (R14)
	Resistor—Fixed composition, 220,000 ohms ±20%, ½ watt (R1, R5)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R8)
	Resistor—Fixed composition, 3.3 megohms ±20%, ½ watt (R4)
	Resistor—Fixed composition, 5.6 megohms ±10%, ½ watt (R6)
73058	Shaft—Tuning knob shaft
73062	Socket—Lamp socket
35787	Socket—Phono input socket
37605	Socket—Tube socket
70390	Spring—Drive cord tension spring
73061	Spring—Station selector indicator pulley retaining spring
70396	Spring—Volume control gear tension spring
70394	Switch—Power, radio and phono switch (S1)
73036	Transformer—First I.F. transformer (L6, L7, C20, C21)
73037	Transformer—Second I.F. transformer (L8, L9, C6, C22, C23)
72296	Transformer—Output transformer (T1)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 922258-2
71058	Speaker—4" x 6" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
71105	Cable—Shielded pickup cable for use with RP-178 record changer
72437	Cable—Shielded pickup cable for use with 960276 record changer
73077	Crystal—Vinylite dial crystal
X1661	Cloth—Grille cloth
72894	Foot—Rubber foot (4 required)
72856	Grommet—Rubber grommet to mount record changer (3 required for RP-178) (4 required for 960276)
72692	Hinge—Lid hinge
73064	Knob—Power, radio and phono switch knob
73065	Knob—Tuning knob
73078	Knob—Volume control knob
11765	Lamp—Dial lamp
73109	Nut—T nut for mounting record changer (3 required for RP-178) (4 required for 960276)
73110	Screw—¼-20 x 1¾ fillister head machine screw for mounting RP-178 record changer (3 required)
73234	Screw—¼-20 x 1½ oval head machine screw for mounting 960276 record changer (4 required)
14270	Spring—Retaining spring for knobs
71824	Stud—Stud and screw to mount one lid hinge
73067	Support—Lid support

APPLY TO YOUR RADIOLA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

75ZU

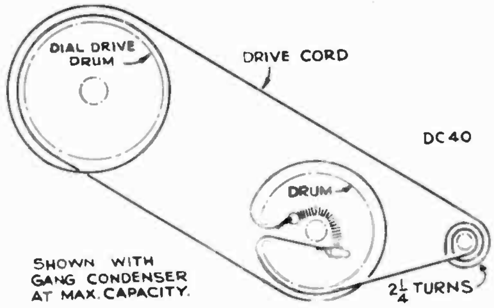
Alignment Procedure

CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.

Take off both wooden strips on bottom of cabinet by removing wood screws before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. All heater wires should be dressed close to chassis.
2. Dress lead from switch to phono jack close to chassis and away from power cord.
3. Dress capacitor between 12SQ7 grid and terminal board away from chassis and away from other parts.
4. Dress lead from arm of volume control to terminal board against front apron and away from other leads.
5. In instrument assembly the lead from the rear section of gang to loop shall be dressed away from chassis and other wires to loop.



Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mfd. capacitor to common "—B." Keep the output signal as low as possible to avoid a.v.c. action.

Speaker and Dial Adjustment.—If the speaker should require replacement or if the position of the speaker mounting bracket is disturbed, reposition as follows:

Mount speaker on bracket, adjust bracket so that front edge of speaker extends 3/4 inch in front of chassis base and tighten bracket screws.

Mount chassis on wood base with mounting screws loose, install in cabinet and push chassis forward until speaker contacts grille and then tighten chassis mounting screws. Adjust dial back plate mounting bracket so that the plate is parallel with cabinet.

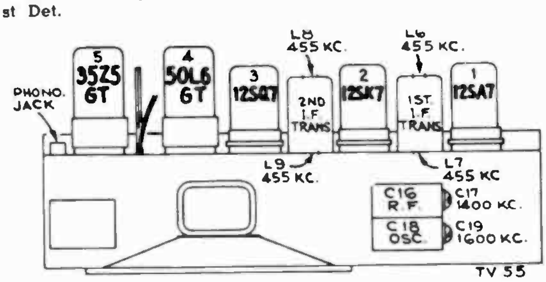
The two wood buttons at the top of the dial back plate should be adjusted to provide the best illumination of the dial and pointer.

Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

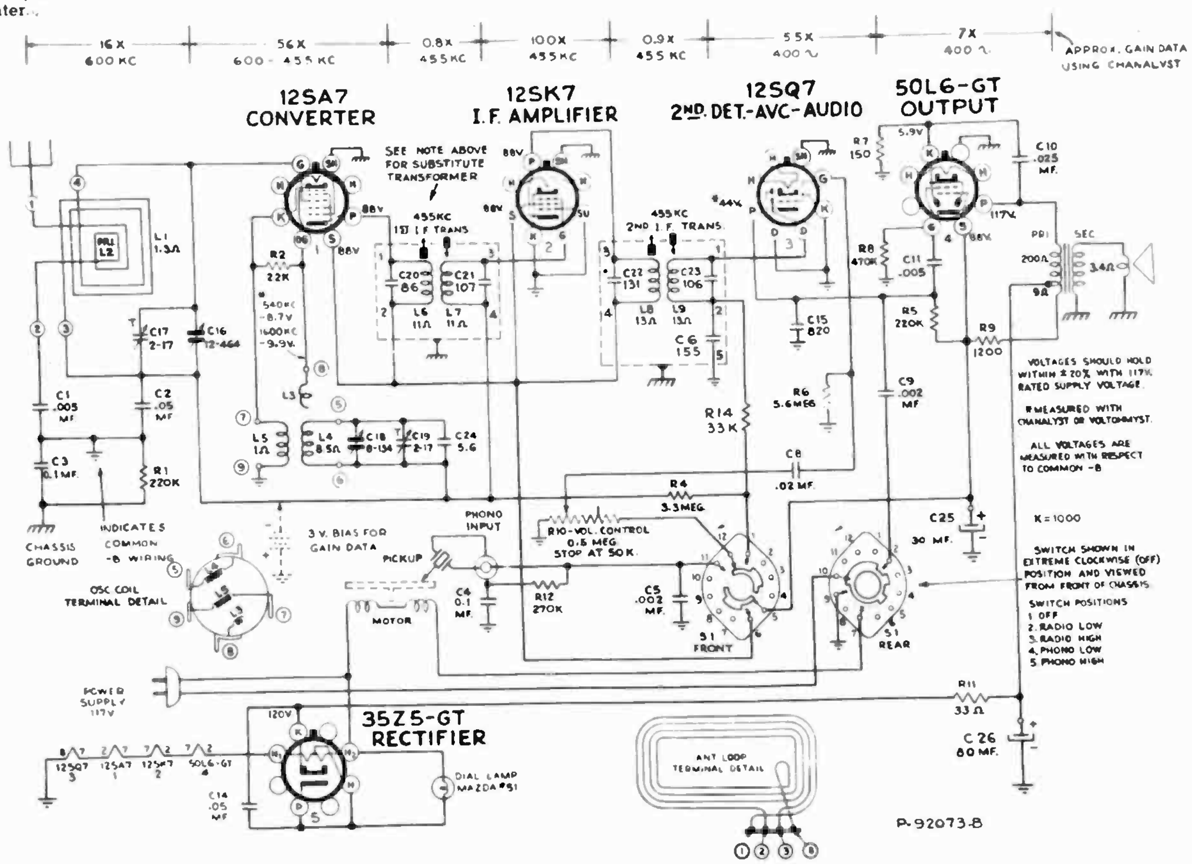
Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer to position illustrated on front page.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 600 kc end of dial	L8 and L9 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.	455 kc	Quiet point 600 kc end of dial	L6 and L7 *1st I.F. transformer
NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET FOR STEPS 3, 4 AND 5				
3	Antenna terminal in series with 220 mmfd.	1600 kc	160	C19 (osc.)
4	Radiated signal	1400 kc	Signal frequency	C17 (ant.)
5	Repeat steps 3 and 4.			

* Do not readjust L8 or L9 when test oscillator is connected to 1st Det.



1st I.F. Trans. Substitution.—The first I.F. transformer may differ from that shown in the schematic diagram. Transformers stamped 970441-1 are as shown in the schematic. Transformers stamped 970441-5 are connected as follows: term. #4 to plate of 12SA7, term. #3 to B+, term. #1 to grid of 12SK7, term. #2 to A.V.C. The d-c resistance of each winding is 16 ohms. The primary capacitor C20 is 131 mmf., the secondary capacitor is 106 mmf.



76ZX11
(Walnut)

76ZX12
(Ivory)

Radiola

76ZX11 and 76ZX12

1st Prod.—Chassis No. RC-1058
2nd Prod.—Chassis No. RC-1058A
Mfr. No. 274

SERVICE DATA

1947 . . . R2

RADIO CORPORATION OF AMERICA
HOME INSTRUMENT DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Frequency Range .... 540-1600 kc
Intermediate Frequency .... 455 kc

Power Output
Undistorted .... 1.0 watt
Maximum .... 1.5 watts

Tube Complement
(1) RCA Radiotron 12SG7 .... Mixer
(2) RCA Radiotron 12SK7 .... I.F. Amplifier
(3) RCA Radiotron 12SQ7 .... 2nd Det., A.V.C., and A.F. Amplifier
(4) RCA Radiotron 35L6GT .... Power Output
(5) RCA Radiotron 12J5GT .... Oscillator
(6) RCA Radiotron 35Z5GT .... Rectifier

Loudspeaker (92572-2)
Type .... 5-inch PM
V. C. Impedance .... 3.2 ohms at 400 cycles

Cabinet Dimensions .... Height, 7¾; Width, 12⅛; Depth, 6¾

Power Supply Rating
105-125 volts, AC, 50 or 60 cycles, or DC .... 30 watts

Pilot Lamp .... type 51, 6-8 volts, 0.20 amp.
Tuning Drive Ratio 14.5:1

POWER SUPPLY POLARITY.—For operation on d-c, the power plug must be inserted in the outlet for correct polarity. If the set does not function, reverse the plug. On a-c, reversal of the plug may reduce hum.

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC-1058—RC-1058A
73172	Capacitor—Ceramic, 56 mmfd., (C19)—for RC-1058A
72571	Capacitor—Mica, 330 mmfd. (C8)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C9)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C1, C3, C4)
70611	Capacitor—Tubular, .01 mfd., 400 volts (C7, C11)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C2, C23)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C22)
39152	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C20, C21)
73704	Coil—Oscillator coil (L3, L4, L5)—for RC-1058
73163	Coil—Oscillator coil (L3, L4)—for RC-1058A
72991	Condenser—Variable tuning condenser complete with drive pulley (C12, C13, C14, C15)—for RC-1058
73171	Condenser—Variable tuning condenser, complete with drive pulley (C12, C13, C14, C15)—for RC-1058A
38410	Control—Volume control and power switch (R13, S1)
†72953	Cord—Drive cord (approx. 50" overall length)
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
37068	Indicator—Station selector indicator
73030	Loop—Antenna loop complete (L1, L2)
72872	Plate—Dial back plate complete with drive cord pulleys
72602	Pulley—Drive cord pulley
	Resistor—Fixed composition, 120 ohms, ±10%, ½ watt (R6, R14)
	Resistor—Fixed composition, 1200 ohms, ±10%, 1 watt (R11)
	Resistor—Fixed composition, 1500 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed composition, 3300 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 22,000 ohms, ±10%, ½ watt (R2)
	Resistor—Fixed composition, 47,000 ohms, ±20%, ½ watt (R12)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R8, R10)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R7)
	Resistor—Fixed composition, 3.3 megohms, ±20%, ½ watt (R5)
	Resistor—Fixed composition, 4.7 megohms, ±20%, ½ watt (R9)
72886	Shaft—Tuning knob shaft
34449	Socket—Lamp socket
37605	Socket—Tube socket, moulded
32299	Socket—Tube socket—wafer
31418	Spring—Drive cord tension spring
70411	Transformer—First I. F. transformer (T1)
70412	Transformer—Second I. F. transformer (T2, C5, C6)
36800	Transformer—Output transformer (T3)
35969	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLY 92572-2W RL 101-3
72201	Speaker—5" P.M. speaker complete with cone and voice coil
	MISCELLANEOUS
39953	Back—Cabinet back for 76ZX11
70409	Back—Cabinet back for 76ZX12
Y1429	Cabinet—Brown plastic cabinet for 76ZX11
Y1430	Cabinet—Ivory plastic cabinet for 76ZX12
36890	Clamp—Dial clamp—L.H.
36891	Clamp—Dial clamp—R.H.
72903	Dial—Glass dial scale
37831	Fastener—Push fastener to hold cabinet back (1 set)
70414	Knob—Control knob—ivory—for 76ZX12
72981	Knob—Control knob—maroon—for 76ZX11
11765	Lamp—Dial lamp—Mazda #51
30900	Spring—Retaining spring for knobs

†This is a reel containing 250 ft. of cord, order from your distributor by specifying Stock No. and length required.

APPLY TO YOUR RADIOLA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

76ZX11, 76ZX12

Alignment Procedure

Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B." Keep the output signal as low as possible to avoid AVC action.

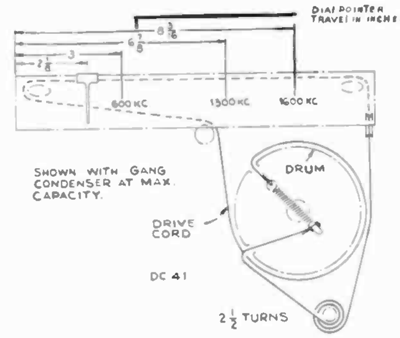
Output Meter.—Connect leads between speaker voice coil and chassis. Turn volume control to maximum.

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates closed). Adjust indicator to 2⅛" from left hand edge of dial back plate.

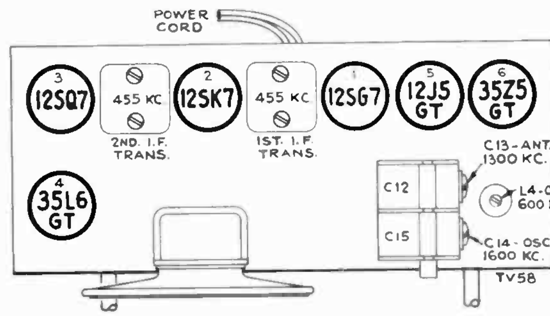
Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	Stator of C-12 in series with .01 mfd.	455 kc	Quiet-point 1,600 kc end of dial	Sec. and pri. 2nd I-F trans.
2				Sec. and pri. 1st I-F trans.
3	Ant. lead in series with 200 mmfd.	1,600 kc	1,600 kc	C14 (osc.)
4		1,300 kc	1,300 kc	C13 ant.
5		600 kc	600 kc	L4 (osc.) Rock in
6	Repeat steps 3, 4 and 5.			

Critical Lead Dress

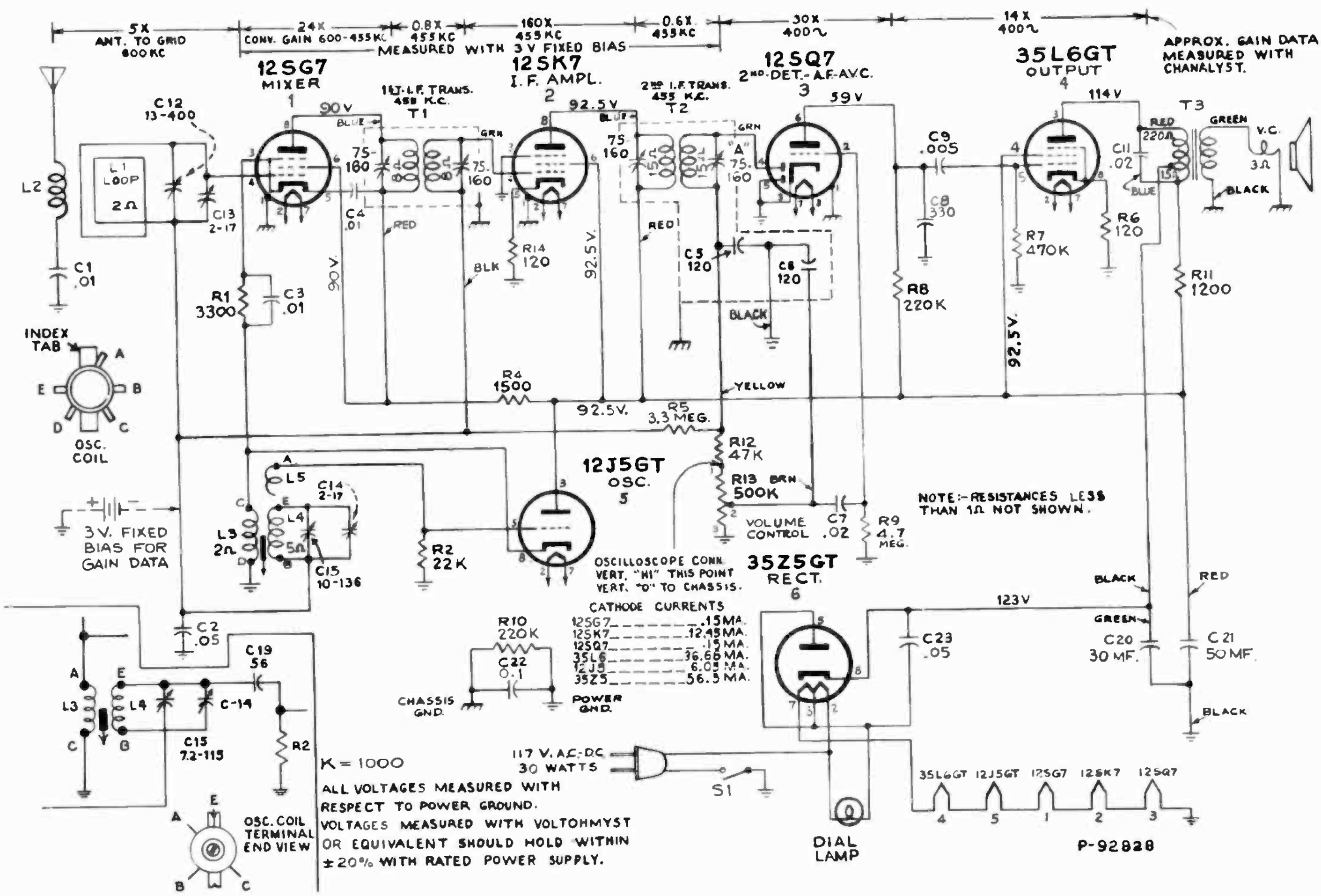
1. Dress output plate bypass capacitor (C-11 .02 mf) against chassis.
2. Dress 35L6GT plate lead (red) against chassis and away from volume control, leads and terminals.
3. Dress audio coupling capacitor (C-7 .02 mf) away from 35L6GT heater leads.
4. Dress 2nd i-f yellow and brown leads away from output plate bypass capacitor (C-11, .02 mf) and away from all heater leads.
5. Dress blue and green leads of both i-f transformers back in shields leaving exposed lengths as short as possible.



Dial-Indicator and Drive Mechanism



Tube and Trimmer Locations



Oscillator Circuit—Chassis No. RC-1058A

Otherwise identical to Chassis No. RC-1058, except C12 (10-398)

Schematic Circuit Diagram—Chassis No. RC-1058

RCA VICTOR

VICTROLA

77U

Radio-Phonograph Combination
Chassis No. RC-1057A
Mfr. No. 274

SERVICE DATA

—1947 No. 8—

PH-147

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Electrical and Mechanical Specifications

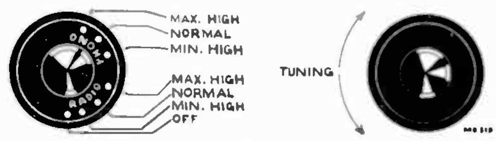
Six-Tube, Single-Band, Superheterodyne Receiver

Frequency Range .... 540-1,600 kc
Intermediate Frequency .... 455 kc
Power Output
Undistorted .... 2.2 watts
Maximum .... 3 watts
Loudspeaker "PM"
Size .... 5x7 inch elliptical
V.C. Impedance .... 3.4 ohms at 400 cycles
Power Supply Rating
105-125 volts, AC, 60 cycles with RP-178 record changer .... 60 watts
IMPORTANT—Do not plug chassis into a d-c power supply.

REFER TO SERVICE DATA FOR MODEL RP-178 FOR INFORMATION AND PARTS ON RECORD CHANGER

	Height	Width	Depth
Cabinet dimensions (inches)	10¾"	15⅝"	18¾"

Tube Complement
(1) RCA-12SA7 .... 1st Det.—Osc.
(2) RCA-12SK7 .... I-F Amplifier
(3) RCA-6C4 .... A-F Amplifier
(4) RCA-6AQ6 .... 2nd Det., AVC, Ph. Inv.
(5) RCA-35L6-GT .... Power Output
(6) RCA-35L6-GT .... Power Output



Control Positions

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 1057A
70407	Button—Plug button to cover holes for I. F. transformers adjustment
39622	Capacitor—Mica, 56 mmf. (C21)
70600	Capacitor—Tubular, .001 mfd., 400 volts (C20, C22)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C1)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C10)
70608	Capacitor—Tubular, .007 mfd., 400 volts (C12)
70612	Capacitor—Tubular, .025 mfd., 400 volts (C18)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C13, C14, C15)
71928	Capacitor—Tubular, .02 mfd., 400 volts (C9)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C11, C16, C17)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C8)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C2, C5)
73013	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 150 volts; 1 section of 30 mfd., 150 volts; and 1 section of 10 mfd., 150 volts (C19A, C19B, C19C)
38201	Clamp—Drive cord clamp
70477	Coil—Oscillator coil (L2, L3)
73007	Condenser—Variable tuning condenser (C3, C4, C6, C7)
38403	Control—Volume control (R7)
72953	Cord—Drive cord (approx. 52" overall length)
70392	Cord—Power cord and plug
70397	Gear—Power, radio and phono switch gear
73014	Gear—Volume control gear—less spring
72283	Grommet—Rubber grommet to mount tuning condenser (3 required)
73015	Indicator—Station selector indicator
73010	Loop—Antenna loop complete (L1)
73006	Plate—Dial back plate complete with (3) pulleys
30868	Plug—2 contact female plug for motor cable
73009	Rectifier—Selenium rectifier (SR1)
73038	Resistor—Normal value 66 ohms with positive temperature coefficient (R18)
	Resistor—Fixed composition, 82 ohms ±10%, 1 watt (R17)
73072	Resistor—Normal value 95 ohms @38°C with negative temperature coefficient (R21)
	Resistor—Fixed composition, 1200 ohms, ±10%, 1 watt (R14)
	Resistor—Fixed composition, 1800 ohms, ±10%, ½ watt (R13)
	Resistor—Fixed composition, 12,000 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed composition, 22,000 ohms, ±20%, ½ watt (R2)
	Resistor—Fixed composition, 82,000 ohms, ±10%, ½ watt (R19)
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R6)
	Resistor—Fixed composition, 220,000 ohms, ±20%, ½ watt (R1, R10, R11, R22)
	Resistor—Fixed composition, 270,000 ohms, ±10%, ½ watt (R5)
	Resistor—Fixed composition, 390,000 ohms, ±10%, ½ watt (R3)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R12)
	Resistor—Fixed composition, 470,000 ohms, ±10%, ½ watt (R15)
	Resistor—Fixed composition, 1.5 megohms, ±10%, ½ watt (R20)
	Resistor—Fixed composition, 3.3 megohms, ±20%, ½ watt (R4)
	Resistor—Fixed composition, 10 megohms, ±20%, ½ watt (R8, R9)
73012	Shaft—Tuning knob shaft
73103	Shield—Tube shield for miniature tubes (2 required)
72998	Socket—Dial lamp socket and lead assembly
35787	Socket—Phono input socket
72516	Socket—Tube Socket, miniature
37605	Socket—Tube socket, molded
70390	Spring—Drive cord tension spring
70396	Spring—Volume control gear tension spring
73011	Switch—Power, radio and phono switch (S1, S2)
73036	Transformer—First I. F. transformer (T1)
73037	Transformer—Second I. F. transformer (T2)
73008	Transformer—Output transformer (T3)
33726	Washer—"C" washer for tuning knob shaft
34457	Washer—Spring washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92573-1K
72728	Cone—Cone and voice coil assembly
72727	Speaker—5"x7" PM speaker complete with cone and voice coil
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71105	Cable—Shielded pickup cable
73017	Clamp—Dial clamp (2 required)
X1660	Cloth—Grille cloth
73051	Decal—Styling line decal (2 required)
71966	Decal—Trade mark decal (Victrola)
71984	Decal—Trade mark decal (RCA Victor)
73039	Dial—Glass dial scale
72894	Foot—Rubber mounting foot (4 required)
72856	Grommet—Rubber grommet to mount record changer (3 required)
73052	Handle—Cabinet lid handle
72692	Hinge—Cabinet lid hinge (2 required)
73016	Knob—Power, radio and phono switch knob
73065	Knob—Tuning knob
73078	Knob—Volume control knob
11765	Lamp—Dial lamp
14270	Spring—Retaining spring for knobs
71824	Stud—Stud and screw to mount lid hinge (1 set)
73050	Support—Cabinet lid support

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

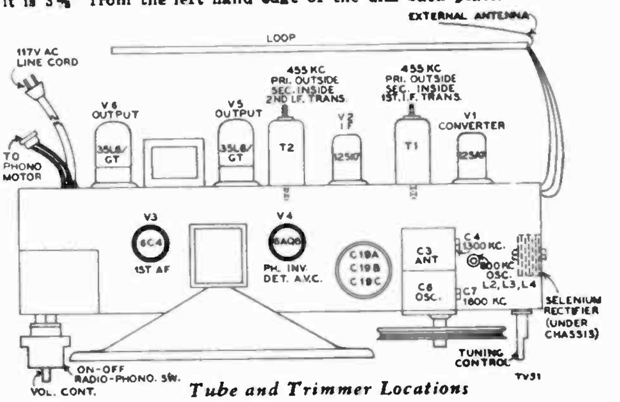
Alignment Procedure

CAUTION.—CLOSE TUNING CONDENSER PLATES COMPLETELY (C-C-W) BEFORE REMOVING CHASSIS FROM CABINET.
Take off both wooden strips on bottom of cabinet by removing wood-screws before loosening chassis bolts.

CRITICAL LEAD DRESS.—

1. Dress output plate bypasses as near chassis as possible.
2. Dress all filament leads down to chassis.
3. Dress all exposed leads away from each other and away from chassis to prevent short circuits.
4. Dress R-6 away from shield.
5. Dress AVC resistor away from R-13 and R-14.
6. Dress output plate leads down to chassis.
7. Dress R-18 away from R-15.
8. Dress R-16 away from V4 socket.
9. Dress R-10 away from V4 socket.
10. Dress high side of line cord down to front apron.
11. Dress lead of C-5 which connects to phono input away from side of chassis.

Dial Pointer Adjustment.—Rotate tuning condenser fully counter-clockwise (plates fully meshed). Adjust indicator pointer so that it is 3¾" from the left hand edge of the dial back plate.



Tube and Trimmer Locations

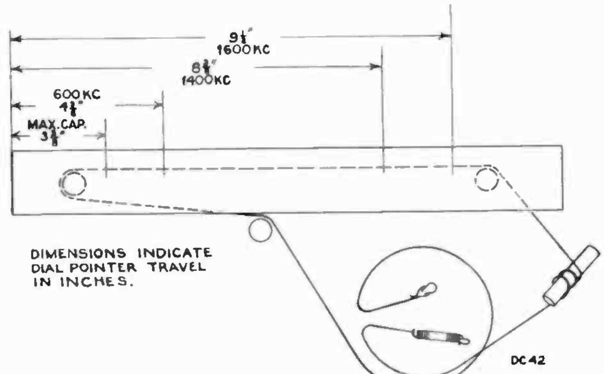
Tubes 6C4 and 6AQ6 may be replaced by removing the sloping panel (remove four wood screws) in the front of the record changer compartment. Before removing the chassis from the cabinet it is advisable to loosen the two hex screws holding the speaker horizontally. This will allow the chassis to be removed and replaced easily. When the chassis is replaced the dial lights should be adjusted so as not to be visible from the front of the cabinet, and yet to give correct dial lighting. Move the speaker so it is flush against the baffle before retightening the hex nuts. The chassis mounting board should be flush against the front of the cabinet, and the chassis mounting holes should be centered over the holes in the board.

The first I-F transformer shown in the schematic is stamped 970441-1. Some chassis will have a first I-F transformer stamped 970441-5. Connections to this alternate transformer are as shown in the block letters. Performance will be identical for both sets.

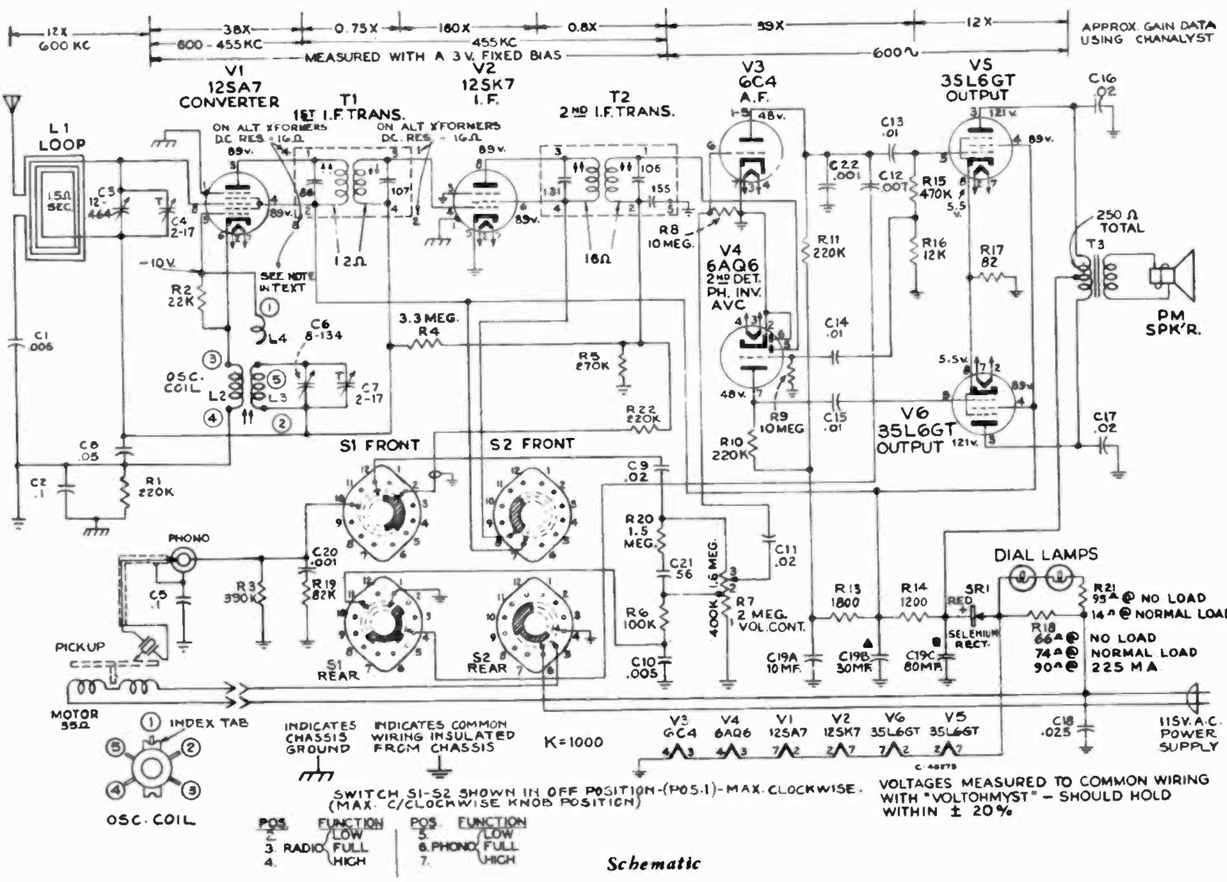
Output Meter.—Connect meter across speaker voice coil. Turn volume control clockwise to radio maximum high position (3) for alignment.

Steps	Connect the high side of test-oscillator to—	Tune test-osc. to—	Turn radio dial to—	Adjust the following for max. peak output
1	I.F. grid, in series with .01 mfd.	455 kc	Quiet point 1,600 kc end of dial	Pri. & Sec. 2nd I.F. transformer
2	1st Det. grid in series with .01 mfd.			Pri. & Sec. 1st I.F. transformer
NOTE.—ANTENNA LOOP AND RECORD CHANGER MUST BE IN CABINET				
3	Antenna terminal in series with 220 mmfd.	1,600 kc	1,600 kc	C7 (osc.)
4		1,400 kc	1,400 kc	C4 (ant.)
5		600 kc	600 kc	Osc. Coil L2, L3 Rock gang
6	Repeat steps 3, 4, & 5 if necessary			

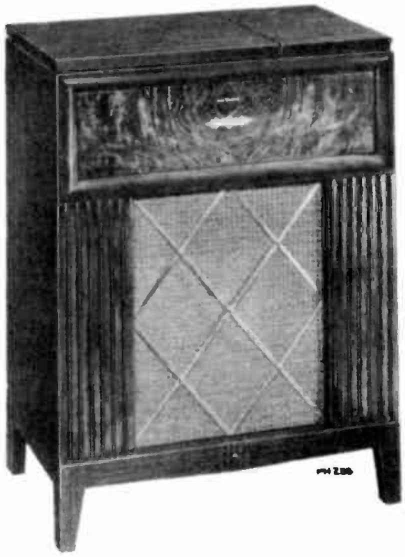
Test Oscillator.—Connect high side of test oscillator as shown in chart. Connect low side through a .01 mf capacitor to common "—B". Keep the output signal as low as possible to avoid a-v-c action.



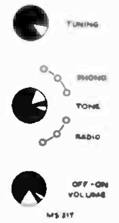
Dial-Indicator and Drive Mechanism



Schematic



Model 77V1



Controls

RCA VICTOR

VICTROLA 77V1

Radio-Phonograph Combination

Chassis No. RC-615 Mfr. No. 274

FOR AUTOMATIC CHANGER INFORMATION REFER TO SERVICE DATA FOR MODEL 960260-1

SERVICE DATA

— 1947 No. 12 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Circuit Description

The receiver is a seven tube superheterodyne employing push-pull power unit. AVC is applied to the converter and i-f tubes. The broadcast band utilizes a standard loop antenna.

Dimensions

	Cabinet	Chassis (overall)
Height (inches)	34	5⅝
Width (inches)	26¼	11⅛
Depth (inches)	16¼	8
Tuning Drive Ratio		16:1

Frequency Ranges

Standard Broadcast "A" .... 540-1,600 kc

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-6SA7 .... 1st Det., Oscillator
(2) RCA-6SK7 .... I-F Amplifier
(3) RCA-6SQ7 .... 2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7 .... A-F Amplifier
(5) RCA-6V6GT .... Power Output
(6) RCA-6V6GT .... Power Output
(7) RCA-6X5GT .... Rectifier

Power Supply Rating (including Phono Motor)

105-125 volts, 60 cycles .... 95 watts

Pilot Lamps .... (2) Mazda No. 51, 6-8 volts, 0.2 amp.

Compartment Lamp .... (1) Mazda No. 51, 6-8 volts, 0.2 amp.

Loudspeaker

Electrodynamic 92569-1W
Size 12-inch
V. C. impedance at 400 cycles .... 2.2 ohms

Power Output Rating

Undistorted .... 5 watts
Maximum .... 5.5 watts

Phonograph

Type .... Automatic 960260-1
Record Capacity .... Twelve 10-in., Ten 12-in.
Turntable .... 78 r.p.m. type
Type Pickup .... Crystal
Motor Power consumption (115 v., 60 cycles) .... 30 watts

Replacement Parts

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 615	70135	Shaft—Tuning knob shaft
70137	Bracket—Dial bracket—L.H.—complete with drive cord pulley	31364	Socket—Lamp socket
70136	Bracket—Dial bracket—R.H.—complete with drive cord pulley	35787	Socket—Phono input socket
71924	Capacitor—Ceramic, 56 mmf. (C5)	31251	Socket—Tube socket
71614	Capacitor—Ceramic, 120 mmf. (C18)	31418	Spring—Drive cord tension spring
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C9, C12)	70134	Switch—Range switch (S1)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C19, C20)	70128	Transformer—First I. F. transformer (T1)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C7)	70129	Transformer—Second I. F. transformer (T2)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16)	70127	Transformer—Power transformer, 117 volt, 60 cycles (T4)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C13)	35969	Washer—"C" Washer for tuning shaft
70610	Capacitor—Tubular, .01 mfd., 400 volts (C6, C10, C17)		SPEAKER ASSEMBLIES 92569-1W RL 103-1
70611	Capacitor—Tubular, .02 mfd., 400 volts (C11, C15)		
70615	Capacitor—Tubular, .05 mfd., 400 volts (C8)		
71976	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts; 1 section of 30 mfd., 350 volts; and 1 section of 20 mfd., 25 volts (C21A, C21B, C21C)	13867	Cap—Dust cap
		36145	Cone—Cone and voice coil assembly
		71560	Plug—5 prong male plug for speaker
70133	Coil—Oscillator coil (L2, L3)	71961	Speaker—12" P.M. speaker complete with cone and voice coil less output transformer and plug
70139	Condenser—Variable tuning condenser (C1, C2, C3, C4)		
70342	Control—Volume control and power switch (R6, S2)	71145	Suspension—Metal cone suspension
72953	Cord—Drive cord (approx. 49" overall length)	37899	Transformer—Output transformer (T3)
70930	Grommet—Rubber grommet to mount variable condenser (3 required)		NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
71608	Indicator—Station selector indicator		
70138	Plate—Dial back plate		
30868	Plug—2 contact female plug for Motor cable		
12493	Plug—5 contact female plug for speaker cable		MISCELLANEOUS
72602	Pulley—Drive cord pulley	71599	Bracket—Lamp bracket
	Resistor—Fixed composition, 330 ohms, ±10%, 1 watt (R19)	13103	Cap—Pilot lamp jewel
	Resistor—Fixed composition, 2200 ohms, ±10%, 2 watts (R20)	70142	Clamp—Dial clamp (1 set)
	Resistor—Fixed composition, 8200 ohms, ±10%, ½ watt (R17)	X1668	Cloth—Grille cloth
	Resistor—Fixed composition, 15,000 ohms, ±10%, 2 watts (R2)	73084	Decal—Control panel decal
	Resistor—Fixed composition, 18,000 ohms, ±10%, ½ watt (R4)	71966	Decal—Trade mark decal (Victrola)
	Resistor—Fixed composition, 22,000 ohms, ±10%, ½ watt (R1)	71910	Decal—Trade mark decal (RCA-Victor)
	Resistor—Fixed composition, 27,000 ohms, ±10%, ½ watt (R5, R7)	70141	Dial—Glass dial scale
		71764	Hinge—Cabinet lid hinge
	Resistor—Fixed composition, 56,000 ohms, ±10%, ½ watt (R8)	71822	Knob—Range switch knob
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R21)	71821	Knob—Tuning or volume control knob
		11765	Lamp—Dial or pilot lamp
	Resistor—Fixed composition, 270,000 ohms, ±10%, ½ watt (R10, R11, R13, R14)	70140	Loop—Antenna loop complete (L1)
	Resistor—Fixed composition, 470,000 ohms, ±10%, ½ watt (R3, R16, R18)	71815	Mounting—One set of hardware consisting of four (4) springs, two (2) "C" washers and two (2) rubber washers to mount record changer
	Resistor—Fixed composition, 2.2 megohms, ±20%, ½ watt (R9)	30900	Spring—Retaining spring for knobs
	Resistor—Fixed composition, 10 megohms, ±20%, ½ watt (R12, R15)	73080	Support—Cabinet lid support—L.H.
		73083	Support—Cabinet lid support—R.H.

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SK7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	Pri. and Sec. (2nd I-F Trans.)
2	6SA7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	Pri. and Sec. (1st I-F Trans.)
3	Primary lead on loop in series with 200 mmfd.	1,400 kc.	1,400 kc.	C4 (osc.) C2 (ant.)
4	Primary lead on loop in series with 200 mmfd.	600 kc.	600 kc.	L2 (osc.) Rock gang
5	Primary lead on loop in series with 200 mmfd.	Repeat steps 3 and 4		

Change in Record Changer:

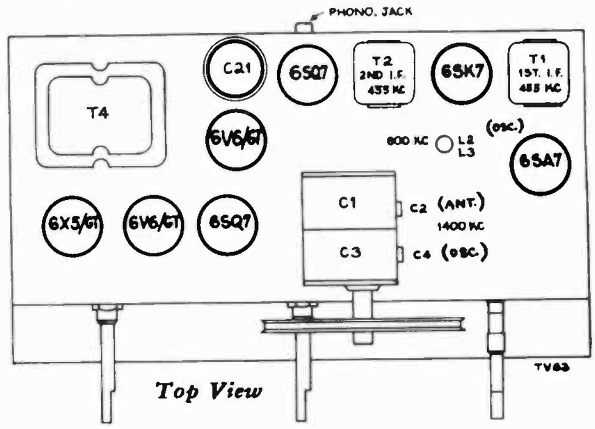
Late production of this instrument uses type RP-178 record changer. Replacement parts are the same except as listed below:

MISCELLANEOUS

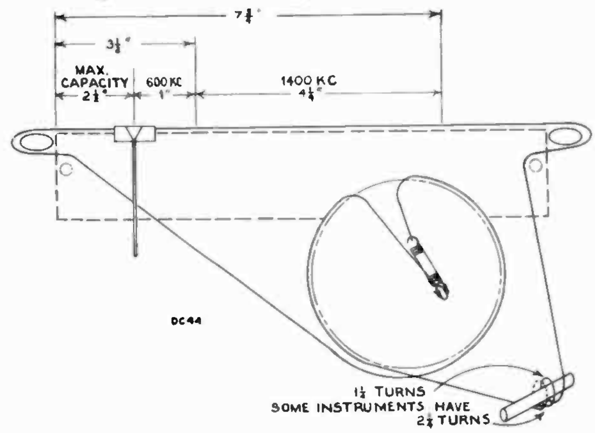
72437 Cable—Shielded pickup cable (used with RP-178 record changer)
72856 Grommet—Rubber grommet to mount record changer (3 required for RP-178, 4 required for 960260 record changer)
71815 Mounting—One set of hardware consisting of four (4) springs, two (2) "C" washers and two (2) rubber washers to mount record changer type 960260.
73109 Nut—Tee nut to mount record changer (3 required) for type RP-178 record changer.
73110 Screw—¼-20 x 1¾" fillister head machine screw to mount record changer type RP-178 (3 required).

Critical Lead Dress:

1. Dress speaker cable leads down next to chassis.
2. Dress output plate capacitors next to chassis.
3. Dress plate lead of output tube away from grid of audio amplifier.
4. Dress all a-c leads away from volume control down next to chassis.
5. Dress lead from top tap of volume control to range-tone switch along front apron of chassis.
6. Dress R12 and R15 down near chassis base.

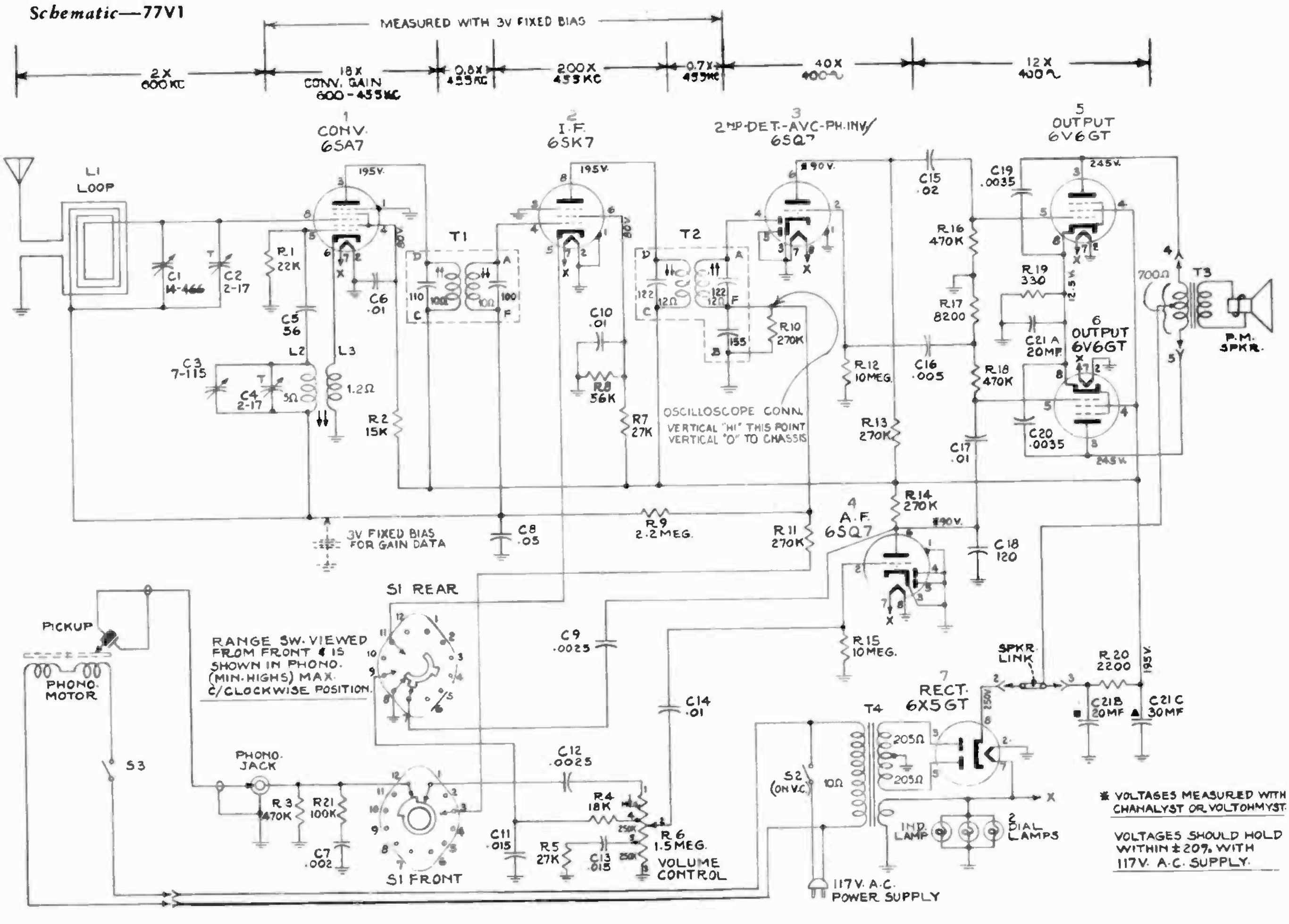


Top View



Dial Indicator and Drive Mechanism

Schematic—77V1



RCA VICTOR

Model 77V2

Radio-Phonograph Combination

MODEL 77V2

Chassis No. RC-606C, Mfr. No. 274

FOR RECORD CHANGER INFORMATION
REFER TO SERVICE DATA FOR MODEL 960260

SERVICE DATA

— 1947 No. 10 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Specifications

Circuit Description

The receiver is a seven tube superheterodyne employing push-pull power output. AVC is applied to the converter and i-f tubes. The broadcast band utilizes a standard loop antenna, and the short wave antenna is a wire tacked in the cabinet.

Dimensions

	Cabinet	Chassis (overall)
Height (inches)	34	5⅝
Width (inches)	33⅜	11⅛
Depth (inches)	17⅝	8

Tuning Drive Ratio 14:1

Frequency Ranges

Standard Broadcast "A" .... 540-1,600 kc
Short Wave "C" .... 9.2-16 mc

Intermediate Frequency .... 455 kc

Tube Complement

(1) RCA-6SA7 .... 1st Det., Oscillator
(2) RCA-6SK7 .... I-F Amplifier
(3) RCA-6SQ7 .... 2nd Det., A. V. C. and Phase Inverter
(4) RCA-6SQ7 .... A-F Amplifier
(5) RCA-6V6-GT .... Power Output
(6) RCA-6V6-GT .... Power Output
(7) RCA-6X5-GT .... Rectifier

Power Supply Rating (including Phono Motor)

105-125 volts, 60 cycles .... 85 watts

Pilot Lamps .... (2) Mazda No. 51, 6-8 volts, 0.2 amp.

Compartment Lamp .... (1) Mazda No. 55, 6-8 volts, 0.4 amp.

Loudspeaker

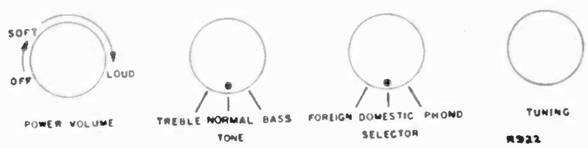
92569-1 .... 12 in. P. M.
V. C. impedance at 400 cycles .... 2.2 ohms

Power Output Rating

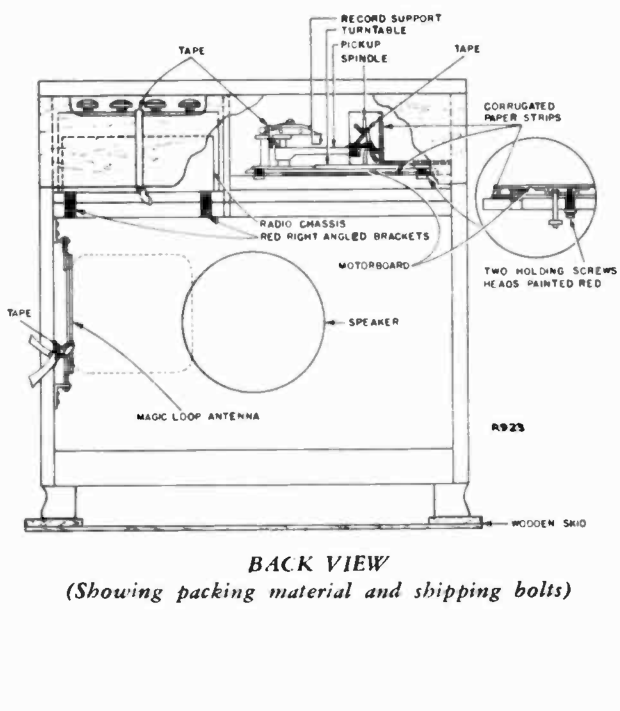
Undistorted .... 5 watts
Maximum .... 5.5 watts

Record Changer

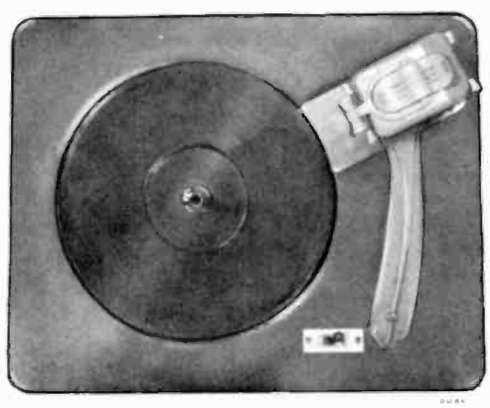
Type 960260-1
Record Capacity .... Twelve 10-in., Ten 12-in.
Turntable Speed .... 78 r.p.m
Type Pickup .... Crystal



FRONT PANEL CONTROLS

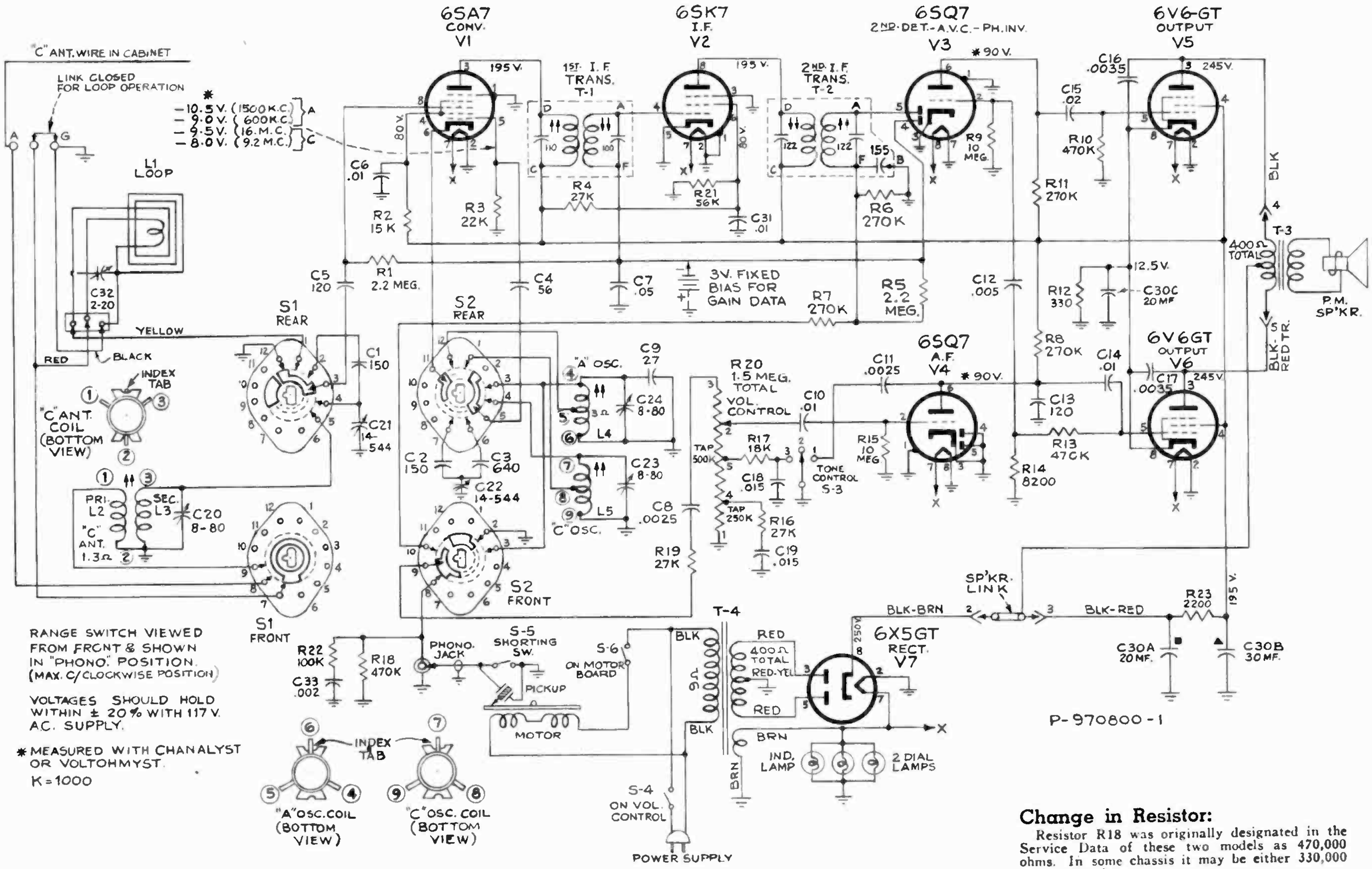


BACK VIEW
(Showing packing material and shipping bolts)



RECORD CHANGER—TOP VIEW

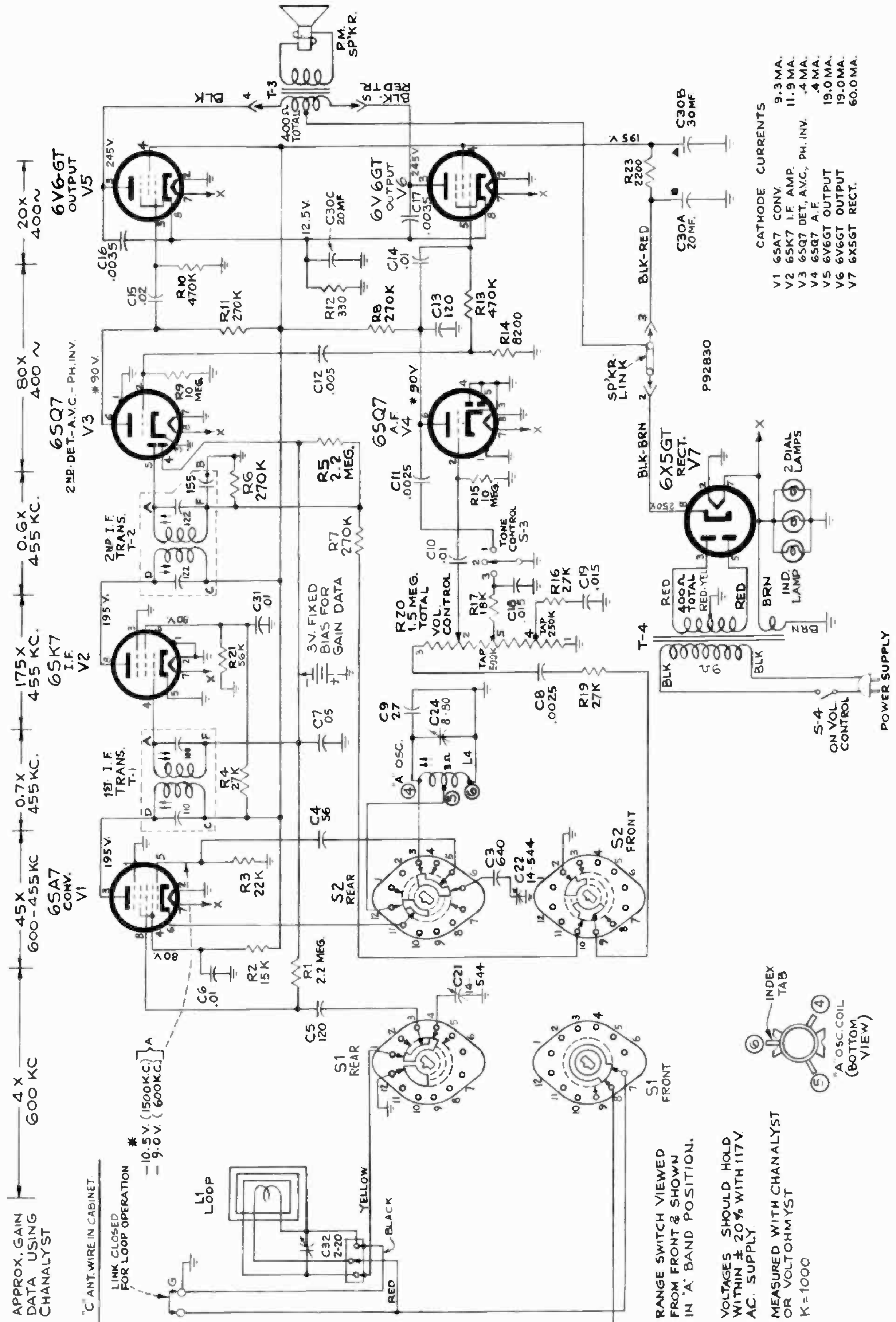
FOR INFORMATION ON RECORD CHANGER REFER TO SERVICE DATA FOR MODEL 960260.



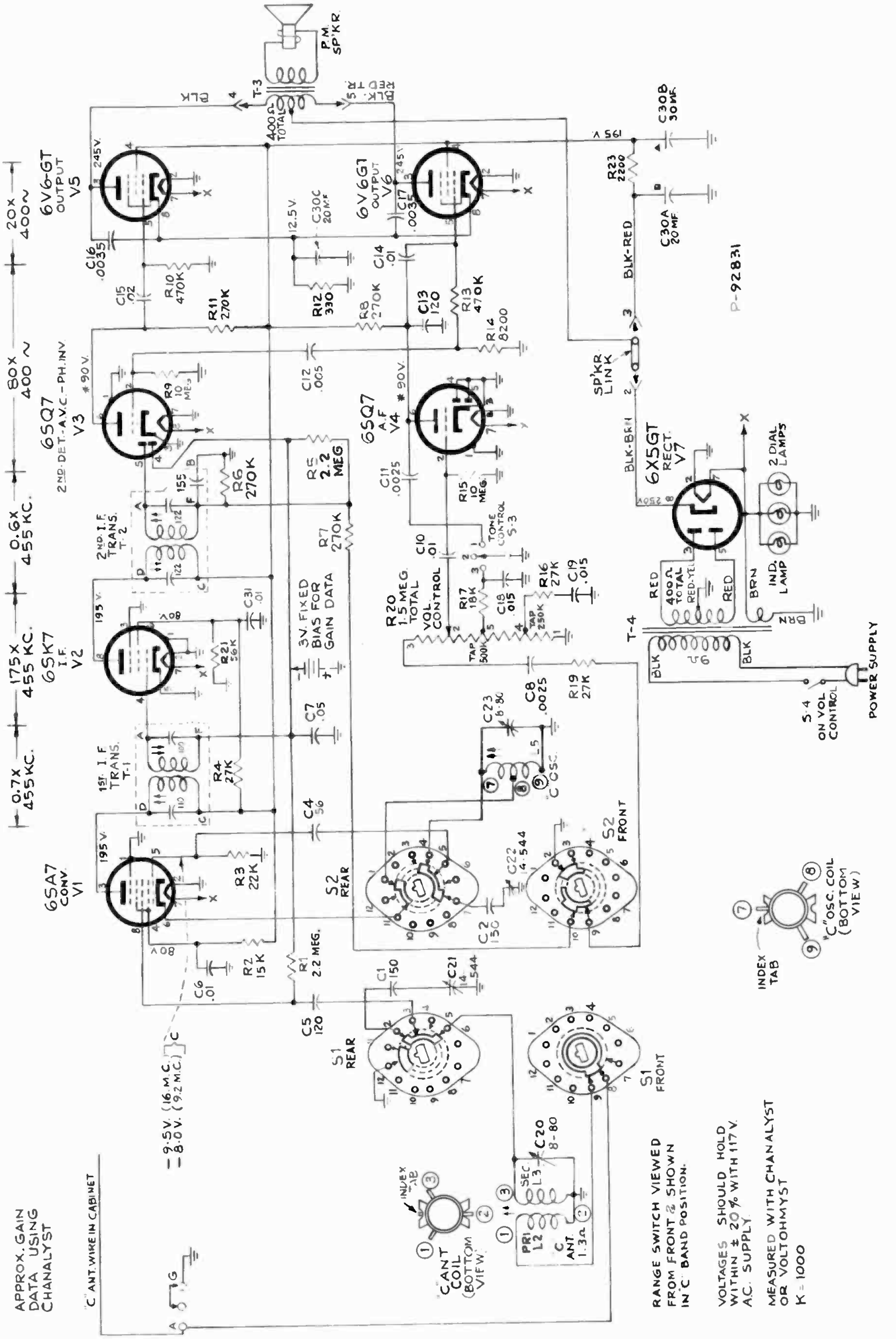
Change in Resistor:

Resistor R18 was originally designated in the Service Data of these two models as 470,000 ohms. In some chassis it may be either 330,000 or 220,000 ohms.

COMPLETE SCHEMATIC DIAGRAM



"A" BAND
SIMPLIFIED SCHEMATIC DIAGRAM



"C" BAND
SIMPLIFIED SCHEMATIC DIAGRAM

Alignment Procedure

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale.—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

Using Printed Dial Scale.—

1. Cut out the printed dial scale, or make a tracing of the scale.
2. With gang at full mesh the pointer should be set to the second reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

Note.—It is not recommended that the glass dial scale in the cabinet be removed as an alignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

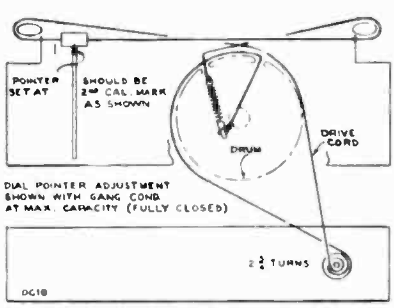
"C" Band Reception.—For best reception on "C" band with an outside antenna, adjust the trimmer screw of C20 on the antenna coil. Turn screw carefully with an insulated screwdriver (RCA Stock No. 31031) while the receiver is tuned to a station in the 31-meter band. If returning to internal antenna at any time, close the link on the center terminal and readjust "C" band antenna trimmer C20 for best reception on 31-meter band.

For additional information, refer to booklet, "RCA Victor Receiver Alignment."

Steps	Connect high side of test oscillator to—	Tune test oscillator to—	Turn radio dial to—	Adjust the following for maximum peak output
1	6SK7 grid in series with .01 mfd.	455 kc.	Broadcast Quiet Point at 550 kc. end of dial	Top and bottom T-1 (2nd I-F Trans.)
2	6SA7 grid in series with .01 mfd.			Top and bottom T-2 (1st I-F Trans.)
3	Yellow lead on loop in series with 200 mmfd. (link closed)	1,400 kc.	Broadcast 1400 kc.	C24 (osc.)
4		600 kc.	Broadcast 600 kc.	L4 (osc.) Rock gang
5		Repeat steps 3 and 4.		
6	Antenna terminal in series with 47 mmfd.	15.2 mc.	Short Wave 15.2 mc.	C23 (osc.)* C20 (ant.)
7		9.5 mc.	Short Wave 9.5 mc.	L5 (osc.) L3 (ant.)
8		Repeat steps 6 and 7		
9	Install and connect chassis in cabinet with link closed. Tune in a radiated signal of 1400 kc. on broadcast band and peak C32 on loop.			

* Use minimum capacity peak if two can be obtained. Check for selection of correct peak by tuning the receiver to approximately 14.3 mc., where a weaker signal should be received.

Oscillator tracks 455 kc. above signal on both bands.

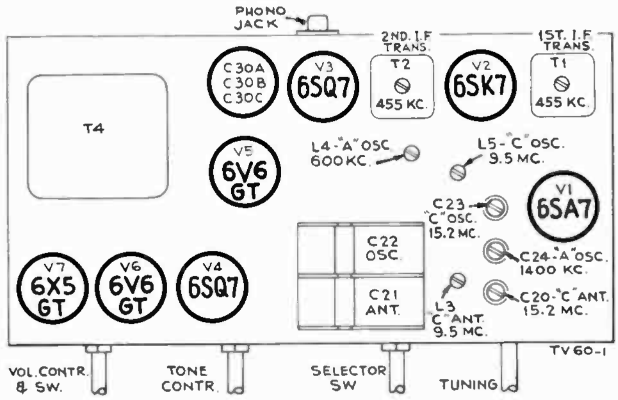


DIAL INDICATOR AND DRIVE MECHANISM

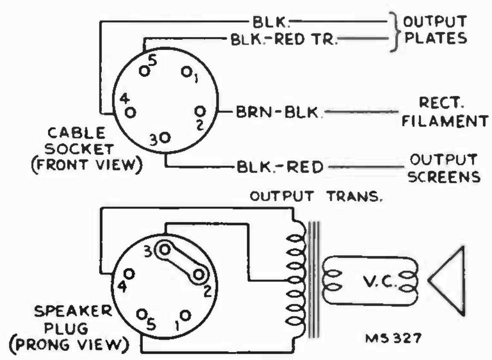
Critical Lead Dress:

1. Dress all A. C. leads away from volume control.
2. Dress lead from top tap of volume control to tone switch along front apron of chassis.
3. Dress R9 and R15 down near chassis base.

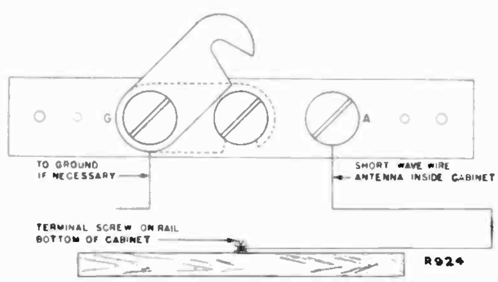
Note.—In order to remove the chassis from the cabinet, remove the knobs and the connecting cables, then unscrew the four slotted hex head screws from the two "L" brackets bolted to the rear of the chassis. The chassis may then be slid out toward the bottom rear of the cabinet. Do not remove the hinge screws or the two large nuts in the rear of the chassis. When replacing the chassis, make sure that the tapered pins on the front of the chassis fit into the holes on the metal runners attached to the cabinet door.



TOP VIEW



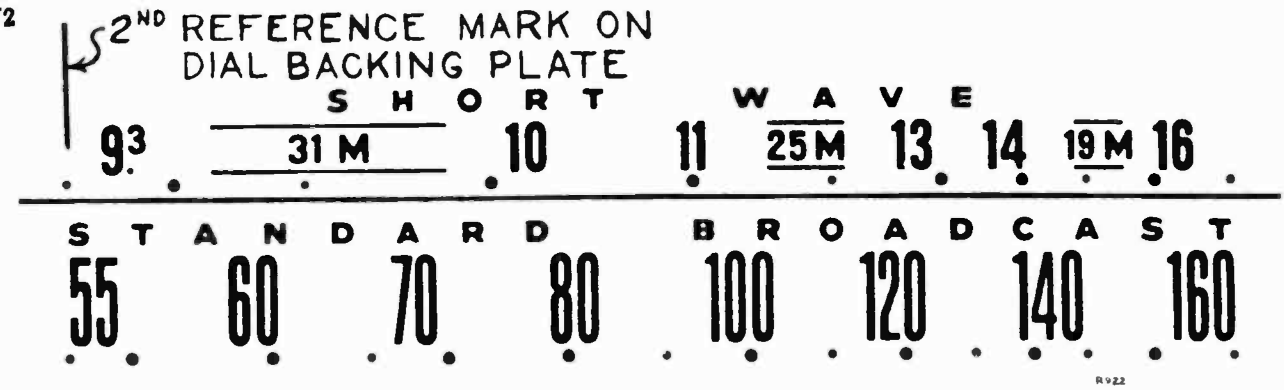
SPEAKER CONNECTIONS



EXTERNAL ANTENNA CONNECTIONS

When using external antenna, open link and connect lead-in to terminal screw.

77V2



The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

Replacement Parts

For Record Changer Parts refer to Service Data for Model 960260-1

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES (RC-606C)
71601	Board—"Ant. ground" board
71606	Bracket—Dial bracket with drive cord pulley (L. H.)
71605	Bracket—Dial bracket with drive cord pulley (R. H.)
71615	Capacitor—Ceramic, 27 mmf. (C9)
71924	Capacitor—Ceramic, 56 mmf. (C4)
71610	Capacitor—Mica trimmer, 3 sections 8-80 mmf. (C20, C23, C24)
71614	Capacitor—Ceramic, 120 mmf. (C5, C13)
39632	Capacitor—Silvered mica, 150 mmf. (C1, C2)
71613	Capacitor—Mica, 640 mmf. (C3)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C33)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C8, C11)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C16, C17)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C12)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C6, C10, C14, C31)
70572	Capacitor—Tubular, .015 mfd., 400 volts (C18, C19)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C15)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C7)
71976	Capacitor—Comprising 1 section 20 mfd. 450 volts, 1 section 30 mfd. 350 volts and 1 section 20 mfd. 25 volts (C30A, C30B, C30C)
71633	Coil—"A" band oscillator coil (L4)
71632	Coil—"C" band antenna coil (L2, L3)
71634	Coil—"C" band oscillator coil (L5)
71600	Condenser—Variable tuning condenser (C21, C22)
70342	Control—Volume control and power switch (R20, S4)
72953	Cord—Drive cord (approx. 45" overall length)
71609	Drum—Drive drum
72069	Grommet—Rubber grommet for rear mounting feet
70930	Grommet—Rubber grommet for mounting tuning condenser
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate
38832	Plug—Pin plug for loop lead
12493	Plug—Speaker cable plug, 5 contact (female)
72602	Pulley—Drive cord pulley mounted on dial bracket
	Resistor—330 ohms, 1 watt (R12)
	Resistor—2,200 ohms, 2 watt (R23)
	Resistor—8,200 ohms, ½ watt (R14)
	Resistor—15,000 ohms, 2 watt (R2)
	Resistor—18,000 ohms, ½ watt (R17)
	Resistor—22,000 ohms, ½ watt (R3)
	Resistor—27,000 ohms, ½ watt (R4, R16, R19)
	Resistor—56,000 ohms, ½ watt (R21)
	Resistor—100,000 ohms, ½ watt (R22)
	Resistor—270,000 ohms, ½ watt (R6, R7, R8, R11)
	Resistor—470,000 ohms, ½ watt (R10, R13, R18)
	Resistor—2.2 megohms, ½ watt (R1, R5)
	Resistor—10 megohms, ½ watt (R9, R15)
71604	Shaft—Tuning shaft
35787	Socket—Input socket
30868	Socket—Motor cable socket, 2 contact (female)
31364	Socket—Pilot lamp socket
31251	Socket—Tube socket
31418	Spring—Indicator cord tension spring
71602	Switch—Range switch (S1, S2)
71603	Switch—Tone control switch (S3)
70128	Transformer—First I-F transformer (T1)
70129	Transformer—Second I-F transformer (T2)
70127	Transformer—Power transformer, 117 volts, 60 cycles (T4)
35969	Washer—"C" washer for tuning shaft

STOCK No.	DESCRIPTION
	SPEAKER ASSEMBLIES 92569-1W or 92569-1W1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly—(2.2 ohm voice coil)
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" PM speaker complete with cone and voice coil less output transformer and plug (92569-1W)
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T6)
	SPEAKER ASSEMBLIES 92569-1W2
13867	Cap—Dust cap
72828	Cone—Cone and voice coil assembly—(6 ohm voice coil)
71560	Plug—5 prong male plug for speaker
71145	Suspension—Metal cone suspension
73242	Transformer—Output transformer (T6)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
71819	Bracket—Door check mounting bracket
36461	Button—Plug button
38684	Capacitor—Mica trimmer, 2-20 mmf. (C32)
71820	Check—Radio compartment door check assembly less spring
X1638	Cloth—Grille cloth for walnut instruments
X1639	Cloth—Grille cloth for mahogany instruments
70547	Cover—Compartment lead cover
71769	Decal—Control function decal for walnut or mahogany instruments
71910	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
71817	Dial—Glass dial scale
71816	Escutcheon—Dial scale escutcheon less dial
11889	Grommet—Rubber grommet to cushion chassis front apron (2 required)
72069	Grommet—Rubber grommet for mounting loop
71764	Hinge—Cabinet door hinge (2 required)
13103	Jewel—Pilot lamp cap
71822	Knob—Range switch or tone switch knob
71821	Knob—Volume control or tuning knob
5117	Lamp—Compartment lamp
11765	Lamp—Dial lamp
71813	Loop—Antenna loop complete (L1, C32)
71815	Mounting—One set of hardware to mount record changer—consisting of four springs, two spring washers and two rubber washers
73187	Pull—Door pull
72324	Shade—Compartment lamp shade
36422	Socket—3 contact socket (female) for loop leads
71818	Spring—Door check spring
30900	Spring—Retaining spring for knobs
71765	Support—Cabinet lid support and hinge
71814	Washer—Rubber washer for door check

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Additions to Parts List:

MISCELLANEOUS

Add:

X1758 Cloth—Grille cloth for blonde instruments

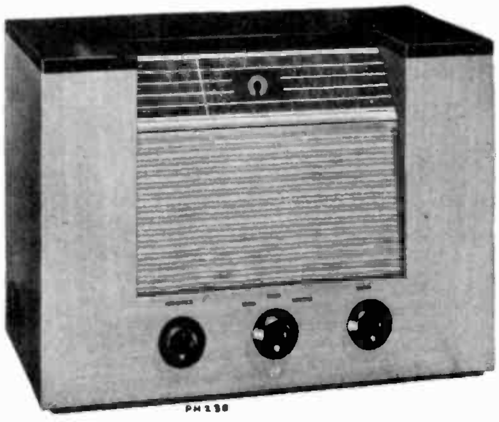
72825 Decal—Control function decal for blonde instruments

73001 Hinge—Cabinet door hinge (2 required) for blonde instruments

73241 Pull—Door pull for blonde instruments

72715 Pull—Door pull for walnut and mahogany instruments

71764 Hinge—Cabinet door hinge (2 required) for walnut and mahogany instruments



RCA MODELS Q109, Q109X

Chassis No. RC602, RC602A, Mfr. No. 274

Service Data

1947 . . . . X6

RADIO CORPORATION OF AMERICA
RCA INTERNATIONAL DIVISION
745 FIFTH AVE., NEW YORK 22, N. Y.

Specifications

Frequency Ranges, Q109

Standard Broadcast ("A" Band)	540—1600 kc.	(556—187 m)
Medium Wave ("B" Band)	2.45—6.3 mc.	(122—47.7 m)
"31-25 Meter" Spread Band	9.5 — 12 mc.	(31.6—25 m)
"19-16 Meter" Spread Band	15.1 — 18 mc.	(19.8—16.6 m)
"13-11 Meter" Spread Band	21.4 — 27 mc.	(14 —11.1 m)

Frequency Ranges, Q109X

Long Wave ("X" Band)	140—375 kc.	(2,140—800 m)
Standard Broadcast ("A" Band)	540—1600 kc.	(556—187 m)
"31-25 Meter" Spread Band	9.5 — 12 mc.	(31.6—25 m)
"19-16 Meter" Spread Band	15.1 — 18 mc.	(19.8—16.6 m)
"49-40 Meter" Spread Band	6.— 7.3 mc.	(50—41 m)

Intermediate Frequency .... 455 kc.

Tube Complement

(1) RCA 6SG7	R-F Amplifier
(2) RCA 6SA7	1st Detector
(3) RCA 6SK7	I-F Amplifier
(4) RCA 6SQ7	2nd Detector, A.V.C., A-F Amplifier
(5) RCA 6AT6	Phase Inverter
(6) RCA 6F6G	Power Output
(7) RCA 6F6G	Power Output
(8) RCA 5Y3 GT	Rectifier
(9) RCA 6U5/6G5	Tuning Indicator

Pilot Lamps .... 2 type 51 6.3 volts, 0.15 amp.
1 type 55 6.3 volts, 0.40 amp.

Power Output Rating

	Undistorted	Maximum
Q109, Q109X	5.0 watts	6.2 watts

Loudspeaker

Chassis No. RC 602, RC 602A	92562-1
Type (Electrodynamic)	6"x9" Elliptical
V-C Impedance (400 c.p.s.)	2.2 ohms

Tuning Drive Ratio 22:1

Power Supply Ratings

Symbol	Voltages	Frequency (cycles)	Watts
Rating A	105-125	50-60	80
Rating B	105-125	25-60	80
Rating D	(See below)	50-60	80

110 position—100 min.—115 max.
125 position—115 min.—135 max.
150 position—135 min.—165 max.
210 position—190 min.—230 max.
240 position—220 min.—260 max.

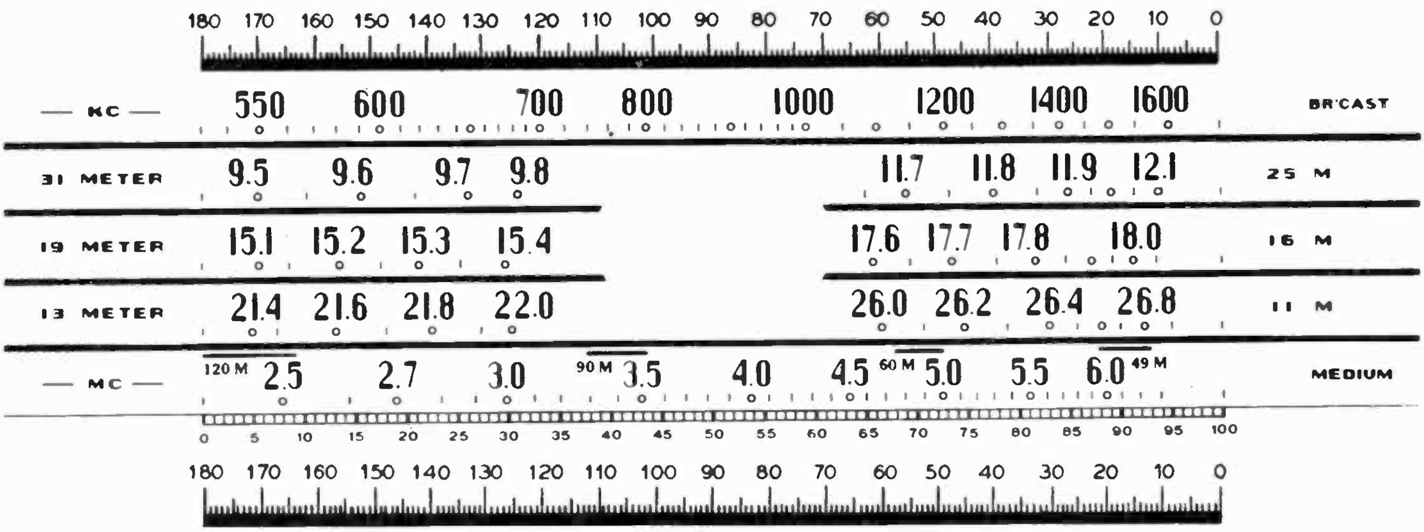
Note: Shipped in 240-volt position. To change, remove round cover on top of transformer case and move link to required position.

CAUTION: Remove power cord from line receptacle before changing link position.

Cabinet Dimensions

Height	12⅝"
Width	18¼"
Depth	11"
Net Weight	approx. 18 lbs.

Phonograph Attachment.—A jack is provided on the rear of chassis for connection to a phonograph. The cable from the attachment should be terminated in a Stock No. 31048 plug.



Reduced Reproduction of Receiver Dial, Q109, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."

Q109, Q109X

Alignment Procedure

Cathode-Ray Alignment is the preferable method. Connections for the oscillograph are shown on the Schematic Circuit Diagram.

Output Meter Alignment.—If this method is used, connect the meter across the voice coil, and turn the receiver volume control to maximum.

Test Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Calibration Scale on Indicator-Drive-Cord-Drum.—The tuning dial is fastened in the cabinet and cannot be used for reference during alignment, therefore a calibration scale is attached to the indicator-drive-cord-drum which is mounted on the shaft of the gang condenser. The setting of the gang condenser is read on this scale, which is calibrated in degrees. The correct setting of the gang in degrees, for each alignment frequency, is given in the alignment table.

As the first step in r-f alignment, check the position of the drum. The "180°" mark on the drum scale must be vertical, and directly over the center of the gang-condenser shaft when the plates are fully meshed. The drum is held to the shaft by means of two set screws, which must be tightened securely when the drum is in the correct position.

To determine the corresponding frequency for any setting of the calibration scales, refer to the calibration scale drawing which shows the dial with 0-180° calibration scales drawn at top and bottom.

Pointer for Calibration Scale.—Improvise a pointer for the calibration scale by fastening a piece of wire to the gang-condenser frame, and bend the wire so that it points to the "180°" mark on the calibration scale when the plates are fully meshed.

Dial-Indicator Adjustment.—After fastening the chassis in the cabinet, attach the dial indicator to the drive cable with indicator at the 540 kc mark (the first mark on "A" hand to the left of "550"), and gang condenser fully meshed. The indicator has a spring clip for attachment to the cable.

Spread-Band Alignment.—The most satisfactory method of aligning or checking the spread-band ranges is on actual reception of short-wave stations of known frequency, by adjusting the magnetite-core oscillator coil for each spread-band so that these stations come in at the correct points on the dial.

In exceptional cases, when the set is being serviced in a location where the noise level is high enough to prevent reception of short-wave stations, a test-oscillator may be used for alignment, but an extremely high degree of accuracy is required in the frequency settings of the test-oscillator, as a slight error will produce considerable inaccuracy on the spread-band dials. The frequency settings of the test-oscillator may be checked by one or both of the following methods:

1. Determine the exact dial settings of the test-oscillator (for frequencies at or close to the specified alignment frequencies) by zero-beating the test-oscillator against short-wave stations of known frequency.
2. Use harmonics of the standard-broadcast range of a test-oscillator, first checking the frequency settings on this range by means of a crystal-controlled oscillator, or by zero-beating against standard broadcast stations.

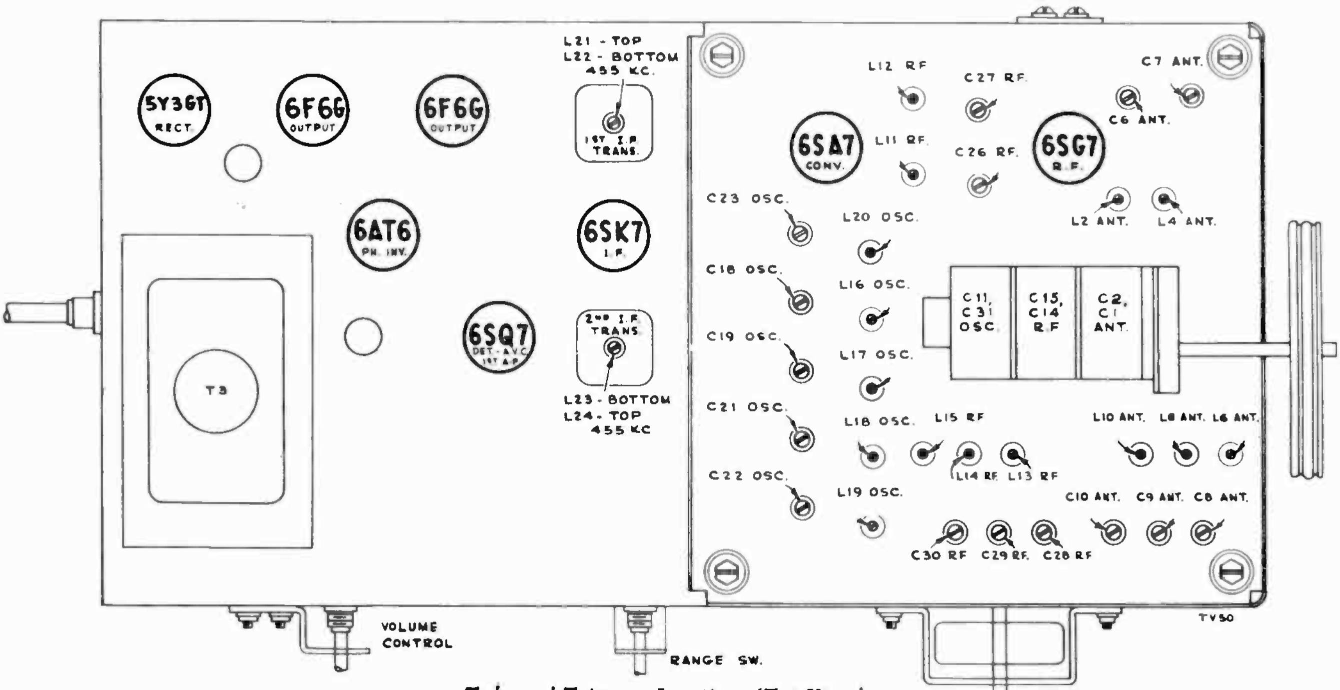
When a test-oscillator is employed for spread-band alignment, a final check should be made on actual reception of short-wave stations of known frequency, and the magnetite-core oscillator coil for each band should be retouched so that the stations come in at the correct points on the dial.

For additional information, refer to booklet "RCA Victor Receiver Alignment."

Q109

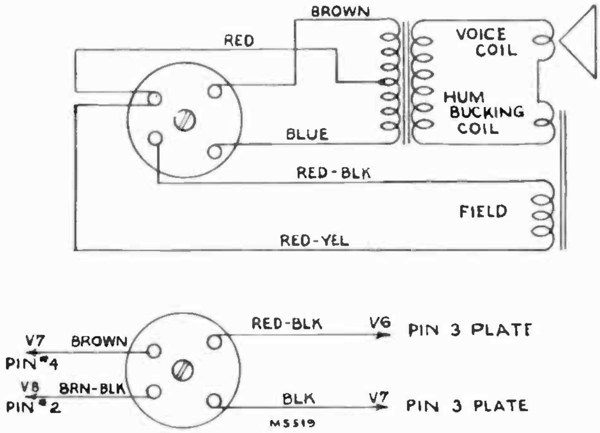
Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L23, L24 2nd. I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L21, L22 1st. I-F trans.
3	Antenna terminal in series with 200 mmfd.	1500 kc	"A" Band	1500 kc (19°)	C23 osc. C30 rf. C10 ant.
4		600 kc		600 kc (148°)	L20 osc. L15 rf.† L10 ant.†
5	Repeat Steps 3 and 4				
6	Antenna terminal in series with 300 ohms	6.2 mc	"B" Band	6.2 mc (14°)	C22 osc.* C29 rf. C9 ant.
7		2.6 mc		2.6 mc (152°)	L19 osc.† L14 rf.† L8 ant.†
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C21 osc.* C28 rf.** C8 ant.**
10		9.5 mc		9.5 mc (170°)	L18 osc.† L13 rf.† L6 ant.†
11		17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C19 osc.* C27 rf.** C7 ant.**
12		15.2 mc		15.2 mc (155°)	L17 osc.† L12 rf.† L4 ant.†
13		26.25 mc	"13-11 Meter" Band	26.25 mc (42°)	C18 osc.* C26 rf.** C6 ant.**
14		21.25 mc		21.25 mc (180°)	L16 osc.† L11 rf.† L2 ant.†

Oscillator tracks above signal on all bands.
*Use minimum capacity peak if two peaks can be obtained.
†These adjustments are pre-set and should not require re-adjustment except when components of the tuning section are changed.
**Rock in—use maximum capacity peak if two peaks can be obtained.

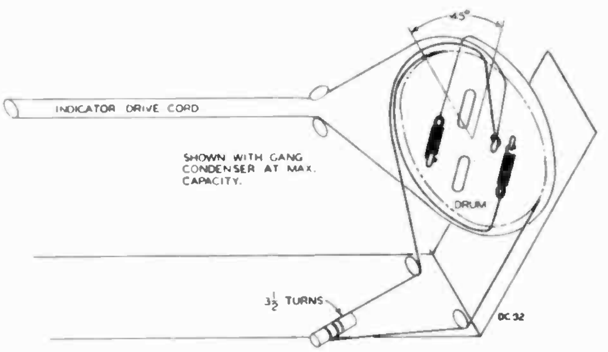


Tube and Trimmer Locations (Top View)

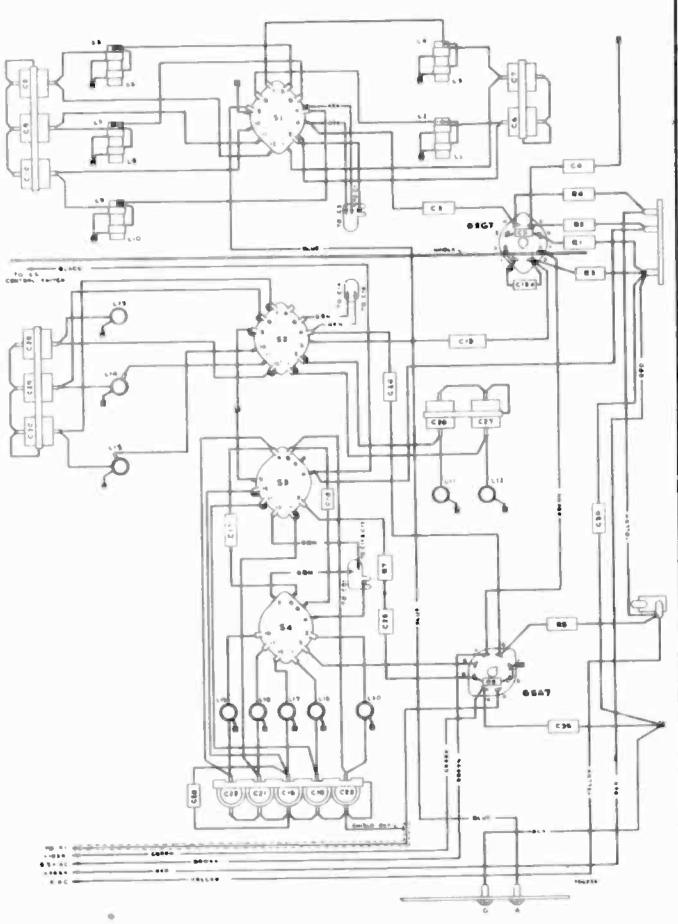
Q109, Q109X



Loudspeaker Connections



Dial-Indicator and Drive Mechanism



R. F. Wiring Diagram (Bottom View)

Q109 (RC-602)

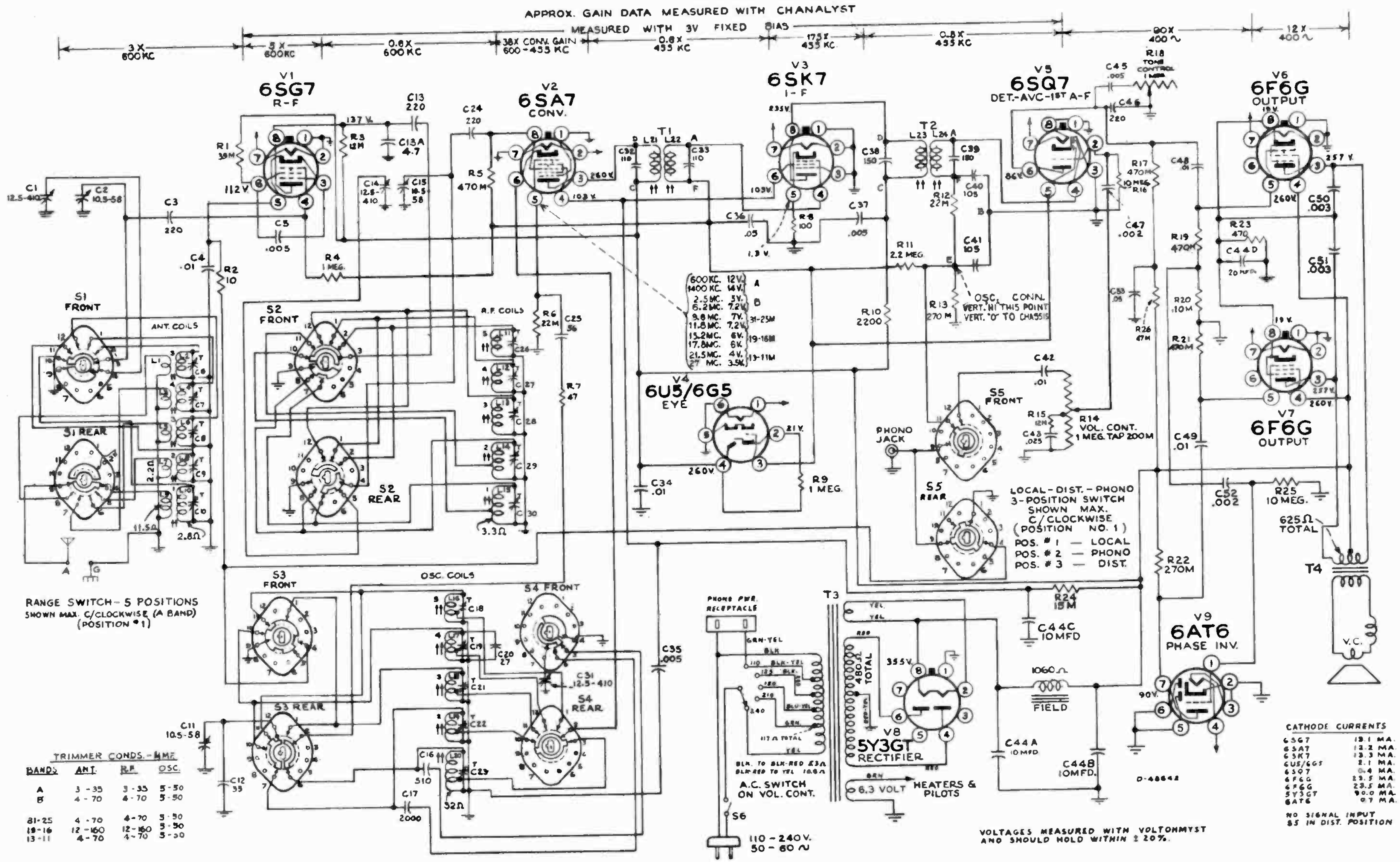
Critical Lead Dress

1. Dress C47 and R16 against chassis.
2. Dress R23 against chassis.
3. Dress C48 on power transformer side of terminal board.
4. All resistor and capacitor leads should be as short as practical.
5. Twist electrolytic capacitor leads and dress between chassis and electrolytic capacitor.
6. Twist all A.C. leads and keep close to chassis and away from otner component parts and wires.
7. Dress blue treble tone control (R18) lead along intersection of chassis and rear apron and under electrolytic capacitor.
8. Keep tuning indicator and pilot lamp leads away from 6SQ7 tube.
9. Dress C35 against RF plate assembly.
10. Dress C25 and R7 and C24 midway between range switch and RF coil.
11. Keep coil leads to switch and trimmers with minimum slack but not stretched tight.
12. Flexibility of RF plate assembly must be maintained.
13. Dress black lead from phono-radio switch to range switch close to chassis.
14. Dress C13A away from RF shield.
15. Dress C34 against RF plate assembly.
16. Keep all gang leads as short as practical.
17. A loop must be maintained in ground braid connecting RF plate assembly to chassis.
18. Dress blue lead to antenna terminal against RF shield.

Q109X

Steps	Connect the high side of the test-osc. to—	Tune test-osc. to—	Turn Range Switch to—	Turn radio dial to—	Adjust the following for max. peak output
1	6SK7 I-F grid in series with .01 mfd.	455 kc	"A" Band	Quiet point near 600 kc (148°)	L23, L24 2nd. I-F trans.
2	6SA7 Det. grid in series with .01 mfd.				L21, L22 1st. I-F trans.
3	Antenna terminal in series with 200 mmfd.	360 kc	"X" Band	360 kc (19°)	C23 osc. C30 rf. C10 ant.
4		160 kc		160 kc (133°)	L20 osc. L15 rf.† L10 ant.†
5	Repeat Steps 3 and 4				
6	Antenna terminal in series with 300 ohms	1500 kc	"A" Band	1500 kc (19°)	C22 osc.* C29 rf. C9 ant.
7		600 kc		600 kc (148°)	L19 osc.† L14 rf.† L8 ant.†
8	Repeat Steps 6 and 7				
9	Antenna terminal in series with 300 ohms	7.2 mc	"49-40 Meter" Band	7.2 mc (44°)	C21 osc.* C28 rf.** C8 ant.**
10		6.1 mc		6.1 mc (141°)	L18 osc.† L13 rf.† L6 ant.†
11		11.8 mc	"31-25 Meter" Band	11.8 mc (40°)	C19 osc.* C27 rf.** C7 ant.**
12		9.5 mc		9.5 mc (170°)	L17 osc.† L12 rf.† L4 ant.†
13		17.75 mc	"19-16 Meter" Band	17.75 mc (40°)	C18 osc.* C26 rf.** C6 ant.**
14		15.2 mc		15.2 mc (155°)	L16 osc.† L11 rf.† L2 ant.†

Oscillator tracks above signal on all bands.
*Use minimum capacity peak if two peaks can be obtained.
†These adjustments are pre-set and should not require re-adjustment except when components of the tuning section are changed.
**Rock in—use maximum capacity peak if two peaks can be obtained.



Schematic Diagram

Q109 (RC-602)

Power Trans. Color Code:

105/125 v. 50-60 cycle—stamped 901944-501
Primary—Black—Black (6.3 ohms d.c.)
H.V. Winding—Red—Red/Yellow—Red (510 ohms d.c.)
Heaters—Brown—Brown
Rect. Fil.—Yellow—Yellow

105/125 v. 25-60 cycle—stamped 901945-501
Primary—Black—Black (8 ohms d.c.)
H.V. Winding—Red—Red/Yellow—Red (460 ohms d.c.)
Heaters—Brown—Brown
Rect. Fil.—Yellow—Yellow

Change in Filter Capacitor:

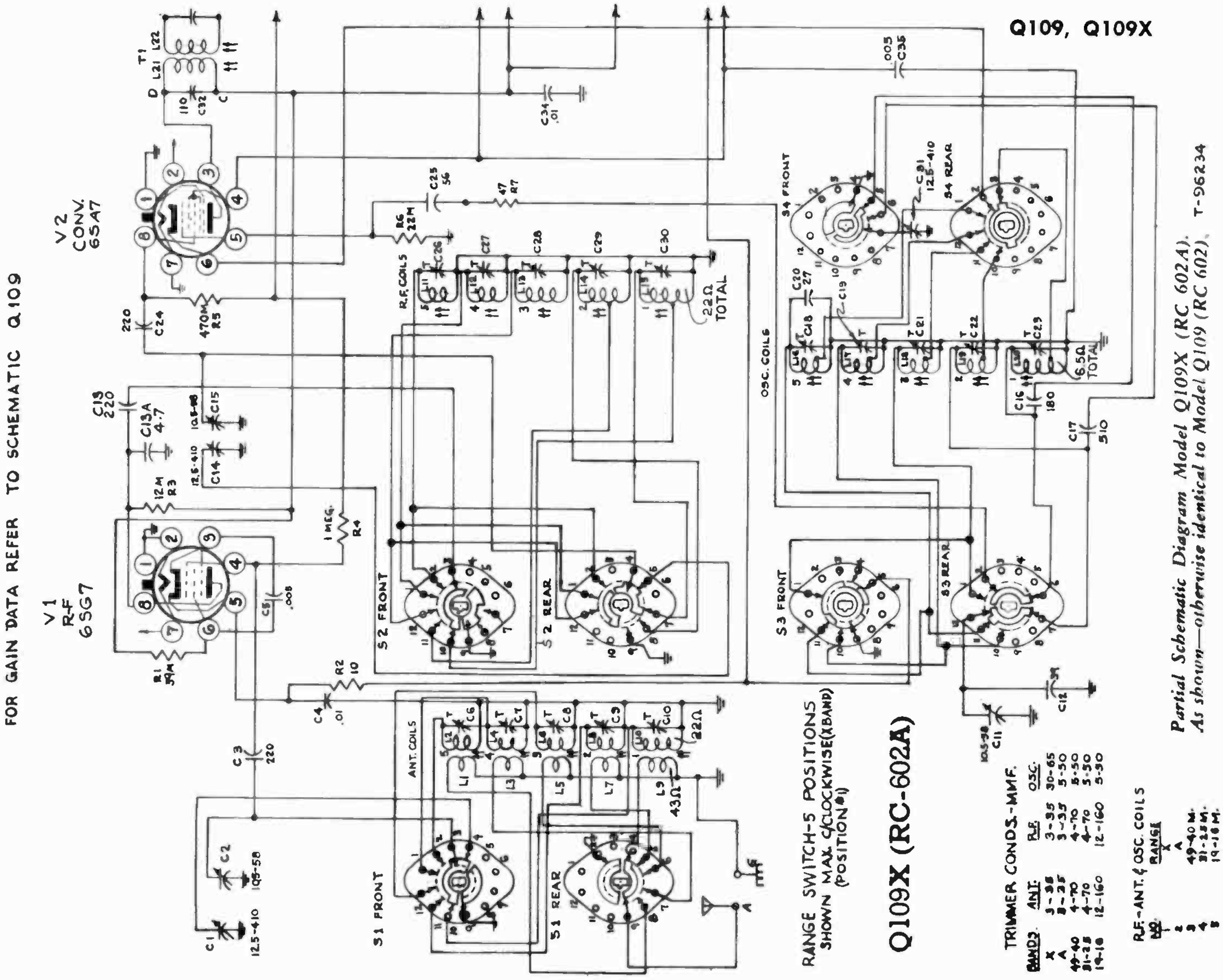
On some sets the filter capacitor C44 has two sections of 15 mfd and one section of 20 mfd @ 450 volts and one section of 20 mfd @ 25 volts.

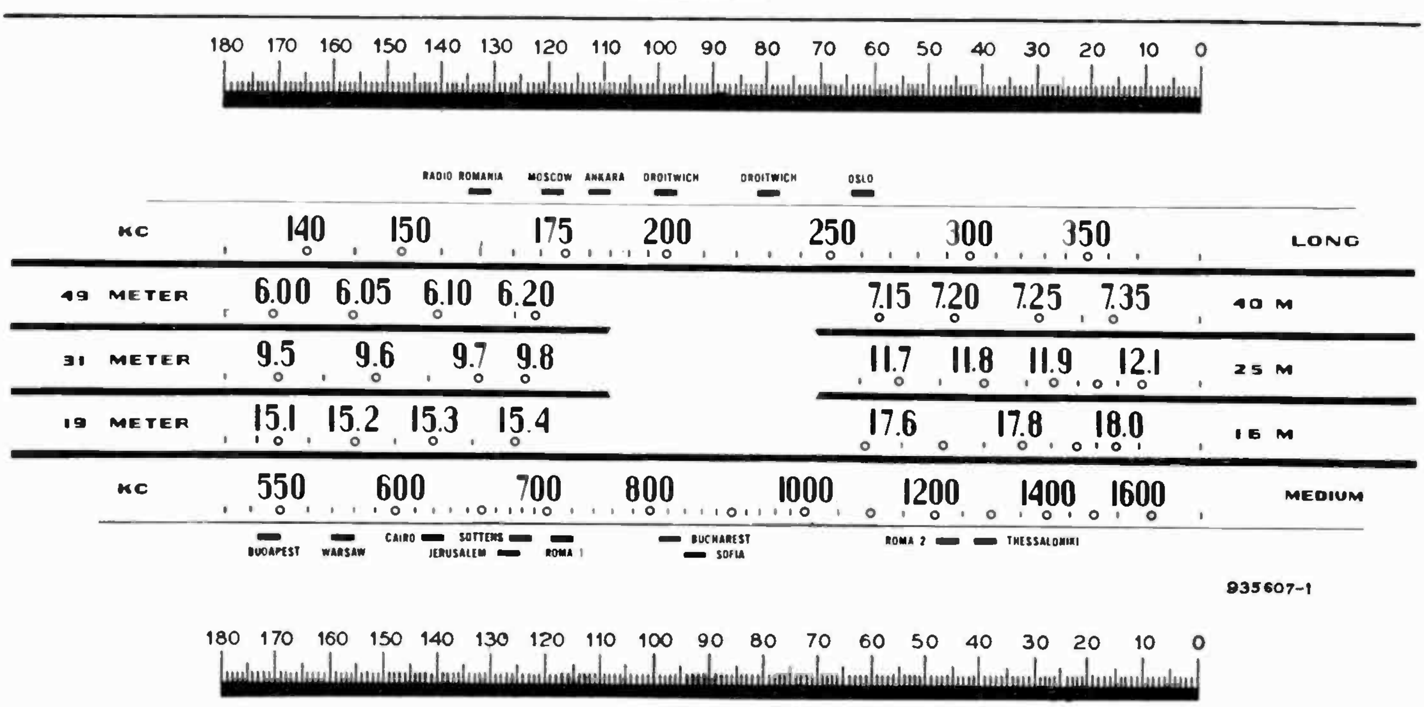
Local-Distance-Phono. Switch:

The Local-Distance-Phono. Switch (S5) used in these receivers is unusual in that the rotor segments do not contact consecutive terminals but instead contact every second terminal.

In LOCAL position the cathode circuit of 6SG7 (R. F. Amp.) is opened (A Band only) and voltages are correspondingly higher due to the absence of cathode current in this tube.

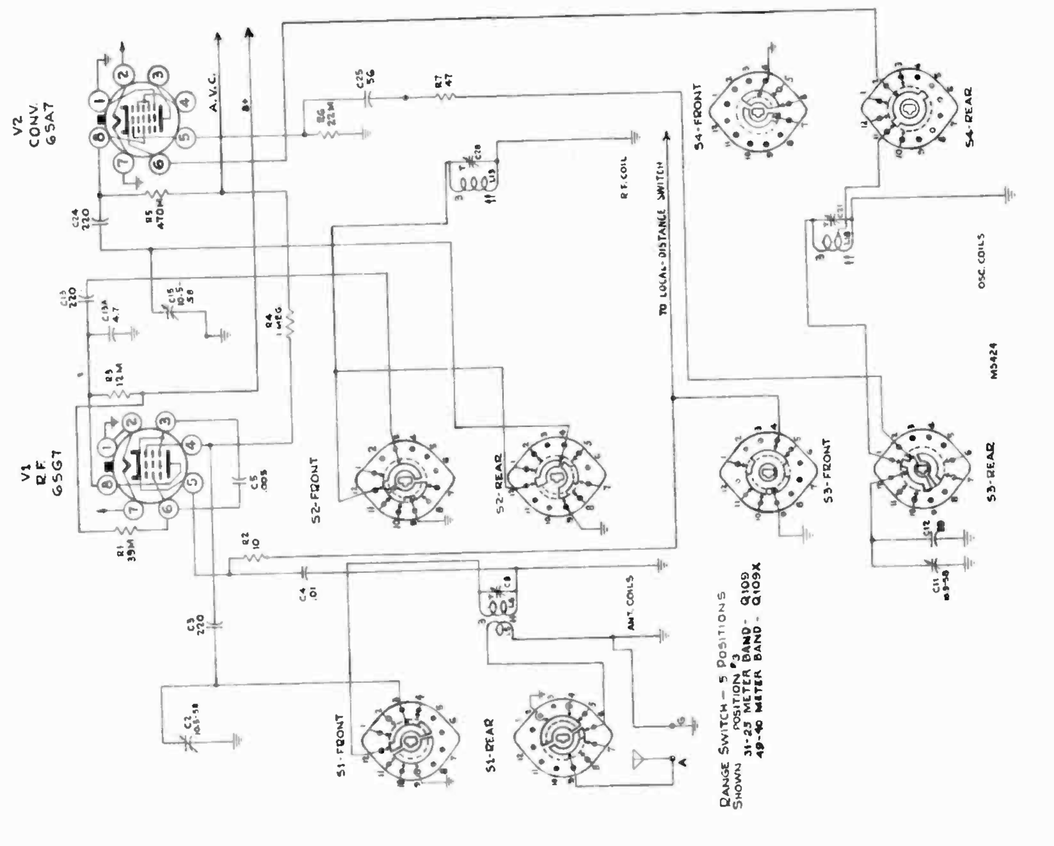
Q109, Q109X





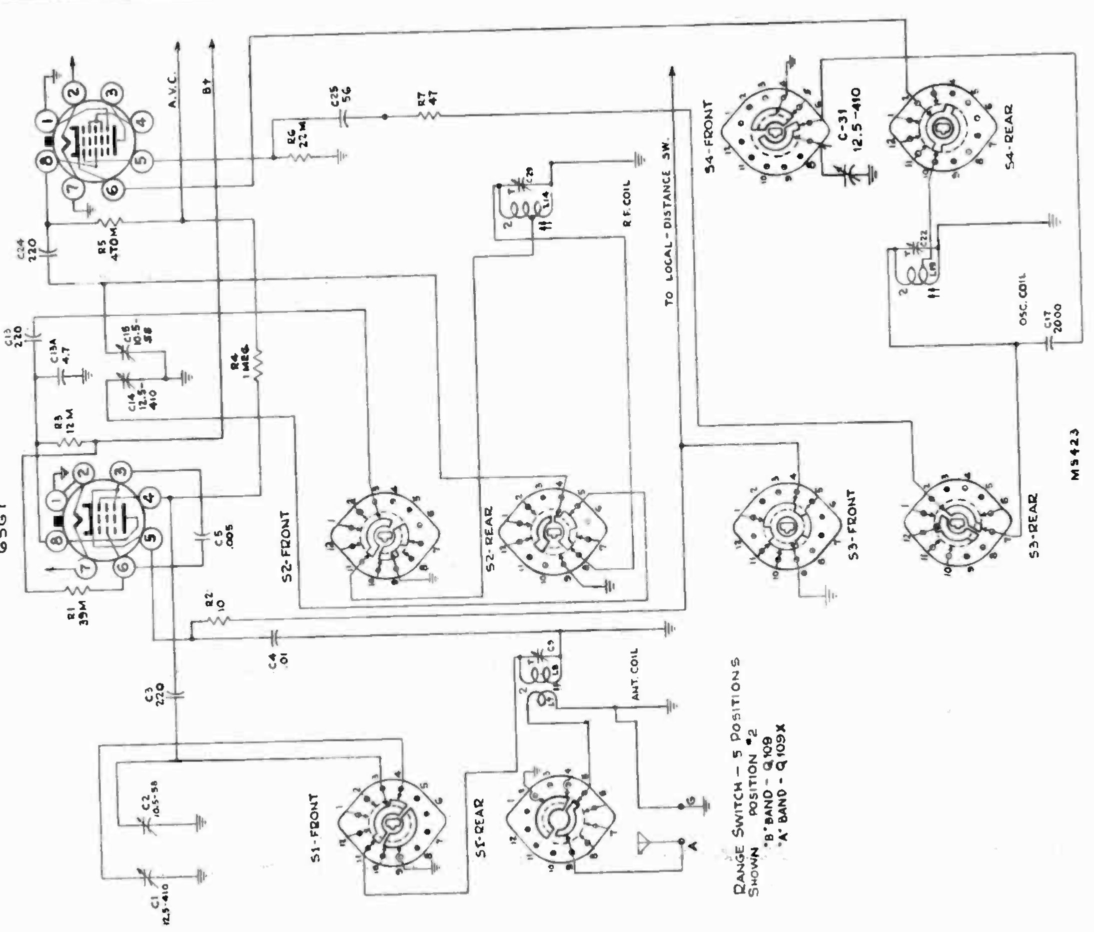
Reduced Reproduction of Receiver Dial Q109X, and Corresponding 0-180° Calibration Scales

The corresponding position of the dial indicator for any setting of the calibration scale can be determined by drawing a line from this point on the bottom calibration scale to the same point on top calibration scale. For example 150° on the calibration scale corresponds to 600 kc on "A" band, etc. Read instructions under "Alignment Procedure."



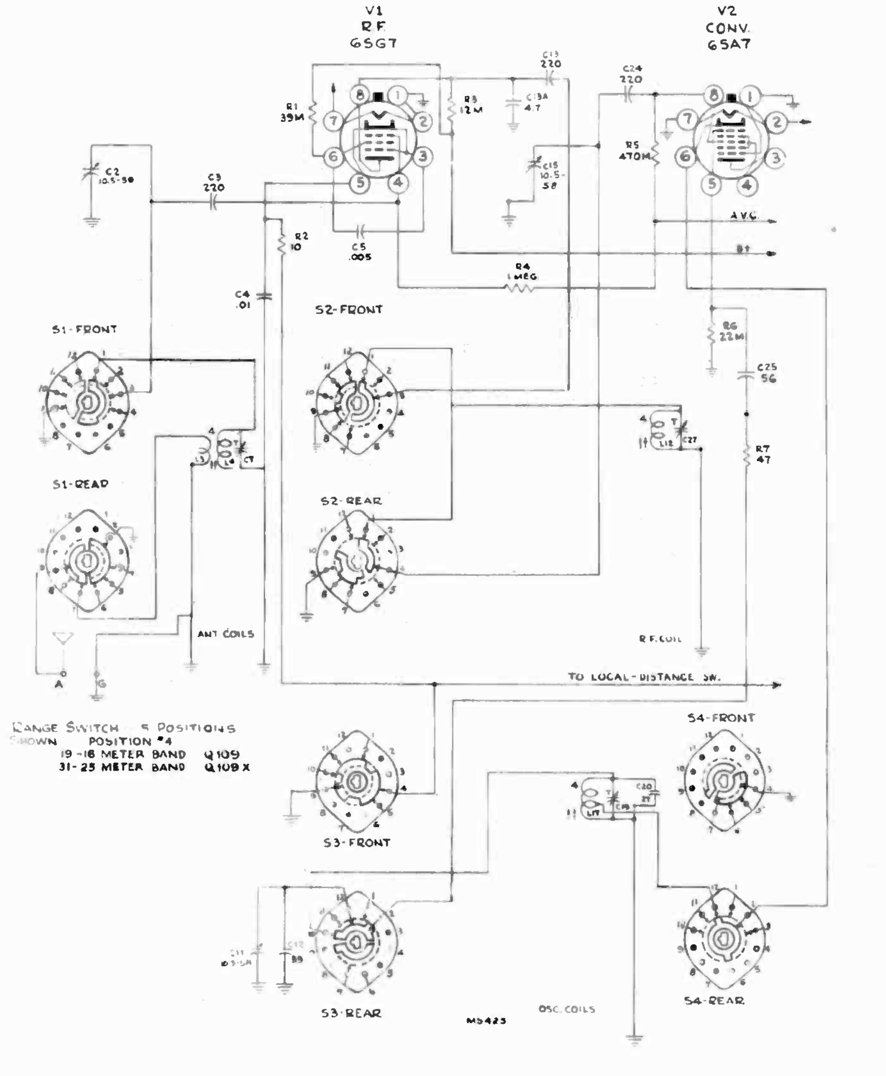
R. F. Section
Simplified Schematic Diagram

NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.

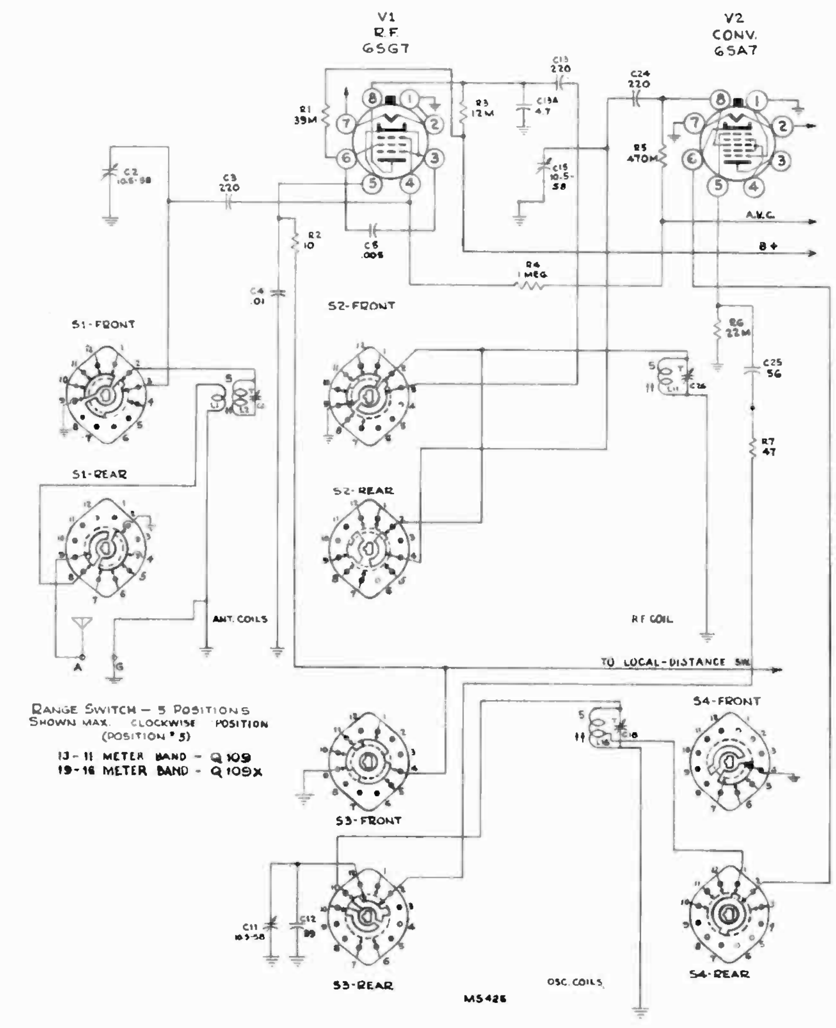


R. F. Section
Simplified Schematic Diagram

The above schematic diagrams as shown for Q109 (RC 602). On Model Q109X (RC 602A) the "Local Distance" Switch connects to term. #5 instead of term. #4 of S3 Front.



R. F. Section
Simplified Schematic Diagram



R. F. Section
Simplified Schematic Diagram

NOTE: Circuits not in use are either disconnected or grounded thru the range switch contacts but are not illustrated.

The above schematic diagrams as shown for Q109 (RC 602). On Model Q109X (RC 602A) the "Local-Distance" switch connects to term. #5 instead of term. #4 of S3 Front. C20 is used on 19-16 Meter" band (switch position #4 of Q109 and #5 of Q109X).

Q109, Q109X — Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES
	RC 602-Q109
	RC 602A-Q109X
12930	Board—"Antenna-Ground" board
70952	Bracket—L.H. bracket complete with drive cord pulley
70951	Bracket—R. H. bracket complete with four (4) pulleys
70840	Cable—Bronze cable (20" long) for band indicator mechanism
35795	Calibrator—Drive Drum Calibrator
71086	Capacitor—Ceramic, 4.7 mmf. ((C13A)
70935	Capacitor—Ceramic, 27 mmf. (C20)
73247	Capacitor—Ceramic, 33 mmf. (C12)
71924	Capacitor—Ceramic, 56 mmf. (C25)
71933	Capacitor—Mica, 180 mmf. (C16 for Q109X)
39636	Capacitor—Mica, 220 mmf. (C3, C13, C24, C46)
71932	Capacitor—Mica, 510 mmf. (C16 for Q109, C17 for Q109X)
72526	Capacitor—Mica, 2000 mmf. (C17 for Q109)
70931	Capacitor—Mica trimmer, comprising 1 section of 3-35 mmf. and 2 sections of 4-70 mmf. for Q109 (C8, C9, C10, C28, C29, C30)
70966	Capacitor—Mica trimmer, comprising 2 sections of 3-35 mmf. and 1 section of 4-70 mmf. for Q109X (C8, C9, C10, C28, C29, C30)
70754	Capacitor—Mica trimmer, comprising 1 section of 4-70 mmf. and 1 section of 12-160 mmf. (C6, C7 for Q109X, C26, C27 for Q109)
70745	Capacitor—Mica trimmer, comprising 1 section of 12-160 mmf. and 1 section of 4-70 mmf. (C6, C7 for Q109, C26, C27 for Q109X)
70965	Capacitor—Ceramic trimmer, comprising 5 sections of 5-50 mmf. for Q109 (C18, C19, C21, C22, C23)
70967	Capacitor—Ceramic trimmer, comprising 4 sections of 5-50 mmf. and 1 section of 30-65 mmf. for Q109X (C18, C19, C21, C22, C23)
71592	Capacitor—Moulded paper, .002 mfd., 200 volts (C52)
71590	Capacitor—Moulded paper, .002 mfd., 600 volts (C47)
71087	Capacitor—Moulded paper, .003 mfd., 1000 volts (C50, C51)
71587	Capacitor—Moulded paper, .005 mfd., 600 volts (C5, C35, C37)
71593	Capacitor—Moulded paper, .005 mfd., 600 volts (C45)
71589	Capacitor—Moulded paper, .025 mfd., 200 volts (C43)
71585	Capacitor—Moulded paper, .01 mfd., 200 volts (C42)
72219	Capacitor—Moulded paper, .01 mfd., 600 volts (C4, C34, C48, C49)
72527	Capacitor—Moulded paper, .05 mfd., 100 volts (C36)
33014	Capacitor—Electrolytic, comprising three (3) sections of 10 mfd., 450 volts and one (1) section of 20 mfd., 25 volts (C44A, C44B, C44C, C44D)
70953	Clamp—Mounting clamp for electrolytic capacitor
38201	Clamp—Clamp for drive and pointer cords
70726	Clip—Retaining clip for coils core and stud
70923	Coil—Antenna coil, 13-11 meter band for Model Q109 (L1, L2)
70924	Coil—Antenna coil, 19-16 meter band (L1, L2 for Q109X, L3, L4 for Q109)
70925	Coil—Antenna coil, 31-25 meter band (L3, L4 for Q109X, L5, L6 for Q109)
70928	Coil—Antenna coil, 49-40 meter band for Model Q109X (L5, L6)
70926	Coil—Antenna coil, "B" band for Model Q109 (L7, L8)
70927	Coil—Antenna coil, "A" band (L7, L8 for Q109X, L9, L10 for Q109)
70929	Coil—Antenna coil, "X" band for Model Q109X (L9, L10)
70964	Coil—R. F. coil, 13-11 meter band for Model Q109 (L11)
70963	Coil—R. F. coil, 19-16 meter band (L11 for Q109X, L12 for Q109)
70962	Coil—R. F. coil, 31-25 meter band (L12 for Q109X, L13 for Q109)
70961	Coil—R. F. coil, 49-40 meter band for Model Q109X (L13)
70960	Coil—R. F. coil, "B" band for Model Q109 (L14)
70959	Coil—R. F. coil, "A" band (L14 for Q109X, L15 for Q109)
70958	Coil—R. F. coil, "X" band for Model Q109X (L15)
70920	Coil—Oscillator coil, 13-11 meter band for Model Q109 (L16)
70823	Coil—Oscillator coil, 19-16 meter band (L16 for Q109X, L17 for Q109
70825	Coil—Oscillator coil, 31-25 meter band (L17 for Q109X L18 for Q109)
70921	Coil—Oscillator coil, 49-40 meter band for Model Q109X (L18)
70829	Coil—Oscillator coil, "B" band for Model Q109 (L19)
70789	Coil—Oscillator coil, "A" band (L19 for Q109X, L20 for Q109)
70922	Coil—Oscillator coil, "X" band for Model Q109X (L20)
70957	Condenser—Variable tuning condenser (C1, C2, C11, C14, C15, C31)
70949	Control—Tone control (R18)
70948	Control—Volume control and power switch (R14, S6)
72953	Cord—Drive cord (approx. 45" overall length required)
72913	Cord—Indicator cord (approx. 57" overall length required)
70945	Core—Adjustable core and stud for "X" band antenna coil—for Model Q109X
70938	Core—Adjustable core and stud for "A" band antenna coils, for 31-25 meter band R. F. and oscillator coils for Model Q109's "B" band oscillator coil
70944	Core—Adjustable core and stud for 31-25 meter band antenna coils and for Model Q109's "B" band antenna coil and for Model Q109X's 49-40 meter band antenna coil
70943	Core—Adjustable core and stud for 19-16 meter band antenna coil
70941	Core—Adjustable core and stud for Model Q109's 13-11 meter band antenna coil and for Model Q109X's 49-40 meter band oscillator coil

STOCK No.	DESCRIPTION
70968	Core—Adjustable core and stud for Model Q109X's "X" band R. F. coil
70969	Core—Adjustable core and stud for "A" band R. F. coil
70937	Core—Adjustable core and stud for 19-16 meter band R. F. and oscillator coils and for Q109's 13-11 meter band oscillator coil
70970	Core—Adjustable core and stud for Model Q109's 13-11 meter band R. F. coil
70942	Core—Adjustable core and stud for Model Q109X's "X" band oscillator coil
70939	Core—Adjustable core and stud for "A" band oscillator coil
72011	Drum—Band indicator actuating drum—located on range switch shaft
31273	Drum—Condenser drive drum
37396	Grommet—Rubber grommet for mounting R. F. assembly (4 required)
35787	Jack—Phono input socket
5117	Lamp—Band indicator lamp—Mazda 55
11765	Lamp—Dial lamp—Mazda 51
35630	Pulley—Drive cord pulley
5040	Plug—4 contact female plug for speaker cable
36637	Receptacle—AC power receptacle
34761	Resistor—10 ohms, ½ watt (R2)
30732	Resistor—47 ohms, ½ watt (R7)
34765	Resistor—100 ohms, ½ watt (R8)
37278	Resistor—470 ohms, 1 watt (R23)
34767	Resistor—2200 ohms, ½ watt (R10)
30436	Resistor—12,000 ohms, ½ watt (R15)
71085	Resistor—12,000 ohms, 2 watts (R3)
35523	Resistor—15,000 ohms, 2 watts (R24)
30492	Resistor—22,000 ohms, ½ watt (R6, R12)
71084	Resistor—39,000 ohms, 1 watt (R1)
30651	Resistor—270,000 ohms, ½ watt (R13, R22)
30648	Resistor—470,000 ohms, ½ watt (R5, R17, R19, R21)
30652	Resistor—1 megohm, ½ watt (R4, R9)
30649	Resistor—2.2 megohms, ½ watt (R11)
30992	Resistor—10 megohms, ½ watt (R16, R20, R25)
14350	Screw—No. 8-32 square head set screw for drive or band indicator drums
70950	Shaft—Tuning knob shaft and flywheel
34909	Socket—Band indicator lamp socket
31364	Socket—Dial lamp socket
70827	Socket—Tube socket
9914	Socket—Tube socket for 6AT6 tube
71554	Socket—Tuning tube socket
31418	Spring—Drive or indicator cord spring
70955	Switch—"Local-Distance" switch (S5)
70956	Switch—Range switch (S1, S2, S3, S4)
70917	Transformer—First I. F. Transformer (T1, L21, L22, C32, C33)
70918	Transformer—Second I. F. transformer (T2, L23, L24, C38, C39, C40, C41)
71154	Transformer—Power transformer, 117 volts, 25 cycle (T3)
71153	Transformer—Power transformer, 117 volts, 60 cycle (T3)
70947	Transformer—Power transformer, 110/125/150/210/240 volts, 50/60 cycle (T3)
34373	Washer—"C" washer for tuning shaft
	SPEAKER ASSEMBLIES
	Stamped 92562-1J
70972	Cone—Cone and voice coil assembly
5039	Plug—4 prong male plug for speaker
70971	Speaker—6"x9" E. M. speaker complete with cone and voice coil less output transformer and plug
37899	Transformer—Output transformer (T4)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
70919	Back—Cabinet back
30716	Clip—Tuning tube mounting clip
X1655	Cloth—Grille cloth
71906	Decal—Control panel decal
71828	Dial—Glass dial for Q109
71829	Dial—Glass dial for Q109X
70977	Disc—Band indicator actuating disc—located on dial frame
11771	Foot—Rubber foot for cabinet (4 required)
70974	Frame—Dial frame and back plate less dial, tube clip, indicator disc, spring indicator and "C" washer
70979	Indicator—Station selector indicator
72954	Knob—"Local-Distance-Phono" switch knob
72950	Knob—Tone control or range switch knob
72949	Knob—Volume control or tuning knob
35630	Pulley—Drive cord pulley
70976	Screen—Band indicator screen—green
6647	Shade—Lamp shade
70978	Spring—Band indicator disc spring
14270	Spring—Retaining spring for knob
71143	Washer—"C" washer to hold disc

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Addition to Parts List:

CHASSIS ASSEMBLIES

72996 Capacitor—Molded paper, .05 mfd., 600 v. (C53)
30787 Resistor Fixed composition, 47,000 ohms, ½ watt (R26)

RCA VICTOR

RP-177-177A-177B

Automatic Record Changer

Mfr. No. 274

SERVICE DATA

—1947 No. 5—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

RP 177

Motor drives rubber tired disc which is attached to turntable. Record separator swivel and record separator support are gold finish.

Early production has feed-in adjustment.

RP 177A

Motor drives idler wheel which engages with inside rim of turntable.

Record separator swivel and record separator support are finished the same color as the motor board.

Does not have feed-in adjustment.

RP-177B

Same as RP-177A except pickup.

FEATURES

1. This record changer is a two-support, drop type, non-intermixing mechanism designed to play automatically a series of twelve ten-inch or ten twelve-inch records of the standard 78 RPM type.
2. The mechanism uses a lightweight, low-noise, crystal pickup cartridge, equipped with a long-life sapphire point.
3. The tone arm is automatically returned to rest position and the power removed from the drive motor, after the mechanism has finished playing the last selection of the stack.
4. The changer is equipped with an eccentric tripping device which insures tripping on all standard records.
5. A pickup muting switch is incorporated, which shorts out the pickup while the changer is in cycle. This prevents mechanical noise of moving parts from being amplified.
6. The record support and separator are mechanically linked, requiring only one operation for changing of record size.
7. Moving parts are few in number while playing records. This insures quiet reproduction, free from rumble and wow.
8. The mechanism is provided with a safety clutch which prevents damage to the mechanism in case of a jam due to a defective record.

MANUAL OPERATION

1. Make certain the mechanism is out of cycle with the pickup on the rest.
2. Push "Start-Reject" knob to manual position.
3. Place record on turntable and push the power switch to the "on" position.
4. Lift and place pickup on record.
5. When the selection has finished playing, the pickup will continue to ride in the eccentric groove until the pickup is lifted from the record or the power is removed from the drive motor.

AUTOMATIC OPERATION

The pickup "rest" consists of a post incorporating a button and shaft connecting a switch beneath the motor board. This switch, which controls the power to the drive motor, is actuated by the weight of the pickup and tone arm while going in and out of rest position.

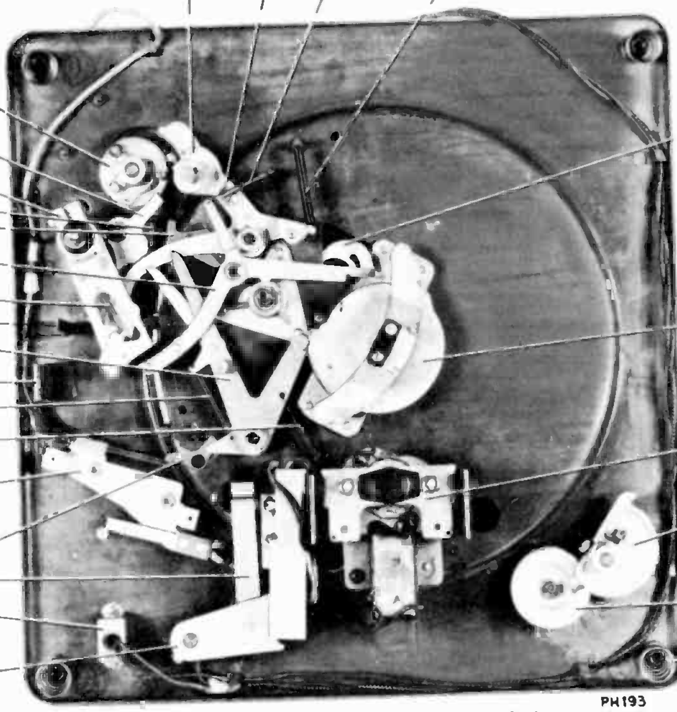
1. Turn the record support on the left-hand side of the changer, to position it for 10- or 12-inch records.
2. Load the records on the supports with the desired selections upward, the last record to be played on top. (Make certain the separator shelf is pushed down when stack is placed on the supports.)
3. Push the "On-Off" knob to the "on" position.
4. Push "Manual-Reject" handle to reject position and release. The mechanism will automatically play in sequence, one side of each record stacked on the supports. After completing the selection on the last record the tone arm will return to rest position and the power will be removed from drive motor.
5. To reject a record being played, push the control handle to "Reject" and release.
6. Lift and turn separator shelf to facilitate the removal of records.
(Note: For automatic operation, each record is required to have the standard eccentric groove.)

Eccentric groove diameter	3¾" nominal
Eccentricity	.125" ± .008"
(causes tone arm swing of	.250" ± .016")

Cautions

Before servicing the automatic changer, inspect the assembly to see that all gears, cams, springs, levers, etc., are correctly assembled and in good working order.

1. Never use force to start or stop the motor or any part of the record changing mechanism.
2. Warped or damaged records may cause the mechanism to jam. When jamming occurs, the safety clutch slips, causing a clicking sound.
3. A cracked or chipped record may damage the sapphire.
4. Warped records may slide on one another while playing and result in unsatisfactory reproduction.
5. Do not leave the records on the record posts or on the turntable as they may warp, particularly in warm climates. Most warped records may be flattened by placing them on a flat surface with a heavy flat article placed on top of them for a few days.
6. If, for any reason, the mechanism stalls, turn off the "On-Off" switch and remove the records from the posts. Start the turntable by turning the switch on and allow the tone arm to complete its cycle.
7. Do not tighten copper-plated, cone-pointed screws until final adjustment has been made.



BOTTOM VIEW WITH BOTTOM SUPPORT (72) REMOVED

FIG. 1

FUNCTION OF PRINCIPAL PARTS

Trip Lever 29

When the pickup is riding in the eccentric groove, the trip pawl located on the trip lever engages the ratchet lever, starting the cycle.

Ratchet Lever 67

Portion of lever acts as a ratchet and the other portion acts as a stop or catch to hold the drive clutch from engaging.

Ratchet Wheel 90 (Fig. 4)

Acts as part of the safety clutch, which is engaged with the cam pawl during cycle.

Drive Cam, Gear and Pawl 93

Transfers motion from turntable through clutch to main gear.

Turntable Spindle Support 82 (Fig. 4)

Forms a bearing for turntable spindle.

Main Cam 80 (Fig. 4)

Has a series of tracks controlling cycling action.

Record Separator Lever, Link, Crank 85 (Fig. 4)

Transfers motion from the main cam through the stud, lever and link to the separator post during change cycle.

Feed-in Lever Locking Pawl or Latch 130

Provides a means of locking feed-in lever until the pickup has landed on the record, then unlatching and allowing feed-in lever to gently push the pickup into starting groove. (Used only on early RP-177)

Manual-Reject Control Knob and Lever Assembly 102-101-96-95

In "manual" position, it contacts the stud on clutch portion of drive cam thereby preventing the clutch from engaging and starting cycle.

In "automatic" position, it permits operation of the ratchet lever safety clutch and stop switch.

In "start reject" position, it momentarily closes control switch which is shunted across stop switch. It also moves the ratchet lever away from drive cam pawl, permitting the clutch to engage and start cycle.

Muting Switch Actuating Lever 131

Opens pickup muting switch during the playing cycle.

Tone Arm Lever 71

Directs horizontal motion of tone arm. It also incorporates an additional retard lever which stabilizes tone arm while the mechanism is in cycle.

Tone Arm Return Lever 63

Moves the tone arm inward and provides positioning for landing.

Feed-in Lever 38

A small lever under spring tension providing a small amount of force inward on tone arm, after the pickup has landed on record. (Used only on early RP-177)

Tone Arm Elevating Lever 77

Directs vertical motion of tone arm.

Tone Arm Elevating Rod 9 (Fig. 4)

Transfers motion from elevating lever to tone arm.

Record Support Shaft, Cam 124

Functions as a lock for record support belt drum.

Record Support and Separator Drums and Belt Assembly 55-56-125

Forms a mechanical linkage between record support and record separator.

Record Support

Provides a support for the record stack and a handle for record size change.

Record Separator Post and Blade

Functions to support the records and, together with the selector blade, to separate the lowest record of the stack and allow it to drop to the turntable during the change cycle.

Shut-off or Segment Cam 42

Forms a stop for tone arm return lever thereby preventing it from pushing the tone arm in for landing.

Retainer Spring and Plate 128

A small piece of phosphor-bronze functioning as a partial lock which stabilizes the tone arm when in the outermost position.

Stop Bracket (part of Motor Board)

A small piece of spring steel used as a stop, which determines the outermost position of tone arm. (Adjustable.)

Cycle of Operation

The changer can be conveniently rotated through the change cycle by pushing the reject handle and revolving the turntable by hand. Eight turntable revolutions are required for one change cycle. Block up the motor, so it is disengaged from the drive disc, to permit easier manual rotation of the turntable.

	Function	Explanation
Operator	Turn Record Support to 10" or 12" Position as Desired	1. Separator post positions itself by means of belt drive.
Operator	Place Records on Posts	1. Separator shaft is pushed down against its spring and carries segment-cam out of path of index finger.
Operator	Push Start Knob	1. Switch connected to start knob momentarily applies power to drive motor until tone arm is raised from stop button. 2. Manual-reject lever pushes ratchet lever. 3. Ratchet lever is pushed out of step on main gear shaft and releases drive cam pawl. 4. Drive cam pawl engages cam sprocket and it revolves, carrying drive gear with it.
Automatic Cycle	Tone Arm Rises	1. Main cam and gear revolves with drive gear. 2. Stud on tone arm lever rides in top track on main cam and directs movement of the lever. 3. Tone arm elevating lever rides up on ridge on main cam and pushes tone arm up by means of elevating rod.
Automatic Cycle	Tone Arm Moves Out	1. Tone arm lever pushes on trip lever stud. (Feed-in on early RP-177 only) 2. Trip lever moves out. 3. Stud on trip lever, on its outermost swing, pushes feed-in lever into locking pawl (130) (fig. 1). 4. Tone arm return lever is carried along by trip lever stud, and by stud on main cam top track.
Automatic Cycle	Record Knife Separates Bottom Record from Stack After Gauging Thickness of Record	1. Stud on separator lever follows main cam bottom track and directs the motion of the lever. 2. Through the separator link and crank, the separator lever turns the separator shaft. 3. Knife turns with shaft and strikes edge of bottom record. 4. Separator shaft continues to revolve and teeth on inner circumference of knife ride up on shelf teeth until knife is carried high enough against the action of the coil spring to move in over top of record.
Automatic Cycle	Record Drops to Turntable	1. Separator shaft continues to turn until knife supports stack of records and shelf moves out from under bottom record.
Automatic Cycle	Tone Arm Moves In	1. Separator shaft reverses rotation. 2. Tone arm lever moves away from trip lever stud. 3. While tone arm lever moves away from stud on trip lever, the retard lever, hinged on tone arm lever, stabilizes tone arm for accurate landing. 4. Tone arm return lever pushes on trip lever stud. 5. Trip lever moves in.
Automatic Cycle	Tone Arm Lowers Sapphire on to Record	1. Index finger on tone arm return lever moves against separator shaft to insure proper landing position. 2. Tone arm elevating lever rides down on main cam ridge thus lowering the elevating rod and the tone arm. 3. Separator shaft returns knife to original position and allows stack of records to rest on shelf.
Automatic Cycle	Sapphire Moves In to Record Groove Record Begins to Play	1. Ratchet lever rides into eccentric step on main gear shaft and blocks drive cam pawl. 2. Pawl is disengaged from drive cam sprocket. (Feed-in on early RP-177 only) 3. Drive gear and main gear stop. 4. Tone arm lever moves into cam to maintain disengagement. 5. As tone arm lever moves to its innermost position, it contacts feed-in latch, unlatching feed-in lever. This allows it to gently push pickup into the first groove of the record.
Automatic Cycle	Last Record Drops and the Last Selection Is Finished Playing	1. As the mechanism goes into cycle the separator shaft raises, allowing segment cam to engage index finger and prevent tone arm return lever from pushing tone arm in for landing. 2. Tone arm is lowered into rest position. 3. Power is removed from drive motor by the weight of the tone arm resting on stop button which opens the stop switch.

RP-177, -177A, -177B

Preliminary Adjustments for Assembling Mechanism

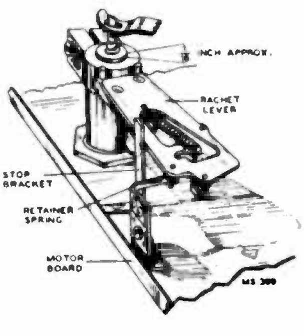
See page 6 for final adjustments.

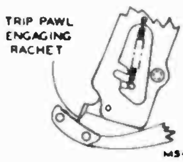
It should be understood that the preliminary adjustments are only approximate and intended to aid in the process of assembling a mechanism in which the major parts have been removed. The final and exact adjustments can be made when the mechanism is completely assembled.

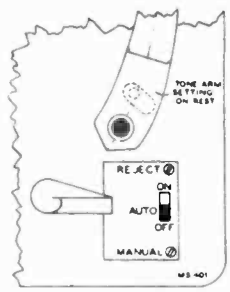
Mounting the Tone Arm:

The assembled tone arm should be mounted with the ratchet lever clamp approximately 1/16" from the end of the pivot arm bushing and against the stop bracket when the tone arm is on the rest as shown in the sketch.

(**Note:** The 1/16" is only a starting point, the important factor is to have the trip pawl engage the ratchet properly.)



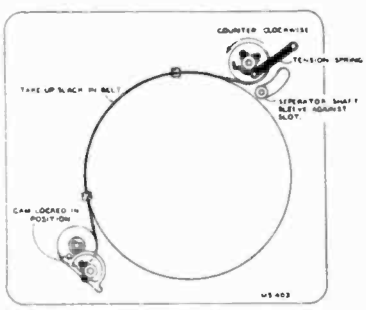


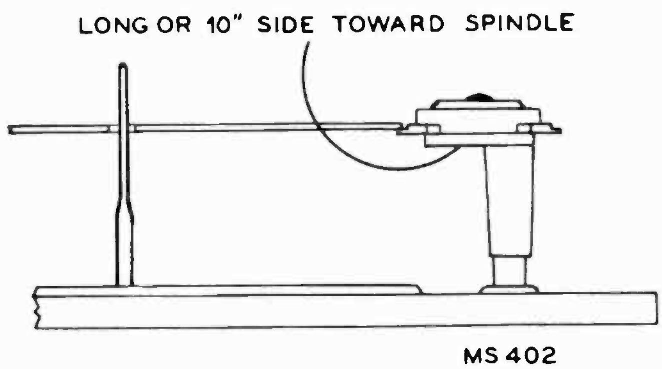


Positioning Record Support Shaft:

Assemble the record support post with the ten inch side (long side) pointing towards the spindle. Adjust the cam so it is locked in position as shown in the sketch.

Take up all the slack in the belt by turning the separation shaft counter clockwise (viewed from underside) aiding the action of the tension spring when the separator shaft sleeve is against the side of the slot in the motor board nearest the turntable as shown in the sketch.

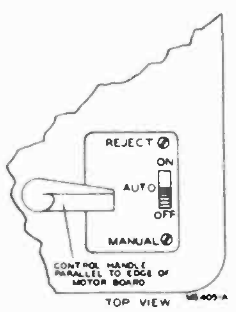


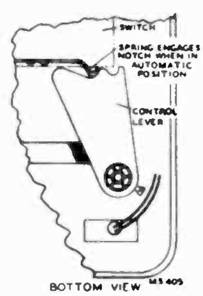


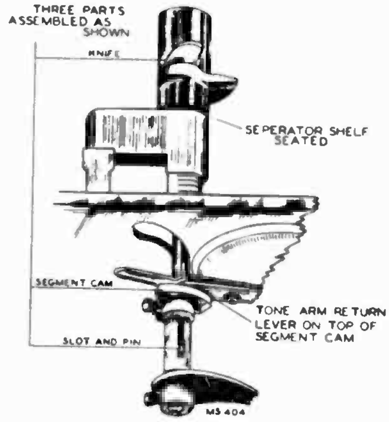
Manual-Reject Lever Mounting:

Place the control handle parallel to the front side of the motor board and pointing towards the "on-off" switch.

Adjust the control lever so the notch engages the spring of the switch as shown in the sketch when the control handle is in the automatic position.





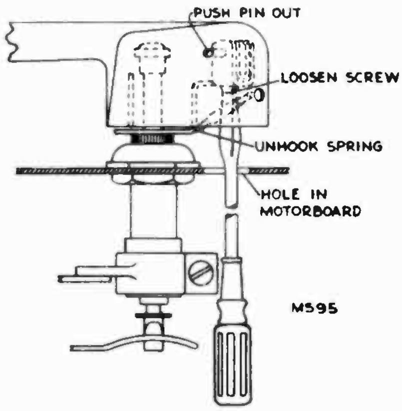


Mounting the Separator Knife and "Shut-off" Cam Assembly:

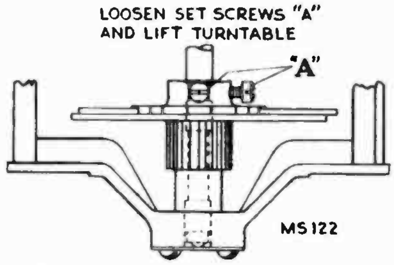
Turn the record support post to the ten inch position and assemble the separator knife, "Shut-off" cam, and separator shaft pin and bushing assembly approximately in line as shown in sketch. Allow the end of the tone arm return lever to ride on the upper side (towards the motor board) of the "shut-off" cam as shown in sketch.

To Remove Tone Arm:

1. Unhook spring
2. Loosen screw
3. Push pin out

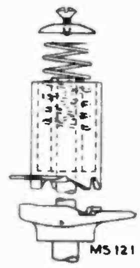


To Remove Turntable:



To remove turntable loosen set screws "A" and lift the turntable.

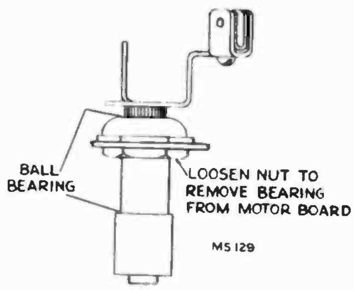
To Remove Separator Knife:



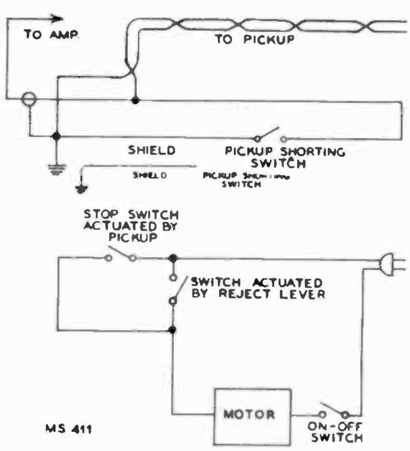
To remove separator knife, loosen top screw and entire assembly can be, dismantled as shown.

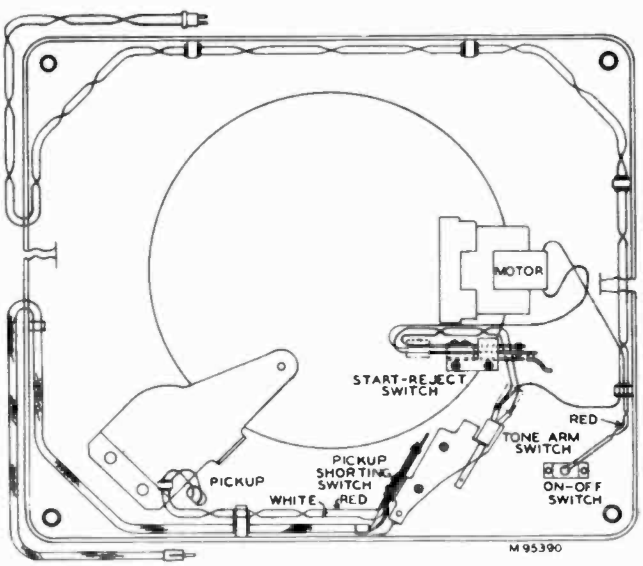
To Remove Tone Arm Bearing:

Do not remove ball bearings from tone arm bearing unless absolutely necessary. If cleaning is necessary immerse entire bearing in cleaning solution such as carbon tetrachloride.



Electrical Connections:





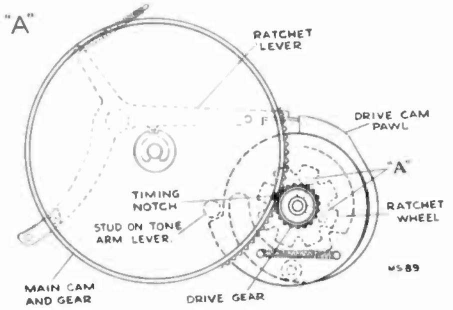
RP-177, -177A, -177B

Reference Chart for Automatic Record Changer Adjustments

Mechanism Jams. General irregularity of operation.

(Mechanism Timing)

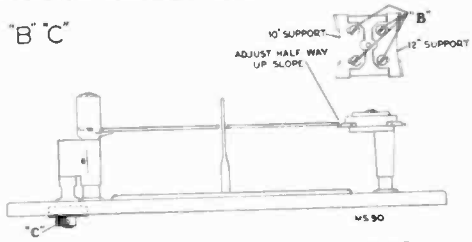
With the ratchet lever and the pawl on the drive shaft cam in playing position as shown, remove the bottom support bracket, link and lever assembly. Remove the "C" washer on the main cam shaft and slip the cam down far enough that it can be rotated with respect to the drive gear. Then rotate it until the timing notch is positioned as shown. Put the main gear back in mesh with the drive gear, replace the "C" washer, place the elevating lever on the cam ridge. Make certain the separator link and lever assembly is in its correct position and replace the bottom support bracket.
The timing notch is no longer used, a small projection has been added to the inside of the main cam and gear for timing indication.



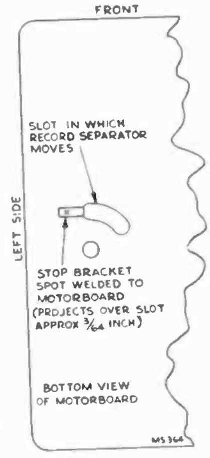
Records strike separator post or fail to stay on record shelf.

(Spacing Between Record Posts)

Turn the record support post to the ten-inch position. Loosen set screws "C," hold the separator post against the end of its slot in the motorboard and turn the belt drum to take up any slack in the belt. Tighten the zinc-plated, blunt-nosed screw and check to see that a ten-inch record fits the posts as shown. Then tighten the copper-plated, cone-pointed screw. Loosen set screws "B" and adjust support shelf so both 10- and 12-inch records set half-way up the slope when support post is turned to their respective positions.



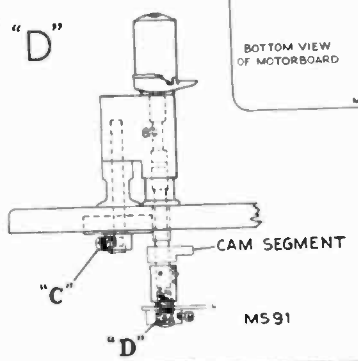
Note:—
A small piece of metal (stop bracket) has been welded to the motor board to improve the separation and dropping of the twelve-inch records.
Bending the metal limits the outward movement of the record separator post, and in so doing makes it possible to equalize the distances between the spindle and the record support and separator posts.



Records do not drop at proper time.

(Record Shelf Timing)

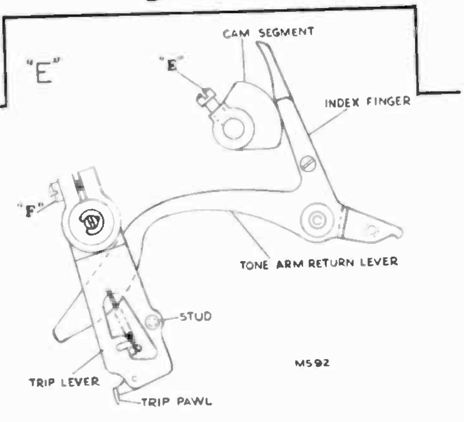
With the record supports turned to ten-inch position, place a ten-inch record on the supports. Loosen the set screws "D" and turn the record separator shaft until the edge of the record-separating knife is 3/32 inch away from the edge of the record. The teeth on the inner circumference of the knife should be resting in the bottom of their slots at the time the adjustment is made. Tighten the zinc-plated blunt-nosed screw first, run through cycle several times as a check, then tighten the cone pointed screw.
Note: It may be found necessary to deviate slightly from 3/32 inch dimension if twelve-inch records do not drop properly.



Tone arm continues to repeat playing of top record or jams when part way in on record.

(Segment-cam height or radial position)

With record changer in the ten-inch position and the records removed from the posts, loosen the set screw "E." Set the record separator segment-cam so that the index finger of the tone arm return lever rides on the middle of the segment-cam, as shown. Rotate the segment-cam until it is in such a position that the index finger will not ride off either end. Check to see that the index finger rides in over top of the cam when the record shelf is depressed by the weight of one record. Tighten the set screw.



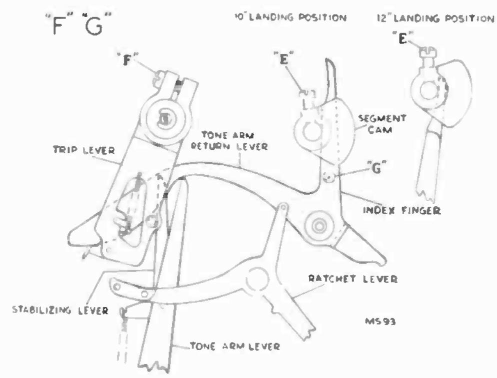
Sapphire does not land at correct point on 10-inch record.

(Tone Arm Position With Respect To Trip Lever)

Correct dimension from outside edge of spindle to sapphire 4 11/16 inches.

With the record changer in the ten-inch position, place a ten-inch record on the turntable and rotate the changer through cycle by hand, until the sapphire is just ready to land. Make certain that the index finger of the pickup arm return lever is against the record separator shaft and that the tone arm trip lever stud is held firmly against the return lever. Loosen the set screw "F" and move the pickup arm to the correct landing position. Maintain correct alignment between ratchet lever and trip pawl, when tightening set screw "F." (Note—Make certain trip lever stud does not come in contact with motorboard while making this adjustment.)

Place a twelve-inch record on the turntable and rotate the changer through cycle until the sapphire is just ready to land. Loosen screw "G" and adjust end of tone arm return lever so it is against separator shaft when pickup is in correct landing position.



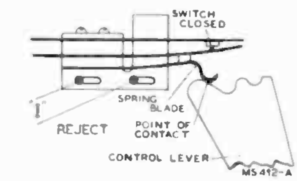
Turntable fails to rotate when the control handle is pushed to "Manual" or "Start-Reject" position.

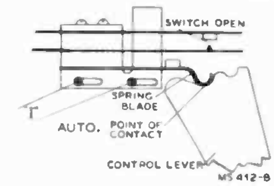
(Control lever and switch position)

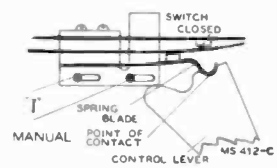
Remove the switch cover.

Loosen the two mounting screws "I" and position the switch so as to conform with the following three conditions.

1. When the control handle is in the "Start-Reject" position, the spring blade should ride up the side of the deep notch in the control lever causing the switch contacts to close. (The control handle should return to "Automatic" position automatically.)
2. When the control handle is in the "Automatic" position the spring blade should engage the deep notch in the control lever and in doing so allow the switch contacts to open.
3. When the control handle is in the "Manual" position, the spring blade should engage the shallow notch in the control lever causing the switch contacts to close and at the same time have "Manual Reject" lever move ratchet lever far enough so as to have free movement of trip lever, thereby preventing engagement between trip pawl and ratchet.







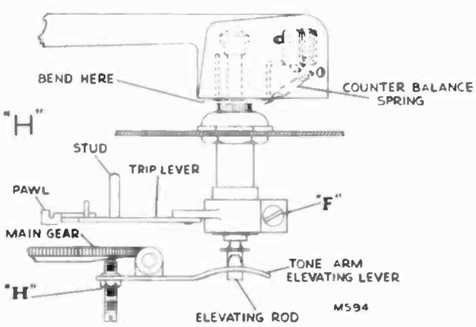
Top of tone arm strikes stack of records or sapphire fails to clear the records on the turntable.

(Tone Arm Height While In Cycle)

Rotate the changer through cycle until the tone arm has risen to its maximum height above the turntable but has not begun to move out. At this point adjust the screw "H" until the distance between the turntable and the sapphire is one and three-sixteenths inches. Tighten the locknut.

(Tone Arm Height While Out of Cycle)

Bend end of tone arm support bracket or pivot arm so the pickup end of tone arm clears the motorboard by 3/32 inch.

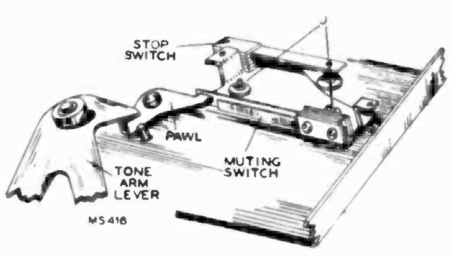


No output.

Noise during cycle.

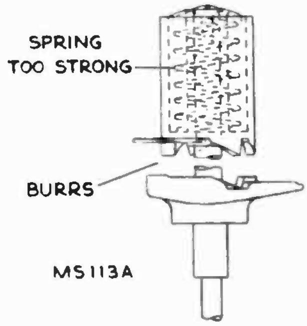
(Position of pickup shorting switch)

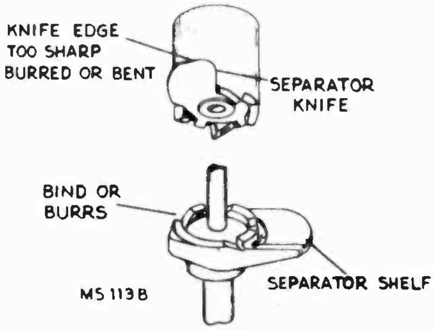
Remove the cover from the switch assembly. Loosen the two mounting screws "J" and position the switch assembly so the shorting switch pawl causes the switch to close during cycle and open while playing records.

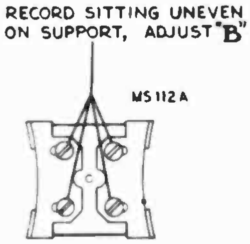


Records Jam or Stack Unsteady:

Record too thick, too thin, warped, or has rough edge.

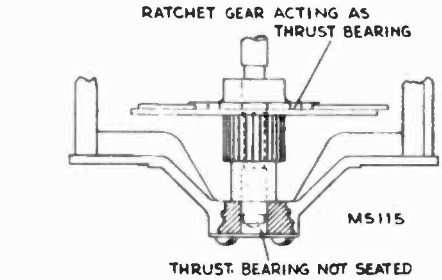


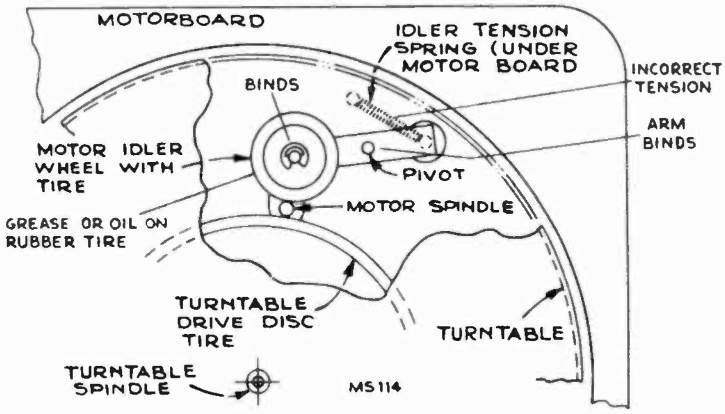




Slow Speed:

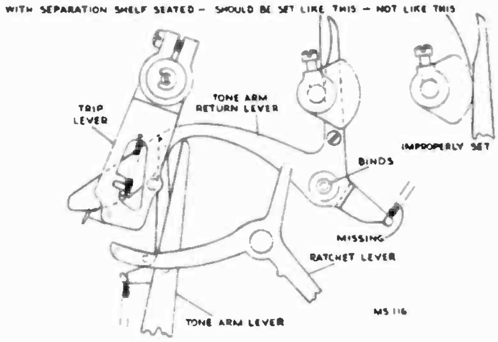
Turntable spindle binds on bottom or top bearing.

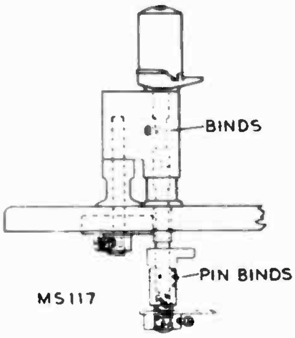


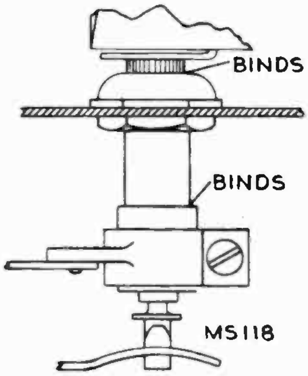


RP-177A and RP-177B use rim drive—see page 14

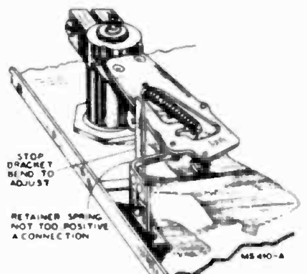
Tone Arm Continues to Come Down in Rest Position:



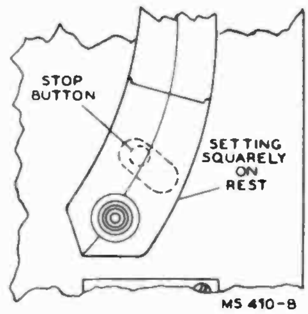




Tone Arm Lands Incorrectly on Rest, Drifts Off of Rest, or Jumps Suddenly When Moving in for Landing:

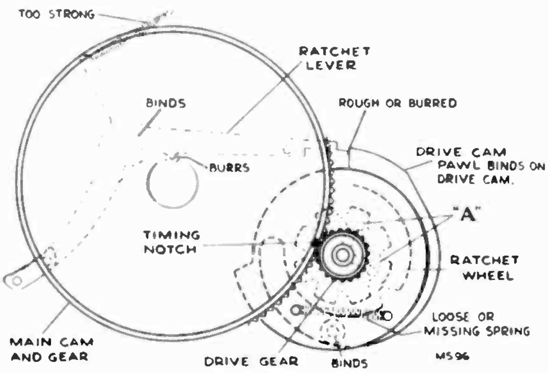


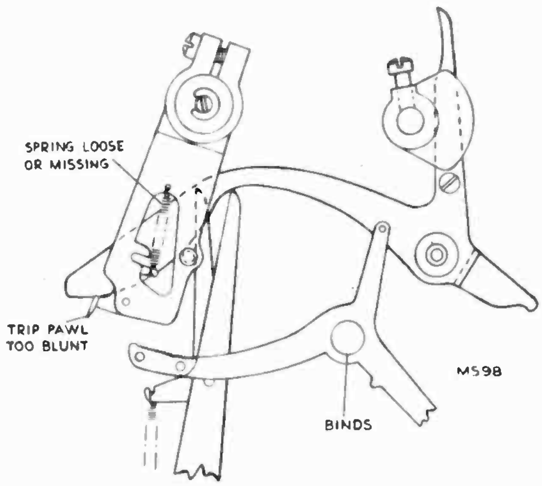
1. Bend bracket for tone arm limit stop.
2. Bend retainer spring which contacts stud on trip lever, so tone arm is stabilized while on rest or in the outermost position. Do not make too positive contact or motion of tone arm will start with a sudden jump.

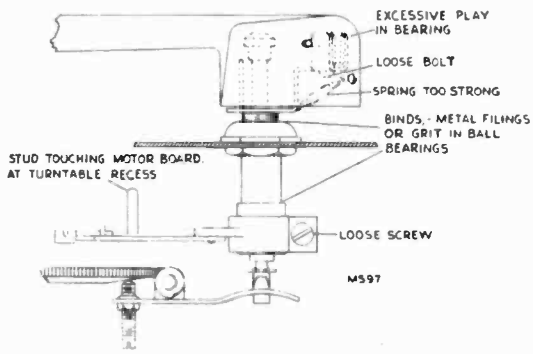


SERVICE HINTS (Continued)

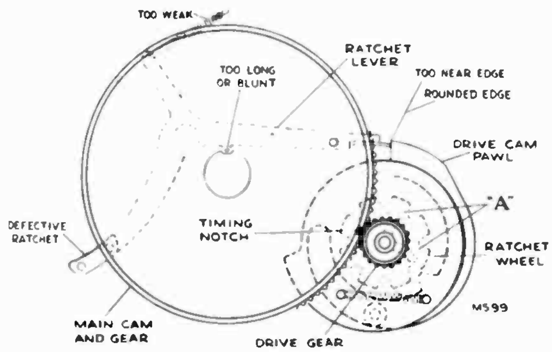
Fails to Trip:

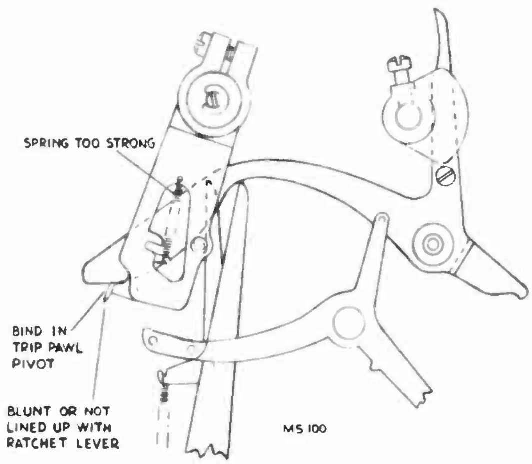




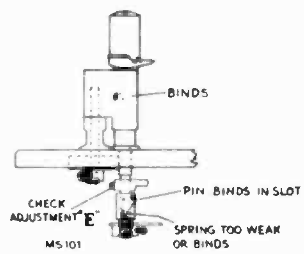


Trips Early:

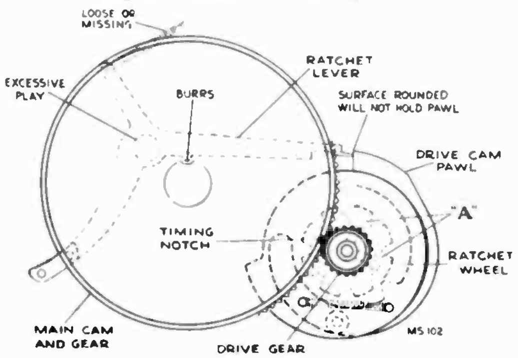


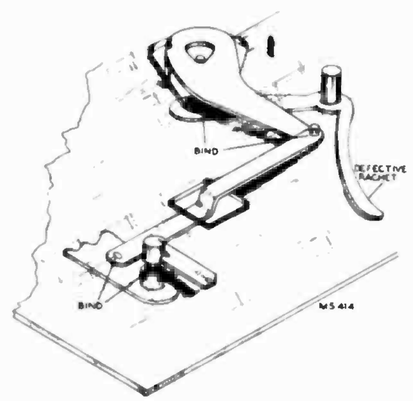


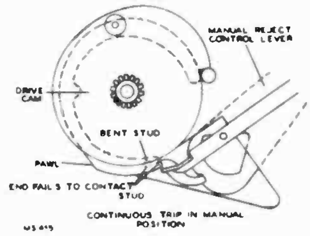
Repeats Playing of Last Record:



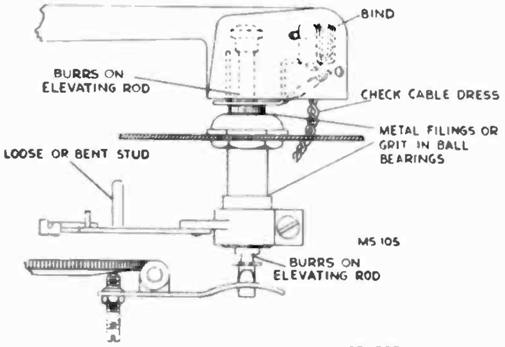
Trips Continuously:

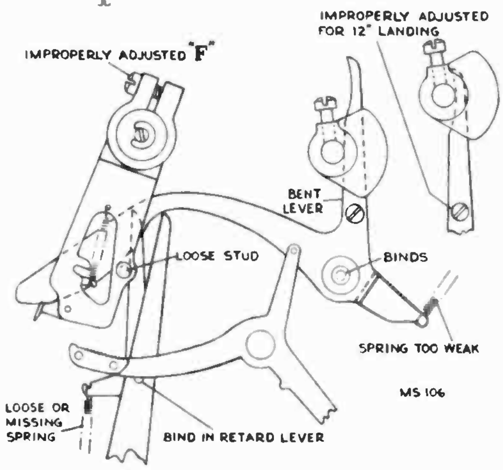


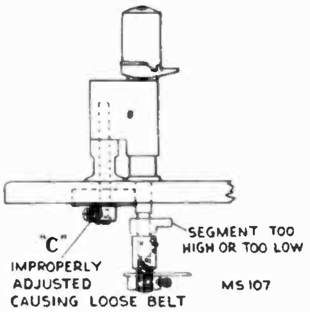




Lands Incorrectly:

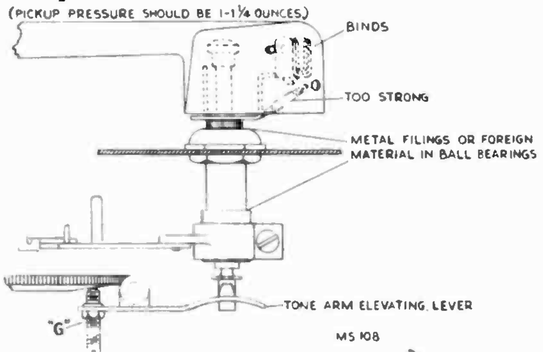


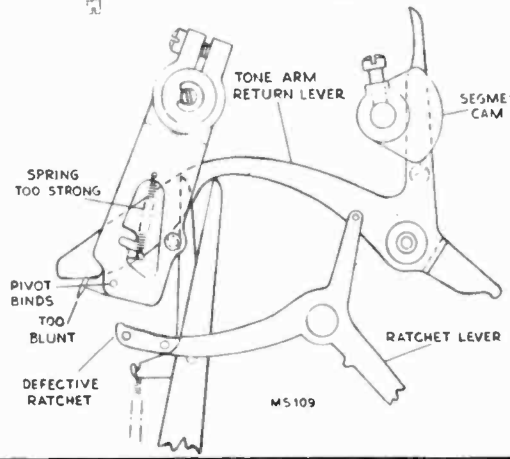




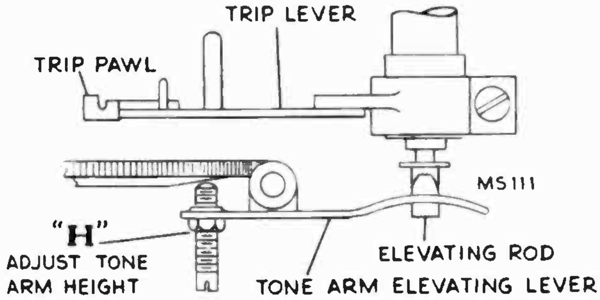
Repeats Grooves:

(PICKUP PRESSURE SHOULD BE 1-1¼ OUNCES)



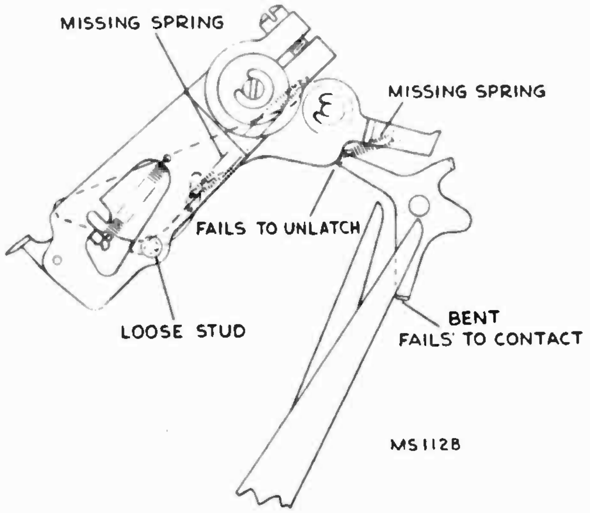


Tone Arm Touches Record on Separator Shelf:



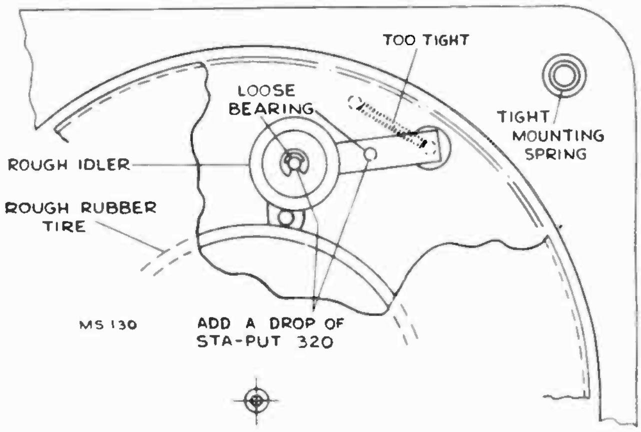
Incorrect Feed-in:

Feed-in on early RP-177 only.



Rumble:

RP-177A and RP-177B use rim drive—see page 14



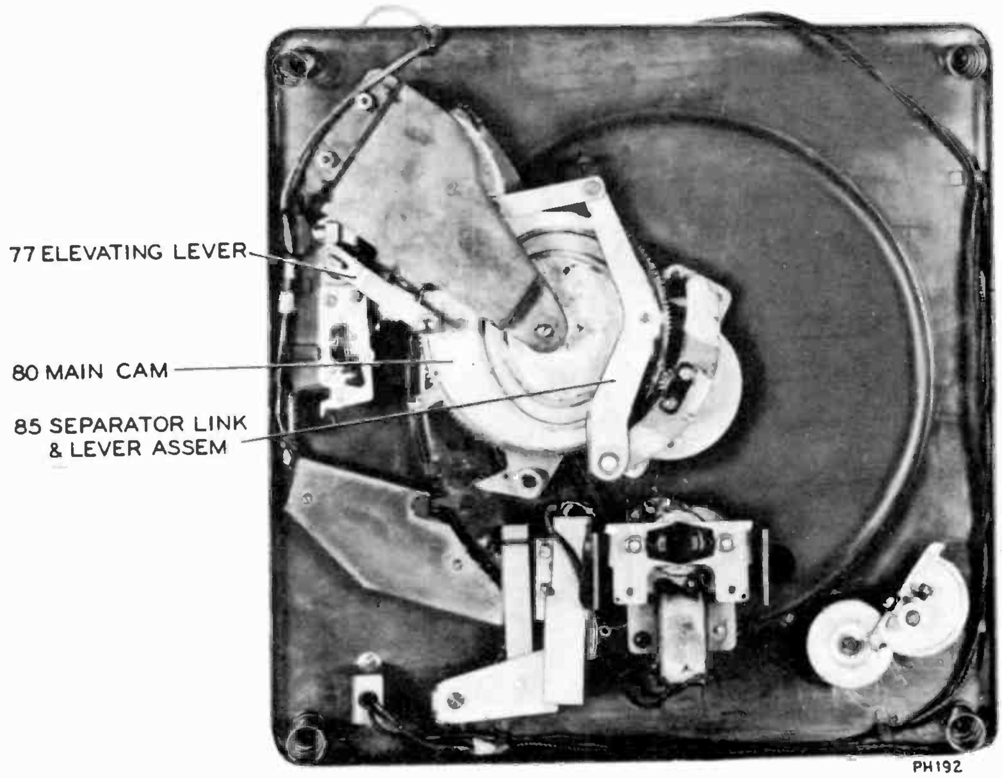


FIG. 2
Bottom view RP-177

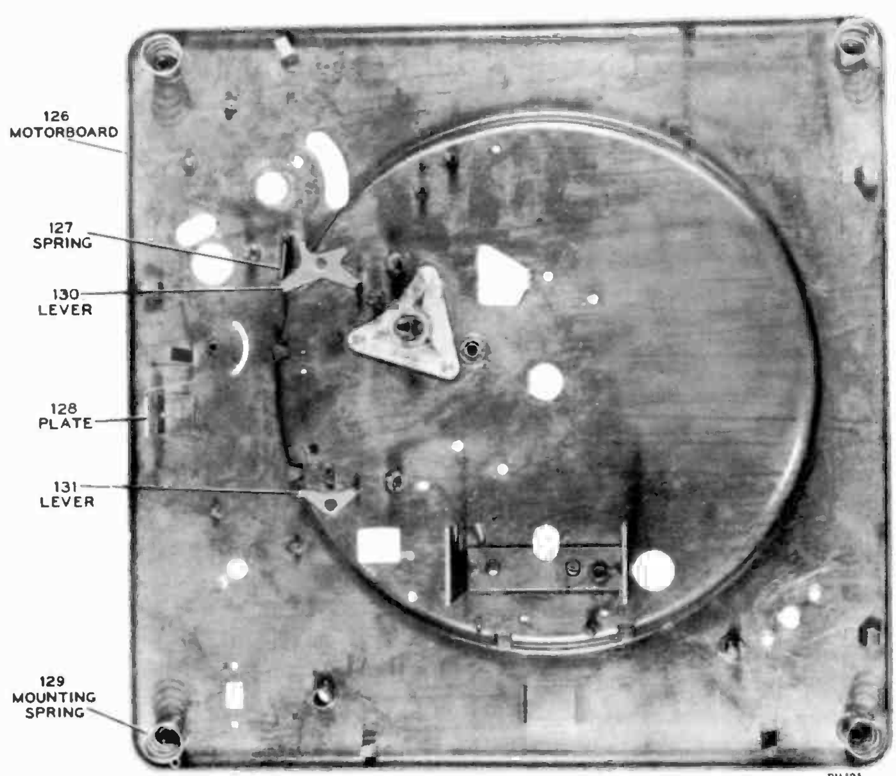


FIG. 3
Bottom view RP-177 motorboard only

RP-177, -177A, -177B

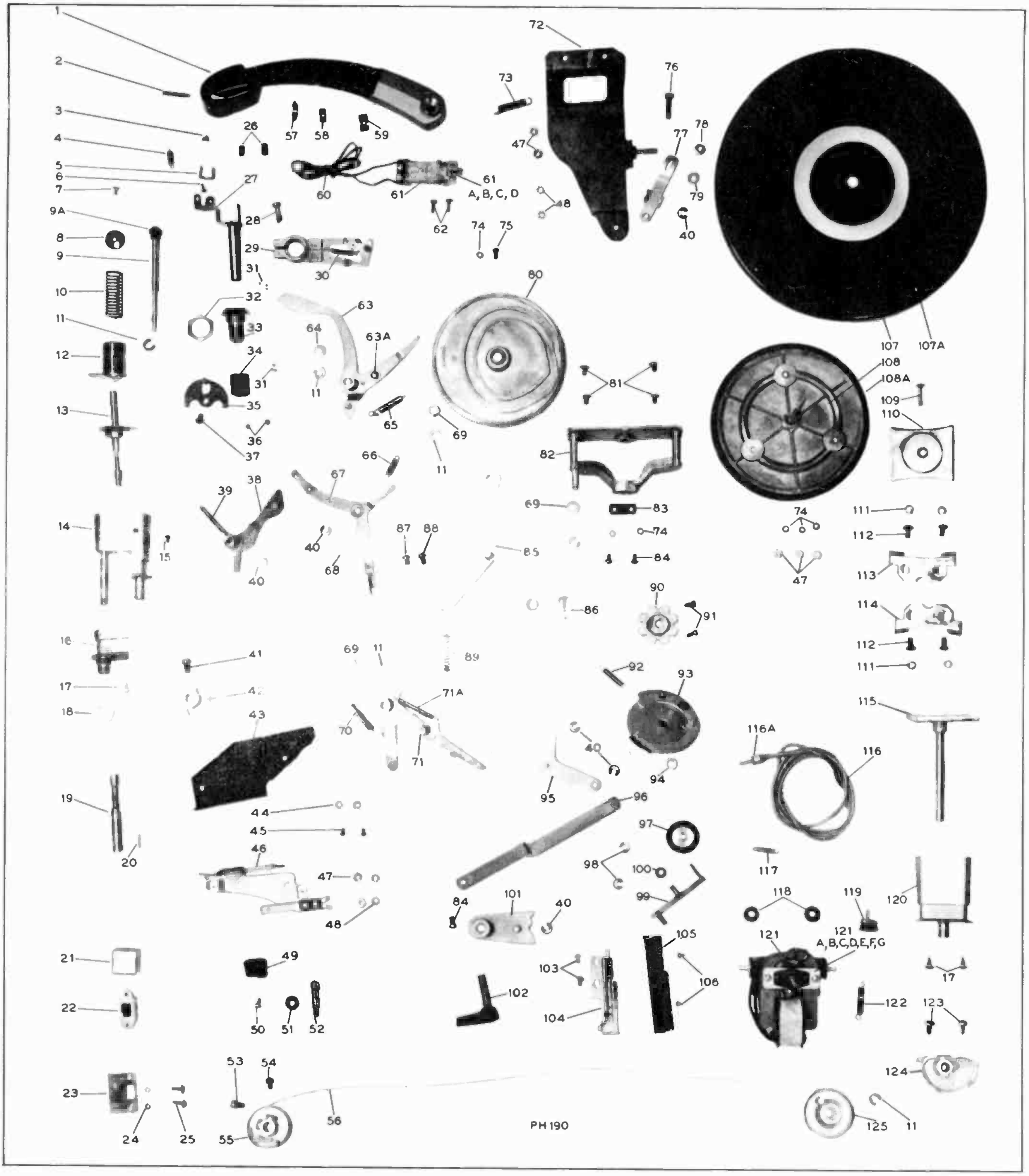


FIG. 4

CHANGES—DIFFERENCES

Pivot Arm Spring:

On early RP-177 the pivot arm spring (Ref. No. 4) was anchored to a stud (Ref. No. 3) in the rear of the tone arm. On RP-177A and late RP-177 a curved spring (Stock No. 73198) clips into the rear of the tone arm to which the pivot arm spring is anchored.

Feed-in Adjustment:

On early RP-177 a feed-in provision was used to cause the sapphire to enter the starting groove of the record after the tone arm had landed. This feature was found to be unnecessary and is not used on RP-177A or late RP-177, however, the feed-in adjusting disc may be found on late RP-177.

Stock No.	Ref. No.		Stock No.	Ref. No.	
72655	35	Disc	71548	127	Spring
70873	38	Lever	—	130	Lever
71550	39	Spring			

Used only on early RP-177, also screws and washers to mount above items.

The major differences between the two models is in the method of driving the turntable. This requires different turntables, motors, motor boards, motor mountings and idler wheels. In RP-177 the motor drives a rubber tired disc which is attached to the turntable and spindle, in RP-177A the motor drives an idler wheel which engages with the inside rim of the turntable. In RP-177 the record separator swivel (14), record separator support (16) and record support base (120) are gold finish whereas in RP-177A they are finished the same color as the motor board.

Record supports (113 & 114) are metal in RP-177 and molded plastic in RP-177A.

The on-off switch (22) ratchet lever spring (66) and tone arm lever spring (71A) have been changed slightly.

ILLUSTRATIONS AND LIST OF PARTS FOR RP-177A WILL BE FOUND ON PAGES 14 and 15.

RP-177B is identical to RP-177A except the crystal pickup—see page 15.

RP-177

REPLACEMENT PARTS

Stock No.	Ref. No.	DESCRIPTION
72397	1	Arm—Pickup arm shell only less crystal, cable and pivot arm
70905	2	Pin—Pivot pin
39674	3	Stud—Pivot arm spring stud
71099	4	Spring—Pivot arm spring (.187" O.D. x ¾"—24 turns)
71098	5	Clamp—"U" clamp to lock pivot arm in position
71097	6	Screw—#4-40 x ¼" long self tapping screw to lock pivot clamps
72414	7	Screw—#6-32 x ¼" oval head screw for record separator cap
72415	8	Cap—Record separator cap
70909	9	Rod—Pusher rod including rubber cushion
38607	9A	Cushion—Rubber cushion for pusher rod
70895	10	Spring—Record separator spring—upper (.622" O.D. x 1-11/16"—13½ turns)
2917	11	Washer—"C" washer for lift rod, drum and belt, tone arm return lever, link, tone arm lever and main cam
72416	12	Knife—Record separator knife
72413	13	Shelf—Record separator shelf and shaft
72399	14	Swivel—Record separator swivel and shaft
72400	15	Screw—Record separator swivel and shaft screw
72589	16	Support—Record separator support
†.........	17	Screw—#10 x ⅜" self tapping screw
70890	18	Nut—9/16-32 hex nut for record separator support
71280	19	Shaft—Record separator bottom shaft
71103	20	Pin—Drive pin for record separator shaft end bushing
71106	21	Cover—Metal cover for "On-Off" switch
72407	22	Switch—"On-Off" switch
72591	23	Escutcheon—Index escutcheon
†.........	24	Nut—Hex nut #4-40
72588	25	Screw—#4-40 x 5/16" binder head screw for "On-Off" switch
†.........	26	Insulation—Two small pieces of spaghetti
70906	27	Arm—Pivot arm and shaft
72402	28	Screw—#10-32 x ⅝" fillister head screw for trip lever
70856	29	Lever—Trip lever less spring
71543	30	Spring—Trip lever spring (.135" O.D. x 21/32"—58 turns)
3658	31	Ball—Steel ball (3/32" dia.)
70886	32	Nut—¾-32" hex nut for pickup arm pivot bearing
72585	33	Bushing—Pivot arm bushing (upper)
70911	34	Bushing—Pivot arm bushing (lower)
72655	35	Disc—Feed-in adjusting disc
5042	36	Screw—#8-32 x ⅛" set screw for lower pivot arm bushing
72408	37	Screw—#8-32 x ¼" binder head screw for feed-in adjusting disc
70873	38	Lever—Feed-in lever
71550	39	Spring—Feed-in adjusting disc spring (.160" O.D. x 1⅜"—82 turns)
20165	40	Washer—"C" washer for ratchet lever, manual operating lever, manual detent lever and feed-in lever and tone arm lift lever
32869	41	Screw—#10-32 x 5/16" fillister head screw for tone arm control lever
70848	42	Cam—Shut-off or segment cam, fastens on record separator shaft
70855	43	Cover—Stop switch cover
†.........	44	Washer—Lockwasher #4
†.........	45	Screw—Round head screw #4-40 x 3/16" long
70876	46	Switch—Stop and muting switch, mounted on bracket
†.........	47	Nut—Hex nut #6-32
†.........	48	Washer—Lockwasher #6
72820	49	Rest—Pickup arm rest
....	50	Screw—Self tapping screw #10-⅜" long
32943	51	Nut—Pickup stop switch button speed nut
71102	52	Button—Pickup stop switch button
32869	53	Screw—#10-32 x 5/16" fillister head screw for record separator drum flat end
72562	54	Screw—#10-32 x 5/16" fillister head set screw for record separator drum—cone point
70898	55	Drum—Record separator drum
70900	56	Belt—Record separator to support belt
71279	57	Nut—Speed nut to hold cable, rear of pivot arm
71095	58	Nut—Speed nut to hold cable, rear of arm
38458	59	Nut—Speed nut to hold cable, front of arm
72584	60	Cable—Pickup cable, twisted pair
72551	61	Crystal—Crystal cartridge complete
38452	61A	Guard—Needle guard
70341	61B	Nut—Mounting washer and nut for sapphire
72345	61C	Sapphire—Sapphire and holder assembly
37763	61D	Screw—#2-56 x ⅛" screw for needle guard
70912	62	Screw—#4-40 x ⅜" binder head screw to mount crystal (2 required)
70847	63	Lever—Tone arm return lever
72401	63A	Screw—Tone arm return lever screw
70884	64	Washer—Bearing washer for tone arm return lever
71726	65	Spring—Tone arm return lever spring (.218" O.D. x 1½"—48½ turns)
71549	66	Spring—ratchet lever spring (.180" O.D. x ⅞"—54½ turns)
73053	67	Lever—Ratchet lever
†.........	68	Washer—Steel washer O.D. ½" I.D., .193", T .020"
70877	69	Washer—.280" I.D. x 7/16" flat washer for link, tone arm lever and main cam
71547	70	Spring—Tone arm lever tension spring (.218" O.D. x 1½"—48½ turns)
70858	71	Lever—Tone arm lever less spring
71549	71A	Spring—Tone arm lever spring (.180" O.D. x ⅞"—54½ turns)
72420	72	Brace—Bottom support for tone arm lift lever and main cam
71544	73	Spring—Drum and belt tension spring (.255" O.D. x 1⅜"—27½ turns)
†.........	74	Washer—#6 lockwasher
†.........	75	Screw—#6-32 x 5/16"
39691	76	Screw—#10-32 x ⅞" fillister head screw for adjusting tone arm lift lever
38631	77	Lever—Tone arm elevating lever
71104	78	Nut—#10-32 hex locknut for tone arm lift lever adjusting screw
†.........	79	Washer—Washer, O.D. 7/16", I.D. 3/16", T 1/32"
70864	80	Cam—Main cam
*72409	81	Screw—#8-32 x ¼" binder head screw for turntable spindle support
70891	82	Support—Turntable spindle support bearing
70880	83	Plate—Spring thrust plate for turntable
70883	84	Screw—#6-32 x 5/16" round head screw for turntable spring plate
70852	85	Link—Record separator shaft link and lever
70849	86	Bushing—Record separator shaft and bushing
71100	87	Screw—#10-32 x 5/16" round head screw for link
31118	88	Screw—#10-32 x 5/16" fillister head screw for link or for automatic—manual—reject detent lever
70850	89	Spring—Record separator shaft bottom spring (.290" O.D. x 1.35"—14¾ turns)
38624	90	Ratchet—Ratchet wheel (drive cam sprocket) for turntable drive
38626	91	Screw—#8-32 x ¼" fillister head set screw for ratchet wheel
70854	92	Spring—Drive shaft cam and pawl spring (.195" O.D. x 1-3/16"—42 turns)
70853	93	Cam—Drive shaft cam and pawl
70879	94	Washer—Washer for cam and pawl
72403	95	Lever — Automatic — manual — reject operating lever
72406	96	Link—Link for automatic—reject—manual operating and detent levers
36274	97	Wheel—Idler wheel
33726	98	Washer—"C" washer for idler wheel and arm
70863	99	Arm—Motor idler arm—less wheel
39996	100	Washer—Fibre washer for idler wheel
72404	101	Lever—Automatic—manual—reject detent lever
72586	102	Lever—Reject lever (handle)
†.........	103	Screw—Hex. head 6-32 x ¼" self-tapping screw
72410	104	Switch—Manual shorting switch
72411	105	Cover—Manual shorting switch cover
†.........	106	Screw—#4-40 x ⅛" round head machine screw
72421	107	Turntable—Turntable including rubber mat less drive disc and tire
70866	107A	Mat—Rubber mat only for turntable
73054	108	Spindle—Turntable spindle drive less tire
37873	108A	Tire—Rubber drive tire
72587	109	Screw—#10-32 x ¾" oval head screw for record support cap
72423	110	Cap—Record support cap
†.........	111	Washer—Approx. 7/16" O.D., 3/16" I.D., .030 T
70861	112	Screw—#10-32 x ⅜" binder head screw for record supports
72418	113	Support—Record support for 12" records
72417	114	Support—Record support for 10" records
72419	115	Shelf—Record support shelf and shaft
72708	116	Cable—Shielded output cable complete with pin plug
31048	116A	Plug—Pin plug for shielded output cable
71546	117	Spring—Idler arm tension spring (.187" O.D. x ⅞"—31 turns)
34368	118	Grommet—Rubber grommet to mount motor (2 required)
30870	119	Plug—2-prong male plug for power cable
72590	120	Base—Record support base
38612	121	Motor—105-125 volts, 60 cycle
39749	121G	Spring—60 to 50 cycle conversion spring
71545	122	Spring—Motor tension spring (.192" O.D. x 1½"—58 turns)
39772	123	Screw—#10-32 x 5/16" fillister head set screw for record support shaft cam—cone point
70845	124	Cam—Record support shaft cam
70899	125	Drum—Record support drum
72398	126	Motorboard—Motorboard sub-assembly complete with all welded, staked and riveted parts—less operating parts
71548	127	Spring—Feed-in control spring (.160" O.D. x 11/16"—52 turns)
72412	128	Plate—Anti-drift spring and plate for tone arm (retainer spring)
38873	129	Spring—Conical spring to mount record changer (4 required)
†.........	130	Lever—Feed-in lever locking pawl or latch. Part of motorboard
†.........	131	Lever—Muting switch actuating lever. Part of motorboard.

† These parts are not stocked.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

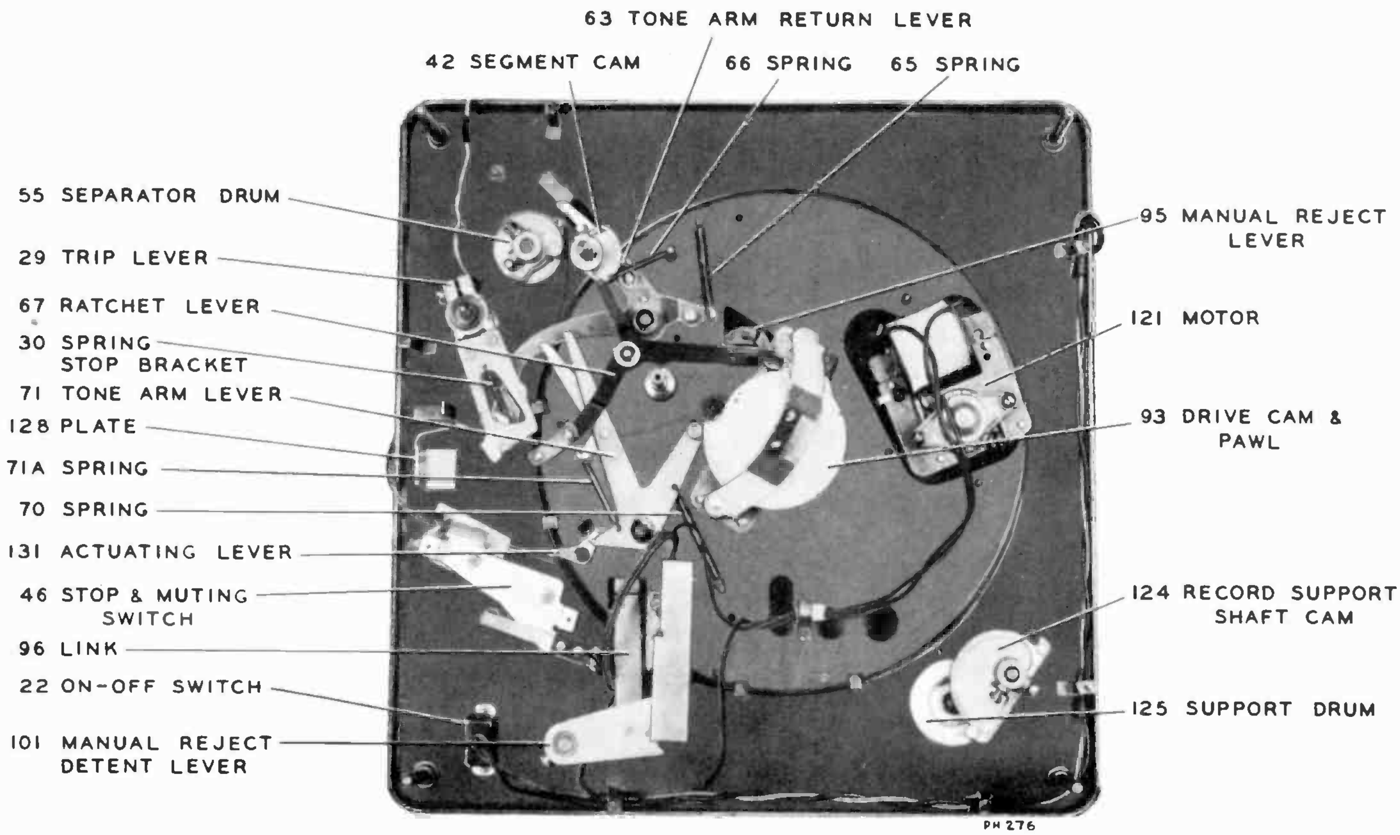


FIG. 5
Bottom view RP-177A, RP-177B

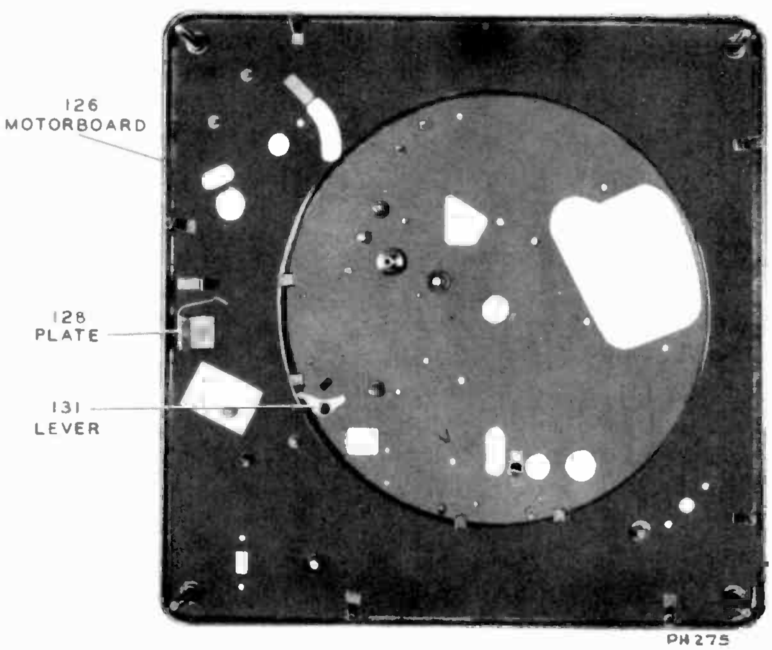
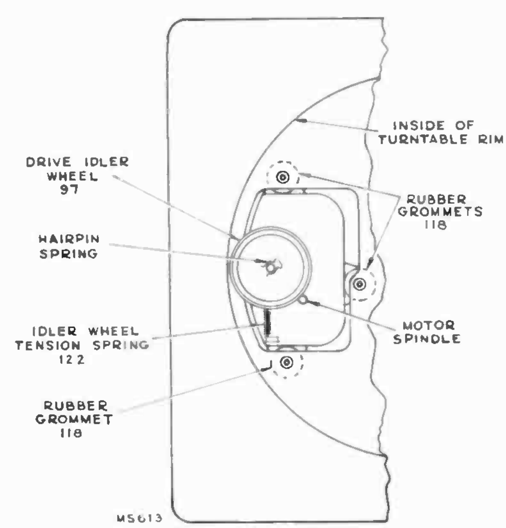
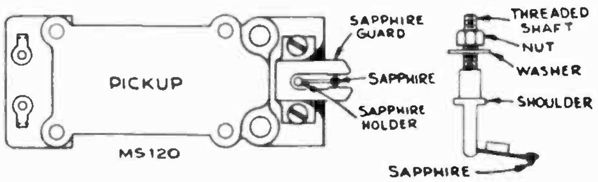


FIG. 6
Bottom view RP-177A, RP-177B (motorboard only)



Turntable drive RP-177A, RP-177B

REPLACEMENT OF SAPPHIRE



RP-177 and RP-177A use crystal Stock No. 72551 and sapphire Stock No. 72345 (has red dot on stylus and no viscoloid damper).

RP-177B uses crystal Stock No. 70339 and sapphire Stock No. 70915 (has viscoloid damper).

Caution: Never bend the sapphire support wire.
Extreme care should be used when loosening the sapphire mounting nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and push the shaft through the hole in the viscoloid until the sapphire holder assembly comes free.

Insert threaded shaft of replacement sapphire holder through viscoloid and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

Note: Pickup force should be approximately 1 to 1¼ oz.

LUBRICATION

A light machine oil (SAE #10) should be used to oil the bearings of the drive motor.

On all bearing surfaces, excepting the motor bearings, Houghton STA-PUT No. 320, or equivalent, should be used. On all other surfaces, STA-PUT No. 512, or equivalent, is recommended. STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia, Pa.

It is important that the drive motor spindle and the rubber tire on the friction disc as well as that on the idler wheel be kept clean and free from oil or grease, dirt, or any foreign material at all times. Carbon tetrachloride or naphtha is satisfactory for cleaning these parts.

(Do not oil or grease record separator shaft.)

The Replacement Parts Listed Below Bear the Same Reference Number as the Corresponding Parts used on RP-177. Refer to RP-177 Parts List on Pages 12 and 13 for All Other Parts which are Identical. Refer to "CHANGES—DIFFERENCES" on Page 12.

REPLACEMENT PARTS

STOCK No.	Ref. No.	DESCRIPTION
		RP-177A
73198		Spring—Curved spring for anchoring pivot arm coil spring.
73311	14	Swivel—Record separator swivel and shaft.
32875	22	Switch—"On-Off" switch.
72372	66	Spring—Ratchet lever spring (.170" O.D. x 11/32" —80 Turns).
73053	67	Lever—Ratchet lever.
71550	71A	Spring—Tone arm lever spring (.160" O.D. x 1⅜" —82 Turns).
73306	91	Screw—#8-32 x 5/16" fillister head set screw for ratchet wheel.
71181		Spring—Hairpin spring to fasten drive idler wheel.
71179	97	Wheel—Drive idler wheel.
73307	107	Turntable—Turntable and spindle assembly complete with rubber mat.
73313	107A	Mat—Rubber mat for turntable.
73317	111	Washer—⅜" O.D. x .195" I.D. flat washer for mounting record supports.
73314	113	Support—Record support for 12" records.
73315	114	Support—Record support for 10" records.
73316	115	Shelf—Record support shelf and shaft.
73309	118	Grommet—Rubber grommet to mount motor (3 required).
73318	120	Base—Record support base.
73308	121	Motor—117 volt, 60 cycle motor complete with idler wheel.
†	121G	Spring—60 to 50 cycle conversion spring.
71180	122	Spring—Idler wheel tension spring.
73305	123	Screw—#10-32 x ⅜" fillister head set screw for record support shaft cam—cone point (2 required).
73312	126	Motor board—Motor board complete with pickup rest, welded, staked or riveted parts less operating parts.
73310		Fastener—Snap fastener for mounting motor (3 required).
		RP-177B Same as RP-177A except
70339	61	Crystal—Crystal cartridge complete.
70915	61C	Sapphire—Sapphire and holder assembly.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

† These parts are not stocked.

SERVICE HINTS

Pre-tripping—Failure to Trip:

Note: Numbers refer to Item Numbers in parts list on page 13. Refer to FIG. A on this page.

1. The engagement of Items 67 and 93 must be 1/64" to 1/32"—file or bend positioning pin of Item 67 to obtain proper engagement.
2. The engaging surfaces of Items 67 and 93 must be smooth and free of burrs. Stone the surfaces if required—if rough the tone arm jumps into label when mechanism trips.
3. The overlap between the trip pawl of Item 29 and the ratchet of Item 67 must be 3/32" to 1/8".

Tone Arm Travels Over Record Label:

While holding pawl of Item 93 disengaged from ratchet lever 67, place the tone arm in the eccentric groove of a record with the turntable running. The tone arm should swing back and forth freely. Should the tone arm jump the eccentric groove and sweep over the label, more overlap is needed between pawl of trip lever 29 and ratchet of Item 67. This can be obtained by filing approximately 1/32" from the trip pawl as indicated on FIG. A.

Spacing Between Record Posts:

Refer to Service Data, page 6, Adjustment "B" and "C" and to FIG B on this page.

1. Set record separator post, as described on page 6, in the 10" position.
2. Adjust the 10" position of the record support by means of the screws "B" so that the 10" "B" dimension indicated on FIG. B is obtained.
3. Set record support to 12" position and adjust by means of the screws "B" so that the 12" "B" dimension indicated on FIG. B is obtained.
4. Bend the stock bracket so that dimension "A" indicated on FIG. B is obtained.

Binding of Turntable:

Refer to FIG. C on this page.

1. Spindle must be seated in spindle support 82.
2. Turntable must be parallel to motorboard.
3. A running clearance must be provided between drive wheel 90 and spindle support 82 and also between drive wheel 90 and pawl and cam assembly 93.

Record Damage:

Refer to FIG. D on this page.

Record damage may be caused by incorrect spacing between the record separator shelf and knife or by an improperly shaped knife edge.

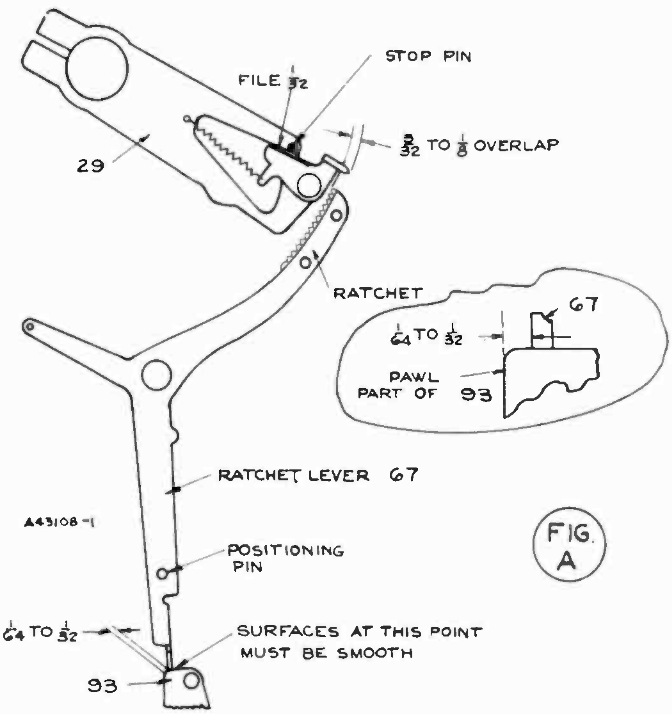


FIG. A

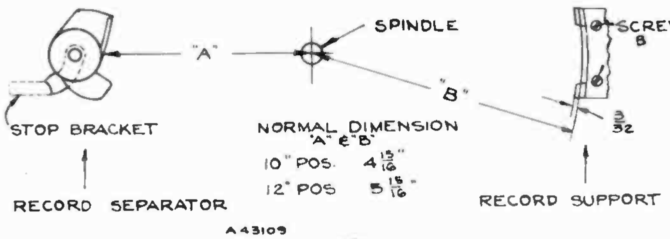


FIG. B

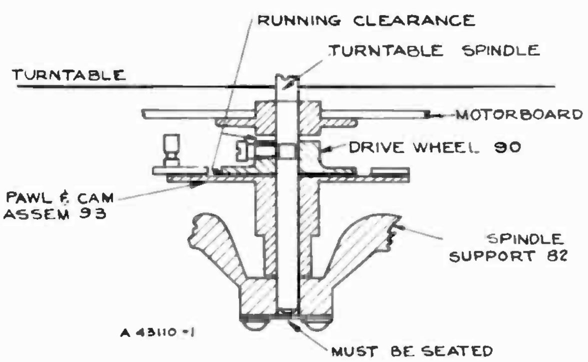


FIG C

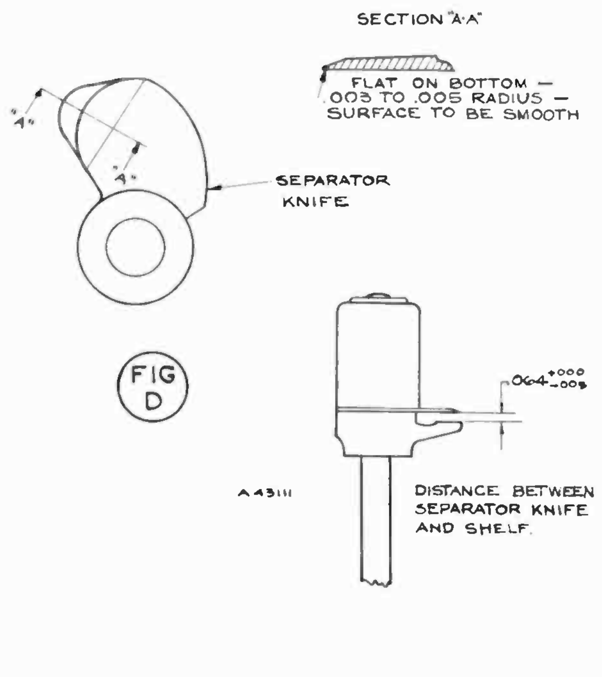


FIG D

RCA VICTOR

RP-178 Series

Automatic Record Changer

Mfr. No. 274

SERVICE DATA

— 1947 No. 9 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

PH 208

RP-178 Series Record Changer

RP-178

Uses 117V. 60 cycle motor. For operation on 50 cycle power supply; a spring, Stock No. 73158 is added to the motor shaft.

Used in the following models:

8TV321, 8TV323, 8V7, 8V90, 8V91, 8V112, 9TW333, 9W105, 75ZU, 77U, 77V1.

RP-178-2

Uses 117V. 25 cycle motor.

Used in instruments manufactured by RCA Victor Company Limited (Canda).

RP-178-3

Uses 117V./234V. 60 cycle motor. For operation on 50 cycle power supply; a spring, Stock No. S-4774 is added to the motor shaft.

Used in Models 6QU3 and 6QV3.

Index

FEATURES

1. This mechanism is designed to play automatically a series of twelve 10-inch or ten 12-inch standard records of the 78 r.p.m. type.
2. It will play manually records up to 12 inches in diameter.
3. Tripping system is of "eccentric" type, insuring reliable automatic operation on all records made to RMA proposed standards.
4. It is a simple operation of sliding the record support to change from 10- to 12-inch records or vice versa.
5. Cycling mechanism is disconnected completely while records are being played. This reduces the load on the drive motor, thereby reducing the tendency for "wow" or rumble.
6. Low noise sapphire point pickup cartridge.

AUTOMATIC OPERATION

1. With the power switch in the off position slide the record support shelf as required for 10- or 12-inch records.
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clamp on top of the record stack.
3. Turn power switch on and press the reject button. The changer will play automatically one side of each record in the stack.
   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
4. Turn the power switch off, lift the stabilizing clamp and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack.

MANUAL OPERATION

1. Slide the record support shelf in towards the center post for 10-inch or away from the center post for 12-inch position.
2. Place the record to be played on the turntable and turn the power switch on.
3. Place the pickup on the start of the record.

   Note: **The mechanism should be allowed to complete cycle before attempting to move tone arm to the rest position.**
4. Turn power switch off manually.
5. Remove the record by raising straight up without tilting.

CAUTIONS

1. Avoid handling the tone arm or sliding the record support assembly while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.

RP-178 SERIES

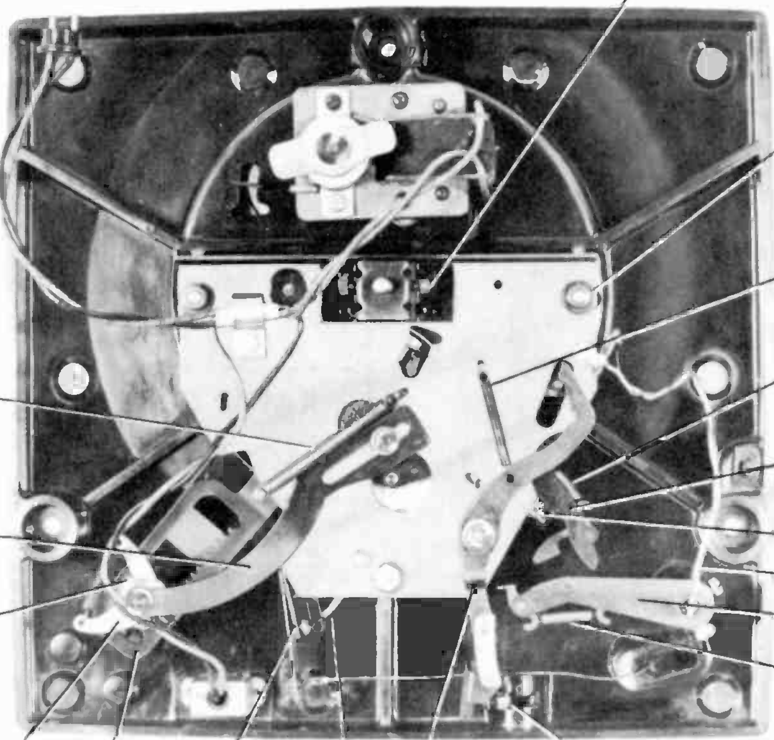


Figure 1

FUNCTION OF PRINCIPAL PARTS

Trip Lever—67

When the sapphire is riding the eccentric groove, the trip pawl engages the ratchet lever, starting cycle.

Ratchet Lever—63

Portion of the lever acts as a ratchet and the other portion incorporates a catch for the stud on the cycling cam carriage. The engagement of this stud prevents the mechanism from going into cycle.

Center Post—32

The center post performs the function of supporting and aids in the separation of the records.

Tone Arm Return Lever and Latch—53B

The tone-arm return lever, together with the latch, locks and stabilizes the tone arm in its outermost position. It also gives the necessary inward motion to the tone arm.

Cycling Cam Carriage—50A

This carriage provides a movable support for the cycling cam.

Tone Arm Director Lever—71

The roller on one end of this lever follows a channel in the cycling cam and thereby pulls on the cable directing the vertical and outward motion of the tone arm.

Locating Lever—12

The sloped portion of the lever forms a stop for the stud on the tone arm return lever thereby determining the landing position of the pickup.

Record Push Cam Gear Assembly—5, 7

Provides a means of coupling the push cam to the rack lever.

Record Support—1A, B, C, D

Provides a support for the edge of the records and a mounting for the record push cam.

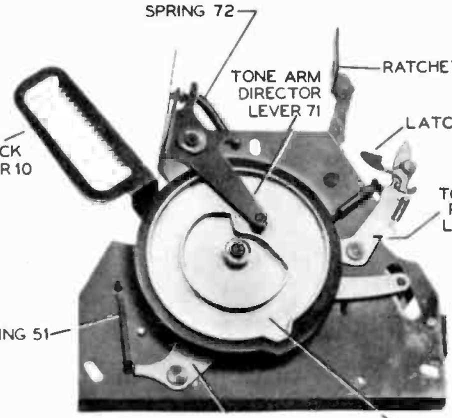


Figure 2

Rack Lever—10

One end of the lever follows the eccentric elevated portion of the cycling cam causing the lever to move in and out from the center of the mechanism. The teeth on the rack lever engage the teeth in the record push cam gear producing a rotary motion necessary to push the record off the step in the center post.

Record Push Cam—4

The oval shaped cam located in the record support, rotates during change cycle. This cam engages and pushes the record from the step in the center post.

ADJUSTMENTS

Tone arm (out of cycle) height adjustment

1. Rotate the turntable until the change cycle is completed.
2. Move the tone arm to a position off the edge of the record and allow it to rest freely in air.
3. Bend portion of the tone arm bracket so that the sapphire is 3/16 inches above the flat surface of the motorboard. (Figure 3.)

Tone arm height adjustment while in change cycle

1. Press the reject button and rotate the turntable by hand until the pickup has raised, to the maximum height in the change cycle.
2. Turn the adjustment screw "A" until the sapphire is 1⅜ inches above the turntable.
   This adjustment will permit the pickup to land and play one record placed on the turntable. At the same time it prevents the tone arm from touching the record resting on the centerpost while the mechanism is going through cycle.
   (If this height cannot be reached by the adjustment screw, take up on the cotter pin.) (Figures 4 and 5.)

Pickup landing adjustment

1. Slide the record support as required for playing 10-inch records.
2. Place a ten-inch record on the turntable and rotate the turntable by hand until the sapphire is just ready to land.
   Loosen set screws "B" (Figure 6).
3. Hold the trip lever to keep it from moving while the pickup is moved to the start of the record.
4. Tighten the black screw "B" and allow the mechanism to run through cycle automatically. If landing is correct, tighten copper plated screw "B." (Figure 6.)
   (Note) No separate 12-inch landing adjustment is necessary.

Record push cam and gear assembly adjustment

1. Have the mechanism out of cycle.
2. With the push cam in place and the record support in the 10-inch position, assemble and engage the teeth of the push cam gear with the rack lever so the eye in the lever is approximately in line with the centerpost as shown in drawing. (Figure 7.)
3. Set the push cam parallel to the front edge of the record support, make certain the thin edge of the cam is on the left side, viewed from the front or centerpost side of the support. (Figure 8.)

Removing the turntable

1. Loosen the two screws mounting the centerpost. (Figure 10.)
2. The centerpost, turntable and thrust bearing can now be easily lifted out.

Replacing the turntable

1. Slip the turntable over the lower end of the centerpost until it comes against the stop or ears. (Figure 9.)
2. Place the thrust bearing and washers on the bottom end of the centerpost and place the centerpost and turntable in position as shown. (Figure 9.)
3. Turn the spindle so the step in the centerpost is away from the record support. (Figure 11.)
4. Tighten the two mounting screws. (Figure 10.)

Turntable centering

If for any reason the sub-assembly had been removed from the motorboard it is necessary to re-center the turntable.

1. Loosen the three sub-assembly mounting bolts. (Figure 12.)
2. Place the turntable in place with the center post extending down through the mounting as shown. (It is not necessary to have the thrust bearing in place for this operation.) (Figure 9.)
3. Center the turntable in respect to the recess in the motorboard by shifting the position of the sub-assembly slightly. (Figure 11.)
4. Tighten the nut on the end of the square head mounting bolt. (Figure 12.)
5. Remove the turntable and tighten the other two mounting bolts. (Figure 12.)

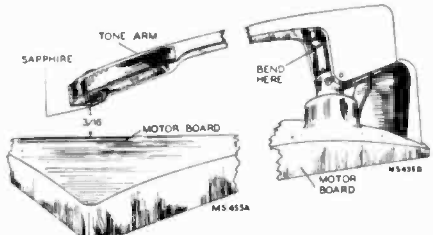


Figure 3

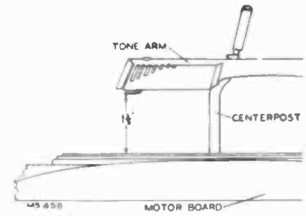


Figure 4

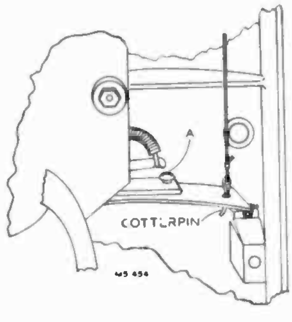


Figure 5

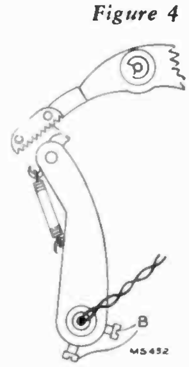


Figure 6

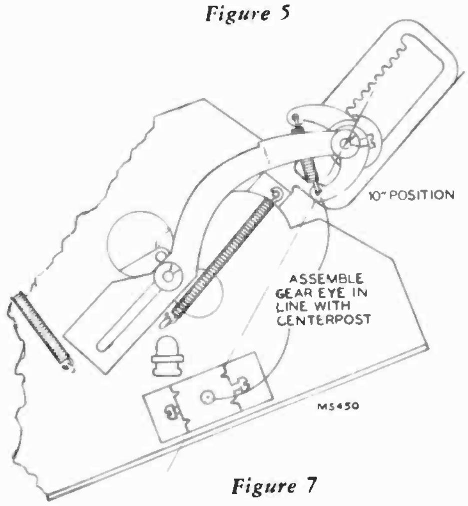


Figure 7

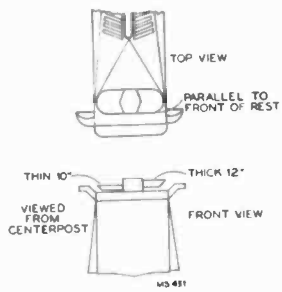


Figure 8

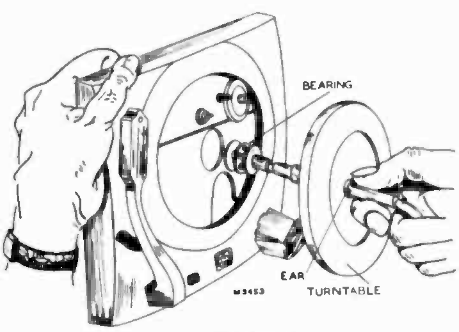


Figure 9

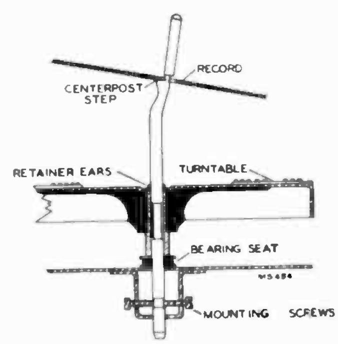
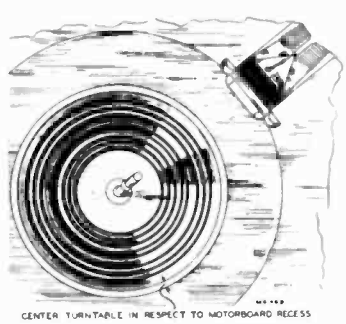
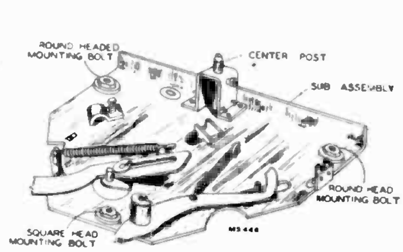


Figure 10



CENTER TURNTABLE IN RESPECT TO MOTORBOARD RECESS

Figure 11



BOTTOM VIEW

Figure 12

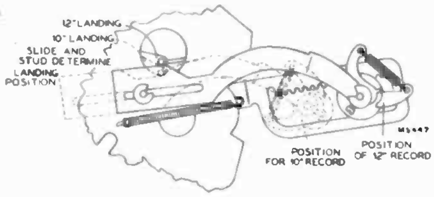
CYCLE OF OPERATION

Function	Explanation

Operator

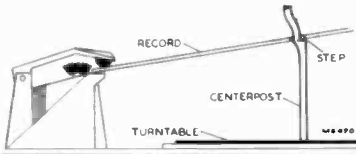
Lift and slide the record support to 10 or 12 inch position as desired

1. Record support locks in position and at the same time the record push cam and gear rotates and assumes a position as required for 10- or 12-inch records.



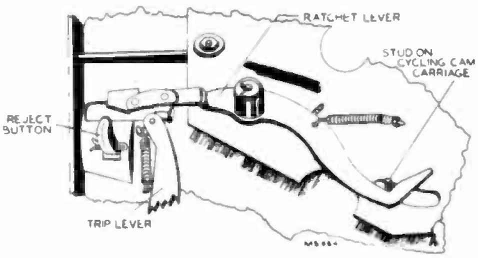
Place the stack of records over the center post

1. The lower record of the stack is sitting on the step in the centerpost, and the edge is resting on the record support.

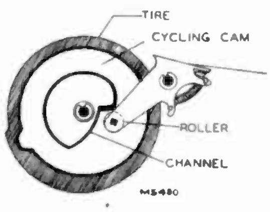


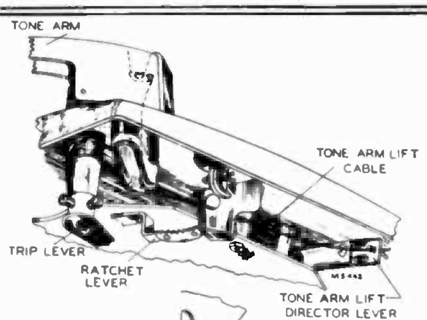
Push reject button

1. The end of the reject button extending through the motorboard contacts and moves ratchet lever.
2. Ratchet lever unlatches stud which is mounted on cycling carriage. This allows the tension spring to pull the cycling cam against the rotating knurled roller and start cycle.



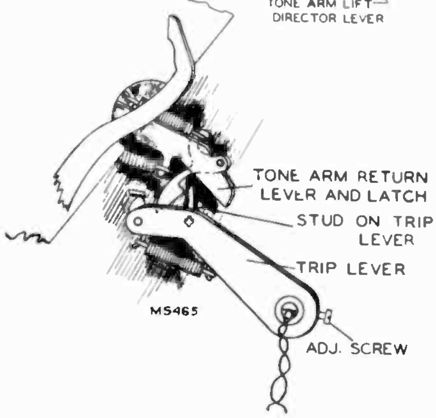
Automatic Cycle





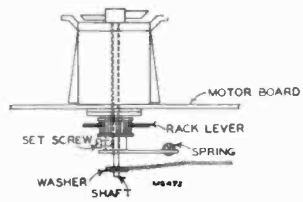
Tone arm rises and moves out

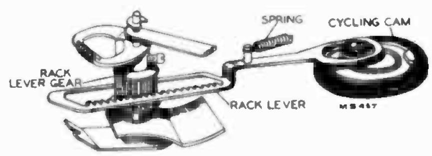
1. As the cycling cam rotates the small roller on the tone arm director lever follows the channel in the cam and in so doing pulls on the cable connected to the tone arm.
2. The hole in the motorboard provides a guide for the tone arm cable. It is so placed as to allow the cable to pull at an angle slightly off 90 degrees thus giving the necessary rising and outward motion of the tone arm.
3. The trip lever which is rigidly connected to the tone arm through the tone arm pivot shaft is moved out with the tone arm.
4. The tone arm return lever has moved out slightly ahead of the trip lever. The tone arm return lever together with the small latch assumes such a position so as to engage the stud on the trip lever and stabilize the tone arm in its outermost position.



The record push cam together with the "step" in the centerpost separates the lower record of the stack allowing it to drop to the turntable

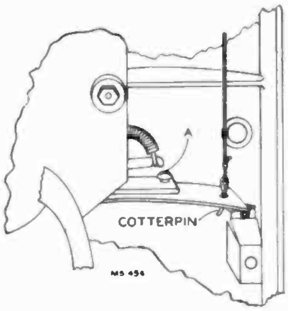
1. While the cycling cam is continuing to rotate, the rack lever is being pushed outward by the small eccentric elevated cam, with which it is engaged.
2. The teeth in the rack lever being engaged with record push cam gear, converts the sliding action of the rack lever into a rotary motion.
3. The rotary motion of the record push cam pushes the record off the step in the centerpost.

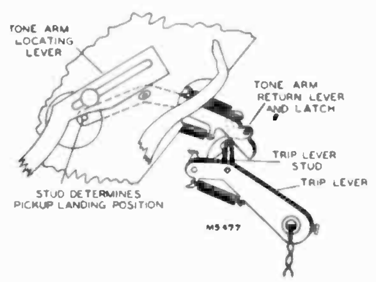




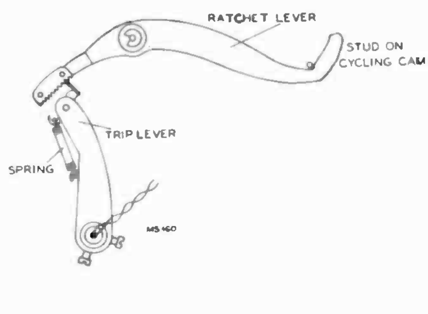
CYCLE OF OPERATION

Function	Explanation
Tone arm moves in and lands on record	1. As the cycling cam is returning to normal position, the tone arm director lever is gradually allowing a slack in the tone arm cable. 2. While the tone arm director lever is gradually allowing slack in cable, the tone arm return lever is tending to retain the tension on the cable by returning the tone arm to the landing position. 3. The distance the tone arm return lever travels, while moving the pickup in for landing, is determined by the contact between the tone arm locating lever and the stud on the tone arm return lever. 4. After the tone arm return lever has moved the tone arm to the landing position the tone arm director lever continues to move and allow enough slack in the cable so the pickup can sit down on the start of the record.





Function	Explanation
Sapphire moves into record groove. Record begins to play	1. As the sapphire moves into the playing groove, the cycling cam becomes disengaged from the rotating knurled roller as the roller falls into the step in the cam. 2. The change cycle is completed as the stud on the cycling cam carriage becomes engaged with the ratchet lever. This engagement prevents the cycling cam from contacting the knurled roller, starting a new cycle.
The record plays	1. After the playing of the record, the pickup moves into the eccentric groove. 2. The movement of the pickup in the eccentric groove causes the trip pawl to engage the ratchet lever starting a new cycle. (The mechanism plays one side of each record in the stack then repeats the playing of the last record until the pickup is manually placed on the rest or the power removed from the mechanism.)



REPLACEMENT OF SAPPHIRE

Caution: Never bend the sapphire support wire.

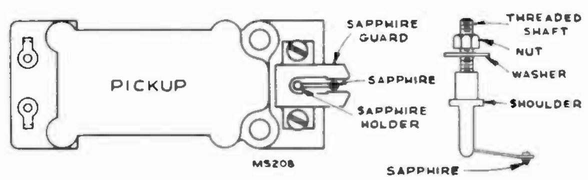
Extreme care should be used when loosening the sapphire mounting nut so that the twisting motion does not break the crystal.

Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free.

Do not use force as the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.

Note: **Pickup pressure should be approximately 1 to 1¼ oz.**



LUBRICATION

Motor

Motor is lubricated at factory to provide normal operation for a long period of time.

If it becomes necessary to lubricate, use SAE #10 motor oil to saturate the felt wicks on the motor bearings.

Main Bearing

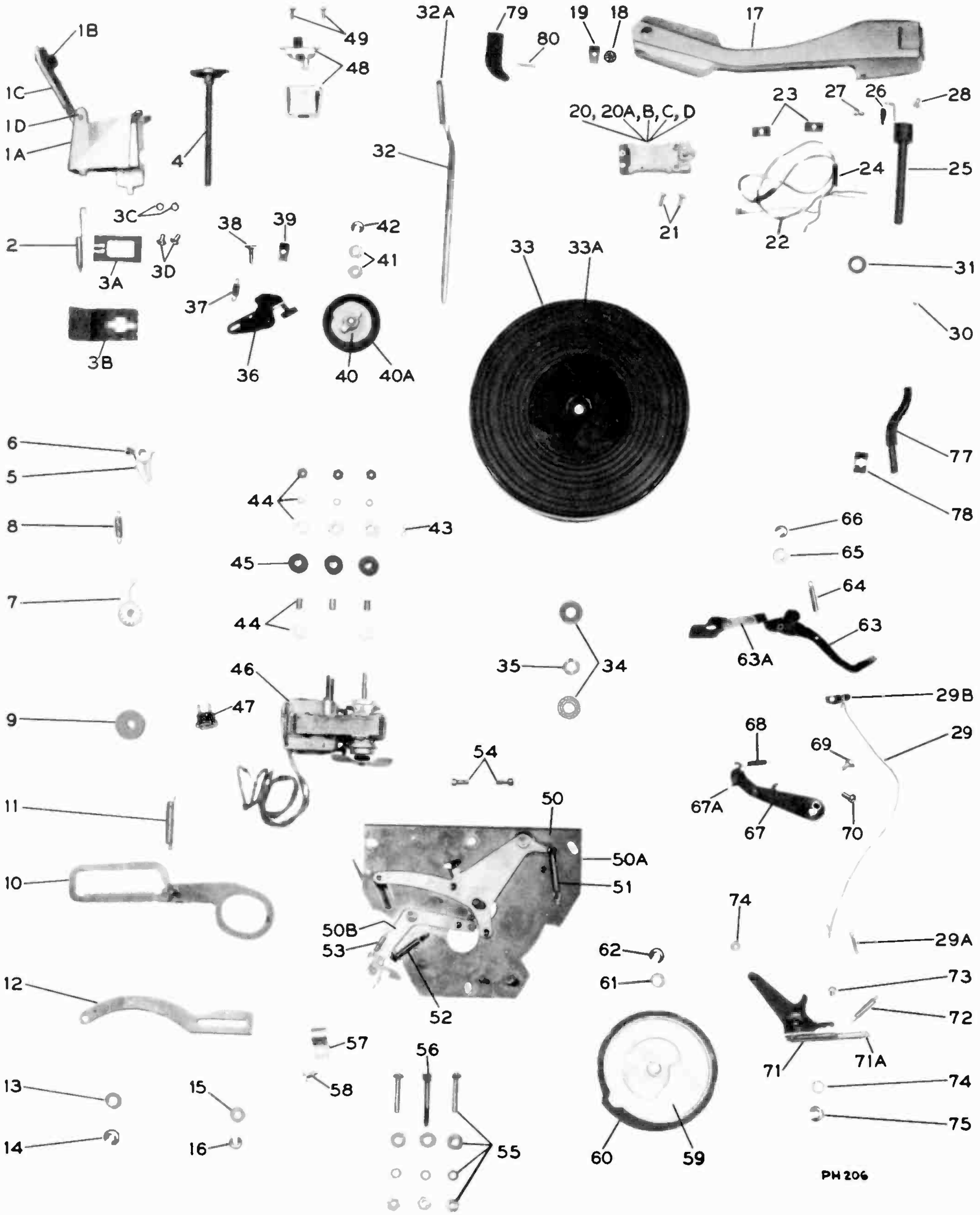
Use STA-PUT #512 or SAE #30 motor oil.

Slides and Levers

Use STA-PUT #512.

STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Phila., Pa.

RP-178 SERIES



Photograph of Parts

Addition to Parts List:

Ref. No.	Stock No	Description
1B, 1C, 1D	74760	Top clamp (1C) complete with rubber cushion (1B) and pins (1D)

The above parts were previously listed only as a part of Record Support Assembly (Stock No. 72390).

REPLACEMENT PARTS

REF. No.	STOCK No.	DESCRIPTION
		OPERATING ASSEMBLIES
1A 1B 1C 1D	72390	Record Support Assembly 1A, complete with rubber cushion 1B, top clamp 1C, and pins 1D
2	72357	Spring—Record support and clamp spring (.200" O.D. x 1-31/32"—37¼ turns)
3A 3B 3C 3D	72391	Plate—Clamp 3A, plates 3B (1 set) for record support assembly including lockwashers 3C and screws 3D
4	72356	Cam—Record separator cam and shaft
5	72360	Lever—Record push cam shaft lever, upper
6	72353	Screw—#8-32 x 5/16" filister head screw for Item #5
7	72361	Lever—Record push cam shaft lever, lower (gear and lever assembly)
8	72362	Spring—Record push cam shaft levers connecting spring (.242" O.D. x 1"—19½ turns)
9	72354	Washer—Flat washer (29/32" O.D. x .220" I.D.) between rack lever and record separator cam
10	72371	Lever—Rack lever
11	72370	Spring—Rack lever spring (.233" O.D. x 1-11/16"—53 turns)
12	72352	Lever—Tone arm locating lever
13	70877	Washer—Brass washer (7/16" O.D. x .280" I.D.) to mount locating lever to record separator cam shaft
14	35969	Washer—"C" washer to fasten locating lever to record separator cam shaft
15	72351	Washer—Brass washer (7/16" O.D. x .195" I.D.) to mount locating lever to sub-base stud
16	33726	Washer—"C" washer to fasten locating lever to sub-base stud
17	72338	Arm—Pickup arm shell only
18	72344	Jewel—Pickup arm decorative jewel
19	38458	Nut—Speed nut to hold jewel
20	72551	Crystal—Crystal cartridge complete (including sapphire and guard)
20A	72345	Sapphire—Sapphire and holder assembly
20B	70341	Nut—Mounting washer and nut for sapphire
20C	38452	Guard—Needle guard
20D	37763	Screw—#2-56 x ⅛" screw for needle guard
21	70912	Screw—#4-40 x ⅜" binder head screw to mount crystal in arm (2 required)
22+	....	Cable—Pickup cable (twisted pair)
23	38458	Nut—Speed nut to hold pickup cable
24+	....	Sleeving—Sleeving to protect pickup cable
25	72339	Shaft—Pickup arm shaft
26	72341	Pivot—Pivot pin 26B, and screw 26A for pickup arm shaft
27	72342	Screw—#4-40 x 3/16" filister head machine screw for locking pivot screw
28	72340	Screw—#8-32 x ¼" round head machine screw to hold lift cable tie plate
29	72343	Cable—Pickup arm lift cable complete (including tie plate and cotter pin)
29A	72386	Pin—Cotter pin to fasten lift cable
29B	....	Plate—Tie plate nut stocked separately, lift cable (Part of 29)
30	10941	Ball—Steel ball (⅛" dia.) for pickup arm shaft
31	72348	Washer—Thrust washer (.580" O.D. x .300" I.D.) for pickup arm shaft
32	72346	Spindle—Turntable spindle or center post
32A	....	Guide—Record guide (Part of 32)
33	72355	Turntable—Turntable complete with knurled bushing and rubber mat
33A	72564	Mat—Rubber mat only for turntable
33B	....	Roller—Knurled roller (Part of 33)
34	72350	Washer—Thrust washer (.750" O.D. x .285" I.D.) for turntable spindle (2 required)
35	72349	Bearing—Thrust bearing
36	72395	Arm—Idler wheel arm and mounting lever
37	72393	Spring—Idler spring (.195" O.D. x 11/16"—17 turns)
38	72388	Stud—Mounting stud for idler wheel arm
39	38458	Nut—Speed nut to hold idler wheel arm stud
40	72396	Wheel—Idler wheel including tire
40A	....	Tire—Rubber tire for idler wheel (not sold separately)
41	39996	Washer—Fibre dampening washer for idler wheel (2 required)
42	33726	Washer—"C" washer to fasten idler wheel
43+	....	Lug—To hold spring 37 (not stocked)
44	72387	Mounting—Motor mounting hardware consisting of 6 (six) washers, 3 (three) spacers, 3 (three) lockwashers and 3 (three) nuts
45	72384	Grommet—Rubber grommet for mounting motor (3 required)
46	72394	Motor—117 volt, 60 cycle motor
47	30870	Plug—2 prong male plug for motor
48	32875	Switch—"On-Off" switch with cover
49	72389	Screw—Mounting screws for power switch (2 required)
50	73071	Base—Sub-base assembly complete with cam mounting plate and tone arm return lever and latch less springs
50A	....	Plate—Cam mounting carriage (Part of 50)
50B	....	Lever—Tone arm return lever and latch (Part of 50)
51	72367	Spring—Cam mounting plate spring (.195" O.D. x 1.167"—38¼ turns)
52	72375	Spring—Return lever spring (.195" O.D. x ⅞"—26 turns)
53	72374	Spring—Return lever latch spring (.165" O.D. x 9/16"—28 turns)
54	72363	Screw—#8-32 x 7/16" filister head screw to fasten center post (2 required)
55	72347	Hardware—One set of mounting hardware to mount sub-base consisting of 2 screws, 3 washers, 3 lockwashers and 3 nuts
56	72364	Screw—#10-32 x 1½" square head screw to mount sub-base
57+	....	Clamp
58+	....	Screw
59	72368	Cam—Main cam (including rubber tire)
60	72369	Tire—Rubber tire only for main cam
61	70877	Washer—Brass washer (7/16" O.D. x .280" I.D.) to mount main cam
62	35969	Washer—"C" washer to fasten main cam
63	72377	Lever—Ratchet lever, complete with ratchet teeth
63A	....	Ratchet—Ratchet teeth (Part of 63)
64	72372	Spring—Ratchet lever spring (.170" O.D. x 1-1/32"—80 turns)
65	72351	Washer—Brass washer (7/16" O.D. x .195" I.D.) to mount ratchet lever
66	33726	Washer—"C" washer to fasten ratchet lever
67	72358	Lever—Trip lever with trip pawl less spring
67A	....	Pawl—Trip pawl (Part of 67)
68	72359	Spring—Trip lever spring (.165" O.D. x ⅞"—62 turns)
69	32869	Screw—#10-32 x 5/16" filister head machine screw for trip lever
70	39772	Screw—#10-32 x 5/16" filister head set screw for trip lever
71	72378	Lever—Tone arm lift director lever
71A	....	Spring—Spring leaf (Part of 71)
72	72376	Spring—Pickup lift cable lever spring (.195" O.D. x 1-3/32"—40¼ turns)
73	72379	Screw—#8-32 x 3/16" round head adjusting screw for lift lever
74	72380	Roller—Cable lever roller
75	72381	Washer—Flat washer (½" O.D. x .290" I.D.) to mount lift lever
76	35969	Washer—"C" washer to fasten lift lever
77	72383	Rest—Tone arm rest
78	33225	Nut—Speed nut for mounting tone arm rest
79	72385	Lever—Reject lever
80	72386	Pin—Cotter pin to fasten reject lever
	72382	Motor board—Plastic motor board only, less all operating parts

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

+ These parts are not stocked.

Addition to Parts List

RP-178 Addition:

Stock No.	Description
73158	Spring—Spring sleeve to convert #72394 motor to 50 cycle operation

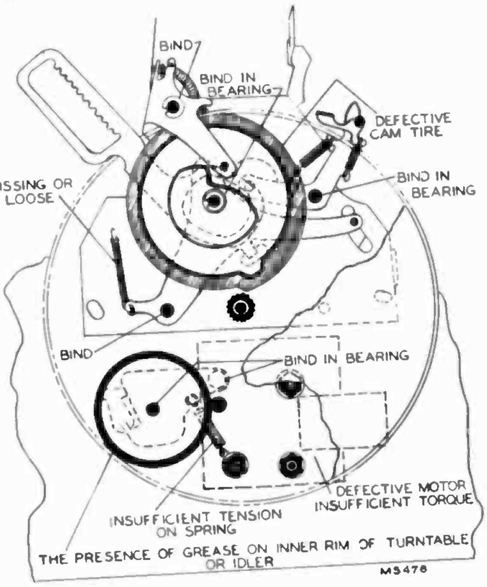
RP-178-2 Same as listed for RP-178—EXCEPT

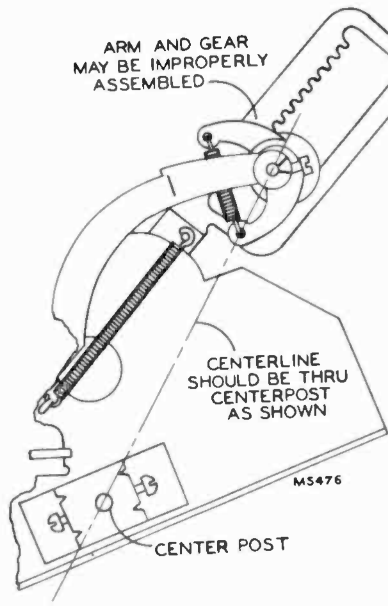
Stock No.	Description
S-4283	Motor—117 volt, 25 cycle motor

RP-178-3 Same as listed for RP-178—EXCEPT

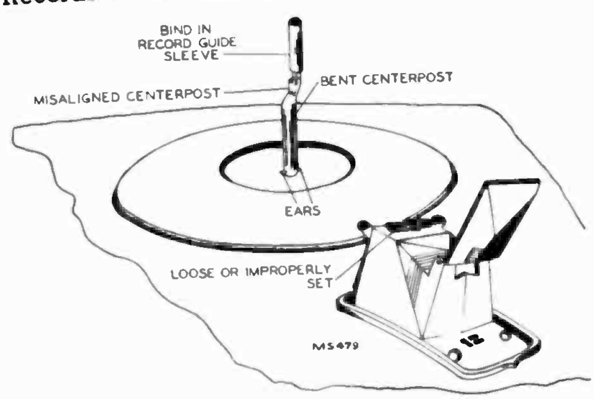
Stock No.	Description
S-4698	Medallion—Trademark medallion
S-4773	Motor—117 volt or 234 volt, 60 cycle motor
11953	Plug—Six prong male plug for motor cable
S-4774	Spring—Spring sleeve to convert #S-4773 motor to 50 cycle operation

Changer Will Not Complete Cycle

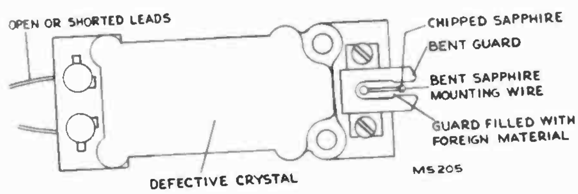




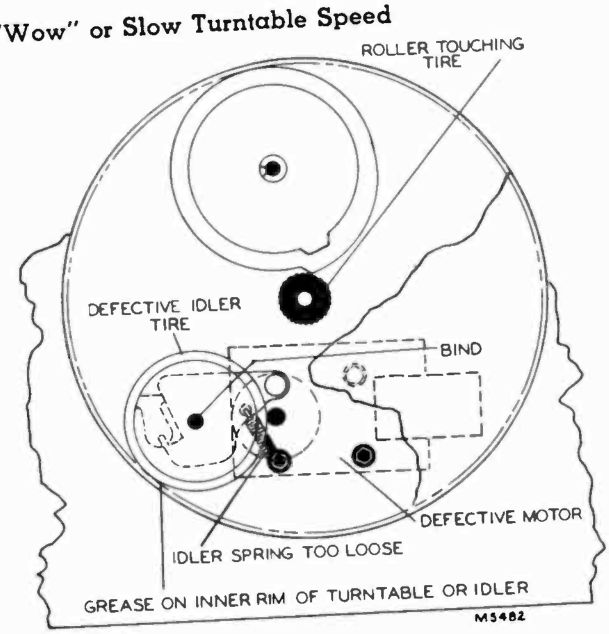
Records Do Not Separate or Drop Properly

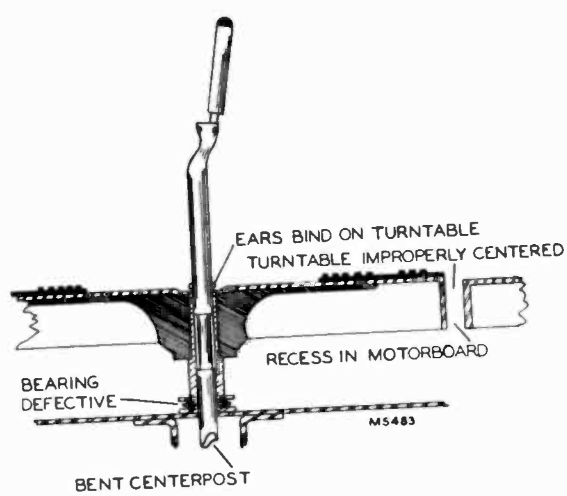


Distorted Output

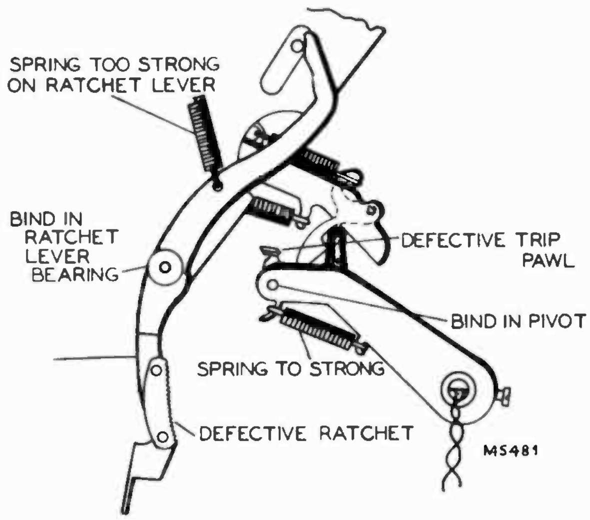


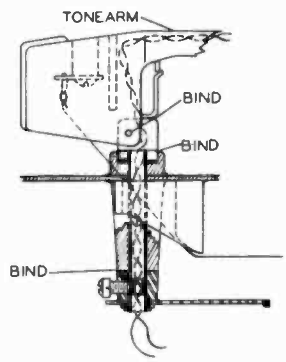
"Wow" or Slow Turntable Speed



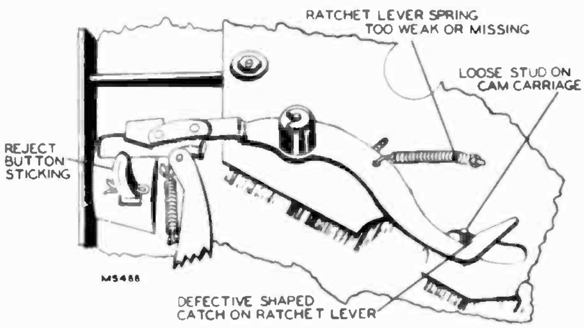


Pickup Repeats Grooves

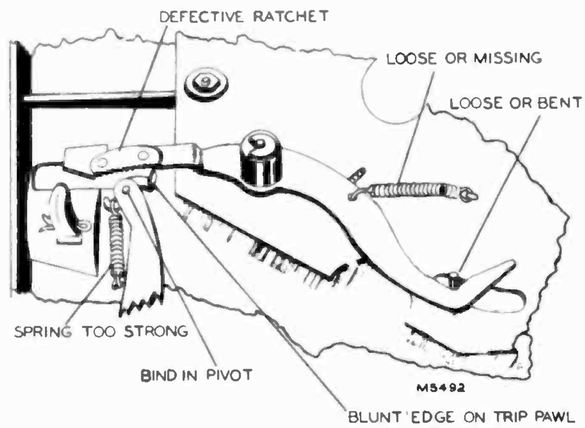




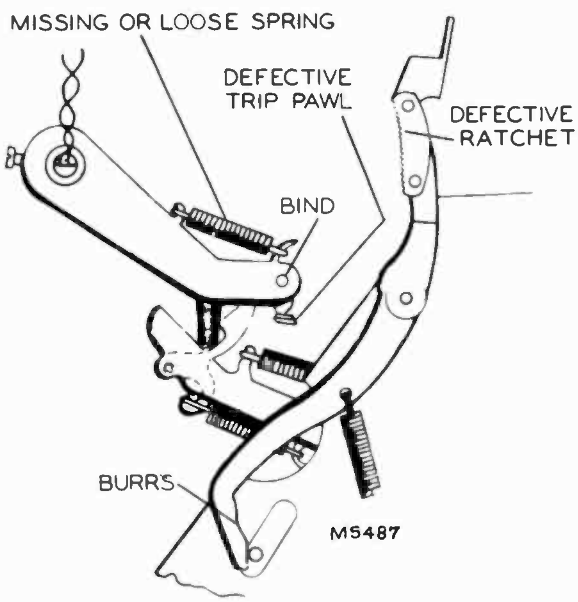
Continuous Tripping

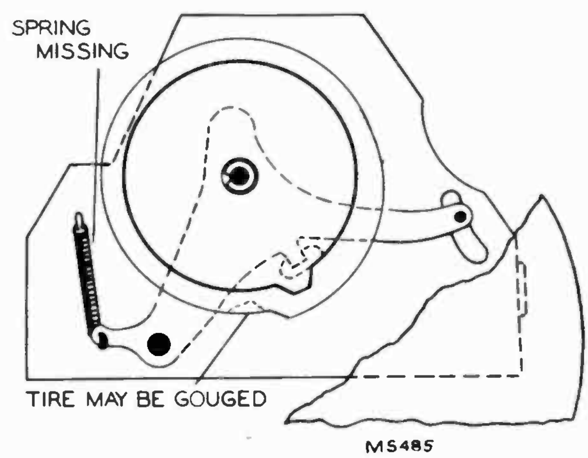


Premature Tripping

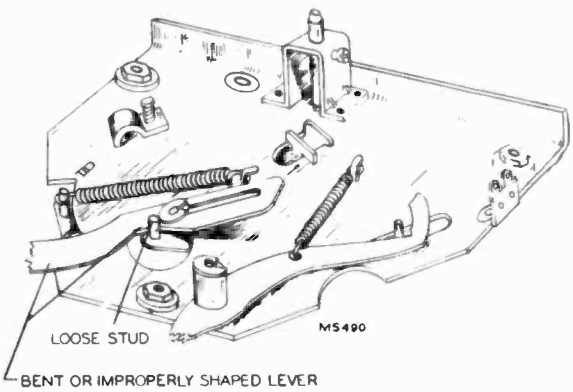


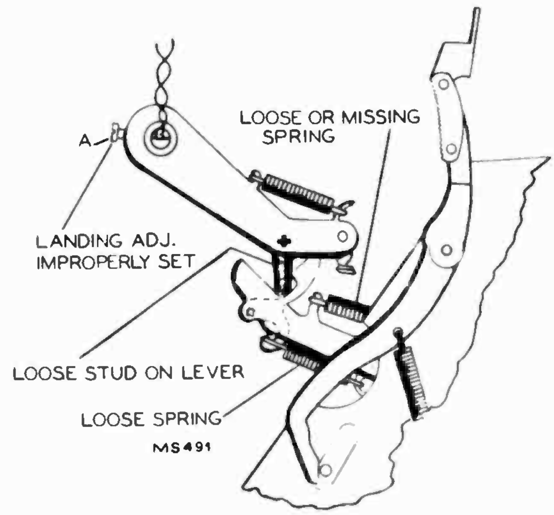
Failure To Trip or Go Into Cycle

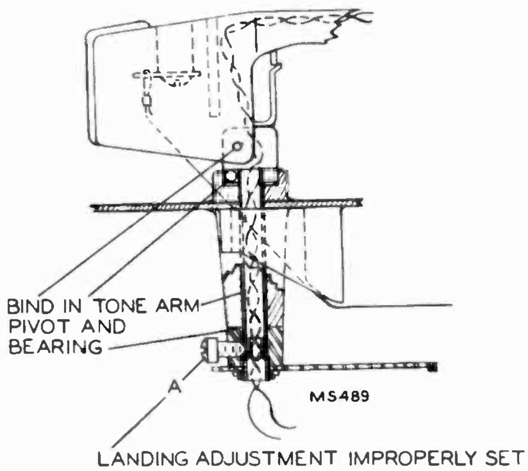


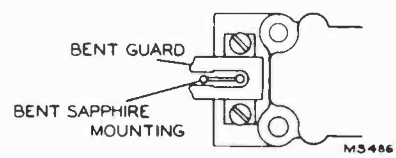


Improper Pickup Landing

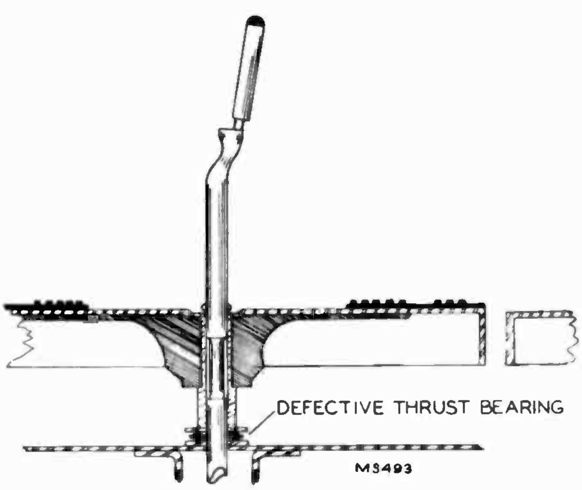


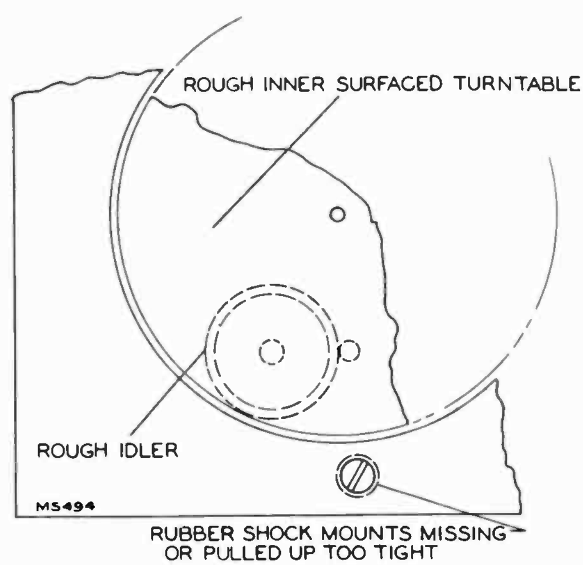






Rumble





RCA VICTOR

MODEL 710V2

AM-FM Radio-Phonograph Combination

Chassis No. RC-613A

FOR RECORD CHANGER INFORMATION REFER TO SERVICE DATA FOR MODEL RP-177

Mfr. No. 274

SERVICE DATA

—1947 No. 13—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Electrical and Mechanical Specifications

FREQUENCY RANGES

Standard Broadcast (BC)	540-1600 kc.
Frequency Modulation (FM)	88-108 mc.
Intermediate Frequency (AM)	455 kc.
Intermediate Frequency (FM)	10.7 mc.

TUBE COMPLEMENT

(1)	RCA 6BE6	FM 1st Det.-Osc.
(2)	RCA 6BE6	AM 1st Det.-Osc.
(3)	RCA 6BA6	IF Amplifier
(4)	RAC 6AU6	Driver
(5)	RCA 6AL5	FM Ratio Detector
(6)	RCA 6SQ7	AM 2nd Det.-AVC-Phase Inverter
(7)	RCA 6SQ7	AF Amplifier
(8)	RCA 6K6GT	Output
(9)	RCA 6K6GT	Output
(10)	RCA 5Y3GT	Rectifier

Pilot Lamps (3)	Mazda No. 51 6-8 volts 0.2 amp.
Tuning Drive Ratio	16.25:1

CABINET DIMENSIONS

Height........35" Width........37½" Depth........16⅝"

POWER OUTPUT

Undistorted	5 watts
Maximum	6.5 watts

LOUDSPEAKER

Type (92569-1)	12 inch PM
Voice Coil Impedance	2.2 ohms at 400 cycles

(Speakers stamped 92569-1W2 are 6 ohms)

POWER SUPPLY RATING (including phono motor)

105-125 volts, 60 cycles .... max. 110 watts

AUTOMATIC RECORD CHANGER—RP-177

Type Pickup	Crystal
Record Capacity	Twelve 10-in., Ten 12-in.

Antennas

Under conditions of normal field strength and interference, the RCA Victor antennas installed inside the cabinet will be effective for Frequency Modulation and Standard Broadcasts.

If reception is not satisfactory on one or both of the bands using the built-in cabinet antennas, one or two external antennas may be used. Connections are made to the antenna terminal boards in the back of the cabinet. External antennas may be erected indoors or outdoors and should be oriented in direction for requirements of best reception. RCA Television Antenna Stock No. 225 or 226 or the equivalent with 300 ohm transmission line is recommended for an FM external antenna. In this case, disconnect the two leads at the two terminals marked "FM" and attach the ends of the two lead wires from the RCA Television Antenna transmission line in their places. To replace the Standard Broadcast antenna, connect the lead-in from the antenna to terminal A. This antenna should consist of a wire 30 to 60 feet or so in length, mounted in a convenient location as high as possible. A ground connection to G should not be necessary but a flexible wire to a waterpipe or other good ground may be used.

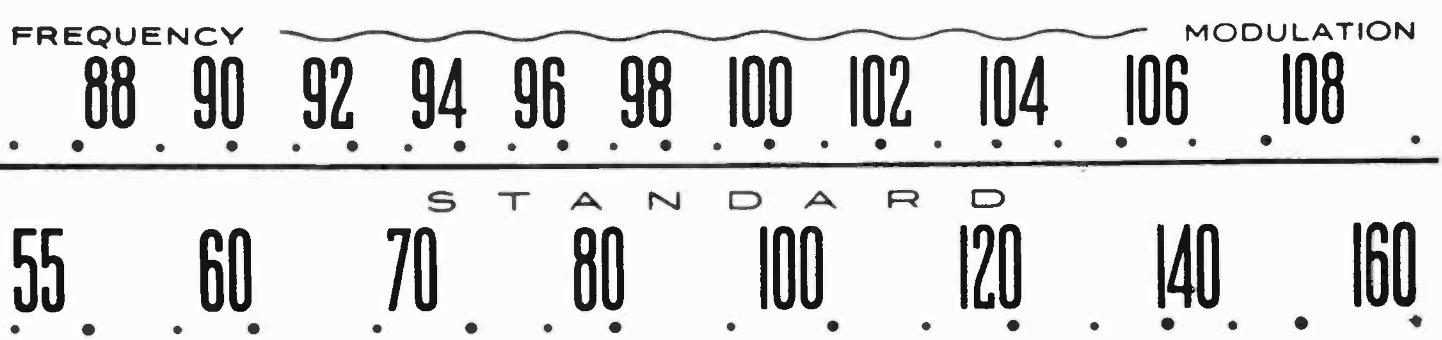
Circuit Description

Model 710V2 has individual built-in antennas for FM and AM coupled to individual 1st Det.-Osc. tubes (6BE6 V1 and V2). The outputs of these two tubes are connected to separate IF transformers (T1 and T2) whose secondaries are in series and connected to the IF amplifier tube (6BA6 V3). The output of V3 is connected to separate IF transformers (T3 and T4) whose primaries are in series. The secondary of T3 (FM IF) is connected to the driver tube (6AU6 V4). The secondary of T4 (AM IF) is connected to the AM second detector (6SQ7 V6). The output of the driver tube (V4) is coupled thru the ratio detector transformer (T5) to the FM ratio detector tube (6AL5 V5).

The audio outputs of the AM second detector and the FM ratio detector are connected thru a section of the range switch to the volume control input.

The B+ supply (+245 V) to the plates and screen grids of V1 and V2 is controlled thru a section of the range switch.

Simple AVC is used on AM and is applied to both the IF amplifier (V3) and the AM 1st detector (V2). Delayed AVC is used on FM and is applied only to the IF amplifier (V3). The AVC distribution is controlled thru a section of the range switch.



933642-1

DIAL SCALE

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

Alignment Procedure

Alignment Indicators:

An RCA VoltOhmyst or equivalent meter is necessary for measuring developed d-c voltage during FM alignment. Connections are specified in the alignment tabulation below. An output meter is also necessary to indicate minimum audio output during alignment. Connect the output meter across the speaker voice coil.

The RCA VoltOhmyst can also be used as an AM alignment indicator, either to measure audio output or to measure a-v-c voltage.

When audio output is being measured the volume control should be turned to maximum.

Signal Generator:

For all alignment operations, except as stated in FM alignment, connect the low side of the signal generator to the receiver chassis. The output should be adjusted to provide accurate resonance indication at all times. If output measurement is used for AM alignment the output of the signal generator should be kept as low as possible to avoid a-v-c action.

Calibration Scale.—The dial scale printed in this service note may be temporarily attached to the chassis for quick reference during alignment.

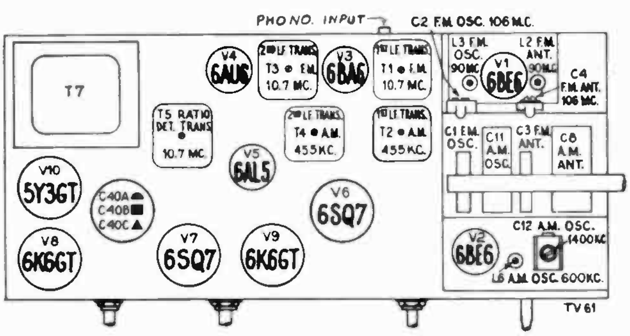
Using Printed Dial Scale.—

1. Cut out the printed dial scale, or, make a tracing of the scale.
2. With gang at full mesh the pointer should be set to the first reference mark from the left hand end of the dial backing plate.
3. Place the printed dial scale or the tracing under the pointer so that the extreme left scale graduations coincide with the pointer. Use scotch tape to hold the dial scale in place.

Note.—It is not recommended that the glass dial scale in the cabinet be removed as an alignment reference. This glass dial scale is fastened to the bezel with sheet metal lugs bent over the scale to hold it in place. Removing the glass dial scale will necessitate bending the lugs, resulting in their weakening and subsequent breakage.

Critical Lead Dress

1. Dress capacitor C5 near chassis base.
2. Dress lead from pin 5, V-1, to terminal C, of transformer T1, as near bottom of FM shelf as possible.
3. The lead from capacitor C24 to the high side of the volume control must be dressed next to chassis along front apron.
4. Dress resistors R32 & R33 near chassis base.
5. Dress all A.C. leads away from volume control.
6. Solder FM antenna coil primary leads to terminal board with as short a lead length as is practical.
7. Make all FM leads as short as possible.
8. The lead from pin 2, V-3, to chassis ground must be dressed as close to base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length nor the point at which it is grounded to the chassis should be changed.
9. Dress all leads away from the 3300 ohm resistors R34 and R35.



TOP VIEW OF CHASSIS

The FM i-f alignment may be checked by means of an FM sweep generator and cathode ray oscilloscope. Connect the output from the sweep generator, which is set to 10.7 mc., to the FM 1st Det.-Osc. grid (6BE6 Pin No. 7) low side to chassis. Disconnect the 5 mfd. capacitor C34 from the Ratio Detector circuit.

Connect the high side of the oscilloscope to the junction of R27 and R28, low side to chassis. Adjust the sweep generator and oscilloscope to obtain the response curve.

The Ratio Detector characteristic may be viewed by connecting the oscilloscope across the volume control R22. Capacitor C34 should be re-connected before checking the Ratio Detector characteristic.

FM Alignment

RANGE SWITCH IN FM POSITION—VOLUME CONT. MAXIMUM

Steps	Connect sig. gen.	Sig. gen. output	Turn radio dial to—	Adjustment for peak output
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd. capacitor C34 and the common lead to chassis. Turn gang condenser to max. capacity (fully meshed).			
2	High side to Pin 1 of driver tube 6AU6 in series with .01 mfd. low side to chassis	10.7 mc. modulated 30% 400 cycles AM (Approx. .1 volt)	Max. capacity (fully meshed)	T5 top core for max. d-c voltage across C34. T5 bottom core for min. audio output
3	High side to one FM ant. term. in series with .01 mfd. Low side to the other FM ant. term.	10.7 mc. 30% modulation, 400 cycles AM. Adjust to provide 2 to 3 volts indication on VoltOhmyst during alignment.	Max. capacity (fully meshed)	†Using alternate loading: T3 bottom core (sec.) T3 top core (pri.) T1 bottom core (sec.) T1 top core (pri.)
4	High side to one FM ant. term. in series with a 120 ohm resistor. Low side to the other FM ant. term in series with a 120 ohm resistor.	106 mc	106 mc	C2 osc. C4 ant.
5	High side to one FM ant. term. in series with a 120 ohm resistor. Low side to the other FM ant. term in series with a 120 ohm resistor.	90 mc	90 mc	L3 osc. L2 ant.
6	Repeat Steps 4 and 5 until further adjustment does not improve calibration.			

†Alternate loading involves the use of a 680 ohm resistor to load the plate winding while the grid winding of the SAME TRANSFORMER is being peaked. Then the grid winding is loaded with the resistor while the plate winding is peaked. Only one winding is loaded at any one time. Remove the 680 ohm resistor after T3 and T1 have been aligned.

AM Alignment

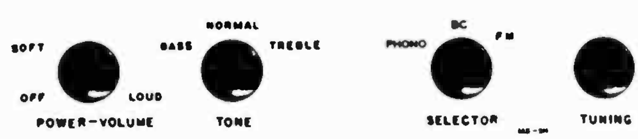
(Correct alignment of the 455 kc. IF requires that the 10.7 mc. IF be aligned previously)

RANGE SWITCH IN BC POSITION

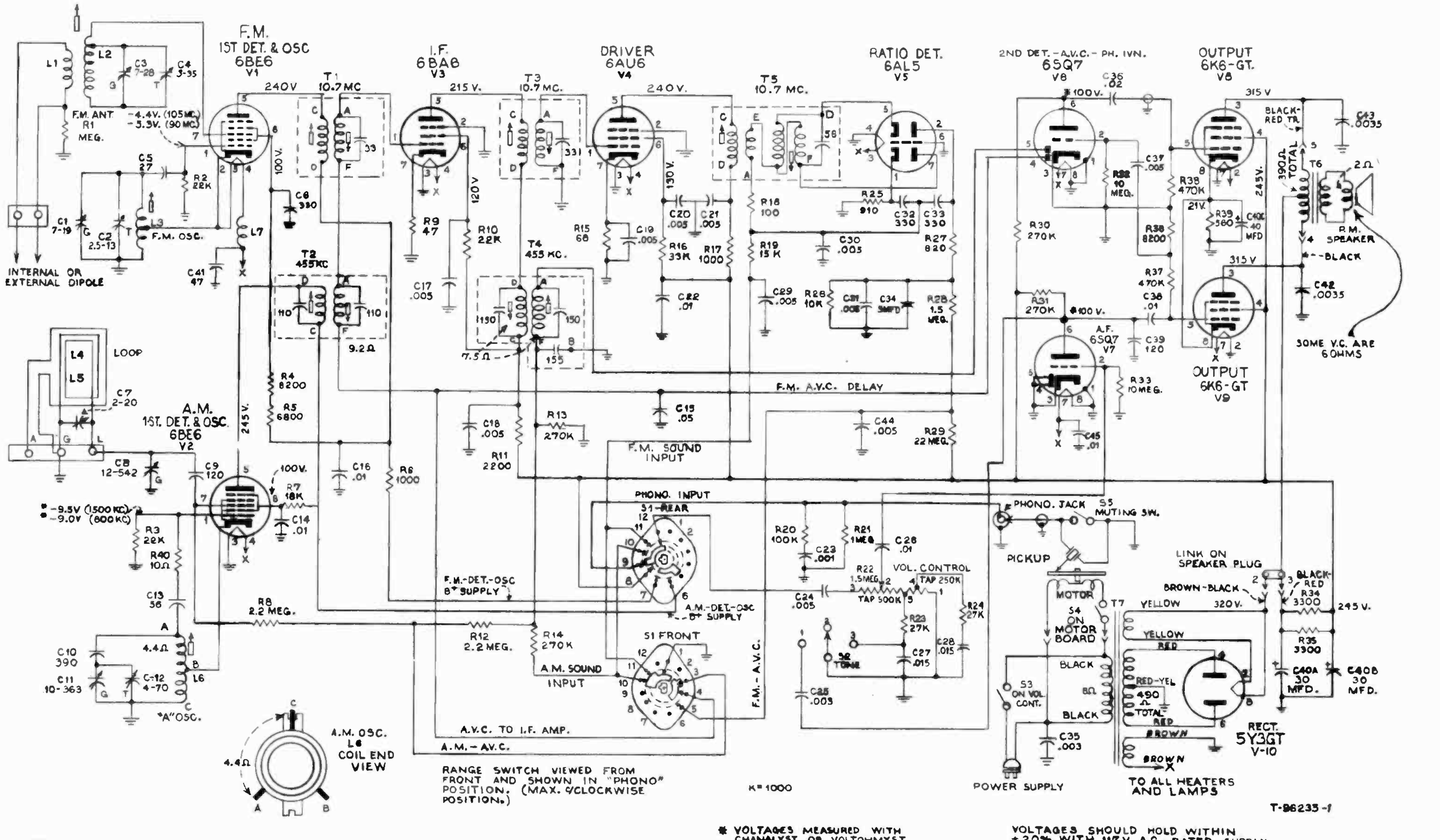
Steps	Connect high side of sig. gen. to—	Sig. gen. output	Turn radio dial to—	Adjust for peak output
1	AM converter grid 6BE6 V-2 in series with .01 mfd.	455 kc	Quiet point at low freq. end.	†T4 top core (sec.) †T4 bottom core (pri.)
2	AM converter grid 6BE6 V-2 in series with .01 mfd.	455 kc	Quiet point at low freq. end.	†T2 bottom core (sec.) †T2 top core (pri.)
3	"A" terminal of terminal board at rear of chassis in series with 200 mmf. (link open)	1400 kc	1400 kc	C12 osc. C 7 ant. (loop)
4	"A" terminal of terminal board at rear of chassis in series with 200 mmf. (link open)	600 kc	600 kc	L6 osc. (Rock gang)
5	Repeat Step 3.			
6	After chassis and loop have been installed in cabinet, adjust C7 for max. output on a weak station near 1400 kc.			

†Align T4 and T2 by means of alternate loading as explained under FM alignment. Use a 47,000 ohm resistor instead of a 680 ohm resistor.

Oscilator frequency is above signal frequency on both AM and FM.



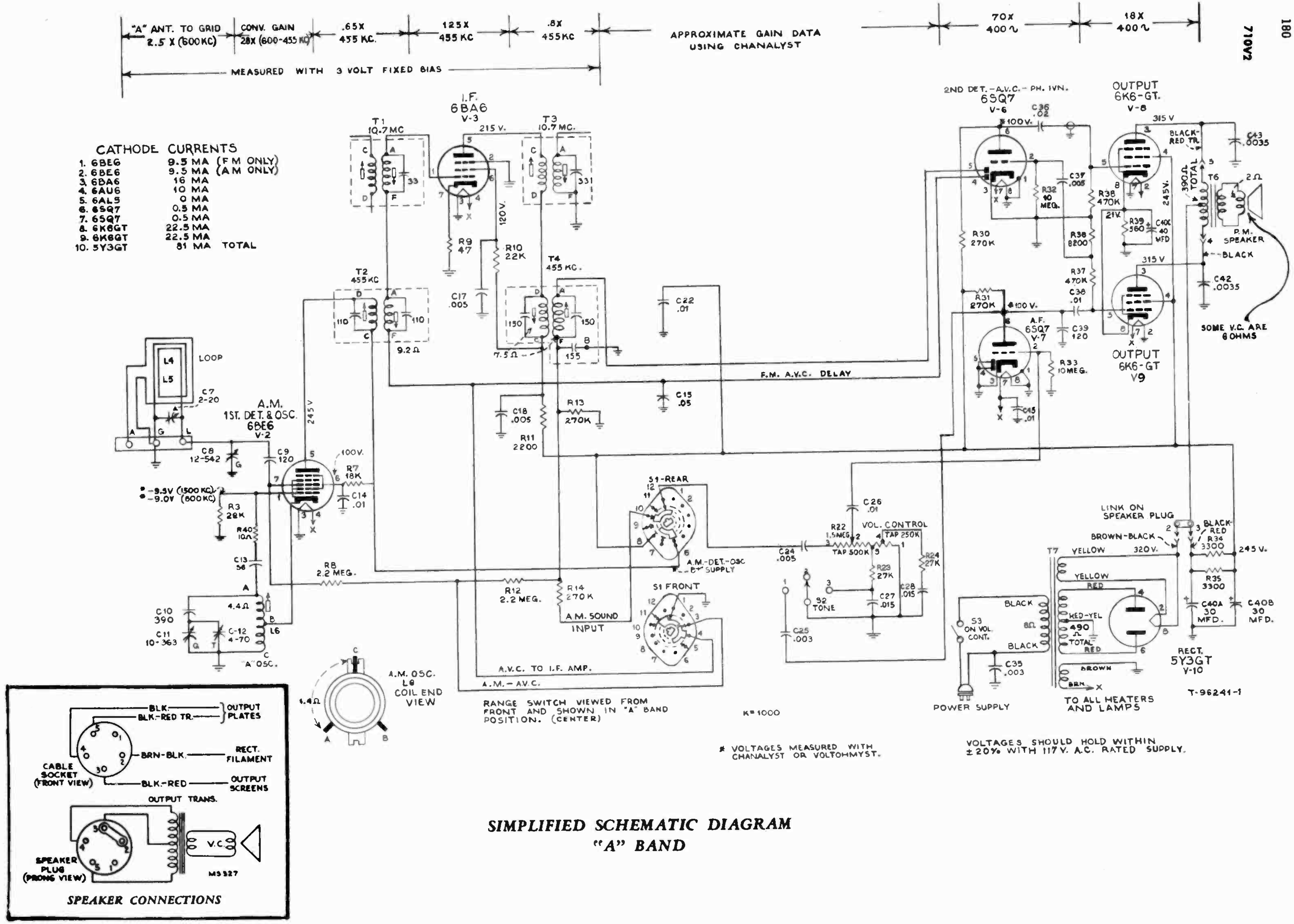
FRONT PANEL CONTROLS



COMPLETE SCHEMATIC DIAGRAM

Change in Resistor:

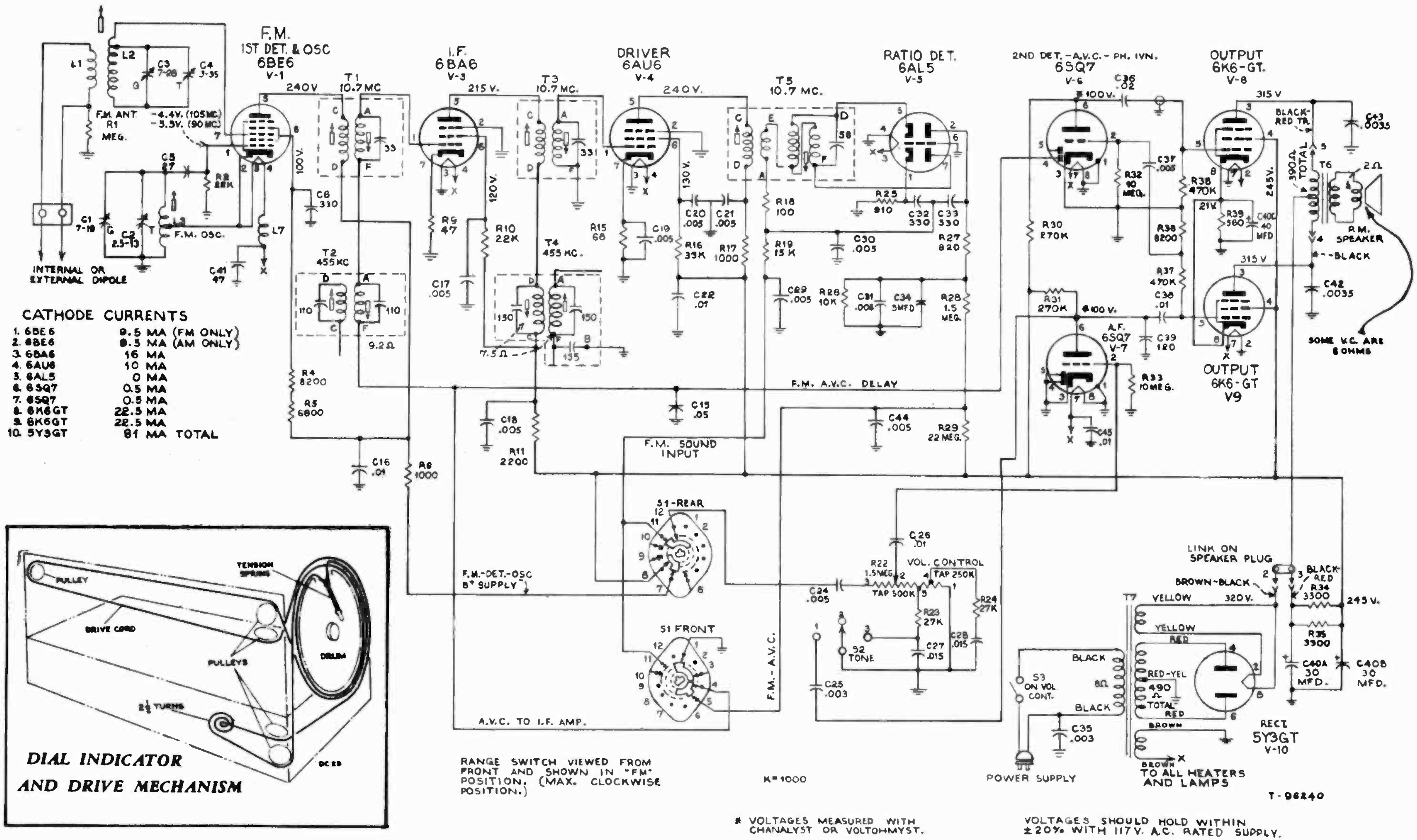
The 68 ohm resistor located in the cathode circuit of the type 6AU6 FM driver stage has been changed in production from 68 ohms to 120 ohms. This change was made because certain 6AU6 tubes were found to draw grid current at the bias value produced by 68 ohms which resulted in a decrease in FM sensitivity.



CATHODE CURRENTS

1. 6BE6	9.5 MA	(FM ONLY)
2. 6BE6	9.5 MA	(AM ONLY)
3. 6BA6	16 MA	
4. 6AU6	10 MA	
5. 6AL5	0 MA	
6. 6SQ7	0.5 MA	
7. 6SQ7	0.5 MA	
8. 6K6GT	22.5 MA	
9. 6K6GT	22.5 MA	
10. 5Y3GT	81 MA	TOTAL

SIMPLIFIED SCHEMATIC DIAGRAM
"A" BAND



DIAL INDICATOR AND DRIVE MECHANISM

SIMPLIFIED SCHEMATIC DIAGRAM
"FM" BAND

Replacement Parts

STOCK No.	DESCRIPTION
	CHASSIS ASSEMBLIES RC 613A
73107	Board—"F.M." board—antenna end
73106	Board—Two (2) contact terminal board for transmission line —chassis end
72046	Capacitor—Mica trimmer, 2.5-13mmf. (C2)
71808	Capacitor—Adjustable, 3-35 mmf. (C4)
72334	Capacitor—Adjustable, 4-70 mmf. (C12)
72570	Capacitor—Ceramic, 27 mmf. (C5)
39042	Capacitor—Ceramic, 47 mmf. (C41)
71924	Capacitor—Ceramic, 56 mmf. (C13)
71614	Capacitor—Ceramic, 120 mmf. (C9, C39)
39640	Capacitor—Mica, 330 mmf. (C6, C32, C33)
39642	Capacitor—Mica, 390 mmf. (C10)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C42, C43)
73186	Capacitor—Tubular, .001 mfd., 400 volts (C23)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C25)
72874	Capacitor—Moulded paper, .003 mfd., 600 volts (C35)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C19, C29, C30, C31, C44)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C17, C18, C20, C21)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C24, C37)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C27, C28)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C26, C45)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C14, C16, C22)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C38)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C36)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C15)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C34)
72052	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts, 1 section of 30 mfd., 350 volts and 1 section of 40 mfd., 25 volts (C40A, C40B, C40C)
72335	Coil—Antenna coil—F.M.—complete with adjustable core and stud (L1, L2)
72336	Coil—Oscillator coil—F.M.—complete with adjustable core and stud (L3)
72333	Coil—Oscillator coil—"A" band—complete with adjustable core and stud (L6)
72574	Coil—Filament choke coil (L7)
72059	Condenser—Variable tuning condenser (C1, C3, C8, C11)
70342	Control—Volume control and power switch (R22, S3)
†72953	Cord—Drive cord (approx. 82" overall required)
70392	Cord—Power cord and plug
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
71799	Grommet—Rubber grommet to mount R.F. shelf (3 required)
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate
30868	Plug—2 contact female plug for motor cable
12493	Plug—5 contact female plug for speaker cable
72602	Pulley—Drive cord pulley
	Resistor—Fixed composition, 10 ohms, ½ watt (R40)
	Resistor—Fixed composition, 47 ohms, ±10%, ½ watt (R9)
	Resistor—Fixed composition, 68 ohms, ±10%, ½ watt (R15)
	Resistor—Fixed composition, 100 ohms, ±5%, ½ watt (R18)
72865	Resistor—Wire wound, 560 ohms, 2 watt (R39)
	Resistor—Fixed composition, 820 ohms, ±5%, ½ watt (R27)
	Resistor—Fixed composition, 910 ohms, ±5%, ½ watt (R25)
	Resistor—Fixed composition, 1000 ohms, ±20%, ½ watt (R6, R17)
	Resistor—Fixed composition, 2200 ohms, ±20%, 1 watt (R11)
	Resistor—Fixed composition, 3300 ohms, ±10%, 2 watt (R34, R35)
	Resistor—Fixed composition, 6800 ohms, ±10%, 1 watt (R5)
	Resistor—Fixed composition, 8200 ohms, ±10%, ½ watt (R36)
	Resistor—Fixed composition, 8200 ohms, ±10%, 1 watt (R4)
	Resistor—Fixed composition, 10,000 ohms, ±10%, ½ watt (R26)
	Resistor—Fixed composition, 15,000 ohms, ±10%, ½ watt (R19)
	Resistor—Fixed Composition, 18,000 ohms, ±10%, 2 watt (R7)
	Resistor—Fixed composition, 22,000 ohms, ±10%, ½ watt (R2, R3)
	Resistor—Fixed composition, 22,000 ohms, ±10%, 1 watt (R10)
	Resistor—Fixed composition, 27,000 ohms, ±10%, ½ watt (R23, R24)
	Resistor—Fixed composition, 33,000 ohms, ±10%, ½ watt (R16)
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R20)
	Resistor—Fixed composition, 270,000 ohms, ±10%, ½ watt (R13, R14, R30, R31)
	Resistor—Fixed composition, 470,000 ohms, ±10%, ½ watt (R37, R38)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R1)
	Resistor—Fixed composition, 1 megohm, ±10%, ½ watt (R21)
	Resistor—Fixed composition, 1.5 megohm, ±20%, ½ watt (R28)
	Resistor—Fixed composition, 2.2 megohm, ±20%, ½ watt (R8, R12)
	Resistor—Fixed composition, 10 megohm, ±20%, ½ watt (R32, R33)
	Resistor—Fixed composition, 22 megohm, ±20%, ½ watt (R29)
72055	Shaft—Tuning knob shaft
31364	Socket—Lamp socket
35787	Socket—Phono input socket
72516	Socket—Tube socket—miniature
31251	Socket—Tube socket—octal
31418	Spring—Drive cord tension spring
73104	Support—Dial back plate support—R.H.—complete with four (4) drive cord pulleys
73105	Support—Dial back plate support—L.H.—complete with one (1) drive cord pulley
72060	Switch—Rang switch (S1)
71603	Switch—Tone control switch (S2)
72887	Transformer—First I.F. transformer—F.M. (T1)
71625	Transformer—First I.F. transformer—A.M. (T2)
72888	Transformer—Second I.F. transformer—F.M (T3)
71631	Transformer—Second I.F. transformer—A.M. (T4)
72889	Transformer—Ratio detector transformer (T5)
71975	Transformer—Power transformer—117 volt, 60 cycle (T7)
35969	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92569-1W or 92569-1W1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly—(2.2 ohm voice coil)
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" PM speaker complete with cone and voice coil less output transformer and plug (92569-1W)
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T6)
	SPEAKER ASSEMBLIES 92569-1W2
13867	Cap—Dust cap
72828	Cone—Cone and voice coil assembly—(6 ohm voice coil)
71560	Plug—5 prong male plug for speaker
71145	Suspension—Metal cone suspension
73242	Transformer—Output transformer (T6)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
72555	Antenna—Di-pole antenna
71599	Bracket—Pilot lamp bracket
72583	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
71892	Catch—Record storage compartment door catch and strike
71820	Check—Radio compartment door check
X1752	Cloth—Grille cloth
73088	Decal—Control panel decal
71910	Decal—Trade mark decal (RCA Victor)
71966	Decal—Trade mark decal (Victrola)
72682	Dial—Glass dial scale
72861	Escutcheon—Dial escutcheon less dial
73181	Grille—Metal grille
11889	Grommet—Rubber grommet for radio chassis mounting strap (2 required)
73024	Hinge—Radio compartment door hinge (2 required)
36817	Hinge—Record storage compartment door hinge—L.H. (1 set)
36610	Hinge—Record storage compartment door hinge—R.H. (1 set)
71821	Knob—Control knob
11765	Lamp—Dial or jewel lamp—Mazda 51
73108	Loop—Antenna loop complete (L4, L5, C7)
70546	Mounting—One set of hardware to mount record changer consisting of four (4) upper springs and four (4) lower springs
71819	Plate—Mounting plate for door check
30870	Plug—2 prong male plug
73034	Pull—Record storage compartment door pull (2 required)
72556	Pull—Record changer compartment or radio compartment door pull (2 required)
73184	Runner—Record changer motor board runner—R.H.
73183	Runner—Record changer motor board runner—L.H.
73185	Stop—Metal stop for motor board runners (2 required)
72936	Stop—Record storage compartment door stop
71818	Spring—Radio compartment door check spring
30900	Spring—Retaining spring for knob
73182	Track—Record changer compartment track (2 required)
73248	Washer—Flat washer (1" square) to mount record changer (4 required)

†This is a reel containing 250 ft. of cord, order from your distributor by specifying Stock No. and length required.

For Automatic Record Changer Parts Refer to Service Data for Model RP-177

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

Change in Record Changer:

Late production of Model 710V2 uses RP-177A record changer which is very similar to RP-177 record changer.

Addition to Parts List:

MISCELLANEOUS

X1797 Cloth—Grille cloth
73417 Decal—Control panel decal
72800 Knob—Control Knob
The above parts are for use on instruments with a blonde mahogany cabinet.

73479 Stud—¼"—20 x 2¼" Stud to mount RP-177 record changer (4 required)

Introduction

The instrument consists of an eleven tube AM-FM radio, designed to operate in the frequency bands indicated in the specifications.

In introducing this model it is important that the service man acquaints himself with some of the important factors regarding FM reception.

In some locations, particularly urban areas, a type of distortion peculiar to FM may be experienced.

This is in no way a fault of the receiver, but rather a physical phenomena caused by the signal being reflected from some object, resulting in two or more paths for the transmitted signal.

The reflected signal, arriving late and out of phase, tends to amplitude modulate the FM signal.

This distortion may appear as a strange buzz, rattle or swish. It may even give the effect of an overloaded audio stage. In other cases an increase in noise level may be noticed.

Choosing a different location for the receiver may eliminate the trouble since the directive folded dipole antenna housed in the cabinet will be directed differently.

In other severe cases an outside dipole and reflector pointing in the right direction may correct the trouble.

(See antenna terminal board drawings, page 11.)

RCA VICTOR

AM-FM Radio Phonograph Combination

MODELS 711V1, 711V2, 711V3

RK-117 and RS-123 Chassis—Mfg. No. 274

SERVICE DATA

— 1947 No. 1 —

RADIO CORPORATION OF AMERICA

RCA VICTOR DIVISION

CAMDEN, N. J., U. S. A.

Model 711V1

Model 711V2

Model 711V3

Specifications

Frequency Range

Broadcast	540-1,600 kc
Short Wave	9.2-16 mc
Frequency Modulation	88-108 mc
Intermediate Frequency—AM	455 kc
Intermediate Frequency—FM	10.7 mc

Tube Complement of RK117 Radio Chassis

(1) RCA-6BA6	R-F Amplifier
(2) RCA-6BE6	Oscillator
(3) RCA-6BA6	Mixer
(4) RCA-6BA6	I-F Amplifier
(5) RCA-6AU6	Driver
(6) RCA-6AL5	Ratio Detector
(7) RCA-6SQ7	Det.-A.V.C.-A-F

Tube Complement of RS123 Power Amplifier Unit

(1) RCA-5U4G	Rectifier
(2) RCA-6J5	Phase Inverter
(3) RCA-6F6G	Power Output
(4) RCA-6F6G	Power Output
Undistorted Power Output	10 watts
Maximum Power Output	11 watts
Total Maximum Power Consumption at 125 volts, 60 cycles	170 watts

(This instrument can be converted to operate on 50 cycles.)

Loudspeaker (92567-2)

Type	12-inch Electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles
Automatic Record Changer	Type 960001-5
Record Capacity	Twelve 10-in., Ten 12-in.

FOR RECORD CHANGER INFORMATION REFER TO SERVICE DATA FOR MODEL 960001 SERIES

Push-Button Adjustment

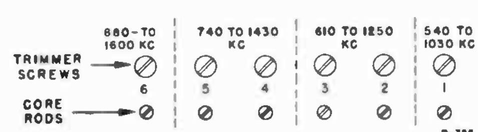


Figure 1—Push-Button Adjustment (Looking from Rear of Chassis)

The push-buttons connect to separate magnetite-core oscillator coils and separate loop circuit trimmers which must be adjusted for the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 70180. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust core rod No. 1 to receive the first station. To secure the best adjustment, rotate the loop for least pickup, and adjust core rod No. 1 for peak output.
5. Adjust trimmer screw No. 1 for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.
7. Repeat adjustments for best results.

On the 880 to 1,600 kc push-button, the higher frequency stations may be received with core rod No. 6 either in or out (oscillator frequency either 455 kc below or 455 kc above the station frequency). The adjustment with this core in its out position (oscillator frequency 455 kc above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.

Alignment

CRITICAL LEAD DRESS

(Any lead dress should be made before alignment.)

1. The lead from terminal 9, switch S4, front, to terminal on switch S7, must be dressed between the main base and R-F shelf.
2. The leads from terminals 10 and 11, switch S3, front, must be dressed together and away from the chassis.
3. Capacitor C56 must have shortest possible lead on the end connecting to pin 1 of tube V4.
4. The following capacitors must be dressed close to the chassis, with leads kept as short as possible: C40, C47, C54, C62 and C78.
5. All FM coil connections must be soldered in the exact place as the original coil. (One-sixteenth inch difference in length may be excessive.)
6. All wiring in the receiver is critical as to length and placement, any changes tend to impair the operation of the set.

FM Alignment

Before aligning set, completely mesh the gang and set the dial pointer at the mechanical maximum calibration point at the extreme left-hand end of the dial.

When making a complete alignment follow in proper sequence the tabulated form below.

If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the chart.

Any adjustments made on the FM 10.7 mc I-F's make it necessary to adjust the AM 455 kc I-F's.

"FM" RATIO DETECTOR ALIGNMENT

SET RANGE SWITCH TO FM POSITION

Steps	Connect High Side of Osc. to—	Tune Osc. to—	Turn Vol. Cont. to—	Adjust
1	Connect a 680-ohm resistor between lugs D and E of the ratio detector transformer T6. Connect d-c probe of a VoltOhmyst to the negative lead of the 5 mfd electrolytic capacitor C77. The common lead of the meter to chassis.			
2	Driver grid pin 1, of 6AU6 (V5) in series with a .01 mfd capacitor	10.7 mc 30% mod. 400 cycles AM	Maximum volume	Driver transformer T5 for maximum d-c voltage across C77
3	Remove meter leads and disconnect the 680-ohm resistor from D and E on T6. Connect two 68,000-ohm resistors (within 1% of each other) in series, across the 22,000-ohm ratio detector load resistor R37. Connect the common lead of the VoltOhmyst to the center point of the 68,000-ohm resistors and the d-c probe to terminal "A" of the ratio detector transformer T6. Use the 30-volt meter range.			
4	Same as step 2	Same as step 2	Maximum volume	*T6 bottom core for zero d-c balance on VoltOhmyst **T6 top core for minimum audio output. (Output meter across voice coil)
5	Reconnect VoltOhmyst as in step 1, omitting the 680-ohm resistor.			
6	Repeat step 2, omitting 680 ohms.			
7	Remove all connections.			

* Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

** The zero d-c balance and the minimum A-F output should occur at the same point; if such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the VoltOhmyst, and an output meter connected across the voice coil for the point at which both zero d-c and minimum output occurs.

NOTE.—Two or more points may be found which will satisfy the condition required in step 4. T7 top core should be correctly adjusted when approximately 1/8 inch of threads extend above the can, therefore, it is desirable to start adjustment with the top core in its furthest "in" position and turn out, while adjusting the bottom core, until the first point of minimum A-F and minimum d-c is reached.

"FM" R-F—I-F ALIGNMENT

RANGE SWITCH IN FM POSITION

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. to—	Radio Dial Tuned to—	Adjust
1	Connect the d-c probe of a VoltOhmyst to the negative lead of the 5 mfd electrolytic capacitor C77, and the common lead of the meter to chassis ground.				
2	Mixer grid pin #1 of 6BA6 (V3) in series with a .01 mfd capacitor (Adjust test osc. output for 6-10 volts developed across C-77) (Range switch in FM Position)	To RF tube shelf ground	10.7 MC 30% modulated at 400 cycles AM	Max. cap. (Fully meshed)	*T3 and T1 top and bottom cores alternately loading primary and secondary of each transformer with 680 ohms while the opposite side of the same transformer is being adjusted. Adjust all transformers for maximum voltage across C77.
3	FM antenna terminals #1 in series with a 120-ohm resistor	To FM antenna terminal #2 in series with a 120-ohm resistor	106 mc	106 mc	OSC, C21 for maximum voltage across C77.
4			90 mc	90 mc	**OSC, L16 for maximum voltage across C77.
5	Repeat steps 3 and 4 for exact calibration.				
6	Same as steps 3 and 4		106 mc	106 mc	R-F, C44 for maximum voltage across C77. (Noise voltage.)
7			90 mc	90 mc	**R-F, L19 for maximum voltage across C77. (Noise voltage.)
8	Repeat steps 6 and 7 for maximum output.				
9	Same as step 3	Same as step 3	106 mc	106 mc	Ant. C3 for maximum voltage across C77.
10	Same as step 3	Same as step 3	90 mc	90 mc	**Ant. L2 for maximum voltage across C77.
11	Repeat steps 9 and 10 for maximum output.				

* This method is known as alternate loading, which involves the use of a 680-ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680-ohm resistor while the plate winding is being peaked.

When the windings are loaded, it is necessary to increase the 10.7 mc input, since the gain will decrease and the voltage across C77 will be less.

** Two positions of the cores in L2, L19, L16 will satisfy the condition indicated, but for greatest sensitivity, the core position for L2 and L19 chosen, should be the one which results in the adjusting stud projecting the lesser distance.

For oscillator L16 the reverse is true and the coil should be aligned with the stud projecting the greater distance.

AM Alignment

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Output Meter Alignment.—Connect the meter across voice coil, and turn the receiver volume control to maximum.

Steps	Connect the High Side of the Test Osc. To	Tune Test Osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following
1	Mixer grid #1 pin of 6BA6—V3 in series with .01 mfd capacitor	455 kc	"BC" Band	Low Freq. end of Dial	*Top and bottom cores of T2 and T4. (For maximum voltage across voice coil.)
2	High Side of loop Primary in series with a .01 mfd capacitor (Link open)	455 kc	"BC" Band	Low Freq. end of Dial	Adj. I-F Trap L17 for minimum voltage across voice coil.
3	High Side of Loop Primary Through a Dummy Ant. comprising a 200-mmf capacitor (Link open)	1400 kc	"BC" Band	1400 kc	Osc.—C15 Ant.—C1 (For maximum voltage across voice coil.)
4		600 kc	"BC" Band	600 kc	Osc.—L12 Loop Load L3. (For maximum voltage across voice coil.)
5	Repeat steps 3 and 4 for maximum output.				
6	"C" Band Ant. Terminal #3 Through a dummy Ant. comprising a 150-ohm resistor in series with a 25 to 30-mmf capacitor	15.2 mc	"C" Band	15.2 mc	** Osc.—C17 Ant.—C4
7		9.5 mc	"C" Band	9.5 mc	Osc.—L13 Ant.—L4
8	Repeat steps 6 and 7 for accurate alignment.				
9	Install and connect chassis in cabinet, with Antenna link closed. Tune in a radiated oscillator signal at 1,400 kc and peak the "A" band ant. trimmer C1 (on loop).				

* It is necessary to alternately load the primary and secondary of each 455-kc I-F transformer with 10,000 ohms while the opposite side of the same transformer is being adjusted.

** To guard against the possibility of alignment of L13 and C17 to image frequencies, tune the test oscillator to 15.2 mc and turn the radio dial to 15.2 mc. Then adjust the test oscillator to 16.11 mc (image frequency). By increasing the test oscillator output, a signal should be heard.

Tune the test oscillator to 9.5 mc and turn the radio dial to 9.5 mc, then adjust the test oscillator to 10.41 mc (image frequency). By increasing the test oscillator output, a signal should be heard.

(If these image frequencies cannot be heard, the set is incorrectly aligned, therefore repeat steps 6 and 7.)

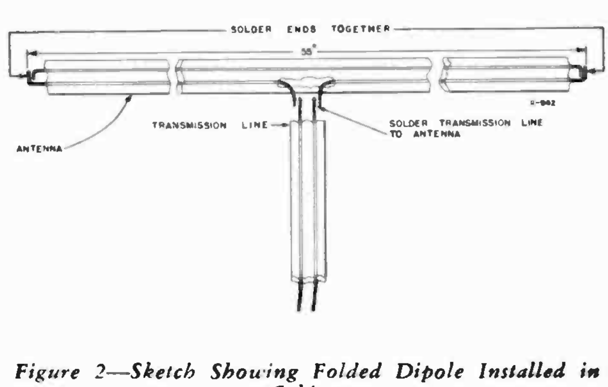


Figure 2—Sketch Showing Folded Dipole Installed in Cabinet

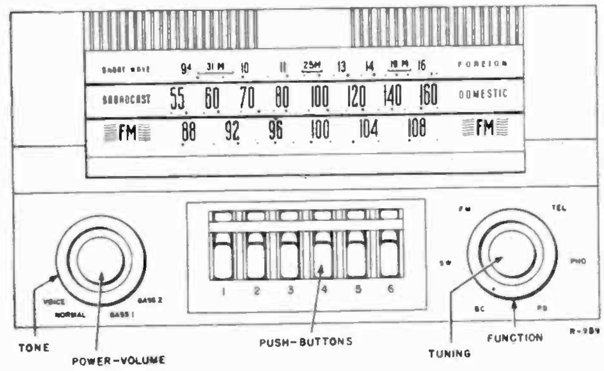


Figure 3—Radio Control Panel
(See page 11 for full size dial drawing)

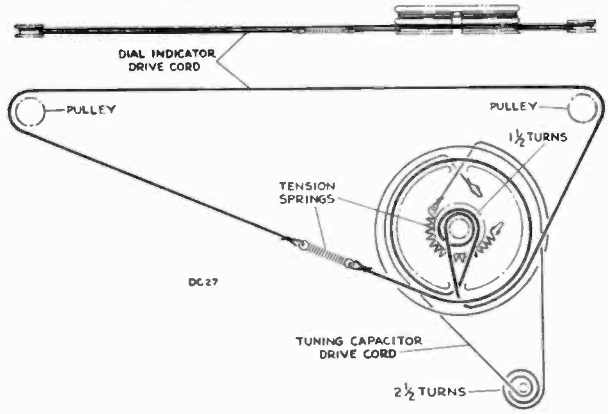


Figure 4—Dial Indicator and Drive Mechanism

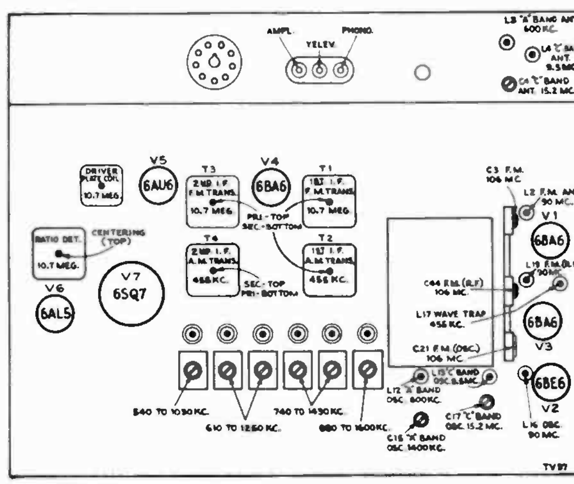


Figure 5—Chassis, Top View, Showing Adjustments

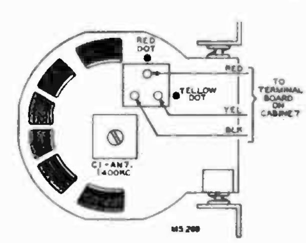


Figure 6—Loop Antenna

Circuit Diagram Breakdown Description

The schematics have been simplified showing the parts actually required for the instrument to operate in the position to which the band switch is turned.

It can be noted by examining the overall schematic that the circuit used in conjunction with V5 and V6 deviate from the conventional form. The explanation of this circuit can be found under the heading of Ratio Detector in the RCA Service Data supplement No. 10.

711V1, 711V2, 711V3

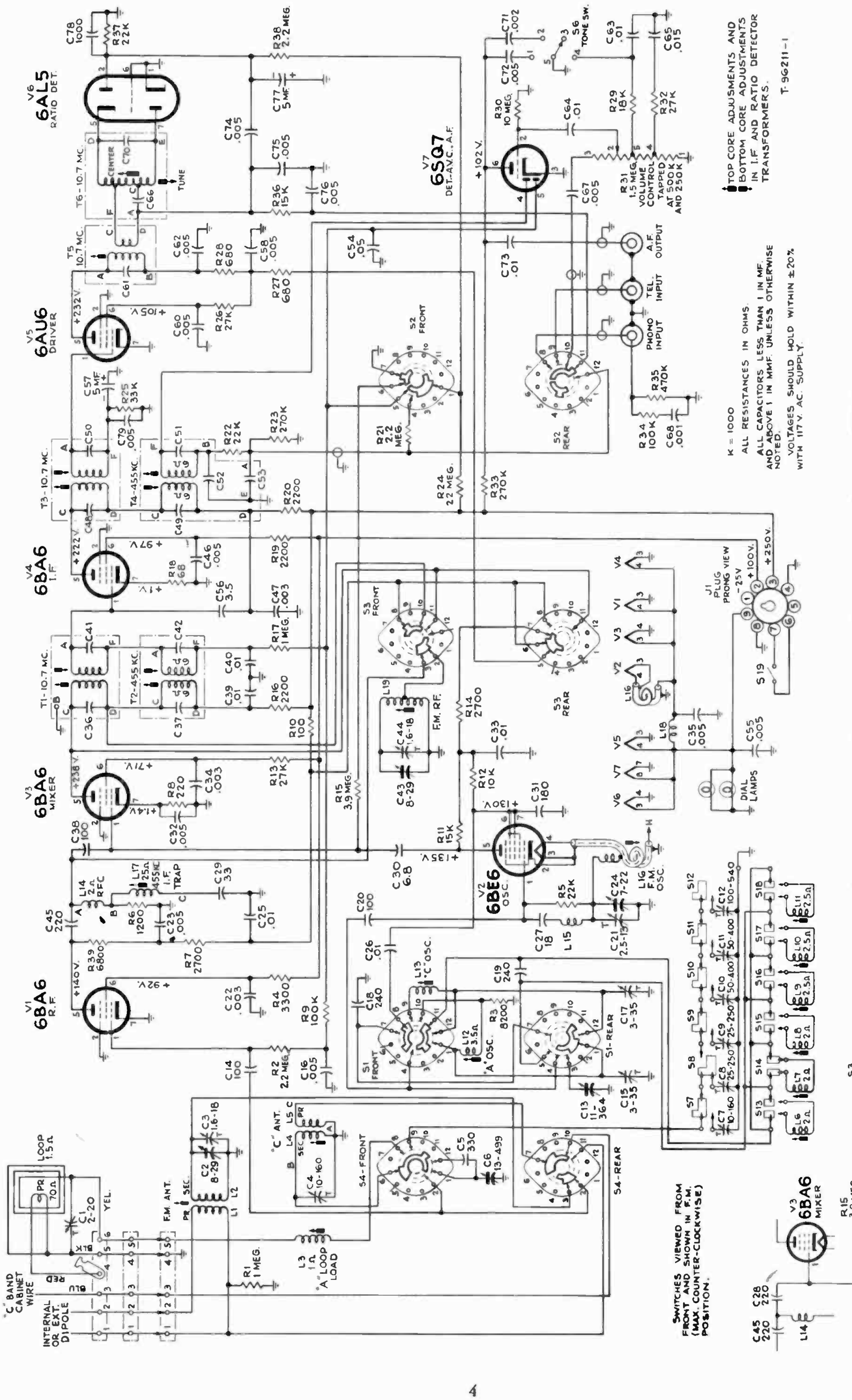
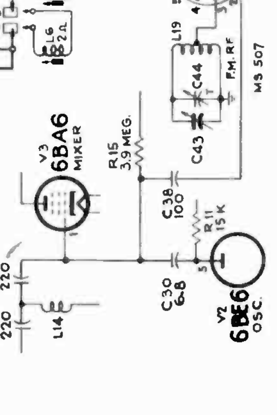


Figure 7—Complete Schematic of Radio Chassis—Range Switch Shown in FM Position.

For separate schematic of range switch positions see figures 11, 12, 13 and 15. See figure 8 for power amplifier.

NOTE: Antenna link closed for loop operation on Broadcast ("A") Band.



Early models are as shown

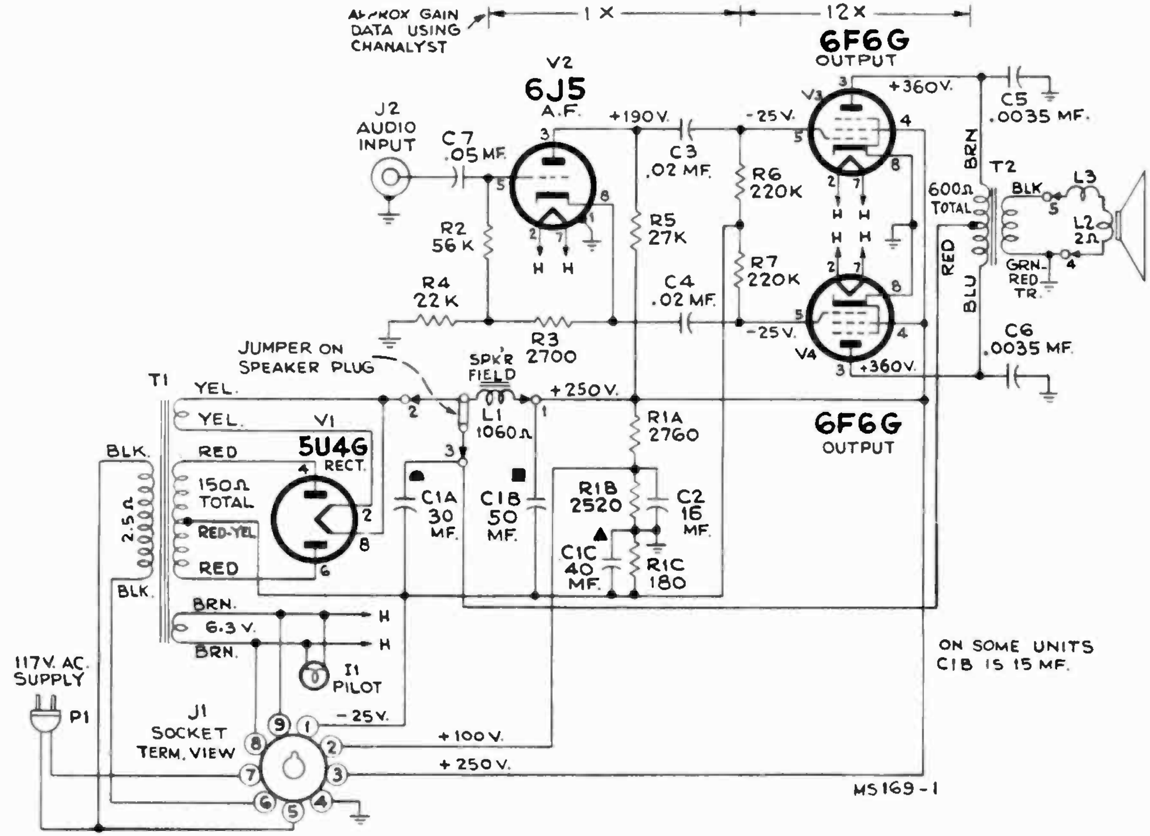


Figure 8—Power Amplifier RS-123

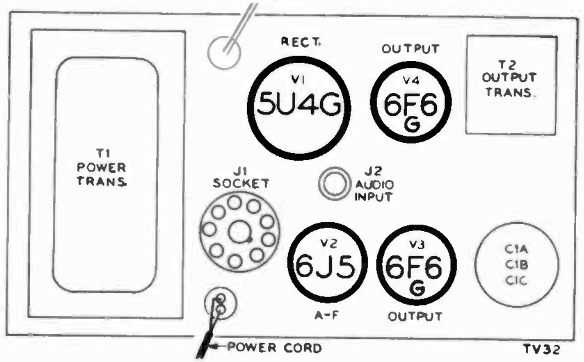


Figure 9—Top View of RS-123

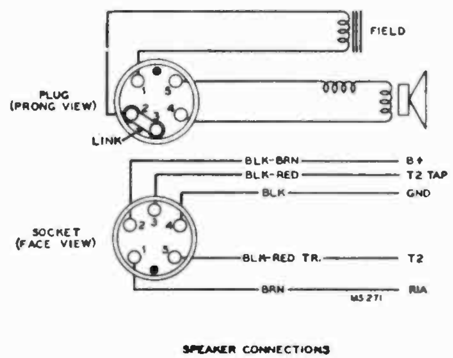


Figure 10

RADIO CHASSIS UNIT RK117 VOLTAGE CHART

Tube	Type	Element	Pin	Phono.	B.C.	S.W.	FM
V1	6BA6	Plate	5	148	148	154	140
		Scg	6	98	96	97	92
V2	6BE6	Plate	5	0	130	130	135
		Grids 2, 3, 4	6-7	0	140	140	130
		Grid 1	1	—	550 kc -24 v	9.5 mc -10 v	88 mc -11 v
		Grid 1	1	—	1600 kc -14 v	15.5 mc -16.2 v	108 mc -12 v
V3	6BA6	Plate	5	250	244	246	238
		Scg	6	67	69	72	71
V4	6BA6	Plate	5	238	230	230	222
		Scg	6	100	98	98	97
V5	6AU6	Plate	5	—	—	—	232
		Scg	6	—	—	—	105
V6	6AL5	—	—	—	—	—	—
V7	6SQ7	Plate	6	106	102	102	102

AMPLIFIER UNIT RS123 VOLTAGE CHART

Tube	Type	Element	Pin	Phono.	B.C.	S.W.	FM
V1	5U4G	Fil.		380	—	—	—
V2	6J5	Plate	3	205	—	—	—
		Cathode	8	54	—	—	—
V3	6F6G	Plate	4	360	—	—	—
		Scg	5	250	—	—	—
V4	6F6G	Same as V3.					

All voltages were measured in respect to ground, using a VoltOhmyst.

CATHODE CURRENTS WITH BAND SWITCH IN THE FM POSITION

V1 R-F Amplifier	14.1 ma.	V7 Det. Avc. A-F	0.5 ma.
V2 Osc.	12.3 ma.	Power Amp. RS-123	
V3 Mixer	6.5 ma.	V1 Rectifier total	140 ma.
V4 I-F Amplifier	13.5 ma.	V2 Phase inverter	2.15 ma.
V5 Driver FM	15.4 ma.	V3 Power amp.	27 ma.
V6 Ratio Detector	....	V4 Power amp.	27 ma.

711V1, 711V2, 711V3

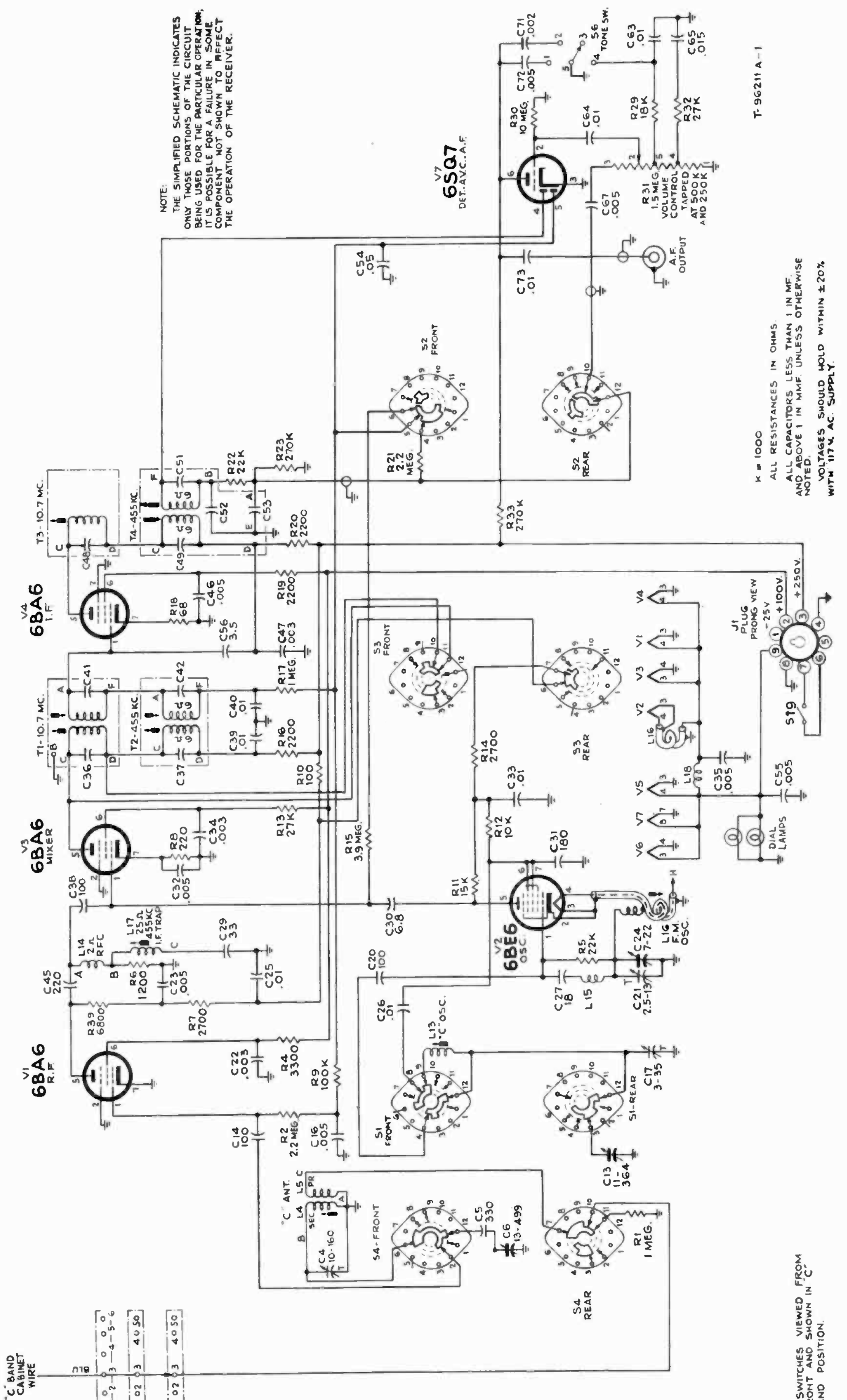


Figure 11—Simplified Schematic Shown in "C" Band Position Only. (See Note above.)

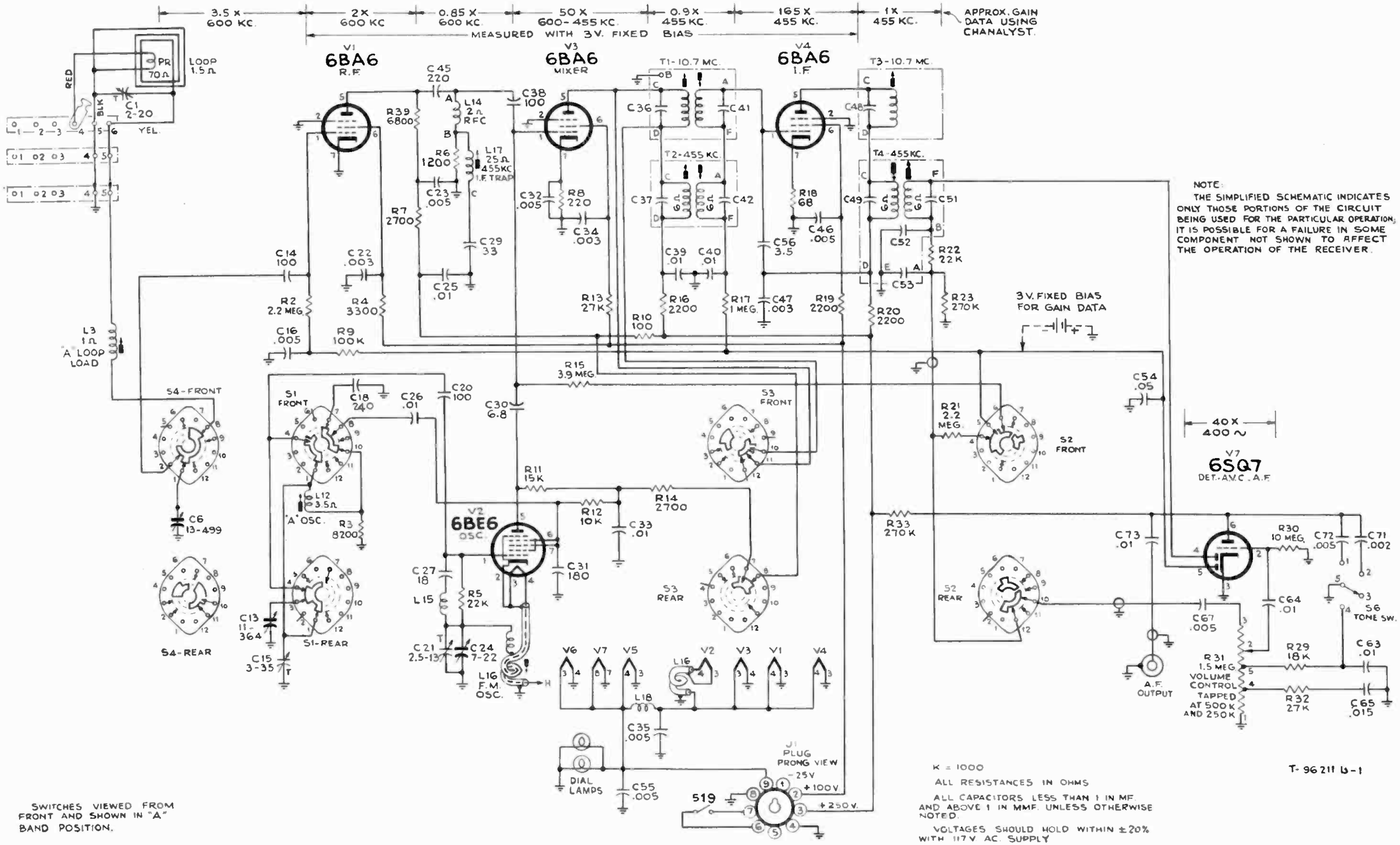


Figure 12—Simplified Schematic Shown in Broadcast ("A") Band Position Only. (See Note above.)

NOTE: Antenna link closed for loop operation (see page 11 for external antenna connections).

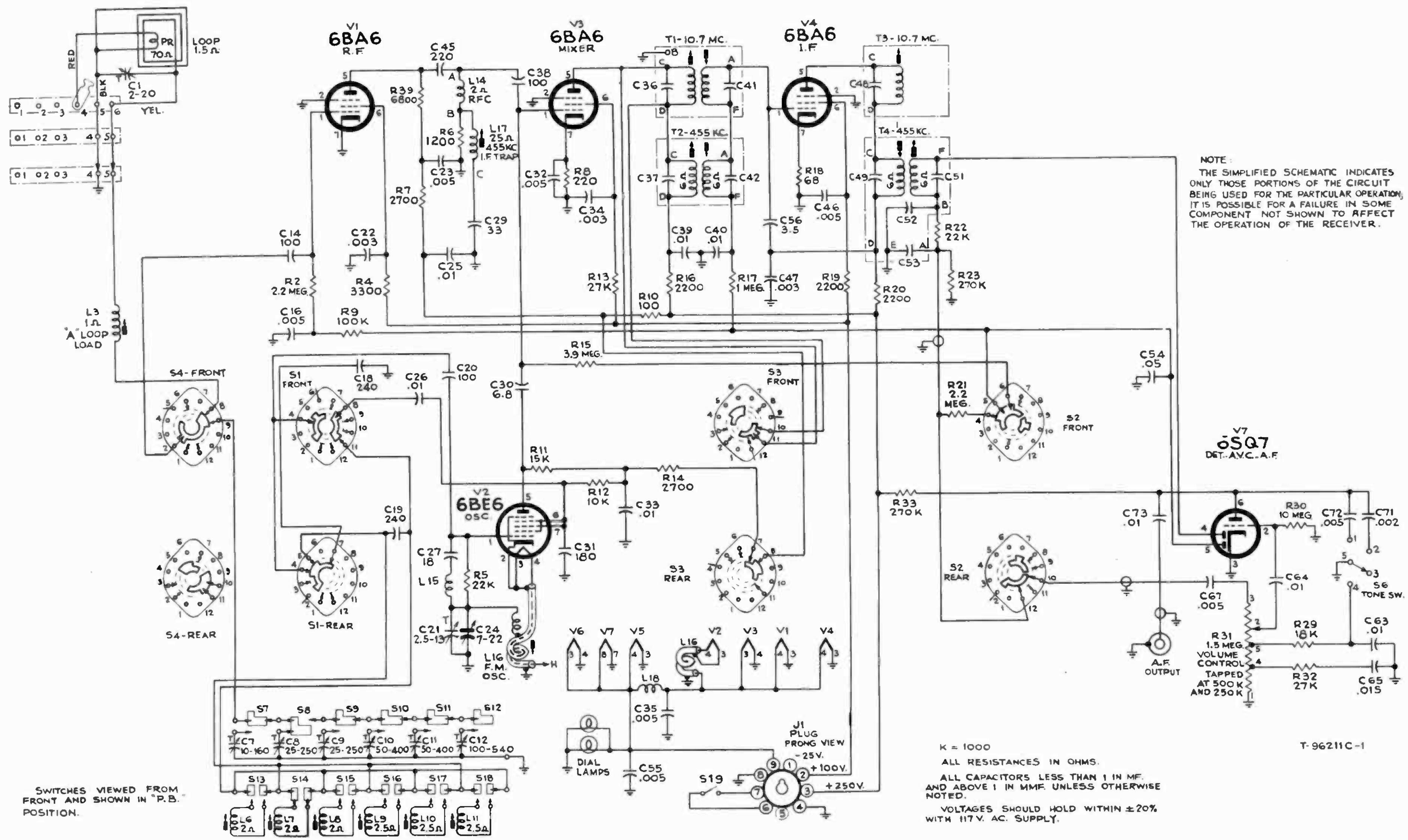
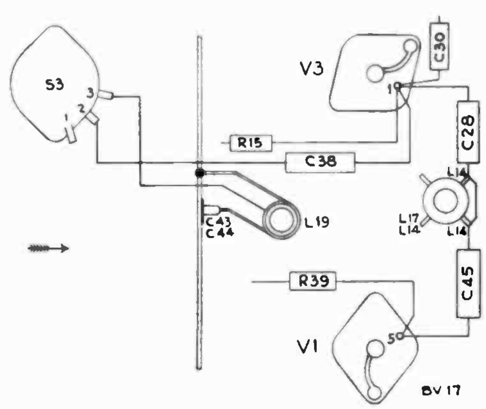


Figure 13—Simplified Schematic Shown in "Push-Button" Position Only. (See Note above.)

NOTE: Antenna link closed for loop operation (see page 11 for external antenna connections).

Early models are connected as shown →



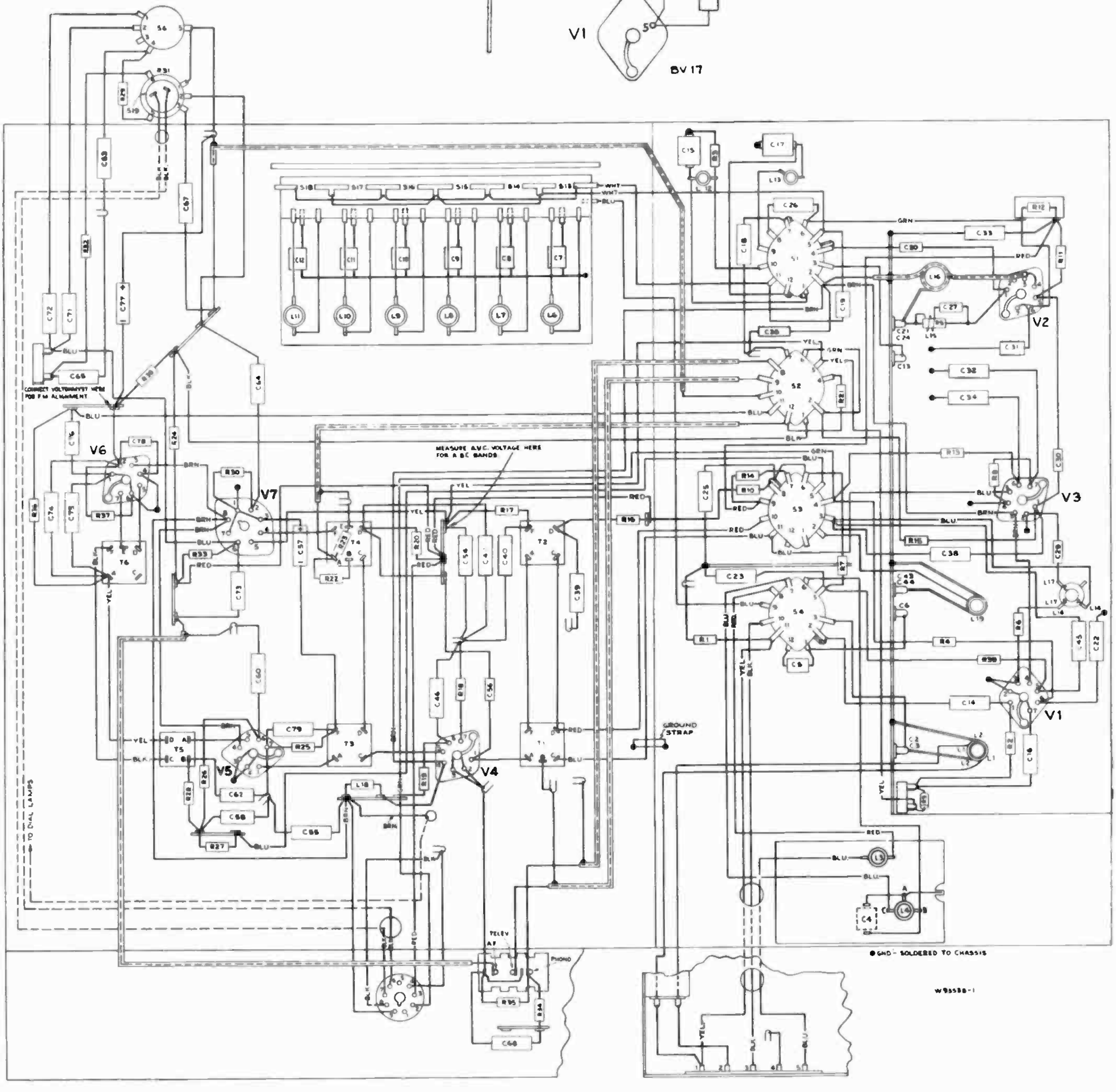


Figure 14—Radio Chassis Wiring Diagram

NOTE: In some instances the color coding of the wiring may be different.

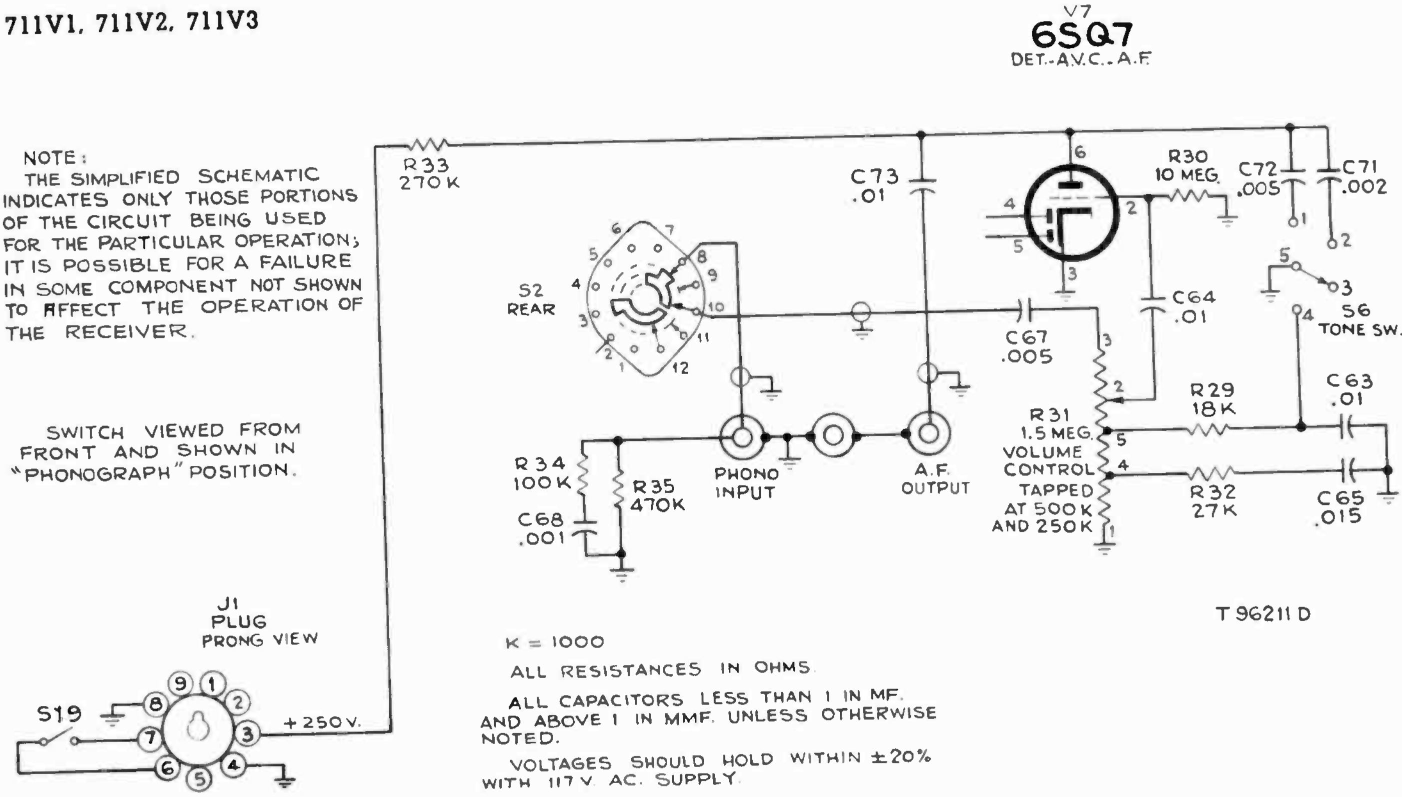


Figure 15—Schematic Shown for Phonograph Reproduction Only.

NOTE: Oscillator plate voltage is removed when the band switch is turned to the phono. or television position.

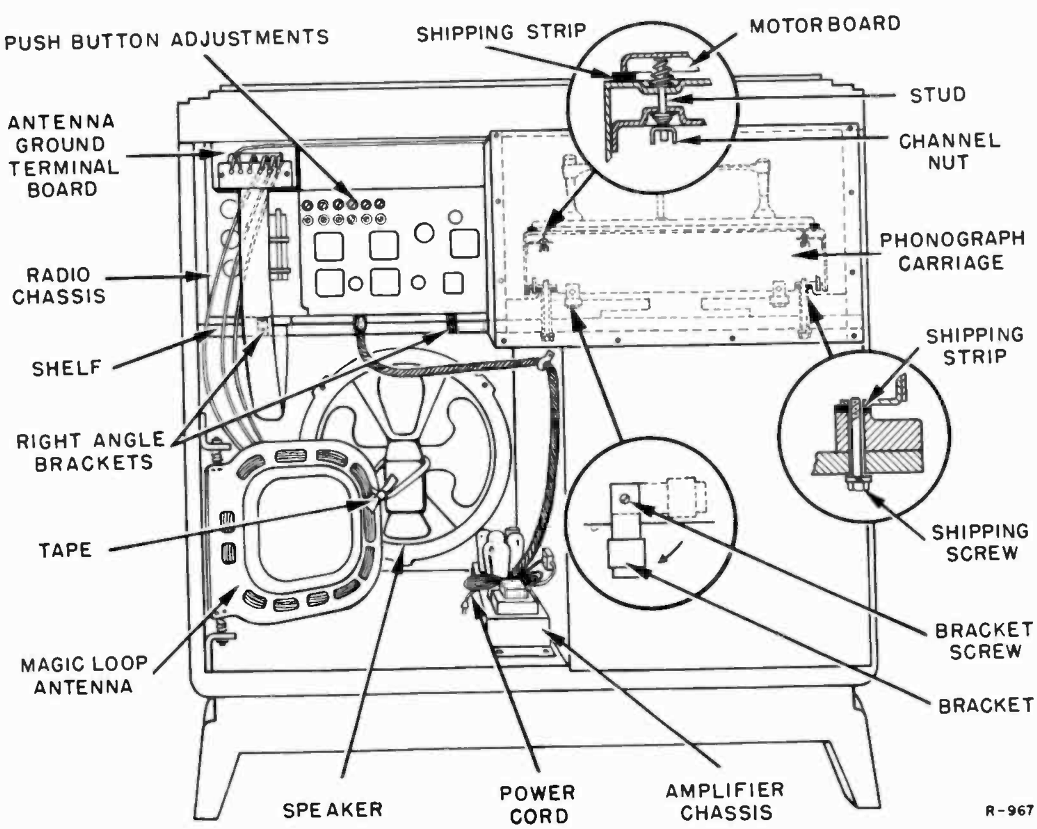


Figure 16—Back View of Cabinet

To remove chassis, remove knobs, loosen all interconnecting cables and remove screws holding right angle mounting brackets to metal mounting strips, then lower chassis.

To remove "Roll-out" loosen all interconnecting cables, turn bracket as indicated in circle in the above drawing, pull out through the front.

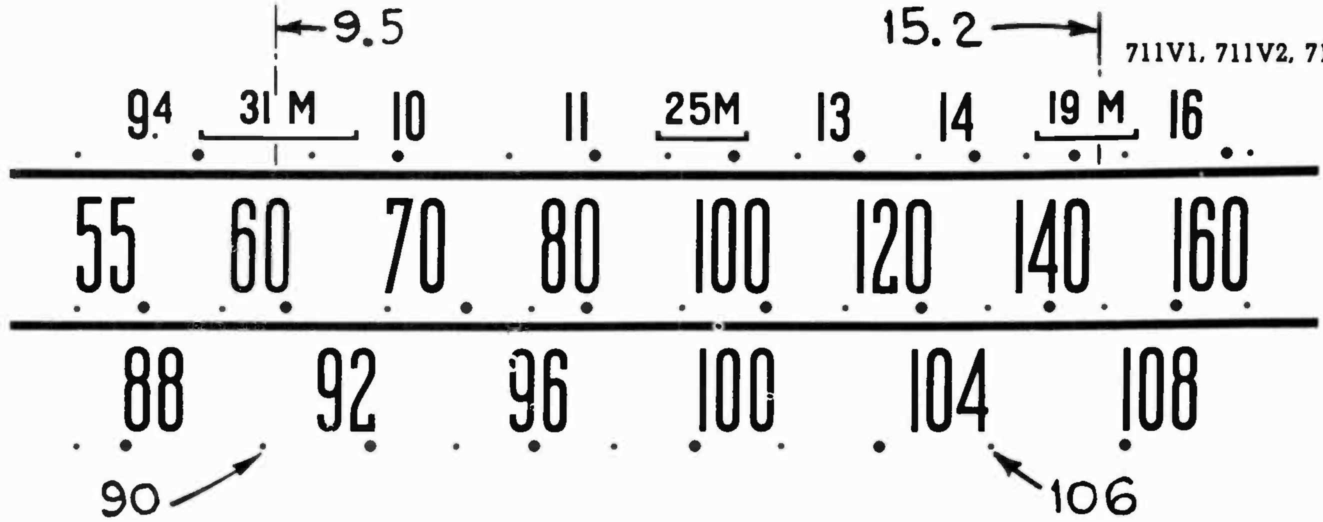


Figure 17

The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

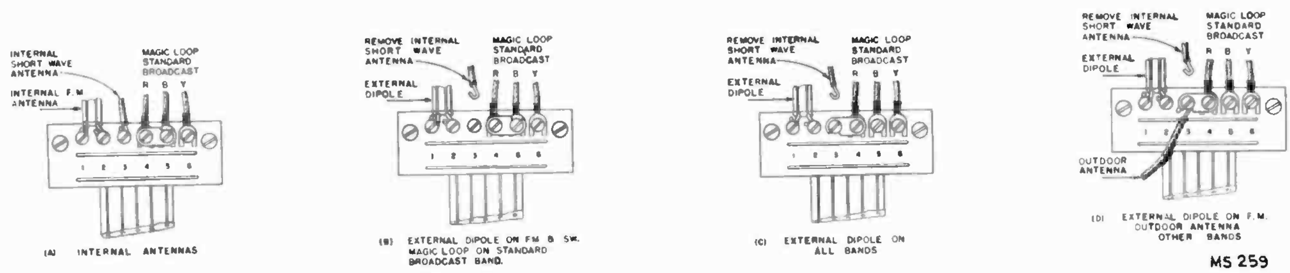


Figure 18—Antenna Terminal Board

External Antennas.—If reception is not satisfactory on one or more of the three bands, using the built-in cabinet antennas, an external antenna may be used. The Magic Loop Antenna will usually provide sufficient pickup on the Standard Broadcast band, but if an external dipole is installed to improve reception on Frequency Modulation it may be used for Standard Broadcast and Short Wave as well. Connections are made to the antenna terminal board in the back of the cabinet. External antennas may be erected indoors or outdoors and should be oriented in direction for best reception. RCA Television Antenna, Stock No. 225 or 226, or the equivalent with 300-ohm transmission line is recommended for an external antenna.

Figure 18 (A) shows the Antenna Terminal Board with connections for internal cabinet antennas.

Figure 18 (B) shows connections for the RCA Television Antenna replacing those for the internal FM antenna on terminals 1 and 2, and the internal SW antenna disconnected at terminal 3. The external dipole antenna is now the antenna for FM and SW bands.

Figure 18 (C) shows the additional change for connecting the Standard Broadcast band to make use of the external RCA Television Antenna. The link across terminals 4 and 5 is changed to terminals 4 and 3. The external antenna is now effective on all bands. Tighten terminals and be sure that the red, black and yellow leads (R.B.Y.) to terminals 4, 5 and 6 are still in place and securely connected.

Figure 18 (D) shows connections for a separate outdoor antenna on SW and SB reception, and the external dipole on FM. This outdoor antenna should consist of a wire 30 to 60 feet or so in length mounted in a convenient location as high as possible. Connect lead-in from the antenna to terminal 3 on the antenna terminal board. This outdoor antenna is effective on SB and SW bands. If this connection makes the SB signal too strong, causing overload and distortion, replace the link across terminals 4 and 5 as in Figure 18 (A) and (B). This outdoor antenna is now effective on SW only.

Replacement Parts

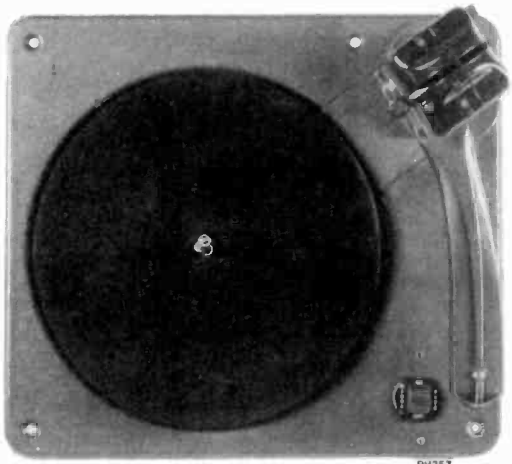
STOCK No.	DESCRIPTION
	HEAD END UNIT #2 RK 117
71638	Board—5 contact terminal board for antenna lead-in
72047	Capacitor—Mica trimmer, 1.6-18 mmf. (C3, C44)
72046	Capacitor—Adjustable, 2.5-13 mmf. (C21)
72790	Capacitor—Ceramic, 3.5 mmf. (C56)
72037	Capacitor—Mica trimmer, 3-35 mmf. (C15, C17)
39043	Capacitor—Ceramic, 6.8 mmf. (C30)
71807	Capicitor—Adjustable, 10-160 mmf. (C4)
33111	Capacitor—Ceramic, 33 mmf. (C29)
39396	Capacitor—Ceramic, 100 mmf. (C14, C20, C38)
71933	Capacitor—Mica, 180 mmf. (C31)
71920	Capacitor—Ceramic, 220 mmf. (C28, C45)
72789	Capacitor—Mica, 240 mmf. (C18, C19)
72793	Capacitor—Mica, 330 mmf. (C5)
71929	Capacitor—Ceramic, 1000 mmf. (C78)
72049	Capacitor—Mica trimmer, comprising 1 section of 100-540 mmf., 2 sections of 50-400 mmf., 2 sections of 25-250 mmf. and 1 section of 10-160 mmf. (C7, C8, C9, C10, C11, C12)
72792	Capacitor—Tubular, .001 mfd., 200 volts (C68)
71927	Capacitor—Tubular, .002 mfd., 400 volts (C71)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C22, C34)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C47)
71926	Capacitor—Tubular .005 mfd., 200 volts (C16, C32, C35, C46, C67, C74, C75, C76, C79)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C23, C58, C60, C62)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C72)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C65)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C40, C63, C64)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C25, C26, C33, C39, C73)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C54)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C57, C77)
72595	Coil—Loop loading coil—"A" band (L3)
71856	Coil—Antenna coil—"C" band (L4, L5)
72044	Coil—Antenna coil—FM (L1, L2)
71852	Coil—Oscillator coil—"A" band (L12)
71853	Coil—Oscillator coil—"C" band (L13)
71937	Coil—Oscillator coil—FM (L16)
71942	Coil—Filament choke coil (L18)
72050	Coil—P.B. coil—high frequency (L6, L7, L8)
72051	Coil—P.B. coil—low frequency (L9, L10, L11)
72045	Coil—R-F coil—FM (L19)
71407	Coil—Wave trap coil (L14, L17)
72038	Condenser—Variable tuning condenser (C2, C6, C13, C24, C43)
72034	Control—Volume control, tone control and power switch (R31, S6, S19)
32634	Cord—Indicator drive cord (approx. 35" overall length) NOTE: Before assembling, stretch to full length
32634	Cord—Manual drive cord (approx. 19" overall length) NOTE: Before assembling, stretch to full length
71941	Coupling—FM coupling unit (R5, C27, L15)
72043	Drum—Drive drum
72040	Gear—36 teeth gear

711V1, 711V2, 711V3 Replacement Parts—Continued

STOCK No.	DESCRIPTION
72042	Gear—Sleeve gear, 32 teeth
70930	Grommet—Rubber grommet for mounting R-F shelf (4 required)
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
72036	Indicator—Station selector indicator
11765	Lamp—Dial lamp, Mazda #51
72035	Plate—Dial back plate
72602	Pulley—Drive cord pulley
71637	Receptacle—A-F television and phono terminal board
71636	Receptacle—9 prong male receptacle for interconnecting cable (J1)
34763	Resistor—68 ohms, ½ watt (R18)
34765	Resistor—100 ohms, ½ watt (R10)
5201	Resistor—220 ohms, ½ watt (R8)
12262	Resistor—680 ohms, ½ watt (R27, R28)
30731	Resistor—1200 ohms, ½ watt (R6)
34767	Resistor—2200 ohms, ½ watt (R16, R19, R20)
30730	Resistor—2700 ohms, ½ watt (R7, R14)
30733	Resistor—3300 ohms, ½ watt (R4)
38887	Resistor—6800 ohms, 1 watt (R39)
14250	Resistor—8200 ohms, ½ watt (R3)
71914	Resistor—10,000 ohms, 1 watt (R12)
36714	Resistor—15,000 ohms, ½ watt (R36)
71915	Resistor—15,000 ohms, 1 watt (R11)
3219	Resistor—18,000 ohms, ½ watt (R29)
30492	Resistor—22,000 ohms, ½ watt (R22, R37)
30409	Resistor—27,000 ohms, ½ watt (R13, R32)
71990	Resistor—27,000 ohms, 1 watt (R26)
30685	Resistor—33,000 ohms, ½ watt (R25)
3252	Resistor—100,000 ohms, ½ watt (R9, R34)
30651	Resistor—270,000 ohms, ½ watt (R23, R33)
30648	Resistor—470,000 ohms, ½ watt (R35)
30652	Resistor—1 megohm, ½ watt (R1, R17)
30649	Resistor—2.2 megohms, ½ watt (R2, R21, R38)
70249	Resistor—3.9 megohms, ½ watt (R15)
30992	Resistor—10 megohms, ½ watt (R30)
71917	Resistor—22 megohms, ½ watt (R24)
14343	Retainer—Tuning shaft retainer
31611	Screw—#8-32 x ¼" milled head set screw for gear (RCA #72040)
72041	Shaft—Tuning shaft
31364	Socket—Lamp socket
72516	Socket—Tube socket, miniature
31251	Socket—Tube socket, octal
72821	Spring—Anti-noise spring (hook) for tuning condenser shaft
31418	Spring—Indicator cord tension spring or drive cord tension spring
72031	Support—Dial support and bracket complete with pulley —L.H.
72030	Support—Dial support and bracket complete with pulley —R.H.
72048	Switch—P.B. selector switch only (S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S18)
72039	Switch—Range switch (S1, S2, S3, S4)
72593	Transformer—First I-F transformer, FM (T1, C36, C41)
71846	Transformer—First I-F transformer, AM (T2, C37, C42)
72594	Transformer—Second I-F transformer, FM (T3, C48, C50)
71848	Transformer—Second I-F transformer, AM (T4, C49, C51, C52, C53)
71935	Transformer—Driver transformer (T5, C61)
71934	Transformer—Ratio detector transformer (T6, C66, C70)
	POWER SUPPLY ASSEMBLIES RS 123
70646	Capacitor—Tubular, .0035 mfd, 1000 volts (C5, C6)
70632	Capacitor—Tubular, .02 mfd, 600 volts (C3, C4)
72596	Capacitor—Tubular, .05 mfd, 200 volts (C7)
31323	Capacitor—Electrolytic, 16 mfd, 150 volts (C2)
72955	Capacitor—Electrolytic, comprising 1 section of 30 mfd, 450 volts, 1 section of 50 mfd, 400 volts, and 1 section of 40 mfd, 25 volts (C1A, C1B, C1C)
18469	Insulator—Mounting insulator for electrolytic
11765	Lamp—Pilot lamp, Mazda #51
12493	Plug—Speaker cable plug
30730	Resistor—2700 ohms, ½ watt (R3)
30492	Resistor—22,000 ohms, ½ watt (R4)
30409	Resistor—27,000 ohms, ½ watt (R5)
30650	Resistor—56,000 ohms, ½ watt (R2)
14583	Resistor—220,000 ohms, ½ watt (R6, R7)
71660	Resistor—Comprising 1 section of 180 ohms, 3.5 watts, 1 section of 2520 ohms, 3.97 watts, and 1 section of 2760 ohms, 9.3 watts (R1A, R1B, R1C)
71659	Socket—9 prong power socket (J1)
35787	Socket—Audio input socket (J2)
31364	Socket—Pilot lamp socket
31319	Socket—Tube socket
37048	Transformer—Power transformer, 117 volts, 50/60 cycle (T1)
71661	Transformer—Output transformer (T2)
	SPEAKER ASSEMBLIES 92567-2W RL 70R1
13867	Cap—Dust cap
71147	Clamp—Clamp to hold metal cone suspension (2 required)
71146	Coil—Field coil, 1060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
31539	Plug—5 prong male plug for speaker
71144	Speaker—12" E.M. speaker complete with cone and voice coil less plug
71145	Suspension—Metal cone suspension

STOCK No.	DESCRIPTION
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
72555	Antenna—Dipole antenna
72681	Back—Cabinet back—mahogany for 711V2
73079	Back—Cabinet back—mahogany for 711V1 and 711V3
72680	Back—Cabinet back—walnut and brown mahogany for 711V2
70168	Back—Cabinet back—walnut for 711V1 and 711V3
72146	Bezel—Push button bezel
71819	Bracket—Door check mounting bracket
71599	Bracket—Pilot lamp cap bracket
72908	Bumper—Rubber bumper for record changer carriage (2 required)—711V1 and 711V3
70556	Bumper—Rubber bumper for record changer carriage (2 required)—for 711V2
72151	Button—Push button
73250	Cable—5 conductor moulded antenna lead-in cable
72445	Cable—Shielded audio cable complete with two pin plugs
72583	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp cap
38684	Capacitor—Mica trimmer, 2-20 mmf (C1)
72925	Carriage—Record changer carriage only, less rollers—for 711V1 and 711V3 only
70553	Carriage—Record changer carriage only, less rollers—711V2 only
71892	Catch—Door catch and strike
72434	Check—Radio compartment door check
72157	Clip—Push button bezel spring clip
X1669	Cloth—Grille cloth—for 711V1 and 711V3
X1635	Cloth—Grille cloth for mahogany instruments—711V2
X1634	Cloth—Grille cloth for walnut instruments—711V2
72695	Decal—Volume control and tone control function decal
72696	Decal—Tuning and range switch function decal
71910	Decal—Trade mark decal (RCA Victor)—711V1 and 711V3
71984	Decal—Trade mark decal (RCA Victor)—711V2
71966	Decal—Trade mark decal (Victrola)
72707	Dial—Glass dial scale
72158	Escutcheon—Dial escutcheon less dial
73085	Grille—Metal grille for 711V1
72690	Grille—Metal grille for 711V2
73087	Grille—Metal grille for 711V3
11889	Grommet—Rubber grommet to cushion chassis front apron
72442	Guide—Carriage guide—L.H.
72441	Guide—Carriage guide—R.H.
36610	Hinge—Speaker compartment door hinge (1 set)—R.H.—for 711V3
36817	Hinge—Record storage compartment door hinge
72692	Hinge—Record changer compartment or radio compartment hinge (2 required)—for 711V2
71945	Hinge—Record changer compartment or radio compartment door hinge—for 711V1 and 711V3
72147	Knob—Range switch knob
72148	Knob—Tone control knob
72149	Knob—Tuning knob
72150	Knob—Volume control and power switch knob
71862	Loop—Antenna loop complete
72563	Marker—Call letter markers
70546	Mounting—One set of record changer mounting hardware consisting of four upper springs, four bottom springs and four clamp nuts
31048	Plug—Pin plug for shielded pickup cable or audio cable
30868	Plug—2 contact female plug for extension power cable or for interconnecting cable
36422	Plug—3 contact female plug for loop leads
71967	Plug—9 contact female plug for interconnecting cable
30870	Plug—2 prong male plug for extension power cable
32641	Plug—3 prong male plug for loop cable
71968	Plug—9 prong male plug for interconnecting cable
73086	Pull—Door pull for record changer compartment and radio compartment doors—for 711V1 and 711V3
72807	Pull—Record storage compartment door pull—for 711V1 and 711V3
72694	Pull—Record storage compartment door pull—for 711V2
72693	Pull—Upper door pull for 711V2
73034	Pull—Speaker compartment door pull—for 711V3
70551	Retainer—Tray roller retainer strip—L.H.
70552	Retainer—Tray roller retainer strip—R.H.
70554	Roller—Record changer tray roller
72581	Spring—Door check spring
72156	Spring—Push button bezel spring
72845	Spring—Retaining spring for knob #72147
14270	Spring—Retaining spring for knob #72148
34053	Spring—Retaining spring for button #72151
30900	Spring—Retaining spring for knob #72149
30330	Spring—Retaining spring for knob #72150
72582	Stop—Mechanism stop
72706	Stop—Rubber stop for radio compartment door
72691	Support—Drop support for record changer compartment door
70545	Support—Loop support complete with mounting brackets and spring (2 required)
70555	Tire—Rubber tire for tray rollers
2917	Washer—"C" washer to fasten rollers

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS


PH257

RCA VICTOR

Model 960276

Automatic Record Changer

Mfr. No. 274

SERVICE DATA

— 1947 No. 14 —

RADIO CORPORATION OF AMERICA

RCA VICTOR DIVISION

CAMDEN, N. J., U. S. A.

Index

Features

1. This mechanism is designed to play automatically a series of twelve 10-inch or ten 12-inch standard records of the 78 r.p.m. type.
2. It will play manually records up to 12 inches in diameter.
3. Tripping system is of "constant diameter" type, insuring reliable automatic operation on all records made to RMA proposed standards.
4. It is a simple operation of turning one record support to change from 10- to 12-inch records or vice versa.
5. Cycling mechanism is disconnected completely while records are being played. This reduces the load on the drive motor, thereby reducing the tendency for "wow" or rumble.

Manual Operation

1. Rotate the record separator shelf clockwise for 10-inch or counterclockwise for 12-inch position (numerals 10 or 12 pointing towards center post).
2. Place the record to be played on the turntable and turn the power switch on.
3. Move the control knob to manual and to the on position.
4. Press down firmly but momentarily on the end of the tone arm and let go. The pickup will land automatically on the start of the record. When the selection is completed the pickup will ride the eccentric groove until the pickup is placed on the rest manually.
5. Turn power switch off manually.
6. Remove the record by raising straight up without tilting.

Automatic Operation

1. With the power switch in the off position rotate the record support shelf as required for 10- or 12-inch records until the record size indicated on the support cover is pointing toward the center post. **(ROTATE ONLY CLOCKWISE FOR 10-INCH AND COUNTERCLOCKWISE FOR 12-INCH RECORDS.)**
2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clip on top of the record stack.
3. Push the control knob to automatic and to the on position.
4. Press down firmly but momentarily on the end of the tone arm and let go. The changer will continue to play one side of each record of the entire stack automatically.
   The tone arm can be moved to the rest position any time the mechanism is not in cycle.
5. Turn the power switch off and remove the stack from the turntable by placing fingers of both hands directly opposite and under the stack. Then lift straight up—"don't tilt" or squeeze stack. Turning the support shelf one-fourth turn facilitates removal of records.

Cautions

1. Avoid handling the tone arm or rotating record support assembly while mechanism is in cycle.
2. Never turn the power switch off, leaving the mechanism in cycle for an extended period of time.
3. Do not allow the records to remain on supports when not in use.
4. Do not allow oil or grease to come in contact with any rubber parts.
5. Do not install instrument near source of heat. Excessive heat may damage the pickup cartridge.

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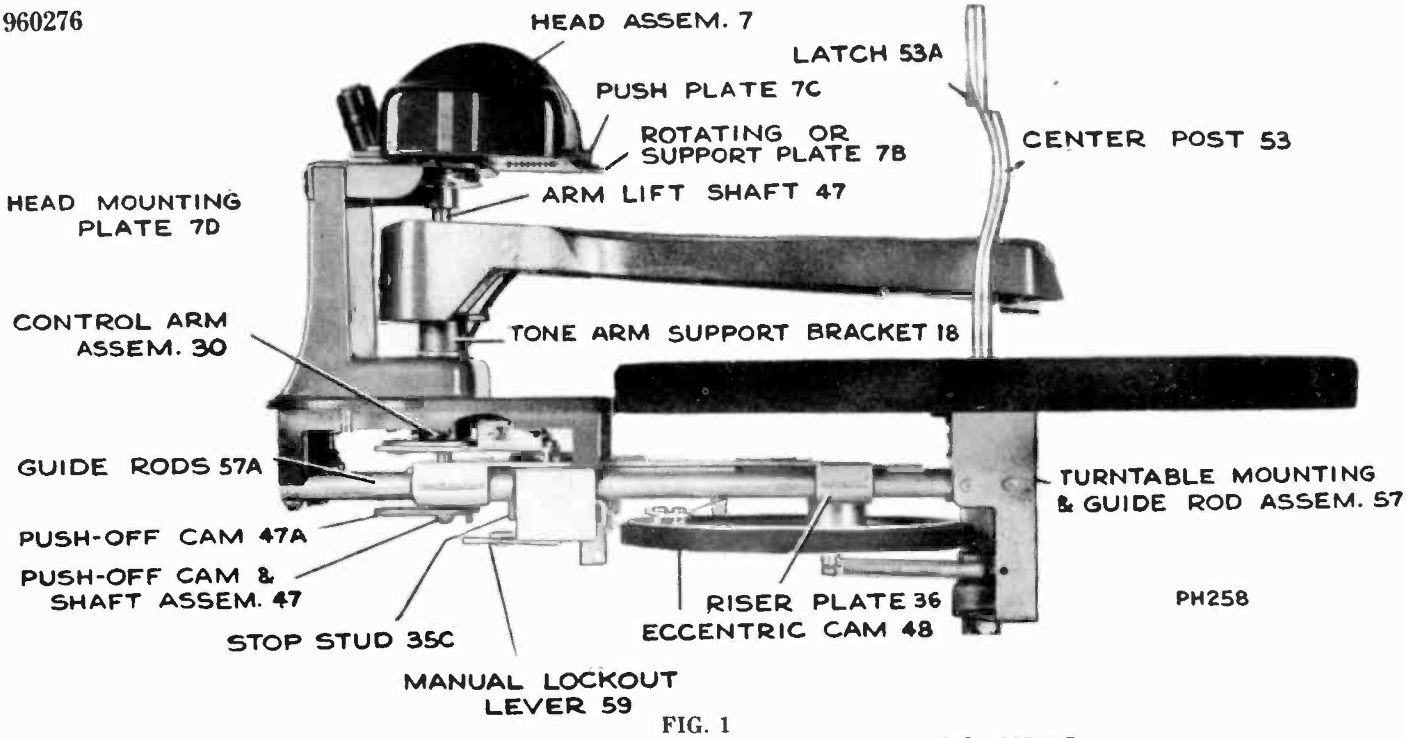

FIG. 1

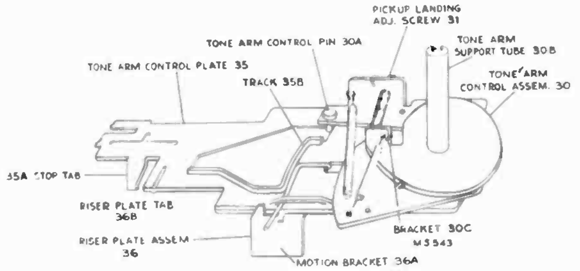

FIG. 2

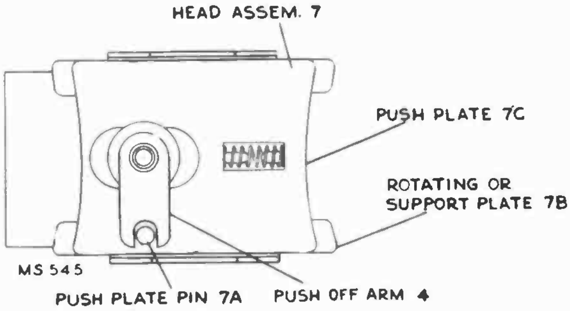

FIG. 4

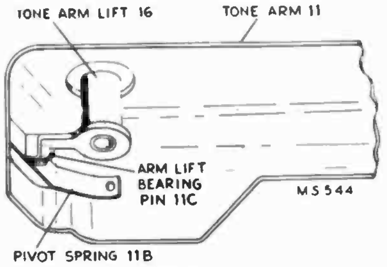

FIG. 3

FUNCTIONS OF PRINCIPAL PARTS

Head Assembly—7, 7A, 7B, 7C
Supports outer edge of record stack and pushes the record off notch in center post and allows it to drop to the turntable while the mechanism is going through cycle.

Center Post—53
Supports the entire stack of records, and together with the offset notch and latch in the center post, provides a means for separating records.

Tone Arm Lift Assembly—16
Couples tone arm to riser plate 36 through arm lift shaft 47, thereby transferring the action for the vertical motion of the tone arm during change cycle.

Arm Control Assembly—30
Provides a tie between tube 30B, bracket 30C and tone arm support bracket 18, thereby directing the horizontal movement of the tone arm during change cycle. Arm control pin 30A slides along track in arm control plate 35, and in so doing, determines the point of landing of the pickup and the point of trip of the mechanism. It also incorporates landing adjusting screw 31.

Arm Control Plate Assembly 35, 35A, 35B, 35C
Incorporates a track 35B which controls the pickup landing and the tripping of the mechanism.
Stop tab 35A functions as portion of the tripping device, stud 35C, contacting push-off cam 47A controls, the point of landing for both 10- and 12-inch records.

Riser Plate Assembly—36, 36A, 36B, 36C
Provides mounting for eccentric cam 48, and incorporates an inclined track 36C, which controls the vertical movement of the tone arm.
Riser plate tab 36B pushes against curved portion of cam on arm control assembly 30, providing a control for the horizontal movement of tone arm during change cycle.
Riser plate bracket 36A contacting push-off cam 47A provides the necessary motion for push plate 7C.

Eccentric Cam—48
Transfers motion from turntable to riser plate 36 while cycling.

Push-Off Cam and Shaft Assembly—47, 47A
Provides a means of mechanically coupling tone arm lift 16 and push plate 7 assemblies to main cycling mechanism. Cam 47A contacting stud 35C controls the position of arm control plate while in cycle, which determines the landing point of the pickup on 10- or 12-inch records.

Turntable Mounting and Guide Rod Assembly—57, 57A
Incorporates the main bearings for the turntable and provides a mounting for guide rods 57A.

Manual Lockout Lever—59
Consists of a small lever which forms a stop for stud 35C. This prevents arm control plate 35 from moving forward and disengaging stop catch 45 when the mechanism is operated in the manual position.

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ADJUSTMENTS

Tone Arm Adjustment
The tone arm height should be so adjusted as to permit the sapphire to engage and ride in the grooves of one record placed on the turntable, but at the same time prevent the tone arm from touching the records on the supports while the mechanism is going through cycle, fig. 5.

1. With the mechanism out of cycle, lift tone arm and check, and make certain tone arm lift 16 engages pin 11C as shown in fig. 6.
2. With the pickup near the edge of the record, loosen the set screw, holding collar 10, fig. 9, and moving it up or down on shaft 47, so as to have the conditions indicated in sketch, fig. 5.

Preliminary Landing Adjustments
An accessible landing adjustment screw 31 is provided, but if for any reason the tone arm support bracket has become loose or removed, proceed as follows:

1. With the mechanism out of cycle turn adjustment screw 31, fig. 8, clockwise as far as it will go, then turn counterclockwise two or three full turns.
2. Set head assembly for 12-inch position; place a 12-inch record on turntable.
3. Press down on the reject button and rotate the turntable by hand, causing the mechanism to cycle until the pickup is about to land on the record. In this position, the arm control pin 30A is in a position on track 35B as indicated by "s" and adjustment screw 31 remains against bracket 30C as indicated in fig. 8.
4. Loosen the two set screws holding the tone arm support bracket.
5. While holding this position, indicated in step 2, place the sapphire in the starting groove of the record and tighten the two set screws in the tone arm support bracket.

Final Landing Adjustment
The exact landing adjustment can be made by pressing the reject button and rotating the turntable by hand until the pickup is about to land. Then turn adjustment screw 31, fig. 8, until the sapphire is directly above the starting groove of the record. If the mechanism continues to land incorrectly after this adjustment has been made, compensate the difference by turning the screw 31 slightly. Turning screw counter-clockwise will move the landing towards the center post.

Positioning Push-Off Arm

1. With the mechanism out of cycle, turn the push-off cam 47A so that its arm makes a 90° angle with the slide bars as shown in fig. 10. Make certain the large radius side of cam is toward the stud 35C when the support post is in the 12-inch position.
2. Place push-off arm 4 over push-off cam shaft 47, and engage push-off plate pin 7A near the top edge, fig. 7. Tighten set screws.
3. Press down on reject button and rotate the turntable slowly by hand, making certain push plate does not reach its limit before riser plate motion bracket has reached the end of its outward travel. If the push plate should reach its limit, deviate slightly from the 90° angle but make certain that the mechanism operates satisfactorily on both 10" and 12" records.
4. Check this for 10- and 12-inch setting.

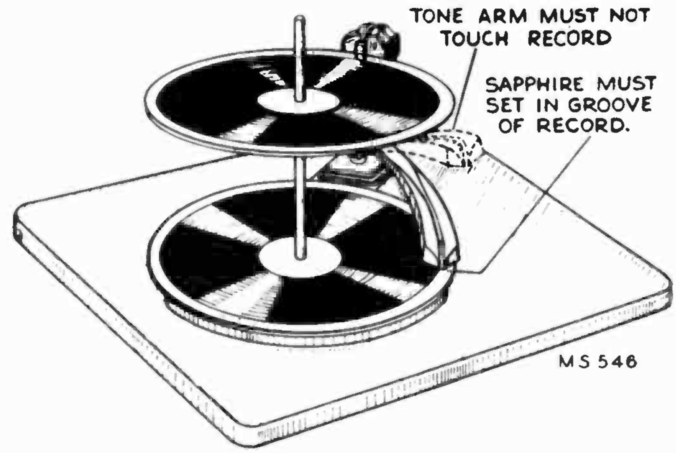

FIG. 5

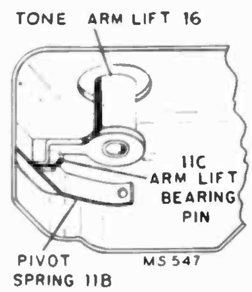

FIG. 6

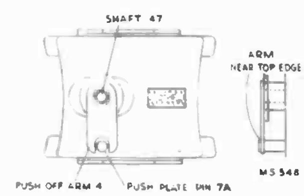

FIG. 7

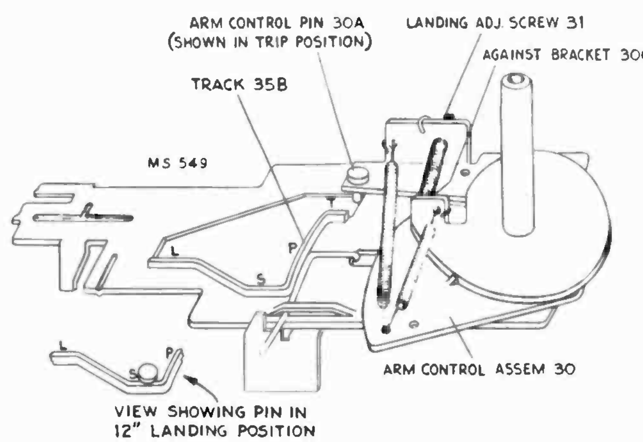

FIG. 8

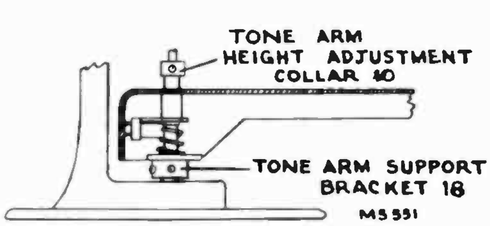

FIG. 9

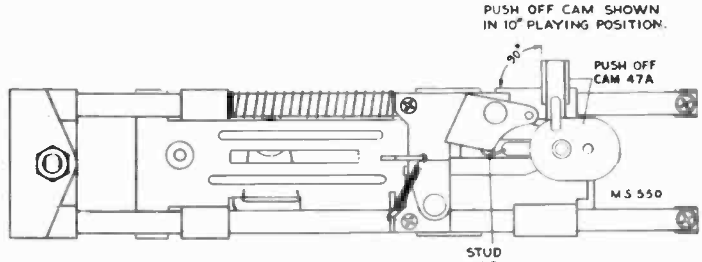

FIG. 10

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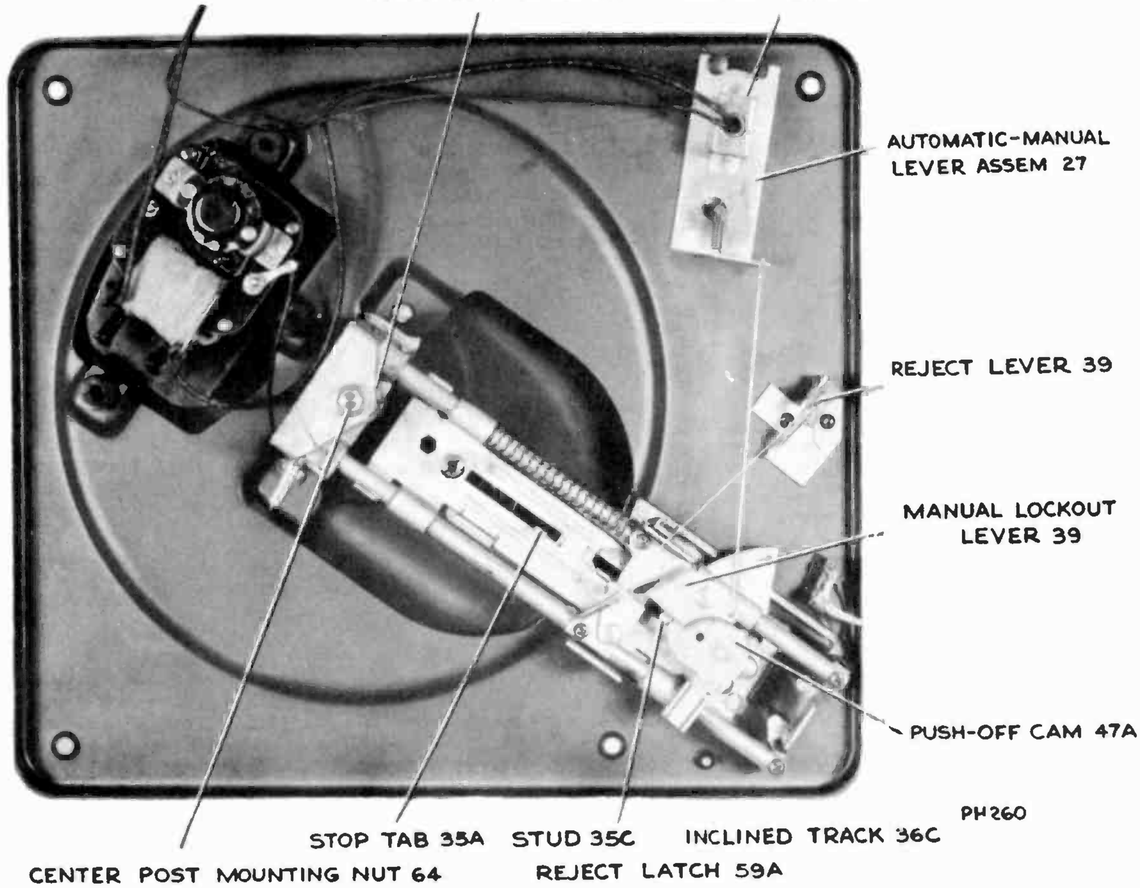


FIG. 11

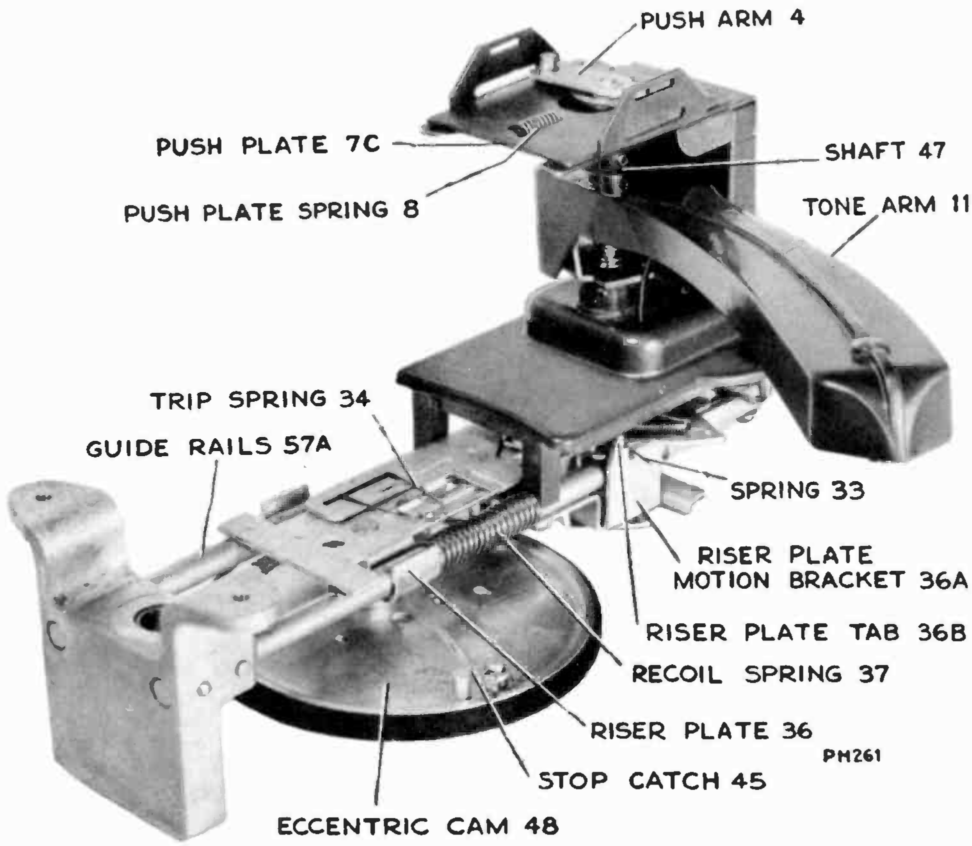


FIG. 12

CYCLE OF OPERATION

Turn record support to 10- or 12-inch position as desired and place a stack of records on supports.	1. Turning the record support positions the push-off cam 47A through the linkage of push-off arm 4 and push-off shaft 47. In so doing it determines the amount of movement of control plate 35 which in turn governs pickup landing.
Start-reject button.	1. Press down on tone arm; this actuates button on which it is resting. 2. Start-reject button actuates reject lever. 3. Reject lever transfers action to reject latch 59A through coupling wire 42. 4. The unlatching of reject latch allows eccentric cam 48 to be pulled against rotating knurled roller 61 which starts cycle.
Record plays.	1. While the record is being played and the tone arm moves towards the center of the record, the arm control pin 30A on arm control assembly 30 moves along track 35B as designated by "P," fig. 13. 2. As pickup moves into trip groove on record, tone arm control pin 30A moves into recess in control plate 35 at point indicated by "T," fig. 13. 3. Trip spring 34 pulls arm control plate 35 towards center post 53, and in so doing allows stop tab 35A on arm control plate 35 to disengage stop catch 45 on eccentric arm 48. **(In manual operation the manual lockout lever holds stud 35C thereby preventing arm control plate from moving forward and starting cycle.)**
Cycling starts.	1. Spring 49 pulls eccentric cam 48, causing rubber tire 48A to engage rotating knurled roller 61. 2. Eccentric cam 48 mounted on riser plate forces the riser plate assembly back along the guide rails 57A away from center post 53. 3. As riser plate moves, the push-off cam and shaft assembly 47 rides along the inclined track 36C of the riser plate 36. 4. This action results in the push-off cam and shaft assembly 47 being pulled down.
Tone arm raises and moves out.	1. The tone arm lift 16 sliding on shaft 47 is pulled downward, contacting lift bearing pin 11C, and causing tone arm to raise and clear record. 2. The riser plate tab 36B contacting curved portion of arm control assembly 30, which is coupled to tone arm support bracket assembly, causes the tone arm to be moved outward away from, and clear of the edge of the records. Arm control plate is also being carried along by tab 36B contacting spring 33.
Record is separated and drops to turntable.	1. As riser plate 36 continues to travel further along guide rods 57A, the riser plate motion bracket 36A contacts and rotates the push-off cam and shaft assembly 47. 2. Push-off arm 3, being coupled to push-off cam and shaft assembly 47, is rotated, causing push plate 7C to push record off of projection on center-post and dropping it to the turntable. Note: The small separator latch in the end of the center post functions as a thickness gauge, allowing only one record to be pushed off the projection at one time.
Tone arm is returned and is positioned for landing.	1. As eccentric cam 48 is returning to minimum diameter (out of cycle position), riser plate is being pushed back to normal position by recoil spring 37. At the same time, the push plate spring 8 is pushing the push plate 7C and push-off arm 4 back to normal position. 2. The portion of arm control assembly mounting the control pin, and the control bracket 30C, are hinged on the plate forming part of assembly 30. Since the pin 30A has followed the track 35B and the curved portion of bracket 30C was forced out by motion of tab 36B, the tension of spring 26 is tending to pull them together as the riser plate is returning to normal position. The governing factor in determining how far the bracket will be pulled in, is the setting of the landing adjustment screw 31.
Pickup lands.	1. During part of the change cycle when riser plate is in the outermost position, and carrying arm control plate along by tab 36B contacting spring 33, the stud 35C is stopped by cam 47A. This acts as a gauge to determine the point of contact of pin 30A on arm control track 35B. This cam having two different radii will govern the distance arm control plate can travel since this is set when the record size change is made. If the smaller radius side of cam 47A is toward stud 35C, the arm control pin 30A will ride portion of track 35B designated by "L," causing the pickup to land on 10-inch records. On the other hand, if the larger radius portion of cam is toward the stud, the pin will ride along track designated by "S," which determines landing point on 12-inch records.

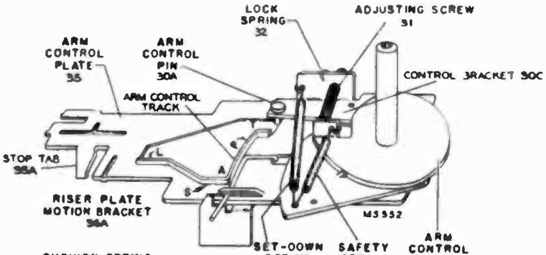


FIG. 13

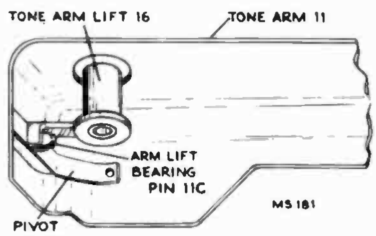
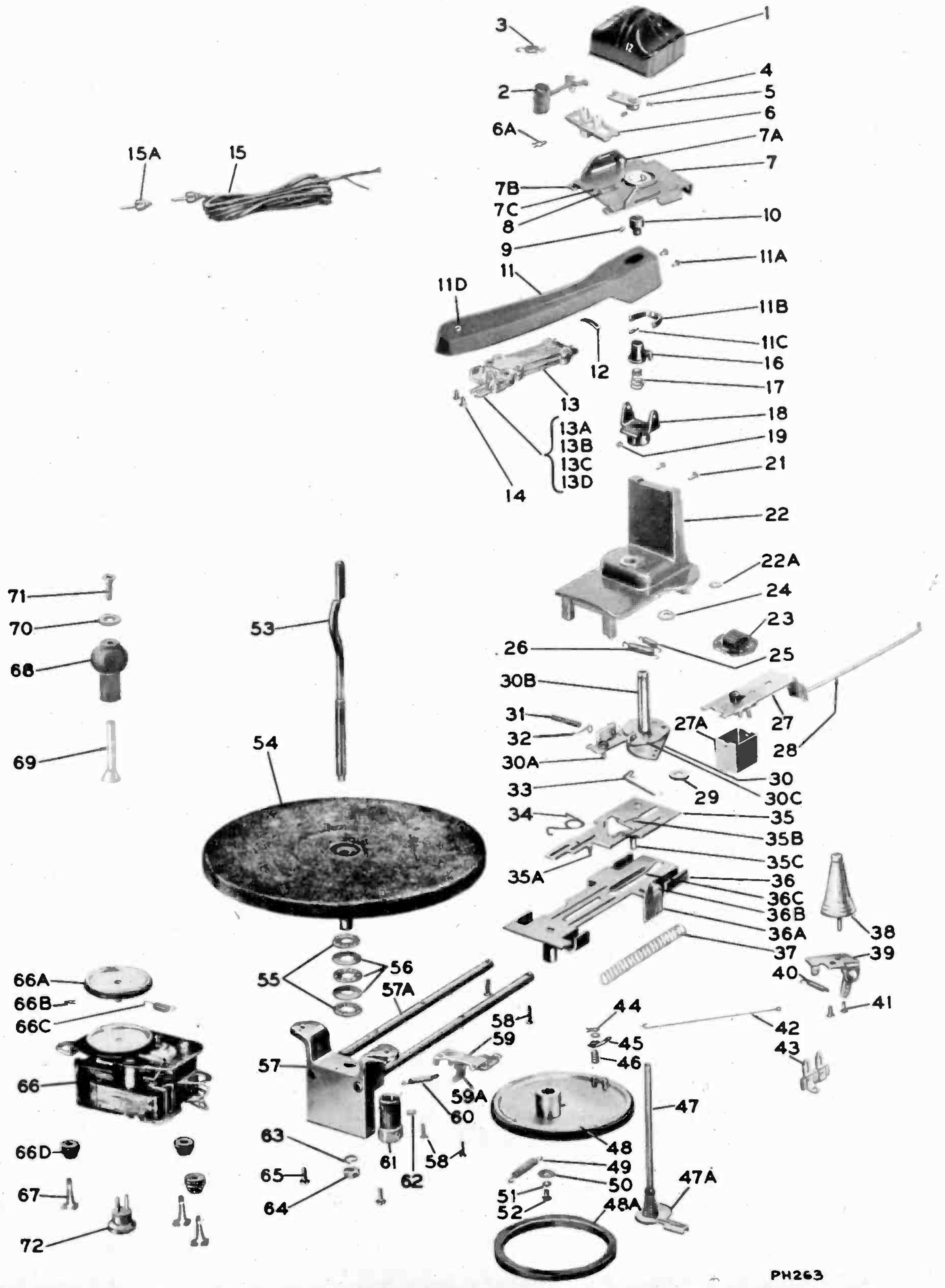


FIG. 14



PHOTOGRAPH OF PARTS

FIG. 15

Replacement Parts

STOCK No.	ILL. No.	DESCRIPTION
73338	1	Cover—
73337	2	Pad—Hold down pad and arm
71232	3	Spring—Hold down spring
72458	4	Arm—Push off arm
37458	5	Screw—#6-32 x ⅛" set screw
73339	6	Plate—Hold down plate
71177	6A	Spring—Hairpin spring
73340	7	Head—Head assembly including
———	7A	Push pin
———	7B	Rotating plate } Part of 7
———	7C	Push plate
71209	8	Spring—Push plate spring
71201	9	Screw—#6-32 x 3/16" Bristo head set screw
72461	10	Collar—Lift adjusting collar
73342	11	Arm—Pickup arm shell complete with
———	11A	—Arm mounting rivets
———	11B	—Pivot mounting spring } Part of 11
———	11C	—Lift stud
———	11D	—Plastic button
73190	11D	Button—Plastic button for pickup arm
71169	12	Clip-Pickup arm spring clip
70338	13	Crystal—Crystal cartridge complete with guard and sapphire
72345	13A	Sapphire—Sapphire and holder assembly
38452	13B	Guard—Sapphire guard
70341	13C	Nut—Mounting nut and washer for sapphire
37763	13D	Screw—#2-56 x ⅛" screw for sapphire guard
70912	14	Screw—#4-40 screw to mount crystal (2 required)
71240	15	Cable—Shielded pickup cable complete with pin plug
31048	15A	Plug—Pin plug for shielded cable
72462	16	Lift—Pickup arm lift
72463	17	Spring—Brake spring
72465	18	Support—Pickup arm support
———	†19	Screw—To mount pickup arm support (two required) one Allen or Bristo #6-32 x ⅛" cone point set screw one Allen or Bristo #6-32 x 3/16" blunt set screw
73341	21	Screw—#6 x 5/16" Phillips flat head type Z screw
73343	22	Base—Operating mechanism mounting base less all removable parts
73362	22A	Washer—Faston washer to mount mechanism base to motorboard
73356	23	Knob—Control knob
72466	24	Washer—Spring washer
72469	25	Spring—Safety spring
72470	26	Spring—Set down spring
32119	27	Switch—"On-Off" switch
———	†27A	Cover—Switch cover
73358	28	Trigger—Manual control trigger (wire)
71225	29	Washer—Spring washer
73344	30	Control—Arm control assembly including
———	30A	—Arm control pin
———	30B	—Arm control tube } Part of 30
———	30C	—Bracket
72472	31	Screw—Landing adjustment screw
73345	32	Spring—Set down adjustment lock spring
72474	33	Spring—Cushion spring
72475	34	Spring—Trip spring
73346	35	Control—Arm control plate including
———	35A	—Stop tab
———	35B	—Track } Part of 35
———	35C	—Size change stop
73347	36	Riser—Riser plate including
———	36A	—Motion bracket
———	36B	—Riser plate tab } Part of 36
———	36C	—Inclined track
71191	37	Spring—Recoil spring
73353	38	Rest—Pickup arm rest and start-reject button
73354	39	Lever—Reject lever
71228	40	Spring—Reject lever spring
———	†41	Screw—self tapping screws for mounting item 39
73355	42	Trigger—Reject trigger (wire)
———	43	Terminal—Terminal strip
71177	44	Spring—Hair pin spring
73352	45	Catch—Reject catch
72486	46	Spring—Reject catch support spring
72478	47	Cam—Push off cam including
———	47A	—Shaft (part of 47)
72479	48	Cam—Eccentric cam and tire
71198	48A	Tire—Rubber tire for eccentric cam
72480	49	Spring—Eccentric cam spring
———	†50	Washer—Washer used to mount eccentric cam (#8 washer approx. 9/16" O.D.)
———	†51	Washer—Lock washer (#8)
———	†52	Screw—Eccentric cam mounting screw (#8 x 32 x ¼" binder head)
71235	53	Centerpost—
73348	54	Turntable—
71239	55	Washer—One set of cork washers for turntable
71238	56	Bearing—Turntable thrust bearing (including 2 steel washers)
73349	57	Support—Turntable mounting support including guide rods
73350	58	Screw—#6 x ⅝" fillister head set screw to mount turntable support (4 required)
73351	59	Control—Reject manual control including
———	59A	—Arm (Part of 59)
71228	60	Spring—Reject arm spring
72926	61	Roller—Turntable shaft knurled roller
71200	62	Screw—#8-32 x ⅛" bristo head set screw to fastern knurled roller (2 required)
———	†63	Washer—lockwasher for mounting centerpost
71236	64	Nut—Hex nut for centerpost
———	†65	Screw—#8 R.H. ¼" screw to mount turntable support
71183	66	Motor—Motor (117 volt, 60 cycle) complete with drive idler, tension spring, mounting grommets, shaft bushing and mounting bracket—less power cord
71413	66A	Wheel—Drive idler wheel for motor stamped 407B9
71177	66B	Pin—Cotter pin (hairpin spring) for drive idler wheel
71414	66C	Spring—Drive idler wheel tension spring for motor stamped 407B9
71244	66D	Grommets—Motor mounting grommets
73359	67	Fastener—Snap fastener to mount motor (3 required)
73360	68	Grommet—Rubber grommet to mount record changer (4 required)
73361	69	Stud—Record changer mounting stud (4 required)
———	†70	Washer—#10 Flat washer (OD ½")
———	71	Screw—Phillips #10 x 32 x ½" flat head counter sunk screw used to connect shock mounts to motor board
30870	72	Plug—2 prong male AC plug

† These parts are not stocked.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS.

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CHANGER WILL NOT COMPLETE CYCLE

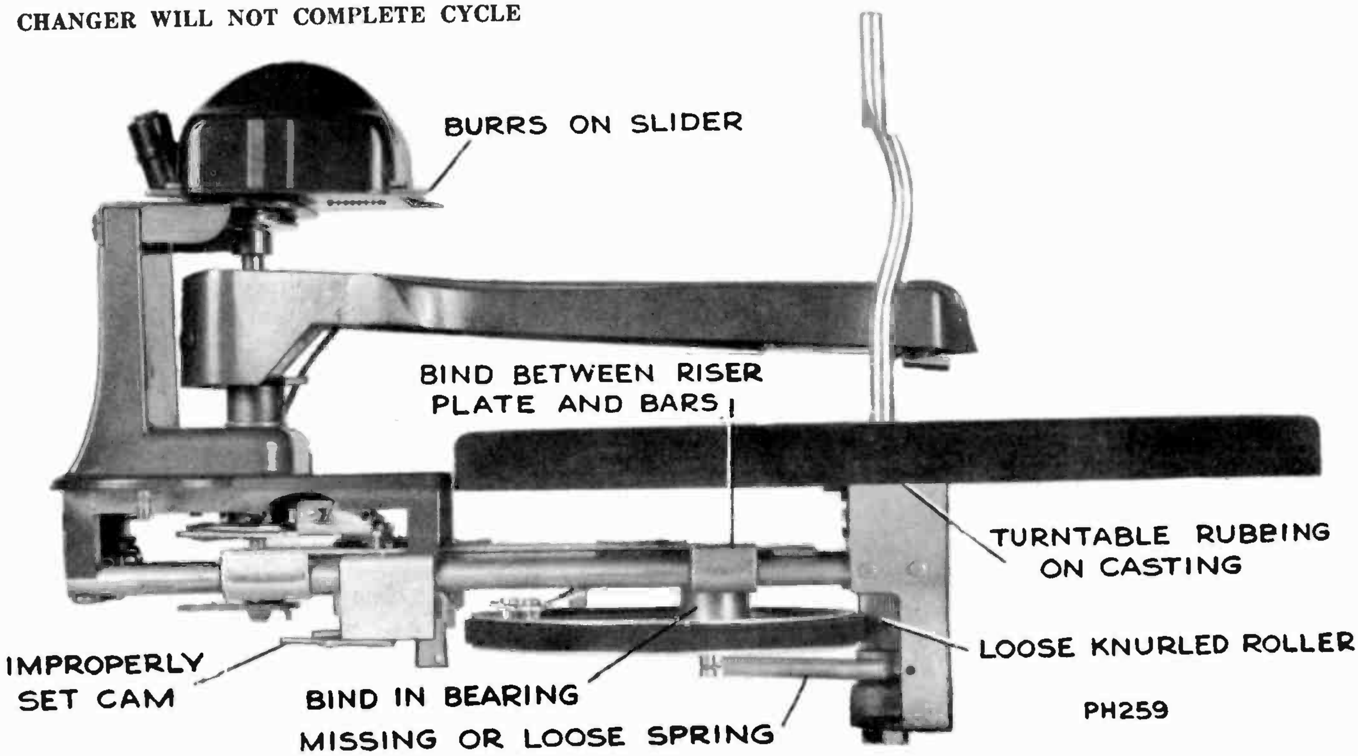

FIG. 16

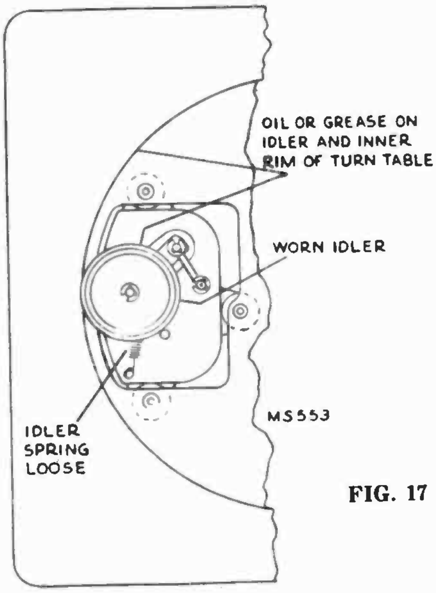

FIG. 17

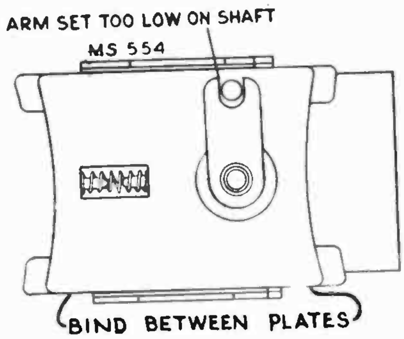

FIG. 18

RECORDS DO NOT SEPARATE OR DROP PROPERLY

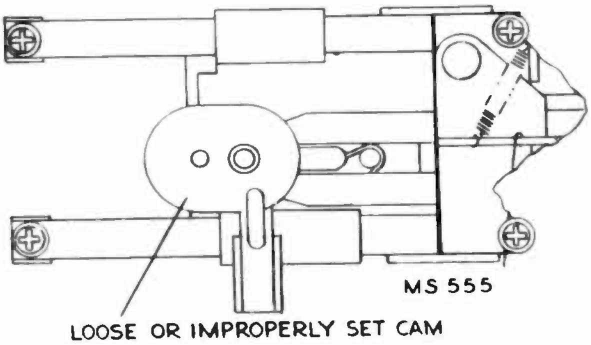

FIG. 19

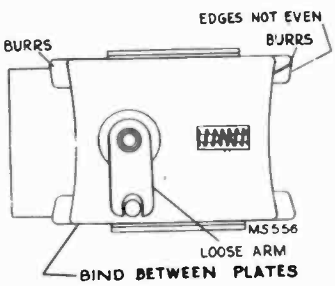

FIG. 20

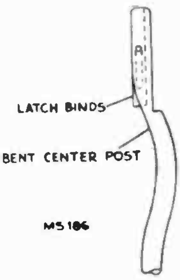

FIG. 21

PICKUP REPEATS GROOVES

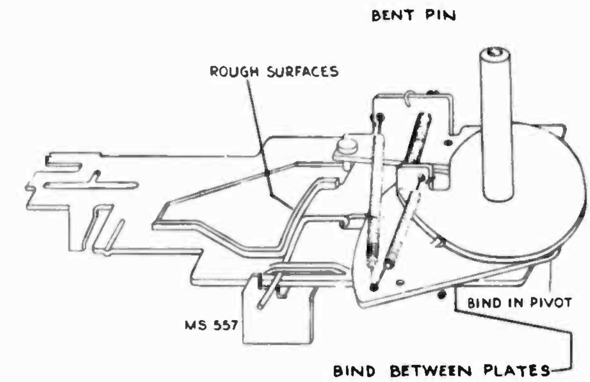

FIG. 22

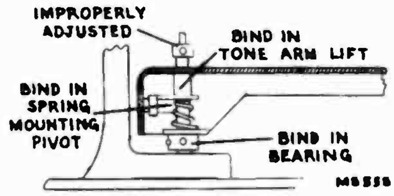

FIG. 23

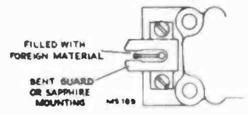

FIG. 24

"WOW" OR SLOW TURNTABLE SPEED

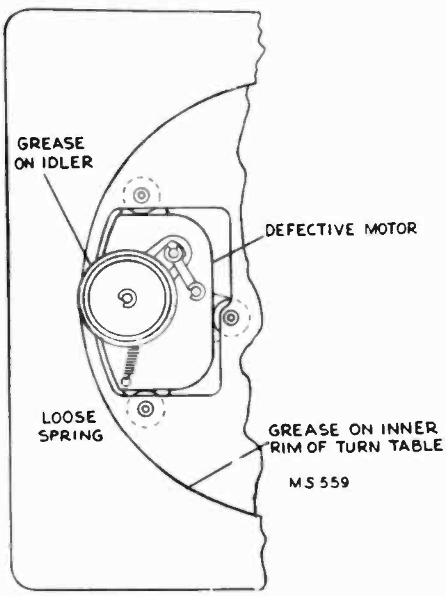

FIG. 25

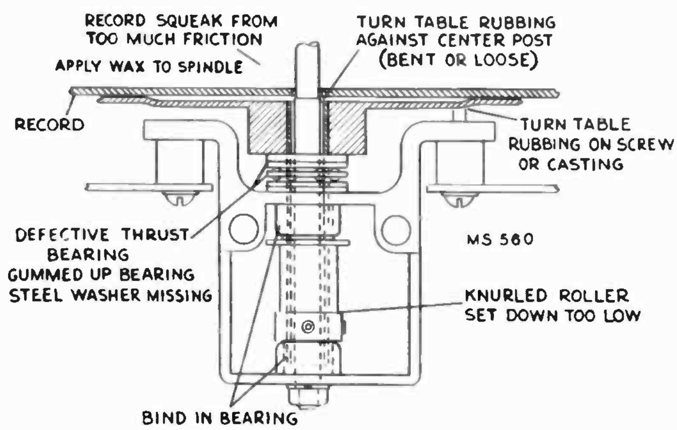

FIG. 26

CONTINUOUS TRIPPING

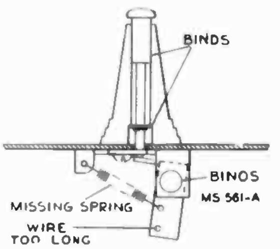

FIG. 27

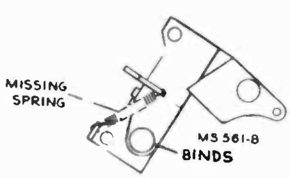

FIG. 28

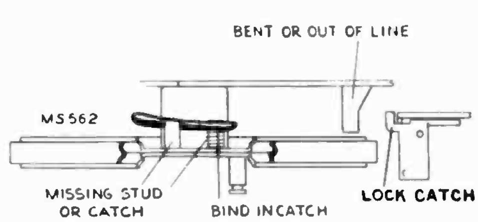

FIG. 29

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IMPROPER PICKUP LANDING

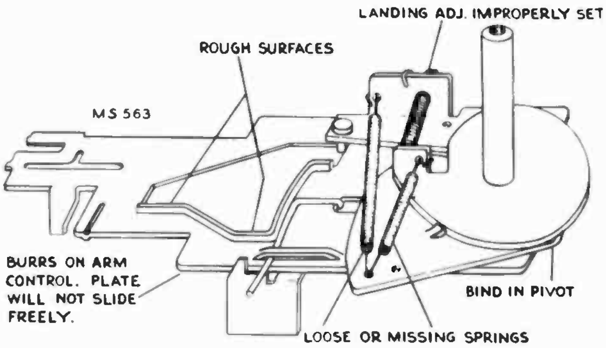

FIG. 30

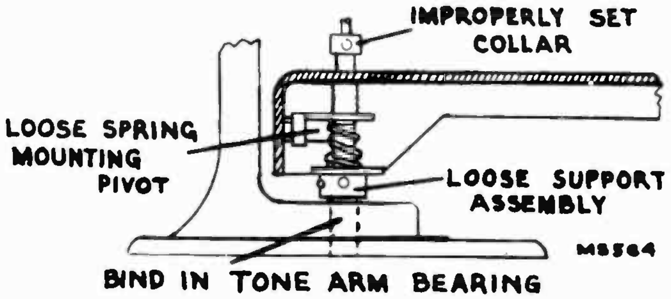

FIG. 31

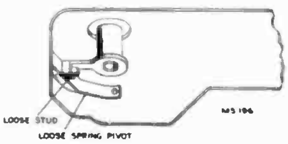

FIG. 32

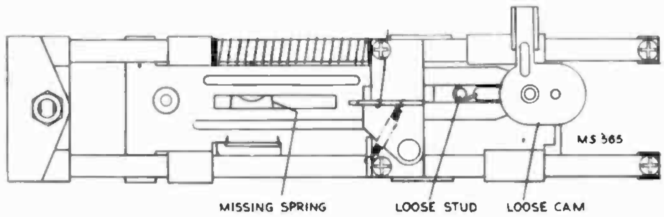

FIG. 33

FAILURE TO TRIP OR GO INTO CYCLE

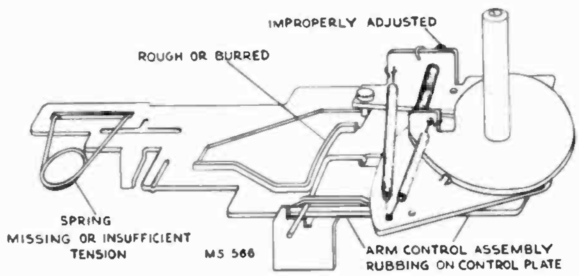

FIG. 34

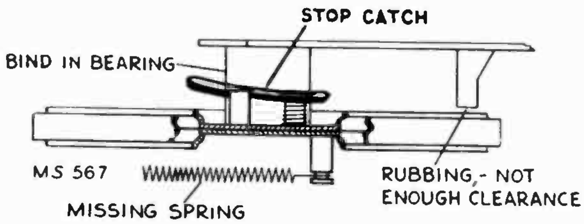

FIG. 35

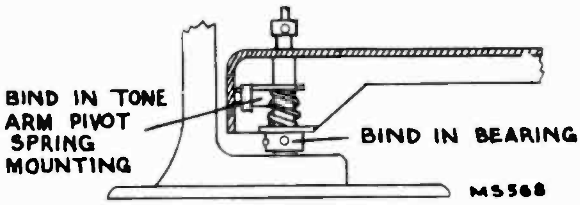

FIG. 36

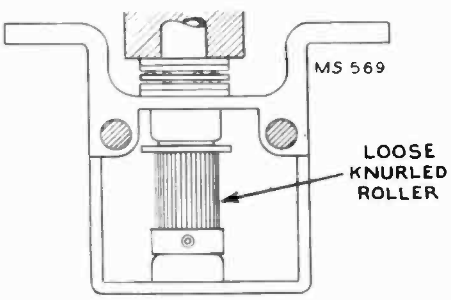

FIG. 37

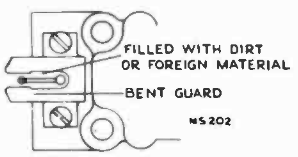

FIG. 38

Distorted or No Output

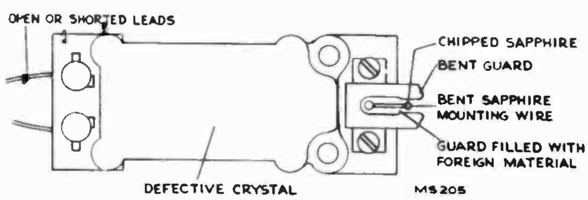

FIG. 39

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PREMATURE TRIPPING

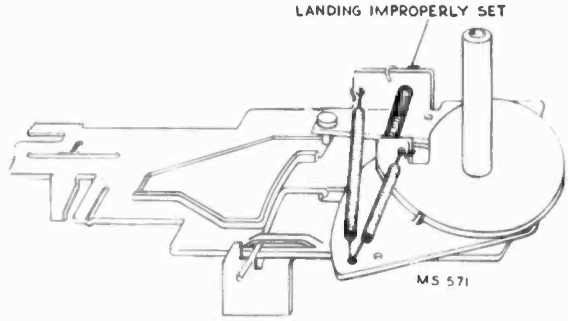


FIG. 40

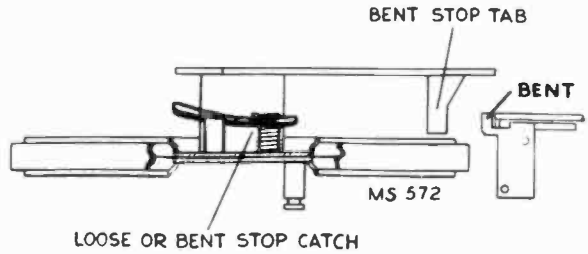


FIG. 41

RUMBLE OR HOWL

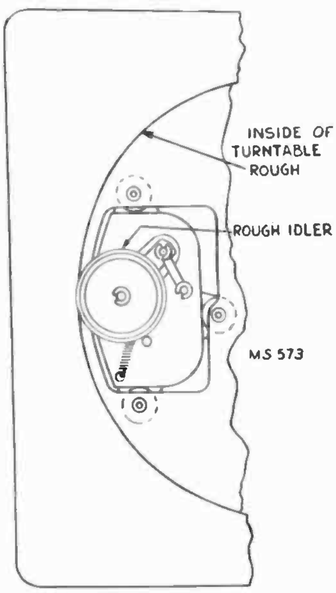


FIG. 42

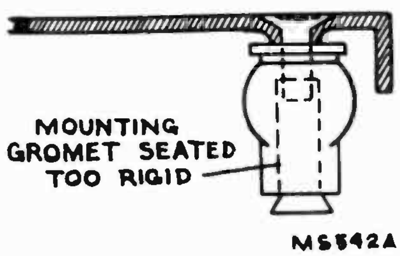


FIG. 43

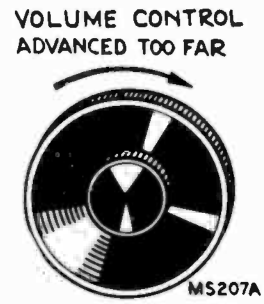


FIG. 44

TONE ARM FAILS TO LEAVE REST AUTOMATICALLY

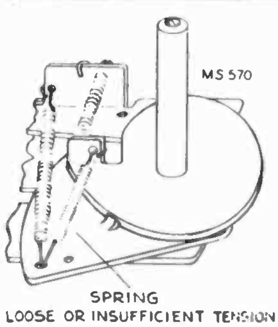


FIG. 45

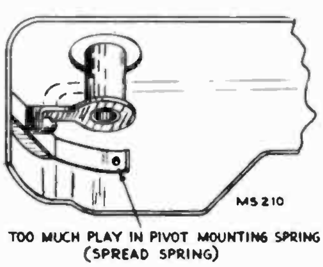


FIG. 46

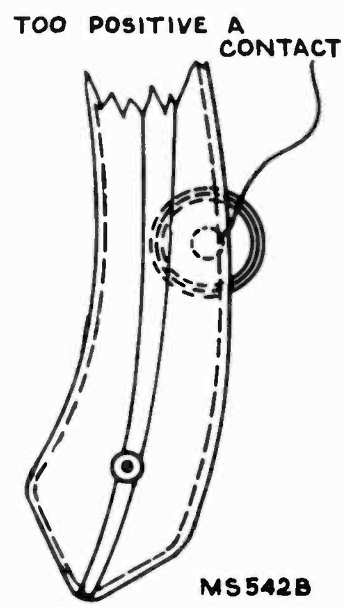


FIG. 47

RECORD DAMAGE

The spindle shelf and the top of spindle shaft should be free from burrs or rough edges to avoid scratching records or damaging record center holes. The record shelf edge should be smooth and be rounded only to a minute radius. Never round the bottom edge of the record separator latch.

A slight application of wax on the spindle shaft will prevent "squeal" of a stack of records.

LUBRICATION

Motor

Motor is lubricated at factory to provide normal operation for a long period of time.

If it becomes necessary to lubricate, use SAE #10 motor oil to saturate the felt wicks on the motor bearings.

Main Bearing

Use STA-PUT #512 or SAE #30 motor oil.

Slides and Levers

Use STA-PUT #512.

STA-PUT can be purchased from E. F. Houghton & Co., 303 W. Lehigh Ave., Phila., Pa.

REPLACEMENT OF SAPPHIRE

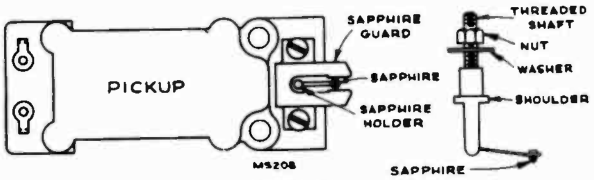
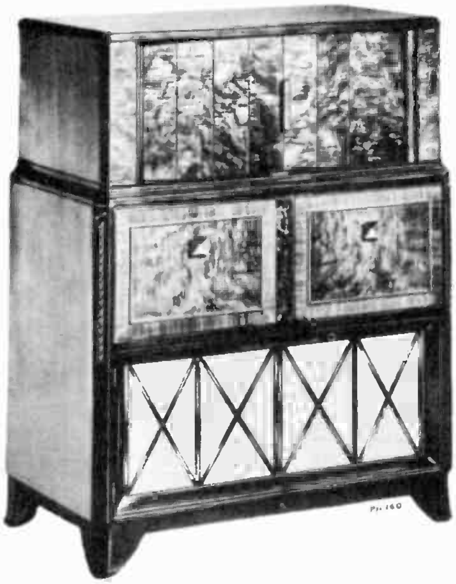


FIG. 48

Caution: Never bend the sapphire support wire. Extreme care should be used when loosening the nut so that the twisting motion does not break the crystal. Remove the two screws holding the sapphire guard in place and remove guard. Remove the small nut and washer on the threaded shaft of the sapphire holder and gently push the shaft through the hole in the armature shaft until the sapphire holder assembly comes free. Do not use force or the crystal may be broken.

Insert threaded shaft of replacement sapphire holder through armature shaft and replace the washer and nut. Make sure that the sapphire is in the correct position. Take hold at the lower end of the shaft with a pair of pliers while tightening the nut, being very careful so as not to strip the threads or break the crystal. Replace the sapphire guard, positioning it by means of the oversize screw slots. Make certain that the sapphire and its supporting wire are centered in the guard. Tighten the guard screws. Before using, check to see that the sapphire projects far enough (approx. .020) beyond the guard so that the guard will not strike the record. If necessary, bend the guard a little.



Model 641TV
Walnut, Mahogany or Toasted Mahogany

RCA VICTOR

TELEVISION, AM-FM RADIO, PHONOGRAPH COMBINATION

MODEL 641TV

Chassis Nos. KCS 25A-1 (60 cycles), KCS 25C-2 (50 cycles)
RK-117A and RS-123A (50/60 cycles)—

MODEL 8TV41

Chassis Nos. KCS 25D-1 (60 cycles), KCS 25E-2 (50 cycles)
RK-117A and RS-123A (50/60 cycles)—
Mfr. No. 274

SERVICE DATA

– 1947 No. T1 –

—1948 No. T3—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Model 8TV41
Mahogany

GENERAL DESCRIPTION

Models 641TV and 8TV41 are forty-one tube Television, AM-FM Radio, Phonograph console combination. The television unit employs a thirty-tube chassis with ten-inch kinescope.

Features of the television unit are full thirteen channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; three-stage sync separator and clipper; four mc band width for picture channel and reduced hazard high voltage supply.

The radio receiver employs a seven-tube tuner unit and a four-tube audio-amplifier, power-supply unit.

An automatic record changer of the "slicer" type is employed and features a crystal pickup with the "Silent Sapphire" stylus.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

TELEVISION R-F FREQUENCY RANGES

Television Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Tel. Rec. R-F Osc. Freq. Mc.
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

TELEVISION FINE TUNING RANGE

Plus and minus approximately 800 kc on channel 1, and plus and minus approximately 1.9 mc on channel 13.

RECEIVER ANTENNA INPUT IMPEDANCE .. 300 ohms, balanced

RADIO TUNING RANGE

Broadcast .... 540-1,600 kc
Short Wave .... 9.2-16 mc
Frequency Modulation .... 88-108 mc
Intermediate Frequency—AM .... 455 kc
Intermediate Frequency—FM .... 10.7 mc

PICTURE SIZE .... 6⅜" x 8½"—2" radius at corner

POWER SUPPLY RATING

Television Operation .... 115 volts, 430 watts
Radio Operation .... 115 volts, 145 watts
Phonograph Operation .... 115 volts, 165 watts

AUDIO POWER OUTPUT RATING

Undistorted Power Output .... 10 watts
Maximum Power Output .... 11 watts

Specifications continued on page 3

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH-VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH-VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE, OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly the rim of the viewing surface—must not be struck, scratched, or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly through the deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

DIMENSIONS (inches)

	Length	Height	Depth
Model 641TV	35	46	22
Model 8TV41	37	45¼	22

WEIGHT

Model 641TV .... 221 lbs.
Model 8TV41 .... 211 lbs.

RECORD CHANGER

Model 641TV (walnut or mahogany) 960001-1
Model 641TV (toasted mahogany) 960001-6
Model 8TV41 .... RP177A

CHASSIS DESIGNATION

Television Chassis (641TV) .... KCS25A-1 or KCS25C-2
Television Chassis (8TV41) .... KCS25D-1 or KCS25E-2
Radio Chassis RK117A
Audio Amplifier RS123A

LOUDSPEAKER (92567-2)

Type .... 12-inch Electrodynamic
Voice Coil Impedance .... 2.2 ohms at 400 cycles

TELEVISION CHASSIS DATA

PICTURE I-F FREQUENCIES

Picture Carrier Frequency .... 25.75 mc
Adjacent Channel Sound Trap .... 27.25 mc
Accompanying Sound Traps .... 21.25 mc
Adjacent Channel Picture Carrier Trap .... 19.75 mc

SOUND I-F FREQUENCIES

Sound Carrier Frequency .... 21.25 mc
Sound Discriminator Band Width (between peaks) .... 350 kc

VIDEO RESPONSE .... To 4 mc

FOCUS .... Magnetic

SWEEP DEFLECTION .... Magnetic

SCANNING .... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY .... 15,750 cps

VERTICAL SCANNING FREQUENCY .... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) .... 30 cps

OPERATING CONTROLS (front panel)

Channel Selector, Fine Tuning .... Dual Control Knobs
Picture .... Single Control Knob
Picture Horizontal Hold, Picture Vertical Hold .... Dual Control Knobs
Brightness .... Single Control Knob

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Horizontal Centering .... rear chassis adjustment
Vertical Centering .... rear chassis adjustment
Height .... rear chassis adjustment
Vertical Linearity .... rear chassis adjustment
Width .... rear chassis screwdriver adjustment
Horizontal Linearity .... top chassis screwdriver adjustment
Horizontal Drive .... rear chassis adjustment
Horizontal Oscillator Frequency .... rear chassis adjustment
Horizontal Oscillator Phase .... bottom chassis adjustment
Focus .... rear chassis adjustment
Focus Coil .... top chassis wing nut adjustment
Ion Trap Magnet .... top chassis thumb screw adjustment
Deflection Coil .... top chassis wing nut adjustment

RCA TUBE COMPLEMENT

KCS25A-1 TELEVISION CHASSIS

	Tube Used	Function
(1)	RCA-6J6	R-F Amplifier
(2)	RCA-6J6	R-F Oscillator
(3)	RCA-6J6	Converter
(4)	RCA-6BA6	1st Sound I-F Amplifier
(5)	RCA-6BA6	2nd Sound I-F Amplifier
(6)	RCA-6AU6	3rd Sound I-F Amplifier
(7)	RCA-6AL5	Sound Discriminator
(8)	RCA-6AT6	A-G-C Amplifier
(9)	RCA-6AL5	A-G-C Diode and D-C Restorer
(10)	RCA-6AG5	1st Picture I-F Amplifier
(11)	RCA-6AG5	2nd Picture I-F Amplifier
(12)	RCA-6AG5	3rd Picture I-F Amplifier
(13)	RCA-6AG5	4th Picture I-F Amplifier
(14)	RCA-6AL5	Picture 2nd Detector and A-G-C Detector
(15)	RCA-6AU6	1st Video Amplifier
(16)	RCA-6K6GT	2nd Video Amplifier
(17)	RCA-6SK7	1st Sync Amplifier
(18)	RCA-6SH7	Sync Separator
(19)	RCA-6SN7GT	2nd Sync Amplifier and Horizontal Discharge
(20)	RCA-6J5	Vertical Sweep Oscillator and Discharge
(21)	RCA-6K6GT	Vertical Sweep Output
(22)	RCA-6AL5	Horizontal Sync Discriminator
(23)	RCA-6K6GT	Horizontal Sweep Oscillator
(24)	RCA-6AC7	Horizontal Sweep Oscillator Control
(25)	RCA-6BG6G	Horizontal Sweep Output
(26)	RCA-5V4G	Horizontal Reaction Scanning
(27)	RCA-1B3-GT/8016	High Voltage Rectifier
(28)	RCA-5U4G	Power Supply Rectifiers (2 tubes)
(29)	RCA-10BP4	Kinescope

RK117A RADIO CHASSIS

	Tube Used	Function
(1)	RCA-6BA6	R-F Amplifier
(2)	RCA-6BE6	Oscillator
(3)	RCA-6BA6	Mixer
(4)	RCA-6BA6	I-F Amplifier
(5)	RCA-6AU6	Driver
(6)	RCA-6AL5	Ratio Detector
(7)	RCA-6SQ7	AM Det., AVC and Audio Amplifier

RS123A AUDIO AMPLIFIER

	Tube Used	Function
(1)	RCA-5U4G	Rectifier
(2)	RCA-6J5	Phase Inverter
(3)	RCA-6F6G	Power Output
(4)	RCA-6F6G	Power Output

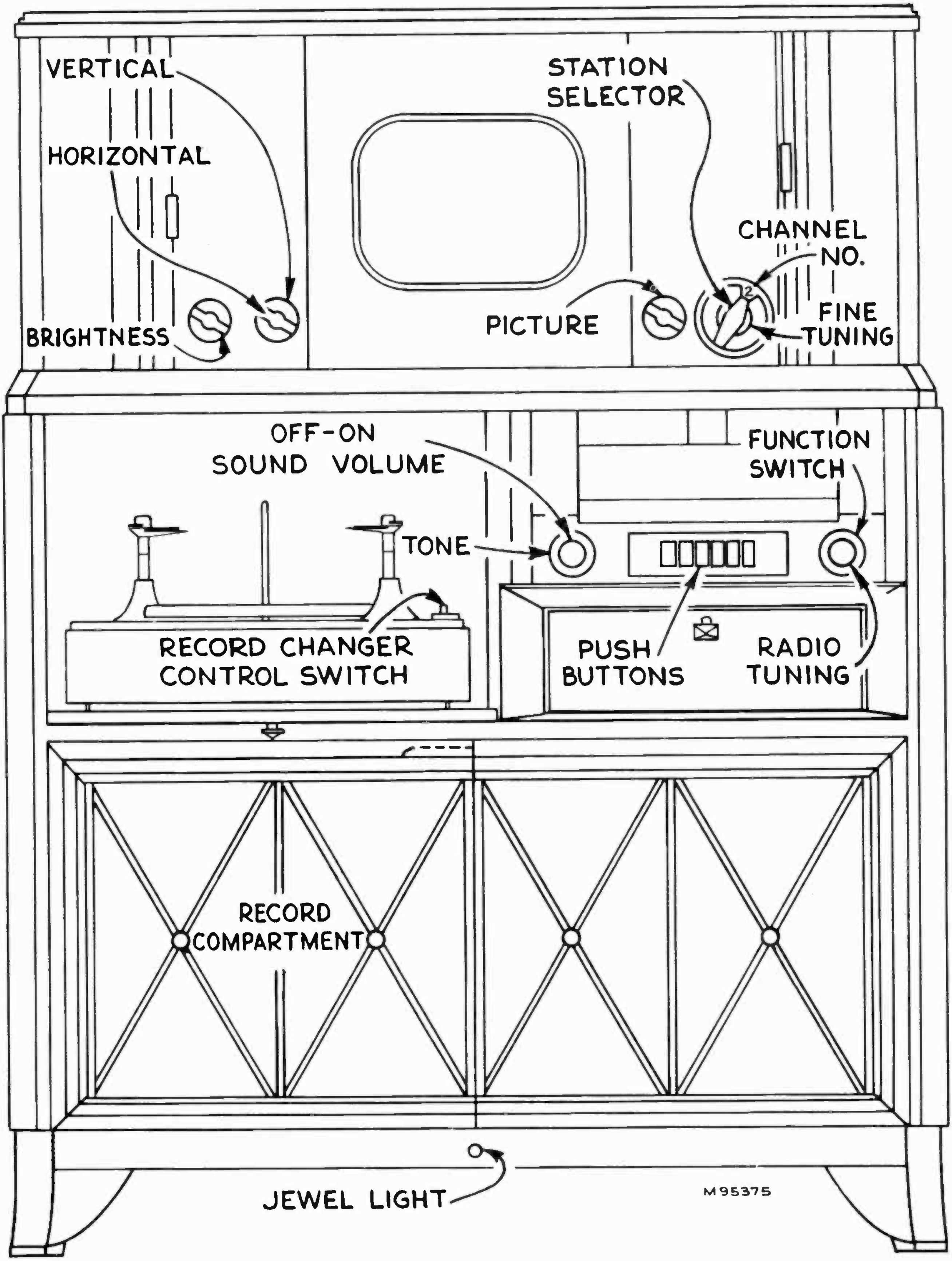


Figure 1—Receiver Operating Controls

TELEVISION OPERATION

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the radio FUNCTION switch to Tel.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Turn the PICTURE control fully counter-clockwise.

5. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen, then counter-clockwise until the glow just disappears.

6. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.

7. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

8. Adjust the VERTICAL hold control until the pattern stops vertical movement.

9. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

10. Adjust the PICTURE control for suitable picture contrast.

11. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

12. In switching from one station to another, it may be necessary to repeat steps number 7 and 10.

13. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 7 is generally sufficient.

14. If the position of the controls has been changed, it may be necessary to repeat steps number 2 through 10.

RADIO OPERATION

1. Turn the radio FUNCTION switch to the desired band (BC, SW or FM).

2. Tune in the desired station with the TUNING control.

PUSH BUTTON OPERATION

1. Turn the radio FUNCTION switch to PB.

2. Push the appropriate push button to receive the desired station.

PHONOGRAPH OPERATION

1. Turn the radio FUNCTION switch to Pho.

AUTOMATIC OPERATION

2. Move the changer tone arm over to the pickup rest position, or if changer is in cycle and the arm cannot be moved, push the Record Changer Control Switch to the manual position until the arm stops in the rest position.

3. Turn Record Support Shelf so that the number corresponding to the size of record to be played is toward the turntable spindle.

4. Place the stack of records over the turntable spindle and on the fingers of the Record Support.

5. Pull the Record Changer Control Switch forward and release. The changer will cycle automatically and will stop after the last record has been played.

NOTE

The changer will not operate on intermixed ten- and twelve-inch records in the automatic position.

MANUAL OPERATION

6. Move the changer tone arm over to the pickup rest position, or, if the changer is in cycle and the arm cannot be moved, push the Record Changer Control Switch to the manual position until the arm stops in the rest position.

7. Place the record on the turntable.

8. Lift the pickup arm from the rest position and place the needle in the outer groove of the record.

NOTE

The changer will not automatically stop after playing the record when the Control Switch is in the manual position.

Check all chassis interconnecting cables to make sure that all are plugged into the proper sockets as shown in Figure 3. It is possible to insert the receiver antenna and ground plug backwards. The ground wire should go to the middle connector at the radio chassis as shown.

Remove the metal grill in back of the television compartment. Remove the tapes holding the radio and television compartment doors.

The radio and television control knobs are packed in envelopes taped to the cabinet lower back cross member. Remove the knobs and install them on their control shafts.

Remove the safety glass and front panel by removing the moulding at the top and bottom of the glass as shown in Figure 4. Caution: The safety glass and front panel fit very snugly and care must be taken in removing so as not to scratch the cabinet finish.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten. See Figure 5 for the location of the cushion and yoke adjustments.

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wingnuts and raise, lower, or rotate the coil until alignment is obtained. Tighten the wingnuts with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 4 for location of the slides and their adjustment screws. Loosen the ion trap magnet adjustment thumb screws.

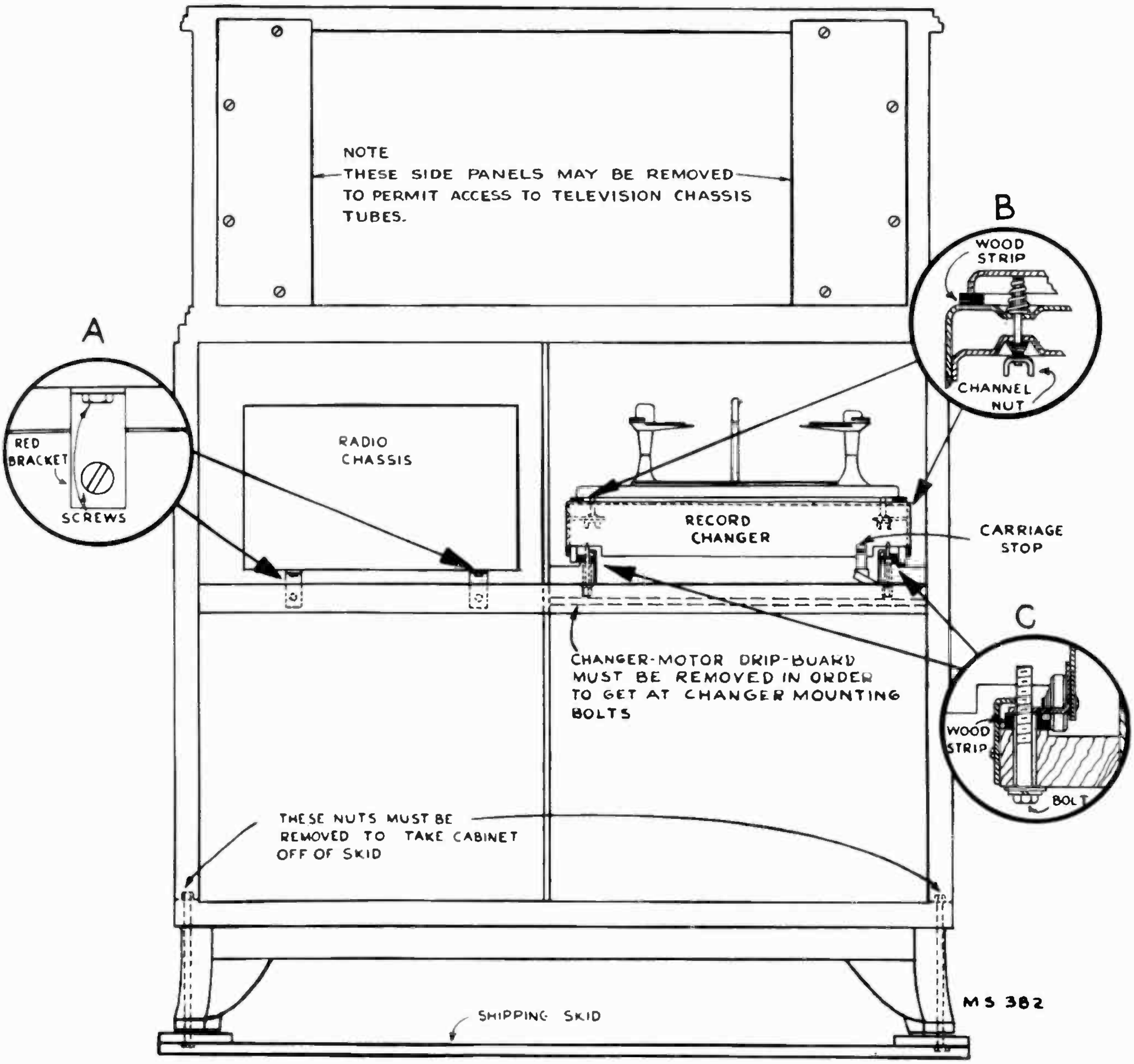


Figure 2—Removal of Shipping Material

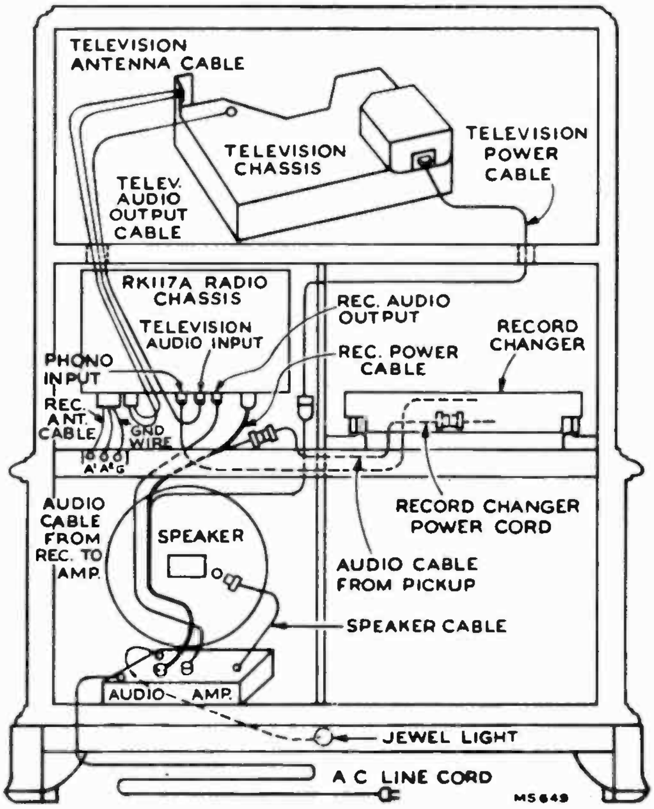


Figure 3—Chassis Interconnecting Cables

TO REMOVE FRONT PANEL, TAKE OUT THESE SCREWS AND REMOVE MOULDING

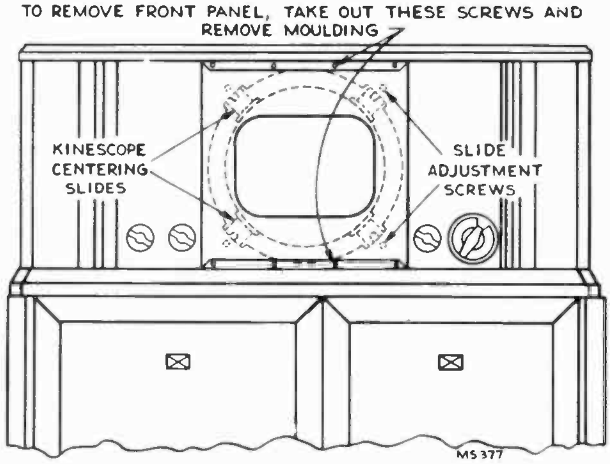


Fig. 4A—Removal of Front Panel—Model 641TV

If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil adjustment wing nuts and rotate the coil about its vertical and horizontal axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the coil in this position.

INSTALLATION OF KINESCOPE—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is approximately on top. The final orientation of the tube will be determined by the position of the ion trap flags. Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck, is provided with two small metal flags, as shown in Figure 6. The kinescope must be installed so that when looking down on the chassis, the two flags will be seen as shown in Figure 5.

Slip the ion trap magnet on the neck of the kinescope with the large coil toward the base of the tube as shown in Figure 5. Connect the kinescope socket to the tube base. Insert the kinescope until the face of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet.

TO REMOVE FRONT PANEL, TAKE OUT THESE SCREWS

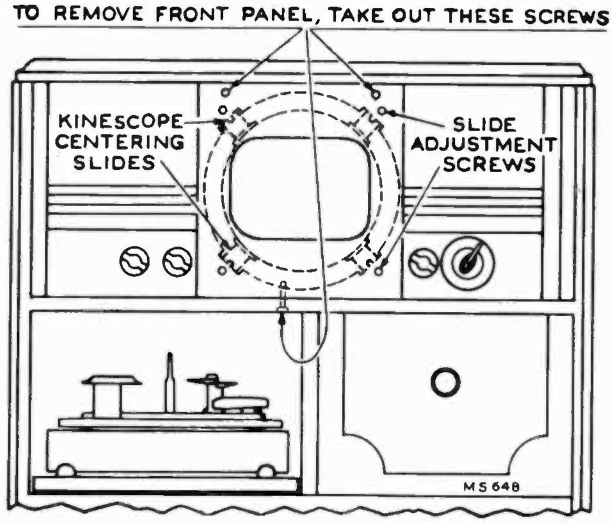


Fig. 4B—Removal of Front Panel—Model 8TV41

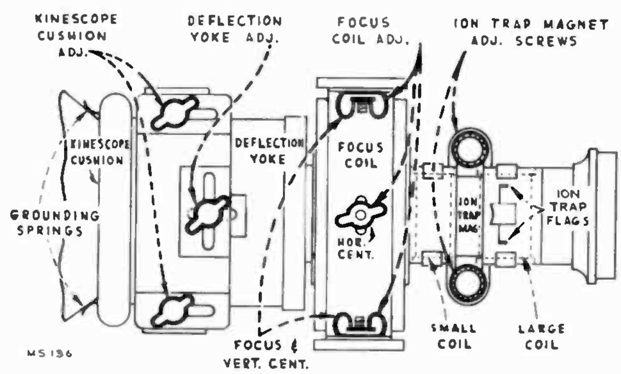


Fig. 5A—Yoke and Focus Coil Adjustments—Model 641TV

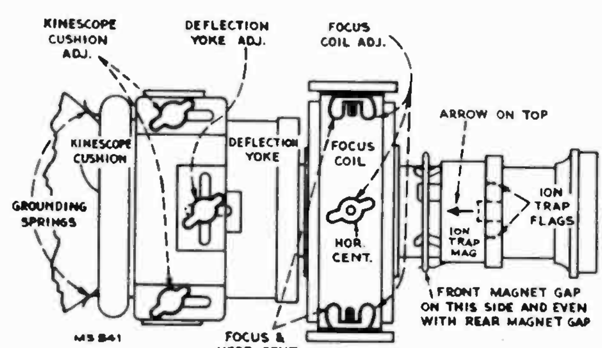


Fig. 5B—Yoke and Focus Coil Adjustments—Model 8TV41

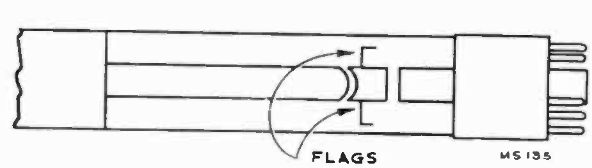


Figure 6—Ion Trap Flags

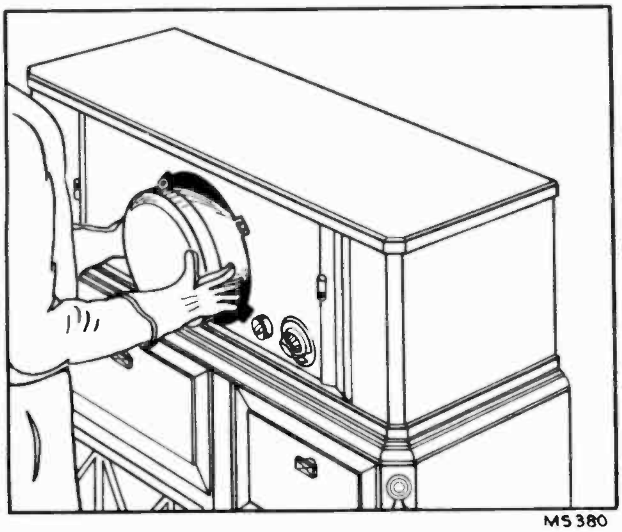


Figure 7—Kinescope Insertion

Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

Install the cabinet front as indicated in Figure 4.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. Connect the high voltage lead to the kinescope second anode socket.

The antenna and power connections should now be made. Turn the power switch to the "on" position, the function switch to television the brightness control fully clockwise, and picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT—The ion trap rear magnet poles should be approximately over the kinescope flags as shown in Figure 5. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Tighten the magnet adjustment thumbscrews sufficiently to hold it in this position but still free enough to permit further adjustment. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R184 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

FOCUS COIL ADJUSTMENTS—Turn the centering controls R181 and R211 to mid position. See Figure 8 for location of these rear apron controls.

If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil adjustment wing nuts and rotate the coil about its vertical and horizontal axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the coil in this position.

DEFLECTION YOKE ADJUSTMENT—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 3 through 10 of the receiver operating instructions on page 5.

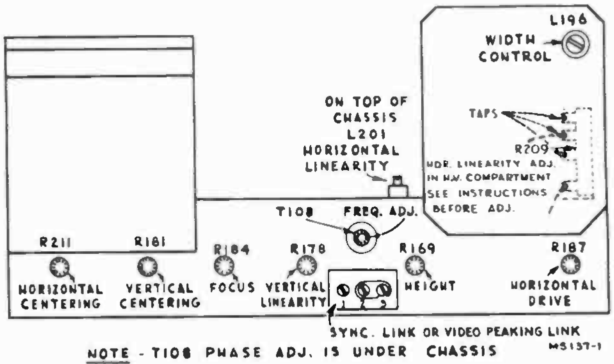


Figure 8—Rear Chassis Adjustments

CHECK OF LINK CONNECTION—In early receivers, the link board J102 was connected to the horizontal oscillator control tube. In late production, the link was employed to provide optional video peaking. In order to determine which type of connection is employed in a particular set, touch the finger to terminal #3. If the picture is displaced horizontally the board is connected to the control tube. Little or no effect may be noticed if the board is connected to the video stage.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—If the board was found to be connected to the control tube in the above test, set the link in the normal position (2 to 3). Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will pull into sync.

Turn the horizontal hold control to the extreme clockwise position. The picture should remain in sync. Momentarily remove the signal. Again the picture should normally pull into sync.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at either extreme or failed to pull into sync after momentary removals of the signal, make the adjustments under "Slight Retouching Adjustments." If, after making these retouching adjustments, the receiver fails to pass the above checks or if the horizontal oscillator is completely out of adjustment, then make the adjustments under "Complete Realignment."

Slight Retouching Adjustments—Tune in a Television Station and adjust the fine tuning control for best sound quality. Sync the picture and adjust the picture control for slightly less than normal contrast. Turn the horizontal hold control to the extreme position in which the oscillator fails to hold or to pull in. Momentarily remove the signal. Turn the T108 frequency adjustment on the chassis rear apron until the oscillator pulls into sync. Check hold and pull-in for the other extreme position of the hold control.

Complete Realignment—Tune in a Television Station and adjust the fine tuning control for best sound quality.

Turn the T108 frequency adjustment (on rear apron), untill the picure is synchronized. (If the picture is not synchronized vertically, adjust the vertical hold.) Adjust the picture control so that the picture is somewhat below averege contrast level.

Turn the T108 phase adjustment screw (under chassis, see Figure 23) until the blanking bar, which may appear in the picture, moves to the right and off the raster. The range of this adjustment is such that it is possible to hit an unstable condition (ripples in the raster). The screw must be turned clockwise from the unstable position. The length of stud beyond the bushing in its correct position is usually about ½ inch.

Turn horizontal hold to extreme counter-clockwise position. Turn T108 frequency adjustment clockwise until the picture falls out of sync. Then turn it slowly counter-clockwise to the point where the picture falls in sync again.

Readjust T108 phase adjustment so that the left side of the picture is close to the left side of the raster, but does not begin to fold over.

Turn horizontal hold to extreme clockwise. The right side of the picture should be close to the right side of the raster, but should not begin to fold over. If it does, readjust the phase.

Momentarily remove the signal. When the signal is restored, the picture should fall in sync. If it doesn't, turn T108 frequency adjustment counter-clockwise until the picture falls in sync.

Turn horizontal hold to extreme counter-clockwise position. Remove the signal momentarily. When signal is restored, the picture should fall in sync.

NOTE: If the picture does not pull in sync after momentary removals of signal in both extreme positions of horizontal hold, the pull-in range may be inadequate, though not necessarily. A pull-in through ¾ of the hold control range may still be satisfactory. There is a difference between the pull-in range and hold-in range of frequencies. Once in sync, the circuit will hold about 50% to 100% more variation in frequency than it can pull in. The range of the horizontal hold control is only approximately equal to the pull-in range, considerable variation may be found due to variations in the cut-off characteristic of the horizontal oscillator control tubes, V124.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R169 on chassis rear apron) until the picture fills the mask vertically (6⅜ inches). Adjust vertical linearity (R178 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the horizontal drive (R187 on rear apron) clockwise as far as possible without causing crowding of the right of the picture. This position provides maximum high voltage to the kinescope second anode. Adjust the width control (L196 on rear chassis) until the picture just fills the mask horizontally (8½ inches). Adjust the horizontal linearity control L201 (see Figure 8) until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust horizontal centering to align the picture with the mask.

If repeated adjustments of drive, width, and linearity fail to give proper linearity, it may be necessary to move the tap on R209, which is located in the high voltage compartment. Adjustments of drive, width and linearity must then be repeated.

FOCUS—Adjust the focus control (R184 on chassis rear apron) for maximum definition in the test pattern vertical "wedge."

Check to see that all cushion, yoke, focus coil and ion trap magnet thumb screws are tight.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—With a crystal calibrated test oscillator or heterodyne frequency meter, check to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 22. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 9. Adjustments for channels 6 and 13 are under the chassis. See Figure 27 for their location.

Tune in all available Television Stations. Observe the picture for detail, for proper interlacing and for the presence of interference or reflections.

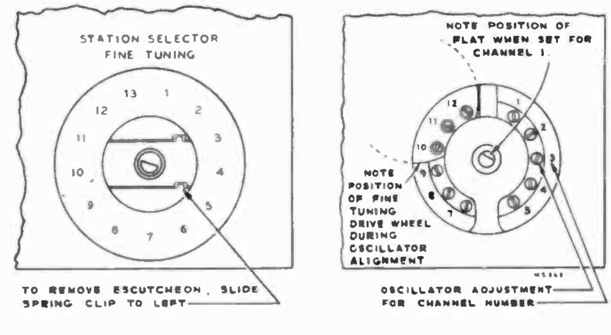


Figure 9—R-F Oscillator Adjustments

ANTENNA TRAP—In some instances an antenna trap has been installed on the receiver to eliminate interference from an FM station on the image of channel 2 or interference on channel 6 from a station on channel 10 or on channel 5 from a station on channel 7. To adjust the trap, tune in the station on which the interference is observed. Tune both cores of the trap (see figure 22) for minimum interference in the picture. Keep both cores approximately the same by visual inspection. Then, turn one core ½ turn from the original position and repeak the second for maximum rejection. Repeat this process until the best rejection is obtained. In severe cases of interference, it may be necessary to reorient the antenna to eliminate this difficulty.

VIDEO PEAKING—If the link board J102 was shown to be connected to the video circuits by the test outlined on page 8, then some video peaking may be obtained by connecting the link in the 2-3 position. If the pictures from the majority of stations look best with the link in the 2-3 position, it should be so connected. However if transients are then produced on high contrast pictures, then the link should be connected in the 1-2 position.

RADIO OPERATION—Turn the receiver function switch to AM and FM positions and check the radio for proper operation. In switching from radio to television or from television to radio, approximately 30 seconds warm-up time is required.

PUSH-BUTTON ADJUSTMENT—To adjust the radio push buttons, set the function switch to the broadcast band position, tune the receiver to the desired station and identify the program. Turn the function switch to the push button position and push the appropriate push button. Adjust the corresponding oscillator core until the desired station is heard. Adjust the corresponding antenna trimmer for maximum output. Proceed in the same manner to adjust the remaining push buttons. Figure 10 shows the location of the push-button adjustments and the range which the adjustments will cover.

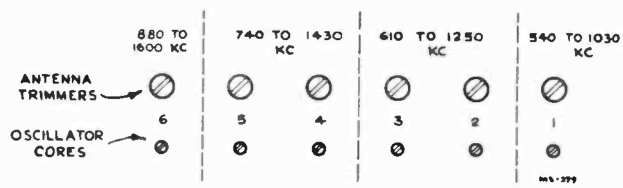


Figure 10—Push-Button Adjustments

Select the proper station call letter tab, moisten the back of the tab and insert in the appropriate recess in the push button bezel. Place the tab cellophane cover in the recess over the tab.

RECORD CHANGER OPERATION—Open the record changer compartment door and roll the changer out. Move the tone arm to the rest position. Place a record on the turntable. Turn the front record shelf to the position to take the size of records used. Place a stack of records on the shelf. Turn the radio function switch to phono position. Pull the record changer control switch to the reject position and release.
Replace the television receiver metal back grill. Replace the cabinet back. Tap the nails which hold the back clips in place to insure that all clips are seated firmly against the back, otherwise the back may rattle or buzz when the receiver is operating at high volume.

It is advisable that the reader be familiar with a recent standard textbook of television principles in order to understand the receiver circuits and their functions. Such a knowledge is assumed for the purpose of this publication. The discussions which follow will not dwell on the operation of conventional circuits used which have been used in previous receivers and which should be well known. In general, the circuits discussed will be only those that are new to the field.

For ease of understanding the basic operation of the television receiver, a 14 unit block diagram of it is shown in Figure 11. The circuit description will follow the numerical order of these blocks in order to follow a signal through the set in a logical manner.

R-F UNIT (block # 1)—The r-f unit is a separate subchassis of the receiver. On this subchassis are the r-f amplifier, converter, oscillator, fine tuning control, channel switch, converter transformer, r-f, converter and oscillator coils and all their tuning adjustments. The unit provides operation on all thirteen of the present television channels. It functions to select the desired picture and sound carriers, amplifies and converts to provide at the converter plate, a picture i-f carrier frequency of 25.75 mc. and a sound i-f carrier of 21.25 mc.

R-F Amplifier—Referring to the schematic diagram (page 59), T1 is a center tapped coil used for the short circuiting of low frequency signals picked up by the antenna which would otherwise be directly applied to the control grids of the 6J6 r-f amplifier, V1. C1 and C2 are antenna isolating capacitors. The d-c return for the grids of V1 is through R3 and R13 which also properly terminate the 300 ohm antenna transmission line. C3 and C4 are neutralizing capacitors necessary to counteract the grid to plate capacitance of the triode r-f amplifier.

In the plate circuit of the r-f amplifier are a series of inductances L1 to L25 and L2 to L26 inclusive. These inductances may be considered as a quarter wave section of a balanced transmission line which can be tuned over a band of frequencies by moving a shorting bar along the parallel conductors.

Adjustable coils L25 and L26 provide the correct length of line for the thirteenth channel, 210—216 mc. L13 to L23 and L14 to L24 are fixed sections of line which are added to L25 and L26 as the shorting bar is moved progressively down the line. The physical construction of each one of these inductances is a small non-adjustable silver strap between the switch contacts. Each strap is cut to represent a six-megacycle change

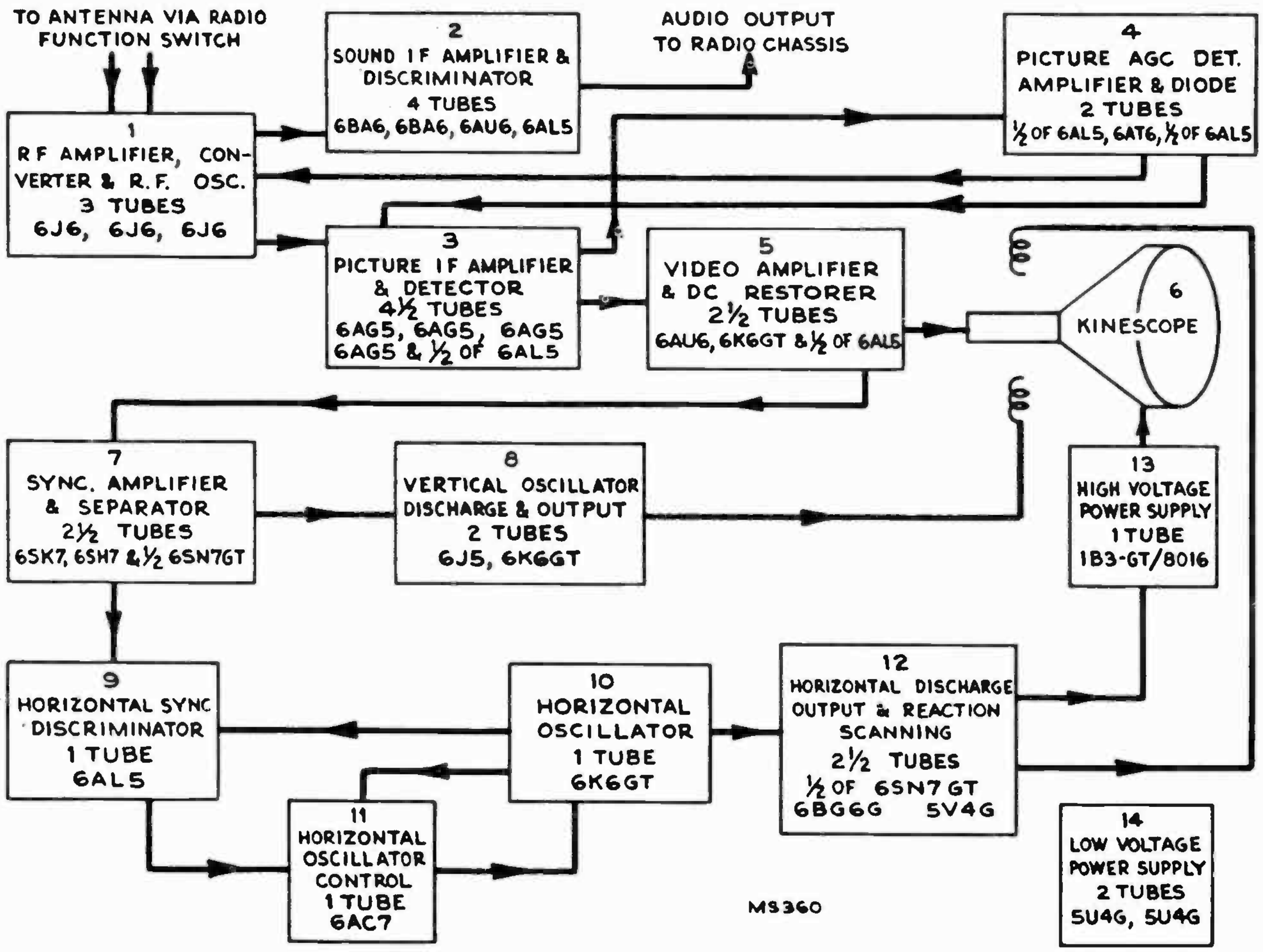


Figure 11—Receiver Block Diagram

in frequency. In order to make the jump between the lowest high frequency channel (174-180 mc) and the highest low frequency channel (82-88 mc), adjustable coils L11 and L12 are inserted. To provide for the remaining five low frequency channels, L1 to L9 and L2 to L10 are progressively switched in to add the necessary additional inductance.

Coils L1 to L9 and L2 to L10 are unusual in that they are wound in figure 8 fashion on fingers protruding from the switch wafer. This winding form produces a relatively non-critical coil since the coupling between turns is minimized. A maximum amount of wire is used for the small inductance which is required, thus permitting greater accuracy in manufacturing.

Converter—The converter grid line operates in a similar manner and is so arranged on the switch to provide coupling between it and the r-f line. C10, C12, C13 and a link, provide additional coupling which is arranged to produce at least a 4.5 megacycle band pass on each of the channels.

L80 and C14 form a series resonant circuit used to prevent i-f feedback in the converter by grounding its grids for i-f frequency. They also act as a trap to reject short-wave signals of i-f frequency which arrive at the converter grids in a push push manner.

A 6J6 twin triode is used as converter. Since the grids are fed in push pull by both the signal and the oscillator, the heterodyne products (i-f signals) are in phase on the converter plates so the two plates are connected in parallel. Unwanted signals of i-f frequency that arrive at the converter grid in a push pull manner are out of phase on the converter plates. Since the plates are tied together, these signals tend to cancel thus reducing the possibility of interference from this source.

R-F Oscillator—The oscillator line is similar except that trimmer adjustments are provided for each channel and the low frequency coils are not figure 8 windings. For tuning each channel, brass screws are used in close proximity to the high frequency tuning straps L66 to L76, and adjustable brass cores are provided for coils L54 to L62. It is obvious that the high frequency adjustments should be made before each lower frequency one.

C15 is a fine tuning adjustment which provides approximately plus or minus 800 kc. variation of oscillator frequency on channel 1 and approximately plus or minus 1.9 mc. on channel 13.

The physical location of the oscillator line with respect to the converter grid line is such as to provide some coupling to the converter grids. This coupling is augmented by the link shown on the schematic and provides a reasonably uniform oscillator voltage at the converter grids over the entire tuning range of the unit.

The converter transformer T2 is a combination picture i-f transformer, sound trap, and sound i-f transformer. The converter plate coil is assembled within the structure of a high Q resonant circuit tuned to the sound i-f frequency. This high Q coil absorbs the sound i-f component from the primary. Thus on the T2 primary (from which the picture i-f is fed), the sound carrier is attenuated with relation to the picture channel.

SOUND I-F AMPLIFIER AND DISCRIMINATOR (block #2)—A portion of the energy absorbed by the T2 trap circuit is fed to the first sound i-f amplifier. Three stages of amplification are used to provide adequate sensitivity. A conventional discriminator is used to demodulate the signal. The discriminator band width is approximately 350 kc. between peaks.

The output from the discriminator is fed into the radio audio system and is controlled by the radio volume and tone controls.

PICTURE I-F AMPLIFIER AND DETECTOR (block #3)—The picture i-f amplifier departs considerably from the conventional coupled system. To obtain the necessary wide band characteristic with adequate gain, four stages of i-f amplification are employed. The converter plate and each successive i-f transformer utilize one tuned circuit each and each is tuned to a different frequency. The effective Q of each coil is fixed by the shunt plate load or grid resistor so that the response product of the total number of stages produces the desired overall response curve. Figure 12 shows the relative gains and selectivities of each coil and the shape of the curve of the quintuple combination.

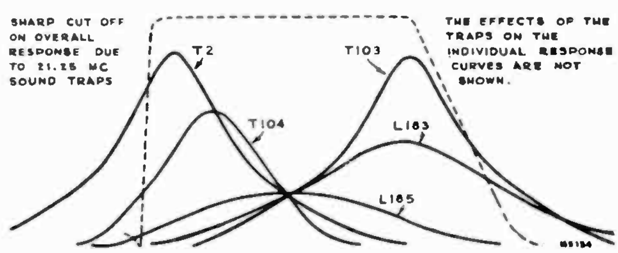


Figure 12—Stagger Tuned I-F Response

In order to obtain this band pass characteristic, the picture i-f transformers are tuned as follows:

Converter transformer	21.8 mc. (T2 primary)
First pix i-f transformer	25.3 mc. (T103 primary)
Second pix i-f transformer	22.3 mc (T104 primary)
Third pix i-f coil	25.2 mc. (L183)
Fourth pix i-f coil	23.4 mc. (L185)

In such a stagger tuned system variations of individual i-f amplifier tube gain do not affect the shape of the overall i-f response curve if the Q's and center frequencies of the stages remain unchanged. This means that the i-f amplifier tubes are non-critical in replacement because variations in Gm do not affect the response curve.

To align the i-f system, the transformers are peaked to the specified frequencies with a signal generator. The overall i-f response is then observed by use of a sweep generator and oscilloscope. Slight deviations from design center circuit Q are compensated for with slight shifts in tuned-circuit center frequency until the desired response curve is obtained. If this response cannot be obtained, the difficulty is likely to be in a component that affects either the frequency or Q of one or more of the i-f coils.

The response curve does shift slightly as the picture control is varied due to the Miller effect. This effect is the change in tube input capacitance as its gain is varied by grid bias changes. The change of input capacitance causes a slight de-tuning of the preceding i-f coil and a small shift in response curve shape. This effect is slight, however, and when the receiver is aligned with the specified grid bias, no difficulty from this source should be encountered.

For familiarization with the frequencies which are important in the receiver's operation, Figure 13 shows the relative position of the picture and sound carriers for channels 2, 3 and 4. If a station on channel 3 is transmitting a picture with video frequencies up to 4 mc., the picture carrier will have upper side band frequencies up to 65.25 mc. The lower side bands are suppressed at the transmitter.

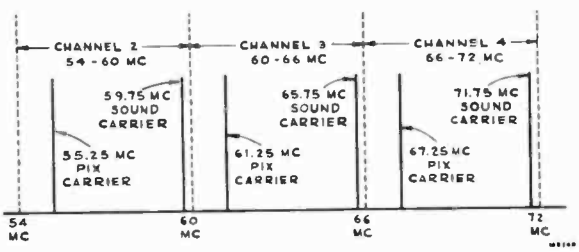


Figure 13—Television Channel Frequencies

With the receiver r-f oscillator operating at a higher frequency than the received channel, the i-f frequency relation of picture to sound carrier is reversed as shown in Figure 14.

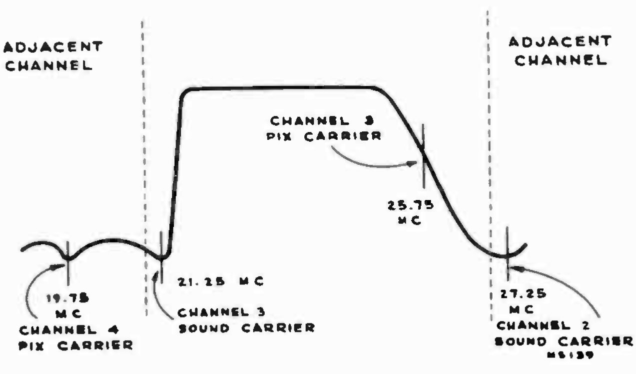


Figure 14—Overall Picture I-F Response

Traps—Since it is necessary for the picture i-f to pass frequencies quite close to the sound carrier frequency, the sound carrier would produce interference in the picture. In order to prevent this interference, traps must be added to the picture i-f amplifier to attenuate the sound carrier. If the receiver should be operating on channel 3, it is possible that interference would be experienced from the channel 2 sound carrier and the channel 4 picture carrier. The adjacent channel traps are provided to attenuate these unwanted frequencies.

The first three traps are absorption circuits. The first trap (T2 secondary) is tuned to the accompanying sound i-f frequency. The second trap (T103 secondary) is tuned to the adjacent channel sound frequency. The third trap (T104 secondary) is tuned to the adjacent channel picture carrier frequency. The fourth trap (T105 secondary) is in the cathode circuit of the fourth picture i-f amplifier V113 and is tuned to the accompanying sound carrier i-f frequency. The primary of T105 in series with C181 forms a series resonant circuit at the frequency to which L185 is tuned (23.4 mc.). This provides a low impedance in the cathode circuit at this frequency and permits the tube to operate with a gain. However, at the resonant frequency of the secondary (21.25 mc.), a high impedance is reflected into the cathode circuit, and the gain of the tube for this frequency is reduced by degeneration. The rejection at 21.25 mc. with this circuit is limited to the gain of the tube.

Picture Second Detector—The detector is a conventional half wave rectifier connected to produce a video signal of the proper polarity.

PICTURE A-G-C DETECTOR, AMPLIFIER AND DIODE (block #4)—An automatic gain control circuit is employed in connection with the picture i-f system to hold the output from the i-f's substantially constant over a wide range of signal inputs.

The a-g-c system of the picture i-f amplifier (shown in Figure 15) differs considerably from the a-v-c system used in broadcast receivers. In broadcast receivers, it is customary to use the filtered d-c drop across the diode resistor as the source of the a-v-c voltage. This is satisfactory, because the d-c voltage thus obtained is directly proportional to the average carrier amplitude at the diode. If it maintains the average carrier amplitude substantially constant, then the a-v-c operates as it should.

In the transmission of television pictures, however, the average carrier amplitude varies greatly with picture content, and an a-g-c system operating on the principle of maintaining a substantially uniform average carrier amplitude therefore is not suitable.

The RMA Standard Television Signal calls for a transmission system known as d-c negative transmission. Under this system, the carrier always reaches a uniform maximum amplitude during the periods when synchronizing pulses are being transmitted, and a white portion of the scene is represented by minimum or zero carrier condition. Thus, if there is no fading, the peaks of the synchronizing pulses will always represent some constant amplitude, and they, therefore, form a convenient reference for operating a satisfactory picture a-g-c system.

A portion of the output from the fourth i-f amplifier is fed into V114B, the a-g-c detector. Since the time constant of the diode load resistor and filter (R251 and C240) is somewhat greater than one horizontal line, the detector is essentially a peak reading voltmeter at sync frequency (15,750 cps). The d-c voltage that appears on the cathode of V114B is therefore proportional to the peak strength of the received signal and substantially independent of the picture content.

Such a system will also tend to read the peak of noise pulses. To prevent this, R252 and the diodes of V108 are used as a two-stage clipper or noise-limiting network. For further protection against noise, the d-c output is fed through an integrating network (R253 and C242) which tends to remove the effects due to random noise.

The d-c output from the integrator is less than that required to control the gain, and since it increases in the positive direction with increases in signal strength, it is necessary to am-

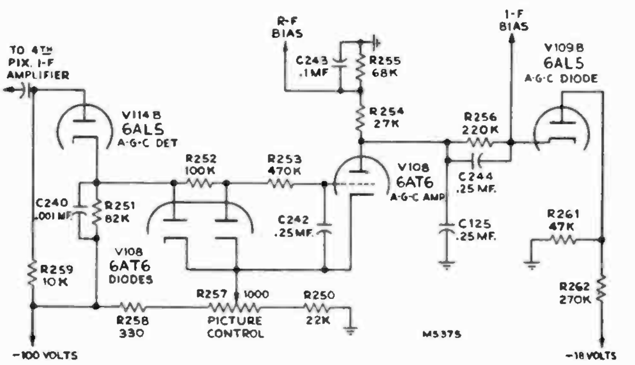


Figure 15—Picture A-G-C Circuit

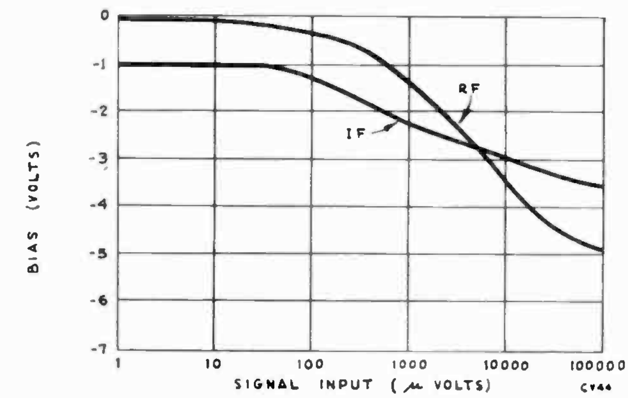


Figure 16—Bias versus Signal Input

plify and "invert." To accomplish this, the output from the integrator is d-c coupled to the V108 a-g-c amplifier grid.

V108 is operated with approximately minus one hundred volts on the cathode and the plate at or slightly below ground potential. The voltage available from the plate is therefore suitable for use as a control bias.

With a weak signal input, the bias on V108 (obtained across R258 and R257) is sufficient to cause the V108 plate current to be cut off. The V108 plate is therefore at ground potential, no bias is applied to the r-f and i-f grids and the receiver operates at maximum gain. When a strong signal is applied to the receiver, the d-c output from the a-g-c detector opposes the fixed bias on V108 and causes plate current to flow. As a consequence, the plate goes negative with respect to ground and this negative voltage is applied to the r-f and i-f grids reducing gain and maintaining constant output from the i-f system.

Since the grid control characteristic of the pentode i-f amplifiers is different from that of the triode r-f amplifier, different bias voltages are required and must be taken from different points in the system.

Also, in order to obtain the maximum signal to noise ratio from the receiver, it is desirable to allow the r-f amplifier to run essentially at full gain on any signal which will not cause overloading of the first i-f stage. The circuit arrangement of Figure 15 including the a-g-c diode (V109B) permits maximum use of r-f gain on weak signals and prevents overloading of the i-f amplifier on strong signals.

On a signal of 1000 microvolts (with the picture control set for normal contrast) the V108 plate is at approx. –2 volts. Since the a-g-c diode plate is placed at approx. a –2.5 volt tap on the dividers R261 and R262, the diode does not conduct and the –2 volts on V108 plate is applied to the i-f grids. On a signal of 10,000 microvolts, the a-g-c amplifier is at approx. –5 volts. Under this condition, the a-g-c diode conducts and due to the drop in R256, prevents the i-f bias from rising appreciably above approx. –3 volts. The r-f bias, however, is not limited and can therefore rise above the i-f bias.

This high value of bias on the r-f amplifier is necessary to reduce the triode nearly to cut-off. Although triodes are not generally considered to be remote cut-off tubes, sufficient curvature is present in the grid control characteristic to provide approximately a ten to one reduction in gain when the bias approaches the plate current cut-off point.

Figure 16 shows a graph of the r-f and i-f bias versus signal input.

Picture Control—A manual gain control is also provided since it is necessary to vary the picture contrast because of variations in room lighting, transmitting technique and to suit personal preference in picture balance. The control varies the i-f gain by varying the initial bias on the a-g-c amplifier which in turn varies the r-f and i-f bias.

VIDEO AMPLIFIER AND D-C RESTORER (block #5)—The function of this section of the receiver is to amplify the video output of the second detector. Two amplifier stages are employed. The gain from the first video grid to output plate is 30X and the frequency response extends to 4 mc.

Noise Saturation Circuit—Since the synchronizing pulse is "blacker than black" and "black" information must drive the kinescope grid toward cut-off, the video signal polarity must be such that the sync is negative when applied to the kinescope grid. It is obvious that for the two-stage video amplifier used, the sync pulse from the second detector must also be negative at the first video amplifier grid. The first stage is designed so that with a normal signal input level at its grid, the tube will be working over most of its operating range. Any large noise signal above sync will drive the grid to cut-off and the noise will be limited. In effect, the signal to noise ratio is thus improved.

D-C Restorer—Since the video amplifier is an a-c amplifier, the d-c component of the video signal that represents the average illumination of the original scene will not be passed. Unless this d-c component is restored, difficulty will be experienced in maintaining proper scene illumination. For any given scene, this average illumination could be set properly by the brightness control. However, a change of scene would probably necessitate resetting this control. The d-c restorer accomplishes this setting automatically thus assuring proper picture illumination at all times. For a detailed explanation of the operation of the d-c restorer, see "Practical Television by RCA."

KINESCOPE (block #6)—The kinescope is a 10" tube employing a new type screen material which provides considerably improved picture brilliance. The tube employs magnetic deflection and magnetic focus. An ion trap is employed to prevent the ion beam from producing a brown spot on the screen.

Electrons and ions emitted from the cathode start toward the anode as shown in Figure 17. The non-symmetrical electrostatic field created by the angular cut on the electron gun and first anode, cause the ions and the electron beam to be bent at "A."

The electron beam is more easily deflected by magnetic fields than are the ions so advantage is taken of this effect to sepa-

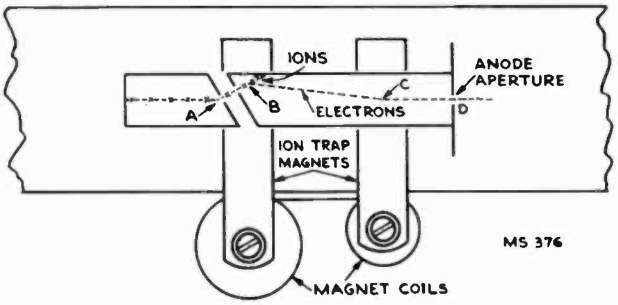


Figure 17—Kinescope Gun and Ion Trap

rate them. The field from the ion trap magnet causes the electron beam to be bent at "B" and "C" and to pass through the anode aperture at "D" headed for the center of the deflection yoke. Since the ions are not appreciably deflected by the field, they fall into the anode and are prevented from reaching the screen.

In installing the receiver, it is necessary to adjust the ion trap magnet location in order to obtain the proper bending of the beam at "B" and "C."

The inside and outside of the flaring portion of the kinescope bulb are given a metallic coating. The inner coating, which is the second anode, is connected to the high voltage supply. The outer coating is grounded by means of two small springs on the deflection yoke support. The capacity between the two coatings is approximately 500 mmf and is used as a high voltage filter condenser.

SYNC AMPLIFIER AND SEPARATOR (block #7)—The function of this system is to amplify the sync signal and effect separation of sync from the video.

Sync Amplifier—The first sync amplifier V118 is a 6SK7 which has a remote cut-off characteristic. The signal from the d-c restorer is fed into this amplifier with the polarity such that the sync is in the negative direction. Noise pulses above sync that remain after the limiting action of the first video grid are thus further compressed and the sync to noise ratio is again improved.

Sync Separator—The sync at the sync separator grid is positive in polarity. The operating voltages applied to the grid, screen and plate, are such that the negative portion of the applied signal is cut off. Thus, the video and blanking pulses are removed and only the sync pulses appear at the sync separator plate.

Second Sync Amplifier—The sync pulses appearing at the second sync amplifier, (V120A), grid are negative in polarity and must be inverted before they can be injected into the sweep oscillators. The signal at the V120A grid is sufficient to drive the tube beyond cut-off and the signal is again clipped. This final clipping removes all amplitude variations between sync pulses due to noise, hum, etc., and it appears with the correct polarity at the plate.

Integrating Network—The purpose of this network is to separate the horizontal from the vertical sync and to pass the vertical to the vertical oscillator.

Since the horizontal sync pulse is of short duration (5 microseconds) and the vertical pulse is of much longer duration (190 microseconds), they can be separated by an r-c filter which is responsive to wave shape. The integrating network which is such a filter is composed of R163, R164, R165, C151, C152 and C153. In operation it can be considered to be a low-pass filter which by-passes the narrow or high frequency horizontal sync but passes the broad or low frequency vertical sync.

VERTICAL OSCILLATOR DISCHARGE AND OUTPUT (block #8)—The function of these circuits is to provide a sawtooth of current of the proper frequency and phase to perform the vertical scanning for the kinescope. To produce such a current in the vertical deflection coil, a somewhat differently shaped voltage wave is required.

Since the vertical trace is slow, requiring approximately 16,000 microseconds, and the vertical deflection coil inductance is small, approximately 50 millihenries, the majority of the voltage across the coil during trace is across its resistive component. In order to produce a linear change of current through a resistance, a linear change of voltage is necessary. Retrace, however, must be accomplished within the 666 microsecond vertical blanking time and therefore requires a much faster rate of change of current through the coil. During this time, the effect of the inductance of the coil becomes appreciable because of the required fast rate of change of current. It is therefore necessary to apply a large pulse of voltage across the coil in order to obtain rapid retrace. The composite waveform required to produce a sawtooth of current in the coil is a sawtooth of voltage with a sharp pulse as shown in Figure 18. V121 and V122 supply such a voltage.

Vertical Oscillator and Discharge—A single 6J5 triode, V121, with its associated components form a blocking oscillator and discharge circuit. The wave form of the voltage at the control grid of this tube with respect to time, is a small, positive surge followed by a large negative drop which returns to the positive condition at a relatively slow rate. During the negative part of the cycle, the grid is beyond cut-off and the discharge capacitor, C158, charges through resistors R169 and R170. When the grid reaches a voltage that permits plate to cathode conduction, C158 discharges through T106 secondary and V121. The discharge current of C158 builds up a magnetic field in T106 that in turn induces a positive voltage at the grid of V121. This positive voltage on the V121 grid lowers the plate resistance of the tube and allows C158 to discharge more rapidly. This process builds up very rapidly until C158 is nearly discharged. The magnetic field in T106 then collapses and drives the V121 grid negative. The charge placed on C154 due to grid conduction during the positive pulse now holds the grid negative. As the charge on C154 leaks off through R171, R172, etc., the grid slowly becomes less negative and approaches the point which will allow plate to cathode conduction. Just before the conduction point is reached, the 60 cycle vertical synchronizing pulse from the integrating network is applied to the V121 grid. This pulse is sufficient to drive the tube to conduction and the process is repeated. In this manner, the incoming sync maintains control of vertical scanning.

On the plate of V121, a sawtooth of voltage appears due to the slow charging and rapid discharging of C158. A sharp negative pulse also occurs during the discharge period. See Figure 18. This pulse appears because of the action of R174 and C158, an action which is known as peaking. When V121 is conducting, the plate voltage drops nearly to cathode potential. C158 discharges during this time. However, since the conduction time is short, C158 cannot be completely discharged due to the time constant of R174 in series with C158. When V121 becomes non-conducting, the plate voltage does not have to rise slowly from cathode potential but instead rises immediately to an appreciable value due to the charge that remains on C158. The plate voltage then slowly rises from this value as C158 charges through R170 and R169. Adjustment of the height control R169 varies the amplitude of the sawtooth voltage on V121 plate by controlling the rate at which C158 can charge.

The voltage present on the V121 plate is of the shape required to produce a sawtooth of current in the vertical deflection coil. It is now necessary to amplify it in a tube capable of supplying a sufficient amount of power.

Vertical Output—A 6K6GT is connected as a triode for the output stage, V122. The vertical output transformer T107 matches the resistance of the vertical deflection coils to the plate impedance of the 6K6GT.

Vertical Linearity Control—R178 is provided as a vertical sweep linearity control. Since the grid-voltage, plate-current curve of V122 is not a straight line over its entire range, the effect of adjustments of R178 is to produce slight variations in the shape of the sawtooth by shifting the operating point of the tube to different points along the curve.

Since the slope of the curve varies at these different points and thus varies the effective gain of the tube, it is apparent that adjustments of linearity affect picture height and that such adjustments must be accompanied by readjustments of the height control R169. Adjustments of the height control affect the shape of the sawtooth voltage on the V121 plate so that adjustments of height must be accompanied by readjustments of linearity.

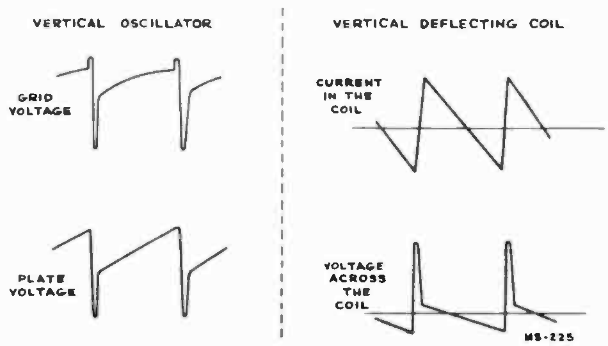


Figure 18—Vertical Sweep Waveforms

HORIZONTAL SYNC DISCRIMINATOR, HORIZONTAL OSCILLATOR AND OSCILLATOR CONTROL (block #9, 10 and 11) —These circuits are a radical departure from the conventional systems used for framing the picture in the horizontal direction. Their features are ease of operation, stability and good noise immunity.

HORIZONTAL OSCILLATOR (block #10)—The horizontal oscillator is an extremely stable Hartley oscillator operating at the scanning frequency 15,750 cps. The primary of T108 (terminals A, B and C) is the oscillator coil. This coil is closely coupled to the secondary winding (terminals D, E and F) and thus feeds a sine wave voltage to V123.

HORIZONTAL SYNC DISCRIMINATOR (block #9)—The sync discriminator, V123, is a 6AL5 dual diode in a circuit which produces a d-c output voltage proportional to the phase displacement between the incoming sync pulses and the sine wave horizontal oscillator voltage.

The sine wave oscillator voltages applied to the plates of V123 are equal in amplitude and opposite in phase. The synchronizing pulses from the second sync amplifier are fed through a small capacitor (C166) to attenuate the vertical sync and then applied to the center tap of T108. The horizontal sync pulses thus appear in phase and of equal amplitude on the diode plates as shown in Figure 19. When the pulse and sine wave are properly phased as in (A), both diodes will produce equal voltage across their load resistances, R191 and R192. However, these voltages are of opposing polarity and therefore the sum of the voltages across these two load resistors will be zero. If the phase of the pulse changes with respect to the sine wave as in (B), the top diode will produce more voltage across R191 than the bottom diode produces across R192. Thus, the voltage across the two will be positive. In (C) the reverse condition exists. It is obvious that the output of the discriminator can swing from positive through zero to negative dependent upon the phase relation of the synchronizing signal and the oscillator. This d-c output is applied to the grid of V124.

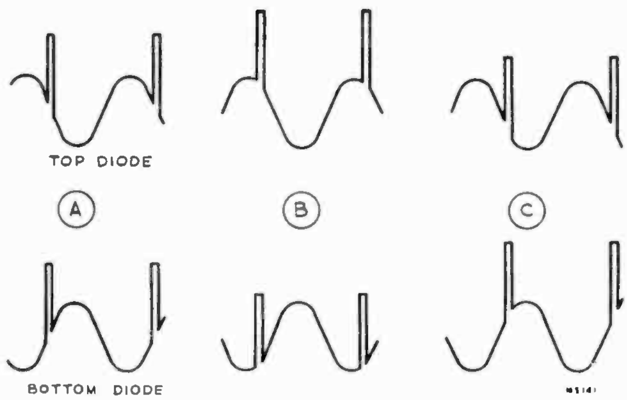


Figure 19—Sync Discriminator Waveforms

HORIZONTAL OSCILLATOR CONTROL (block #11)—V124 the oscillator control is a 6AC7 connected as a reactance tube across the V125 oscillator coil. A change in the d-c output of the sync discriminator produces a change in Gm of V124 which in turn changes the frequency of the oscillator. If the phase of the oscillator shifts with respect to the synchronizing pulse, the corresponding change in d-c from the sync discriminator causes the oscillator to be brought back into correct phase.

C167 and C170 form a voltage divider to attenuate rapid changes in d-c from the sync discriminator such as are produced by the vertical sync or bursts of noise.

Sync Link—If any phase modulation is present in the transmitted sync, a condition which unfortunately still exists in some transmitters to date, a faster response to fluctuations in the sync phase is needed than is provided by the ratio of C167 to C170.

The sync discriminator will demodulate sync phase variation quite faithfully, however, the filter resistor R193 together with the capacity attenuator, C167 and C170 is just as effective in removing this information as it is with respect to the noise disturbances for which it is intended. The removal of this information will produce a horizontal displacement of portions of the picture.

It may be necessary in some instances to sacrifice some noise immunity to compensate for phase modulation in the transmitted sync. By switching the link provided for this purpose, C171 is added across C167 and the speed of response is increased by several times. Therefore, the link of J102 should be connected between terminals 1 and 2 whenever this condition exists.

Before making this change, however, it should first be definitely determined that distortion of the raster is due to phase modulation of the sync. Horizontal "jitter" and distortion of the raster can be caused by operating the picture control at too great a gain setting considering the r-f signal input. Such a setting produces an excessive video signal at the first video amplifier grid. This stage is designed to limit an excessive input in order to improve the signal to noise ratio. If the video input is excessive, the sync is limited and thus removed. At the same time picture information may be introduced into the sync circuits. With extreme excesses of video level, both horizontal and vertical sync may be lost. If the receiver operating instructions on page 5 are followed, no difficulty should be experienced with the picture control setting.

HORIZONTAL DISCHARGE, OUTPUT AND REACTION SCANNING (block #12)—The purpose of these circuits is to produce a sawtooth of current in the deflection coils to provide horizontal scanning for the kinescope.

Horizontal Discharge—One-half of a 6SN7GT is employed for the discharge tube V120B. The function of this stage is to produce a sawtooth voltage for use in the horizontal sweep circuits.

The oscillation in V125 takes place between screen-grid and cathode. Since the peak to peak voltage on its grid is approximately 130 volts, a square wave of voltage is produced on its plate. This wave is differentiated by C176 and R202, and the pulse so obtained is applied to the grid of the discharge tube V120B.

The discharge tube is normally cut off due to bias produced by grid rectification of these incoming pulses. The pulse from V125 overcomes this bias and drives the tube into heavy momentary conduction. During this period the plate voltage falls nearly to cathode potential and C179 discharges rapidly. However, since the period of conduction is quite short, C179 is not completely discharged due to the time constant introduced by R187 and R210 in series with C179. Then when V120B again becomes non conducting, the plate voltage rises quickly to a value determined by the charge remaining on C179. From this point the plate voltage rises slowly and approximately linearly as C179 charges through R204.

Horizontal Output and Reaction Scanning—The operation of these two circuits is so interconnected that it will be necessary to discuss them simultaneously. The function of the output tube V126 is to supply sufficient current of the proper wave form to the horizontal deflection coils in order to provide horizontal scanning for the kinescope. The function of the reaction scanning tube V128 is to stop oscillation of certain components at certain times and thus help provide a linear trace. Other functions of these circuits include the utilization of energy stored in the horizontal deflection coil to furnish retrace and kinescope high voltage. The reaction scanning circuit also recovers some of the energy from the yoke kickback and uses it to help supply the plate power requirements of the output tube.

In operation, the visible portion of the horizontal trace is approximately 53 microseconds in duration. Although the inductance of the horizontal deflection coil is in the order of 8 millihenries, at the horizontal scanning frequency, the reactance of the coil predominates over its resistance. This is a different case than that encountered in the vertical deflection system and so a different method of operation must be employed.

Horizontal blanking is approximately 10 microseconds in duration. During this time, the kinescope beam must be returned to the left side of the tube, the trace started and made linear. To accomplish all this within the horizontal blanking time, only 7 microseconds can be allowed for the return trace. In order to obtain such rapid retrace, the horizontal deflection coil, output transformer and associated circuits are designed to resonate at a frequency such that one-half cycle of oscillation at this frequency will occur in the 7 microseconds retrace time limit. This represents a frequency of approximately 71 kc.

During the latter part of the horizontal trace, the output tube conducts very heavily and builds up a strong magnetic field in the deflection coil and output transformer. When the negative pulse from the horizontal discharge tube is applied to the output tube grid, its plate current is suddenly cut off and the magnetic field in the transformer and deflection coil begins to collapse at a rate determined by the resonant frequency of the system. Actually the system is shock excited into oscillation. Since the output tube is cut off and since the voltage generated by the collapsing field is negative on the reaction scanning tube plate so that it is non-conductive, there is essentially no load on the circuit and it oscillates vigorously for one half cycle. If the reaction scanning tube were not present, the circuit would continue to oscillate as shown in Figure 20 (A). This condition, however, is not permitted. One half cycle of oscillation is permitted because at the end of such a time the current in the deflection coil has reached a maximum in the opposite direction to which it was flowing at the end of the trace period. This reversal of the direction of flow of current is the requirement for retrace and it is accomplished in the allotted 7 microseconds.

Now that retrace has been completed, it is necessary to start the next trace. The energy which was placed in the deflection coil by the output tube in the latter part of the last trace has not been dissipated. During the one-half cycle of oscillation, retrace was accomplished with very little loss of energy. The field in the coil was merely reversed in polarity. So, at this point, a strong field exists in the deflection coil.

As mentioned previously, if the coil were not damped, it would continue to oscillate at its natural frequency as shown in Figure 20 (A). To prevent such an oscillation the reaction scanning tube is brought into action. This tube is in a modified damper circuit which is effectively connected across the deflecting coil.

In the oscillating circuit, the current in the deflection coil lags the voltage by approximately 90 degrees (one-quarter cycle at oscillation frequency) and when the current has reached its maximum negative value, the voltage across the coil being 90 degrees ahead, has begun to swing positive. When the voltage on the reaction scanning tube plate becomes positive with respect to its cathode, it begins to conduct heavily. This places such a load across the deflection coil that it cannot oscillate. Instead the field begins to decay at a rate permitted by the load which the reaction scanning tube placed on the coil. The circuit constants are such that this decay is linear and at a rate suitable for the visible trace.

If no additional energy were fed into the coil, the field would fall to zero and the kinescope beam would come to rest in the center of the tube. In such an r-f circuit, as the current approaches its final value, it does not do so linearly but asymptotically as indicated in Figure 20 (B). It is therefore necessary to have the output tube begin to supply power to the deflection coil before the energy in the coil is completely dissipated. Figure 20 (C) shows the shape of the current supplied by the output tube. Although the currents supplied by the output tube and by the decaying field are curved at the cross over point, together they produce a coil current that is linear.

By the time the beam has reached the right side of the kinescope, the output tube is conducting heavily and has built up a strong field in the transformer and coil. At this point, the output tube is again suddenly cut off and the process is repeated.

The 6BG6G plate voltage is supplied through the 5V4G which is conducting over the major portion of the trace. Capacitors C186 and C188 are charged during this period and this charge is sufficient to supply the 6BG6G plate when the 5V4G is not conducting.

The charge is placed on these capacitors by the receiver d-c supply and by the current from the collapse of the field in the horizontal deflecting coil. The a-c axis of the sweep voltage is 275 volts above ground since the T109 secondary is connected to the receiver 275 volt bus. The charge placed on these capacitors by the coil kick-back is therefore in addition to that from the d-c supply and thus the capacitors are charged to a voltage greater than the d-c supply. This permits operation of the 6BG6G at a higher voltage than is obtainable from the receiver power supply and produces an increase in the system efficiency by salvaging energy that would otherwise have been wasted.

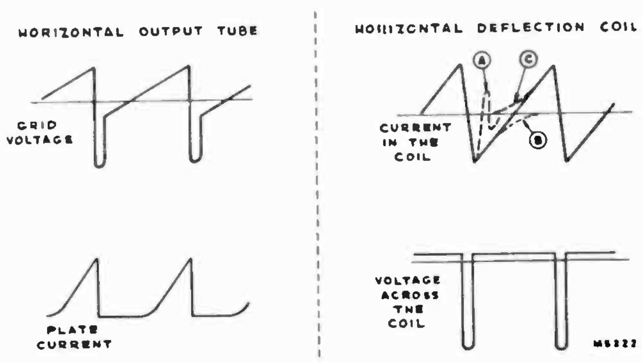


Figure 20—Horizontal Sweep Waveforms

Width Control—L196 is provided to vary the output and hence the picture width by shunting a portion of the T109 secondary winding. Clockwise rotation of the adjustment increases the picture width and causes the right side of the picture to stretch slightly.

Horizontal Drive Control—R187, the horizontal drive control, determines the ratio of high peaking and sawtooth voltage on the grid of the output tube and thus affects the point on the trace at which the tube conducts. Clockwise rotation of control increases picture width, crowds the right side of the picture and stretches the left side.

Horizontal Linearity Control—In order to describe the action of the linearity control, some additional facts about damper circuits must be presented.

Figure 21A shows the basic circuit of a conventional damper. During the first half of the visible trace (which is supplied by the decaying field in the deflection coil), trace linearity is controlled by the conduction of the damper tube. During this conduction period, capacity C1 is charged by the damper current. The time constant of R1 and C1 is such that C1 does not completely discharge between traces. This voltage acts as a "bias" on the damper and controls damper tube conduction. By varying the bias on the damper during the trace, a variation of damping action and a consequent control of trace linearity can be achieved.

Figure 21B shows the basic reaction scanning circuit. The tube bias is developed across C2 which discharges through L1, R2 and C3. By varying L1, the rate and shape of the discharge can be controlled.

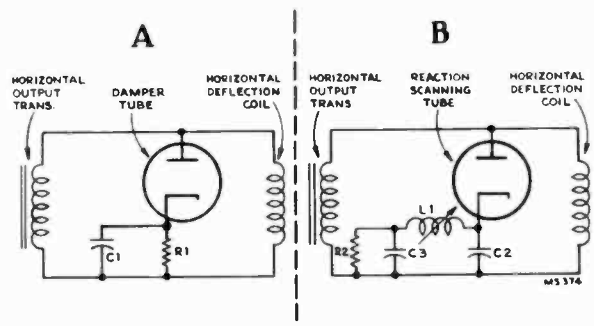


Figure 21—Damper Circuits

In Model 641TV, the linearity control is L201 and is provided to effect small improvements in linearity of the left side of the picture. Counterclockwise rotation of the adjustment screw causes the second quarter of the picture to stretch and the first quarter to crowd.

R209 is a damping resistor inserted to control trace linearity on the extreme left edge of the picture. A high and low tap is provided on this resistor by which variations in the yoke and output transformer can be compensated for. This tap is set in the factory and probably will not have to be changed in the field.

HIGH VOLTAGE POWER SUPPLY (block #13)—The kinescope high voltage supply is unusual in that the power is obtained from the energy stored in the deflection inductances during each horizontal scan. When the 6BG6G plate current is cut off by the incoming signal, a positive pulse appears on the T109 primary due to the collapsing field in the deflection coil. This pulse of voltage is stepped up, rectified, filtered and applied to the second anode of the kinescope. Since the frequency of the supply voltage is high, (15,750 cps), relatively little filter capacity is necessary. Since the filter capacity is small, the stored energy is small, and the high voltage supply is made less dangerous.

LOW VOLTAGE POWER SUPPLY (block #15)—The low voltage power supply provides the filament and plate voltages for the receiver. The unit is conventional, and employs two 5U4G rectifier tubes in parallel to supply 400 volts d-c at approximately 270 ma.

The ion trap used in Model 8TV41 is of the permanent magnet type—see Fig. 5 on page 213. The illustration below shows the magnet used in Model 641TV.

L183 (3rd Pix I-F coil adj.) is T102 in Model 8TV41.

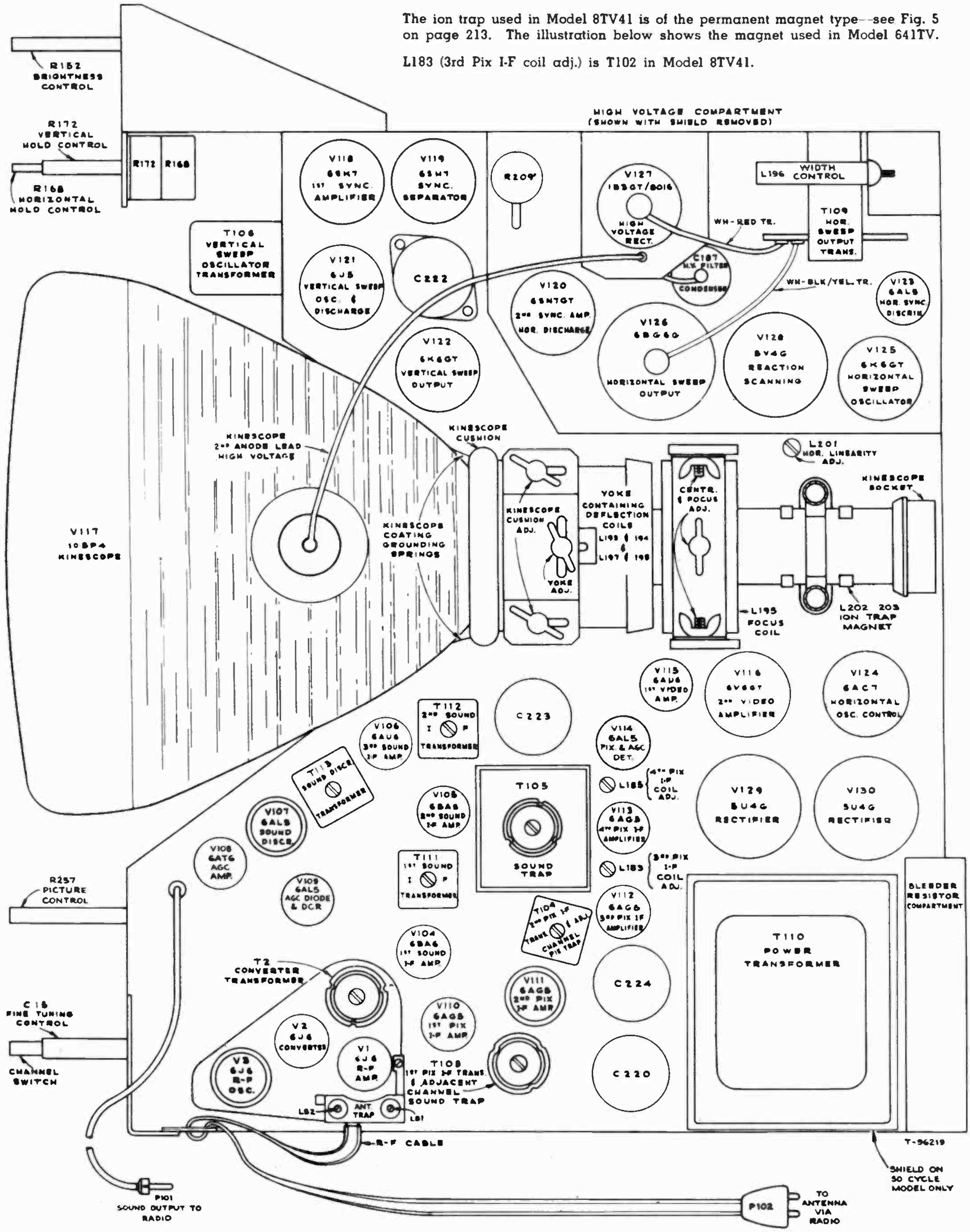


Figure 22—Television Chassis Top View

L183 (3rd pix I-F coil) is T102 in Model 8TV41.

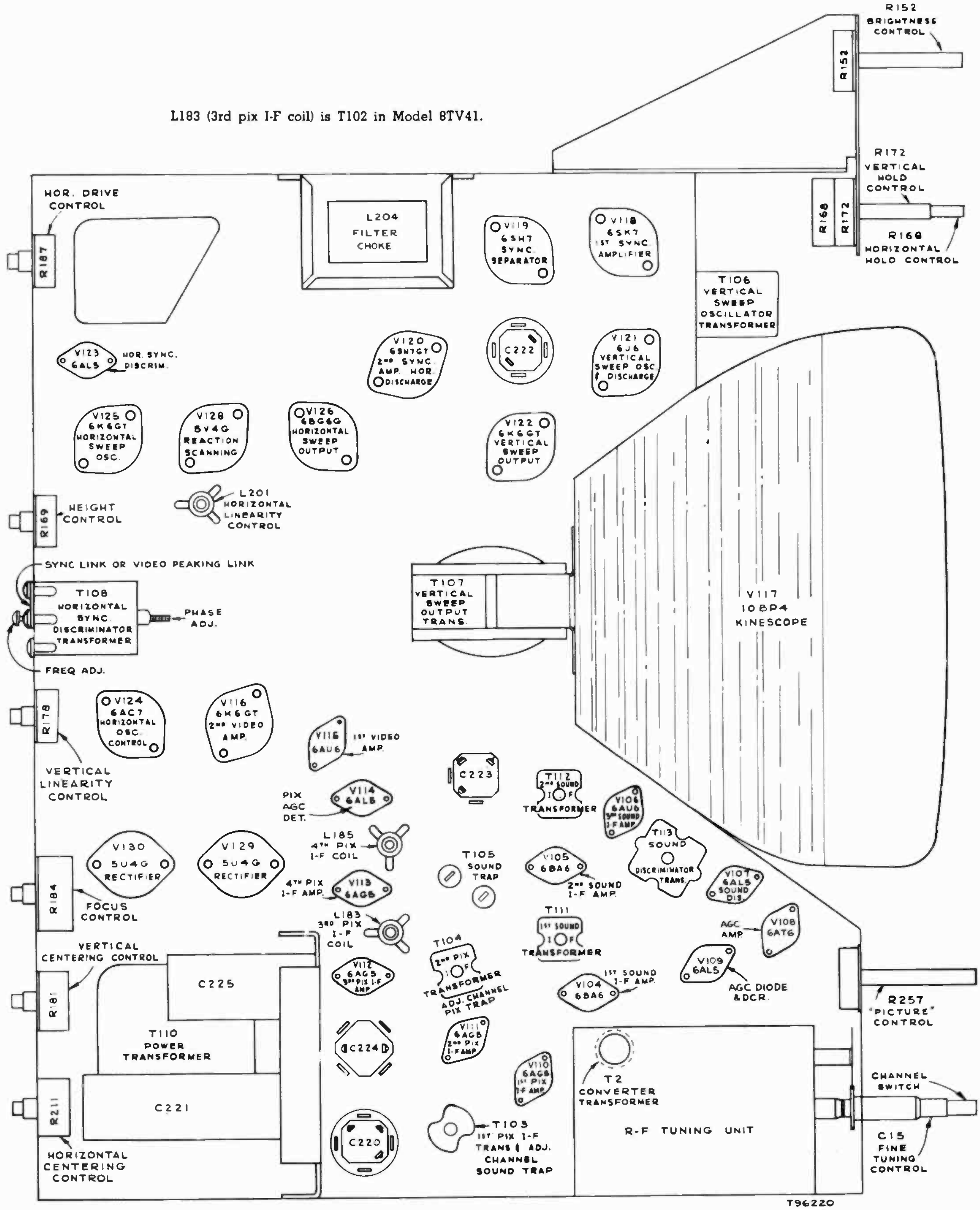


Figure 23—Television Chassis Bottom View

TEST EQUIPMENT—To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges

18 to 30 mc., 1 mc. sweep width
40 to 90 mc., 10 mc. sweep width
170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-ray Oscilloscope, preferably one with a wide band vertical deflection, an input calibrating source, and a low capacity probe.

Signal Generator to provide the following frequencies.

(a) I-F frequencies

19.75 mc. adjacent channel picture trap
21.25 mc. sound i-f and sound traps
21.8 mc. converter transformer
22.3 mc. second picture i-f transformer
23.4 mc. fourth picture i-f coil
25.2 mc. third picture i-f coil
25.3 mc. first picture i-f transformer
25.75 mc. picture carrier
27.25 mc. adjacent channel sound trap

(b) R-F frequencies

Channel Number	Picture Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.	Sound Carrier Freq. Mc.
1	45.25	71	49.75
2	55.25	81	59.75
3	61.25	87	65.75
4	67.25	93	71.75
5	77.25	103	81.75
6	83.25	109	87.75
7	175.25	201	179.75
8	181.25	207	185.75
9	187.25	213	191.75
10	193.25	219	197.75
11	199.25	225	203.75
12	205.25	231	209.75
13	211.25	237	215.75

(c) Output on these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 10 kv.

Service Precautions—If necessary to remove the chassis from cabinet, the kinescope must first be removed. See Figures 4 and 7. If possible, the chassis should then be serviced without the kinescope. However, if it is necessary to view the raster during servicing, the kinescope should be inserted only after the chassis is turned on end. The kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer down, all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave all adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not short the kinescope second anode lead. Its short circuit current is approximately 3 ma. This represents approximately 9 watts dissipation and a considerable overload on the high voltage filter resistor R235.

Adjustments Required—Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require re-adjustment.

Due to the high frequencies at which the receiver operates the r-f oscillator line adjustment is critical and may be affected by a tube change. The line can be adjusted to proper frequency on channel 13 with practically any 6J6 tube in the oscillator socket. However, it may not then be possible to adjust the line to frequency on all of channels 7, 8, 9, 10, 11 and 12. To be satisfactory as an oscillator tube, it should be possible to adjust the line to proper frequency with the fine tuning control in the middle third of its range. It may therefore be necessary to select a tube for the oscillator socket. In replacing, if the old tube can be matched for frequency by trying several new ones, this practice is recommended. At best, however, it will probably be necessary to completely realign the oscillator line when changing the tube.

Tubes which cannot be used as oscillator will work satisfactorily as r-f amplifier or converter.

The detailed alignment procedure which follows is intended primarily as a discussion of the method used, precautions to be taken and the reasons for these precautions. Then, for more convenient reference during alignment, a tabulation of the method is given. All the information necessary for alignment is given in the table, however, alignment by the table should not be attempted before reading the detailed instructions.

ORDER OF ALIGNMENT—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:—

Sound discriminator
Sound i-f transformers
Picture i-f traps
Picture i-f transformers
R-F and converter lines
R-F oscillator line
Converter grid trap
Retouch picture i-f transformers
Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT—

Set the signal generator for approximately .1 volt output at 21.25 mc. and connect it to the third sound i-f grid.

Detune T113 secondary (bottom).

Set the "VoltOhmyst" on the 10 volt scale.

Connect the meter in series with a one megohm resistor to the junction of diode resistors R219 and R220. Do not remove the discriminator shield to make connection to R219 and R220. Connection can be easily made by fashioning a hook on the 1 meg resistor lead and making connection to the transformer lug "C" through the hole provided for the adjusting tool.

Adjust the primary of T113 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of R236 and the sound output cable.

Adjust T113 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T113 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the third sound i-f amplifier.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 and with an output of approximately 1 volt.

Connect the oscilloscope to the junction of R236 and the sound output cable.

The pattern obtained should be similar to that shown in Figure 30A. If it is not, adjust the T113 (top) until the wave form is symmetrical.

The peak to peak bandwidth of the discriminator should be approximately 350 kc. and it should be linear from 21.175 mc. to 21.325 mc.

SOUND I-F ALIGNMENT—

Connect the sweep oscillator to the second sound i-f amplifier grid.

Connect the oscilloscope to the third sound i-f grid return (terminal A T112) in series with a 33,000 ohm isolating resistor.

Insert a 21.25 mc. marker signal from the signal generator into the second sound i-f grid.

Adjust T112 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 30B.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the third sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

Connect the sweep and signal generator to the top end of the trap winding of T2 (on top of the chassis). Adjust T111 (top and bottom), for maximum gain and symmetry at 21.25 mc.

Reduce the sweep output for the final adjustments so that approximately .3 volt peak-to-peak is present at the third sound i-f grid return.

The band width at 70% response from the first sound i-f grid to the third i-f grid should be approximately 200 kc.

PICTURE I-F TRAP ADJUSTMENT—

Turn the receiver picture control fully clockwise.

Remove the 6AT6 a-g-c amplifier, V108.

Construct a bias box by shunting a 10,000 ohm potentiometer across a 4½ volt battery. Connect the positive terminal of the battery to the receiver chassis. Connect the arm of the potentiometer to pin 5 of V109. Adjust the potentiometer to provide −3 volts at its arm.

Set the channel switch to channel 13.

Connect the "VoltOhmyst" across the picture second detector load resistor R137.

Connect the output of the signal generator to the junction of L80 and R6. This connection is available on a terminal lug through a hole in the side apron of the chassis, beside the r-f unit. This hole is normally down when the chassis is in the recommended position. Connection can be easily made, however, by allowing the receiver to hang over the edge of the test bench by a few inches.

Set the generator to each of the following frequencies and tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency

21.25 mc.—T105 (top)
21.25 mc.—T2 (top)
27.25 mc.—T103 (top)
27.25 mc—T102 (bottom) Model 8TV41 only
19.75 mc.—T104 (top)

PICTURE I-F TRANSFORMER ADJUSTMENTS—

Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst."

21.8 mc.—T2 (bottom
25.3 mc.—T103 (bottom)
22.3 mc.—T104 (bottom)
25.2 mc.—L183 (top of chassis)
23.4 mc.—L185 (top of chassis)

L183 (3rd pix I-F coil) is T102 in Model 8TV41.

If T104 (bottom) required adjustment, it will be necessary to reset T104 (top) for minimum response at 19.75 mc.

Picture I-F Oscillation—If the receiver is badly misaligned and two or more of the i-f transformers are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a voltage in excess of 3 volts at the picture detector load resistor. This voltage is unaffected by r-f signal input and sometimes is independent of picture control setting.

If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the transformers approximately to frequency by setting the adjustment stud extensions of T2, T103, T104, T105, L183, and L185 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias. If so, it should then be possible to align the transformers by the usual method. Once aligned in this manner, the i-f should be stable with reduced bias.

In Model 8TV41, T102 is used in place of L183 (3rd. pix i-f coil).

If the oscillation cannot be stopped in the above manner, shunt the grids of the first three i-f amplifiers to ground with 1000 mmf. capacitors.

Connect the signal generator to the fourth i-f grid and adjust L185 to frequency.

Remove the shunting capacitor from the third i-f grid, connect the signal generator to this grid and align L183 (or T102).

Remove the shunting capacitor from the second i-f grid, connect the signal generator and align T104.

Remove the shunt from the first i-f grid, connect the signal generator to the receiver antenna terminals, and align T2 to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is very stable when properly aligned. Check all i-f by-pass condensers, transformer shunting resistors, tubes, socket voltages, etc.

R-F AND CONVERTER LINE ADJUSTMENT—
Connect the r-f sweep oscillator to the receiver antenna terminals. If the sweep oscillator has a 50 ohm single-ended output, it will be necessary to obtain balanced output by properly terminating the sweep output cable and connecting a 120 ohm non-inductive resistor in series between the sweep output cable and each receiver antenna terminal as shown in Figure 24.

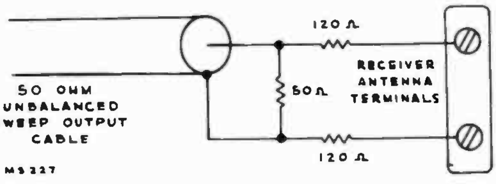


Figure 24—Unbalanced Sweep Cable Termination

Connect the oscilloscope to the junction of L80 and R6 (in the r-f tuning unit) through a 10,000 ohm resistor.

By-pass the first picture i-f grid to ground through a 1000 mmfd. capacitor. Keep the leads to this by-pass as short as possible. If this is not done, lead resonance may fall in the r-f range and cause an incorrect picture of the r-f response.

Turn the picture control fully clockwise. Connect the positive terminal of the bias box to the receiver chassis and the arm to pin 5 of V109. Set the potentiometer for −1 volt at its arm.

Connect the signal generator loosely to the receiver antenna terminals.

Set the C14 adjustment screw to its approximate normal operating position, 1½ turns out from maximum capacity. If the C14 capacity is less than this it may produce a resonance in channel 1, 2 or 3. During r-f alignment, such a resonance may show up as a "suck out" in the response curve of one of these channels. Under such conditions it will be impossible to obtain the proper response. With C14 set as specified or in later production receivers in which C14 is fixed, no such difficulty should be experienced.

Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7 (see Figure 29 for switch shaft flat location versus channel).

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier 175.25 mc. and 179.75 mc.

Adjust L25, L26, L51 and L52 (see Figure 31) for an approximately flat topped response curve located symmetrically between the markers. Normally this curve appears somewhat overcoupled or double humped with a 10 or 15% peak to valley excursion and the markers occur at approximately 90% response. See Figure 31, channel 7. In making these adjustments, the stud extension of all cores should be kept approximately equal.

Check the response of channels 8 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observe the response obtained. See Figure 31 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 70% response. If the markers do not fall within this requirement on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L25, L26, L51 and L52, and possibly compromise some channel slightly in order to get the markers up on other channels. Normally however, no difficulty of this type should be experienced since the higher frequency channels become comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L11, L12, L37 and L38, for an approximately flat-topped response curve located symmetrically between the markers.

Check channels 5 down through channel 1 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 70% response point. If this is not the case, L11, L12, L37 and L38 should be retouched. On final adjustment, all channels must be within the 70% specification.

Coupling between r-f and converter lines is augmented by a link between L12 and L37. This link is adjusted in the factory and should not require adjustment in the field. On channel 6 with the link in the minimum coupling position, the response is slightly overcoupled with approximately a 10% excursion from peak-to-valley. With the coupling at maximum, the response is somewhat broader and the peak-to-valley excursion is approximately 40%. The amount of coupling permissible is limited by the peak-to-valley excursion which should not be greater than 30% on any channel.

R-F OSCILLATOR LINE ADJUSTMENT—

The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the "Volt-Ohmyst" to the sound discriminator output (junction of R236 and the sound output cable.

Connect the signal generator to the receiver antenna terminals.

The order of alignment remains the same regardless of which method is used.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to channel 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust L77 and L78 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. The core stud extensions should be maintained equal by visual inspection except as discussed in the following paragraph entitled Oscillator Pulling.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L76 for indications as above.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

Oscillator Pulling—If in setting the low frequency channels, the high frequency channels are pulled noticeably off frequency, or if it is impossible to set channels 10, 11 or 12 within the range of their respective trimmers, it may be due to interaction between sections of the line. A quick check can be made to determine if this is the case.

The shorting section of the r-f oscillator channel switch, (rotor), should be at ground r-f potential. If this is not the case due to dissymmetry in the circuit, the shorting section may be somewhat above ground. Since at these high frequencies, even the length of the shorting bar represents an appreciable portion of a wave length, the lower frequency section is effectively tapped up on the high frequency section and reflects reactance into it. This reactance varies with low frequency channel oscillator adjustments thus causing a shift in oscillator frequency on the upper channels. One way to cure this difficulty is to adjust the shorting switch to ground potential. This can be accomplished by staggering L77 and L78 until this condition is achieved.

To find if dissymmetry exists, remove the bottom cover from the r-f unit.

Set the channel switch to channel 10.

Disconnect any input from the receiver.

Connect the "VoltOhmyst" to R6 through the hole in the side of chassis, and measure the oscillator injection into the converter grid.

Take an insulated metal prod and touch the center of the oscillator rotor shorting bar. If the meter reading changes, it indicates that the bar is not at r-f ground.

To balance the line, switch to channel 13 and stagger the cores for one or more turns (usually L78 out and L77 in). The final adjustment must leave the oscillator on correct channel 13 frequency.

Switch back to channel 10 and touch the switch rotor as before. As before, meter movement indicates unbalance.

For fine balancing touch the switch contacts for channel 10. When balanced, the meter will show equal reduction for both contacts. Continue staggering the cores until balance is obtained.

Repeat the oscillator adjustments for all channels.

In later production receivers, several r-f oscillator coil changes were made and a capacitor C19 was added to minimize the oscillator pulling effect. In receivers in which C19 is present the staggering of cores should not be necessary.

CONVERTER GRID TRAP ADJUSTMENT—
Connect the sweep generator to the receiver antenna terminals. Observe the precaution for single-ended output generators mentioned in the r-f alignment section.

Connect the oscilloscope to R6 through 10,000 ohms.

Shunt the first picture i-f grid to ground with a 1,000 mmf. capacitor, keeping the leads as short as possible.

Couple the signal generator loosely to the receiver antenna terminals.

Switch the channel switch and signal generator through the low frequency channels and observe the response on each range.

Select a channel which is essentially flat over the operating range with the sound and picture carrier markers at 90% or higher on the response curve.

Remove the capacitor from the first picture i-f grid and shunt it from the second picture i-f grid to ground.

Adjust C14 for an r-f response curve similar to the one obtained with the first picture i-f grid shunted. See Figure 32.

In later production receivers, C14 is fixed and obviously this adjustment cannot be made on those sets. In such receivers, this step should be followed as a check to assure that proper converter operation is obtained.

RETOUCHING OF PICTURE I-F ADJUSTMENTS—
The picture i-f response curve varies somewhat with change of bias and for this reason it should be aligned with approximately the same signal input as it will receive in operation. If the receiver is located at the edge of the service area, it should be aligned with approximately −1 volt i-f grid bias. However, for normal conditions, (signals of 1000 microvolts or greater), it is recommended that the picture i-f be aligned with a grid bias of −3 volts.

Connect the r-f sweep generator to the receiver antenna terminals.

Connect the signal generator to the antenna terminals and feed in the 25.75 mc i-f picture carrier marker and a 22.3 mc. marker.

Connect the oscilloscope across the picture detector load resistor.

Remove the shunting capacitor from the second picture i-f grid.

Turn the picture control fully clockwise. Connect the bias box and set the potentiometer for −3 volts at its arm.

Set the sweep output to produce approximately .3 volt peak-to-peak across the picture detector load resistor.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. See Figure 33

If for example as in Figure 33A the response is peaked in the middle, and the picture carrier is low on the response curve slope, then the high Q transformer T103, (which is peaked at 25.3 mc.—near the picture carrier 25.75 mc.), should be retouched to bring the picture carrier response up to approximately 40%.

It will then probably be found that the response is generally high on the low frequency end of the curve as in Figure 33B. If this is the case, adjust L183, (25.2 mc. and fairly broad), to bring the high frequency end response up. The picture carrier is thus brought still further up the slope and an approximately flat topped response curve is obtained as in Figure 33C.
In Model 8TV41, T102 is used in place of L183 (3rd. pix i-f coil).

If T104 (bottom) required any adjustment, it will be necessary to reset T104 (top) for minimum response at 19.75 mc.

On final adjustment the picture carrier marker must be at approximately 45% response. The curve must be approximately flat topped and with the 22.3 mc. marker at approximately 100% response.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 45% response point. If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture definition is impaired by loss of high frequency video response.

The above example is used to show the line of reasoning involved in making the retouching adjustments. Since there are five tuned circuits each aligned to a different frequency, it is obvious that many different conditions can exist, however, similar reasoning will apply to each case. With some experience in making these adjustments, it will be found that the desired response can be readily obtained. In making these adjustments, care should be taken that no two transformers are tuned to the same frequency as i-f oscillation may result.

Replace the 6AT6 a-g-c amplifier, V108.

RESPONSE CURVES—The response curves shown on page 30 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected. Channel 2 response (not shown) is similar to that of channel 3.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

ALIGNMENT TABLE—Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment. If it is found that the dual listing is confusing, the unwanted listing can be easily erased.

In Model 8TV41, T102 is used in place of L183 (3rd. pix i-f coil).

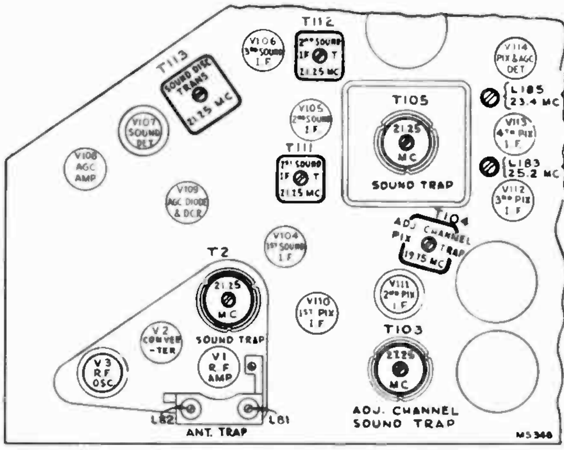
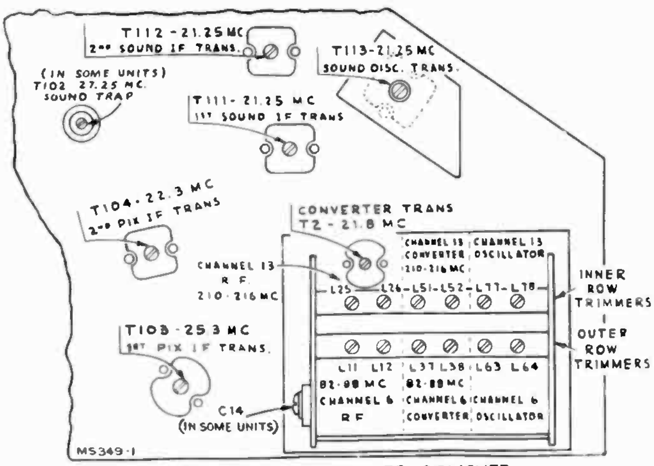


Figure 26—Top Chassis Adjustments



R-F UNIT SHOWN WITH COVER REMOVED

Figure 27—Bottom Chassis Adjustments

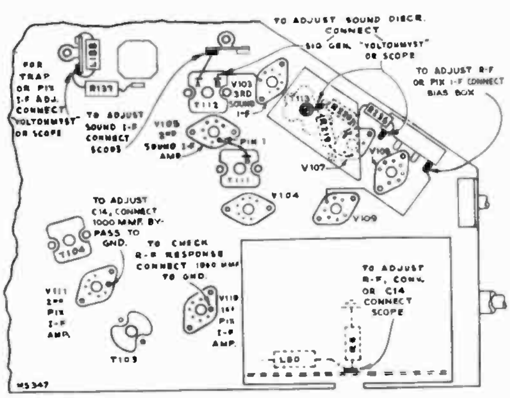
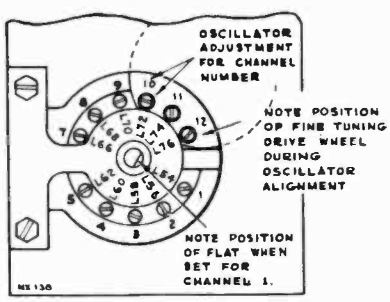


Figure 28—Test Connection Points



OSCILLATOR ADJUSTMENTS FOR CHANNELS 6 AND 13 ARE ON SIDE OF R.F. UNIT

Figure 29—R-F Oscillator Adjustments

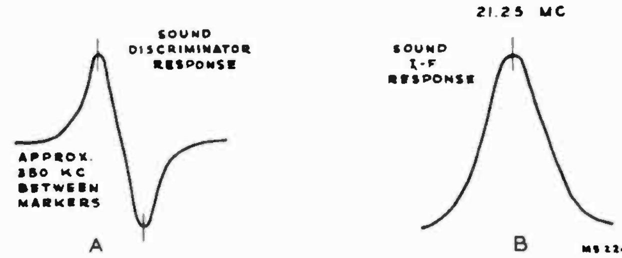


Figure 30—Sound Discriminator and I-F Response

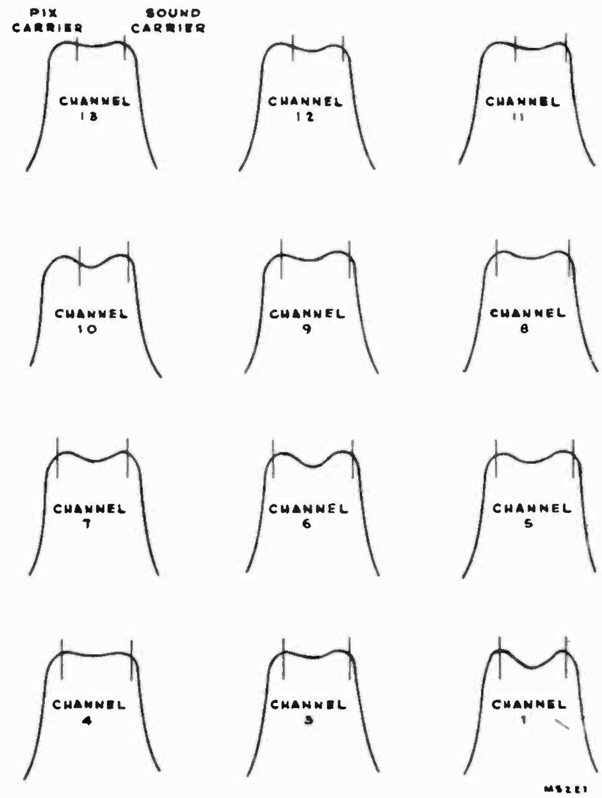


Figure 31—R-F Response

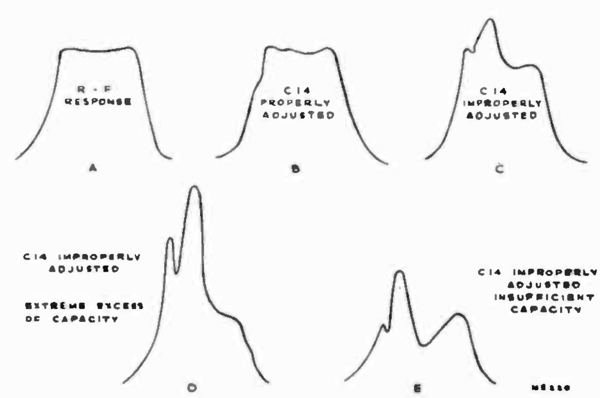


Figure 32—Effects of C14 Adjustments

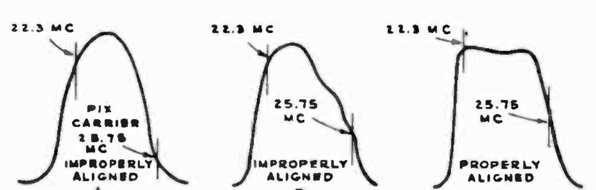


Figure 33—Overall Response

TELEVISION ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 20 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	DISCRIMINATOR AND SOUND I-F ALIGNMENT								
1	3rd sound i-f grid (pin 1, V106)	21.25 .1 volt output	Not used		Not used	In series with 1 meg. to junction of R219 & R220		Detune T113 (bottom). Adjust T113 (top) for max. on meter	Fig. 28 Fig. 27 Fig. 26
2	"	"	"		"	Junct. of R236 & sound output cable	Meter on 3 volt scale	T113 (bottom) for zero on meter	Fig. 28 Fig. 27
3	"	"	3rd sound i-f grid (pin 1, V106)	21.25 center 1 mc. wide .1 v. out	Junction of R236 & Sound Output Cable	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T113 (top) until they are equal		Fig. 28 Fig. 30 A
4	2nd sound i-f grid (pin 1, V105)	21.25 reduced output	2nd sound i-f grid	21.25 reduced output	Terminal A, T112 in series with 33,000 ohms	"	Sweep output reduced to provide .3 volt p-to-p on scope	T112 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 28 Fig. 26 Fig. 27 Fig. 30 B
5	Trap winding on T2 (top of chassis)	21.25 reduced output	Trap winding on T2	21.25 reduced output	"	"	"	T111 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 26 Fig. 27 Fig. 28 Fig. 30 B
	PICTURE I-F AND TRAP ADJUSTMENT								
6	Not used		Not used		Not used	Pin 5, V109	Remove V108. Connect bias box + to gnd. — to Pin 5 V109 socket	Picture control max. bias box −3 volts.	Fig. 28
7	Junction C14 and R6	21.25	"		"	Junction of L188 & R137	Meter on 3 volt scale. Receiver on channel 13	T105 (top) for min. on meter	Fig. 26
8	"	21.25	"		"	"	"	T2 (top) for min.	Fig. 28 Fig. 26
9	"	27.25	"		"	"	"	T103 (top) for min.	"
10	"	27.25	"		"	"	"	T102 (bottom) for min.	Fig. 27
11	"	19.75	"		"	"	"	T104 (top) for min.	Fig. 26
12	"	21.8	"		"	"	"	T2 (bottom) for max.	Fig. 27
13	"	25.3	"		"	"	"	T103 (bottom) for max.	"
14	"	22.3	"		"	"	"	T104 (bottom) for max.	"
15	"	25.2	"		"	"	"	T102 (top chassis) for max.	Fig. 26
16	"	23.4	"		"	"	"	L185 (top chassis) for max.	"
17	If T104 (bottom) required adjustment in step 14, repeat step 11.								
	R-F AND CONVERTER LINE ALIGNMENT								
18	Not used		Not used		Not used			Picture control max. bias box −1 volt.	Fig. 28 Fig. 27
19	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (see text for precaution)	Sweeping channel 7	Junction C14 and R6 through 10,000 ohm series resistor	Not used	1st i-f grid by-pass to gnd. with 1000 mmf. Receiver on channel 7	L25, L26, L51 & L52 for approx. flat top response between markers. Markers above 70%	Fig. 28 Fig. 27 Fig. 31 (7)
20	"	181.25 185.75	"	channel 8	"	"	Receiver on channel 8	Check to see that response is as above	Fig. 31 (8)
21	"	187.25 191.75	"	channel 9	"	"	Receiver on channel 9	"	Fig. 31 (9)
22	"	193.25 197.75	"	channel 10	"	"	Receiver on channel 10	"	Fig. 31 (10)
23	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 31 (11)
24	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 31 (12)
25	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 31 (13)
26	If the response on any channel (steps 20 through 25) is below 70% at either marker, switch to that channel and adjust L25, L26, L51 & L52 to pull response up on that channel. Then recheck steps 19 through 25.								

*Step 10 used for Model 8TV41 only.
†In Model 641TV; L183 is used in place of T102

R-F AND CONVERTER LINE ALIGNMENT (Cont'd)

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
27	Antenna terminals (loosely)	83.25 87.75	Antenna terminals (see text for precaution)	Sweeping channel 6	Junction C14 and R6 through 10,000 ohm series resistor	Not used	Receiver on channel 6	L11, L12, L37 & L38 for response as above	Fig. 31 (6)
28	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 31 (5)
29	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 31 (4)
30	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 31 (3)
31	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	
32	"	45.25 49.75	"	channel 1	"	"	Receiver on channel 1	"	Fig. 31 (1)
33	If the response on any channel (steps 28 through 32) is below 70% at either marker, switch to that channel and adjust L11, L12, L37 & L38 to pull response up on that channel. Then recheck steps 27 through 32.								

R-F OSCILLATOR ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
34	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Junction of R236 and sound output cable for sig. gen. method only	Fine tuning centered for all adjustments Receiver on channel 13	L77 & L78 for zero on meter or beat on het. freq. meter	Fig. 28 Fig. 27
35	"	209.75	"	231	"	"	Rec. on chan. 12	L76 as above	Fig. 29
36	"	203.75	"	225	"	"	Rec. on chan. 11	L74 as above	"
37	"	197.75	"	219	"	"	Rec. on chan. 10	L72 as above	"
38	"	191.75	"	213	"	"	Rec. on chan. 9	L70 as above	"
38	"	185.75	"	207	"	"	Rec. on chan. 8	L68 as above	"
40	"	179.75	"	201	"	"	Rec. on chan. 7	L66 as above	"
41	"	87.75	"	109	"	"	Rec. on chan. 6	L63 & L64 as above	Fig. 27
42	"	81.75	"	103	"	"	Rec. on chan. 5	L62 as above	Fig. 29
43	"	71.75	"	93	"	"	Rec. on chan. 4	L60 as above	"
44	"	65.75	"	87	"	"	Rec. on chan. 3	L58 as above	"
45	"	59.75	"	81	"	"	Rec. on chan. 2	L56 as above	"
46	"	49.75	"	71	"	"	Rec. on chan. 1	L54 as above	"
47	Repeat steps 34 through 46 as a check.								

RETOUCHING PICTURE I-F TRANSFORMERS

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
48			Not used		Not used	Pin 5 of V109	Receiver & sweep on a channel between 1 and 6 known to have good r-f response	Picture control max. bias box −3 volts	Fig. 28
49	Antenna terminals (loosely)	22.3 25.75	"		Junction L188 and R137	Not used	Retouch pix i-f adjustments (T2, T103, T104 bottoms T102 & L185) as necessary to provide proper response		Fig. 28 Fig. 27 Fig. 33
50	If T104 (bottom) was adjusted in step 49, repeat step 11 and step 49. Replace V108 upon completion.								

ANTENNA TRAP ADJUSTMENT

Select 1 of the 6 steps below for suitable method for type of interference encountered.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
51-1	Antenna terminals through termination	193.25	Loosely coupled to r-f osc.	109	Not used	Junction of L188 & R137	Rec. on chan. 6	L81 & L82 for min. on meter	Fig. 28 Fig. 26
51-2	"	109	"	87	"	"	Rec. on chan. 3	"	"
51-3	"	179.75	"	103	"	"	Rec. on chan. 5	"	"
51-4	"	103	"	81	"	"	Rec. on chan. 2	"	"
51-5	"	FM Sta. Freq.	"	81	"	"	"	"	"
51-6	Not used		Not used		Not used	Not used	Rec. on interfered channel	L81 & L82 for min. interference	"

SENSITIVITY CHECK

STEP No.	
52	Connect antenna to receiver through attenuator pad to provide weak signal. Compare picture and sound obtained to that obtained on other receivers under the same conditions.

TELEVISION SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults.

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet—Coils reversed either front to back or top to bottom, ion trap magnet coil open.

(2) V126 or V127 inoperative—check voltage and waveform on grids and plates.

(3) No high voltage—If horizontal deflection is operating as evidenced by the correct waveform on terminal 4 of horizontal output transformer, the trouble can be isolated to the 8016 circuit. Either the T109 high voltage winding is open, (points 2 to 3), the 8016 tube is defective, its filament circuit is open, C187 is shorted or R233 or R235 open.

(4) V125 and V120-B circuits inoperative—check for sine wave on V125 grid, pulse on V120-B grid, and sawtooth on V126 grid. Refer to schematic and wave form chart.

(5) Reaction scanning tube (V128) inoperative.

(6) Defective kinescope.

(7) R152 open, (terminal 3 to ground).

(8) No receiver plate voltage—filter capacitor or choke shorted—negative bleeder or filter choke open.

NO VERTICAL DEFLECTION:

(1) V121 or V122 inoperative. Check voltage and wave forms on grids and plates.

(2) T107 open.

(3) Vertical deflection coils open.

NO HORIZONTAL DEFLECTION:

(1) V125, V120B, V126 or V128 inoperative—check voltage and wave forms on grids and plate.

(2) T109 open.

(3) Horizontal deflection coil open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V122.

(2) Vertical output transformer defective.

(3) V121 inoperative—check voltage and wave forms on grid and plate.

(4) R174, C158, C221-C or C222-B defective.

(5) Low bias or plate voltage—check rectifiers and capacitors in supply circuits.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V128 or V126.

(2) T109 or L201 defective.

(3) C186 or C188 or R209 defective.

(4) C179, R187 or R210 defective.

WRINKLES ON LEFT SIDE OF RASTER:

(1) R180, R201 or C181 defective.

(2) Defective yoke.

PICTURE OUT OF PHASE HORIZONTALLY:

(1) T108 winding D to F incorrectly tuned or connected in reverse.

(2) R200 or R202 defective.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER:

(1) Improper adjustment of focus coil or ion trap magnet.

(2) Defective yoke.

RASTER & SIGNAL ON KINESCOPE BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f or discriminator inoperative—check V104, V105, V106, V107 and their socket voltages.

(3) Radio audio system inoperative.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) Picture control advanced too far.

(2) V109A, V118, V119, or V120-A inoperative. Check voltage and waveforms at their grids and plates.

(3) C142 defective.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V121 and associated circuit—C154, T106, etc.

(2) Integrating network inoperative—Check C149 C151, C152, C153, R162, R163, R164 and R165.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T108 misadjusted—readjust as instructed on page 8.

(2) V123 or V124 inoperative—check socket voltages and waveforms.

(3) T108 defective.

(4) C166, C167, C170 or C171 defective.

(5) If horizontal speed is completely off and cannot be adjusted check C168, C169, R168 and R196.

SOUND & RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V110, V111, V112, V113, V114, V115 and V116—check socket voltages.

(2) Bad contact to kinescope grid.

PICTURE STABLE BUT POOR RESOLUTION:

(1) Make sure that the focus control operates on both sides of proper focus.

(2) V114, V115 or V116 defective.

(3) Peaking coils defective—check for specified resistance.

(4) C138, C140, C141 or C142 defective.

(5) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) Video amplifier overloaded by excessive input—reduce picture control setting.

(2) Insufficient bias on V115 and V116 resulting in grid current on video signal. Check bias and possible grid current.

(3) Defective coupling condenser or grid load resistor—check C138, C140, C141, C223B, R138, R142, R143, R148, etc.

(4) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) Picture control operated at excessive level.

(2) If regular sections at the left picture are displaced change V126.

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync. Connect sync link to terminal 1 and 2.
(Sync link used only on early 641TV)

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—Check V1, V2, V3 and their socket voltages.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V126.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C181 defective.

(2) V128 defective.

(3) Change tap on R209.

CRITICAL LEAD DRESS:

1. Dress spaghetti-covered leads from A and B on discriminator transformer T113 to pin 7 and 2 on V107 tube socket approximately 3/16" above chassis.

2. Dress video capacitors C-138, C-140 and C-141 up and away from chassis.

3. Dress video peaking coils L-187, L-188, L-189, L-190, L-191 and L-192 up and away from chassis.

4. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.

5. Dress leads from L196 (width control coil) away from the lead to the cap of V127 (h-v rectifier). Contact between these leads will cause arcing and fire.

6. Dress T109 winding leads as shown in Figure 34.

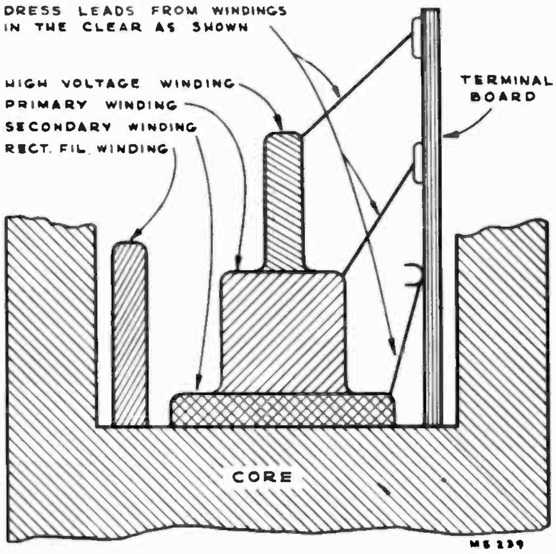


Figure 34—T109 Lead Dress

PICTURE I-F RESPONSE—At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method.

Select a channel with a flat r-f response as outlined in the converter grid trap adjustment section of the alignment procedure.

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

Figures 35 through 39 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

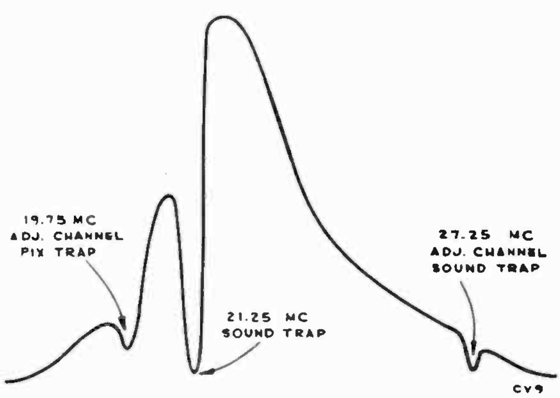


Figure 35—T2 Response

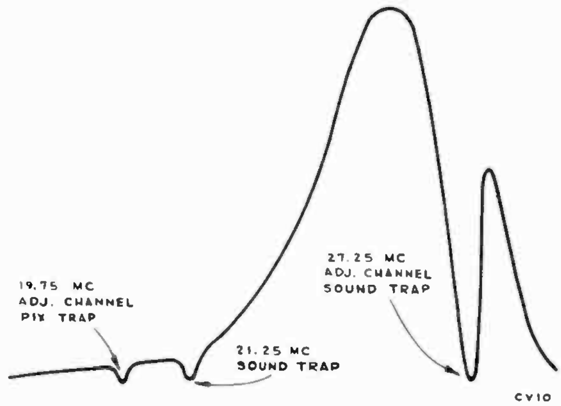


Figure 36—T103 Response

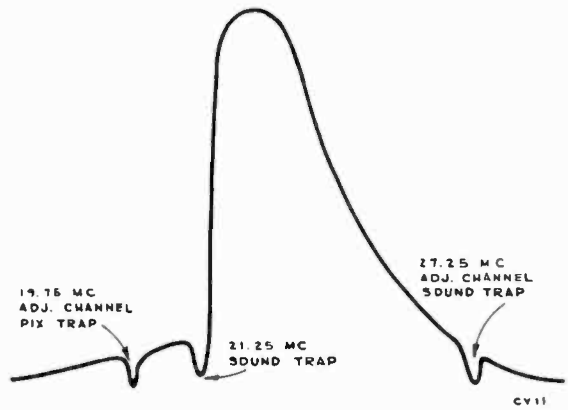


Figure 37—T104 Response

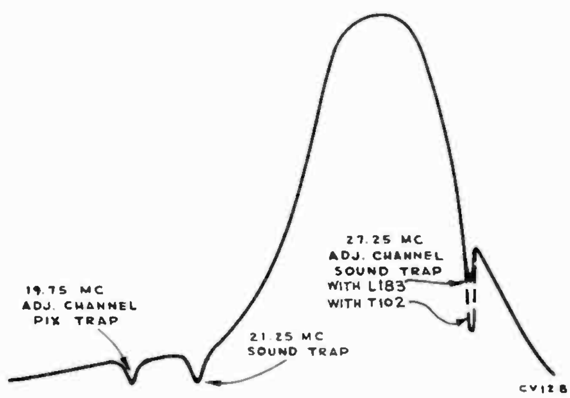


Figure 38—L183 (or T102) Response

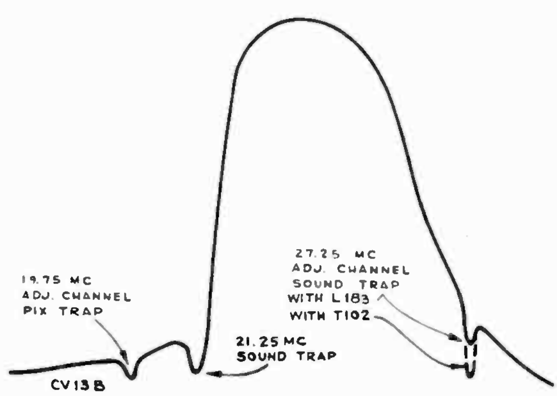
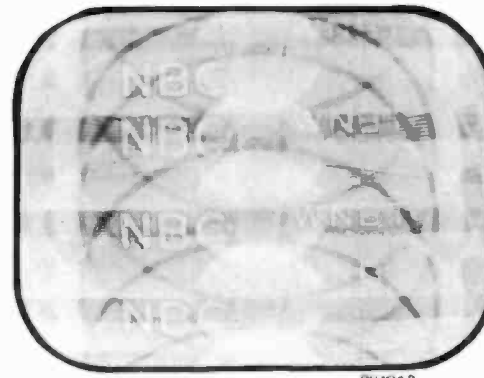


Figure 39—L185 Response

PH104A-1

Figure 40—Normal Picture

Figure 41—Vertical Hold Control Misadjusted

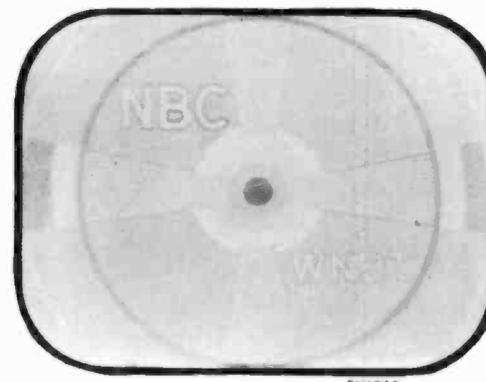


PH104B

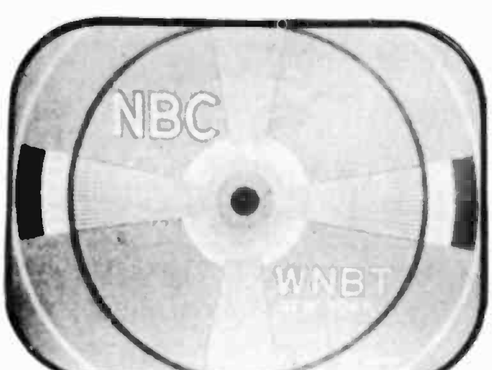
PH104C

Figure 42—Picture Control Misadjusted

Figure 43—Brightness Control Misadjusted



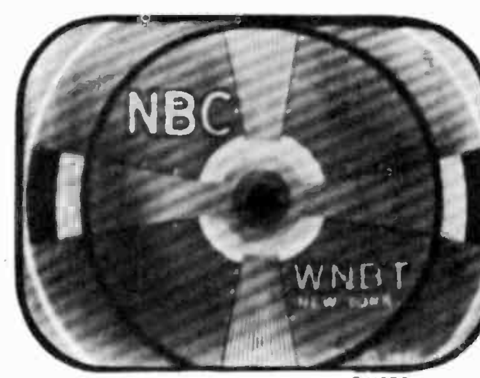
PH104D



PH105A

Figure 44—Weak Signal

Figure 45—Interference from Another Signal

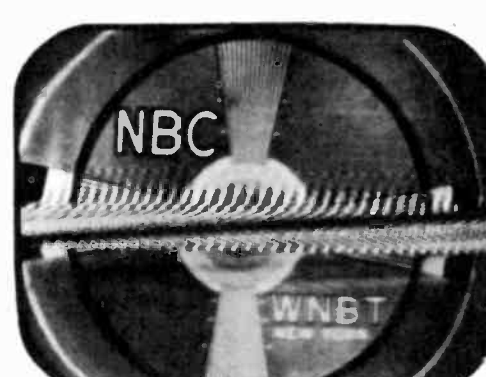


PH105B

PH105C

Figure 46—Sound in the Picture

Figure 47—Interference, Diathermy, etc.



PH105D

PH 104 A-1

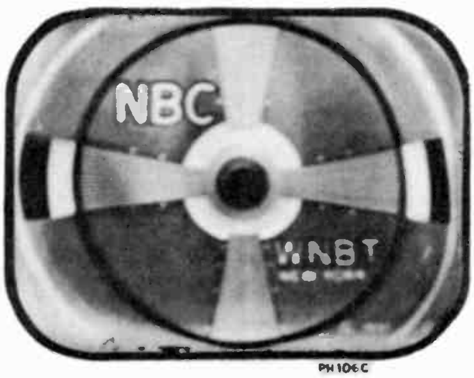
Figure 48—Normal Picture

←

Figure 49—Focus Coil and Ion Trap Magnet Misadjusted

→

PH 106 B



PH 106 C

Figure 50—Focus Control Misadjusted

←

Figure 51—Deflection Yoke Misadjusted (Rotated)

→

PH 107 B

PH 106 D

Figure 52—Horizontal Centering Control Misadjusted

←

Figure 53—Vertical Centering Control Misadjusted

→

PH 107 A

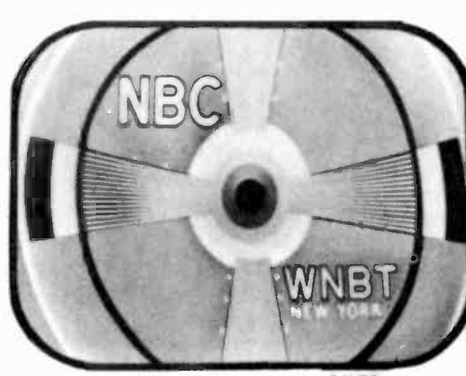
PH 107 C

Figure 54—Vertical Linearity Control Misadjusted

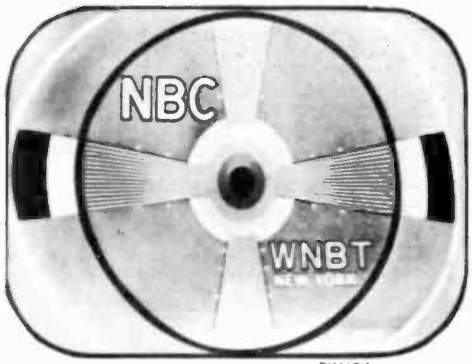
←

Figure 55—Height Control Misadjusted

→



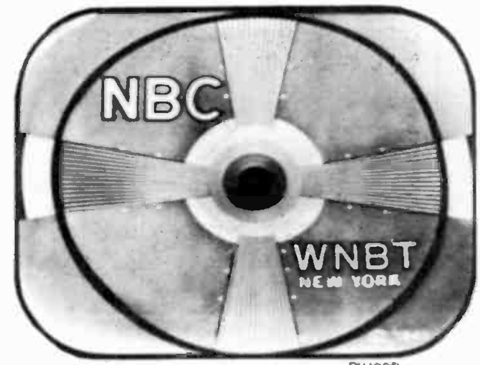
PH 107 D



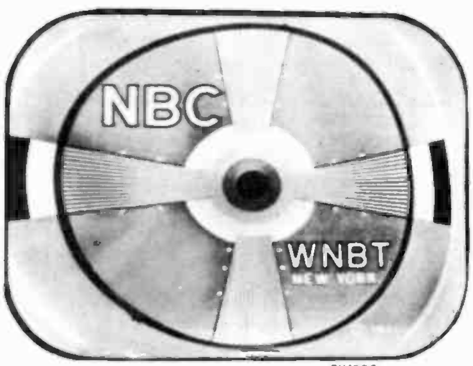
PH108A

Figure 56—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

Figure 57—Width Control Misadjusted



PH108B

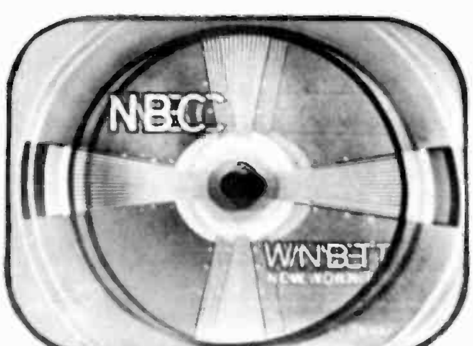


PH108C

Figure 58—Horizontal Drive Control Misadjusted

Figure 59—Hum in Video and Sync (Picture Off Center to Show Edge of Raster)

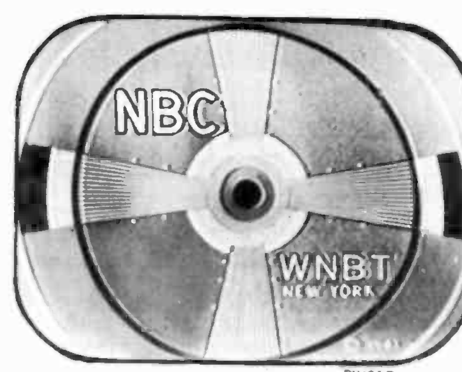
PH108E



PH109A

Figure 60—Reflections

Figure 61—Transients

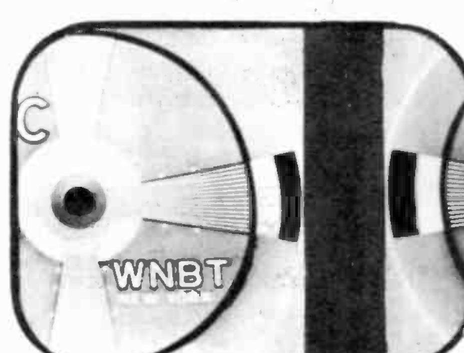


PH109B

PH109C

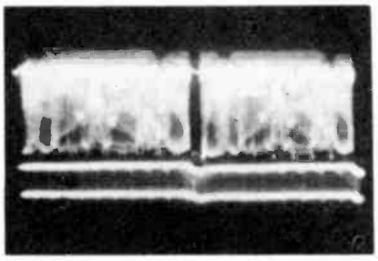
Figure 62—Horizontal Sync Discriminator Transformer Frequency Adjustment Misadjusted

Figure 63—Horizontal Sync Discriminator Transformer Phase Adjustment Misadjusted



PH109D

WAVEFORM PHOTOGRAPHS



CV26A

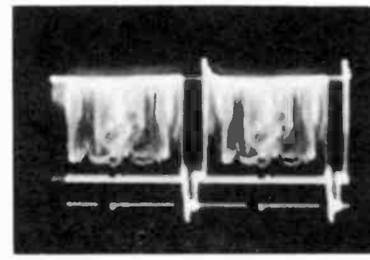
Video Signal Input to 1st Video Amplifier (Junction of L187, R136, L188 and C138)

Figure 64—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (1.5 Volts PP)

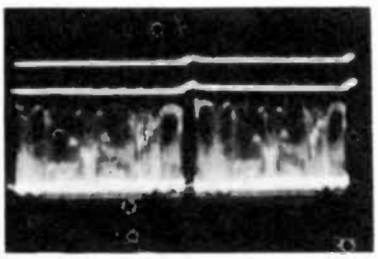
←

Figure 65—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (1.5 Volts PP)

→



CV26B



CV26C

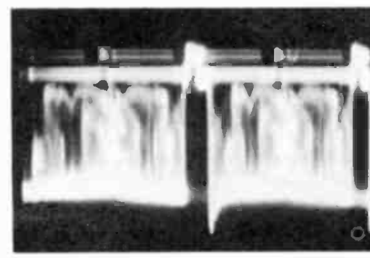
Output of 1st Video Amplifier (Junction of L189, R139, L190 and C140)

Figure 66—Vertical (10 Volts PP)

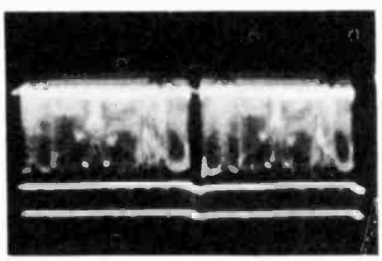
←

Figure 67—Horizontal (10 Volts PP)

→



CV26D



CV26E

Input to Kinescope Grid (Junction of C141, R148 and Green Lead to Kinescope)

Figure 68—Vertical (38 Volts PP)

←

Figure 69—Horizontal (38 Volts PP)

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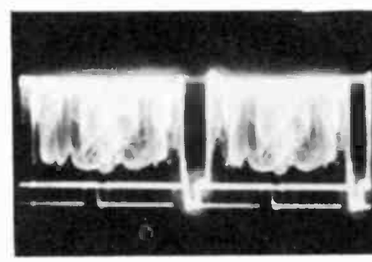
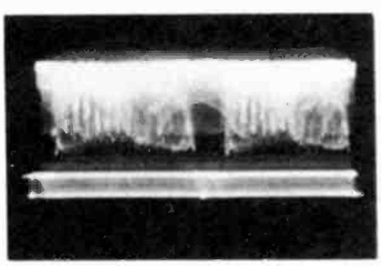


CV26F



CV27A

Cathode of D-C Restorer (Pin 1 of V109-A) (6AL5)

(In Model 8TS30: Pin 5 of V114B)

Figure 70—Vertical (36 Volts PP)

←

Figure 71—Horizontal (36 Volts PP)

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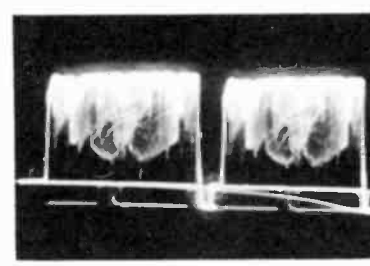
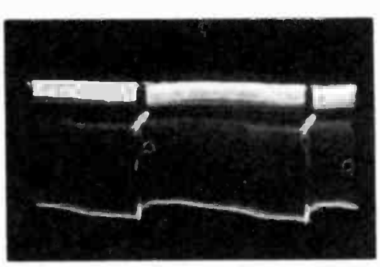


CV27B



CV27C

Plate of D-C Restorer (Pin 7 of V109-A) (6AL5)

(In Model 8TS30: Pin 2 of V114B)

Figure 72—Vertical (9 Volts PP)

←

Figure 73—Horizontal (9 Volts PP)

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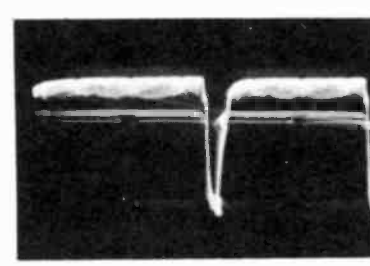
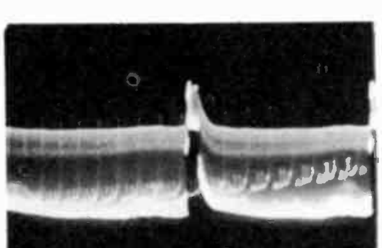


CV27D



CV27E

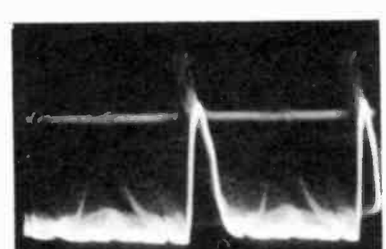
Output of 1st Sync. Amplifier (Pin 8 of V118) (6SK7)

Figure 74—Vertical (58 Volts PP)

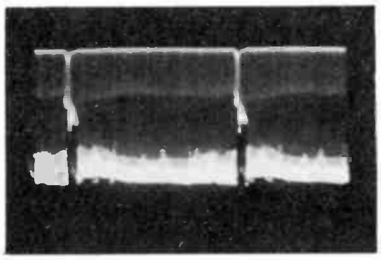
←

Figure 75—Horizontal (40 Volts PP)

→



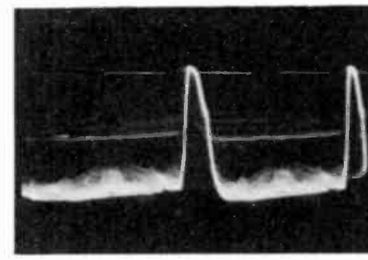
CV27F



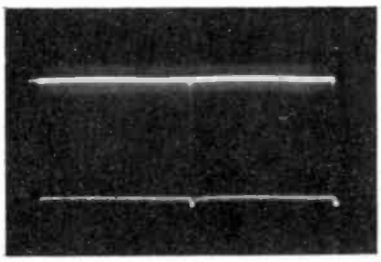
Input to Sync. Separator (Pin 4 of V119) (6SH7)

Figure 76—Vertical (35 Volts PP)
←

Figure 77—Horizontal (35 Volts PP)
→



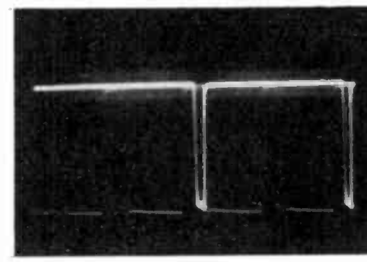
CV28A CV28B



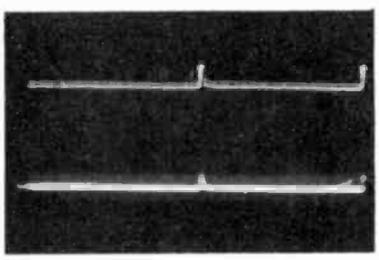
Output of Sync. Separator (Pin 8 of V119) (6SH7)

Figure 78—Vertical (75 Volts PP)
←

Figure 79—Horizontal (75 Volts PP)
→



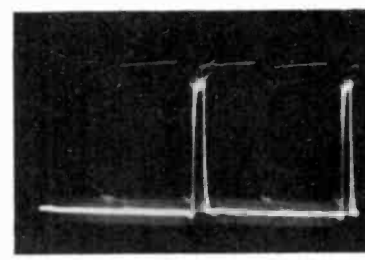
CV28C CV28D



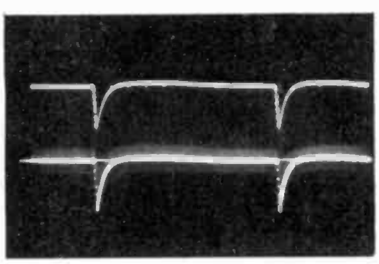
Output of 2nd Sync. Amplifier (Pin 2 of V120-A) (6SN7GT)

Figure 80—Vertical (35 Volts PP)
←

Figure 81—Horizontal (29 Volts PP)
→



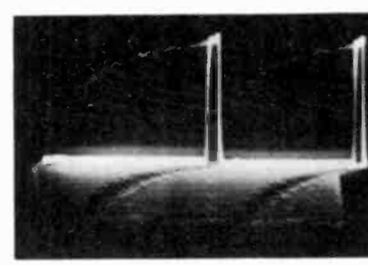
CV28E CV28F



Input to Integrating Network (Junction of C149, R162 and R163)

Figure 82—Vertical (45 Volts PP)
←

Figure 83—Horizontal (30 Volts PP)
→



CV29A CV29B

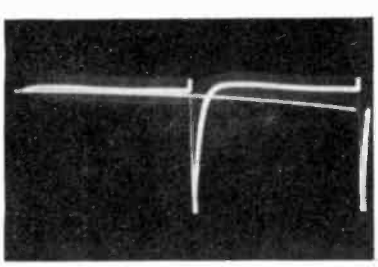
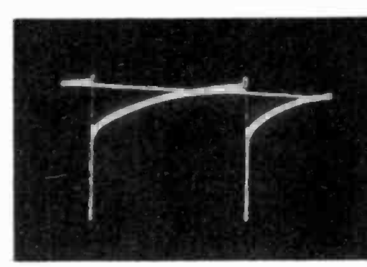


Figure 84—Output of Integrating Network (Junction of R165, C153 and Yellow Lead of T106). Vertical (32 Volts PP)
←

Figure 85—Grid of Vertical Osc. (350 Volts PP) (Pin 5 of V121) (6J5)
→



CV29C CV29D

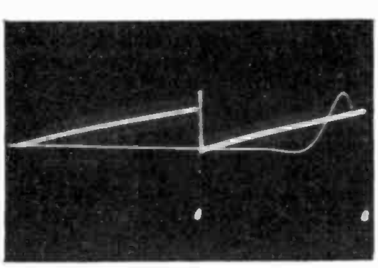
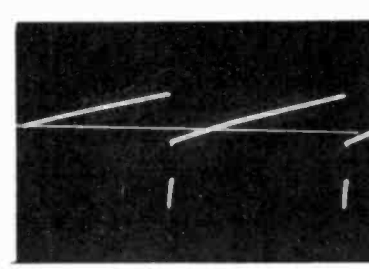


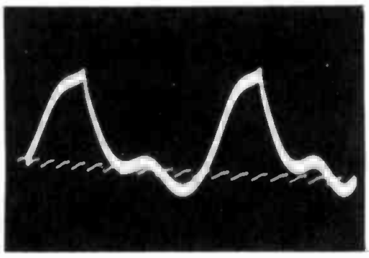
Figure 86—Plate of Vertical Osc. (140 Volts PP) (Pin 3 of V121) (6J5)
←

Figure 87—Input Coupling of Vertical Output (125 Volts PP) (Junction of C157, C158, R170 and Red Lead of T106)
→



CV29E CV29F

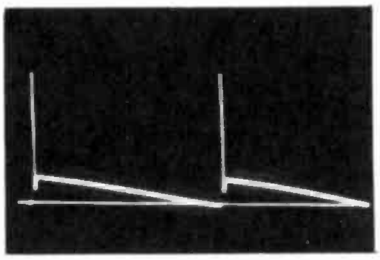
WAVEFORM PHOTOGRAPHS



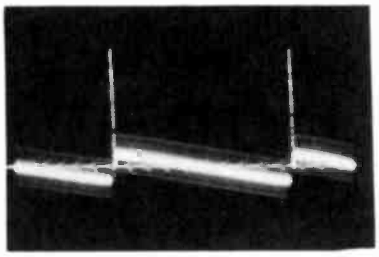
CV30A

Figure 88—Cathode of Vertical Output (.75 Volt PP) (Pin 8 of V122) (6K6GT)
←

Figure 89—Plate of Vertical Output (700 Volts PP) (Pin 3 of V122) (6K6GT)
→



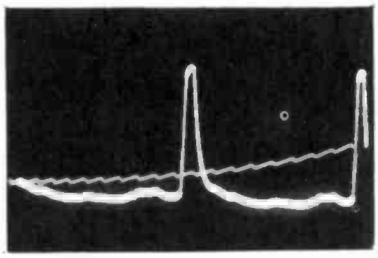
CV30B



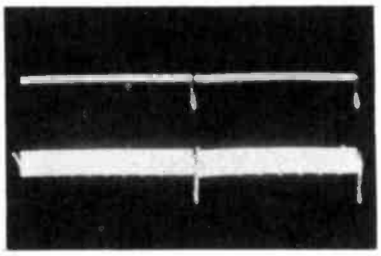
CV30C

Figure 90—Input to Vertical Deflection Coils (60 Volts PP) (Junction of Green Lead of T107 and Green Lead of Yoke)
←

Figure 91—Vertical Boost of 1st Sync. Amplifier (16 Volts PP) (Junction of R154, R155 and C146)
→



CV30D

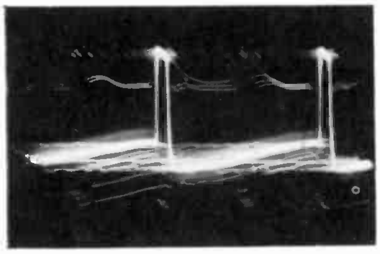


CV31A

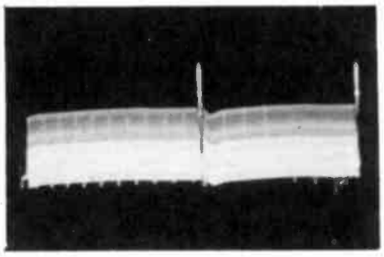
Terminal "E" of Sync Discriminator Transformer (T108)

Figure 92—Vertical (16 Volts PP)
←

Figure 93—Horizontal (13 Volts PP)
→



CV31B

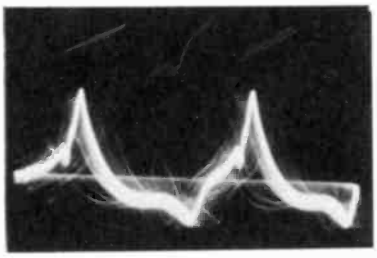


CV31C

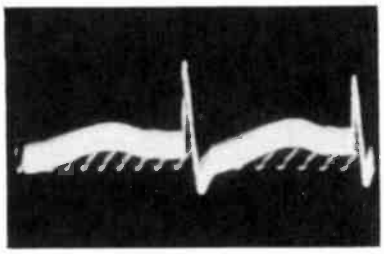
Junction of R191 and R192 (Cathode Resistors of Horizontal Sync. Discriminator)

Figure 94—Vertical (3 Volts PP)
←

Figure 95—Horizontal (1.7 Volts PP)
→



CV31D

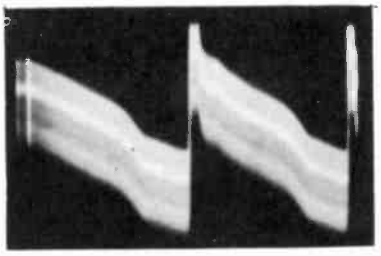


CV31E

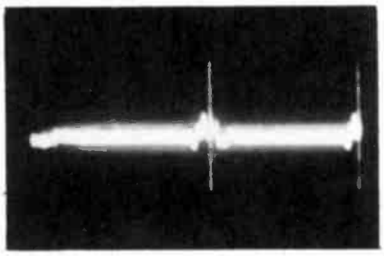
Cathode of Hor. Sync. Discriminator (Pin 1 of V123) (6AL5)

Figure 96—Vertical (.8 Volt PP)
←

Figure 97—Horizontal (.15 Volt PP)
→



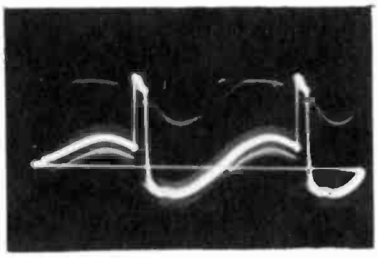
CV31F



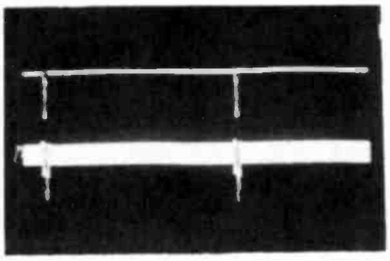
CV32A

Figure 98—Cathode of Hor. Sync. Discr. (Pin 5 of V123) (6AL5) Horizontal (.19 Volt PP)
←

Figure 99—Plate of Hor. Sync. Discr. (Pin 7 of V123) (6AL5) Horizontal (23 Volts PP)
→



CV32C



CV32D

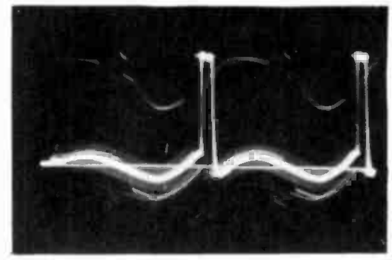
Plate of Hor. Sync. Discr. (Pin 2 of V123) (6AL5)

Figure 100—Vertical (21 Volts PP)

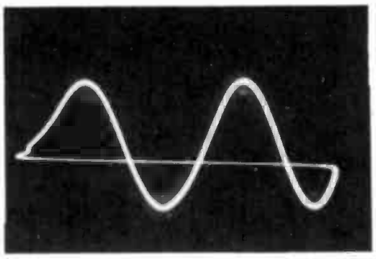
←

Figure 101—Horizontal (21 Volts PP)

→



CV32E



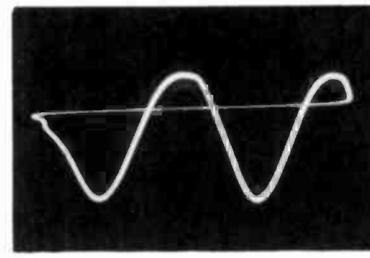
CV33A

Figure 102—Horizontal (95 Volts PP) Terminal "A" of Sync. Discriminator Transformer (T108)

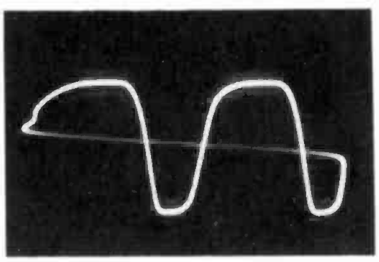
←

Figure 103—Cathode of Horizontal Oscillator Control (1.5 Volts PP) (Pin 5 of V124) (6AC7)

→



CV33B



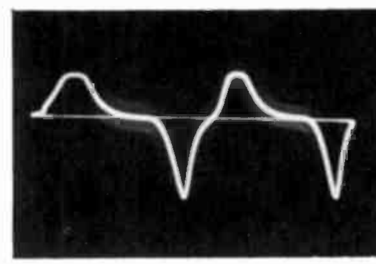
CV33C

Figure 104—Plate of Horizontal Oscillator (225 Volts PP) (Pin 3 of V125) (6K6GT)

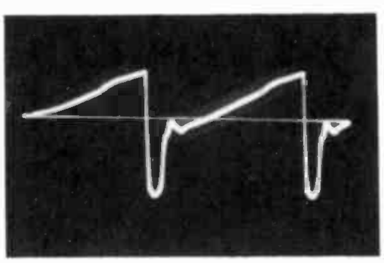
←

Figure 105—Input of Hor. Discharge (100 Volts PP) (Junction of C176, C177 and R202)

→



CV33D



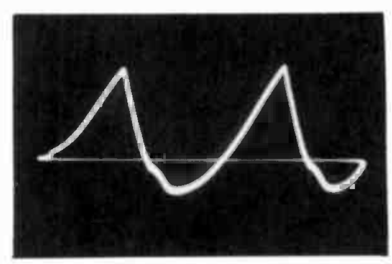
CV33E

Figure 106—Plate of Hor. Discharge (78 Volts PP) (Pin 5 of V120-B) (6SN7GT)

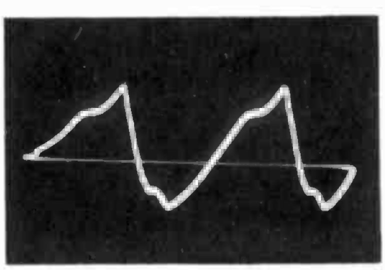
←

Figure 107—Cathode of Hor. Output (11.5 Volts PP) (Pin 3 of V126) (6BG6-G)

→



CV33F



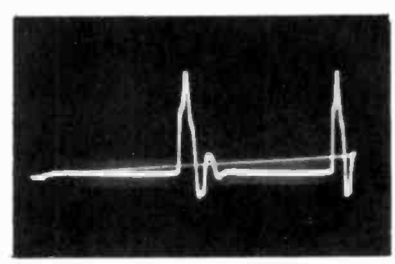
CV34A

Figure 108—Screen of Hor. Output (9 Volts PP) (Pin 8 of V126) (6BG6-G)

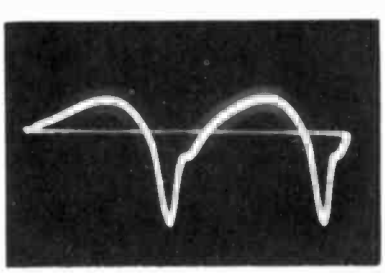
←

Figure 109—Plate of Horizontal Output (Approx. 6000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V126 to Ground)

→



CV34B



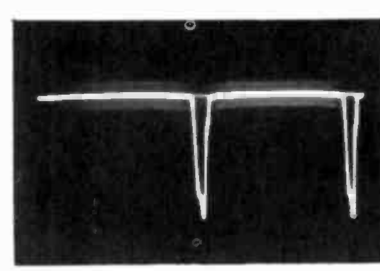
CV34C

Figure 110—Cathode of Reaction Scanning (60 Volts PP) (Pin 8 of V128) (5V4G)

←

Figure 111—Input to Horizontal Deflection Coils (1325 Volts PP) (Pin 4 of V128) (5V4G)

→



CV34E

TELEVISION VOLTAGE CHART

Measurements made with receiver operating on 117 volts 60 cycles a-c and with no signal input except where otherwise indicated. Voltages shown are as read with Jr. "VoltOhmyst" between indicated terminal and chassis ground except where otherwise noted. Symbol < means "less than."

Tube No.	Tube Type	Function	Operating Condition **	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	R-F Amplifier	Pictr. Min.	1 & 2	130	—	—	7	0	5 & 6	–21	<.1*	—	*Per Plate
			Pictr. Max.	1 & 2	65	—	—	7	0	5 & 6	–.1	4.3*	—	*Per Plate
V2	6J6	Converter	Pictr. Min.	1 & 2	130	—	—	7	0	5 & 6	–3 to –6.	.5 to 4*	—	*Per Plate
			Pictr. Max.	1 & 2	90	—	—	7	0	5 & 6	–2 to –5.	.2 to 3*	—	*Per Plate
V3	6J6	R-F Oscillator	Pictr. Min.	1 & 2	105	—	—	7	.25	5 & 6	–4.5 to –6.5	2.5*	—	*Per Plate
			Pictr. Max.	1 & 2	75	—	—	7	.15	5 & 6	–3.5 to –5.	1.7*	—	*Per Plate
V104	6BA6	1st Sound I-F Amplifier	Pictr. Min.	5	115	6	115	7	1.6	1	0	11.3	4.7	
			Pictr. Max.	5	101	6	101	7	1.4	1	0	9.7	4.3	
V105	6BA6	2d Sound I-F Amplifier	Pictr. Min.	5	118	6	115	7	1.8	1	0	13	4.8	
			Pictr. Max.	5	103	6	100	7	1.6	1	0	11.5	4.4	
V106	6AU6	3d Sound I-F Amplifier	Pictr. Min.	5	48	6	48	7	0	1	–.23	3.3	1.3	
			Pictr. Max.	5	41	6	41	7	0	1	–.24	2.8	1.2	
V107	6AL5	Sound Discrim.	Pictr. Min.	2 & 7	–.45	—	—	4 & 5	—	—	—	—	—	
			Pictr. Max.	2 & 7	–.45	—	—	4 & 5	—	—	—	—	—	
V108	6AT6	AGC Amplifier	Pictr. Min.	7	–32	—	—	2	–99	1	–99	—	—	
			Pictr. Max.	7	0	—	—	2	–97	1	–95	—	—	
V109-A	6AL5	DC Restorer	Brightness Min.	7	–98	—	—	1	–76	—	—	—	—	
			Brightness Max.	7	–1	—	—	1	0	—	—	—	—	
V109-B	6AL5	AGC Diode	Pictr. Min.	2	–7.2	—	—	5	–7.1	—	—	—	—	
			Pictr. Max.	2	–3.1	—	—	5	–1	—	—	—	—	
V110	6AG5	1st Pix. I-F Amplifier	Pictr. Min.	5	125	6	125	2 & 7	0	1	–7.1	0	0	
			Pictr. Max.	5	92	6	92	2 & 7	.2	1	–1.0	4.5	.6	
V111	6AG5	2d Pix. I-F Amplifier	Pictr. Min.	5	125	6	125	2 & 7	0	1	–7.1	0	0	
			Pictr. Max.	5	94	6	94	2 & 7	.2	1	–1.0	4.0	1.1	
V112	6AG5	3d Pix. I-F Amplifier	Pictr. Min.	5	130	6	130	2 & 7	0	1	–7.1	0	0	
			Pictr. Max.	5	85	6	105	2 & 7	.3	1	–1.0	6.1	1.6	
V113	6AG5	4th Pix. I-F Amplifier	Pictr. Min.	5	84	6	120	2 & 7	1.3	1	0	6.9	1.8	
			Pictr. Max.	5	74	6	106	2 & 7	1.15	1	0	6.1	1.6	
V114-A	6AL5	Picture 2d Det.	Pictr. Min.	7	–.25	—	—	1	0	—	—	—	—	
V114-B	6AL5	AGC Detector	Pictr. Min.	2	–105	—	—	5	–104	—	—	—	—	
			Pictr. Max.	2	–108	—	—	5	–106	—	—	—	—	
V115	6AU6	1st Video Amplifier	Pictr. Min.	5	243	6	135	7	0	1	–2.05	5.4	1.8	
			Pictr. Max.	5	254	6	117	7	0	1	–2.1	3.8	1.2	
V116	6K6-GT	2d Video Amplifier	Pictr. Min.	3	100	4	135	8	3.3	5	–7.7	9.2	1.6	
			Pictr. Max.	3	92	4	117	8	2.5	5	–7.8	7.0	1.4	

TELEVISION VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V117	10-BP4	Kinescope	Brightness Min.	Cap	9200*	10	294	11	0	2	–76	0	0	*Measured with "VoltOhmyst" and high voltage multiplier probe
			Brightness Max.	Cap	6000*	10	294	11	0	2	–.5	.7	—	
			Brightness Average	Cap	9000*	10	294	—	—	—	—	.1	—	
V118	6SK7	1st Sync. Amplifier	Pictr. Min.	8	195	6	120	5	0	4	–4.2	10.6	2.9	
			Pictr. Max.	8	216	6	105	5	0	4	–4.3	8.1	2.0	
V119	6SH7	Sync. Separator	Pictr. Min.	8	135	6	135	5	0	4	–5.2	0	0	
			Pictr. Max.	8	117	6	117	5	0	4	–10*	0	0	*Depends on noise
V120-A	6SN7 GT	2d Sync. Amplifier	Pictr. Min.	2	84	—	—	3	0	1	–.6	7.9	—	
			Pictr. Max.	2	75	—	—	3	0	1	–9*	6.8	—	*Depends on noise
V120-B	6SN7 GT	Horizontal Discharge	Pictr. Min.	5	–42	—	—	6	–105	4	–145	.49	—	
V121	6J5	Vertical Oscillator	Pictr. Min.	3	60*	—	—	8	–105	5	–145	.2	—	*Height, linearity and hold affect readings 2 to 1
V122	6K6-GT	Vertical Output	Pictr. Min.	3	216	4	216*	8	–61	5	–100	7.0	*	*Screen connected to plate
V123	6AL5	Horizontal Sync. Discr.	Pictr. Min.	2 7	–5.8 –6.0	—	—	1 5	–2.8 –2.4	—	—	—	—	
V124	6AC7	Horizontal Osc. Control	Pictr. Min.	8	140	6	82	5	.05	4	–1.7	6.5	2.0	
V125	6K6-GT	Horizontal Oscillator	Hold Max. Resistance	3	195	4	213	8	.25	5	–29.2	19.4	7.8	
			Hold Min. Resistance	3	185	4	200	8	.28	5	–22.5	21.7	9.3	
V126	6BG6-G	Horizontal Output	Pictr. Min.	Cap	*Do Not Meas.	8	135	3	–97	5	–115	73.8	12.2	*6000 volt pulse present
V127	8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	9200	—	—	0	—	*9200 volt pulse present
			Brightness Max.	Cap	*	—	—	2 & 7	6700	—	—	.7	—	*9200 volt pulse present
V128	5V4G	Reaction Scanning	Pictr. Min.	4 & 6	Do Not Meas.*	—	—	8	360	—	—	86*	—	*1200 volt pulse present
V129	5U4G	Rectifier	Pictr. Min.	4 & 6	390*	—	—	2 & 8	315	—	—	135†	—	*A-C measured from plate to trans center tap †Measured at filament.
V130	5U4G	Rectifier	Pictr. Min.	4 & 6	390*	—	—	2 & 8	315	—	—	135†	—	

** Where separate readings are not listed for max. and min. gain settings of the picture control, the effect of the control is slight and readings are given for "Picture Min."

Following readings taken with video signal applied through video amplifiers to produce 25 volts peaks to peak on Kinescope grid.

V114-B	6AL5	DC Restorer	Pictr. Min.	2	–41	—	—	5	–27	—	—	—	—	
V119	6SH7	Sync. Separator	Pictr. Min.	8	129	6	135	5	0	4	–21.5	.9	.8	
V120-A	6SN-7GT	2d Sync. Amplifier	Pictr. Min.	2	88	—	—	3	0	1	–5.4	9.0	—	
V123	6AL5	Horizontal Sync. Discr.	Pictr. Min.	2 & 7	–20	—	—	1 & 5	K, * K, –2.1	—	—	—	—	*See grid voltage of V124
V124	6AC7	Horizontal Osc. Control	Pull-in*	8	200(a)	6	100(b)	5	<.1	4	–1.5 to –3	<8.	<2.5	*Varying Hor. Osc. tuning
			Hold*	8	200(c)	6	100(d)	5	<.1	4	(e)	<8.	<2.5	

(a) Pull-in range varies with tubes from 110-210 to 195-270.
(b) Pull-in range varies with tubes from 80-100 to 100-115.
(c) Hold range varies with tubes from 110-270 to 140-270.
(d) Hold range varies with tubes from 80-115 to 90-115.
(e) Hold range varies with tubes from 1.5-7.0 to 1.-4.5.

641TV, 8TV41 — RADIO ALIGNMENT PROCEDURE

If any lead dressing is necessary, it should be done before aligning the receiver. See Critical Lead Dress.
Before aligning set, completely mesh the gang and set the dial pointer to the mechanical max. calibration point at extreme left end of dial.
When making a complete alignment follow the tabulated form below in sequence.
If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the chart.
Any adjustments made on the FM 10.7 mc. I-F's make it necessary to adjust the AM 455 kc. I-F's.

FM ALIGNMENT

"FM" RATIO DETECTOR ALIGNMENT

SET RANGE SWITCH TO FM POSITION

Steps	Connect High Side of Osc. to—	Tune Osc. to—	Turn Vol. Cont. to—	Adjust
1	Connect a 680-ohm resistor between lugs D and E of the ratio detector transformer T6. Connect d-c probe of a "VoltOhmyst" to the negative lead of the 5 mfd electrolytic capacitor C77. Connect the common lead of the meter to chassis.			
2	Driver grid, pin 1, of V5 in series with .01 mfd	10.7 mc., 30% mod., 400 cycles AM	Maximum volume	Driver transformer T5 for maximum d-c voltage across C77
3	Remove meter leads and disconnect the 680-ohm resistor from D and E on T6. Connect two 68,000-ohm resistors (within 1% of each other) in series, across the 22,000-ohm ratio detector load resistor R37. Connect the common lead of the "VoltOhmyst" to the center point of the 68,000-ohm resistors and the d-c probe to terminal "A" of the ratio detector transformer T6. Use the 30-volt meter range.			
4	Same as step 2	Same as step 2	Maximum volume	*T6 bottom core for zero d-c balance on "VoltOhmyst" **T6 top core for minimum audio output. (Output meter across voice coil)
5	Reconnect "VoltOhmyst" as in step 1, omitting the 680-ohm resistor.			
6	Repeat step 2, omitting 680 ohms.			
7	Remove all connections.			

* Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

** The zero d-c balance and the min. a-f output should occur at the same point; if such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the "VoltOhmyst," and an output meter connected across the voice coil for the point at which both zero d-c and min. output occur.

NOTE.—Two or more points may be found which will satisfy the condition required in step 4. T6 top core should be correctly adjusted when approximately ⅛ inch of threads extend above the can, therefore, it is desirable to start adjustment with top core at the max. "in" position and turn out, while adjusting the bottom core, until the first point of minimum a-f and minimum d-c is reached.

"FM" R-F-I-F ALIGNMENT

RANGE SWITCH IN FM POSITION

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. to—	Radio Dial Tuned to—	Adjust
1	Connect "VoltOhmyst" d-c probe to negative lead of C77, and the meter common lead to chassis ground.				
2	Mixer grid pin #1 of 6BA6 (V3) in series with a .01 mfd capacitor (Adjust test osc. output for 6-10 volts developed across C-77) (Range switch in FM position)	To r-f tube shell ground	10.7 mc., 30% modulated at 400 cycles AM	Max. cap. (Fully meshed)	*T3 and T1 top and bottom cores alternately loading pri. and sec. of each transformer with 680 ohms while the opposite side of the same transformer is being adjusted. Adjust all transformers for maximum voltage across C77.
3	Ant. term. #1 in series with 120-ohm resistor	Ant. term. #2 in series with 120-ohms	106 mc.	106 mc.	OSC. C21 for max. voltage across C77.
4			90 mc.	90 mc.	**OSC. L16 for max. voltage across C77.
5	Repeat steps 3 and 4 for exact calibration.				
6	Same as steps 3 and 4		106 mc.	106 mc.	R-F. C44 for max. voltage across C77.
7			90 mc.	90 mc.	**R-F. L19 for max. voltage across C77.
8	Repeat steps 6 and 7 for maximum output.				
9	Same as step 3	Same as step 3	106 mc.	106 mc.	Ant. C3 for max. voltage across C77.
10	Same as step 3	Same as step 3	90 mc.	90 mc.	**Ant. L2 for max. voltage across C77.
11	Repeat steps 9 and 10 for maximum output.				

* This method, which is known as alternate loading, involves the use of a 680-ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680-ohm resistor while the plate winding is being peaked.

When windings are loaded, it is necessary to increase the 10.7 mc. input, since gain will decrease and voltage across C77 will be less.

** Two positions of the cores in L2, L19, L16 will satisfy the condition indicated, but for greatest sensitivity, the core position chosen for L2 and L19 should be the one which results in the adjusting stud projecting the lesser distance.

For oscillator L16 the reverse is true and the coil should be aligned with the stud projecting the greater distance.

RADIO ALIGNMENT PROCEDURE

AM ALIGNMENT

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Output Meter.—Connect the meter across the speaker voice coil, and turn the receiver volume control to maximum.

Steps	Connect the High Side of the Test Osc. to—	Tune Test Osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following
1	Pin #1 of 6BA6 (V3) in series with .01 mfd	455 kc.	"A" Band	Low Freq. end of Dial	*Top and bottom cores of T2 and T4. (For max. voltage across voice coil.)
2	Ant. term. #2 through dummy ant. comprised of 200 mmf	455 kc.	"A" Band	"	Adj. I-F Trap L17 for minimum voltage across voice coil.
3	"	1400 kc.	"A" Band	1400 kc.	Osc.—C15; Ant.—C82. (For max. voltage across voice coil.)
4	"	600 kc.	"A" Band	600 kc.	Osc.—L12; Ant.—L22 (For max. voltage across voice coil.)
5	Repeat steps 3 and 4 for maximum output.				
6	Ant. term. #2 through dummy ant. of 25 mmfs in series with 150 ohms	15.2 mc.	"C" Band	15.2 mc.	**Osc.—C17; Ant.—C4.
7		9.5 mc.	"C" Band	9.5 mc.	Osc.—L13; Ant.—14.
8	Repeat steps 6 and 7 for accurate alignment.				

* It is necessary to alternately load the primary and secondary of each 455-kc. i-f transformer with 10,000 ohms while the opposite side of the same transformer is being adjusted.

** To guard against the possibility of alignment of L13 and C17 to image frequencies, tune the test oscillator to 16.11 mc. (image frequency). By increasing the test oscillator output, a signal should be heard.

Tune the test oscillator to 9.5 mc., and turn the radio dial to 9.5 mc., then adjust the test oscillator to 10.41 mc. (image frequency). By increasing the test oscillator output, a signal should be heard.

(If these image frequencies cannot be heard, the set is incorrectly aligned, therefore repeat steps 6 and 7.)

Note: To increase "A" band sensitivity in weak signal areas cut Link "A" (see figure 116.) For still greater sensitivity, connect a jumper across C69 and readjust C82 at 1400 kc.

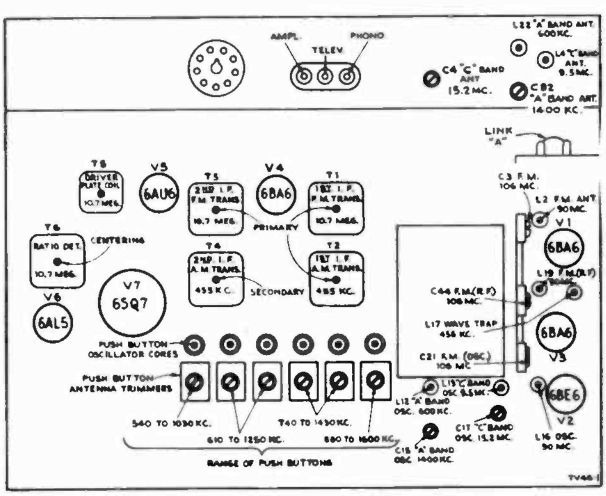


Figure 116—Chassis, Top View, Showing Adjustments

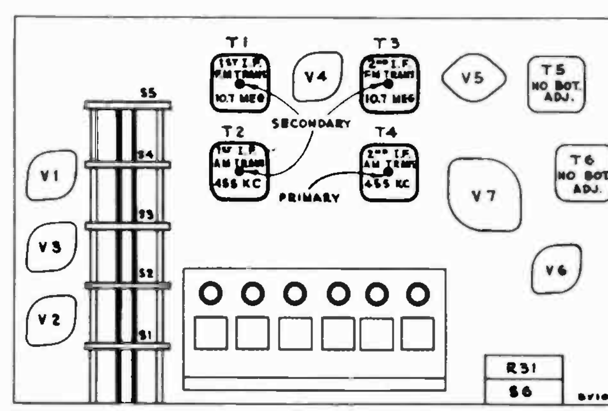


Figure 117—Chassis, Bottom View, Showing Adjustments

PUSH-BUTTON ADJUSTMENT

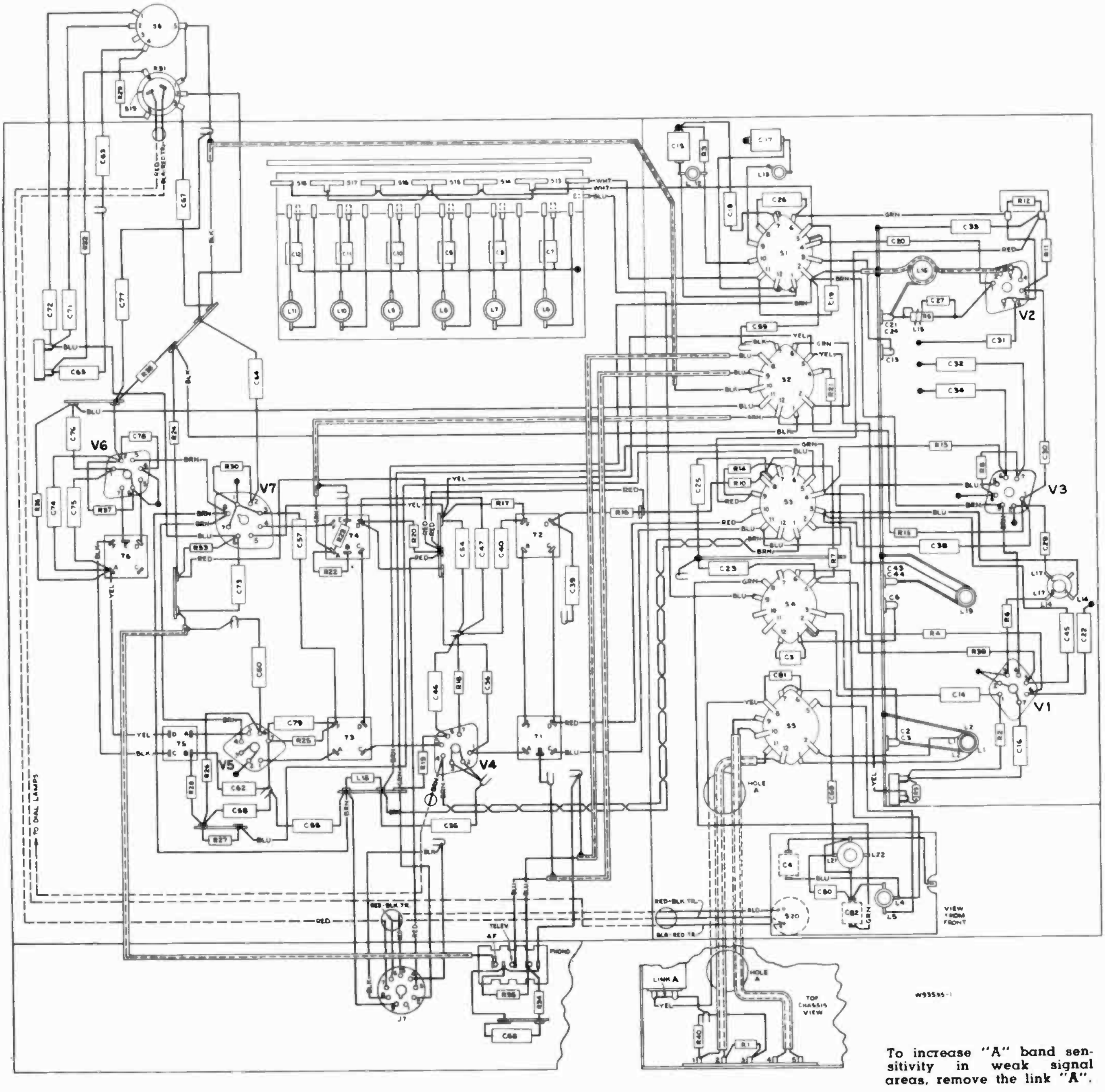
The push buttons connect to separate magnetite-core oscillator coils and separate antenna trimmers which must be adjusted to the desired stations. Use an insulated screwdriver or alignment tool such as RCA Stock No. 70180. Allow about five minutes warm-up period before making adjustments.

The procedure is as follows:

1. Make a list of the desired stations, arranged in order from low to high frequencies.
2. Turn the range switch to the broadcast position and manually tune in the first station on the list.
3. Turn range switch to push-button position and press in the left-hand button.
4. Adjust the oscillator core rod to receive the first station.
5. Adjust the antenna trimmer screw for peak output on the first station.
6. Proceed in the same manner to adjust for the remaining stations.
7. Repeat adjustments for best results.

On the 880 to 1,600 kc. push button, the higher frequency stations may be received with the oscillator core rod either in or out (oscillator frequency either 455 kc. below or 455 kc. above the station frequency). The adjustment with this core in its out-position (oscillator frequency 455 kc. above the station frequency) is the correct one.

NOTE: Clockwise adjustment of cores and trimmers tunes the circuits to lower frequencies.



To increase "A" band sensitivity in weak signal areas, remove the link "A".

Figure 118—Radio Chassis Wiring Diagram

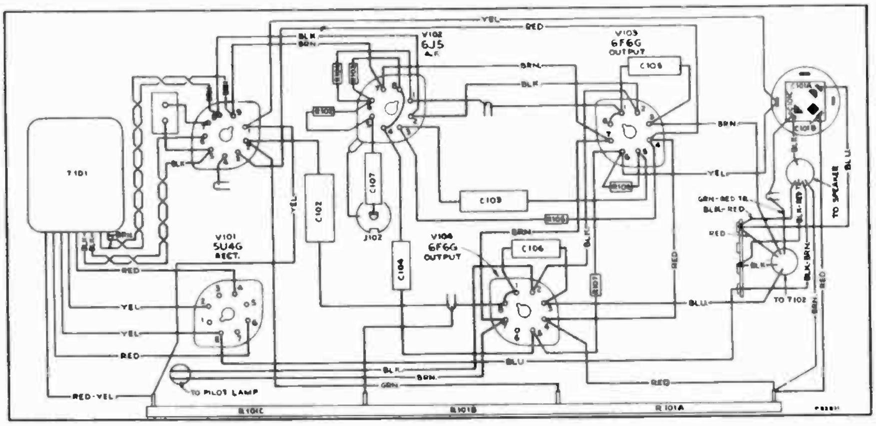


Figure 119—Audio Amplifier Wiring Diagram

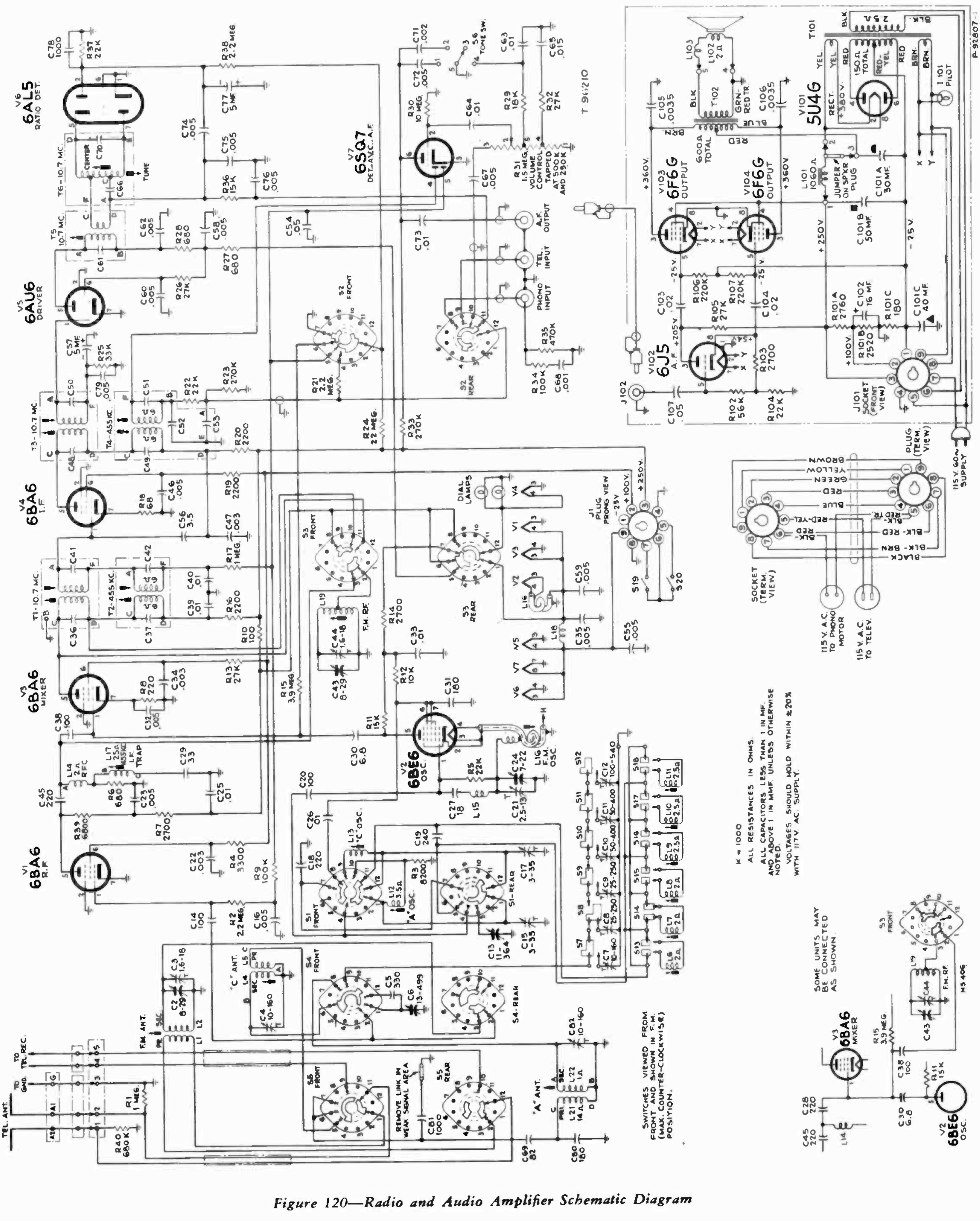


Figure 120—Radio and Audio Amplifier Schematic Diagram

CRITICAL LEAD DRESS

(Any lead dress should be made before alignment.)

1. The lead from terminal 9, switch S4, front, to terminal on switch S7, must be dressed between the main base and r-f shelf.
2. The leads from terminals 1 0and 11, switch S3, front, must be dressed together and away from the chassis.
3. Capacitor C56 must have shortest possible lead on the end connecting to pin 1 of tube V4.
4. The following capacitors must be dressed close to the chassis, with leads kept as short as possible; C40, C47, C54, C62, and C78.
5. All FM coil connections must be soldered in the exact place as the original coil. (One-sixteenth inch difference in length may be excessive.)
6. All r-f and i-f wiring in the receiver is critical as to length and placement; any changes tend to impair the operation of the set.

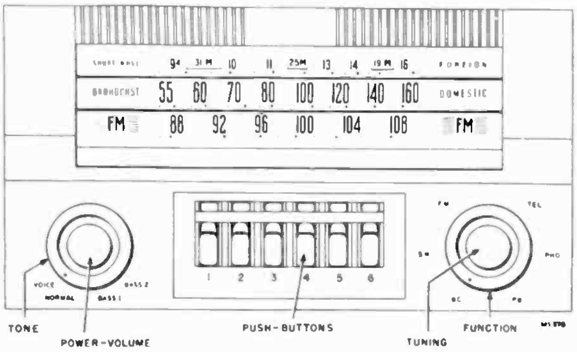


Figure 121—Radio Control Panel

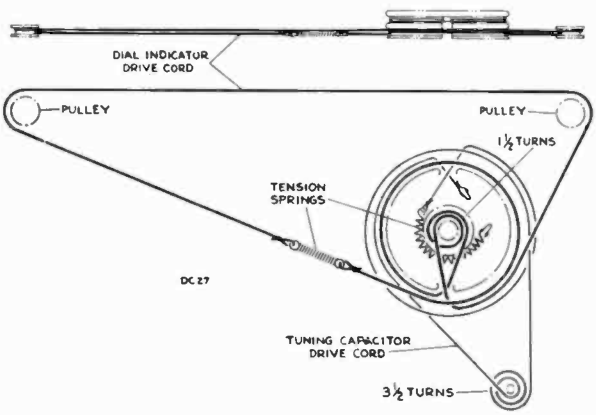


Figure 122—Dial and Drive Cord Assembly

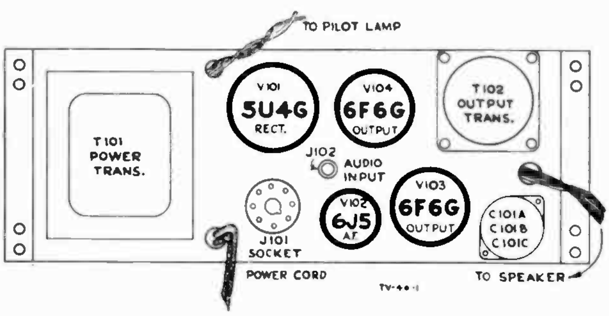


Figure 123—Top View of RS123A

RADIO VOLTAGE CHART

All voltages were measured in respect to ground, using a "VoltOhmyst."

Tube	Type	Element	Pin	Tel. or Phono.	B.C.	S.W.	FM
V1	6BA6	Plate	5	148	148	154	140
		Scg	6	98	96	97	92
V2	6BE6	Plate	5	0	130	130	135
		Grids 2, 3, 4	6-7	0	140	140	130
		Grid 1	1	—	550kc −24 v	9.5 mc −10 v	88 mc −11 v
		Grid 1	1	—	1600 kc −14 v	15.5 mc −16.2 v	108 mc −12 v
V3	6BA6	Plate	5	250	244	246	238
		Scg	6	67	69	72	71
V4	6BA6	Plate	5	238	230	230	222
		Scg	6	100	98	98	97
V5	6AU6	Plate	5	—	—	—	232
		Scg	6	—	—	—	105
V6	6AL5	—	—	—	—	—	—
V7	6SQ7	Plate	6	106	102	102	102
V101	5U4G	Fil.		380	—	—	—
V102	6J5	Plate	3	205	—	—	—
		Cathode	8	54	—	—	—
V103	6F6G	Plate	4	360	—	—	—
		Scg	5	250	—	—	—
V104	6F6G	Same as V103.					

CATHODE CURRENTS WITH FUNCTION SWITCH IN THE FM POSITION

V1 R-F Amplifier	14.1 ma.	V7 Det. Avc. A-F	0.5 ma.
V2 Osc.	12.3 ma.	Power Amp. RS123A	
V3 Mixer	6.5 ma.	V101 Rectifier total	140 ma.
V4 I-F Amplifier	13.5 ma.	V102 Phase inverter	2.15 ma.
V5 Driver FM	15.4 ma.	V103 Power amp.	27 ma.
V6 Ratio Detector		V104 Power amp.	27 ma.

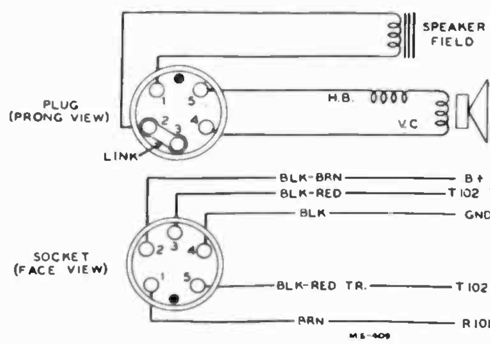
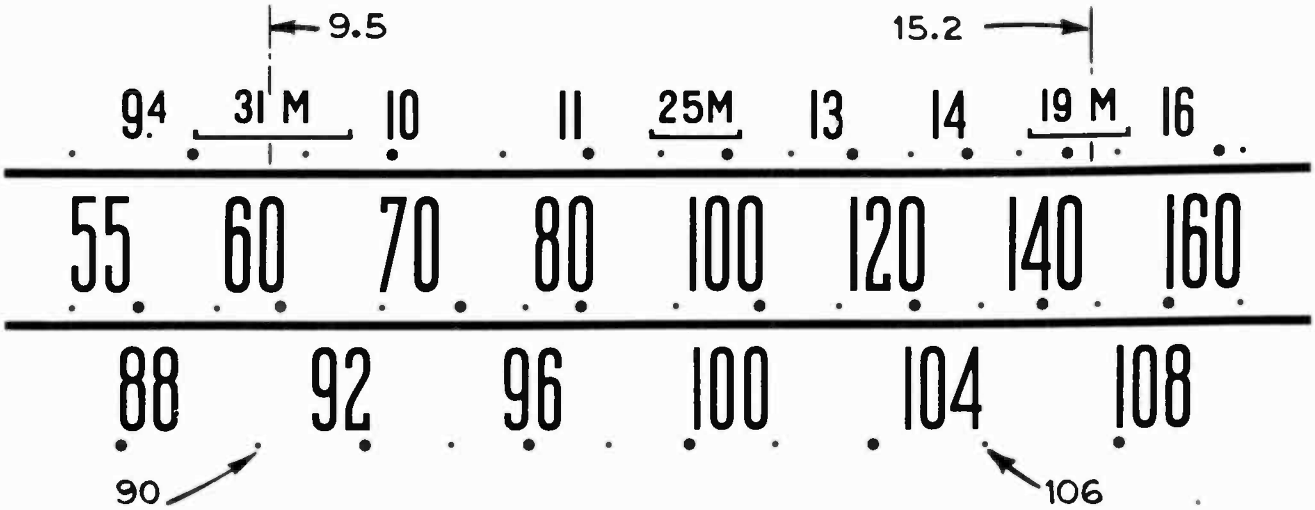
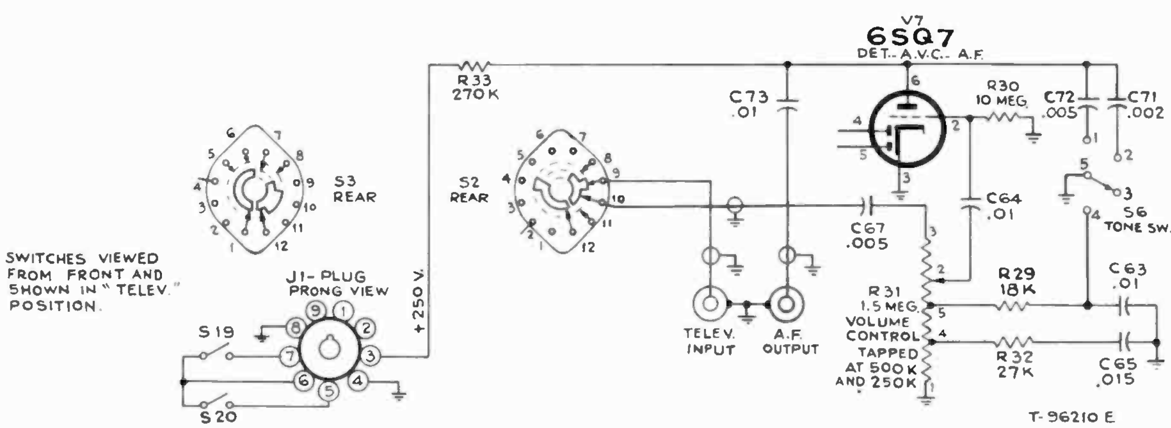


Figure 124—Speaker Connections



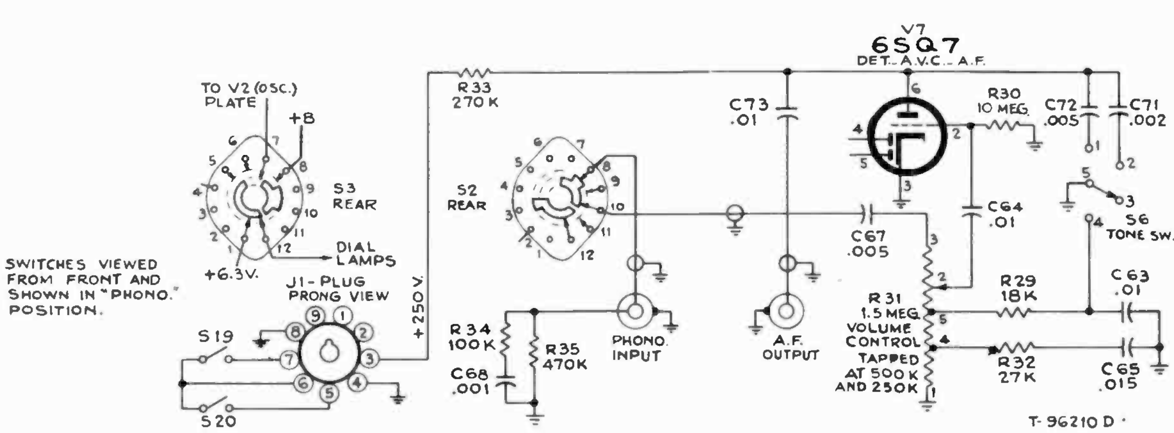
The dial scale drawing shown is a full size reproduction. It can be used as a reference in alignment procedure.

Figure 125—Radio Dial Scale



NOTE: Oscillator plate voltage is removed when the function switch is turned to the television position.

Figure 126—Simplified Schematic—Shown in Television Position



NOTE: Oscillator plate voltage is removed when the function switch is turned to the phono. position.

Figure 127—Simplified Schematic—Shown in Phono Position

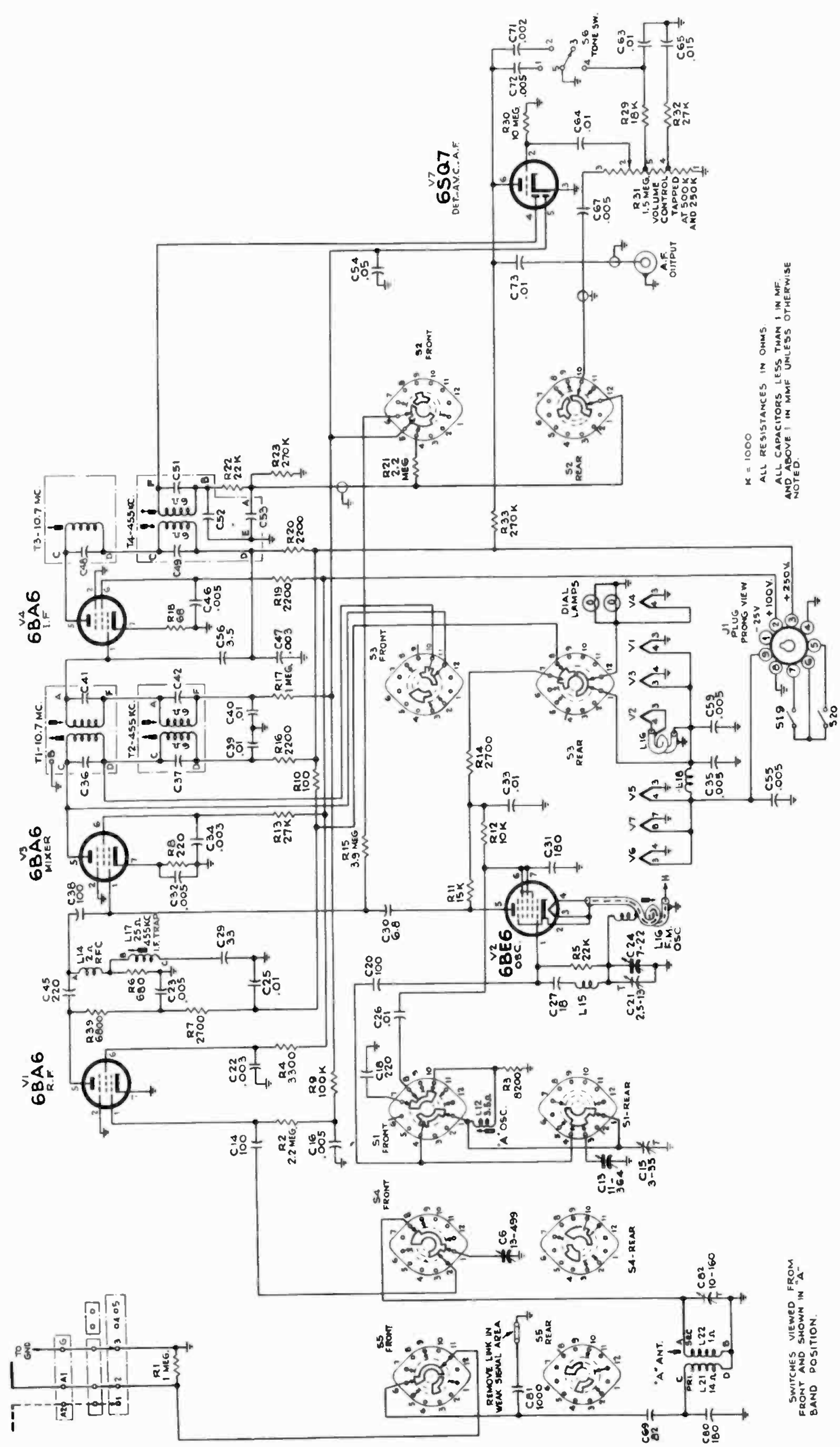


Figure 128—Simplified Schematic—Shown in "A" Band Position

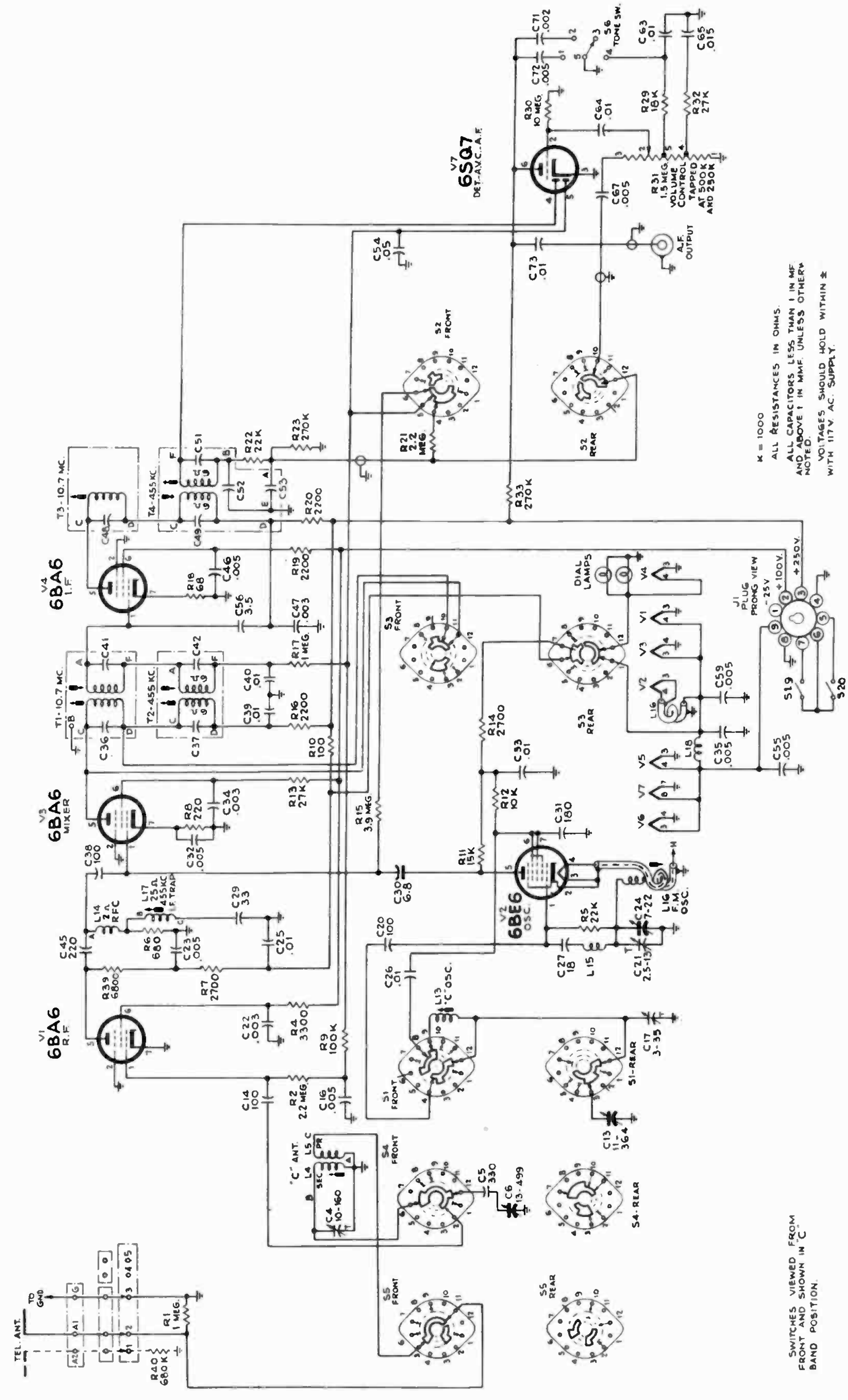


Figure 129—Simplified Schematic—Shown in "C" Band Position

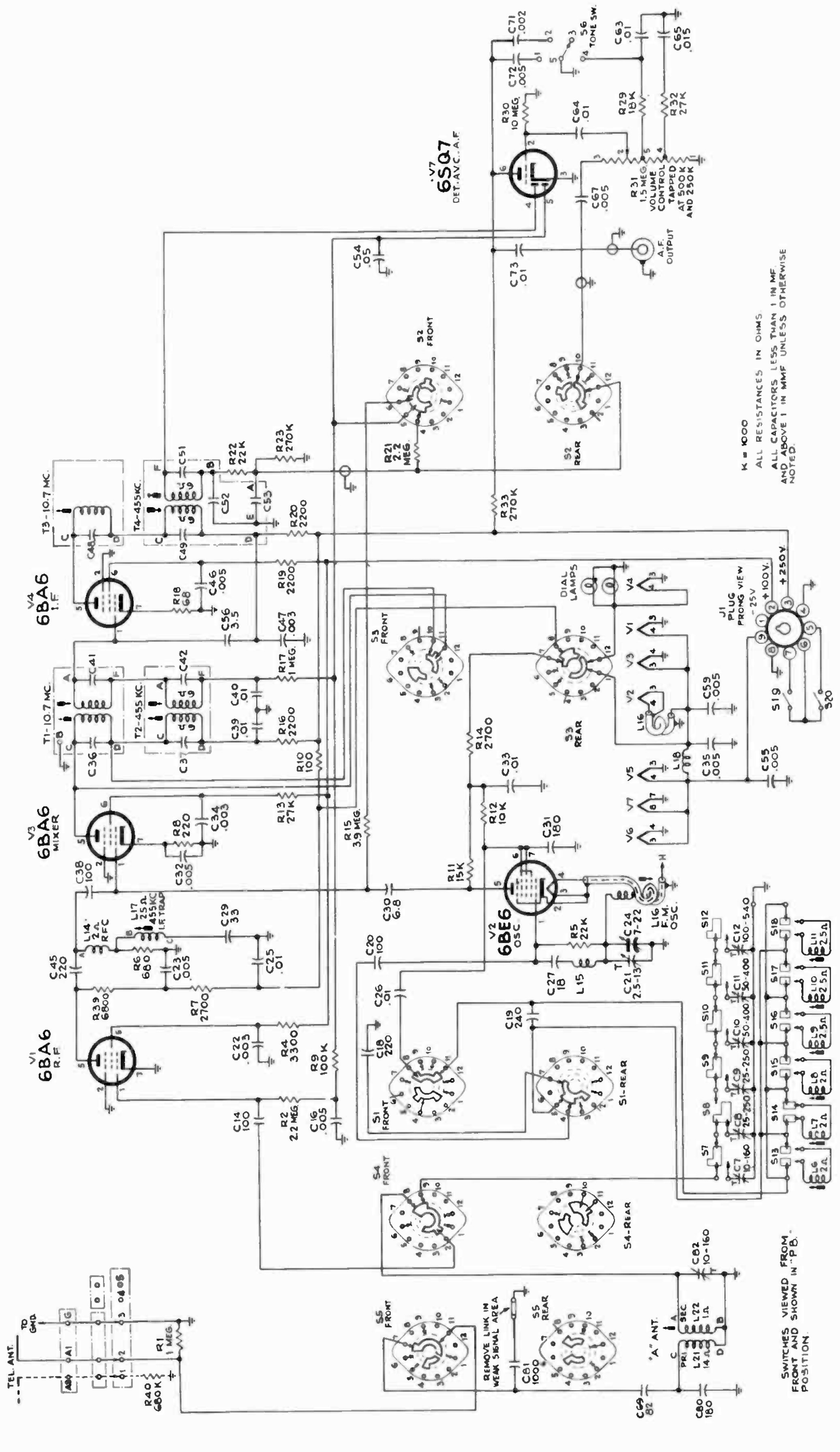


Figure 130—Simplified Schematic—Shown in Push Button Position

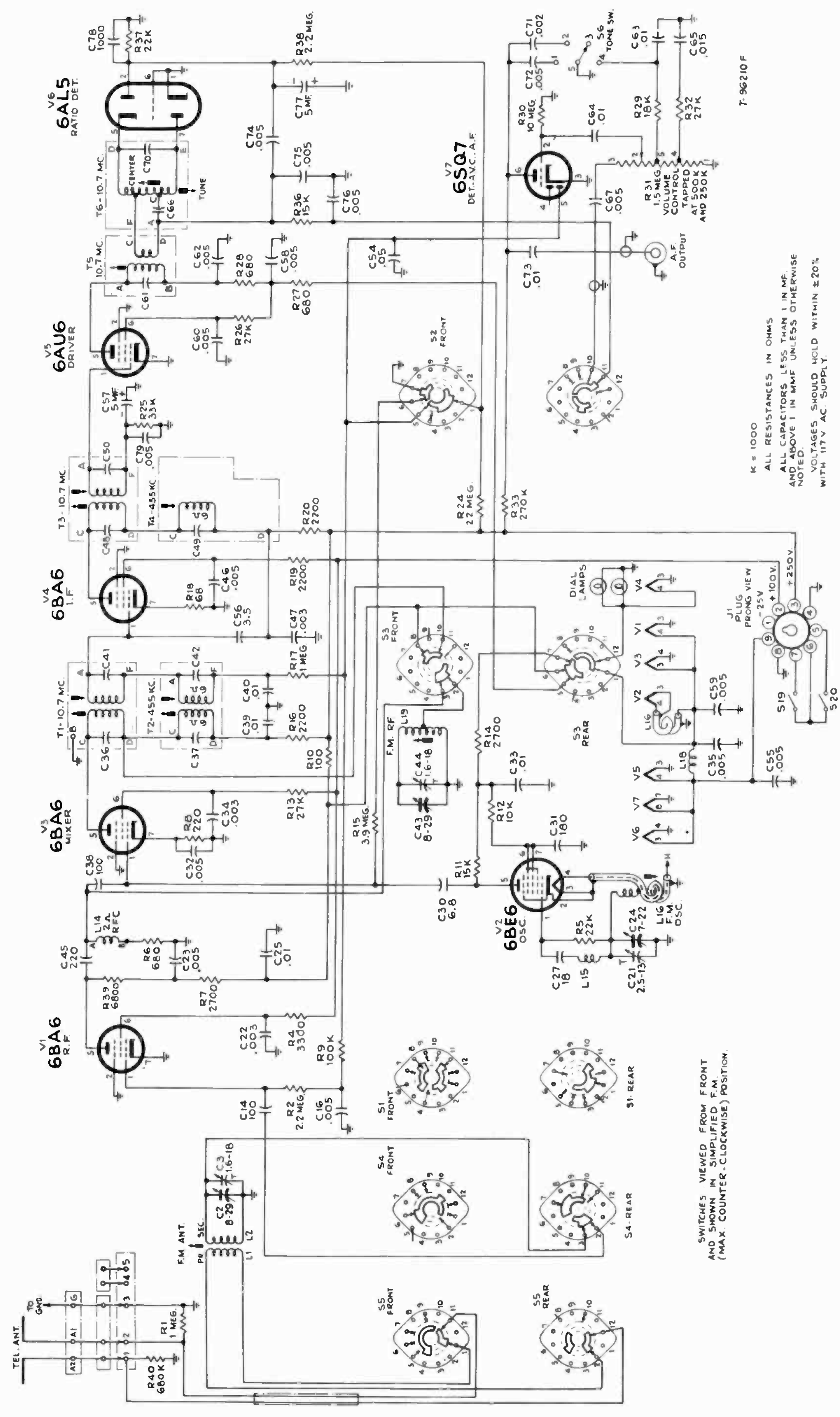
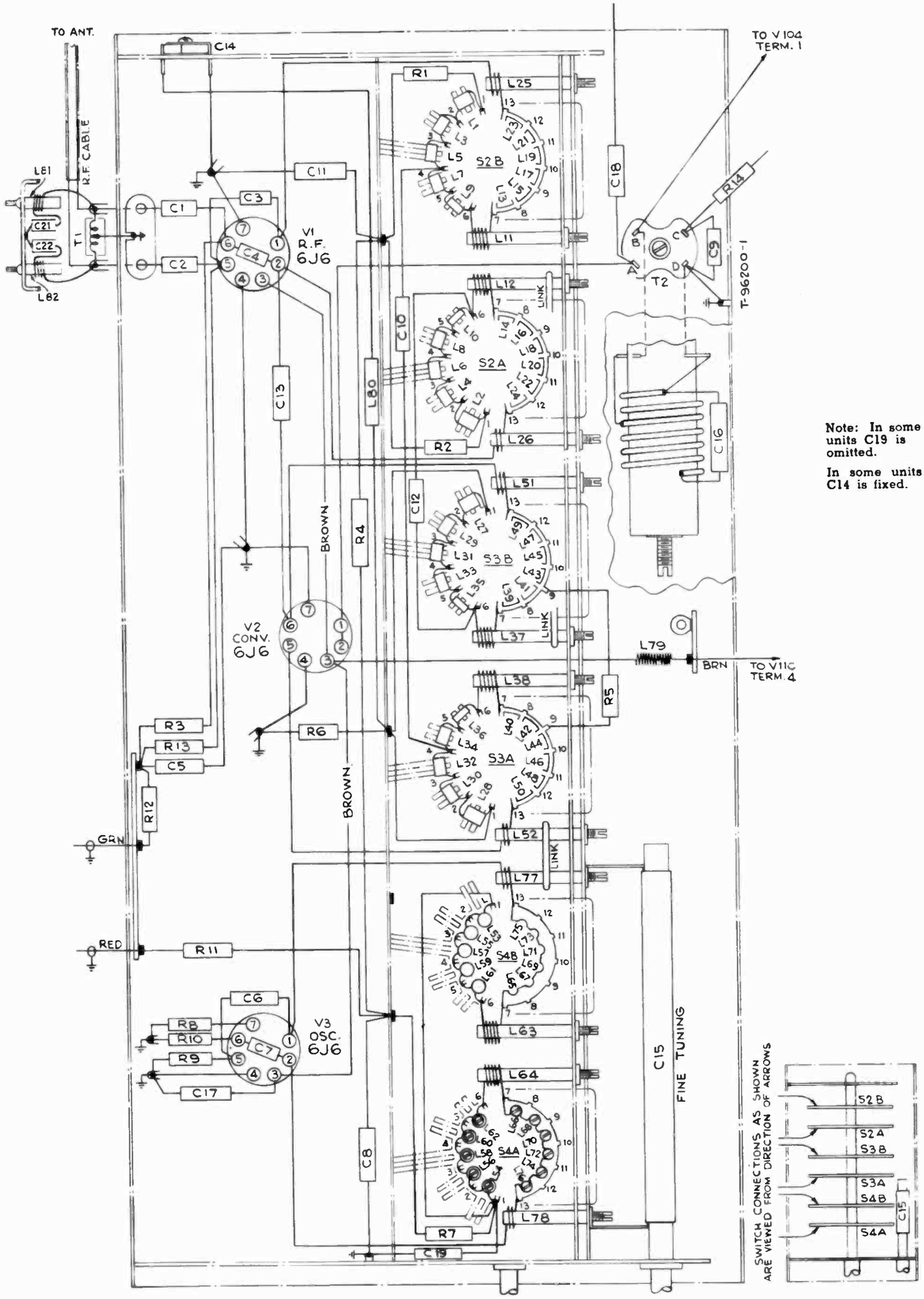


Figure 131—Simplified Schematic—Shown in FM Position



Note: In some units C19 is omitted.

In some units C14 is fixed.

Figure 132—Television R-F Unit Wiring Diagram

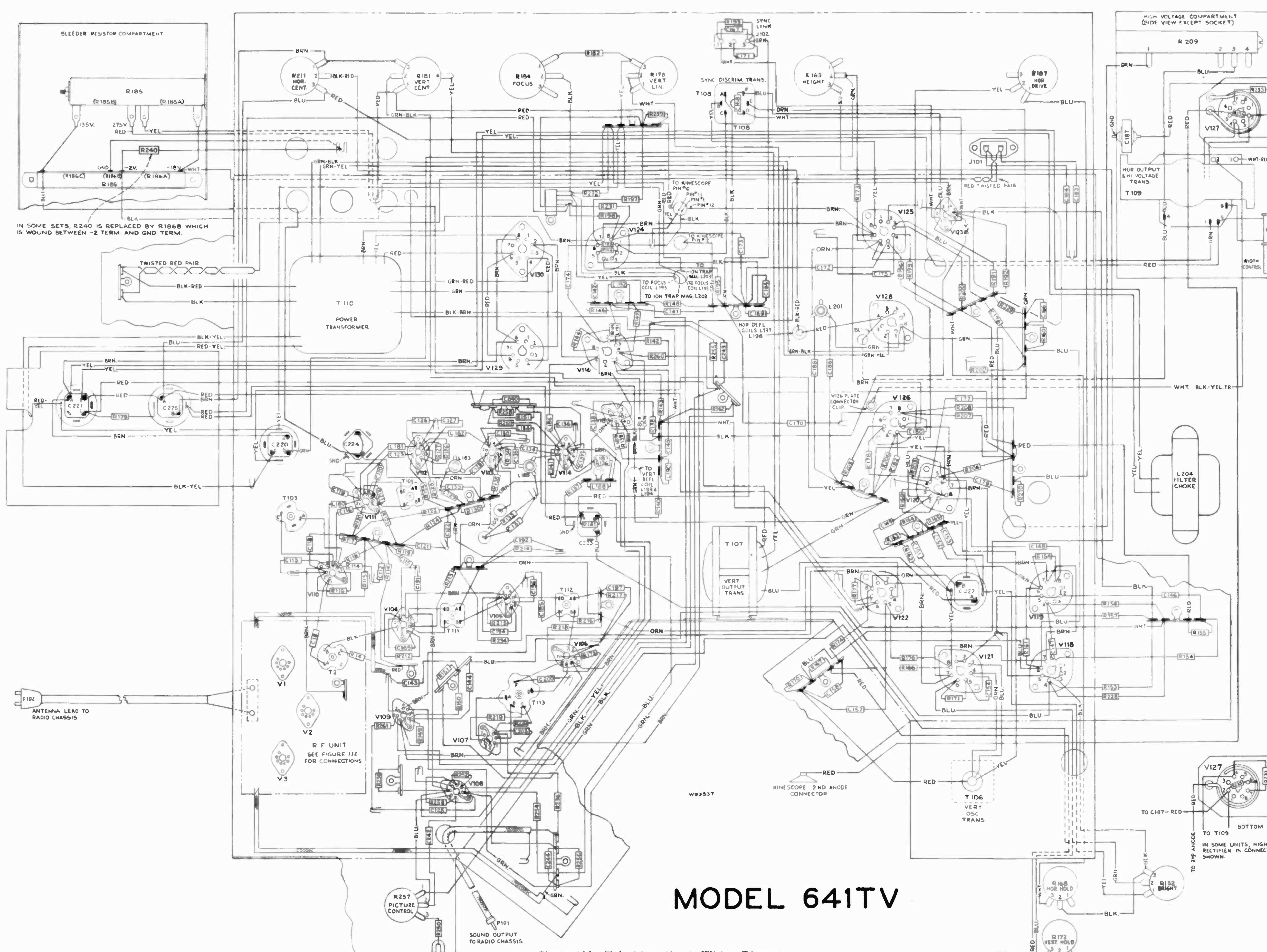
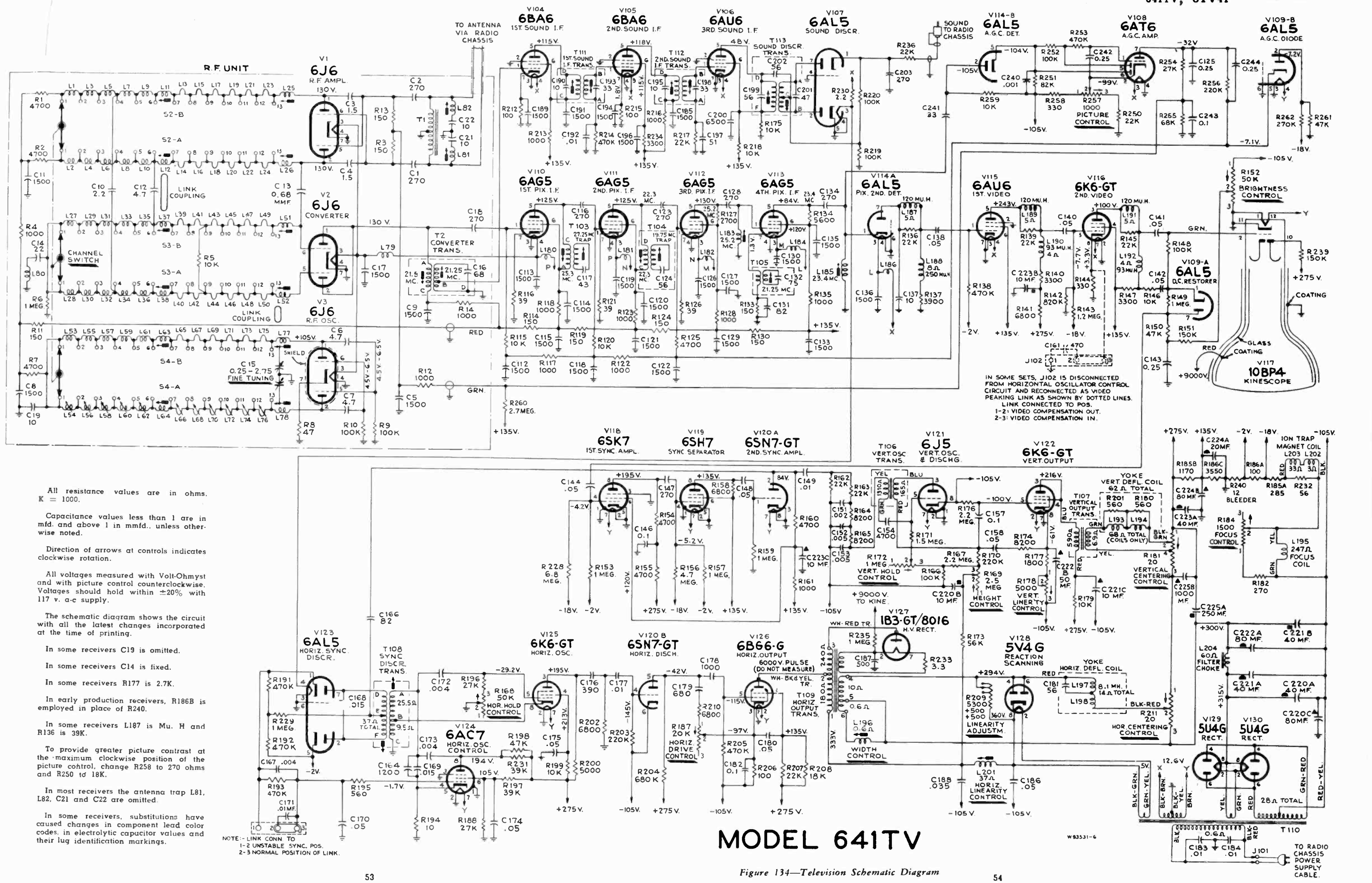


Figure 133—Television Chassis Wiring Diagram



All resistance values are in ohms. K = 1000.

Capacitance values less than 1 are in mfd. and above 1 in mmfd., unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with Volt-Ohmyst and with picture control counterclockwise. Voltages should hold within ±20% with 117 v. a-c supply.

The schematic diagram shows the circuit with all the latest changes incorporated at the time of printing.

In some receivers C19 is omitted.

In some receivers C14 is fixed.

In some receivers R177 is 2.7K.

In early production receivers, R186B is employed in place of R240.

In some receivers L187 is Mu. H and R136 is 39K.

To provide greater picture contrast at the maximum clockwise position of the picture control, change R258 to 270 ohms and R250 to 18K.

In most receivers the antenna trap L81, L82, C21 and C22 are omitted.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

MODEL 641TV

Figure 134—Television Schematic Diagram

TELEVISION CHASSIS WIRING DIAGRAM

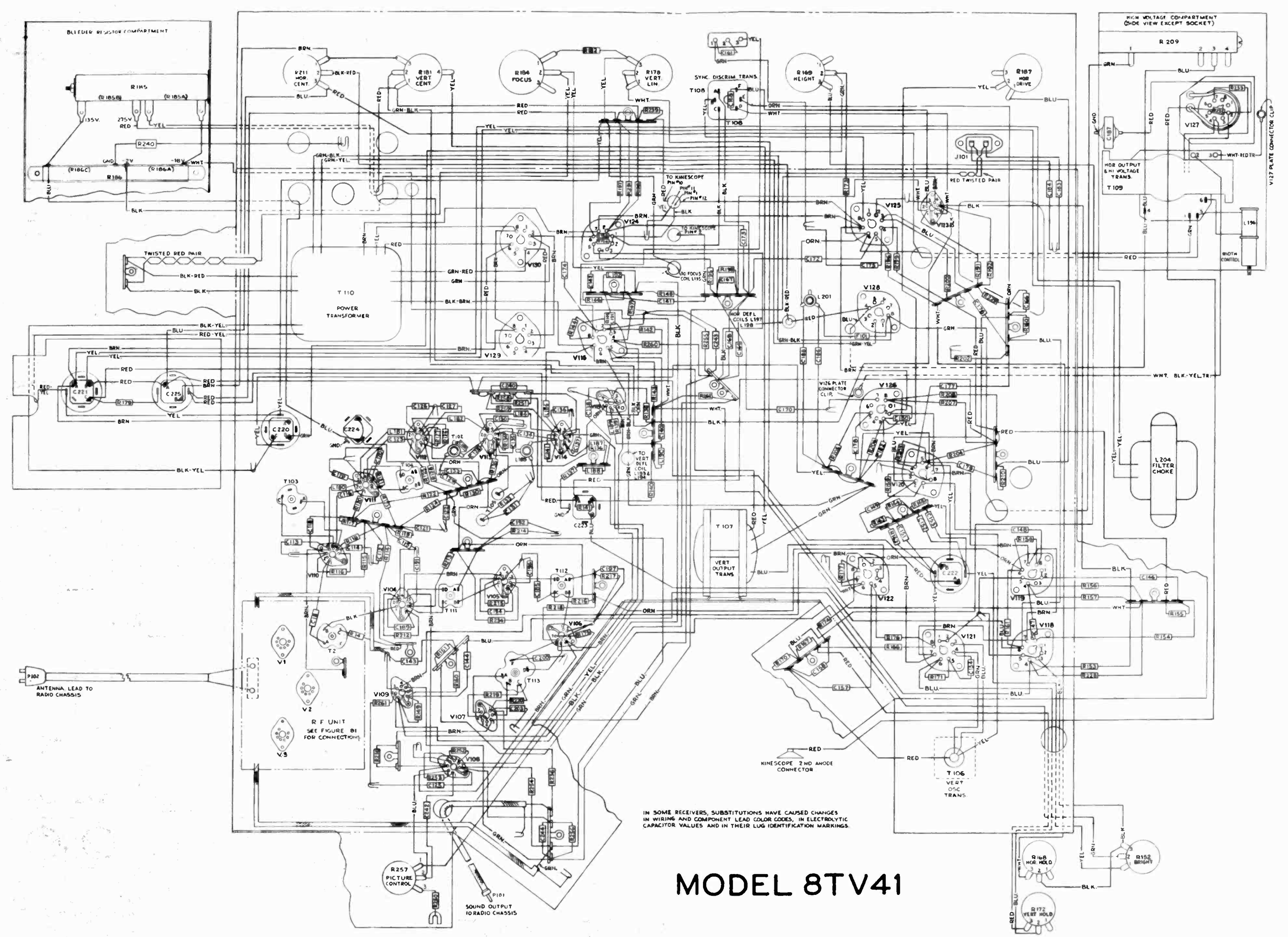
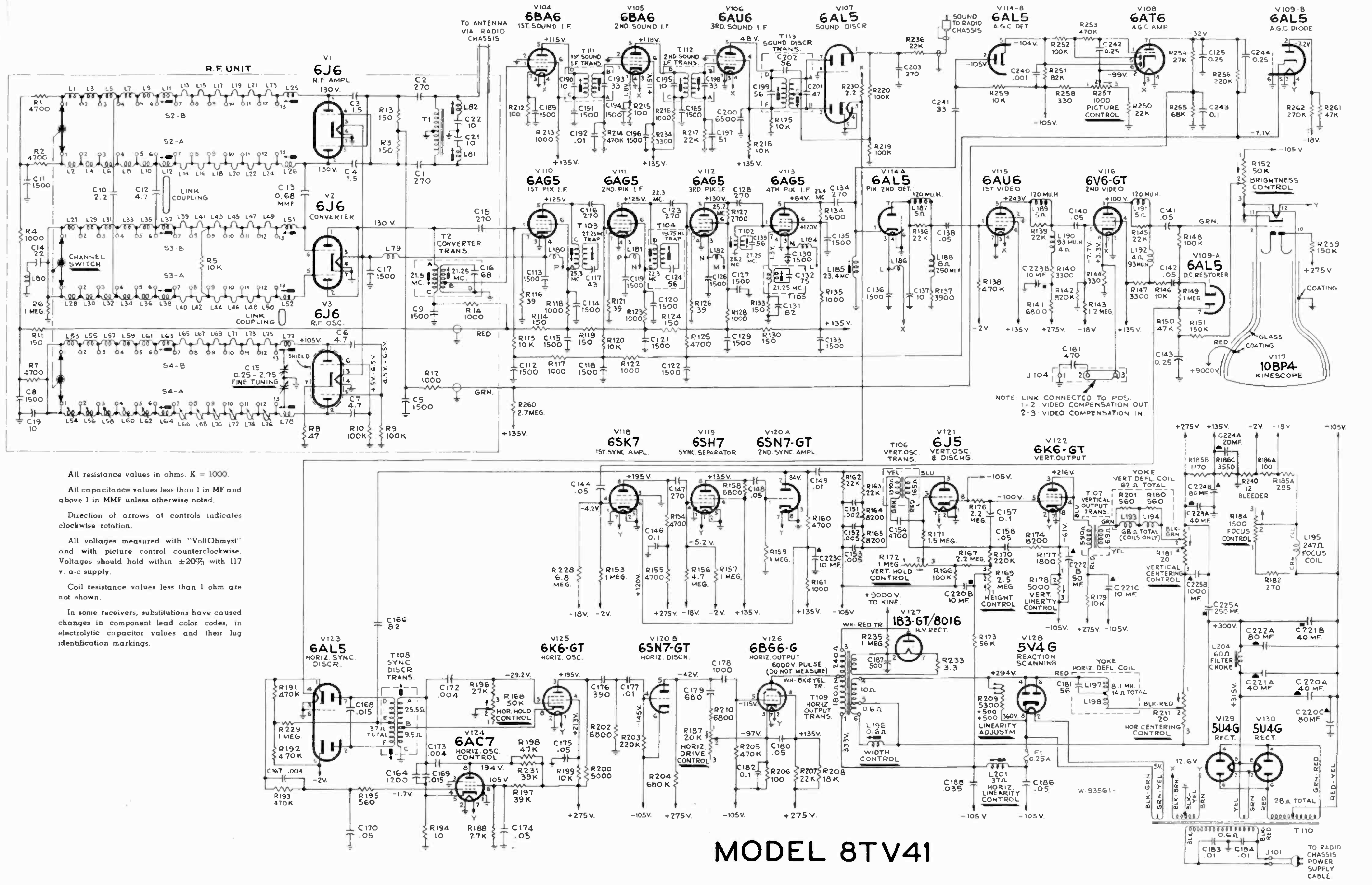


Figure 135—Television Chassis Wiring Diagram

TELEVISION SCHEMATIC DIAGRAM



All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "VoltOhmyst" and with picture control counterclockwise. Voltages should hold within ±20% with 117 v. a-c supply.

Coil resistance values less than 1 ohm are not shown.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

Figure 136—Television Schematic Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	TELEVISION R-F UNIT ASSEMBLY KRK 2
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
45466	Capacitor—Ceramic, 10 mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
65401	Capacitor—Mica, 270 mmf. (C18)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 r-f. amplifier plate coil—front or rear section or channel #1 convertor grid coil—front or rear section (L1, L2, L27, L28)
71479	Coil—Channel #2 r-f. amplifier plate coil—front or rear section or channels #2 and #4 convertor grid coil—front or rear section (L3, L4, L29, L30, L33, L34)
71480	Coil—Channel #4 r-f. amplifier plate coil—front or rear section (L7, L8)
71481	Coil—Channel #5 r-f. amplifier plate coil—front or rear section or channel #5 convertor grid coil—front or rear section (L9, L10, L35, L36)
71492	Coil—Channel #6 oscillator, convertor grid or r-f. amplifier plate coil—front or rear sections (L11, L12, L37, L38, L63, L64)
71491	Coil—Channel #13 convertor grid or r-f. amplifier plate coil—rear section (L25, L51)
71490	Coil—Channel #13 convertor grid or r-f. amplifier plate coil—front section (L26, L52)
72597	Coil—Channel #3 convertor grid coil—front or rear section and channel #3 r-f. amplifier plate coil—front or rear section (L5, L6, L31, L32)
71469	Coil—Channel #1 oscillator coil—front or rear section (L53, L54)
71471	Coil—Channel #5 oscillator coil—front section or channel #2 oscillator coil—rear section (L55, L62)
71470	Coil—Channels #2, 3 and 4 oscillator coil—front sections (L56, L58, L60)
72552	Coil—Channel #3 oscillator coil—rear section (L57)
72553	Coil—Channel #4 oscillator coil—rear section (L59)
71472	Coil—Channel #5 oscillator coil—rear section (L61)
71489	Coil—Channel #13 oscillator coil—rear section (L77)
71488	Coil—Channel #13 oscillator coil—front section (L78)
71505	Coil—Heater choke coil (L79)
71506	Coil—Convertor grid choke coil (L80)
71493	Connector—Segment connector
71597	Core—Channel #13 front and rear oscillator coils' adjustable core and stud
71498	Core—Channels #6 and #13 front and rear convertor grid coils or front and rear r-f. amplifier plate coils' adjustable core and stud
71497	Core—Channel #6 front and rear oscillator coils' adjustable core and stud
71463	Detent—Detent mechanism and fibre shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
71464	Drive—Fine tuning pinch washer drive
71487	Form—Coil form only for Channels #6 and 13 coils—less winding
71462	Loop—Oscillator to convertor grid coupling loop
	Resistor—Fixed, composition, 47 ohms ± 20%, ½ watt (R8)
	Resistor—Fixed, composition, 150 ohms ± 10%, ½ watt (R3, R11, R13)
	Resistor—Fixed, composition, 1000 ohms ± 20%, ½ watt (R4, R12, R14)
	Resistor—Fixed, composition, 4700 ohms ± 20%, ½ watt (R1, R2, R7)
	Resistor—Fixed, composition, 10,000 ohms ± 10%, ½ watt (R5)
	Resistor—Fixed, composition, 100,000 ohms ± 20%, ½ watt (R9, R10)
	Resistor—Fixed, composition, 1 megohm, ± 20%, ½ watt (R6)
14343	Ring—Retaining ring for drive

STOCK No.	DESCRIPTION
71475	Screw—#4-40 x 15/32" adjusting screw for coils (L54, L56, L58, L60, L62)
71476	Screw—#4-40 x ¼" binder head screw for adjusting coils (L66, L68, L70, L72, L74, L76)
71473	Segment—Convertor grid section front segment—less coils or r-f. amplifier plate section front segment—less coils (Part of S3 or Part of S2)
71474	Segment—Convertor grid section rear segment less coils or r-f. amplifier plate section rear segment—less coils (Part of S3 or Part of S2)
71467	Segment—Oscillator section front segment—less coils (Part of S4)
71468	Segment—Oscillator segment rear section—less coils (Part of S4)
72951	Shield—Lead tube shield for V3
71494	Socket—Tube socket—miniature
71461	Spring—Snap spring to hold fine tuning shaft
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
71495	Transformer—Convertor transformer (T2, C16)
73239	Trap—Antenna trap (L81, L82, C21, C22)
	TELEVISION CHASSIS ASSEMBLIES KCS25A-1, KCS25C-2 KCS25D and KCS25E
71894	Bearing—R-F Unit shaft bearing
71454	Board—Terminal board, 3 contact with link
72615	Capacitor—Mica, 10 mmf. (C137)
38868	Capacitor—Ceramic, 33 mmf. (C241)
71771	Capacitor—Ceramic, 51 mmf. (C197)
73090	Capacitor—Mica, 82 mmf., 1000 volts (C166)
71514	Capacitor—Ceramic, 82 mmf. (C131)
73091	Capacitor—Mica, 270 mmf., 1000 volts (C116, C123, C128, C134, C147, C203)
39642	Capacitor—Mica, 390 mmf. (C176)
39644	Capacitor—Mica, 470 mmf. (C161)
71450	Capacitor—Hi-voltage, 500 mmf. (C187)
39648	Capacitor—Mica, 680 mmf. (C179)
72638	Capacitor—Ceramic, 1200 mmf. (C164)
71501	Capacitor—Ceramic, 1500 mmf. (C112, C113, C114, C115, C118, C119, C120, C121, C122, C126, C127, C129, C130, C133, C135, C136, C185, C189, C191, C194, C196)
72524	Capacitor—Mica, 4700 mmf. (C154)
71690	Capacitor—Ceramic, 6500 mmf. (C200)
70600	Capacitor—Tubular, .001 mfd., 400 volts (C240)
70642	Capacitor—Tubular, .001 mfd., 1000 volts (C178)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C151)
70605	Capacitor—Tubular, .004 mfd., 400 volts (C167, C172)
70647	Capacitor—Tubular, .004 mfd., 1000 volts (C173)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C152, C153)
71516	Capacitor—Tubular, oil impregnated, .015 mfd., 400 volts (C168, C169)
73100	Capacitor—Tubular, oil impregnated, .035 mfd., 1000 volts (C188)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C149, C177, C192)
72838	Capacitor—Molded paper, .01 mfd., 400 volts (C183, C184)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C138, C144, C148, C170)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C140, C141, C142, C174, C175, C180)
71515	Capacitor—Tubular, oil impregnated, .05 mfd., 600 volts (C158)
73093	Capacitor—Tubular, oil impregnated, .05 mfd., 1000 volts (C186)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C157, C182, C243)
70638	Capacitor—Tubular, 0.1 mfd., 600 volts (C146)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C125, C143, C242, C244)
71431	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts and 1 section of 80 mfd., 150 volts (C220a, C220b, C220c)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
71432	Capacitor—Electrolytic, comprising 2 sections of 40 mfd., 450 volts and 1 section of 10 mfd., 450 volts (C221a, C221b, C221c)
71433	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 450 volts and 1 section of 50 mfd., 50 volts (C222a, C222b)
71434	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts and 1 section 10 mfd., 350 volts (C223a, C223b, C223c)
71435	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts and 1 section of 80 mfd., 350 volts (C224a, C224b)
71436	Capacitor—Electrolytic, comprising 1 section of 250 mfd., 10 volts and 1 section of 1000 mfd., 6 volts (C225a, C225b)
71970	Choke—Filter choke (L204)
71505	Coil—Choke coil (L180, L181, L182, L184, L186)
71426	Coil—Fourth picture i-f. coil (L185)
71529	Coil—Peaking coil (L187, L189, L191, R136, R139, R145)
71526	Coil—Peaking coil (L188)
71527	Coil—Peaking coil (L190, L192)
71421	Coil—Focus coil (L195)
71429	Coil—Width control coil (L196)
71449	Coil—Horizontal linearity control coil (L201)
71521	Connector—Hi-voltage filter capacitor connector
71789	Connector—Kinescope anode connector
71444	Control—Brightness control (R152)
71442	Control—Focus control (R184)
71440	Control—Height control (R169)
71447	Control—Horizontal drive control (R187)
72064	Control—Picture control (R257)
72758	Control—Vertical and horizontal hold control (R168, R172)
71441	Control—Vertical linearity control (R178)
71443	Control—Vertical centering or horizontal centering control (R181, R211)
72065	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytics #71431 and 71433
71509	Cushion—Deflection yoke upper cushion
71510	Cushion—Deflection yoke lower cushion
71522	Magnet—Ion trap magnet (L202, L203)
73301	Magnet—Ion trap magnet (P-M type)
71451	Nut—Speed nut to mount hi-voltage capacitor
71455	Nut—Wing nut to mount focus coil (3 required)
18469	Plate—Mounting plate for electrolytics #71431 and 71433
71448	Plug—2 prong male plug for power cord
72850	Plug—2 prong male plug for r-f. cable
71918	Resistor—Wire wound, 2.2 ohms, 1 watt (R230)
71513	Resistor—Wire wound, 3.3 ohms, ½ watt (R233)
	Resistor—Fixed, composition, 10 ohms ± 5%, ½ watt (R194)
73098	Resistor—Wire wound, 12 ohms, 1 watt (R240)
	Resistor—Fixed, composition, 39 ohms ± 10%, ½ watt (R116, R121, R126)
	Resistor—Fixed, composition, 100 ohms ± 10%, 2 watt (R206)
	Resistor—Fixed, composition, 100 ohms ± 20%, ½ watt (R212, R215)
	Resistor—Fixed composition, 150 ohms ± 10%, ½ watt (R114, R119, R124, R130, R133)
39505	Resistor—Wire wound, 270 ohms, 2 watt (R182)
	Resistor—Fixed, composition, 330 ohms ± 10%, ½ watt (R144)
	Resistor—Fixed, composition, 330 ohms ± 5%, ½ watt (R258)
	Resistor—Fixed, composition, 560 ohms ± 10%, ½ watt (R195)
	Resistor—Fixed, composition, 1000 ohms ± 20%, ½ watt (R117, R118, R122, R123, R128, R135, R213, R216)
	Resistor—Fixed, composition, 1000 ohms ± 10%, ½ watt (R161)
	Resistor—Fixed, composition, 1800 ohms ± 10%, ½ watt (R177)
	Resistor—Fixed, composition, 2700 ohms ± 5%, ½ watt (R127)
	Resistor—Fixed, composition, 3300 ohms ± 20%, ½ watt (R234)
	Resistor—Fixed, composition, 3300 ohms ± 10%, ½ watt (R140)
	Resistor—Fixed, composition, 3300 ohms ± 10%, 1 watt (R147)
	Resistor—Fixed, composition, 3900 ohms ± 5%, ½ watt (R137)
	Resistor—Fixed, composition, 4700 ohms ± 10%, ½ watt (R160)
	Resistor—Fixed, composition, 4700 ohms ± 5%, ½ watt (R125)
	Resistor—Fixed, composition, 4700 ohms ± 10%, 1 watt (R154, R155)
45876	Resistor—Wire wound, 5000 ohms, 5 watts (R200)
	Resistor—Fixed, composition, 5600 ohms ± 5%, ½ watt (R134)
	Resistor—Fixed, composition, 6800 ohms ± 10%, ½ watt (R141, R158, R202, R210)
	Resistor—Fixed, composition, 68,000 ohms ± 10%, ½ watt (R255)
	Resistor—Fixed, composition, 82,000 ohms ± 10%, ½ watt (R251)
	Resistor—Fixed, composition, 100,000 ohms ± 20%, ½ watt (R148, R252)
	Resistor—Fixed, composition, 100,000 ohms ± 10%, ½ watt (R166, R219 R220)
	Resistor—Fixed, composition, 150,000 ohms ± 20%, ½ watt (R239)
	Resistor—Fixed, composition, 150,000 ohms ± 10%, ½ watt (R151)
	Resistor—Fixed, composition, 220,000 ohms ± 20%, ½ watt (R203)
	Resistor—Fixed, composition, 220,000 ohms ± 10%, ½ watt (R170, R256)
	Resistor—Fixed, composition, 270,000 ohms ± 5%, ½ watt (R262)
	Resistor—Fixed, composition, 470,000 ohms ± 20%, ½ watt (R138, R193, R214, R253)
	Resistor—Fixed, composition, 470,000 ohms ± 10%, ½ watt (R191, R192, R205)
	Resistor—Fixed, composition, 680,000 ohms ± 5%, ½ watt (R204)
	Resistor—Fixed, composition, 820,000 ohms ± 5%, ½ watt (R142)
71973	Resistor—Wire wound, comprising 1 section of 1170 ohms, 25 watts and 1 section of 285 ohms, 8.5 watts (R185a, R185b)
71974	**Resistor—Voltage divider, comprising 1 section of 3550 ohms, 6 watts, 1 section of 12.5 ohms, .5 watt, and 1 section of 100 ohms, 3 watts (R186A, R186B, R186C)**
73099	Resistor—Voltage divider, comprising 1 section of 3550 ohms, 6 watts and 1 section of 100 ohms, 3 watts (R186a, R186c)
71439	Resistor—Wire wound, consisting of 1 section of 5300 ohms, 20 watts and 2 sections of 500 ohms, 2 watts (R209)
	Resistor—Fixed, composition, 1 megohm ± 20%, ½ watt (R149, R153, R159)
	Resistor—Fixed, composition, 8200 ohms ± 10%, ½ watt (R164, R165)
	Resistor—Fixed, composition, 8200 ohms ± 5%, ½ watt (R174)
	Resistor—Fixed, composition, 10,000 ohms ± 10%, ½ watt (R146, R175, R259)
	Resistor—Fixed, composition, 10,000 ohms ± 5%, ½ watt (R115, R120)
	Resistor—Fixed, composition, 10,000 ohms ± 20%, 1 watt (R179)
	Resistor—Fixed, composition, 10,000 ohms ± 10%, 1 watt (R199, R218)
	Resistor—Fixed, composition, 18,000 ohms ± 10%, 1 watt (R208)
	Resistor—Fixed, composition, 22,000 ohms ± 20%, ½ watt (R162, R163, R236)
	Resistor—Fixed, composition, 22,000 ohms ± 10%, ½ watt (R217)
	Resistor—Fixed, composition, 22,000 ohms ± 10%, 1 watt (R207)
	Resistor—Fixed, composition, 22,000 ohms ± 5%, 1 watt (R250)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, ½ watt (R196, R254)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
	Resistor—Fixed, composition, 27,000 ohms ± 10%, 1 watt (R188)
	Resistor—Fixed, composition, 39,000 ohms ± 10%, 1 watt (R197)
	Resistor—Fixed, composition, 39,000 ohms ± 5%, 1 watt (R231)
	Resistor—Fixed, composition, 47,000 ohms ± 10%, ½ watt (R150)
	Resistor—Fixed, composition, 47,000 ohms ± 5%, ½ watt (R261)
	Resistor—Fixed, composition, 47,000 ohms ± 5%, 1 watt (R198)
	Resistor—Fixed, composition, 56,000 ohms ± 10%, ½ watt (R173)
	Resistor—Fixed, composition, 1 megohm ± 10%, ½ watt (R157, R229)
	Resistor—Fixed, composition, 1 megohm ± 10%, 1 watt (R235)
	Resistor—Fixed, composition, 1.2 megohm ± 5%, ½ watt (R143)
	Resistor—Fixed, composition, 1.5 megohm ± 5%, ½ watt (R171)
	Resistor—Fixed, composition, 2.2 megohm ± 10%, ½ watt (R167, R176)
	Resistor—Fixed, composition, 2.7 megohm ± 10%, ½ watt (R260)
	Resistor—Fixed, composition, 4.7 megohm ± 10%, ½ watt (R156)
	Resistor—Fixed, composition, 6.8 megohm ± 10%, ½ watt (R228)
71456	Screw—Wing screw to mount deflection yoke (3 required)
71452	Sleeve—Rubber sleeve for focus coil
35574	Socket—Pilot lamp socket
31251	Socket—Tube socket
71508	Socket—Tube socket for 8016 tube
71525	Socket—Kinescope socket
72516	Socket—Tube socket, miniature
71972	Socket—Tube socket, miniature, complete with mounting plate
71559	Spring—Grounding spring for hi-voltage capacitor
71453	Stud—Mounting stud for focus coil (2 required)
71423	Transformer—First picture i-f transformer (T103, C117)
71425	Transformer—Second picture i-f transformer (T104, C124)
71418	Transformer—Vertical oscillator transformer (T106)
71417	Transformer—Vertical output transformer (T107)
71428	Transformer—Horizontal sync. discriminator transformer (T108)
71416	Transformer—Horizontal output and hi-voltage transformer (T109)
73708	Third picture i-f transformer (T102, C139)
72775	Transformer—Power transformer, 115 volt, 50 cycle (T110)
71415	Transformer—Power transformer, 115 volt, 60 cycle (T110)
71424	Transformer—First or second sound i-f transformer (T111, T112, C190, C193, C195, C198)
71427	Transformer—Sound discriminator transformer (T113, C199, C201, C202)
71422	Trap—Sound trap (T105, C132)
71420	Yoke—Deflection yoke (L193, L194, L197, L198 C181, R180, R201)

RADIO CHASSIS
RK117A

STOCK No.	DESCRIPTION
71638	Board—5 contact terminal board for antenna cables
72047	Capacitor—Adjustable, 1.6-18 mmf. (C3, C44)
72046	Capacitor—Adjustable, 2.5-13 mmf. (C21)
72790	Capacitor—Ceramic, 3.5 mmf. (C56)
72037	Capacitor—Mica trimmer, 3-35 mmf. (C15, C17)
39043	Capacitor—Ceramic, 6.8 mmf. (C30)
71807	Capacitor—Adjustable, 10-160 mmf. (C4, C82)
33111	Capacitor—Ceramic, 33 mmf. (C29)
71514	Capacitor—Ceramic, 82 mmf. (C69)
39396	Capacitor—Ceramic, 100 mmf. (C14, C20, C38)
71933	Capacitor—Mica, 180 mmf. (C31, C80)
71920	Capacitor—Ceramic, 220 mmf. (C45)
39636	Capacitor—Mica, 220 mmf. (C18)
72789	Capacitor—Mica, 240 mmf. (C19)
72793	Capacitor—Mica, 330 mmf. (C5)
71929	Capacitor—Ceramic, 1000 mmf. (C78, C81)
72049	Capacitor—Mica trimmer, comprising 1 section of 100-540 mmf., 2 sections of 50-400 mmf., 2 sections of 25-250 mmf., and 1 section of 10-160 mmf. (C7, C8, C9, C10, C11, C12)
72792	Capacitor—Tubular, .001 mfd., 200 volts (C68)
71927	Capacitor—Tubular, .002 mfd., 400 volts (C71)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C22, C34)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C47)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C16, C32, C35, C46, C55, C67, C74, C75, C76, C79)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C23, C58, C59, C60, C62)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C72)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C65)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C40, C63, C64)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C25, C26, C33, C39, C73)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C54)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C57, C77)
72071	Coil—Antenna coil, "A" band (L21, L22)
71856	Coil—Antenna coil, "C" band (L4, L5)
72044	Coil—Antenna coil, F. M. (L1, L2)
71942	Coil—Filament choke coil (L18)
71852	Coil—Oscillator coil, "A" band (L12)
71853	Coil—Oscillator coil, "C" band (L13)
71937	Coil—Oscillator, F. M. (L16)
72050	Coil—P. B., high frequency (L9, L10, L11)
72051	Coil—P. B., low frequency (L6, L7, L8)
72045	Coil—R-F coil, F. M. (L19)
71407	Coil—Wave trap coil (L14, L17)
72038	Condenser—Variable tuning condenser (C2, C6, C13, C24, C43)
72145	Control—Volume control, tone control and power switch (R31, S6, S19)
32634	Cord—Indicator drive cord (approx. 35" overall length) NOTE: Before assembling, stretch to full length.
32634	Cord—Manual drive cord (approx. 19" overall length) NOTE: Before assembling, stretch to full length.
71941	Coupling—F-M coupling unit (R5, C27, L15)
72043	Drum—Drive drum
72042	Gear—Sleeve gear, 32 teeth
72040	Gear—36 tooth gear
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
70930	Grommet—Rubber grommet for mounting r-f shelf (4 required)
72036	Indicator—Station selector indicator
11765	Lamp—Dial lamp, Mazda 51
72035	Plate—Dial back plate
71636	Plug—9-prong male plug (J1)
72602	Pulley—Drive cord pulley
71637	Receptacle—A-F, television and phono terminal board
34763	Resistor—68 ohms, ½ watt (R18)
34765	Resistor—100 ohms, ½ watt (R10)
5201	Resistor—220 ohms, ½ watt (R8)
12262	Resistor—680 ohms, ½ watt (R6, R27, R28)
34767	Resistor—2200 ohms, ½ watt (R16, R19, R20)
30730	Resistor—2700 ohms, ½ watt (R7, R14)
30733	Resistor—3300 ohms, ½ watt (R4)
38887	Resistor—6800 ohms, 1 watt (R39)
14250	Resistor—8200 ohms, ½ watt (R3)
71914	Resistor—10,000 ohms, 1 watt (R12)
36714	Resistor—15,000 ohms, ½ watt (R36)
71915	Resistor—15,000 ohms, 1 watt (R11)
3219	Resistor—18,000 ohms, ½ watt (R29)
30492	Resistor—22,000 ohms, ½ watt (R22, R37)
30409	Resistor—27,000 ohms, ½ watt (R13, R26, R32)
30685	Resistor—33,000 ohms, ½ watt (R25)
3252	Resistor—100,000 ohms, ½ watt (R9, R34)
30651	Resistor—270,000 ohms, ½ watt (R23, R33)
30648	Resistor—470,000 ohms, ½ watt (R35)
30562	Resistor—680,000 ohms, ½ watt (R40)
30652	Resistor—1 megohm, ½ watt (R1, R17)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
30649	Resistor—2.2 megohms, ½ watt (R2, R21, R38)
70249	Resistor—3.9 megohms, ½ watt (R15)
30992	Resistor—10 megohms, ½ watt (R30)
71917	Resistor—22 megohms, ½ watt (R24)
14343	Retainer—Tuning shaft retainer
31611	Screw—#8-32 x ¼" milled head set screw for gear #72040 and drum #72043
72041	Shaft—Tuning shaft
31364	Socket—Lamp socket
72516	Socket—Tube socket, miniature
31251	Socket—Tube socket, octal
72821	Spring—Anti-noise spring (hook) for tuning condenser shaft
31418	Spring—Indicator cord and drive cord tension spring
72030	Support—Dial support and bracket complete with pulley, R. H.
72031	Support—Dial support and bracket complete with pulley, L. H.
72048	Switch—P. B. selector switch only (S7, S8, S9, S10, S11, S12, S13, S14, S15, S16, S17, S18)
72070	Switch—Range switch (S1, S2, S3, S4, S5, S20)
72593	Transformer—First i-f transformer, F. M. (T1, C36, C41)
71846	Transformer—First i-f transformer, A. M. (T2, C37, C42)
72594	Transformer—Second i-f transformer, F. M. (T3 C48, C50)
71848	Transformer—Second i-f transformer, A. M. (T4, C49, C51, C52, C53)
71935	Transformer—Driver transformer (T5, C61)
71934	Transformer—Ratio detector transformer (T6, C66, C70)
	POWER SUPPLY
	RS 123A
71646	Capacitor—Tubular, .0035 mfd., 1000 volts (C105, C106)
70632	Capacitor—Tubular, .02 mfd., 600 volts (C103, C104)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C107)
31323	Capacitor—Electrolytic, 16 mfd., 150 volts (C102)
72955	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts, 1 section of 50 mfd., 400 volts, and 1 section of 40 mfd., 25 volts (C101A, C101B, C101C)
18469	Insulator—Mounting insulator for electrolytic
11765	Lamp—Pilot lamp, Mazda 51
12493	Plug—Speaker cable plug
30730	Resistor—2700 ohms, ½ watt (R103)
30492	Resistor—22,000 ohms, ½ watt (R104)
30409	Resistor—27,000 ohms, ½ watt (R105)
30650	Resistor—56,000 ohms, ½ watt (R102)
14583	Resistor—220,000 ohms, ½ watt (R106, R107)
71660	Resistor—Comprising 1 section of 180 ohms, 3.5 watts, 1 section of 2520 ohms, 3.97 watts, and 1 section of 2760 ohms, 9.3 watts (R101A, R101B, R101C)
71659	Socket—9-prong power socket (J101)
35787	Socket—Audio input socket (J102)
31364	Socket—Pilot lamp socket
31319	Socket—Tube socket
37048	Transformer—Power transformer, 115 volts, 50/60 cycle (T101)
71661	Transformer—Output transformer (T102)
	SPEAKER ASSEMBLIES
	RL70R1
	92567-2W
13867	Cap—Dust cap
71147	Clamp—Clamp to hold metal cone suspension (2 required)
71146	Coil—Field coil, 1060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
31539	Plug—5-prong male plug for speaker
71144	Speaker—12" E. M. speaker complete with cone and voice coil less plug
	MODEL 641TV
	MISCELLANEOUS
72701	Back—Cabinet back for walnut instruments
72816	Back—Cabinet back for mahogany instruments
72916	Back—Cabinet back for toasted mahogany instruments
72439	Back—Television chassis back cover
72146	Bezel—Push button bezel for walnut and standard mahogany instruments
72906	Bezel—Push button bezel for toasted mahogany instruments
71819	Bracket—Mounting bracket for balancing unit
72446	Bracket—Pilot lamp bracket
72908	Bumper—Rubber bumper for record changer tray (2 required)
72151	Button—Push button
72444	Cable—Radio antenna cable
72437	Cable—Shielded pickup cable (37")
72445	Cable—Shielded audio cable complete with two male plugs—part of interconnecting cable
13103	Cap—Pilot lamp cap
71892	Catch—Door strike and catch
72434	Check—Radio compartment door check
72157	Clip—Push button bezel spring clip
X1636	Cloth—Grille cloth for walnut instruments
X1640	Cloth—Grille cloth for mahogany instruments
X1652	Cloth—Grille cloth for toasted mahogany instruments
72706	Cushion—Rubber cushion for door
71982	Decal—Brightness and horizontal-vertical control decal for walnut and standard mahogany instruments
71966	Decal—Trade mark decal (Victrola)
71984	Decal—Trade mark decal (RCA Victor)
72696	Decal—Tuning, range and function switch decal for walnut and standard mahogany instruments
72695	Decal—Volume control and tone control decal for walnut and standard mahogany instruments
72922	Decal—Picture and channel marker decal for walnut and standard mahogany instruments
72921	Decal—Volume control and tone control function decal for toasted mahogany instruments
72923	Decal—Tuning and range switch function decal for toasted mahogany instruments
72924	Decal—Control marker decal for television controls for toasted mahogany instruments
72707	Dial—Glass dial scale
71598	Escutcheon—Channel marker escutcheon
72158	Escutcheon—Dial escutcheon less dial
72702	Glass—Safety glass
72703	Grille—Speaker and record compartment metal grille
72914	Guide—Carriage guide, L.H., for walnut and standard mahogany instruments
72915	Guide—Carriage guide, R.H., for walnut and mahogany instruments
72904	Guide—Carriage guide, L.H., for toasted mahogany instruments
72905	Guide—Carriage guide, R.H., for toasted mahogany instruments
71945	Hinge—Door hinge
71533	Knob—Television fine tuning knob for walnut and standard mahogany instruments
71534	Knob—Television channel selector knob for walnut and standard mahogany instruments
71536	Knob—Inner knob for horizontal hold control for walnut and standard mahogany instruments
71537	Knob—Inner knob for picture control or brightness control for walnut and standard mahogany instruments
71535	Knob—Outer knob for picture control, vertical hold control or brightness control for walnut and standard mahogany instruments

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
72147	Knob—Radio range switch knob for walnut and standard mahogany instruments
72148	Knob—Radio tone control knob for walnut and standard mahogany instruments
72149	Knob—Radio tuning knob for walnut and standard mahogany instruments
72150	Knob—Radio power switch knob for walnut and standard mahogany instruments
72569	Knob—Inner knob for horizontal hold control for toasted mahogany instruments
72566	Knob—Inner knob for picture control or brightness control for toasted mahogany instruments
72565	Knob—Outer knob for picture control, vertical hold control or brightness control for toasted mahogany instruments
72917	Knob—Radio range switch knob for toasted mahogany instruments
72918	Knob—Radio tone control knob for toasted mahogany instruments
72919	Knob—Radio tuning knob for toasted mahogany instruments
72920	Knob—Radio power switch knob for toasted mahogany instruments
72567	Knob—Television fine tuning knob for toasted mahogany instruments
72568	Knob—Television channel selector knob for toasted mahogany instruments
11765	Lamp—Dial lamp
72563	Marker—Call letter marker
70546	Mounting—One set of hardware consisting of four upper springs, four lower springs and four clamp nuts to mount record changer
31048	Plug—Male plug for audio cable
4573	Plug—2-contact female power plug for interconnecting cable (television chassis end)
30868	Plug—2-contact female power plug for radio interconnecting cable and for record changer extension cable
30870	Plug—2-prong male plug for record changer extension cable
71968	Plug—9-prong male plug for radio interconnecting cable (power supply end)
71967	Plug—9-contact female plug for radio interconnecting cable (radio end)
72705	Pull—Radio or record changer compartments door pull
72704	Pull—Television compartment door pull (2 required)
70551	Retainer—Tray roller retaining strip, L. H.
70552	Retainer—Tray roller retaining strip, R. H.
70554	Roller—Record changer tray roller
71539	Slide—Centering slide with rubber cushion for kinescope (4 required)
72156	Spring—Push button bezel spring
34053	Spring—Retaining spring for push button
72581	Spring—Radio compartment door check spring
4982	Spring—Retaining spring for knob #71533 and #72567
72845	Spring—Retaining spring for knob #72147 and #72917
14270	Spring—Retaining spring for knobs #71534, #71535, #71537, #72565, #72566 and #72568
30330	Spring—Retaining spring for knobs #71536, #72150, #72569 and #72920
30900	Spring—Retaining spring for knobs #72148, #72149, #72918 and #72919
71538	Spring—Spring clip for channel marker escutcheon
72440	Stop—Record changer mechanism tray stop
72691	Support—Drop support for record changer compartment door for walnut and mahogany instruments
73005	Support—Door support for record changer compartment door for toasted mahogany instruments
70555	Tire—Rubber tire for tray roller
72925	Tray—Record changer mechanism tray for walnut and standard mahogany instruments
72909	Tray—Record changer mechanism tray for toasted mahogany instruments
2917	Washer—"C" washer for tray roller

MODEL 8TV41

MISCELLANEOUS

STOCK No.	DESCRIPTION
72701	Back—Cabinet back—mahogany
72439	Back—Television chassis back cover
72146	Bezel—Push button bezel
71599	Bracket—Pilot lamp bracket
72908	Bumper—Rubber bumper for record changer tray
72151	Button—Push button
72444	Cable—Radio antenna cable
72445	Cable—Shielded audio cable complete with pin plugs—part of interconnecting cable
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
72925	Carriage—Record changer mechanism carriage less rollers and bumpers
71892	Catch—Door catch and strike for radio, phono and speaker compartments and guide for television compartment doors
73422	Catch—Door catch and strike for television compartment doors (2 required)
72434	Check—Radio compartment door check
72157	Clip—Push button bezel spring clip
X1799	Cloth—Grille cloth
71982	Decal—"Brightness—Horizontal Vertical" decal
72922	Decal—Picture control and channel marker decal
71966	Decal—Trademark decal (Victrola)
72696	Decal—Tuning and selector switch decal
72695	Decal—Volume control and tone control decal
72707	Dial—Glass dial scale
73180	Emblem—Metal trademark emblem (RCA-Victor)
73220	Escutcheon—Channel marker escutcheon
72158	Escutcheon—Dial escutcheon less dial
73419	Glass—Safety glass
73423	Grille—Metal grille
72441	Guide—Carriage guide—R.H.
72442	Guide—Carriage guide—L.H.
73421	Hinge—Center hinge for radio-phono compartment doors
73024	Hinge—L.H. or R.H. end hinge for radio-phono compartment doors
36610	Hinge—Speaker compartment door hinges (1 set)—R.H.
36817	Hinge—Speaker compartment door hinges (1 set)—L.H.
73420	Hinge—Television compartment door hinges (4 required)
73224	Knob—Channel selector knob
73222	Knob—Fine tuning knob
73228	Knob—Horizontal hold control knob
73230	Knob—Picture control or brightness control knob (inner)
73226	Knob—Picture control, vertical hold control or brightness control knob (outer)
72150	Knob—Radio power switch knob
72147	Knob—Radio range switch knob
72148	Knob—Radio tone control knob
72149	Knob—Radio tuning control knob
72563	Marker—Station marker
70546	Mounting—Set of hardware consisting of four (4) upper springs, four (4) bottom springs and four (4) clamp nuts to mount record changer

641TV, 8TV41

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
71819	Plate—Mounting plate for radio compartment door check	72581	Spring—Radio compartment door check spring
30868	Plug—2 contact female plug for interconnecting cable (power cable)	34053	Spring—Retaining spring for push button
4573	Plug—2 contact female plug for interconnecting cable (television chassis end)	30900	Spring—Retaining spring for radio tuning knob
71967	Plug—9 contact female plug for interconnecting cable	72845	Spring—Retaining spring for fine tuning knob and radio range switch knob
71968	Plug—9 prong male plug for interconnecting cable	14270	Spring—Retaining spring for knob #72148
31048	Plug—Pin plug for audio or pickup cable	30330	Spring—Retaining spring for horizontal hold control knob and radio power switch knob
73034	Pull—Door pull for speaker compartment doors (2 required)	71538	Spring—Spring clip to mount channel marker escutcheon
73425	Pull—Television compartment door and radio-phono compartment's doors pull	72440	Stop—Record changer carriage stop
70551	Retainer—Tray roller retaining strip—L.H.	72936	Stop—Speaker compartment door stop
70552	Retainer—Tray roller retaining strip—R.H.	72940	Support—Record changer compartment door drop support—L.H.
70554	Roller—Record changer tray roller	72939	Support—Record changer compartment door drop support—R.H.
73424	Roller—Television compartment door roller	70555	Tire—Rubber tire for tray roller
71539	Slide—Kinescope centering slide with rubber cushion (4 required)	71814	Washer—Rubber washer for radio compartment door check
72156	Spring—Push button bezel spring	2917	Washer—Spring washer to fasten rollers to tray

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 8TS30
Walnut, Mahogany or Toasted Mahogany

RCA VICTOR

TELEVISION RECEIVER MODEL 8TS30

Chassis No. KCS 20J-1 (60 cycles) and KCS 20K-2 (50 cycles)—Mfr. No. 274

SERVICE DATA

— 1948 No. T1 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 8TS30 is a thirty-tube, direct-viewing, 10" table model, Television Receiver. The receiver is complete in one unit and is operated by the use of seven front-panel controls. Features of the receiver include: Full thirteen channel coverage; F-M sound system; Improved picture brilliance; A-F-C horizontal hold; Stabilized vertical hold; Two stages of video amplification; Noise saturation circuits; Three stage sync separator and clipper; Four mc. band width for picture channel, and Reduced hazard high voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .... 6⅝" x 8½"—2" radius at corner

R-F FREQUENCY RANGES

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq Mc.	Receiver R-F Osc. Freq. Mc.
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE

Plus and minus approximately 300 kc on channel 1 and plus and minus approximately 750 kc on channel 13.

POWER SUPPLY RATING

KCS 20J-1 ....115 volts., 60 cycles, 320 watts
KCS 20K-2 ....115 volts, 50 cycles, 320 watts

AUDIO POWER OUTPUT RATING

Undistorted .... 2.5 watts
Maximum .... 4 watts

LOUDSPEAKER (92573-2)

Type .... 5 x 7 inch Permanent Magnet Dynamic
Voice Coil Impedance .... 3.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet (less Kinescope) .... 80 lbs.
Shipping Weight .... 93 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE .300 ohms balanced

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (Outside	26	14½	19
Chassis Base (Outside)	19¼	3¾	15½
Chassis Overall	21¾	11¾	16⅛

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6J6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6J6	Converter
(4)	RCA 6BA6	1st Sound I-F Amplifier
(5)	RCA 6BA6	2nd Sound I-F Amplifier
(6)	RCA 6AU6	3rd Sound I-F Amplifier
(7)	RCA 6AL5	Sound Discriminator
(8)	RCA 6AT6	1st Audio Amplifier
(9)	RCA 6K6GT	Audio Output
(10)	RCA 6AG5	1st Picture I-F Amplifier
(11)	RCA 6AG5	2nd Picture I-F Amplifier
(12)	RCA 6AG5	3rd Picture I-F Amplifier
(13)	RCA 6AG5	4th Picture I-F Amplifier
(14)	RCA 6AL5	Picture 2nd Detector and D-C Restorer
(15)	RCA 6AU6	1st Video Amplifier
(16)	RCA 6K6GT	2nd Video Amplifier
(17)	RCA 6SK7	1st Sync Amplifier
(18)	RCA 6SH7	Sync Separator
(19)	RCA 6SN7GT	2nd Sync Amplifier and Horizontal Discharge
(20)	RCA 6J5	Vertical Sweep Oscillator and Discharge
(21)	RCA 6K6GT	Vertical Sweep Output
(22)	RCA 6AL5	Horizontal Sync Discriminator
(23)	RCA 6K6GT	Horizontal Sweep Oscillator
(24)	RCA 6AC7	Horizontal Sweep Oscillator Control
(25)	RCA 6BG6G	Horizontal Sweep Output
(26)	RCA 5V4G	Horizontal Reaction Scanning
(27)	RCA 1B3-GT/8016	High Voltage Rectifier
(28)	RCA 5U4G	Power Supply Rectifiers (2 tubes)
(29)	RCA 10BP4	Kinescope

Specifications continued on page 2

ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE I-F FREQUENCIES

Picture Carrier Frequency	25.75 Mc.
Adjacent Channel Sound Trap	27.25 Mc.
Accompanying Sound Traps	21.25 Mc.
Adjacent Channel Picture Carrier Trap	19.75 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 Mc.
Sound Discriminator Band Width between peaks)	350 kc

VIDEO RESPONSE	To 4 Mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SCANNING FREQUENCY	15,750 cps
VERTICAL SCANNING FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front panel)

Channel Selector Fine Tuning	Dual Control Knobs
Picture Sound Volume and On-Off Switch	Dual Control Knobs
Picture Horizontal Hold Picture Vertical Hold	Dual Control Knobs
Brightness	Single Control Knob

NON-OPERATING CONTROLS not including r-f & i-f adjustments)

Horizontal Centering	rear chassis adjustment
Vertical Centering	rear chassis adjustment
Width	rear chassis screwdriver adjustment
Height	rear chassis adjustment
Horizontal Linearity	top chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis adjustment
Horizontal Oscillator Frequency	rear chassis adjustment
Horizontal Oscillator Phase	bottom chassis adjustment
Focus	rear chassis adjustment
Focus Coil	top chassis wing nut adjustment
Ion Trap Magnet	top chassis thumb screw adjustment
Deflection Coil	top chassis wing nut adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.
2. Set the STATION SELECTOR to the desired channel.
3. Turn the PICTURE control fully counter-clockwise.
4. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen then counter-clockwise until the glow just disappears.
5. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.
6. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.
7. Adjust the VERTICAL hold control until the pattern stops vertical movement.
8. Adjust the HORIZONTAL hold control until a picture is obtained and centered.
9. Adjust the PICTURE control for suitable picture contrast.
10. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.
11. In switching from one station to another, it may be necessary to repeat steps number 6 and 9.
12. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 6 is generally sufficient.
13. If the positions of the controls have been changed, it may be necessary to repeat steps number 1 through 9.

NOTE: If any difficulty is experienced with steps number 7 or 8, turn the PICTURE control ¼ turn counterclockwise and repeat those adjustments.

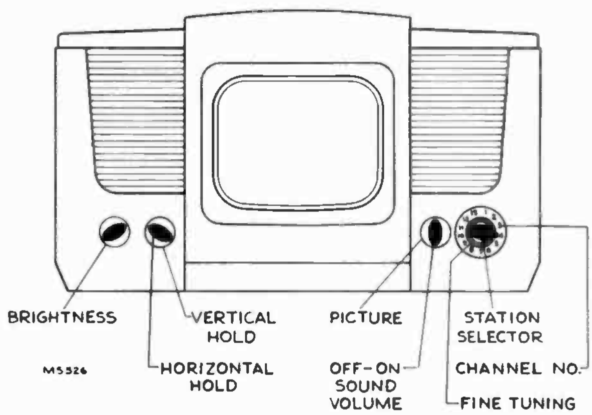


Figure 1—Receiver Operating Controls

INSTALLATION INSTRUCTIONS

The Model 8TS30 television receiver is shipped complete in one carton except for the 10BP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING—To unpack the receiver, tear open the carton bottom flaps, pick the receiver up from under the bottom of the cabinet and lift it out of the shipping carton.

The cabinet safety glass front panel is packed in a cardboard box. Remove the box and unpack the panel. Take off the cabinet top and back.

The operating control knobs are packed in a paper bag which is tied to the inside of the cabinet brace. Remove the bag.

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten. See Figure 2 for the location of the cushion and yoke adjustments.

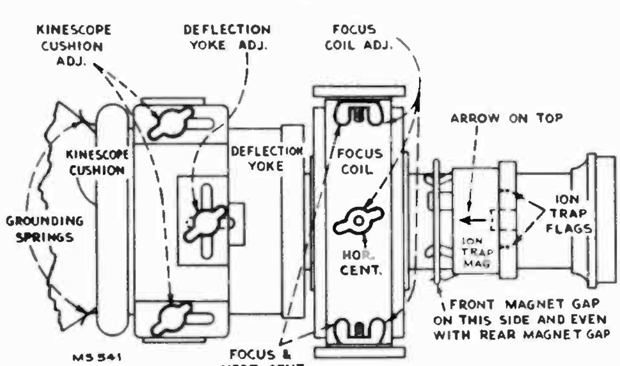


Figure 2—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wingnuts and raise, lower, or rotate the coil until alignment is obtained. Tighten the wingnuts with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 3 for location of the slides and their adjustment screws.

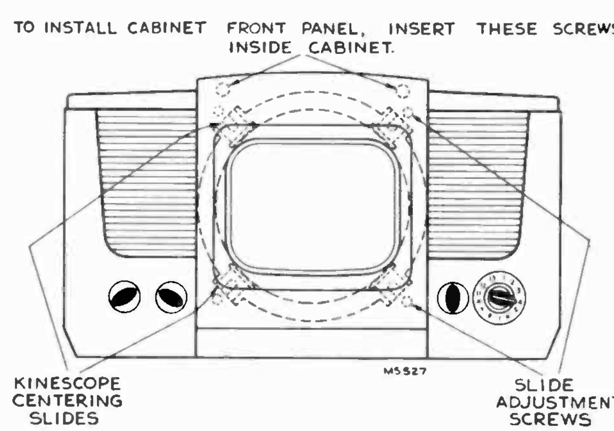


Figure 3—Cabinet, Front View

KINESCOPE HANDLING PRECAUTION—Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

INSTALLATION OF KINESCOPE—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is approximately on top. The final orientation of the tube will be determined by the position of the ion trap flags. Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags, as shown in Figure 4. The kinescope must be installed so that when looking down on the chassis, the two flags will be seen as shown in Figure 2.

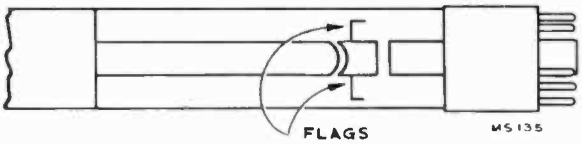


Figure 4—Ion Trap Flags

Insert the neck of the kinescope through the deflection and focus coils as shown in Figure 5 until the base of the tube protrudes approximately two inches beyond the focus coil. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

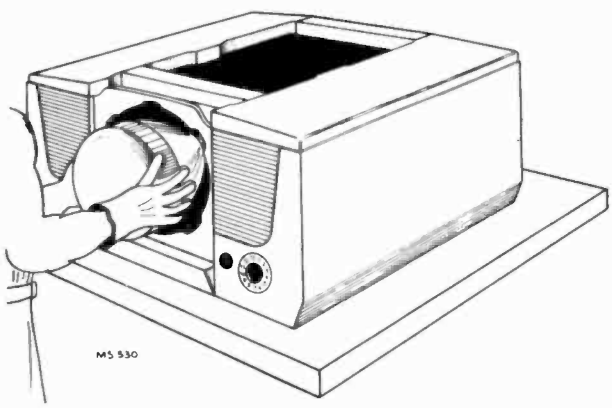


Figure 5—Kinescope Insertion

Early production receivers employed an EM type of ion trap magnet like that in the model 630TS receiver. Late production receivers employed a PM type magnet as shown in Figure 2.

If an EM type of magnet is applied, slip the assembly over the neck of the kinescope with the coils down and the large coil towards the base of the tube. Tighten the magnet adjustment thumbscrews sufficiently to hold it in position but still free enough to permit adjustment.

If the PM type is employed, slip the assembly over the neck of the kinescope with the large magnet towards the base of the tube and with the arrow on the assembly up as shown in Figure 2. The front magnet is movable on the assembly. The correct position of the front magnet is with the gap on the left side (from the rear of the cabinet) and even with the gap of the rear magnet.

Connect the kinescope socket to the tube base. Insert the kinescope until the face of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet. Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

Install the cabinet front panel as indicated in Figure 3.

To install the front panel place the lip on the bottom of the panel in the recess below the kinescope opening and push the top in. Insert the two screws from the bag with the knobs into the back of panel as shown in Figure 3.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. Connect the high voltage lead to the kinescope second anode socket.

The antenna and power connections should now be made. Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT—The ion trap rear magnet poles should be approximately over the ion trap flags as shown in Figure 2. Starting from this position adjust the magnet by moving it forwards or backwards at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R184 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

FOCUS COIL ADJUSTMENTS—Turn the centering controls R181 and R211 to mid position. See Figure 6 for location of these rear apron controls.

If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil adjustment wing nuts and rotate the coil about its vertical and horizontal axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the coil in this position.

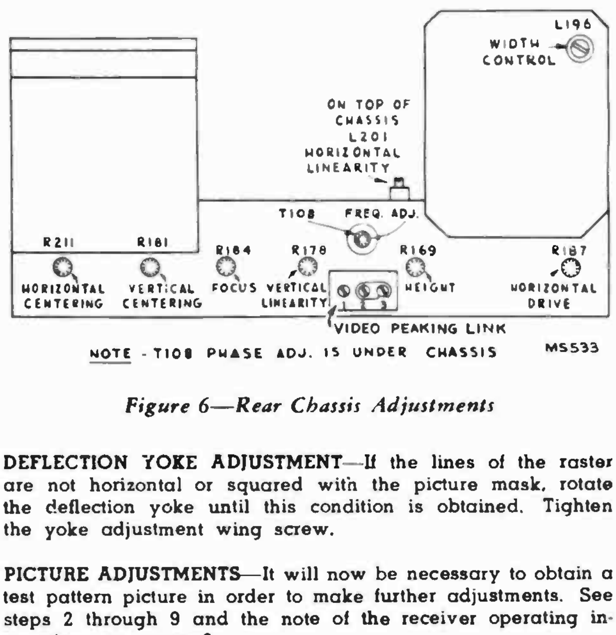


Figure 6—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 9 and the note of the receiver operating instructions on page 3.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will pull into sync. Turn the horizontal hold control to the extreme clockwise position. The picture should remain in sync. Momentarily remove the signal. Again the picture should normally pull into sync.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator and proceed with 'FOCUS' adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at either extreme or failed to pull into sync after momentary removals of the signal, make the adjustments under "Slight Retouching Adjustments." If, after making these retouching adjustments, the receiver fails to pass the above checks or if the horizontal oscillator is completely out of adjustment, then make the adjustments under "Complete Realignment."

Slight Retouching Adjustments—Tune in a Television Station and adjust the fine tuning control for best sound quality. Sync the picture and adjust the picture control for slightly less than normal contrast. Turn the horizontal hold control to the extreme position in which the oscillator fails to hold or to pul in. Momentarily remove the signal. Turn the T108 frequency adjustment on the chassis rear apron until the oscillator pulls into sync. Check hold and pull-in for the other extreme position of the hold control.

Complete Realignment—Tune in a Television Station and adjust the fine tuning control for best sound quality.

Turn the T108 frequency adjustment on rear apron until the picture is synchronized. Adjust the picture control so that the picture is somewhat below average contrast level.

Turn the T108 phase adjustment screw (under chassis) until the blanking bar, which may appear in the picture, moves to the right and off the raster. The range of this adjustment is such that it is possible to hit an unstable condition (ripples in the raster). The screw must be turned clockwise from the unstable position. The length of stud beyond the bushing in its correct position is usually about ½ inch.

Turn horizontal hold to the extreme counter-clockwise position. Turn T108 frequency adjustment clockwise until the picture falls out of sync. Then turn it slowly counter-clockwise to the point where the picture falls in sync again.

Readjust T108 phase adjustment so that the left side of the picture is close to the left side of the raster, but does not begin to fold over.

Turn horizontal hold to the extreme clockwise position. The right side of the picture should be close to the right side of the raster, but should not begin to fold over. If it does, readjust the phase control.

Momentarily remove the signal. When the signal is restored, the picture should fall in sync. If it doesn't, turn T108 frequency adjustment counter-clockwise until the picture falls in sync.

Turn horizontal hold to the extreme counter-clockwise position. Remove the signal momentarily. When signal is restored, the picture should fall in sync.

NOTE: If the picture does not pull in sync after momentary removals of the signal in both extreme positions of horizontal hold, the pull-in range may be inadequate, though not necessarily. A pull-in through ¾ of the hold control range may still be satisfactory.

There is a difference between the pull-in range and hold-in range of frequencies. Once in sync, the circuit will hold about 50% to 100% more variation in frequency than it can pull in. The range of the horizontal hold control is only approximately equal to the pull-in range, considerable variation may be found due to variations in the cut-off characteristic of the horizontal oscillator control tubes, V124.

FOCUS—Adjust the focus control R184 for maximum definition of tho vertical wedge of the test pattern.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R169 on chassis rear apron) until the picture fills the mask vertically (6⅜ inches). Adjust vertical linearity (R178 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the horizontal drive (R187 on rear apron) clockwise as far as possible without causing crowding of the right of the picture. This position provides maximum high voltage to the kinescope second anode. Adjust the width control (L196 on rear chassis) until the picture just fills the mask horizontally (8½ inches). Adjust the horizontal linearity control L201 (see Figure 6) until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust horizontal centering to align the picture with the mask.

If repeated adjustments of drive width and linearity fail to give proper linearity, it may be necessary to move the tap on R209, which is located in the high voltage compartment. Adjustments of drive, width and linearity must then be repeated. Check to see that all cushion, yoke, focus coil and ion trap magnet thumb screws are tight. Replace the cabinet back and top. Make sure that the back is on tight, otherwise it may rattle at high volume.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—With a crystal calibrated test oscillator or heterodyne frequency meter, check to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 8. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 7. Adjustments for channels 6 and 13 are under the chassis.

VIDEO PEAKING LINK—A video peaking link is provided (see Figure 6) to permit changing the video response. If the pictures from the majority of stations look better with the link closed, (2-3 position) then the link should be placed in that position. However, if transients are produced on high contrast pictures then the link should be left open (1-2 position).

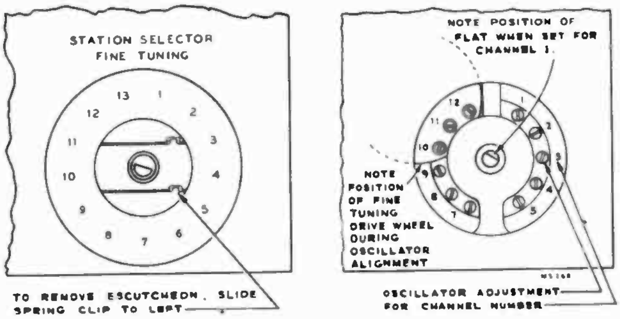


Figure 7—R-F Oscillator Adjustments

ANTENNA TRAP—In some instances interference may be encountered from FM stations that are on the image frequency of a television station. In other instances interference between two television stations may be observed.

Assume that two television stations in a city are operating on channels 6 and 10. When the receiver is tuned to channel 6, a small amount of the oscillator voltage (109 mc.) is present on the r-f amplifier grid. This 109 mc. voltage beats with the channel 10 picture carrier and produces an 84.25 mc. signal. This signal falls within the channel 6 range and interferes with the reception of channel 6. A similar case occurs between channels 5 and 7.

A series resonant trap across ther-f amplifier grid circuit is employed to remove theoscillator voltage from the grids and thus eliminate this type of interference.

To adjust the trap in the field, tune in the station on which the interference is observed. Tune both cores of the trap for minimum interference in the picture. See Figure 8 for the location of the trap. Keep both cores approximately the same by visual inspection. Then, turn one core ½ turn from the original position and repeak the second for maximum rejection. Repeat this process until the best rejection is obtained. For shop alignment of the trap see the alignment procedure on page 11.

In severe cases of interference, it may be necessary to reduce the signal from the interfering station by reorienting the antenna or by connecting a half wave stub of transmission line across the receiver antenna terminals. The end of the stub should be terminated by a 47 ohm, non inductive resistor.

CHASSIS TOP VIEW

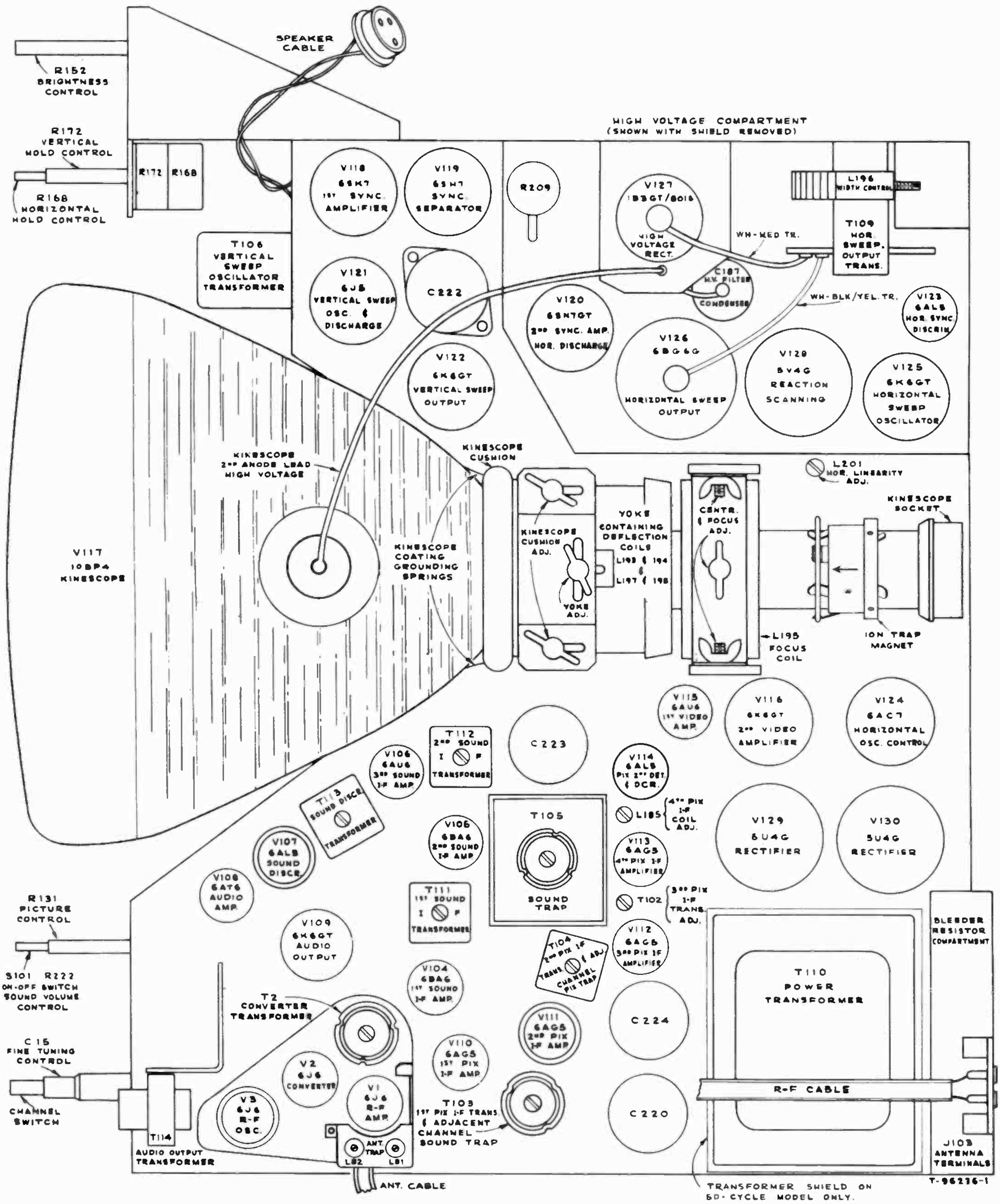


Figure 8—Chassis Top View

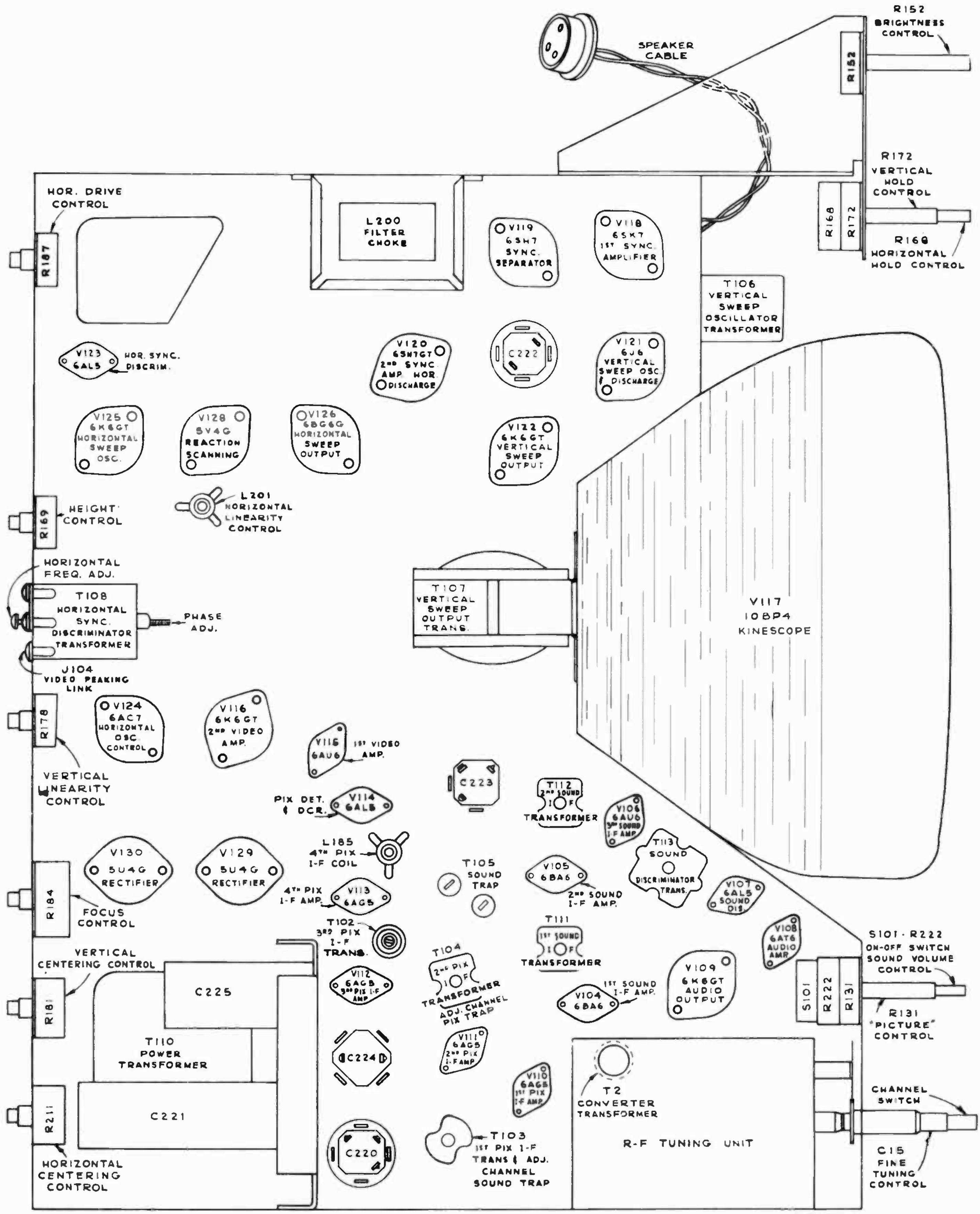


Figure 9—Chassis Bottom View

TEST EQUIPMENT—To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges
- 18 to 30 mc., 1 mc. sweep width
- 40 to 90 mc., 10 mc. sweep width
- 170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-ray Oscilloscope, preferably one with a wide band vertical deflection, an input calibrating source, and a low capacity probe.

Signal Generator to provide the following frequencies.

(a) I-F frequencies
- 19.75 mc. adjacent channel picture trap
- 21.25 mc. sound i-f and sound traps
- 21.8 mc. converter transformer
- 22.3 mc. second picture i-f transformer
- 23.4 mc. fourth picture i-f coil
- 25.2 mc. third picture i-f coil
- 25.3 mc. first picture i-f transformer
- 25 75 mc. picture carrier
- 27.25 mc. adjacent channel sound trap

(b) R-F frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
1	45.25	49.75
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output on these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 10 kv.

Service Precautions—If necessary to remove the chassis from cabinet, the kinescope must first be removed. See Figures 3 and 5. If possible, the chassis should then be serviced without the kinescope. However, if it is necessary to view the raster during servicing, the kinescope should be inserted only after the chassis is turned on end. The kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer down, all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave all adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not short the kinescope second anode lead. Its short circuit current is approximately 3 ma. This represents approximately 9 watts dissipation and a considerable overload on the high voltage filter resistor R235.

Adjustments Required—Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require re-adjustment.

Due to the high frequencies at which the receiver operates the r-f oscillator line adjustment is critical and may be affected by a tube change. The line can be adjusted to proper frequency on channel 13 with practically any 6J6 tube in the oscillator socket. However, it may not then be possible to adjust the line to frequency on all of channels 7, 8, 9, 10, 11 and 12. To be satisfactory as an oscillator tube, it should be possible to adjust the line to proper frequency with the fine tuning control in the middle third of its range. It may therefore be necessary to select a tube for the oscillator socket. In replacing, if the old tube can be matched for frequency by trying several new ones, this practice is recommended. At best, however, it will probably be necessary to completely realign the oscillator line when changing the tube.

Tubes which cannot be used as oscillator will work satisfactorily as r-f amplifier or converter.

ORDER OF ALIGNMENT—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

- Sound discriminator
- Sound i-f transformers
- Picture i-f traps
- Picture i-f transformers
- R-F and converter lines
- R-F oscillator line
- Retouch picture i-f transformers
- Antenna trap adjustment
- Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT—
Set the signal generator for approximately .1 volt output at 21.25 mc. and connect it to the third sound i-f grid.

Detune T113 secondary (bottom).

Set the "VoltOhmyst" on the 10 volt scale.

Connect the meter in series with a one megohm resistor to the junction of diode resistors R219 and R220. Do not remove the discriminator shield to make connection to R219 and R220.

Connection can be easily made by fashioning a hook on the 1 meg resistor lead and making connection to the transformer lug "C" through the hole provided for the adjusting tool.

Adjust the primary of T113 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of R236 and C205. Adjust T113 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T113 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the third sound i-f amplifier.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of R236 and C205. The pattern obtained should be similar to that shown in Figure 16A. If it is not, adjust the T113 (top) until the wave form is symmetrical.

The peak to peak bandwidth of the discriminator should be approximately 350 kc. and it should be linear from 21.75 mc. to 21.325 mc.

SOUND I-F ALIGNMENT—

Connect the sweep oscillator to the second sound i-f amplifier grid.

Connect the oscilloscope to the third sound i-f grid return (terminal A T112) in series with a 33,000 ohm isolating resistor. Insert a 21.25 mc. marker signal from the signal generator into the second sound i-f grid.

Adjust T112 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 16B.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the third sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

Connect the sweep and signal generator to the top end of the trap winding of T2 (on top of the chassis). Adjust T111 (top and bottom), for maximum gain and symmetry at 21.25 mc.

Reduce the sweep output for the final adjustments so that approximately .3 volt peak-to-peak is present at the third sound i-f grid return.

The band width at 70% response from the first sound i-f grid to the third i-f grid should be approximately 200 kc.

PICTURE I-F TRAP ADJUSTMENT—

Turn the receiver picture control for -3 volts on the picture i-f grids.

Set the channel switch to channel 13.

Connect the "VoltOhmyst" across the picture second detector load resistor R137.

Connect the output of the signal generator to the junction of C14 and R6. This connection is available on a terminal lug through a hole in the side apron of the chassis, beside the r-f unit. This hole is normally down when the chassis is in the recommended position. Connection can be easily made, however, by allowing the receiver to hang over the edge of the test bench by a few inches.

Set the generator to each of the following frequencies and tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency

21.25 mc.—T2 (top)
21.25 mc.—T105 (top)
27.25 mc.—T103 (top)
27.25 mc.—T102 (bottom)
19.75 mc.—T104 (top)

Note—On some sets, T102 bottom adjustment is omitted.

PICTURE I-F TRANSFORMER ADJUSTMENTS—

Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst."

21.8 mc.—T2 (bottom)
25.3 mc.—T103 (bottom)
22.3 mc.—T104 (bottom)
25.2 mc.—T102 (top of chassis)
23.4 mc.—L185 (top of chassis)

If T104 (bottom) required adjustment, it will be necessary to reset T104 (top) for minimum response at 19.75 mc.

Picture I-F Oscillation—If the receiver is badly misaligned and two or more of the i-f transformers are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a voltage in excess of 3 volts at the picture detector load resistor. This voltage is unaffected by r-f signal input and sometimes is independent of picture control setting. If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the transformers approximately to frequency by setting the adjustment stud extensions of T2, T103, T104, T105, TT102, and L185 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias. If so, it should then be possible to align the transformers by the usual method. Once aligned in this manner, the i-f should be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first three pix i-f amplifiers to ground with 1000 mmf. capacitors. Connect the signal generator to the fourth pix i-f grid and align L185 to frequency. Progressively remove the shunt from each grid and align the plate coil of that stage to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is very stable when properly aligned. Check all i-f by-pass condensers, transformer shunting resistors, tubes, socket voltages, etc.

R-F AND CONVERTER LINE ADJUSTMENT—

Connect the r-f sweep oscillator to the receiver antenna terminals. If the sweep oscillator has a 50 ohm single-ended output, it will be necessary to obtain balanced output by connecting as shown in Figure 10.

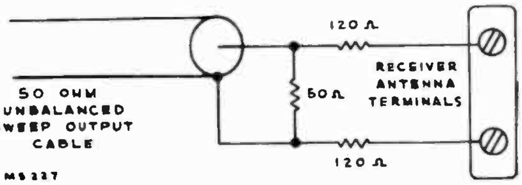


Figure 10—Unbalanced Sweep Cable Termination

Connect the oscilloscope to the junction of C14 and R6 (in the r-f tuning unit) through a 10,000 ohm resistor.

By-pass the first picture i-f grid to ground through a 1000 mmfd. capacitor. Keep the leads to this by-pass as short as possible. If this is not done, lead resonance may fall in the r-f range and cause an incorrect picture of the r-f response.

Turn the picture control for −1.5 volts on the r-f grids. Connect the signal generator loosely to the receiver antenna terminals.

Turn the antenna trap L81 and L82 cores fully counterclockwise so that the trap will not affect the channel 6 r-f response. Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7 (see Figure 15 for switch shaft flat location versus channel).

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier 175.25 mc. and 179.75 mc.

Adjust L25, L26, L51 and L52 (see Figure 17) for an approximately flat topped response curve located symmetrically between the markers. Normally this curve appears somewhat overcoupled or double humped with a 10 or 15% peak to valley excursion and the markers occur at approximately 90% response. See Figure 17, channel 7. In making these adjustments, the stud extension of all cores should be kept approximately equal.

Check the response of channels 8 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observe the response obtained. See Figure 17 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 70% response. It the markers do not fall within this requirement on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L25, L26, L51 and L52, and possibly compromise some channel slightly in order to get the markers up on other channels. Normally however, no difficulty of this type should be experienced since the higher frequency channels become comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L11, L12, L37 and L38, for an approximately flat-topped response curve located symmetrically between the markers.

Check channels 5 down through channel 1 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 70% response point. If this is not the case, L11, L12, L37 and L38 should be retouched. On final adjustment, all channels must be within the 70% specification.

Coupling between r-f and converter lines is augmented by a link between L12 and L37. This link is adjusted in the factory and should not require adjustment in the field. On channel 6 with the link in the minimum coupling position, the response is slightly overcoupled with approximately a 10% excursion from peak-to-valley. With the coupling at maximum, the response is somewhat broader and the peak-to-valley excursion is approximately 40%. The amount of coupling permissible is limited by the peak-to-valley excursion which should not be greater than 30% on any channel.

R-F OSCILLATOR LINE ADJUSTMENT—
The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated. If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, the calibration frequency listed under R-F Osc. Freq. must be available.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier frequency, the frequencies listed under sound carrier Freq. must be available.

Channel Number	Receiver R-F Osc. Freq. Mc.	R-F Sound Carrier Freq. Mc.
1	71	49.75
2	81	59.75
3	87	65.75
4	93	71.75
5	103	81.75
6	109	87.75
7	201	179.75
8	207	185.75
9	213	191.75
10	219	197.75
11	225	203.75
12	231	209.75
13	237	215.75

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the "VoltOhmyst" to the sound discriminator output (junction of R236 and C205.

Connect the signal generator to the receiver antenna terminals. The order of alignment remains the same regardless of which method is used.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust L77 and L78 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. The core stud extensions should be maintained equal by visual inspection.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L76 for indications as above.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

RETOUCHING OF PICTURE I-F ADJUSTMENTS—
The picture i-f response curve varies somewhat with change of bias and for this reason it should be aligned with approxi-

mately the same signal input as it will receive in operation. If the receiver is located at the edge of the service area, it should be aligned with approximately −1 volt i-f grid bias. However, for normal conditions, (signals of 1000 microvolts or greater), it is recommended that the picture i-f be aligned with a grid bias of −3 volts.

Connect the r-f sweep generator to the receiver antenna terminals.

Connect the signal generator to the antenna terminals and feed in the 25.75 mc i-f picture carrier marker and a 22.3 mc marker.

Connect the oscilloscope across the picture detector load resistor.

Turn the picture control for −3 volts at its arm.

Set the sweep output to produce approximately .3 volt peak-to-peak across the picture detector load resistor.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. See Figure 18.

If T104 (bottom) required any adjustment, it will be necessary to reset T104 (top) for minimum response at 19.75 mc.

On final adjustment the picture carrier marker must be at approximately 45% response. The curve must be approximately flat topped and with the 22.3 mc. marker at approximately 100% response.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 45% response point. If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture definition is impaired by loss of high frequency video response. In making these adjustments, care should be taken that no two transformers are tuned to the same frequency as i-f oscillation may result.

ANTENNA TRAP ALIGNMENT—When the receiver is aligned in the shop, the antenna trap should be adjusted to reject the type of interference which might be encountered at the customer's home. It can be adjusted by actual observation of the interference on the air or by the use of a signal generator. Two methods of adjustment are possible if a signal generator is employed. Select the type of interference and method to suit the test equipment involved.

Method 1 for channel 6-10 interference. Set the "VoltOhmyst" on the 3 volt scale and connect it to the junction of L188 and R137. Turn the picture control to the maximum clockwise position. Connect the signal generator to the antenna terminals through balancing network as shown in Figure 10. Tune the receiver oscillator to 109 mc. with the fine tuning control as determined by the method employed in the previous section on r-f oscillator line adjustment. Feed in the channel 10 picture carrier (193.25 mc.) from the signal generator. Adjust L81 and L82 for minimum reading on the "VoltOhmyst," keeping both cores about the same. For final touches, adjust L81 one-half turn clockwise and readjust L82 for minimum on the meter. If this minimum is lower than the previous, repeat until the lowest minimum is obtained. If this minimum was higher, adjust L81 one-half turn counterclockwse and readjust L82. Repeat for the lowest minimum.

Method 2 for channel 6-10 interference. With the same setup as above, switch the receiver to channel 3 and tune the receiver oscillator to 87 mc. Feed in a signal of 109 mc. from the signal generator and adjust the trap as above.

Method 1 for channel 5-7 interference. With the same setup as above, switch the receiver to channel 5 and tune the receiver oscillator to 103 mc. Feed in the picture 7 sound carrier (179.75 mc.) from the signal generator and adjust the trap as above.

Method 2 for channel 5-7 interference. With the same setup as above, switch the receiver to channel 2 and tune the receiver oscillator to 81 mc. Feed in a 103 mc. signal from the generator and adjust the trap as above.

Method for FM image interference. With the same setup as above, switch the receiver to channel 2 and tune the receiver oscillator to 81 mc. Feed in a signal of the frequency of the interfering FM station and adjust the trap as before.

To adjust the trap by observation of the picture under actual operating conditions, connect an antenna to the receiver and tune in the station on which the interference is observed. Adjust the trap as above for minimum interference in the picture. Since the customer's antenna will affect these adjustments slightly, in cases of severe interference it may be necessary to retouch the trap adjustment when the receiver is installed in the customer's home.

SENSITIVITY CHECK—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through an attenuator pad of the type shown in Figure 11. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position. Only carbon type resistors should be used to construct the pad.

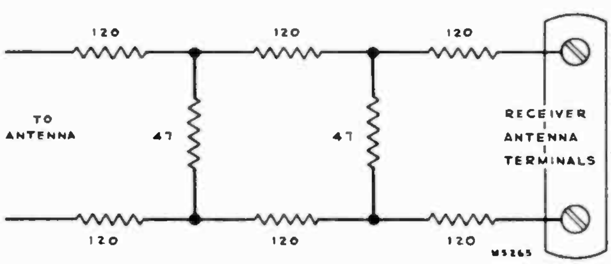


Figure 11—Attenuator Pad

RESPONSE CURVES—The response curves shown on page and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected. Channel 2 response (not shown) is similar to that of channel 3

REFER TO PAGES 236 TO 243 INC. FOR RESPONSE CURVES, TEST PATTERN PHOTOGRAPHS, SERVICE SUGGESTIONS AND WAVEFORM PHOTOGRAPHS.

ALIGNMENT TABLE—Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment.

ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	DISCRIMINATOR AND SOUND I-F ALIGNMENT								
1	3rd sound i-f grid (pin 1, V106)	21.25 .1 volt output	Not used		Not used	In series with 1 meg. to junction of R219 & R220		Detune T113 (bottom). Adjust T113 (top) for max. on meter	Fig. 14 Fig. 13 Fig. 12
2	"	"	"		"	Junct of R236 & C205	Meter on 3 volt scale	T113 (bottom) for zero on meter	Fig. 14 Fig. 13
3	"	"	3rd sound i-f grid (pin 1, V106)	21.25 center 1 mc. wide .1 v. out	Junction of R236 & C205	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T113 (top) until they are equal		Fig. 14 Fig. 16 A
4	2nd sound i-f grid (pin 1, V105)	21.25 reduced output	2nd sound i-f grid	21.25 reduced output	Terminal A, T112 in series with 33,000 ohms	"	Sweep output reduced to provide .3 volt p-to-p on scope	T112 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 14 Fig. 12 Fig. 13 Fig. 16 B
5	Trap winding on T2 (top of chassis)	21.25 reduced output	Trap winding on T2	21.25 reduced output	"	"	"	T111 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 12 Fig. 13 Fig. 14 Fig. 16 B
	PICTURE I-F AND TRAP ADJUSTMENT								
6	Not used		Not used		Not used	Junction of R189 & R190		Picture control for −3 volts on meter	Fig. 14
7	Junction C14 and R6	21.25	"		"	Junction of L188 & R137	Meter on 3 volt scale. Receiver on channel 13	T105 (top) for min. on meter	Fig. 12
8	"	21.25	"		"	"	"	T2 (top) for min.	Fig. 14 Fig. 12
9	"	27.25	"		"	"	"	T103 (top) for min. T102 (bot.) for min.	Fig. 12 Fig. 13
10	"	19.75	"		"	"	"	T104 (top) for min.	Fig. 12
11	"	21.8	"		"	"	"	T2 (bottom) for max.	Fig. 13
12	"	25.3	"		"	"	"	T103 (bottom) for max.	"
13	"	22.3	"		"	"	"	T104 (bottom) for max.	"
14	"	25.2	"		"	"	"	T102 (top chassis) for max.	Fig. 12
15	"	23.4	"		"	"	"	L185 (top chassis) for max.	"
16	If T104 (bottom) required adjustment in step 13, repeat step 10.								
	R-F AND CONVERTER LINE ALIGNMENT								
17	Not used		Not used		Not used	Pin 5 or 6 V108		Picture control for −1.5 volts on meter	Fig. 14 Fig. 13
18	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (see text for precaution)	Sweeping channel 7	Junction C14 and R6 through 10,000 ohm series resistor	Not used	1st i-f grid bypass to gnd. with 1000 mmf. Receiver on channel 7	L25, L26, L51 & L52 for approx. flat top response between markers. Markers above 70%	Fig. 14 Fig. 13 Fig. 17 (7)
19	"	181.25 185.75	"	channel 8	"	"	Receiver on channel 8	Check to see that response is as above	Fig. 17 (8)
20	"	187.25 191.75	"	channel 9	"	"	Receiver on channel 9	"	Fig. 17 (9)
21	"	193.25 197.75	"	channel 10	"	"	Receiver on channel 10	"	Fig. 17 (10)
22	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 17 (11)
23	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 17 (12)
24	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 17 (13)
25	If the response on any channel (steps 19 through 24) is below 70% at either marker, switch to that channel and adjust L25, L26, L51, & L52 to pull response up on that channel. Then recheck steps 18 through 24.								

ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
					R-F AND CONVERTER LINE ALIGNMENT (Cont'd)				
26	Antenna terminals (loosely)	83.25 87.75	Antenna terminals (see text for precaution)	Sweeping channel 6	Junction C14 and R6 through 10,000 ohm series resistor	Not used	Receiver on channel 6	L11, L12, L37 & L38 for response as above	Fig. 17 (6)
27	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 17 (5)
28	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 17 (4)
29	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 17 (3)
30	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	
31	"	45.25 49.75	"	channel 1	"	"	Receiver on channel 1	"	Fig. 17 (1)
32	If the response on any channel (steps 27 through 31) is below 70% at either marker, switch to that channel and adjust L11, L12, L37 & L38 to pull response up on that channel. Then recheck steps 26 through 31.								
					R-F OSCILLATOR ALIGNMENT				
STEP No.	**CONNECT SIGNAL GENERATOR TO**	**SIGNAL GEN. FREQ. MC.**	**CONNECT HETERODYNE FREQ. METER TO**	**HET. METER FREQ. MC.**	**CONNECT OSCILLOSCOPE TO**	**CONNECT "VOLTOHMYST" TO**	**MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS**	**ADJUST**	**REFER TO**
33	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Junction of R236 & C205 for sig. gen. method only	Fine tuning centered for all adjustments Receiver on channel 13	L77 & L78 for zero on meter or beat on het. feq. meter	Fig. 14 Fig. 13
34	"	209.75	"	231	"	"	Rec. on chan. 12	L76 as above	Fig. 15
35	"	203.75	"	225	"	"	Rec. on chan. 11	L74 as above	"
36	"	197.75	"	219	"	"	Rec. on chan. 10	L72 as above	"
37	"	191.75	"	213	"	"	Rec. on chan. 9	L70 as above	"
38	"	185.75	"	207	"	"	Rec. on chan. 8	L68 as above	"
39	"	179.75	"	201	"	"	Rec. on chan. 7	L66 as above	"
40	"	87.75	"	109	"	"	Rec. on chan. 6	L33 & L64 as above	Fig. 13
41	"	81.75	"	103	"	"	Rec. on chan. 5	L62 as above	Fig. 15
42	"	71.75	"	93	"	"	Rec. on chan. 4	L60 as above	"
43	"	65.75	"	87	"	"	Rec. on chan. 3	L58 as above	"
44	"	59.75	"	81	"	"	Rec. on chan. 2	L56 as above	"
45	"	49.75	"	71	"	"	Rec. on chan. 1	L54 as above	"
46	Repeat steps 33 through 45 as a check.								
					RETOUCHING PICTURE I-F TRANSFORMERS				
47			Not used		Not used	Junction of R189 & R190	Receiver & sweep on a channel between 1 and 6 known to have good r-f response	Picture control for −3 volts on meter	Fig. 14
48	Antenna terminals (loosely)	22.3 25.75	"		Junction L188 and R137	Not used	Retouch pix i-f adjustments (T2, T103, T104, bottoms T102 & L185 as necessary to provide proper response		Fig. 14 Fig. 13 Fig. 18
49	If T104 (bottom) was adjusted in step 48, repeat step 10 and step 48.								
					ANTENNA TRAP ADJUSTMENT				
	Select 1 of the 6 steps below for suitable method for type of interference encountered.								
50-1	Antenna terminals through termination	193.25	Loosely coupled to r-f osc.	109	Not used	Junction of L188 & R137	Rec. on chan. 6	L81 & L82 for min. on meter	Fig. 14 Fig. 12
50-2	"	109	"	87	"	"	Rec. on chan. 3	"	"
50-3	"	179.75	"	103	"	"	Rec. on chan. 5	"	"
50-4	"	103	"	81	"	"	Rec. on chan. 2	"	"
50-5	"	FM Sta. Freq.	"	81	"	"	"	"	"
50-6	Not used		Not used		Not used	Not used	Rec. on interfered channel	L81 & L82 for min. interference	"
					SENSITIVITY CHECK				
51	Connect antenna to receiver through attenuator pad to provide weak signal. Compare picture and sound obtained to that obtained on other receivers under the same conditions.								

VOLTAGE CHART

Measurements made with receiver operating on 117 volts 60 cycles a-c and with no signal input except where otherwise indicated. Voltages shown are as read with Jr. VoltOhmyst between indicated terminal and chassis ground except where otherwise noted. Symbol < means "less than."

Tube No.	Tube Type	Function	Operating Condition **	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	R-F Amplifier	Pictr. Min.	1 & 2	130	—	—	7	0	5 & 6	-9.2	<.1*	—	*Per Plate
			Pictr. Max.	1 & 2	55	—	—	7	0	5 & 6	+.05	7.0*	—	*Per Plate
V2	6J6	Converter	Pictr. Min.	1 & 2	125	—	—	7	0	5 & 6	-3 to -6.	.5 to 4*	—	*Per Plate
			Pictr. Max.	1 & 2	100	—	—	7	0	5 & 6	-2 to -5.	.2 to 3*	—	*Per Plate
V3	6J6	R-F Oscillator	Pictr. Min.	1 & 2	108	—	—	7	.25	5 & 6	-4.5 to -6.5	2.5	—	
			Pictr. Max.	1 & 2	90	—	—	7	.15	5 & 6	-3.5 to -5.	1.7	—	
V104	6BA6	1st Sound I-F Amplifier	Pictr. Min.	5	120	6	120	7	1.9	1	0	12.0	5.0	
			Pictr. Max.	5	110	6	110	7	1.6	1	0	10.5	4.5	
V105	6BA6	2d Sound I-F Amplifier	Pictr. Min.	5	122	6	118	7	1.9	1	0	12.5	4.9	
			Pictr. Max.	5	113	6	108	7	1.6	1	0	10.5	4.2	
V106	6AU6	3d Sound I-F Amplifier	Pictr. Min.	5	48	6	48	7	0	1	-.5	3.3	1.4	
			Pictr. Max.	5	41	6	41	7	0	1	-.5	2.8	1.2	
V107	6AL5	Sound Discrim.	Pictr. Min.	2 & 7	-.35	—	—	4 & 5	—	—	—	—	—	
			Pictr. Max.	2 & 7	-.45	—	—	4 & 5	—	—	—	—	—	
V108	6AT6	1st Audio Amplifier	Pictr. Min.	7	80	—	—	2	0	1	-.75	.5	—	
V109	6K6-GT	Audio Output	Pictr. Min.	3	233	4	245	8	0	5	-18	27.5	4.0	
V110	6AG5	1st Pix. I-F Amplifier	Pictr. Min.	5	135	6	135	2 & 7	0	1	-5.0	<.1	<.1	
			Pictr. Max.	5	109	6	109	2 & 7	.26	1	-1.0	5.5	.9	
V111	6AG5	2d Pix. I-F Amplifier	Pictr. Min.	5	135	6	135	2 & 7	0	1	-5.0	<.1	<.1	
			Pictr. Max.	5	113	6	113	2 & 7	.26	1	-1.0	5.6	.9	
V112	6AG5	3d Pix. I-F Amplifier	Pictr. Min.	5	135	6	135	2 & 7	0	1	-5.0	<.1	<.1	
			Pictr. Max.	5	98	6	117	2 & 7	.26	1	-1.0	5.7	.9	
V113	6AG5	4th Pix. I-F Amplifier	Pictr. Min.	5	99	6	127	2 & 7	1.2	1	0	6.8	1.7	
			Pictr. Max.	5	89	6	117	2 & 7	1.1	1	0	6.8	1.7	
V114-A	6AL5	Picture 2d Det.	Pictr. Min.	7	-.1	—	—	1	0	—	—	—	—	
V114-B	6AL5	DC Restorer	Brightness Min.	2	-100	—	—	5	-90	—	—	—	—	
			Brightness Max.	2	-1	—	—	5	-.9	—	—	—	—	
V115	6AU6	1st Video Amplifier	Pictr. Min.	5	240	6	135	7	0	1	-2.15	4.0	1.55	
			Pictr. Max.	5	255	6	125	7	0	1	-2.2	2.8	1.05	
V116	6K6-GT	2d Video Amplifier	Pictr. Min.	3	105	4	135	8	3.7	5	-7.5	9.6	1.6	
			Pictr. Max.	3	95	4	125	8	2.9	5	-7.5	7.5	1.3	

** Where separate readings are not listed for max. and min. gain settings of the picture control, the effect of the control is slight and readings are given for "Picture Min."

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V117	10-BP4	Kinescope	Brightness Min.	Cap	9200*	10	275	11	0	2	–100	0	0	*Measured with VoltOhmyst and high voltage multiplier probe
			Brightness Max.	Cap	6000*	10	275	11	0	2	0	.7	—	
			Brightness Average	Cap	9000*	10	275	—	—	—	—	.05	—	
V118	6SK7	1st Sync. Amplifier	Pictr. Min.	8	163	6	129	5	0	4	–4.3	11.5	3.8	
			Pictr. Max.	8	185	6	115	5	0	4	–4.4	9.2	2.9	
V119	6SH7	Sync. Separator	Pictr. Min.	8	134	6	135	5	0	4	–5.2	.1	.05	
			Pictr. Max.	8	123	6	125	5	0	4	–9*	.3	.1	*Depends on noise
V120-A	6SN7 GT	2d Sync. Amplifier	Pictr. Min.	2	88	—	—	3	0	1	–.5	9.0	—	
			Pictr. Max.	2	80	—	—	3	0	1	–9*	7.9	—	*Depends on noise
V120-B	6SN7 GT	Horizontal Discharge	Pictr. Min.	5	–37	—	—	6	–100	4	–140	.5	—	
V121	6J5	Vertical Oscillator	Pictr. Min.	3	70*	—	—	8	–100	5	–150	.15	—	*Height, linearity and hold affect readings 2 to 1
V122	6K6-GT	Vertical Output	Pictr. Min.	3	180	4	180*	8	–70	5	–100	9.0	*	*Screen connected to plate
V123	6AL5	Horizontal Sync. Discr.	Pictr. Min.	2 & 7	–6.5	—	—	1 & 5	–2.1	—	—	—	—	
V124	6AC7	Horizontal Osc. Control	Pictr. Min.	8	194	6	105	5	.05	4	–2.0	3.8	1.1	
V125	6K6-GT	Horizontal Oscillator	Hold Max. Resistance	3	190	4	208	8	0	5	–30	17.0	6.7	
			Hold Min. Resistance	3	180	4	194	8	0	5	–23.5	19.5	8.2	
V126	6BG6-G	Horizontal Output	Pictr. Min.	Cap	Do not Meas.*	8	134	3	–91	5	–113	77.0	11.5	* 6000 volt pulse present
V127	8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	9200	—	—	0	—	*9200 volt pulse present
			Brightness Max.	Cap	*	—	—	2 & 7	6700	—	—	.7	—	*9200 volt pulse present
V128	5V4G	Reaction Scanning	Pictr. Min.	4 & 6	Do not Meas.*	—	—	8	350	—	—	90	—	* 1200 volt pulse present
V129	5U4G	Rectifier	Pictr. Min.	4 & 6	390*	—	—	2 & 8	300	—	—	146	—	*A-C measured from plate to trans center tap
V130	5U4G	Rectifier	Pictr. Min.	4 & 6	390*	—	—	2 & 8	300	—	—	146	—	

** Where separate readings are not listed for max. and min. gain settings of the picture control, the effect of the control is slight and readings are given for "Picture Min."

Following readings taken with video signal applied through video amplifiers to produce 25 volts peaks to peak on Kinescope grid.

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V114-B	6AL5	DC Restorer	Pictr. Min.	2	–41	—	—	5	–27	—	—	—	—	
V119	6SH7	Sync. Separator	Pictr. Min.	8	136	6	142	5	0	4	–21.5	.9	.8	
V120-A	6SN-7GT	2d Sync. Amplifier	Pictr. Min.	2	88	—	—	3	0	1	–5.4	9.0	—	
V123	6AL5	Horizontal Sync. Discr.	Pictr. Min.	2 & 7	–20	—	—	1 & 5	K_1 * K_2 –2.1	—	—	—	—	*See grid voltage of V124
V124	6AC7	Horizontal Osc. Control	Pull-in*	8	200(a)	6	100(b)	5	<.1	4	–1.5 to –3	<8.	<2.5	*Varying Hor. Osc. tuning
			Hold*	8	200(c)	6	100(d)	5	<.1	4	(e)	<8.	<2.5	

(a) Pull-in range varies with tubes from 110-210 to 195-270.
(b) Pull-in range varies with tubes from 80-100 to 100-115.
(c) Hold range varies with tubes from 110-270 to 140-270.
(d) Hold range varies with tubes from 80-115 to 90-115.
(e) Hold range varies with tubes from 1.5-7.0 to 1.-4.5.

ALIGNMENT DATA

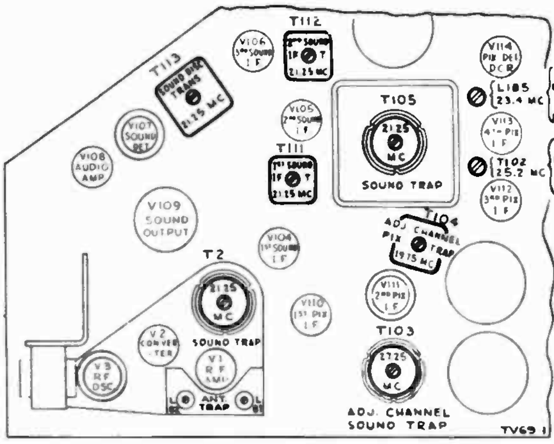
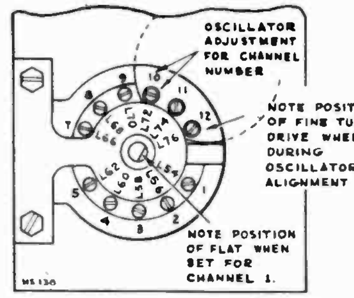


Figure 12—Top Chassis Adjustments



OSCILLATOR ADJUSTMENTS FOR CHANNELS 6 AND 13 ARE ON SIDE OF R.F. UNIT

Figure 15—R-F Oscillator Adjustments

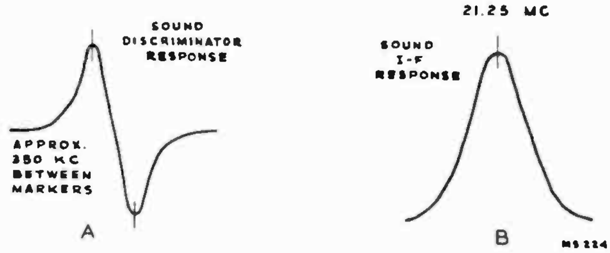
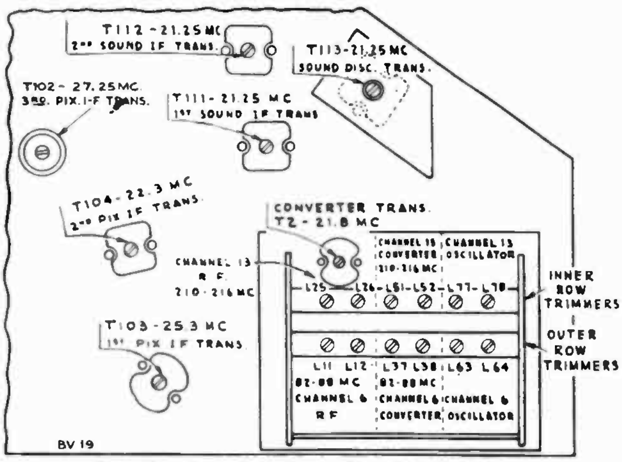


Figure 16—Sound Discriminator and I-F Response



R F UNIT SHOWN WITH SHIELD REMOVED

Figure 13—Bottom Chassis Adjustments

Figure 17—R-F Response

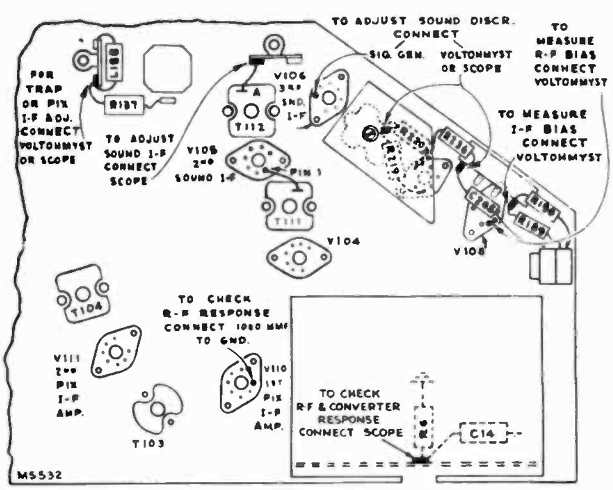


Figure 14—Test Connection Points

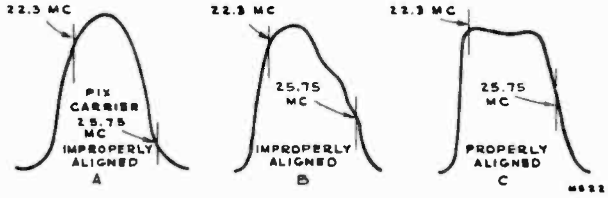
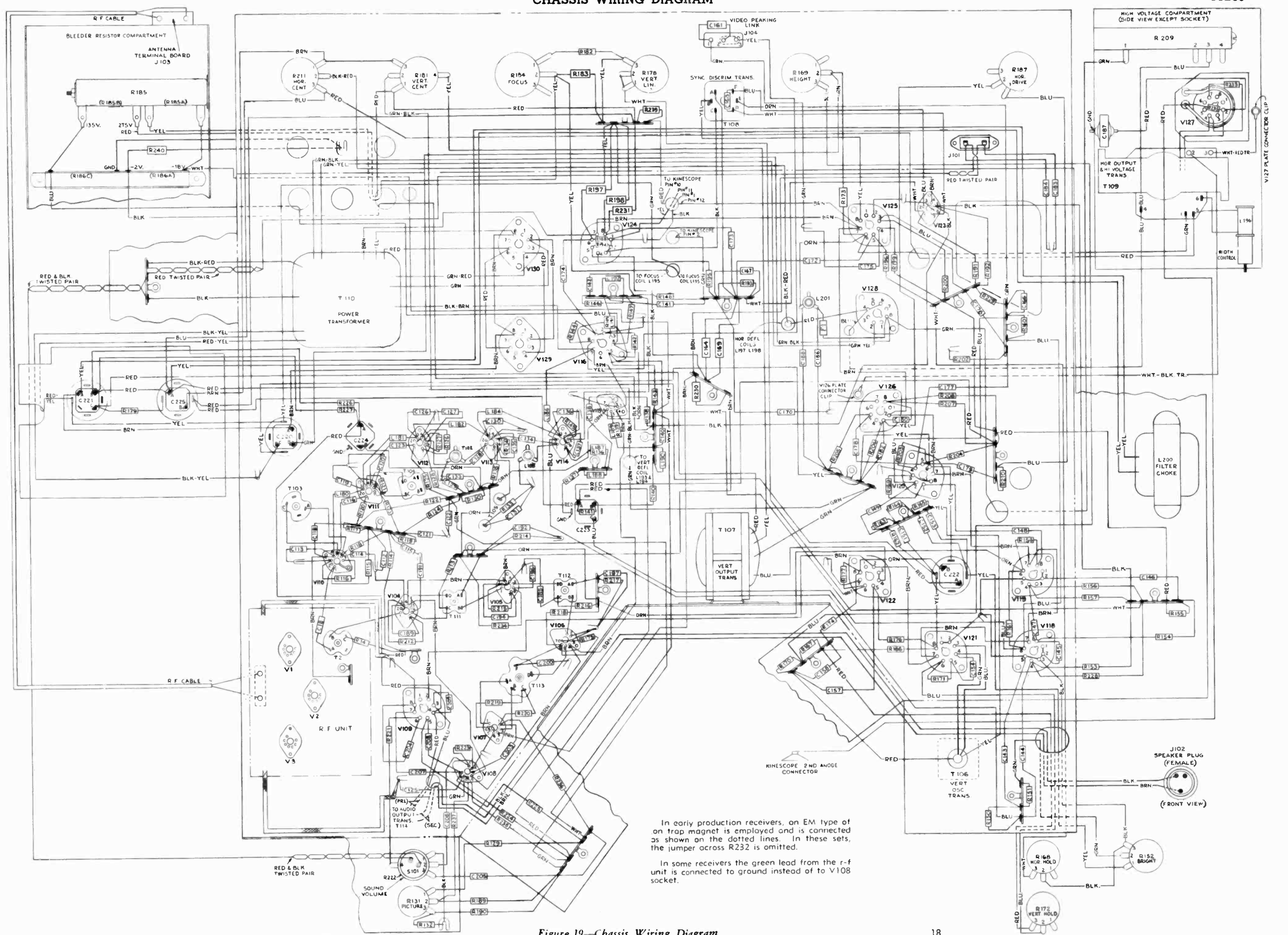


Figure 18—Overall Response

CHASSIS WIRING DIAGRAM

8TS30



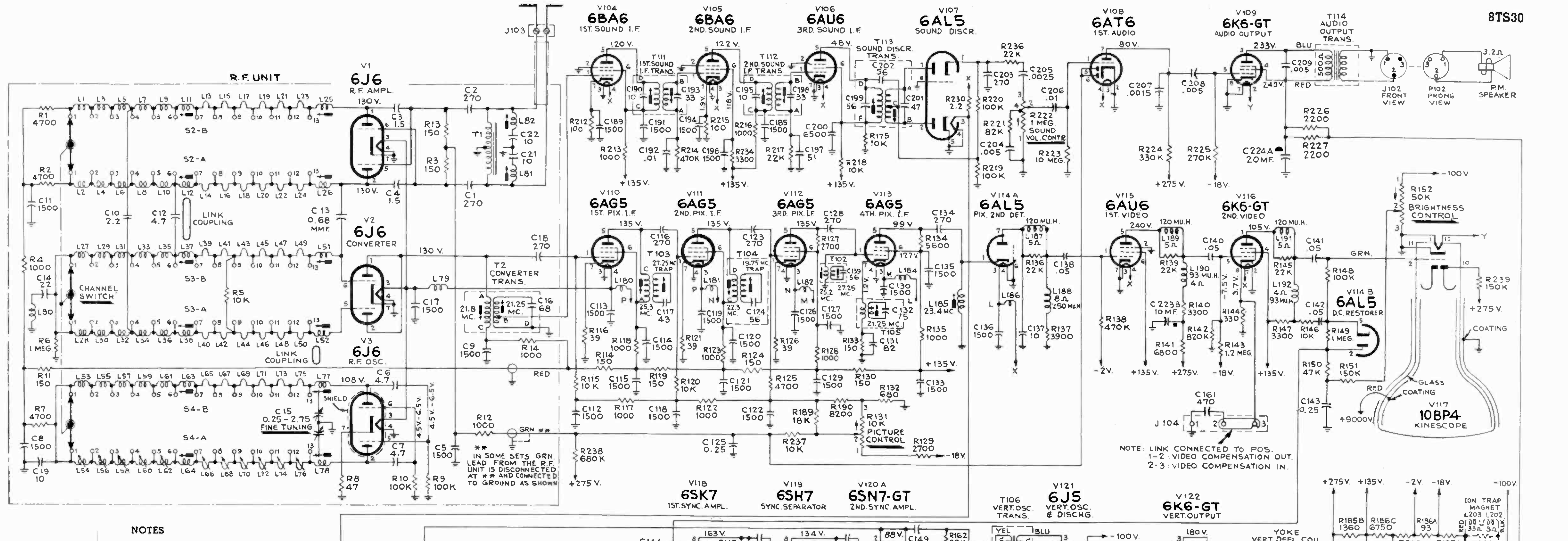
In early production receivers, on EM type of ion trap magnet is employed and is connected as shown on the dotted lines. In these sets, the jumper across R232 is omitted.

In some receivers the green lead from the r-f unit is connected to ground instead of to V108 socket.

Figure 19—Chassis Wiring Diagram

CIRCUIT SCHEMATIC DIAGRAM

8TS30



NOTES

All resistance values are in ohms. K = 1000.

Capacitance values less than 1 are in mfd. and above 1 in mmfd., unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with VoltOhmyst and with picture control counterclockwise. Voltages should hold within ±20% with 117 v. a-c supply.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

In some receivers, the antenna trap (L81, L82, C21 and C 22) may be omitted.

In some receivers, on EM type of ion trap magnet is employed. In these sets, the magnet coils and the shunting resistor R232 are connected as shown by the dotted lines of the schematic. In this case, the jumper across R232 is omitted.

In some receivers, the green lead from the r-f unit is connected to ground to minimize interchannel interference. In this condition the receiver will overload on signals in excess of 15,000 microvolts. If such signals are present, it will be necessary to reconnect the lead as shown or to reduce the signal input to the receiver by a pad or stub on the antenna transmission line.

In some receivers, the trap winding on T102 is omitted.

In some receivers, the fuse F1 is omitted.

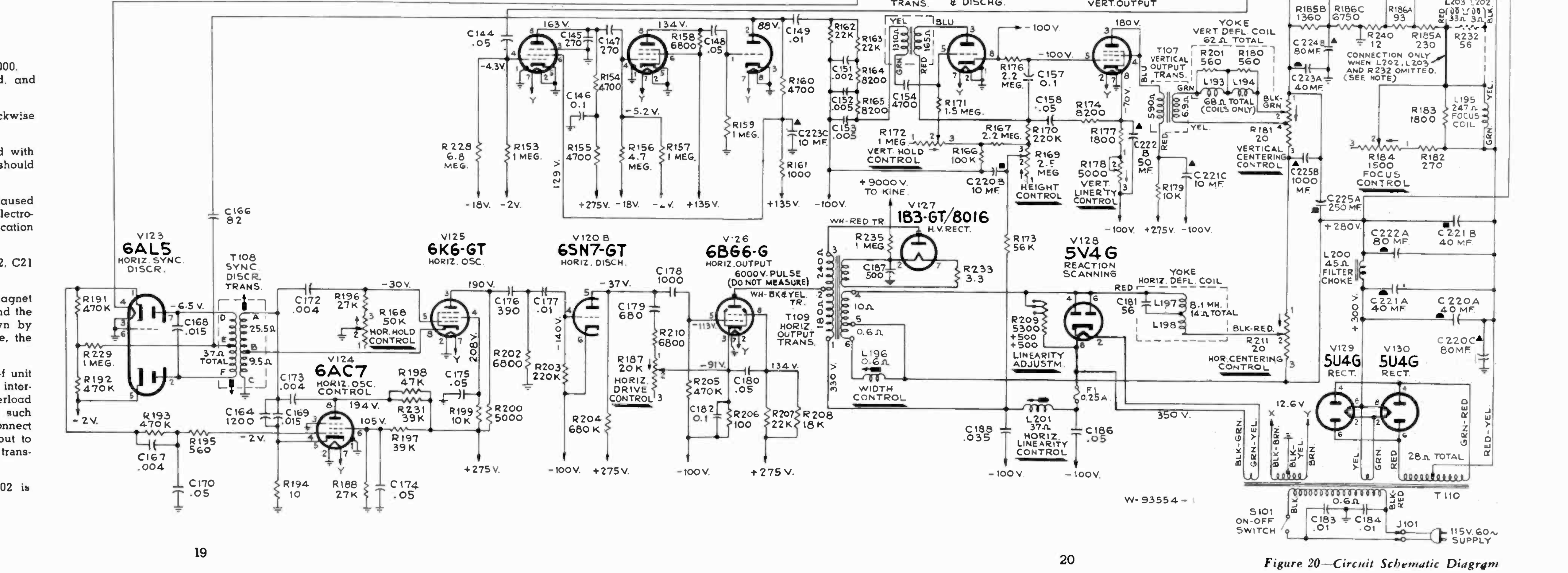


Figure 20—Circuit Schematic Diagram

R-F UNIT WIRING DIAGRAM

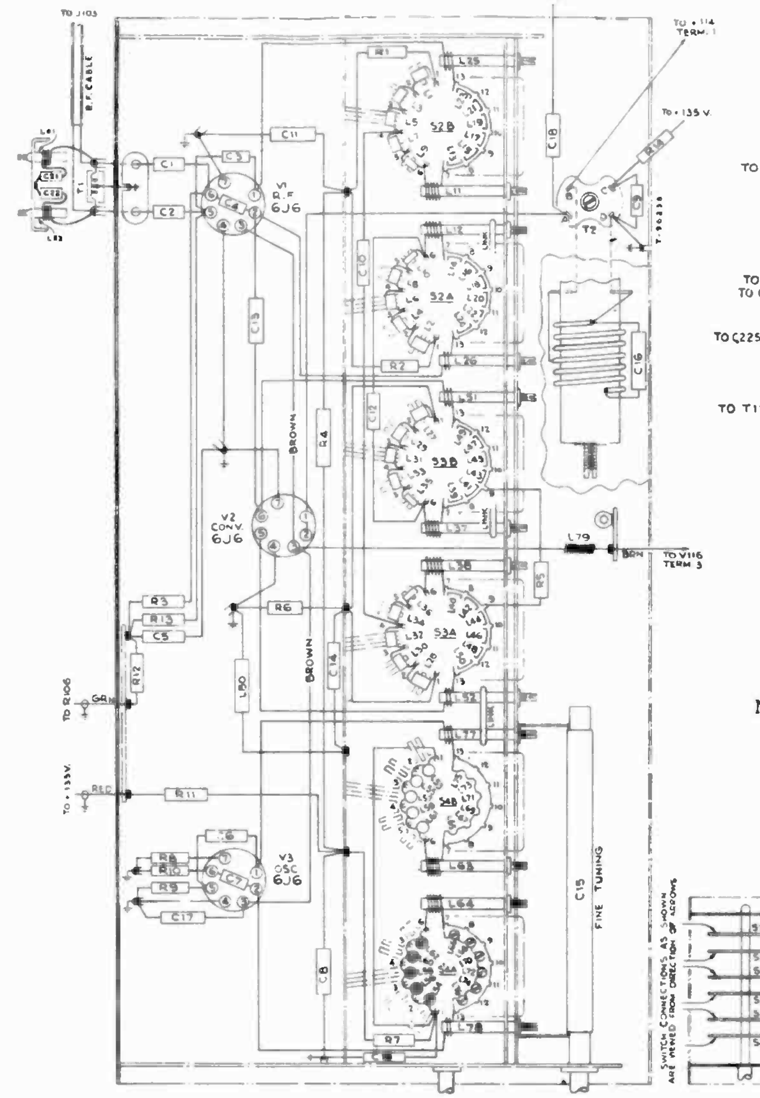


Figure 21—R-F Unit Wiring Diagram

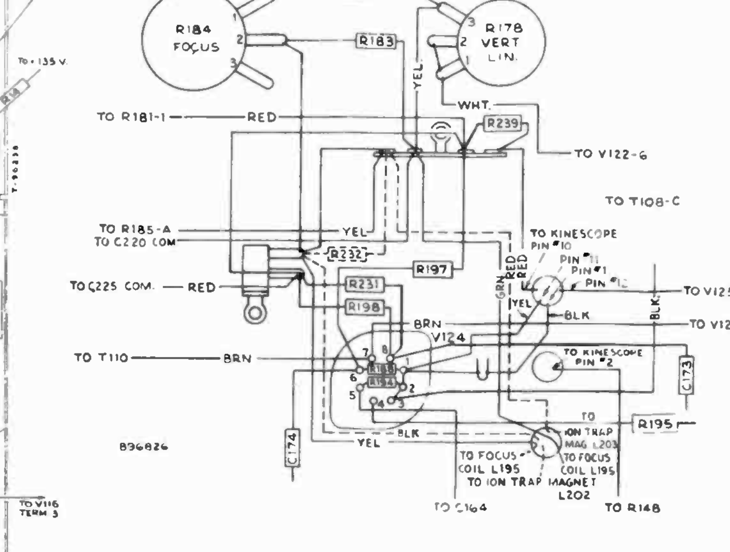


Figure 22—Partial Chassis Wiring Diagram

Note: Some early production chassis used EM type magnets and were wired as shown above. The dotted lines shown are for chassis employing EM type magnets. The jumper across R232 is omitted when EM magnet is used.

CRITICAL LEAD DRESS:

1. Dress spaghetti-covered leads from A and B on discriminator transformer T113 to pin 7 and 2 on V107 tube socket approximately 3/16" above chassis.
2. Dress video capacitors C-138, C-140 and C-141 up and away from chassis.
3. Dress video peaking coils L-187, L-188, L-189, L-190, L-191 and L-192 up and away from chassis.
4. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.
5. Dress leads from L196 (width control coil) away from the lead to the cap of V127 (h-v rectifier). Contact between these leads will cause arcing and fire.
6. Dress T109 winding leads as shown in Figure 23.

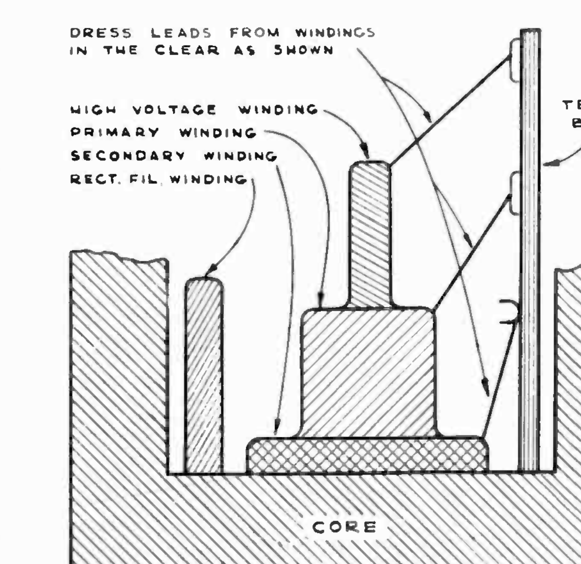


Figure 23—T109 Lead Dress

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY KRK2
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
45466	Capacitor—Ceramic, 10mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
65401	Capacitor—Mica, 270 mmf. (C18)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 r-f amplifier plate coil—front or rear section or channel #1 converter grid coil—front or rear section (L1, L2, L27, L28)
71479	Coil—Channel #2 r-f amplifier plate coil—front or rear section or channels #2 and #4 converter grid coil—front or rear section (L3, L4, L29, L30, L33, L34)
71480	Coil—Channel #4 r-f amplifier plate coil—front or rear section (L7, L8)
71481	Coil—Channel #5 r-f amplifier plate coil—front or rear section or channel #5 converter grid coil—front or rear section (L9, L10, L35, L36)
71492	Coil—Channel #6 oscillator, converter grid or r-f amplifier plate coil—front or rear sections (L11, L12, L37, L38, L63, L64)
71491	Coil—Channel #13 converter grid or r-f amplifier plate coil—rear section (L25, L51)
71490	Coil—Channel #13 converter grid or r-f amplifier plate coil—front section (L26, L52)
72597	Coil—Channel #3 converter grid coil—front or rear section and channel #3 r-f amplifier plate coil—front or rear section (L5, L6, L31, L32)
71469	Coil—Channel #1 oscillator coil—front or rear section (L53, L54)
71471	Coil—Channel #5 oscillator coil—front section or channel #2 oscillator coil—rear section (L55, L62)
71470	Coil—Channels #2, 3 and 4 oscillator coil—front sections (L56, L58, L60)
72552	Coil—Channel #3 oscillator coil—rear section (L57)
72553	Coil—Channel #4 oscillator coil—rear section (L59)
71472	Coil—Channel #5 oscillator coil—rear section (L61)
71489	Coil—Channel #13 oscillator coil—rear section (L77)
71488	Coil—Channel #13 oscillator coil—front section (L78)
71505	Coil—Heater choke coil (L79)
71506	Coil—Converter grid i-f choke coil (L80)
71493	Connector—Segment connector
71597	Core—Channel #13 front and rear oscillator coils' adjustable core and stud
71498	Core—Channels #6 and #13 front and rear converter grid coils or front and rear r-f amplifier plate coils' adjustable core and stud
71497	Core—Channel #6 front and rear oscillator coils' adjustable core and stud
72743	Detent—Detent mechanism and fibre shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
72744	Drive—Fine tuning pinch washer drive
71487	Form—Coil form only for channels #6 and #13 coils—less winding
71462	Loop—Oscillator to converter grid coupling loop
	Resistor—Fixed composition, 47 ohms ±20%, ½ watt (R8)
	Resistor—Fixed composition, 150 ohms ±10%, ½ watt (R3, R11, R13)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R4, R12, R14)
	Resistor—Fixed composition, 4700 ohms ±20%, ½ watt (R1, R2, R7)
	Resistor—Fixed composition, 10,000 ohms ±10%, ½ watt (R5)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R9, R10)
	Resistor—Fixed composition, 1 megohm ±20%, ½ watt (R6)
14343	Ring—Retaining ring for drive
71475	Screw—#4-40 x 1¼" adjusting screw for coils L54, L56, L58, L60, L62

STOCK No.	DESCRIPTION
71476	Screw—#4-40 x ¼" binder head screw for adjusting coils L66, L68, L70, L72, L74, L76
71473	Segment—Converter grid section front segment—less coils or r-f amplifier plate section front segment—less coils (Part of S2, S3)
71474	Segment—Converter grid section rear section less coils or r-f amplifier plate section rear segment—less coils (Part of S2, S3)
71467	Segment—Oscillator section front segment—less coils (Part of S4)
71468	Segment—Oscillator segment rear section—less coils (Part of S4)
72951	Shield—Lead tube shield for V3
71494	Socket—Tube socket—miniature
71461	Spring—Snap spring to hold fine tuning shaft
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
71495	Transformer—Converter transformer (T2, C16)
73239	Trap—Antenna trap (L81, L82, C21, C22)
	TELEVISION CHASSIS KCS20J-1, KCS20K-2
71894	Bearing—Bearing assembly for R-F Unit shaft
71460	Board—Antenna board
72615	Capacitor—Mica, 10 mmf. (C137)
71771	Capacitor—Ceramic, 51 mmf. (C197)
73090	Capacitor—Mica, 82 mmf. (C166)
71514	Capacitor—Ceramic, 82 mmf. (C131)
73091	Capacitor—Mica, 270 mmf. (C116, C123, C128, C134, C145, C147, C203)
39642	Capacitor—Mica, 390 mmf. (C176)
39644	Capacitor—Mica, 470 mmf. (C161)
71450	Capacitor—High-voltage capacitor, 500 mmf. (C187)
39648	Capacitor—Mica, 680 mmf. (C179)
72638	Capacitor—Ceramic, 1200 mmf. (C164)
71501	Capacitor—Ceramic, 1500 mmf. (C112, C113, C114, C115, C118, C119, C120, C121, C122, C126, C127, C129, C130, C133, C135, C136, C185, C189, C191, C194, C196)
72524	Capacitor—Mica, 4700 mmf. (C154)
71690	Capacitor—Ceramic, 6500 mmf. (C200)
71394	Capacitor—Tubular, .0015 mfd., 600 volts (C207)
70602	Capacitor—Tubular, .0025 mfd., 400 volts (C205)
70642	Capacitor—Tubular, .001 mfd., 1000 volts (C178)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C151)
70605	Capacitor—Tubular, .004 mfd., 400 volts (C167, C172)
70647	Capacitor—Tubular, .004 mfd., 1000 volts (C173)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C152, C204, C208)
70627	Capacitor—Tubular, .005 mfd., 600 volts (C209)
71516	Capacitor—Tubular, oil impregnated, .015 mfd., 400 volts (C168, C169)
73100	Capacitor—Tubular, oil impregnated, .035 mfd., 1000 volts (C188)
71770	Capacitor—Moulded paper, .01 mmfd., 400 volts (C183, C184)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C149, C177, C192, C206)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C138, C144, C148, C170)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C140, C141, C142, C174, C175, C180)
71515	Capacitor—Tubular, oil impregnated, .05 mfd., 600 volts (C158)
73093	Capacitor—Tubular, oil impregnated, .05 mfd., 1000 volts (C186)
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C157, C182)
70638	Capacitor—Tubular, 0.1 mfd., 600 volts (C146)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C125, C143)
71432	Capacitor—Electrolytic, comprising 2 sections of 40 mfd., 450 volts, and 1 section of 10 mfd., 450 volts (C221A, C221B, C221C)
71433	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 450 volts and 1 section of 50 mfd., 50 volts (C222A, C222B)
71434	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts, and 1 section of 10 mfd., 350 volts (C223A, C223B, C223C)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
71431	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts, and 1 section of 80 mfd., 150 volts (C220A, C220B, C220C)
71435	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 450 volts, and 1 section of 80 mfd., 350 volts (C224A, C224B)
71436	Capacitor—Electrolytic, comprising 1 section of 250 mfd., 10 volts, and 1 section of 1000 mfd., 6 volts (C225A, C225B)
73154	Choke—Filter choke (L200)
71505	Coil—Choke coil (L180, L181, L182, L184, L186)
71421	Coil—Focus coil (L195)
71449	Coil—Horizontal linearity control coil (L201)
71526	Coil—Peaking coil (L188)
71529	Coil—Peaking coil (L187, L189, L191, R136, R139, R145)
71527	Coil—Peaking coil (L190, L192)
71426	Coil—Fourth picture i-f coil (L185)
71429	Coil—Width control coil (L196)
71523	Connector—Anode connector
71521	Contact—High-voltage capacitor lead contact
73156	Control—Brightness control (R152)
71442	Control—Focus control (R184)
71440	Control—Height control (R169)
71447	Control—Horizontal drive control (R187)
72734	Control—Vertical and horizontal hold control (R168, R172)
71443	Control—Vertical and horizontal centering control (R181, R211)
71441	Control—Vertical linearity control (R178)
73157	Control—Picture control, volume control and power switch (R131, R222, S101)
71457	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytics #71431 and #71433
71509	Cushion—Deflection yoke hood upper cushion
71510	Cushion—Deflection yoke hood lower cushion
73600	Fuse—0.25 ampere, 250 volts (F1)
73155	Grommet—Rubber grommet for anode connector and kine. grid lead holes
71522	Magnet—Ion trap magnet (EM type) (L202, L203)
73301	Magnet—Ion trap magnet (PM type)
71455	Nut—#8-32 wing nut for mounting focus coil (3 required)
71451	Nut—Speed nut to mount high-voltage capacitor
18469	Plate—Bakelite mounting plate for electrolytics #71431 and #71433
5119	Plug—3 contact female plug for speaker cable
71448	Plug—2 prong male plug for power cable
71918	Resistor—Wire wound, 2.2 ohms, 1 watt (R230)
71513	Resistor—3.3 ohms, ⅓ watt (R233)
	Resistor—Fixed composition, 10 ohms ±10%, ½ watt (R194)
73098	Resistor—Wire wound, 12 ohms, 1 watt (R240)
	Resistor—Fixed composition, 39 ohms ±10%, ½ watt (R116, R121, R126)
	Resistor—Fixed composition, 56 ohms ±10%, 1 watt (R232), in some sets
	Resistor—Fixed composition, 100 ohms ±10%, 2 watts (R206)
	Resistor—Fixed composition, 100 ohms ±20%, ½ watt (R212, R215)
	Resistor—Fixed composition, 150 ohms ±10%, ½ watt (R114, R119, R124, R130, R133)
39505	Resistor—Wire wound, 270 ohms, 2 watts (R182)
	Resistor—Fixed composition, 330 ohms ±10%, ½ watt (R144)
	Resistor—Fixed composition, 560 ohms ±10%, ½ watt (R195)
	Resistor—Fixed composition, 680 ohms ±10%, ½ watt (R132)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R117, R118, R122, R123, R128, R135, R213, R216)
	Resistor—Fixed composition, 1000 ohms ±10%, ½ watt (R161)

STOCK No.	DESCRIPTION
	Resistor—Fixed composition, 1800 ohms ±10%, ½ watt (R177)
71512	Resistor—Wire wound, 1800 ohms, 1 watt (R183)
	Resistor—Fixed composition, 2200 ohms ±20%, 2 watts (R226, R227)
	Resistor—Fixed composition, 2700 ohms ±10%, ½ watt (R129)
	Resistor—Fixed composition, 2700 ohms ±5%, ½ watt (R127)
	Resistor—Fixed composition, 3300 ohms ±20%, ½ watt (R234)
	Resistor—Fixed composition, 3300 ohms ±10%, 1 watt (R147)
	Resistor—Fixed composition, 3300 ohms ±10%, ½ watt (R140)
	Resistor—Fixed composition, 3900 ohms ±5%, ½ watt (R137)
	Resistor—Fixed composition, 4700 ohms ±10%, ½ watt (R160)
	Resistor—Fixed composition, 4700 ohms ±5%, ½ watt (R125)
	Resistor—Fixed composition, 4700 ohms ±10%, 1 watt (R154, R155)
45876	Resistor—Wire wound, 5000 ohms, 5 watts (R200)
	Resistor—Fixed composition, 5600 ohms ±5%, ½ watt (R134)
	Resistor—Fixed composition, 6800 ohms ±10%, ½ watt (R141, R158, R202, R210)
	Resistor—Fixed composition, 8200 ohms ±10%, ½ watt (R164, R165, R190)
	Resistor—Fixed composition, 8200 ohms ±5%, ½ watt (R174)
	Resistor—Fixed composition, 10,000 ohms ±10%, ½ watt (R146, R175, R237)
	Resistor—Fixed composition, 10,000 ohms ±5%, ½ watt (R115, R120)
	Resistor—Fixed composition, 10,000 ohms ±20%, 1 watt (R179)
	Resistor—Fixed composition, 10,000 ohms ±10%, 1 watt (R199, R218)
	Resistor—Fixed composition, 18,000 ohms ±10%, ½ watt (R189)
	Resistor—Fixed composition, 18,000 ohms ±10%, 1 watt (R208)
	Resistor—Fixed composition, 22,000 ohms ±20%, ½ watt (R162, R163, R236)
	Resistor—Fixed composition, 22,000 ohms ±10%, ½ watt (R217)
	Resistor—Fixed composition, 22,000 ohms ±10%, 1 watt (R207)
	Resistor—Fixed composition, 27,000 ohms ±10%, ½ watt (R196)
	Resistor—Fixed composition, 27,000 ohms ±10%, 1 watt (R188)
	Resistor—Fixed composition, 39,000 ohms ±10%, 1 watt (R197)
	Resistor—Fixed composition, 39,000 ohms ±5%, 1 watt (R231)
	Resistor—Fixed composition, 47,000 ohms ±10%, ½ watt (R150)
	Resistor—Fixed composition, 47,000 ohms ±10%, 1 watt (R198)
	Resistor—Fixed composition, 56,000 ohms ±10%, ½ watt (R173)
	Resistor—Fixed composition, 82,000 ohms ±10%, ½ watt (R221)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R148)
	Resistor—Fixed composition, 100,000 ohms ±10%, ½ watt (R166, R219, R220)
	Resistor—Fixed composition, 150,000 ohms ±20%, ½ watt (R239)
	Resistor—Fixed composition, 150,000 ohms ±10%, ½ watt (R151)
	Resistor—Fixed composition, 220,000 ohms ±20%, ½ watt (R203)
	Resistor—Fixed composition, 220,000 ohms ±10%, ½ watt (R170)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
	Resistor—Fixed composition, 270,000 ohms ±10%, ½ watt (R225)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R138, R193, R214)
	Resistor—Fixed composition, 470,000 ohms ±10%, ½ watt (R191, R192, R205)
	Resistor—Fixed composition, 330,000 ohms ±20%, ½ watt (R224)
	Resistor—Fixed composition, 680,000 ohms ±5%, ½ watt (R204, R238)
	Resistor—Fixed composition, 820,000 ohms ±5%, ½ watt (R142)
71458	Resistor—Wire wound, comprising 1 section of 1360 ohms, 17 watts, and 1 section of 230 ohms, 10 watts (R185A, R185B)
71439	Resistor—Wire wound, comprising 1 section of 5300 ohms, 20 watts, and 2 sections of 500 ohms, 2 watts (R209)
73097	Resistor—Voltage divider, comprising 1 section of 6750 ohms, 3.2 watts, and 1 section of 93 ohms, 4 watts (R186)
	Resistor—Fixed composition, 1 megohm ±20%, ½ watt (R149, R153, R159)
	Resistor—Fixed composition, 1 megohm ±10%, ½ watt (R157, R229)
	Resistor—Fixed composition, 1 megohm ±10%, 1 watt (R235)
	Resistor—Fixed composition, 1.2 megohms ±5%, ½ watt (R143)
	Resistor—Fixed composition, 1.5 megohms ±5%, ½ watt (R171)
	Resistor—Fixed composition, 2.2 megohms ±10%, ½ watt (R167, R176)
	Resistor—Fixed composition, 4.7 megohms ±10%, ½ watt (R156)
	Resistor—Fixed composition, 6.8 megohms ±10%, ½ watt (R228)
	Resistor—Fixed composition, 10 megohms ±20%, ½ watt (R223)
71456	Screw—Wing screw for mounting deflection yoke
71452	Sleeve—Rubber sleeve for focus coil
71559	Spring—Grounding spring for high-voltage capacitor
71525	Socket—Kinescope socket
72516	Socket—Tube socket, miniature
31251	Socket—Tube socket, wafer
71508	Socket—Tube socket for 8016
71453	Stud—Threaded stud for focus coil mounting brackets (2 required)
71423	Transformer—First picture i-f transformer (T103, C117)
71425	Transformer—Second picture i-f transformer (T104, C124)
73708	Transformer—Third picture i-f trans. (T102, C139)
71418	Transformer—Vertical oscillator transformer (T106)
71417	Transformer—Vertical output transformer (T107)
71428	Transformer—Horizontal oscillator transformer (T108)
71416	Transformer—Horizontal output and high-voltage transformer (T109)
72775	Transformer—Power transformer, 115 volt, 50 cycle (T110)
71415	Transformer—Power transformer, 115 volt, 60 cycle (T110)
71424	Transformer—First or second sound i-f transformer (T111, T112, C190, C193, C195, C198)
71427	Transformer—Sound discriminator transformer (T113, C199, C201, C202)

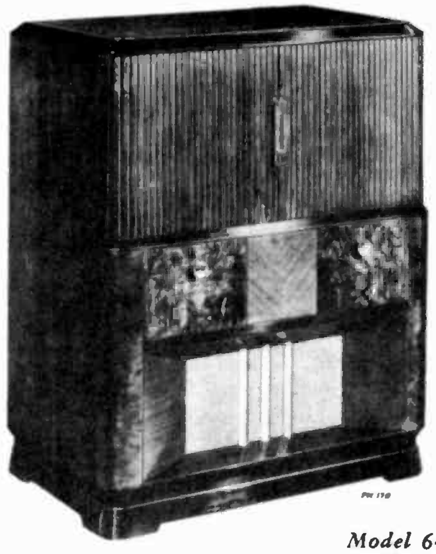
STOCK No.	DESCRIPTION
71419	Transformer—Audio output transformer (T114)
71422	Trap—Sound trap (T105, C132)
71420	Yoke—Deflection yoke (L193, L194, L197, L198, C181, R180, R201)
	SPEAKER ASSEMBLIES 92573-2
73236	Speaker—5" x 7" PM speaker complete with cone and voice coil
	MISCELLANEOUS
73709	Back—Cabinet back—Masonite
X1751	Cloth—Grille cloth
73232	Decal—Control function decal for toasted mahogany instruments
71983	Decal—Control function decal (Off-On Sound and Station Selector) for walnut and mahogany instruments
71982	Decal—Control function decal (Brightness and Horizontal-Vertical) for walnut and mahogany instruments
73221	Escutcheon—Channel marker escutcheon for toasted mahogany instruments
73220	Escutcheon—Channel marker escutcheon for walnut and mahogany instruments
72113	Foot—Cabinet foot—rubber (4 required)
73177	Glass—Safety glass
73222	Knob—Fine tuning control knob (burgundy) for walnut and mahogany instruments
73223	Knob—Fine tuning control knob (tan) for toasted mahogany instruments
73226	Knob—Picture control, brightness control, or vertical hold control knob (burgundy) for walnut and mahogany instruments
73227	Knob—Picture control, brightness control or vertical hold control knob (tan) for toasted mahogany instruments
73224	Knob—Station selector knob (burgundy) for walnut and mahogany instruments
73225	Knob—Station selector knob (tan) for toasted mahogany instruments
73228	Knob—Volume control and power switch or horizontal hold control knob (burgundy) for walnut and mahogany instruments
73229	Knob—Volume control and power switch or horizontal hold control knob (tan) for toasted mahogany instruments
73230	Knob—Brightness control knob (burgundy) for walnut and mahogany instruments
73231	Knob—Brightness control knob (tan) for toasted mahogany instruments
73180	Name Plate—"RCA-Victor" name plate
71539	Slide—Kinescope centering slide complete with rubber cushion (4 required)
71538	Spring—Channel marker escutcheon spring
72845	Spring—Retaining spring for knobs #73222 and #73223
14270	Spring—Retaining spring for knobs #73224, #73225, #73226, #73227, #73230 and #73231
30330	Spring—Retaining spring for knobs #73228 and #73229
73178	Trim—Grille trim—L. H.
73179	Trim—Grille trim—R. H.

Note: A few early production instruments were supplied with the type of escutcheon and knobs employed by the Model 630TS Receiver. These items are listed below.

STOCK No.	DESCRIPTION
71598	Escutcheon—Channel marker escutcheon
71535	Knob—Picture, brightness or vertical hold knob
71537	Knob—Dummy brightness control knob
71533	Knob—Fine tuning knob
71536	Knob—Horizontal hold or volume control knob
71534	Knob—Station selector knob
71538	Spring—Spring clip fo rescutcheon
4982	Spring—Retaining spring for knob #71533
14270	Spring—Retaining spring for knob #71534, #71535 and #71537
30330	Spring—Retaining spring for knob #71536

To obtain resistors for which no stock number is given, order by stating type, value of resistance, tolerance and wattage.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Model 648PTK

Model 648PV
Walnut or Mahogany

RCA VICTOR

PROJECTION TELEVISION, AM-FM RADIO, COMBINATION

MODEL 648PTK

Chassis Nos. KCS 24-1, KRS 20-1, KRS 21-1
KRK 1-1, RK-121A and RS-123A

PROJECTION TELEVISION AM-FM RADIO PHONOGRAPH COMBINATION

MODEL 648PV

Chassis No. KCS 24A-1, KRS 20-1, KRS 21A-1
KRK-1A, RK-121A and RS-123B

Mfr. No. 274

SERVICE DATA

- 1947 No. T2 -
- 1948 No. T4 -

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 648PTK is a forty-eight tube Projection Television, AM-FM Radio, console combination. The television receiver employs four chassis with a total of thirty-five tubes and a five-inch projection kinescope. A Reflective Optical System provides a 15" x 20" picture on the screen.

Features of the television unit are full thirteen channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; three-stage sync separator and clipper; four mc band width for picture channel and reduced hazard high voltage supply.

The radio receiver employs an eight-tube tuner unit and a four-tube audio-amplifier, power-supply unit.

The radio chassis is provided with a Phono input jack to permit the use of an external record player.

Model 648PV is a forty-eight tube Projection Television, AM-FM Radio, Phonograph, console combination. The television receiver employs four chassis with a total of thirty-five tubes and a five-inch projection kinescope. A Reflective Optical System provides a 15" x 20" picture on the screen.

Features of the television unit are full thirteen channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; three-stage sync separator and clipper; four mc band width for picture channel and reduced hazard high voltage supply.

The radio receiver employs an eight-tube tuner unit and a four-tube audio-amplifier, power-supply unit.

An automatic record changer of the "slicer" type is employed and features a crystal pickup with the "Silent Sapphire" stylus.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

TELEVISION R-F FREQUENCY RANGES

Television Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Tel. Rec. R-F Osc. Freq. Mc.
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

TELEVISION FINE TUNING RANGE

Plus and minus approximately 800 kc on channel 1, and plus and minus approximately 1.9 mc on channel 13.

PICTURE SIZE .... 15" x 20"

RADIO TUNING RANGE

Broadcast .... 540-1,600 kc
Short Wave .... 9.2-16 mc
Frequency Modulation .... 88-108 mc
Intermediate Frequency—AM .... 455 kc
Intermediate Frequency—FM .... 10.7 mc

RECEIVER ANTENNA INPUT IMPEDANCE..300 ohms balanced

Specifications continued on page 3

TABLE OF CONTENTS

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE TELEVISION RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the receiver Installation Instructions section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

POWER SUPPLY RATING

Television Operation	115 volts, 60 cycles, 530 watts
Radio Operation	115 volts, 60 cycles, 145 watts
Phonograph Operation	115 volts, 60 cycles, 165 watts

AUDIO POWER OUTPUT RATING

Undistorted Power Output	10 watts
Maximum Power Output	11 watts

CHASSIS DESIGNATIONS	648PTK	648PV
Television R-F, I-F Chassis	KCS24-1	KCS24A-1
Horizontal Deflection Chassis	KRS20-1	KRS20-1
Television Power Supply Chassis	KRS21-1	KRS21A-1
Optical Barrel	KRK1-1	KRK-1A
Radio Chassis	RK121A	RK121-A
Audio Amplifier	RS123A	RS123B
Record Player		RP176

LOUDSPEAKER (92567-2)

Type	12-inch Electrodynamic
Voice Coil Impedance	2.2 ohms at 400 cycles

WEIGHT	648PTK	648PV
Chassis with Tubes in Cabinet	295 lbs.	323 lbs.
Shipping Weight	360 lbs.	407 lbs.

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside) 648PTK	36¼	47½	22¾
Cabinet (outside) 648PV	48	39¼	25½

TELEVISION CHASSIS DATA

PICTURE I-F FREQUENCIES

Picture Carrier Frequency	25.75 mc
Adjacent Channel Sound Trap	27.25 mc
Accompanying Sound Traps	21.25 mc
Adjacent Channel Picture Carrier Trap	19.75 mc

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 mc
Sound Discriminator Band Width (between peaks)	350 kc

VIDEO RESPONSE	To 4 mc
FOCUS	Electrostatic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SCANNING FREQUENCY	15,750 cps
VERTICAL SCANNING FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Horizontal Centering	Horizontal Deflection chassis adjustment
Vertical Centering	R-F, I-F chassis rear adjustment
Height	R-F, I-F chassis rear adjustment
Vertical Linearity	R-F, I-F chassis rear adjustment
Width	Horizontal Deflection chassis screwdriver adjustment
Horizontal Linearity	Horizontal Deflection chassis adjustment
Horizontal Drive	Horizontal Deflection chassis adjustment
Horizontal Oscillator Frequency	Horizontal Deflection chassis adjustment
Horizontal Oscillator Phase	Horizontal Deflection chassis adjustment
Focus (Electrical)	Horizontal Deflection chassis rear adjustment
Focus (Mechanical)	Optical Barrel adjustment
Deflection Coil	Optical Barrel adjustment
Video Peaking Switch	R-F, I-F chassis rear switch
Horizontal Optical Centering	Optical Barrel adjustment
Lateral Optical Centering	Optical Barrel adjustment

RCA TUBE COMPLEMENT

KCS24-1, KCS24A-1 R-F, I-F CHASSIS

	Tube Used	Function
(1)	RCA-6J6	R-F Amplifier
(2)	RCA-6J6	R-F Oscillator
(3)	RCA-6J6	Converter
(4)	RCA-6BA6	1st Sound I-F Amplifier
(5)	RCA-6BA6	2nd Sound I-F Amplifier
(6)	RCA-6AU6	3rd Sound I-F Amplifier
(7)	RCA-6AL5	Sound Discriminator
(8)	RCA-6AT6	A-G-C Amplifier
(9)	RCA-6AL5	A-G-C Diode and D-C Restorer
(10)	RCA-6AG5	1st Picture I-F Amplifier
(11)	RCA-6AG5	2nd Picture I-F Amplifier
(12)	RCA-6AG5	3rd Picture I-F Amplifier
(13)	RCA-6AG5	4th Picture I-F Amplifier
(14)	RCA-6AL5	Picture 2nd Detector and A-G-C Detector
(15)	RCA-6AU6	1st Video Amplifier
(16)	RCA-6V6GT	2nd Video Amplifier
(17)	RCA-6SK7	1st Sync Amplifier
(18)	RCA-6SH7	2nd Sync Amplifier
(19)	RCA-6J5	3rd Sync Amplifier
(20)	RCA-6J5	Vertical Sweep Oscillator and Discharge
(21)	RCA-6K6GT	Vertical Sweep Output

KRS20-1 HORIZONTAL DEFLECTION CHASSIS

	Tube Used	Function
(1)	RCA-6H6	Horizontal Sync Discriminator
(2)	RCA-6K6GT	Horizontal Sweep Oscillator
(3)	RCA-6J5	Horizontal Discharge
(4)	RCA-6AC7	Horizontal Sweep Oscillator Control
(5)	RCA-6BG6G	Horizontal Sweep Output (2 tubes)
(6)	RCA-5V4G	Horizontal Damper
(7)	RCA-6AS7G	Horizontal Damper
(8)	RCA-1B3-GT/8016	High Voltage Rectifier (3 tubes)
(9)	RCA-5TP4	Projection Kinescope

KRS21-1, KRS21A-1 TELEVISION POWER SUPPLY CHASSIS

	Tube Used	Function
(1)	RCA-5U4G	Rectifier (3 tubes)

RK121A RADIO CHASSIS

	Tube Used	Function
(1)	RCA-6BA6	R-F Amplifier
(2)	RCA-6BE6	Oscillator
(3)	RCA-6BA6	Mixer
(4)	RCA-6BA6	1st I-F Amplifier
(5)	RCA-6AU6	2nd I-F and Phono Amplifier
(6)	RCA-6AU6	Driver
(7)	RCA-6AL5	Ratio Detector
(8)	RCA-6AT6	AM Detector, AVC and Audio Amplifier

RS123A, RS123B AUDIO AMPLIFIER

	Tube Used	Function
(1)	RCA-5U4G	Rectifier
(2)	RCA-6J5	Phase Inverter
(3)	RCA-6F6G	Power Output (2 tubes)

RECEIVER OPERATING INSTRUCTIONS

TELEVISION OPERATION

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the radio FUNCTION switch to Tel.

2. Turn the receiver "ON" and advance the sound VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Turn the PICTURE control fully counter-clockwise.

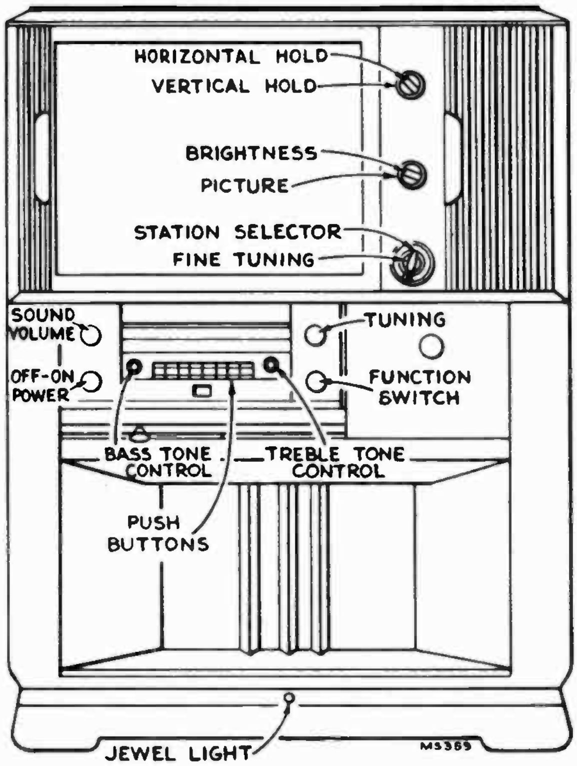


Figure 1—Receiver Operating Controls **648PTK**

5. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen, then counter-clockwise until the glow just disappears.

6. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.

7. Adjust the FINE TUNING control for best sound fidelity and sound VOLUME for suitable volume.

8. Adjust the VERTICAL hold control until the pattern stops vertical measurement.

9. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

10. Adjust the PICTURE control for suitable picture contrast.

11. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

12. In switching from one station to another, it may be necessary to repeat steps number 7 and 10.

13. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 7 is generally sufficient.

14. If the position of the controls have been changed, it may be necessary to repeat steps number 2 through 10.

RADIO OPERATION

1. Turn the radio FUNCTION switch to the desired band (BC, SW or FM).
2. Tune in the desired station with the TUNING control.

PUSH-BUTTON OPERATION

1. Turn the radio FUNCTION switch to the desired band (BC, SW or FM).
2. Push the appropriate push button to receive the desired station.

PHONOGRAPH OPERATION

1. Turn the radio FUNCTION switch to the phono position.
2. Slide the changer power switch to "ON."

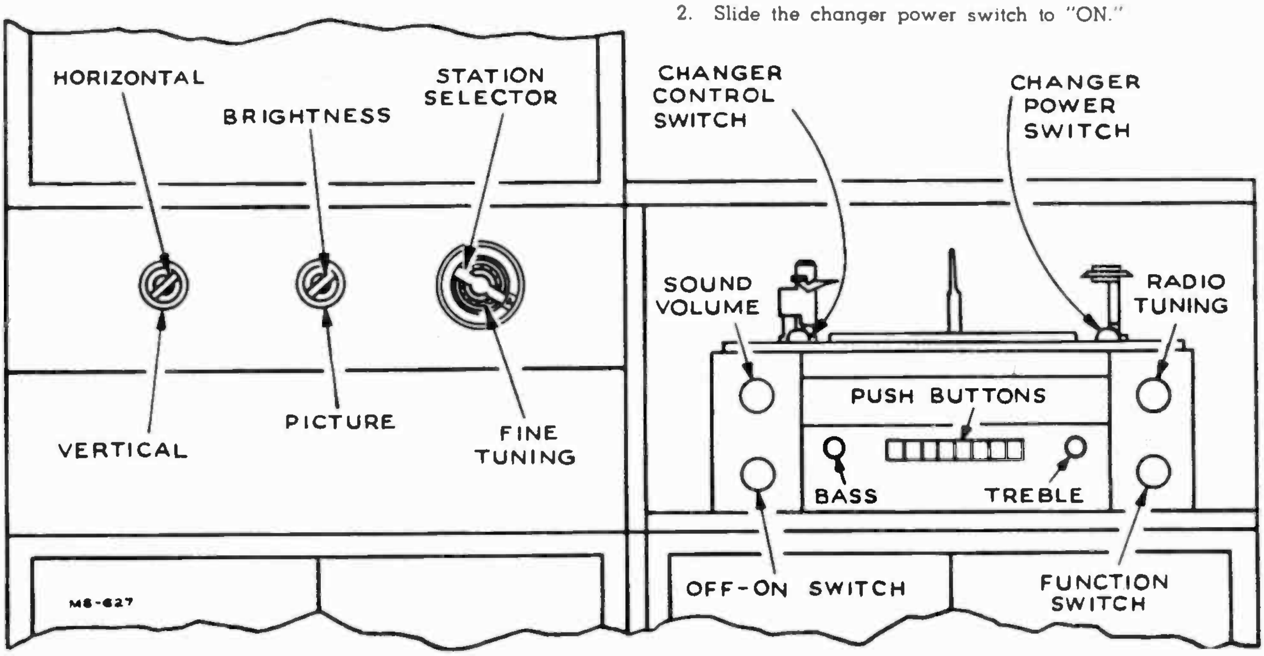


Figure 1—Receiver Operating Controls **648PV**

MODEL 648PTK

Access to the front tubes in the r-f, i-f chassis may be had through the front of the cabinet by raising the door stop as shown in Detail A of Figure 2 and then sliding the right television door all the way back. When this check is completed, close the door to its normal position and drop the door stop back in place.

MODEL 648PV

A heat shield is placed over the RS123 audio amplifier to prevent the rectifier tube from coming in contact with the optical barrel dust shield when the cabinet is closed. Care should be taken to see that this shield is replaced after the cardboard shipping shields have been removed from the RS123 amplifier.

To get at the optical barrel adjustments, take out three screws on each side of the front of the speaker grill and remove the panel.

Remove the shipping material as shown in Figure 2. Make sure that all tubes are firmly seated in their sockets.

Untie the canvas dust cover for the optical barrel and tie it off to one side.

Caution: Handle the corrector lens with care. This lens is made of a plastic material, is soft and can be easily scratched by improper handling or even by rubbing with a cloth. Do not use cleaning fluid on the lens as it may be attacked by some of the chemicals used in such solutions. In short, the lens should be given the care due any precision optical equipment. Remove the corrector lens from the top of the optical barrel by loosening the three screws holding the clamp springs as shown in Figure 4. Caution: Do not loosen the three screws holding the corrector lens mounting plate.

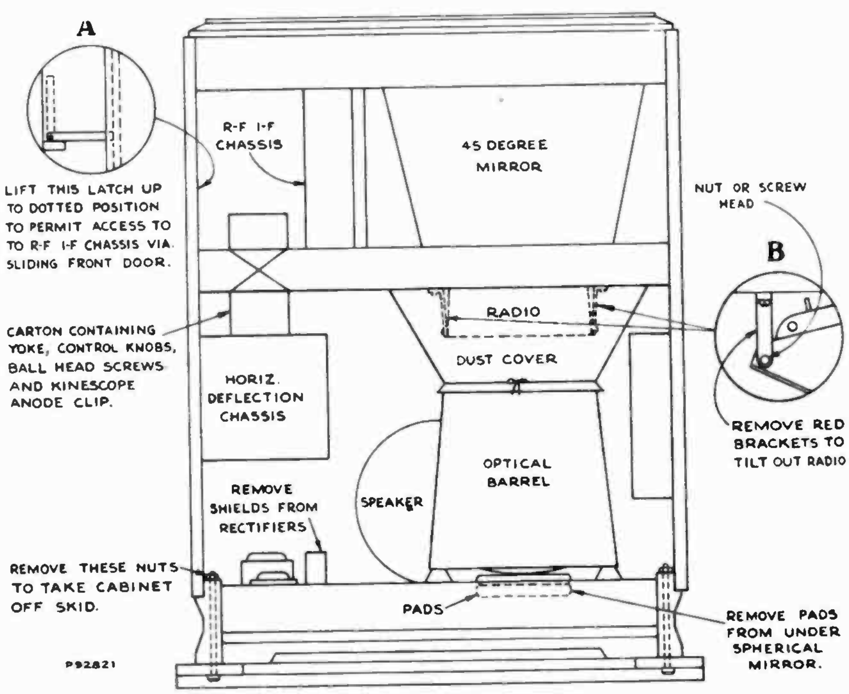


Figure 2—Removal of Shipping Material
MODEL 648PTK

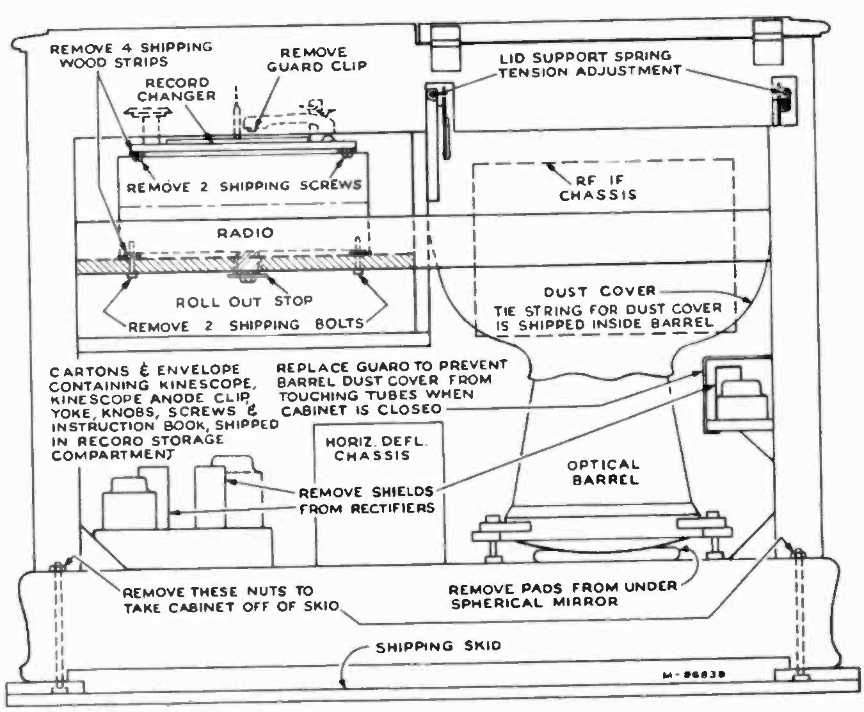


Figure 2—Removal of Shipping Material
MODEL 648PV

Although the high voltage filter capacitors of a new receiver are not likely to be charged, it is a good idea to form the habit of discharging the optical barrel before making any internal adjustments. Take a clip lead, fasten the clip end to the barrel and discharge the unit by making repeated contacts to the kinescope holder shown in Figure 3.

Clean the back of the screen, the front of the 45° mirror and the optical barrel spherical mirror by "sweeping" the surface with a small camel's hair brush. Any dust on the spherical mirror should be swept into the black center portion where it can be picked up with a piece of scotch tape. Caution: Do not touch the silvered portion of the mirrors. The mirrors are surface silvered and can be damaged by contact with the moist hand. If the screen or mirrors require cleaning, a solution of "Dreft" and water should be employed.

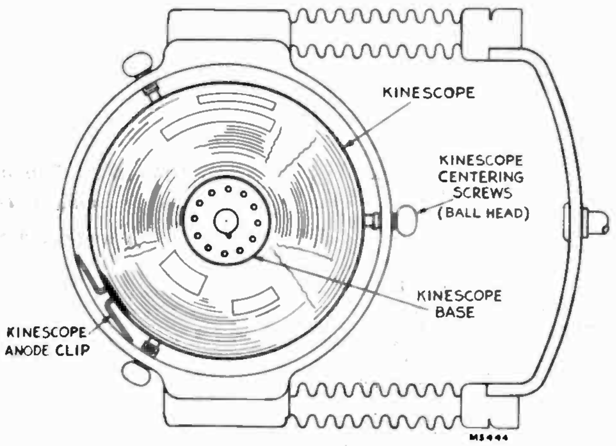


Figure 3—Kinescope Holder

Place a type 202-B-1 test lamp in the kinescope holder and adjust the ball screws to center the lamp in the holder. Connect the lamp cord into a 110-volt power outlet and turn the lamp on. Replace the corrector lens, taking care that the arrow on the edge of the lens points to the rear of the cabinet. Rotate the lamp so as to produce a picture on the screen in the proper aspect. Cover the center hole in the corrector lens with a piece of black cardboard in order to prevent light from this source from lowering the resolution. Pull the dust cover down around the barrel.

Observe the raster on the screen by use of a mirror placed in front of the set. A chrome-plated photographic ferrotype tin is excellent for this purpose.

Loosen the optical focus adjustment lock screws and adjust the optical focus adjustment for the best overall definition on the screen. The optical system should show at least 900 line resolution over all the screen. If the system shows less definition, it will be necessary to make the adjustments under "Alignment of Optical Barrel."

ALIGNMENT OF OPTICAL BARREL—With the test lamp in place as described above, turn the optical focus adjustment until the vertical and horizontal lines become double. When the test lamp is properly centered, the lines are parallel. If the lines are not parallel, the Horizontal or Lateral optical centering controls require readjustment.

Lateral Optical Adjustment—If the vertical lines are not parallel, loosen the lateral adjustment set screws and turn the lateral adjustment until the vertical lines are parallel. Tighten the adjustment set screws.

Horizontal Optical Adjustment—If the horizontal lines are not parallel, loosen the optical horizontal centering lock screws and turn the optical horizontal centering adjustment until the lines are parallel. Tighten the adjustment lock screws.

Corrector Lens Centering—Turn the focus adjustment until a halo appears around the dot in the center of the test lamp. If the halo is not symmetrical around the dot, loosen the three corrector lens lock screws and the three corrector lens mounting clip screws and shift the lens until the halo is symmetrical. Tighten the lens centering lock screws with the lens in this position.

Check of Optical Barrel Tilt—Adjust the optical focus control to and through the focus range. The picture should go through focus all over at the same time. This does not mean that the definition will be equal over all the picture, but it should be the best definition obtainable. If this is not the case, the optical barrel is not in alignment with the cabinet and requires adjustment as outlined in the following paragraph.

Optical Barrel Tilt Alignment—Turn the optical focus adjustment counterclockwise until the picture is out of focus then clockwise until the picture begins to come in focus. If one side comes into focus before the rest of the picture, it indicates that that side of the optical barrel should be raised. Loosen the lock nuts and turn the inner jack nuts, shown in Figure 4, to raise that side of the barrel and the other jack nut down to lower the other side of the barrel, until both sides of the picture come into focus at the same time.

If the top of the picture comes into focus first as the optical focus adjustment is turned clockwise, it indicates that the outer jack nut (nearest the focus controls) should be adjusted to lower the back of the optical barrel, until top and bottom come into focus at the same time.

When the barrel is properly adjusted, the entire picture will come into best focus all over at the same time as the focus control is rocked through the focus point. At this point the pattern should be in the center of the screen. When this condition of alignment is obtained, tighten the lock nuts being careful not to disturb the adjustments. If the optical barrel tilt adjustments are made, it will be necessary to recheck the adjustments under Horizontal Optical Adjustments and Lateral Optical Adjustments. Loosen all the kinescope mounting wing screws equally and just sufficiently to permit removal of the test lamp.

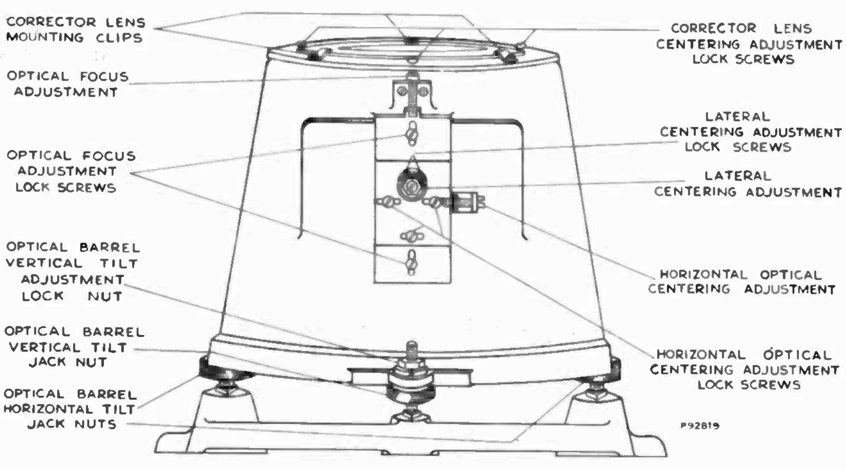
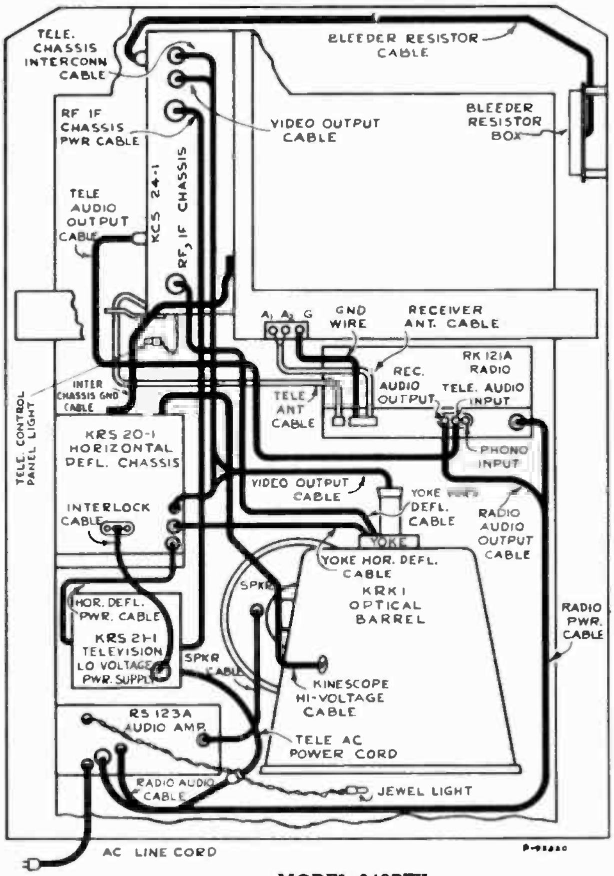


Figure 4—Optical Barrel Adjustments



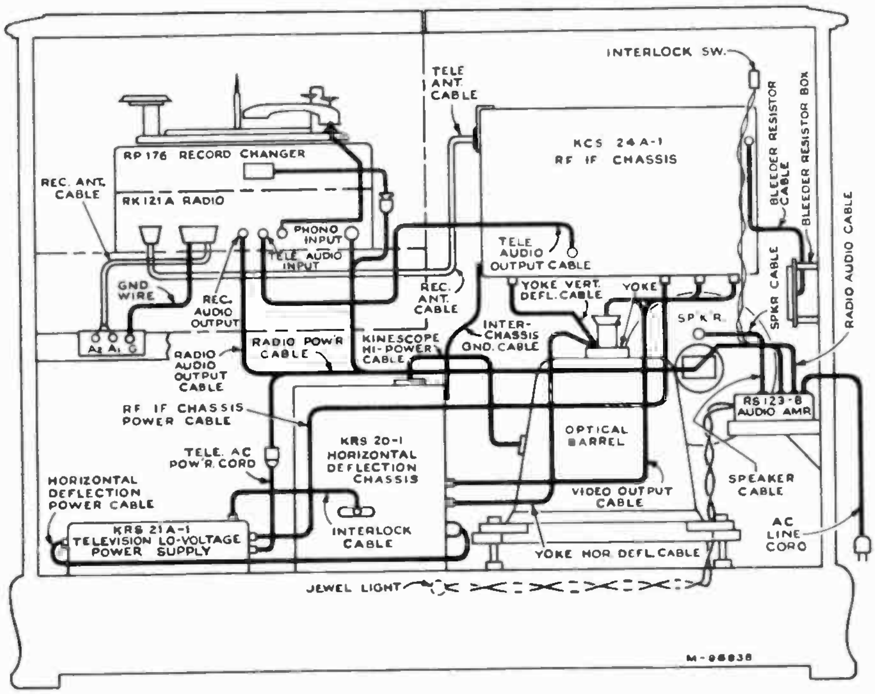
MODEL 648PTK

Figure 5—Chassis Interconnecting Cables

KINESCOPE HANDLING PRECAUTION—Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

Open the kinescope shipping carton and remove the tube. Handle this tube by the neck. Do not cover the envelope of the tube with fingermarks as it will produce leakage paths between the high voltage rim near the screen and the grounded coating on the neck. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride, which is obtainable at most drug stores.

Wipe the kinescope screen clean of all dust or finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.



MODEL 648PV

Figure 5—Chassis Interconnecting Cables

INSTALLATION OF KINESCOPE—The kinescope second anode contact is a recessed metal well in the side of the bulb. A small brass clip (from the carton containing the deflection yoke and front panel control knobs) must be placed in the kinescope anode contact and the tube inserted in the holder as shown in Figure 3. The tube must be installed so that the socket key on the base of the tube is pointed towards the horizontal deflection chassis. Make sure that the anode clip is horizontal so that it cannot protrude out of the holder.

Tighten the three ball screws equally to center the tube in the support. Caution: Do not apply too much pressure in tightening the ball screws as the tube can be cracked by so doing.

Wipe the corrector lens clean with a piece of lens tissue and replace on the barrel. Turn the lens mounting clips in place and tighten the clip screws.

Turn the deflection yoke so that the slotted end of the bakelite center tube is up and slide the yoke down over the neck of the kinescope. Connect the kinescope socket to the base of the tube.

Slip the yoke cables out through the cable sleeve in the optical barrel dust cover. The three-prong plug on the unshielded yoke cable should be plugged into the television r-f i-f chassis as shown in Figure 5. The two-prong plug on the shielded yoke cable should be plugged into the horizontal deflection chassis. The shield braid extension from this cable should be grounded to the chassis by means of the screw provided for this purpose.

Caution—Do not turn the television receiver on with the deflection yoke cables disconnected. To do so may cause the destruction of the kinescope screen.

Reconnect the speaker. Check all chassis interconnecting cables to make sure that all are plugged into the proper sockets as shown in Figure 5. It is possible to insert the receiver antenna and ground plug backwards. The ground wire should go to the middle connector at the radio chassis as shown.

Remove the cover from the horizontal deflection chassis and take out the strings holding the high voltage filter capacitors in the clips during shipment. Replace the chassis cover.

The antenna and power connections should now be made. Turn the power switch to the "on" position, the function switch to television, the picture control counterclockwise and the brightness control clockwise until a glow appears on the screen.

Adjust the electrical focus control R331 on the horizontal deflection chassis until the raster lines are in sharpest focus as seen when looking down into the barrel. If necessary, reduce the brilliance control setting, and readjust the focus control. Pull the dust cover down around the optical barrel.

Adjust the optical focus adjustment until the raster lines are in focus on the screen. Turn the deflection yoke until the raster lines are horizontal on the screen and tighten the yoke clamp in this position.

Picture Adjustments—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See step 3 through step 10 of the receiver operating instructions on page 4.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—The sync link (see Figure 7) must be in the normal position (2 to 3). Turn the horizontal hold control to the extreme counterclockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by turning the picture control fully counterclockwise and then returning it to the operating position. Normally the picture will pull into sync.

Turn the horizontal hold control to the extreme clockwise position. The picture should remain in sync. Momentarily remove the signal. Again the picture should normally pull into sync. If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at either extreme or failed to pull into sync after momentary removals of the signal, make the adjustments under "Slight Retouching Adjustments." If, after making these retouching adjustments, the receiver fails to pass the above checks or if the horizontal oscillator is completely out of adjustment, then make the adjustments under "Complete Realignment."

Slight Retouching Adjustments—Tune in a Television Station and adjust the fine tuning control for best sound quality. Sync the picture and adjust the picture control for slightly less than normal contrast. Turn the horizontal hold control to the extreme position in which the oscillator fails to hold or to pull in. Momentarily remove the signal. Turn the T301 frequency adjustment on the chassis rear apron until the oscillator pulls into sync. Check hold and pull-in for the other extreme position of the hold control.

Complete Realignment—Tune in a Television Station and adjust the fine tuning control for best sound quality.

With the sync link in the normal position (2-3), turn the T301 frequency adjustment (on rear apron), until the picture is synchronized. (If the picture is not synchronized vertically, adjust the vertical hold.) Adjust the picture control so that the picture is somewhat below average contrast level.

Turn the T301 phase adjustment screw (under chassis, see Figure 23) until the blanking bar, which may appear in the picture, moves to the right and off the raster. The range of this adjustment is such that it is possible to hit an unstable condiion (ripples in the raster). The screw must be turned clockwise from the unstable position. The length of stud beyond the bushing in its correct position is usually about ½ inch.

Turn horizontal hold to extreme counterclockwise position. Turn T301 frequency adjustment clockwise until the picture falls out of sync. Then turn it slowly counterclockwise to the point where the picture falls in sync again.

Readjust T301 phase adjustment so that the left side of the picture is close to the left side of the raster, but does not begin to fold over.

Turn horizontal hold to extreme clockwise. The right side of the picture should be close to the right side of the raster, but should not begin to fold over. If it does, readjust the phase. Momentarily remove the signal. When the signal is restored, the picture should fall in sync. If it doesn't, turn T301 frequency adjustment counterclockwise until the picture falls in sync.

Turn horizontal hold to extreme counterclockwise position. Remove the signal momentarily. When signal is restored, the picture should fall in sync.

NOTE: If the picture does not pull in sync after momentary removals of signal in both extreme positions of horizontal hold, the pull-in range may be inadequate, though not necessarily. A pull-in through ¾ of the hold control range may still be satisfactory.

There is a difference between the pull-in range and hold-in range of frequencies. Once in sync, the circuit will hold about 50% to 100% more variation in frequency than it can pull in. The range of the horizontal hold control is only approximately equal to the pull-in range, considerable variation may be found due to variations in the cut-off characteristic of the horizontal oscillator control tubes, V303.

Excessive pull-in is objectionable because the higher sensitivity of the control circuits means also greater susceptibility to noise, and to the vertical sync and equalizing pulses which tend to cause a bend in the upper part of the raster. This effect is more noticeable when the sync link is in the 1-2 position.

Now that a picture has been obtained we may proceed with the picture adjustments.

Adjust the electrical and optical focusing adjustments for maximum definition in the vertical wedge of the test pattern.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R149 on r-f, i-f chassis rear apron) until the picture fills the screen vertically. Adjust vertical linearity (R175 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask. In some cases it may be necessary to shift the position of the kinescope in the holder (see Figure 3) in order to obtain proper centering of the picture.

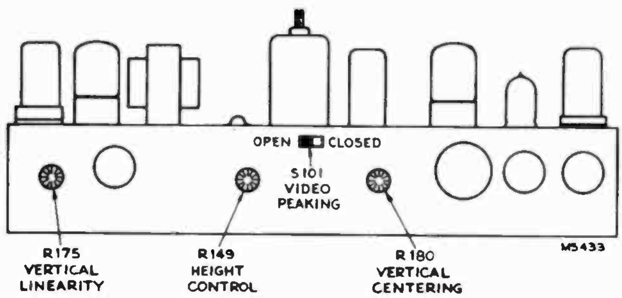


Figure 6—R-F, I-F Rear Chassis Adjustments

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the horizontal drive, R340, clockwise as far as possible without causing crowding of the right of the picture. Adjust the horizontal linearity control, R351, until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust the width control, L302, until the picture just fills the screen horizontally. Adjust horizontal centering to align the picture with the mask. In some cases it may be necessary to shift the position of the kinescope in the holder in order to obtain proper centering of the picture.

Do not turn the horizontal drive control beyond approximately ⅞ of its maximum clockwise position. To do so may cause the output stage to oscillate and result in the loss of horizontal sync.

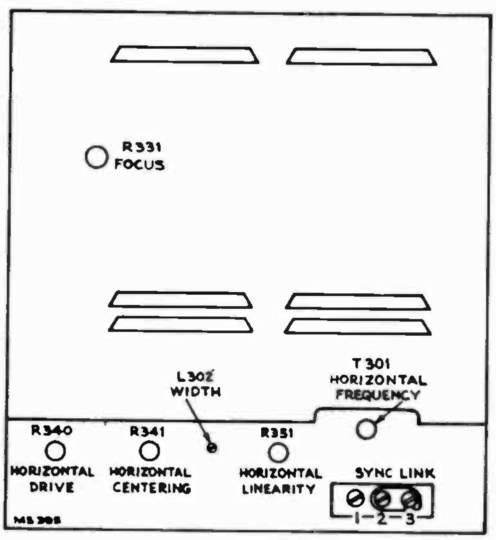


Figure 7—Horizontal Deflection Chassis Adjustments

FOCUS—Adjust the focus control for maximum definition in the test pattern vertical "wedge." Adjust the optical focus adjustment for best overall focus on the screen.

Tighten all yoke and optical barrel lock screws.

Pull the dust cover down around the top of the optical barrel and tie it securely in place. Tie the cable sleeve tight around the leads. These precautions are very important for if dust is permitted to enter and settle on the corrector lens, the optical efficiency of the system will be greatly impaired.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—Tune in all available television stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 22. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 8. Adjustments for channels 6 and 13 are under the chassis. See Figure 17.

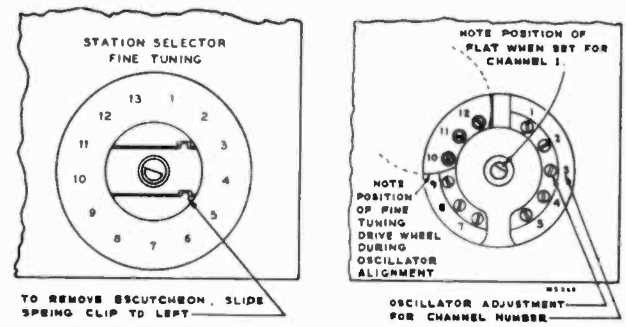


Figure 8—R-F Oscillator Adjustments

VIDEO PEAKING SWITCH—A video peaking switch is provided (see Figure 6) to permit changing the video response. Normally the switch should be left open. However, if the pictures from the majority of stations look better with the switch closed, the switch should be closed. If transients are produced on high contrast pictures, the switch should be left open.

ANTENNA TRAP—A series resonant trap across the r-f amplifier grid circuit is provided to eliminate interference from an FM station on the image frequency of a television station or interference on channel 6 from a station on channel 10 or on channel 5 from a station on channel 7. To adjust the trap in the field, tune in the station on which the interference is observed. Tune both cores of the trap for minimum interference in the picture. See Figure 16 for the location of the trap. Keep both cores approximately the same by visual inspection. Then, turn one core ½ turn from the original position and repeak the second for maximum rejection. Repeat this process until the best rejection is obtained.

RADIO OPERATION—Turn the receiver function switch to AM and FM positions and check the radio for proper operation.

PUSH-BUTTON ADJUSTMENT—To adjust the radio push buttons, set the function switch to the broadcast band position, tune the receiver to the desired station. Adjust the push buttons as instructed on page 51.

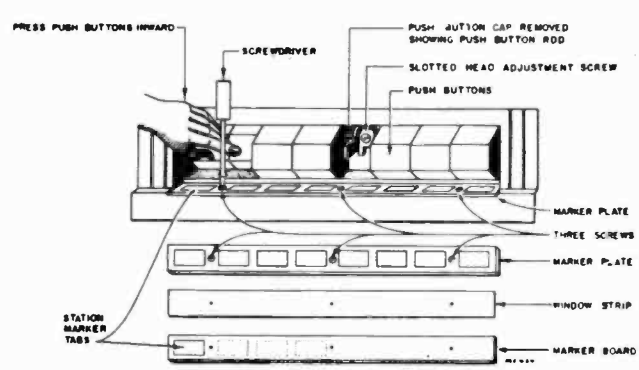


Figure 9—Push-Button Adjustments

Select the proper station call letter tab, moisten the back of it and insert in the appropriate recess in the push button bezel. Place the tab cellophane cover in the recess over the tab.

Replace the cabinet back. Make sure the screws which hold the back in place are tight, otherwise it may rattle or buzz when the receiver is operating at high volume.

648PTK, 648PV

INSTALLATION INSTRUCTION TABLE

The following table is provided as a check-off list for use when installing the receivers.

Step No.	Proceed as Indicated
1	Remove front of shipping carton.
2	Slide cabinet out of carton.
3	Remove cabinet back.
4	Take off two nuts inside cabinet and remove cabinet from skid.
5	Unpack yokes, knobs, anode clip, and kinescope holder ball head screws.
6	Remove shipping materials.
7	Remove radio brackets.
8	Remove shipping tapes.
9	Install control knobs.
10	Make sure all tubes are firmly seated in their sockets.
11	Remove optical barrel dust cover.
12	Remove corrector lens and warning label.
13	Clean screen and mirrors.
14	Insert test lamp in kinescope holder.
15	Replace corrector lens, cover center hole.
16	Misadjust optical focus.
17	Check optical, horizontal and lateral centering.
18	Adjust centering if necessary.
19	Adjust corrector lens centering if necessary.
20	Refocus.
21	If focus is uneven, adjust optical barrel tilt.
22	Repeat steps 17 through 21 if necessary to obtain proper resolution.
23	Remove corrector lens.
24	Remove test lamp.
25	Unpack and clean kinescope.
26	Insert kinescope in kinescope holder.
27	Clean and replace corrector lens.
28	Install deflection yoke, connect cables and kinescope socket.
29	Check all chassis interconnecting cables.
30	Remove high voltage capacitors shipping strings.
31	Connect receiver to an a-c line and antenna.
32	Turn receiver on, function switch to Tel.
33	Tune in station per Operating Instructions, steps 3 through 10.
34	Adjust electrical and optical focus control.
35	Check horizontal oscillator for hold and pull-in with horizontal hold control at each extreme.
36	Align horizontal oscillator (T301) if necessary.
37	Rotate yoke for horizontal pattern, tighten.
38	Adjust height and vertical linearity and vertical centering controls.
39	Adjust width, horizontal drive, linearity and horizontal centering controls.
40	Adjust focus control R331 for max definition of vertical wedge and optical focus adjustment for best overall focus.
41	MAKE SURE ALL OPTICAL ADJUSTMENT LOCKS ARE TIGHT.
42	Replace optical barrel dust cover.
43	Check r-f oscillator frequency on all channels.
44	Observe picture from all available stations.
45	Set video peaking switch S101
46	Check radio for operation on BC, SW, and FM bands.
47	Set push buttons.
48	Adjust antenna trap.
49	Insert station call letter tabs in push button escutcheon.
50	Replace cabinet back.

RECEIVER LOCATION—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

VENTILATION CAUTION—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

If the receiver is to be operated with the back of the cabinet near a wall, at least a two-inch clearance should be maintained between cabinet and wall.

ANTENNAS—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and to use care in its installation.

RCA Television Antennas, stock #225 and #226 are designed for reception on all thirteen television channels. These antennas use the 300-ohm RCA "Bright Picture" television transmission line. Installation personnel are cautioned not to make any changes in the antenna or substitute other types of transmission line as such changes may result in unsatisfactory picture reproduction.

The stock #226 antenna is bi-directional on channels one through six (44 to 88 Mc). When used on these channels, the maximum signal is obtained when the antenna rods are broadside toward the transmitting antenna.

The stock #225 antenna with reflector is uni-directional on channels one through six. When used on these channels, the maximum signal is obtained when the antenna rods are broadside toward the transmitting antenna, with the antenna element beween the reflector and the transmitting antenna.

When operated on channels seven through thirteen, (174 to 216 Mc), both types of antennas have side lobes. On these channels, the maximum signal will be obtained when the antenna is rotated approximately 35 degrees in either direction from its broadside position toward the transmitting antenna.

In general, the stock #225 antenna should be used if reflections are encountered, if the signal strength is weak, or if the receiving location is noisy. If these conditions are not encountered, the stock #226 antenna will probably be satisfactory.

In some cases, the antenna should not be installed permanently until the quality of the picture reception has been observed on a television receiver. A temporary transmission line can be run between receiver and the antenna, allowing sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver and an assistant at the antenna, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of direction or a few feet in antenna position may effect a tremendous difference in picture reception.

REFLECTIONS—Multiple images, sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions. Wet surfaces have been known to have different reflecting characteristics than dry surfaces.

INTERFERENCE—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

LIGHTNING ARRESTOR—The lightning arrestor contained in the antenna kit should be installed in accordance with the instructions. The mast used to mount the antenna should be provided with a direct ground.

INFORMATION REFERENCES—In short, a television receiving antenna and its installation must conform to much higher standards than an antenna for reception of International Short Wave and Standard Broadcast signals. For further information on antennas and antenna installation see the RCA Booklet entitled "Practical Television by RCA," and also the specific instructions accompanying the RCA Television Antenna.

It is advisable that the reader be familiar with a recent standard textbook of television principles in order to understand the receiver circuits and their functions. Such knowledge is assumed for the purpose of this publication. The discussions which follow will not dwell on the operation of conventional circuits used which have been used in previous receivers and which should be well known. In general, the circuits discussed will be only those that are new to the field.

For ease of understanding the basic operation of the television receiver, a 14 unit block diagram of it is shown in Figure 10. The circuit description will follow the numerical order of these blocks in order to follow a signal through the set in a logical manner.

R-F UNIT (block #1)—The r-f unit is a separate subchassis of the receiver. On this subchassis are the r-f amplifier, converter, oscillator, fine tuning control, channel switch, converter transformer, r-f, converter and oscillator coils and all their tuning adjustments. The unit provides operation on all thirteen of the present television channels. It functions to select the desired picture and sound carriers, amplifies and converts to provide at the converter plate, a picture i-f carrier frequency of 25.75 mc. and a sound i-f carrier of 21.25 mc.

R-F Amplifier—Referring to the schematic diagram (page 59), T1 is a center tapped coil used for the short circuiting of low frequency signals picked up by the antenna which would otherwise be directly applied to the control grids of the 6J6 r-f amplifier, V1. C1 and C2 are antenna isolating capacitors. The d-c return for the grids of V1 is through R3 and R13 which also serve to terminate the 300 ohm antenna transmission line. C3 and C4 are neutralizing capacitors necessary to counteract the grid to plate capacitance of the triode r-f amplifier.

In the plate circuit of the r-f amplifier are a series of inductances L1 to L25 and L2 to L26 inclusive. These inductances may be considered as a quarter wave section of a balanced transmission line which can be tuned over a band of frequencies by moving a shorting bar along the parallel conductors.

Adjustable coils 25 and L26 provide the correct length of line for the thirteenth channel, 210—216 mc. L13 to L23 and L14 to L24 are fixed sections of line which are added to L25 and L26 as the shorting bar is moved progressively down the line. The physical construction of each one of these inductances is a small non-adjustable silver strap between the switch contacts. Each strap is cut to represent a six-megacycle change in frequency. In order to make the jump between the lowest high frequency channel (174-180 mc) and the highest low frequency channel (82-88 mc), adjustable coils L11 and L12 are inserted. To provide for the remaining five low frequency channels, L1 to L9 and L2 to L10 are progressively switched in to add the necessary additional inductance.

Coils L1 to L9 and L2 to L10 are unusual in that they are wound in figure 8 fashion on fingers protruding from the switch wafer. This winding form produces a relatively noncritical coil since the coupling between turns is minimized. A maximum amount of wire is used for the small inductance which is required, thus permitting greater accuracy in manufacturing.

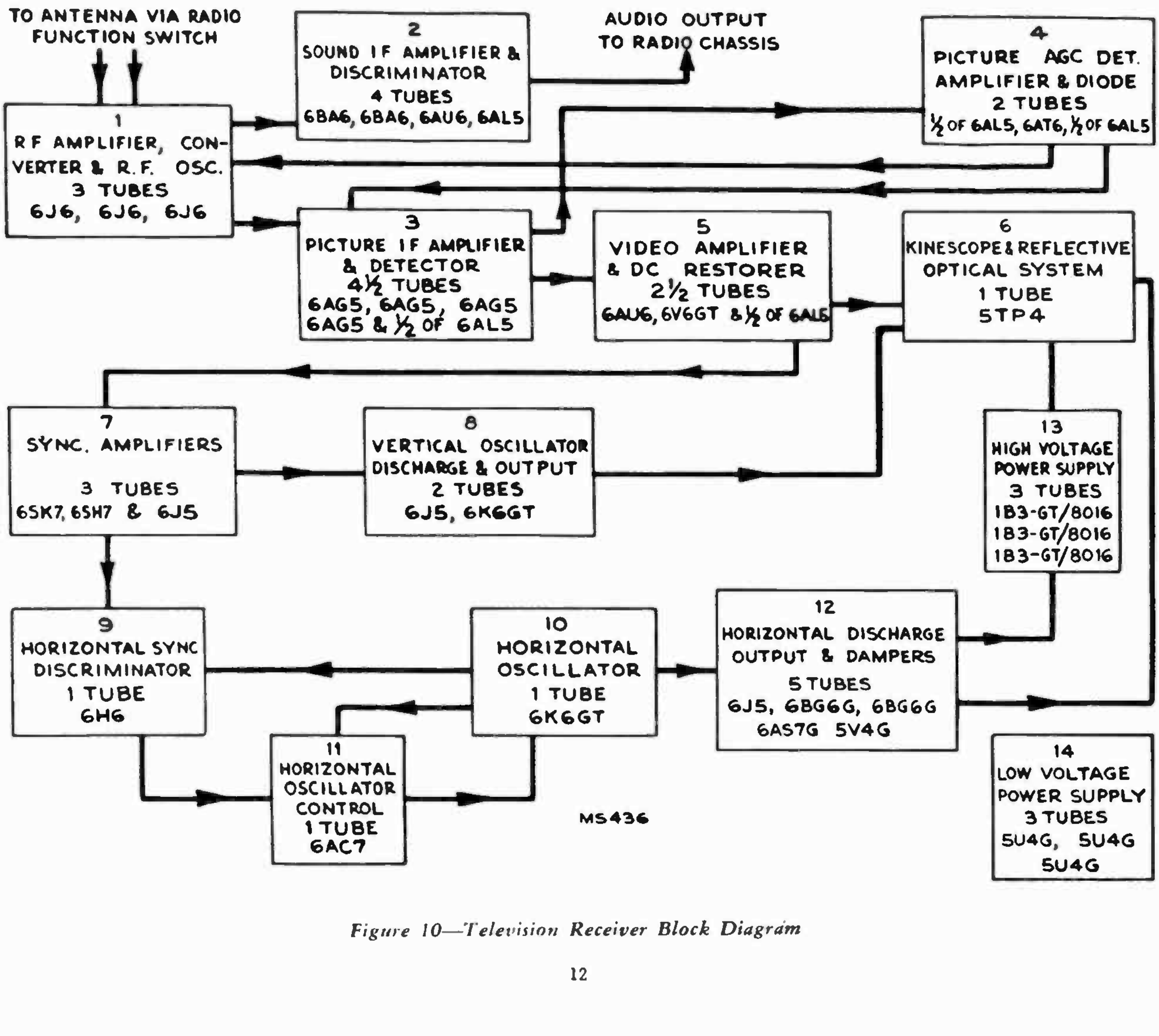


Figure 10—Television Receiver Block Diagram

Converter—The converter grid line operates in a similar manner and is so arranged on the switch to provide coupling between it and the r-f line. C10, C12, C13 and a link, provide additional coupling which is arranged to produce at least a 4.5 megacycle band pass on each of the channels.

L80 and C14 form a series resonant circuit used to prevent i-f feedback in the converter by grounding its grids for i-f frequency. They also act as a trap to reject short-wave signals of i-f frequency which arrive at the converter grids in a push push manner.

A 6J6 twin triode is used as converter. Since the grids are fed in push pull by both the signal and the oscillator, the heterodyne products (i-f signals) are in phase on the converter plates so the two plates are connected in parallel. Unwanted signals of i-f frequency that arrive at the converter grid in a push pull manner are out of phase on the converter plates. Since the plates are tied together, these signals tend to cancel thus reducing the possibility of interference from this source.

R-F Oscillator—The oscillator line is similar except that trimmer adjustments are provided for each channel and the low frequency coils are not figure 8 windings. For tuning each channel, brass screws are used in close proximity to the high frequency tuning straps L66 to L76, and adjustable brass cores are provided for coils L54 to L62. It is obvious that the high frequency adjustments should be made before each lower frequency one.

C15 is a fine tuning adjustment which provides approximately plus or minus 800 kc. variation of oscillator frequency on channel 1 and approximately plus or minus 1.9 mc. on channel 13.

The physical location of the oscillator line with respect to the converter grid line is such as to provide some coupling to the converter grids. This coupling is augmented by the link shown on the schematic and provides a reasonably uniform oscillator voltage at the converter grids over the entire tuning range of the unit.

The converter transformer T2 is a combination picture i-f transformer, sound trap, and sound i-f transformer. The converter plate coil is assembled within the structure of a high Q resonant circuit tuned to the sound i-f frequency. This high Q coil absorbs the sound i-f component from the primary. Thus on the T2 primary (from which the picture i-f is fed), the sound carrier is attenuated with relation to the picture channel.

SOUND I-F AMPLIFIER AND DISCRIMINATOR (block #2)—A portion of the energy absorbed by the T2 trap circuit is fed to the first sound i-f amplifier. Three stages of amplification are used to provide adequate sensitivity. A conventional discriminator is used to demodulate the signal. The discriminator band width is approximately 350 kc. between peaks.

The output from the discriminator is fed into the radio audio system and is controlled by the radio volume and tone controls.

PICTURE I-F AMPLIFIER AND DETECTOR (block #3)—The picture i-f amplifier departs considerably from the conventional coupled system. To obtain the necessary wide band characteristic with adequate gain, four stages of i-f amplification are employed. The converter plate and each successive i-f transformer utilize one tuned circuit each and each is tuned to a different frequency. The effective Q of each coil is fixed by the shunt plate load or grid resistor so that the response product of the total number of stages produce the desired overall responsive curve. Figure 11 shows the relative gains and selectivities of each coil and the shape of the curve of the quintuple combination.

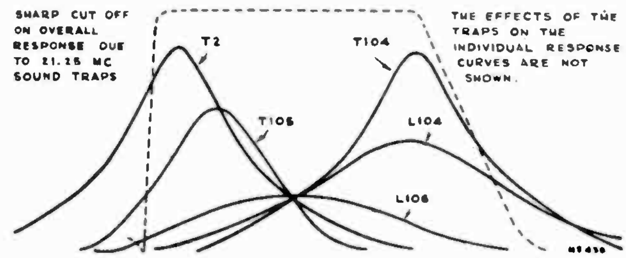


Figure 11—Stagger Tuned I-F Response

In order to obtain this band pass characteristic, the picture i-f transformers are tuned as follows:

Converter transformer	21.8 mc. (T2 primary)
First pix i-f transformer	25.3 mc. (T104 primary)
Second pix i-f transformer	22.3 mc. (T105 primary)
Third pix i-f coil	25.2 mc. (L104)
Fourth pix i-f coil	23.4 mc. (L106)

In such a stagger tuned system variations of individual i-f amplifier tube gain do not affect the shape of the overall i-f response curve if the Q's and center frequencies of the stages remain unchanged. This means that the i-f amplifier tubes are non-critical in replacement because variations in Gm do not affect the response curve.

To align the i-f system, the transformers are peaked to the specified frequencies with a signal generator. The overall i-f response is then observed by use of a sweep generator and oscilloscope. Slight deviations from design center circuit Q are compensated for with slight shifts in tuned-circuit center frequency until the desired response curve is obtained. If this response cannot be obtained, the difficulty is likely to be in a component that affects either the frequency or Q of one or more of the i-f coils.

The response curve does shift slightly as the picture control is varied due to the Miller effect. This effect is the change in tube input capacitance as its gain is varied by grid bias changes. The change of input capacitance causes a slight detuning of the preceding i-f coil and a small shift in response curve shape. This effect is slight, however, and when the receiver is aligned with the specified grid bias, no difficulty from this source should be encountered.

For familiarization with the frequencies which are important in the receiver's operation, Figure 12 shows the relative position of the picture and sound carriers for channels 2, 3 and 4. If a station on channel 3 is transmitting a picture with video frequencies up to 4 mc., the picture carrier will have upper side band frequencies up to 65.25 mc. The lower side bands are suppressed at the transmitter.

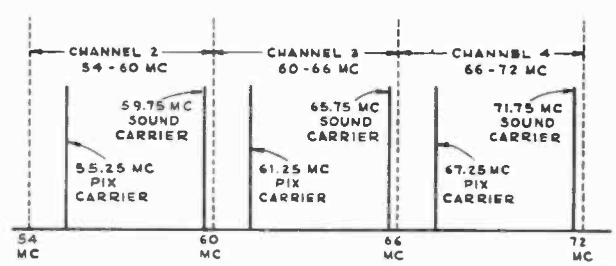


Figure 12—Television Channel Frequencies

With the receiver r-f oscillator operating at a higher frequency than the received channel, the i-f frequency relation of picture to sound carrier is reversed as shown in Figure 13.

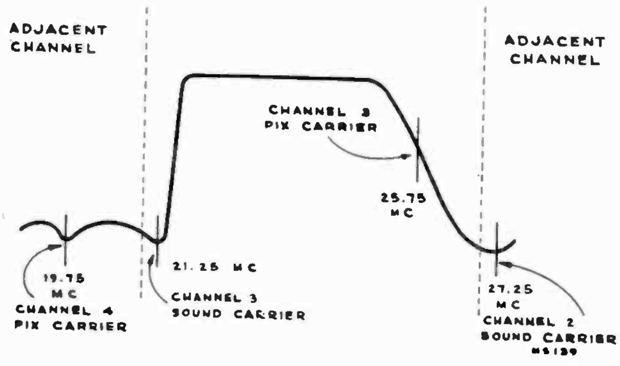


Figure 13—Overall Picture I-F Response

Traps—Since it is necessary for the picture i-f to pass frequencies quite close to the sound carrier frequency, the sound carrier would produce interference in the picture. In order to prevent this interference, traps must be added to the picture i-f amplifier to attenuate the sound carrier. If the receiver should be operating on channel 3, it is possible that interference would be experienced from the channel 2 sound carrier and the channel 4 picture carrier. The adjacent channel traps are provided to attenuate these unwanted frequencies.

The first three traps are absorption circuits. The first trap (T2 secondary) is tuned to the accompanying sound i-f frequency. The second trap (T104 secondary) is tuned to the adjacent channel sound frequency. The third trap (T105 secondary) is tuned to the adjacent channel picture carrier frequency. The fourth trap (T106 secondary) is in the cathode circuit of the fourth picture i-f amplifier V111 and is tuned to the accompanying sound carrier i-f frequency. The primary of T106 in series with C137 forms a series resonant circuit at the frequency to which L106 is tuned (23.4 mc.). This provides a low impedance in the cathode circuit at this frequency and permits the tube to operate with a gain. However, at the resonant frequency of the secondary (21.25 mc.), a high impedance is reflected into the cathode circuit, and the gain of the tube for this frequency is reduced by degeneration. The rejection at 21.25 mc. with this circuit is limited to the gain of the tube.

Picture Second Detector—The detector is a conventional half wave rectifier connected to produce a video signal of the proper polarity.

PICTURE A-G-C DETECTOR, AMPLIFIER AND DIODE (block #4)—An automatic gain control circuit is employed in connection with the picture i-f system to hold the output from the i-f's substantially constant over a wide range of signal inputs.

The a-g-c system of the picture i-f amplifier (shown in Figure 14) differs considerably from the a-v-c system used in broadcast receivers. In broadcast receivers, it is customary to use the filtered d-c drop across the diode resistor as the source of the a-v-c voltage. This is satisfactory, because the d-c voltage thus obtained is directly proportional to the average carrier amplitude at the diode. If it maintains the average carrier amplitude substantially constant, then the a-v-c operates as it should.

In the transmission of television pictures, however, the average carrier amplitude varies greatly with picture content, and an a-g-c system operating on the principle of maintaining a substantially uniform average carrier amplitude therefore is not suitable.

The RMA Standard Television Signal calls for a transmission system known as d-c negative transmission. Under this system, the carrier always reaches a uniform maximum amplitude during the periods when synchronizing pulses are being transmitted, and a white portion of the scene is represented by minimum or zero carrier condition. Thus, if there is no fading, the peaks of the synchronizing pulses will always represent some constant amplitude, and they, therefore, form a convenient reference for operating a satisfactory picture a-g-c system.

A portion of the output from the fourth i-f amplifier is fed into V105A, the a-g-c detector. Since the time constant of the diode load resistor and filter (R145 and C153) is somewhat greater than one horizontal line, the detector is essentially a peak reading voltmeter at sync frequency (15,750 cps). The d-c voltage that appears on the cathode of V105A is therefore proportional to the peak strength of the received signal and substantially independent of the picture content.

Such a system will also tend to read the peak of noise pulses. To prevent this, R151 and the diodes of V106 are used as a two-stage clipper or noise-limiting network. For further protection against noise, the d-c output is fed through an integrating network (R157 and C158) which tends to remove the effects due to random noise.

The d-c output from the integrator is less than that required to control the gain, and since it increases in the positive direction with increases in signal strength, it is necessary to amplify and "invert." To accomplish this, the output from the integrator is d-c coupled to the V106 a-g-c amplifier grid.

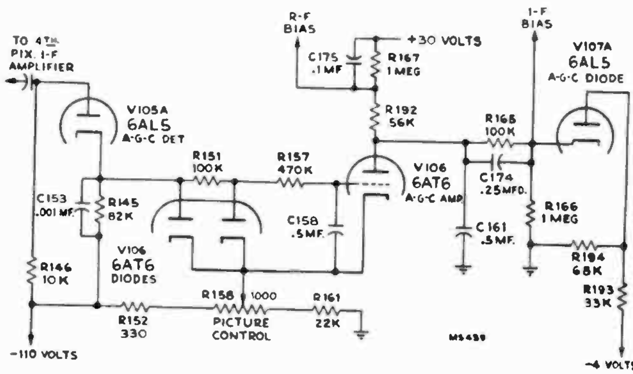


Figure 14—Picture A-G-C Circuit

V106 is operated with approximately minus one hundred and ten volts on the cathode and the plate at or slightly below ground potential. The voltage available from the plate is suitable for use as a control bias.

With a weak signal input, the bias on V106 (obtained across R152 and R158) is sufficient to cause the V106 plate current to be nearly cut off. The V106 plate is at approximately ground potential, no bias is applied to the r-f and i-f grids and the receiver operates at maximum gain. When a strong signal is applied to the receiver, the d-c output from the a-g-c detector opposes the fixed bias on V106 and causes more plate current to flow. As a consequence, the plate goes negative with respect to ground and this negative voltage is applied to the r-f and i-f grids reducing gain and maintaining constant output from the i-f system.

Since the grid control characteristic of the pentode i-f amplifiers is different from that of the triode r-f amplifier, different bias voltages are required and must be taken from different points in the system.

Also, in order to obtain the maximum signal to noise ratio from the receiver, it is desirable to allow the r-f amplifier to run essentially at full gain on any signal which will not cause overloading of the first i-f stage. The circuit arrangement of Figure 14 including the a-g-c diode (V107A) permits maximum use of r-f gain on weak signals and prevents overloading of the i-f amplifier on strong signals.

With an input signal of 1000 microvolts (and the picture control set for normal contrast) the V106 plate is at approx. –2 volts. Since the a-g-c diode plate is placed at approx. a –2.5 volt tap on the dividers R193 and R194, the diode does not conduct and the –2 volts on the V106 plate is applied to the i-f grids. With a signal of 10,000 microvolts, the a-g-c amplifier plate is at approx. –5 volts. Under this condition, the a-g-c diode conducts and due to the drop in R165, prevents the i-f bias from rising appreciably above approx. –3 volts. The r-f bias, however, is not limited and can therefore rise above the i-f bias.

This high value of bias on the r-f amplifier is necessary to reduce the triode nearly to cut-off. Although triodes are not generally considered to be remote cut-off tubes, sufficient curvature is present in the grid control characteristic to provide approximately a ten to one reduction in gain when the bias approaches the plate current cut-off point.

Figure 15 shows a graph of the r-f and i-f bias versus signal input.

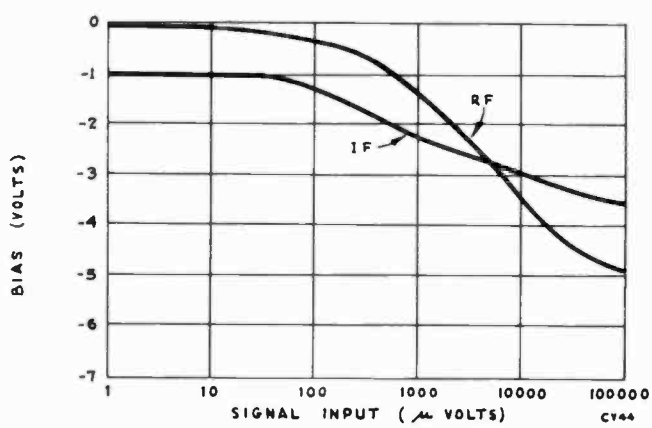


Figure 15—Bias versus Signal Input

Picture Control—A manual gain control is also provided since it is necessary to vary the picture contrast because of variations in room lighting, transmitting technique and to suit personal preference in picture balance. The control varies the i-f gain by varying the initial bias on the a-g-c amplifier which in turn varies the r-f and i-f bias.

VIDEO AMPLIFIER AND D-C RESTORER (block #5)—The function of this section of the receiver is to amplify the video output of the second detector. Two amplifier stages are employed. The gain from the first video grid to output plate is 30X and the frequency response extends to 4 mc.

The 648PTK is aligned to give a normal test pattern when receiving a signal from a station employing standard RMA vestigal side band transmission. If the station deviates from this transmission characteristic, then a properly aligned receiver may produce an output with an excessive amount of low frequency video causing the picture to smear.

The 648PTK provides a back panel Video Peaking Switch S101 to modify the video response to compensate for the above mentioned transmitter characteristic. S101 switches a 680 mmf. capacitor across the V113 cathode resistor, R176. This reduces the cathode degeneration for high frequencies and thus increases the high video response. Closing the switch for operation of the receiver on such a station will generally improve the good picture. However, if the receiver is then tuned to a station with proper side band suppression, transients may be produced on high contrast pictures such as test patterns. Therefore, it must be determined at the time of installation, if the video peaking switch S101 is to be open or closed

Noise Saturation Circuit—Since the synchronizing pulse is "blacker than black" and "black" information must drive the kinescope grid toward cut-off, the video signal polarity must be such that the sync is negative when applied to the kinescope grid. It is obvious that for the two-stage video amplifier used, the sync pulse from the second detector must also be negative at the first video amplifier grid. The first stage is designed so that with a normal signal input level at its grid, the tube will be working over most of its operating range. Any large noise signal above sync will drive the grid to cut-off and the noise will be limited. In effect, the signal to noise ratio is thus improved.

D-C Restorer—Since the video amplifier is an a-c amplifier, the d-c component of the video signal that represents the average illumination of the original scene will not be passed.

Unless this d-c component is restored, difficulty will be experienced in maintaining proper scene illumination For any given scene, this average illumination could be set properly by the brightness control. However, a change of scene would probably necessitate resetting this control. The d-c restorer accomplishes this setting automatically thus assuring proper picture illumination at all times. For a detailed explanation of the operation of the d-c restorer, see "Practical Television by RCA."

KINESCOPE AND REFLECTIVE OPTICAL SYSTEM (block #6)—The picture tube employed is a 5TP4, a five inch projection kinescope. The tube operates at approximately 27 kv and employs magnetic deflection and electrostatic focusing. The kinescope screen is backed by a microscopic aluminum film. This coating is porous to the electron stream. However, it is opaque to light and prevents radiation at the back of the screen from reducing picture contrast by illuminating dark areas of the picture. Instead, this light is reflected out the front of the screen thus increasing the picture brilliance by approximately two to one. The aluminum film also prevents a negative charge from building up on the screen. Such a charge tends to repel the electron beam thus reducing the velocity with which the beam strikes the screen with consequent reduction of light output. The aluminum coating provides some protection against screen burns produced by ions in the electron stream. The thick screen employed in high voltage kinescopes also prevents a burn on the back of the screen from being visible on the outer surface of the screen.

The reflective optical system is employed to project the image from the kinescope on to a large screen. The system consists of the kinescope mounted above and facing a spherical mirror. The spherical mirror reflects the light up through the corrector lens to a forty-five degree plane mirror which in turn reflects the image on to the back of a translucent screen, as shown in Figure 16.

The center section of the spherical mirror is painted black so that the illumination which falls on this sector will not be reflected back on to the face of the kinescope to reduce the picture contrast by illuminating dark areas of the picture.

Since a large spherical mirror by itself will not produce an in focus image, the corrector lens must be employed to bring the image to focus at all points on the screen. The spherical mirror and the forty-five degree mirror are front surfaced mirrors to prevent ghosts which would occur from reflections at the surface of the glass of a rear surfaced mirror.

The screen is composed of two lucite sheets with a partial diffusing layer between them. The back sheet has a fresnel lens molded into its rear surface. The front sheet has vertical ribs molded into its outer surface. The fresnel lens functions to concentrate the light into a narrow viewing angle. The vertical ribs act to increase the horizontal viewing angle above that obtained with a flat surface. The diffusing layer is employed to eliminate interference patterns between the fresnel lens and the vertical ribs. The screen and lens combination give a gain of approximately five over that which would be obtained from a ground glass type screen. This gain is obtained at the expense of the illumination at extreme side, upper or lower viewing angles. Since such extreme angles are impractical due to foreshortening of the picture, no disadvantage is achieved and the brilliance from practical viewing angles is increased.

The leads from the deflection yoke and the kinescope socket pass through the optical path directly above the corrector lens. However, due to the fact that the light from any given point on the kinescope passes through all points on the corrector lens, as shown in Figure 16, the leads do not cast a shadow on the picture, but instead reduce the optical efficiency of the system by a very slight amount proportional to the percentage of the corrector lens area blocked by the leads.

This reflective optical system has a resolution of approximately 1500 lines and an efficiency equivalent to an F.8 lens. Conventional projection optics of this speed for this size kinescope and screen would be prohibitive from the standpoint of cost and size.

The inside and outside of the flaring portion of the kinescope bulb are given a metallic coating. The inner coating, which is the second anode, is connected to the high voltage supply. The outer coating is grounded by means of two small springs on the deflection yoke support. The capacity between the two coatings is used as a high voltage filter capacitor.

The vertical axis of the optical barrel is approximately 7 degrees off vertical and the 45 degree mirror is in reality approximately 48 degrees from the horizontal as shown in Figure 16. This arrangement is employed in order to permit placing the barrel slightly forward of the mirror thus making the optical system as compact as possible.

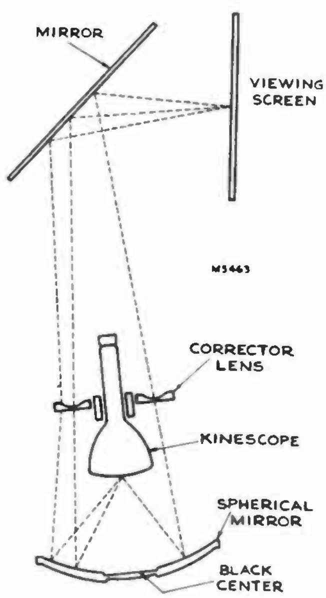


Figure 16—Reflective Optical System

SYNC AMPLIFIERS (block #7)—The function of this system is to amplify the sync signal and effect the separation of sync from the video.

First Sync Amplifier—The first sync amplifier V114 is a 6SK7 which has a remote cut-off characteristic. The signal from the d-c restorer is fed into this amplifier with the polarity such that the sync is in the negative direction. Noise pulses above sync that remain after the limiting action of the first video grid are thus further compressed and the sync to noise ratio is again improved.

Second Sync Amplifier—The sync at the grid of V115, the second sync amplifier grid is positive in polarity. The operating voltages applied to the grid, screen and plate, are such that the negative portion of the applied signal is cut off. Thus, the video and blanking pulses are removed and only the sync pulses appear at the plate.

Third Sync Amplifier—The sync pulses appearing at the third sync amplifier (V116), grid are negative in polarity and must be inverted before they can be injected into the sweep oscillators. The signal at the V116 grid is sufficient to drive the tube beyond cut-off and the signal is again clipped. This final clipping removes all amplitude variations between sync pulses due to noise, hum, etc., and it appears with the correct polarity at the plate.

Integrating Network—The purpose of this network is to separate the horizontal from the vertical sync and to pass the vertical to the vertical oscillator.

Since the horizontal sync pulse is of short duration (5 microseconds) and the vertical pulse is of much longer duration (190 microseconds), they can be separated by an r-c filter which is responsive to wave shape. The integrating network which is such a filter is composed of R142, R143, R144, C148, C149 and C150. In operation it can be considered to be a low-pass filter which by-passes the narrow or high frequency horizontal sync but passes the broad or low frequency vertical sync.

VERTICAL OSCILLATOR DISCHARGE AND OUTPUT (block #8)—The function of these circuits is to provide a sawtooth of current of the proper frequency and phase to perform the vertical scanning for the kinescope. To produce such a current in the vertical deflection coil, a somewhat differently shaped voltage wave is required.

Since the vertical trace is slow, requiring approximately 16,000 microseconds, and the vertical deflection coil inductance is small, approximately 50 millihenries, the majority of the voltage across the coil during trace is across its resistive component. In order to produce a linear change of current through a resistance, a linear change of voltage is necessary. Retrace, however, must be accomplished within the 666 microsecond vertical blanking time and therefore requires a much faster rate of change of current through the coil. During this time, the effect of the inductance of the coil becomes appreciable because of the required fast rate of change of current. It is therefore necessary to apply a large pulse of voltage across the coil in order to obtain rapid retrace. The composite waveform required to produce a sawtooth of current in the coil is a sawtooth of voltage with a sharp pulse as shown in Figure 17D. V117 and V118 supply such a voltage.

Vertical Oscillator and Discharge—A single 6J5 triode, V117, with its associated components form a blocking oscillator and discharge circuit. The wave form of the voltage at the control grid of this tube with respect to time, is a small, positive surge followed by a large negative drop which returns to the positive condition at a relatively slow rate as shown in Figure 17A. During the negative part of the cycle, the grid is beyond cut-off and the discharge capacitor, C160, charges through resistors R148 and R149. When the grid reaches a voltage that permits plate to cathode conduction, C160 discharges through T107 secondary and V117. The discharge current of C160 builds up a magnetic field in T107 that in turn induces a positive voltage at the grid of V117. This positive voltage on the V117 grid lowers the plate resistance of the tube and allows C160 to discharge more rapidly. This process builds up very rapidly until C160 is nearly discharged. The magnetic field in T107 then collapses and drives the V117 grid negative. The charge placed on C155 due to grid conduction during the positive pulse now holds the grid negative. As the charge on C155 leaks off through R155 and R156, the grid slowly becomes less negative and approaches the point which will allow plate to cathode conduction. Just before the conduction point is reached, the 60 cycle vertical synchronizing pulse from the integrating network is applied to the V117 grid. This pulse is sufficient to drive the tube to conduction and the process is repeated. In this manner, the incoming sync maintains control of vertical scanning.

On the plate of V117, a sawtooth of voltage appears due to the slow charging and rapid discharging of C160. A sharp negative pulse also occurs during the discharge period. See Figure 17B. This pulse appears because of the action of R164 and C160, an action which is known as peaking. When V117 is conducting, the plate voltage drops nearly to cathode potential. C160 discharges during this time. However, since the conduction time is short, C160 cannot be completely discharged due to the time constant of R164 in series with C160. When V117 becomes non-conducting, the plate voltage does not have to rise slowly from cathode potential but instead rises immediately to an appreciable value due to the charge that remains on C160. The plate voltage then slowly rises from this value as C160 charges through R148 and R149. Adjustment of the height control R149 varies the amplitude of the sawtooth voltage on V117 plate by controlling the rate at which C160 can charge.

The voltage present on the V117 plate is of the shape required to produce a sawtooth of current in the vertical deflection coil. It is now necessary to amplify it in a tube capable of supplying a sufficient amount of power.

Vertical Output—A 6K6GT is connected as a triode for the output stage, V118. The vertical output transformer T108 matches the resistance of the vertical deflection coils to the plate impedance of the 6K6GT.

Vertical Linearity Control—R175 is provided as a vertical sweep linearity control. Since the grid-voltage, plate-current curve of V118 is not a straight line over its entire range, the effect of adjustments of R175 is to produce slight variations in the shape of the sawtooth by shifting the operating point of the tube to different points along the curve.

Since the slope of the curve varies at these different points and thus varies the effective gain of the tube, it is apparent that adjustments of linearity affect picture height and that such adjustments must be accompanied by readjustments of the height control R149. Adjustments of the height control affect the shape of the sawtooth voltage on the V117 plate so that adjustments of height must be accompanied by readjustments of linearity.

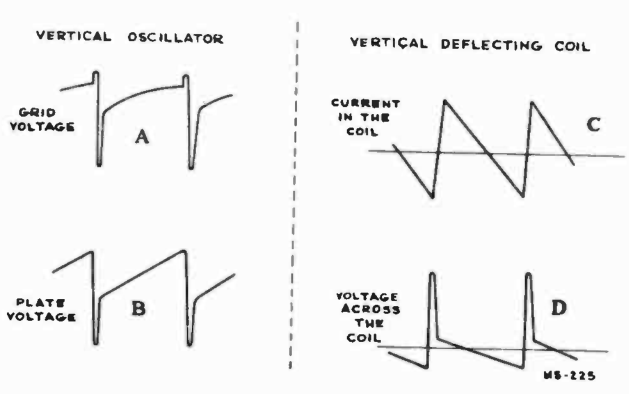


Figure 17—Vertical Sweep Waveforms

HORIZONTAL SYNC DISCRIMINATOR, HORIZONTAL OSCILLATOR AND OSCILLATOR CONTROL (block #9, 10 and 11) —These circuits are a radical departure from the conventional systems used for framing the picture in the horizontal direction. Their features are ease of operation, stability and good noise immunity.

HORIZONTAL OSCILLATOR (block #10)—The horizontal oscillator is an extremely stable Hartley oscillator operating at the scanning frequency 15,750 cps. The primary of T301 (terminals A, B and C) is the oscillator coil. This coil is closely coupled to the secondary winding (terminals D, E and F) and thus feeds a sine wave voltage to V301.

HORIZONTAL SYNC DISCRIMINATOR (block #9)—The sync discriminator, V301, is a 6H6 dual diode in a circuit which produces a d-c output voltage proportional to the phase displacement between the incoming sync pulses and the sine wave horizontal oscillator voltage.

The sine wave oscillator voltages applied to the plates of V301 are equal in amplitude and opposite in phase. The synchronizing pulses from the third sync amplifier are fed through a small capacitor (C301) to attenuate the vertical sync and then applied to the center tap of T301. The horizontal sync pulses thus appear in phase and of equal amplitude on the diode plates as shown in Figure 18. When the pulse and sine wave from the oscillator are properly phased as in (A), both diodes will produce equal voltage across their load resistances, R301 and R303. However, these voltages are of opposing polarity and therefore the sum of the voltages across these two load resistors will be zero If the phase of the sine wave changes with respect to the pulse as in (B), the top diode will produce more voltage across R301 than the bottom diode produces across R303. Thus, the voltage across the two will be positive. In (C) the reverse condition exists. It is obvious that the output of the discriminator can swing from positive through zero to negative dependent upon the phase relation of the synchronizing signal and the oscillator. This d-c output is applied to the grid of V303.

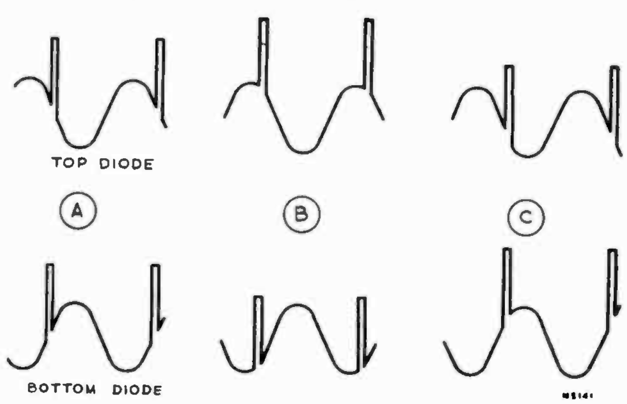


Figure 18—Sync Discriminator Waveforms

HORIZONTAL OSCILLATOR CONTROL (block #11)—V303 the oscillator control is a 6AC7 connected as a reactance tube across the V302 oscillator coil. A change in the d-c output of the sync discriminator produces a change in Gm of V303 which in turn changes the frequency of the oscillator. If the phase of the oscillator shifts with respect to the synchronizing pulse, the corresponding change in d-c from the sync discriminator causes the oscillator to be brought back into correct phase.

C304 and C306 form a voltage divider to attenuate rapid changes in d-c from the sync discriminator such as are produced by the vertical sync or bursts of noise.

Sync Link—If any phase modulation is present in the transmitted sync, a condition which unfortunately still exists in some transmitters to date, a faster response to fluctuations in the sync phase is needed than is provided by the ratio of C304 to C306.

The sync discriminator will demodulate sync phase variation quite faithfully, however, the filter resistor R305 together with the capacity attenuator, C304 and C306 is just as effective in removing this information as it is with respect to the noise disturbances for which it is intended. The removal of this information will produce a horizontal displacement of portions of the picture.

It may be necessary in some instances to sacrifice some noise immunity to compensate for phase modulation in the transmitted sync. By switching the link provided for this purpose, C303 is added across C304 and the speed of response is increased by several times. Therefore, the link of J304 should be connected between terminals 1 and 2 whenever this condition exists.

Before making this change, however, it should first be definitely determined that distortion of the raster is due to phase modulation of the sync. Horizontal "jitter" and distortion of the raster can be caused by operating the picture control at too great a gain setting considering the r-f signal input. Such a setting produces an excessive video signal at the first video amplifier grid. This stage is designed to limit an excessive input in order to improve the signal to noise ratio. If the video input is excessive, the sync is limited and thus removed. At the same time picture information may be introduced into the sync circuits. With extreme excesses of video level, both horizontal and vertical sync may be lost. If the receiver operating instructions on page 4 are followed, no difficulty should be experienced with the picture control setting.

HORIZONTAL DISCHARGE, OUTPUT AND DAMPERS (block #12)—The purpose of these circuits is to produce a sawtooth of current in the deflection coils to provide horizontal scanning for the kinescope.

Horizontal Discharge—A 6J5 is employed for the discharge tube V304. The function of this stage is to produce a sawtooth voltage for use in the horizontal sweep circuits.

The oscillation in V302 takes place between screen-grid and cathode. Since the peak to peak voltage on its grid is approximately 100 volts, a square wave of voltage is produced on its plate. This wave is differentiated by C312 and R314, and the pulse so obtained is applied to the grid of the discharge tube V304.

The discharge tube is normally cut off due to bias produced by grid rectification of these incoming pulses. The pulse from V302 overcomes this bias and drives the tube into heavy momentary conduction. During this period the plate voltage falls nearly to cathode potential and C318 discharges rapidly. Then when V304 again becomes non-conducting, the plate voltage rises slowly and approximately linearly as C318 charges through R316 and C315.

Horizontal Output and Dampers—The operation of these two circuits is so interconnected that it will be necessary to discuss them simultaneously. The function of the output tubes V305 and V306 is to supply sufficient current of the proper wave form to the horizontal deflection coils in order to provide horizontal scanning for the kinescope. The function of the damper tubes V310 and V311 is to stop oscillation of certain components at certain times and thus help provide a linear trace.

Other functions of these circuits include the utilization of energy stored in the horizontal deflection coil to furnish retrace and kinescope high voltage. The damper circuit also recovers some of the energy from the yoke kickback and uses it to help supply the plate power requirements of the output tubes.

In operation, the visible portion of the horizontal trace is approximately 53 microseconds in duration. Although the inductance of the horizontal deflection coil is in the order of 8 millihenries, at the horizontal scanning frequency, the reactance of the coil predominates over its resistance. This is a different case than that encountered in the vertical deflection system and so a different method of operation must be employed.

Horizontal blanking is approximately 10 microseconds in duration. During this time, the kinescope beam must be returned to the left side of the tube, the trace started and made linear. To accomplish all this within the horizontal blanking time, only 7 microseconds can be allowed for the return trace. In order to obtain such rapid retrace, the horizontal deflection coil, output transformer and associated circuits are designed to resonate at a frequency such that one-half cycle of oscillation at this frequency will occur in the 7 microseconds retrace time limit. This represents a frequency of approximately 71 kc.

During the latter part of the horizontal trace, the output tubes conduct very heavily and build up a strong magnetic field in the deflection coil and output transformer. When the negative pulse from the horizontal discharge tube is applied to the output tube grids, their plate currents are suddenly cut off and the magnetic field in the transformer and deflection coil begins to collapse at a rate determined by the resonant frequency of the system. Actually the system is shock excited into oscillation. Since the output tubes are cut off and since the voltage generated by the collapsing field is negative on the damper tube plates so that they are non-conductive, there is essentially no load on the circuit and it oscillates vigorously for one-half cycle. If the damper tubes were not present, the circuit would continue to oscillate as shown in Figure 19 (C), curve 1. This condition however is not permitted. One-half cycle of oscillation is permitted because at the end of such a time the current in the deflection coil has reached a maximum in the opposite direction to which it was flowing at the end of the trace period. This reversal of the direction of flow of current is the requirement for retrace and it is accomplished in the allotted 7 microseconds.

Now that retrace has been completed, it is necessary to start the next trace. The energy which was placed in the deflection coil by the output tubes in the latter part of the last trace has not been dissipated. During the one-half cycle of oscillation, retrace was accomplished with very little loss of energy. The field in the coil was merely reversed in polarity. So at this point, a strong field exists in the deflection coil.

As mentioned previously if the coil were not damped, it would continue to oscillate at its natural frequency as shown in Figure 19 (C), curve 1. To prevent such an oscillation the damper tubes are brought into action. These tubes are effectively connected across the deflecting coil.

In the oscillating circuit, the current in the deflection coil lags the voltage by approximately 90 degrees (one-quarter cycle at oscillation frequency) and when the current has reached its maximum negative value, the voltage across the coil being 90 degrees ahead, has begun to swing positive. When the voltage on the damper plates becomes positive with respect to their cathodes, they begin to conduct heavily. This places such a load across the deflection coil that it cannot oscillate. Instead the field begins to decay at a rate permitted by the load which the damper tubes placed on the coil. The circuit constants are such that this decay is linear and at a rate suitable for the visible trace.

If no additional energy were fed into the coil the field would fall to zero and the kinescope beam would come to rest in the center of the tube. In such an r-l circuit, as the current approaches its final value, it does not do so linearly but asymptotically as indicated in Figure 19 (C), curve 2. It is therefore necessary to have the output tubes begin to supply power to the deflection coil before the energy in the coil is completely dissipated. Figure 19 (C), curve 3 shows the shape of the current supplied by the output tubes. Although the currents supplied by the output tubes and by the decaying field are curved at the cross over point, together they produce a coil current that is linear.

By the time the beam has reached the right side of the kinescope, the output tubes are conducting heavily and have built up a strong field in the transformer and coil. At this point, the output tubes are again suddenly cut off and the process is repeated.

The 6BG6G plate voltage is supplied through the 5V4G which is conducting over the major portion of the trace. Capacitor C324A is charged during this period and this charge is sufficient to supply the 6BG6G plates when the 5V4G is not conducting.

The charge is placed on this capacitor by the receiver d-c supply and by the current from the collapse of the field in the horizontal deflecting coil. The a-c axis of the sweep voltage is 475 volts above ground since the T302 secondary is connected to the receiver 475 volt bus. The charge placed on this capacitor by the coil kick-back is therefore in addition to that from the d-c supply and thus the capacitor is charged to a voltage greater than the d-c supply. This permits operation of the output tubes at a higher voltage than is obtainable from the receiver power supply and produces an increase in the system efficiency by salvaging energy that would otherwise have been wasted.

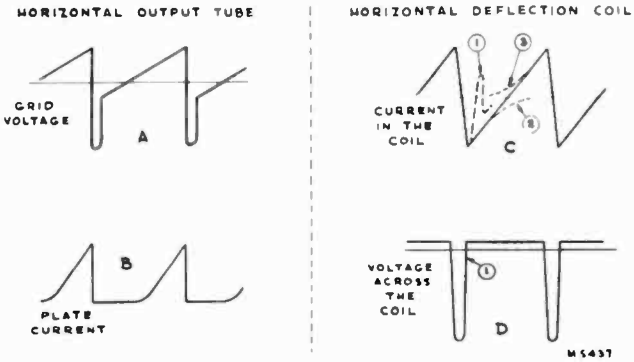


Figure 19—Horizontal Sweep Waveforms

Width Control—L302 is provided to vary the output and hence the picture width by shunting a portion of the T302 secondary winding. Clockwise rotation of the adjustment increases the picture width and causes the right side of the picture to stretch slightly.

Horizontal Drive Control—The horizontal drive control R340 varies the amount of high peaking on the grid of the horizontal output tubes and thus affects the point on the trace at which the tubes conduct. The negative pulse is applied to the sawtooth by feeding back a portion of the pulse from the secondary of the horizontal output transformer. Clockwise rotation of the control increases picture width, crowds the right side of the picture and stretches the left side.

Horizontal Linearity Control—In order to describe the action of the linearity control, some additional facts about damper circuits must be presented.

When two horizontal output tubes are employed as in the 648PTK, proper damping cannot be obtained by a single damper tube due to the heavy damping action required during the first quarter of the trace. V311 a 5V4G provides damping action over the entire trace. V310 a dual triode is employed to provide the extra damping action required during the first portion of the trace. When the voltage on the damper plate swings positive at the start of the trace, the differentiating network (C331, R350, and R351) in the grid circuit of V310 produces a positive pulse on the damper grid due to the steep wave front of the sweep voltage (shown in Figure 19 (D) at point 1. This positive pulse lowers the plate resistance of the triodes and permits heavy damping current to flow. Then due to the short time constant of the grid network, the positive pulse decays and the bias due to grid rectification of the pulses cuts the triode damper off, leaving the 5V4G to provide the damping for the remainder of the trace.

The horizontal linearity control R351 changes the time constant of the differentiation network in the 6AS7G grid circuit and determines the portion of the trace over which the tube conducts, thus controlling linearity on the left side of the picture. Counterclockwise rotation of the control causes the left side of the picture to stretch.

HIGH VOLTAGE POWER SUPPLY (block #13)—The kinescope high voltage supply is unusual in that the power is obtained from the energy stored in the deflection inductances during each horizontal scan. When the 6BG6G plate currents are cut off by the incoming signal, a positive pulse appears on the T302 primary due to the collapsing field in the deflection coil. This pulse of voltage is stepped up by the auto transformer action of T302 and applied to the plate of the high voltage rectifiers. At the same time, a negative pulse is applied to the cathodes of the rectifiers.

Three type 8016 tubes are employed in a voltage trippler circuit which produces approximately 27kv d-c for operation of the kinescope. The pulses are first rectified by V307 and charge capacitor C326 to near peak-to-peak voltage applied between the plate and cathode. Since the cathode of V307 is connected to the plate of V308 by resistors R342 and R343, capacitor C327 will charge to the same voltage as C326. The charge on C327 is thus added to the incoming pulse and V308 rectifies the sum of these voltages thus charging C328 to double the pulse voltage. The cathode of V308 is connected to the plate of V309 through R344 and R345 charging C329 to the same voltage as C328. The charge on C329 is added to the incoming pulse. V309 rectifies the incoming pulse and the d-c charge on C229 to charge C330 to three times pulse voltage.

In practice, due to a slight loss between stages and a small phase shift between the positive and negative pulses, the d-c output is approximately 2.8 rather than 3 times the applied pulse.

Since the frequency of the supply voltage is high (15,750 cps), relatively little filter capacity is necessary Since the filter capacity is small, the stored energy is small, and the high voltage supply is made less dangerous.

Corona rings are employed on the rectifier tube sockets, the high voltage capacitor lugs and on nearby sharp edges in order to prevent corona discharge.

LOW VOLTAGE POWER SUPPLY (block #15)—The low voltage power supply chassis contains two separate power supplies. One supply provides the filament and plate voltages for the r-f, i-f chassis and the other supply provides for the horizontal deflection chassis. This latter supply employs an interlock cable to the horizontal deflection chassis and a fuse in the power transformer primary to protect the supply in case of short circuits in the horizontal deflection chassis.

L81 and L82 are omitted in some units.

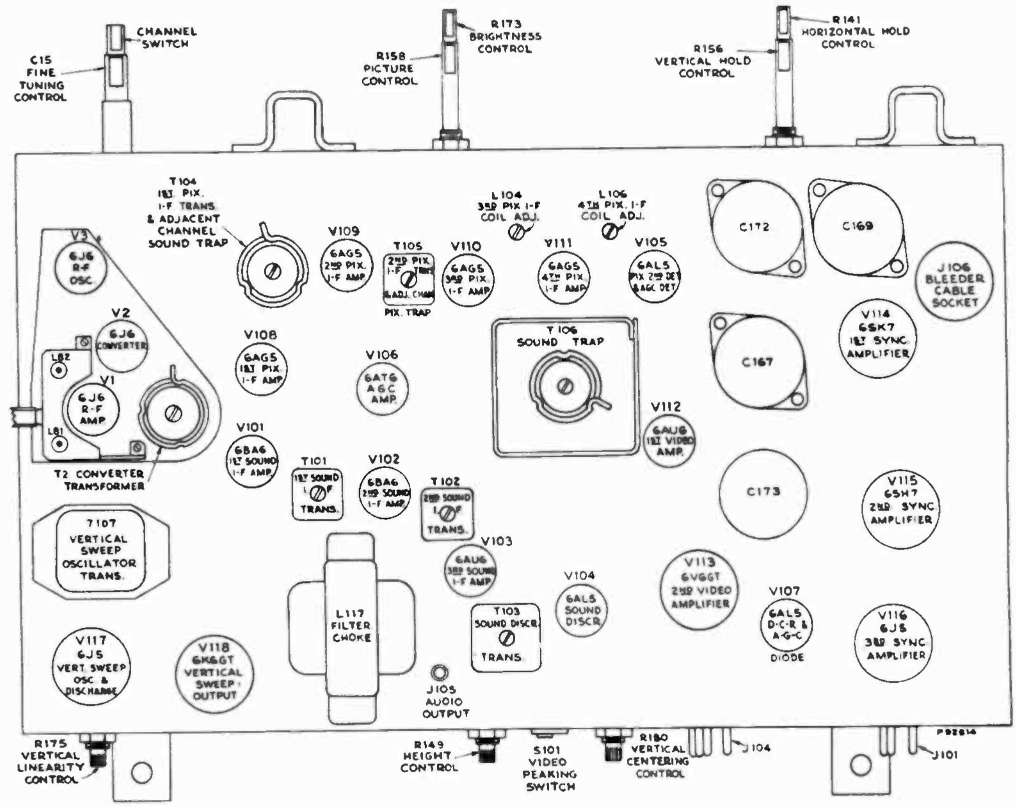


Figure 20—R-F, I-F Chassis Top View

In Model 648PV—T109 (3rd. Pix I-F) is used instead of L104

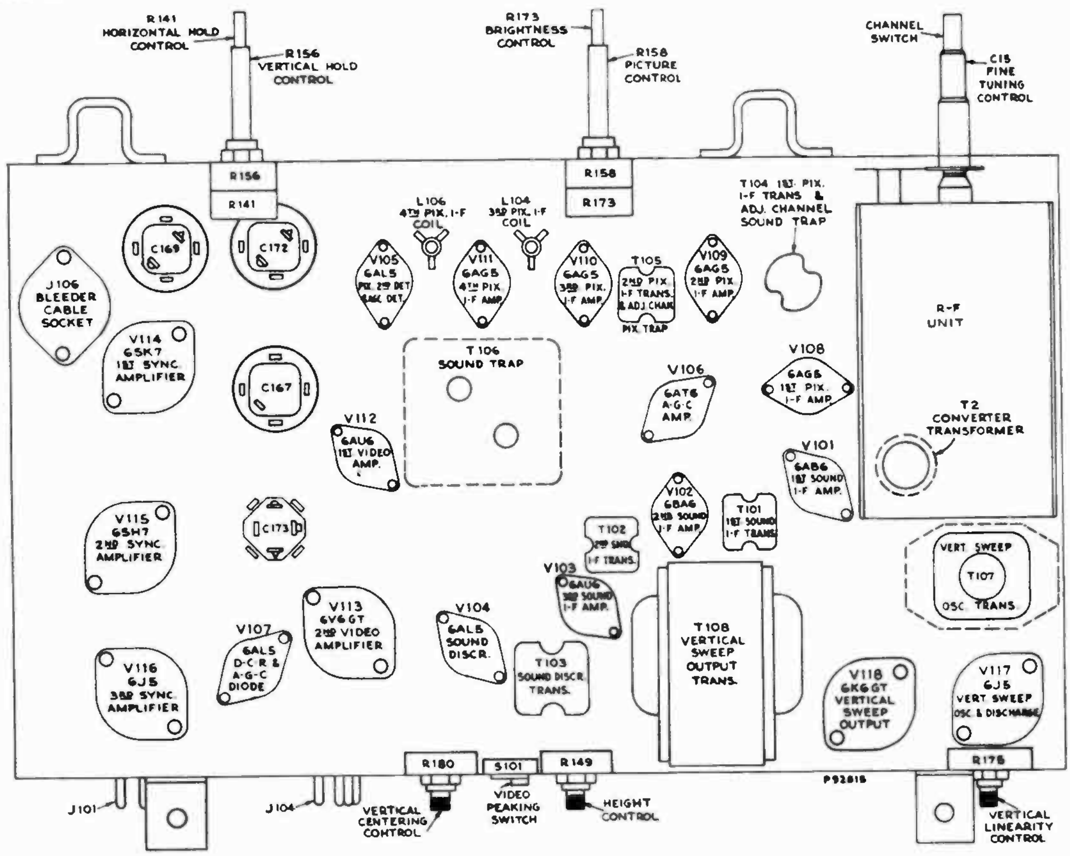


Figure 21—R-F, I-F Chassis Bottom View

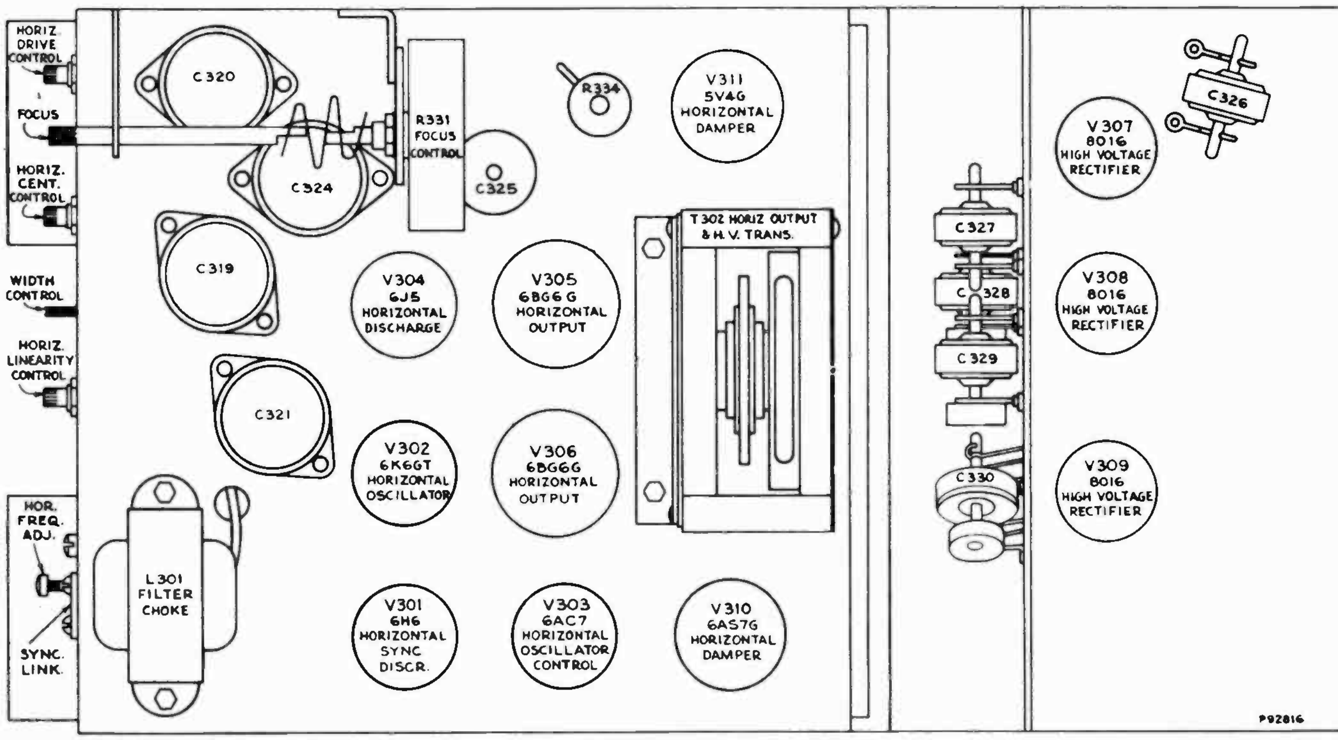


Figure 22—Horizontal Deflection Chassis Top View

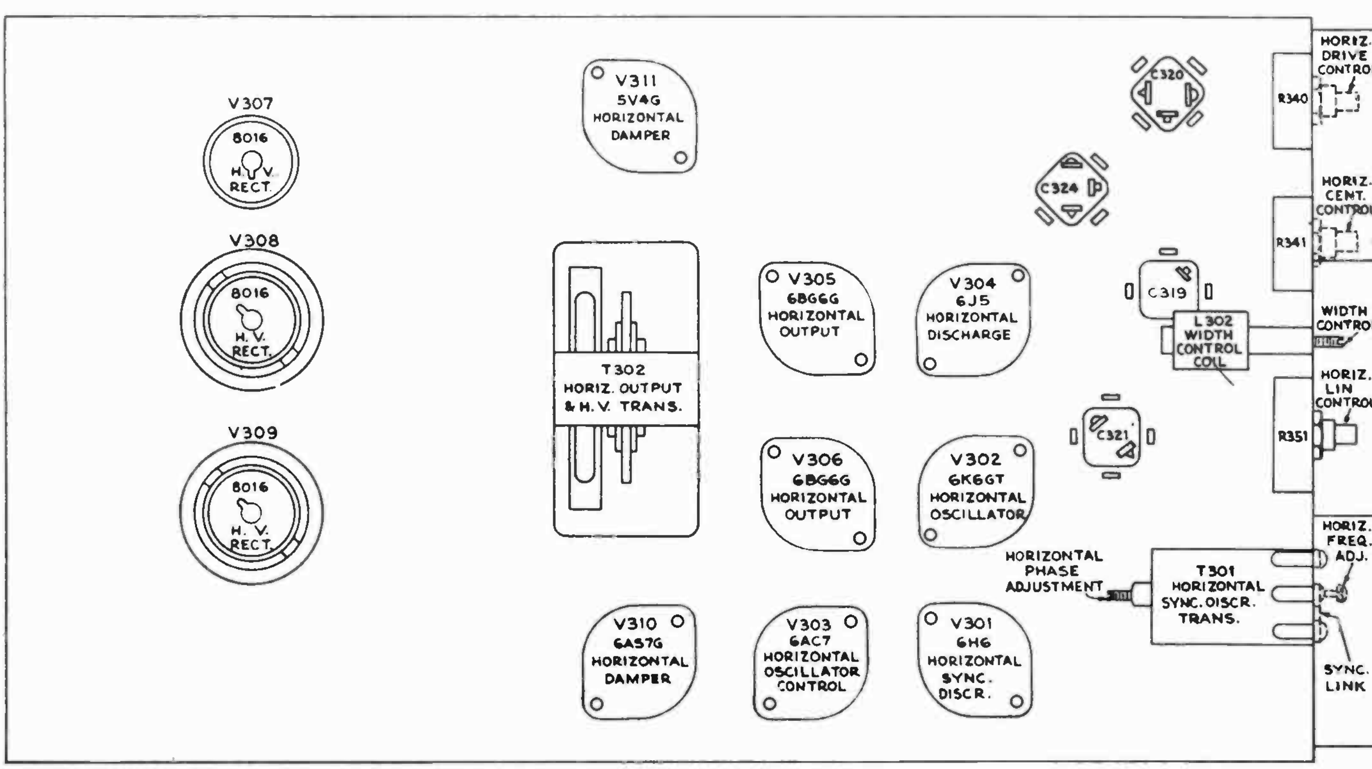


Figure 23—Horizontal Deflection Chassis Bottom View

648PTK, 648PV TELEVISION ALIGNMENT PROCEDURE

TEST EQUIPMENT—To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges

18 to 30 mc., 1 mc. sweep width
40 to 90 mc., 10 mc. sweep width
170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-ray Oscilloscope, preferably one with a wide band vertical deflection, an input calibrating source, and a low capacity probe.

Signal Generator to provide the following frequencies.

(a) I-F frequencies

19.75 mc. adjacent channel picture trap
21.25 mc. sound i-f and sound traps
21.8 mc. converter transformer
22.3 mc. second picture i-f transformer
23.4 mc. fourth picture i-f coil
25.2 mc. third picture i-f coil
25.3 mc. first picture i-f transformer
25.75 mc. picture carrier
27.25 mc. adjacent channel sound trap

(b) R-F frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
1	45.25	49.75
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output on these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 30 kv.

NOTE: Since separate power supplies are used for the r-f, i-f chassis and the horizontal deflection chassis, it is possible to operate the r-f, i-f chassis with the horizontal deflection chassis disconnected and without materially affecting the d-c supply voltage. It is therefore possible to align the r-f, i-f chassis by connecting it alone to the power supply chassis. The vertical oscillator and vertical output tubes are inoperative under such conditions, however the operation of these tubes is unnecessary for alignment purposes.

By turning the chassis on end, all adjustments will be made conveniently available.

Adjustments Required—Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require readjustment.

Due to the high frequencies at which the receiver operates the r-f oscillator line adjustment is critical and may be affected by a tube change. The line can be adjusted to proper frequency on channel 13 with practically any 6J6 tube in the oscillator socket. However, it may not then be possible to adjust the line to frequency on all of channels 7, 8, 9, 10, 11 and 12. To be satisfactory as an oscillator tube, it should be possible to adjust the line to proper frequency with the fine tuning control in the middle third of its range. It may therefore be necessary to select a tube for the oscillator socket. In replacing, if the old tube can be matched for frequency by trying several new ones, this practice is recommended. At best, however, it will probably be necessary to completely realign the oscillator line when changing the tube.

Tubes which cannot be used as oscillator will work satisfactorily as r-f amplifier or converter.

TELEVISION ALIGNMENT PROCEDURE

The detailed alignment procedure which follows is intended primarily as a discussion of the method used, precautions to be taken and the reasons for these precautions. Then, for more convenient reference during alignment, a tabulation of the method is given. All the information necessary for alignment is given in the table, however, alignment by the table should not be attempted before reading the detailed instructions.

ORDER OF ALIGNMENT—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:—

- Sound discriminator
- Sound i-f transformers
- Picture i-f traps
- Picture i-f transformers
- R-F and converter lines
- R-F oscillator line
- Converter grid trap (early 648PTK).
- Retouch picture i-f transformers
- Antenna trap adjustment (late chassis).
- Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT—

Set the signal generator for approximately .1 volt output at 21.25 mc. and connect it to the third sound i-f grid.

Detune T103 secondary (bottom).

Set the "VoltOhmyst" on the 10 volt scale.

Connect the meter in series with a one megohm resistor to the junction of diode resistors R135 and R136. Keep the junction end lead of the resistor as short as possible and dress the test lead away from the i-f section in order to prevent oscillation.

Adjust the primary of T103 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of R135 and C146.

Adjust T103 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T103 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the third sound i-f amplifier.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of R135 and C146.

The pattern obtained should be similar to that shown in Figure 30A. If it is not, adjust the T103 (top) until the wave form is symmetrical.

The peak to peak bandwidth of the discriminator should be approximately 350 kc. and should be linear from 21.175 mc. to 21.325 mc.

SOUND I-F ALIGNMENT—

Connect the sweep oscillator to the second sound i-f amplifier grid.

Connect the oscilloscope to the third sound i-f grid return (terminal A T102) in series with a 33,000 ohm isolating resistor.

Insert a 21.25 mc. marker signal from the signal generator into the second sound i-f grid.

Adjust T102 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 30B.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the third sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

Connect the sweep and signal generator to the top end of the trap winding of T2 (on top of the chassis). Adjust T101 (top and bottom), for maximum gain and symmetry at 21.25 mc.

Reduce the sweep output for the final adjustments so that approximately .3 volt peak-to-peak is present at the third sound i-f grid return.

The band width at 70% response from the first sound i-f grid to the third i-f grid should be approximately 200 kc.

PICTURE I-F TRAP ADJUSTMENT—

Turn the receiver picture control fully clockwise.

Remove the 6AT6 a-g-c amplifier, V106.

Construct a bias box by shunting a 10,000 ohm potentiometer across a 4½ volt battery. Connect the positive terminal of the battery to the receiver chassis. Connect the arm of the potentiometer to pin 1 of V107. Adjust the potentiometer to provide –3 volts at its arm.

Set the channel switch to channel 13.

Connect the "VoltOhmyst" across the picture second detector load resistor R154.

Connect the output of the signal generator to the junction of L80 and R6. This connection is available on a terminal lug through a hole in the side apron of the chassis, beside the r-f unit. This hole is normally down when the chassis is in the recommended position. Connection can be easily made, however, by allowing the receiver to hang over the edge of the test bench by a few inches.

(Junction of C14 and R6 in units where C14 is fixed).

Set the generator to each of the following frequencies and tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency

21.25 mc.—T106 (top)
21.25 mc.—T2 (top)
27.25 mc.—T104 (top)
27.25 mc.—T109 (bottom) 648PV only.
19.75 mc.—T105 (top)

PICTURE I-F TRANSFORMER ADJUSTMENTS—

Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst."

21.8 mc.—T2 (bottom)
25.3 mc.—T104 (bottom)
22.3 mc.—T105 (bottom)
25.2 mc.—L104 (top of chassis) 648PTK only.
25.2 mc.—T109 (top of chassis) 648PV only.
23.4 mc.—L106 (top of chassis)

If T105 (bottom) required adjustment, it will be necessary to reset T105 (top) for minimum response at 19.75 mc.

Picture I-F Oscillation—If the receiver is badly misaligned and two or more of the i-f transformers are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a d-c voltage in excess of 3 volts at the picture detector load resistor. This voltage is unaffected by r-f signal input and sometimes is independent of picture control setting.

If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the transformers approximately to frequency by setting the adjustment stud extensions of T2, T104, T105, T106, L104, and L106 to be approximately equal to those of another receiver known to be in proper alignment.
(In Model 648PV—T109 is used in place of L104).

If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias. If so, it should then be possible to align the transformers by the usual method. Once aligned in this manner, the i-f should be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first three i-f amplifiers to ground with 1000 mmf. capacitors.

Connect the signal generator to the fourth i-f grid and adjust L106 to frequency.

Remove the shunting capacitor from the third i-f grid, connect the signal generator to this grid and align L104.

Remove the shunting capacitor from the second i-f grid, connect the signal generator and align T105.

Remove the shunt from the first i-f grid, connect the signal generator and align T104 to frequency.

Connect the signal generator to the junction of L80 and R6 and align T2 to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is very stable when properly aligned. Check all i-f by-pass condensers, transformer shunting resistors, tubes, socket voltages, etc.

R-F AND CONVERTER LINE ADJUSTMENT—

Connect the r-f sweep oscillator to the receiver antenna terminals. If the sweep oscillator has a 50 ohm single-ended output, it will be necessary to obtain balanced output by connecting as shown in Figure 24.

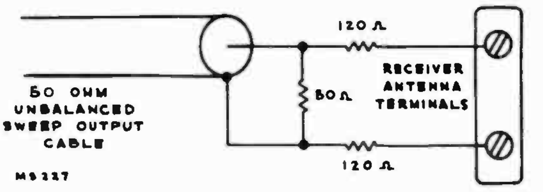


Figure 24—Unbalanced Sweep Cable Termination

Connect the oscilloscope to the junction of L80 and R6 (in the r-f tuning unit) through a 10,000 ohm resistor.
(Junction of C14 and R6 in units where C14 is fixed).

By-pass the first picture i-f grid to ground through a 1000 mmfd. capacitor. **Keep the leads to this by-pass as short as possible. If this is not done, lead resonance may fall in the r-f range and cause an incorrect picture of the r-f response.**

Turn the picture control fully clockwise. Connect the positive terminal of the bias box to the receiver chassis and the arm to pin 1 of V107. Set the potentiometer for −1 volt at its arm.

Connect the signal generator loosely to the receiver antenna terminals.

In most receivers C14 is fixed. However, if C14 is variable, set the C14 adjustment screw to its approximate normal operating position, 1½ turns out from maximum capacity. If the C14 capacity is less than this it may produce a resonance in channel 1, 2 or 3. During r-f alignment, such a resonance may show up as a "suck out" in the response curve of one of these channels. Under such conditions it will be impossible to obtain the proper response. With C14 set as specified or in receivers in which C14 is fixed, no such difficulty should be experienced.

Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7 (see Figure 29 for switch shaft flat location versus channel).

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier 175.25 mc. and 179.75 mc.

Adjust L25, L26, L51 and L52 (see Figure 31) for an approximately flat topped response curve located symmetrically between the markers. Normally this curve appears somewhat overcoupled or double humped with a 10 or 15% peak to valley excursion and the markers occur at approximately 90% response. See Figure 31, channel 7. In making these adjustments, the stud extension of all cores should be kept approximately equal.

Check the response of channels 8 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observe the response obtained. See Figure 31 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 70% response. If the markers do not fall within this requirement on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L25, L26, L51 and L52, and possibly compromise some channel slightly in order to get the markers up on other channels. Normally however, no difficulty of this type should be experienced since the higher frequency channels become comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L11, L12, L37 and L38, for an approximately flat-topped response curve located symmetrically between the markers.

Check channels 5 down through channel 1 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 70% response point. If this is not the case, L11, L12, L37 and L38 should be retouched. On final adjustment, all channels must be within the 70% specification.

Coupling between r-f and converter lines is augmented by a link between L12 and L37. This link is adjusted in the factory and should not require adjustment in the field. On channel 6 with the link in the minimum coupling position, the response is slightly overcoupled with approximately a 10% excursion from peak-to-valley. With the coupling at maximum, the response is somewhat broader and the peak-to-valley excursion is approximately 40%. The amount of coupling permissible is limited by the peak-to-valley excursion which should not be greater than 30% on any channel.

R-F OSCILLATOR LINE ADJUSTMENT—

The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

The heterodyne frequency meter is the more universal method since it is applicable to all types of receivers. However, it requires a great many calibration points since receivers with different i-f frequencies employ different oscillator frequencies and hence different calibration points on the frequency meter. This may result in confusion and errors in adjustment.

Since all sets must receive the same stations, the r-f sound carrier frequencies remain the same, regardless of i-f frequency. By use of this method, only one set of calibrating points is necessary. If these frequencies are crystal controlled, this method of alignment becomes very fast and with a minimum chance for error. However, this method is applicable only on receivers that use a sound discriminator, or other type of sound detector that has a definite and measurable characteristic at center frequency. This method cannot be easily employed on receivers that employ a slope type detector.

Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, the following calibration points must be established

Channel Number	Receiver R-F Osc. Freq. Mc.
1	71
2	81
3	87
4	93
5	103
6	109
7	201
8	207
9	213
10	219
11	225
12	231
13	237

If the receiver oscillator is adjusted by feeding in the r-f sound carrier frequency, the following signals must be available.

Channel Number	R-F Sound Carrier Freq. Mc.
1	49.75
2	59.75
3	65.75
4	71.75
5	81.75
6	87.75
7	179.75
8	185.75
9	191.75
10	197.75
11	203.75
12	209.75
13	215.75

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the "Volt-Ohmyst" to the sound discriminator output (junction of R135 and C146).

Connect the signal generator to the receiver antenna terminals.

The order of alignment remains the same regardless of which method is used.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to channel 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust L77 and L78 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. The core stud extensions should be maintained equal by visual inspection except as discussed in the following paragraph entitled Oscillator Pulling.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L76 for indications as above.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

Oscillator Pulling—If in setting the low frequency channels, the high frequency channels are pulled noticeably off frequency, or if it is impossible to set channels 10, 11 or 12 within the range of their respective trimmers, it may be due to interaction between sections of the line. A quick check can be made to determine if this is the case.

The shorting section of the r-f oscillator channel switch, (rotor), should be at ground r-f potential. If this is not the case due to dissymmetry in the circuit, the shorting section may be somewhat above ground. Since at these high frequencies, even the length of the shorting bar represents an appreciable portion of a wave length, the lower frequency section is effectively tapped up on the high frequency section and reflects reactance into it. This reactance varies with low frequency channel oscillator adjustments thus causing a shift in oscillator frequency on the upper channels. One way to cure this difficulty is to adjust the shorting switch to ground potential. This can be accomplished by staggering L77 and L78 until this condition is achieved.

To find if dissymmetry exists, remove the bottom cover from the r-f unit.

Set the channel switch to channel 10.

Disconnect any input from the receiver.

Connect the "VoltOhmyst" to R6 through the hole in the side of chassis, and measure the oscillator injection into the converter grid.

Take an insulated metal prod and touch the center of the oscillator rotor shorting bar. If the meter reading changes, it indicates that the bar is not at r-f ground.

To balance the line, switch to channel 13 and stagger the cores for one or more turns (usually L78 out and L77 in). The final adjustment must leave the oscillator on correct channel 13 frequency.

Switch back to channel 10 and touch the switch rotor as before. As before, meter movement indicates unbalance.

For fine balancing touch the switch contacts for channel 10. When balanced, the meter will show equal reduction for both contacts. Continue staggering the cores until balance is obtained.

Repeat the oscillator adjustments for all channels.

In later production receivers, several r-f oscillator coil changes were made and a capacitor C19 was added to minimize the oscillator pulling effect. In receivers in which C19 is present the staggering of cores should not be necessary.

CONVERTER GRID TRAP ADJUSTMENT—
Connect the sweep generator to the receiver antenna terminals. Observe the precaution for single-ended output generators mentioned in the r-f alignment section.

Connect the oscilloscope to R6 through 10,000 ohms.

Shunt the first picture i-f grid to ground with a 1,000 mmf. capacitor, keeping the leads as short as possible.

Couple the signal generator loosely to the receiver antenna terminals.

Switch the channel switch and signal generator through the low frequency channels and observe the response on each range.

Select a channel which is essentially flat over the operating range with the sound and picture carrier markers at 90% or higher on the response curve.

Remove the capacitor from the first picture i-f grid and shunt it from the second picture i-f grid to ground.

Adjust C14 for an r-f response curve similar to the one obtained with the first picture i-f grid shunted. See Figure 32.

In most receivers, C14 is fixed and obviously this adjustment cannot be made on those sets. In such receivers, this step should be followed as a check to assure that proper converter operation is obtained.

RETOUCHING OF PICTURE I-F ADJUSTMENTS—
The picture i-f response curve varies somewhat with change of bias and for this reason it should be aligned with approximately the same signal input as it will receive in operation.

If the receiver is located at the edge of the service area, it should be aligned with approximately −1 volt i-f grid bias. However, for normal conditions, (signals of 1000 microvolts or greater), it is recommended that the picture i-f be aligned with a grid bias of −3 volts.

Connect the r-f sweep generator to the receiver antenna terminals.

Connect the signal generator to the antenna terminals and feed in the 25.75 mc i-f picture carrier marker and a 22.3 mc. marker.

Connect the oscilloscope across the picture detector load resistor.

Remove the shunting capacitor from the second picture i-f grid.

Turn the picture control fully clockwise. Connect the bias box and set the potentiometer for −3 volts at its arm.

Set the sweep output to produce approximately .3 volt peak-to-peak across the picture detector load resistor.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. See Figure 33.

If for example as in Figure 33A the response is peaked in the middle, and the picture carrier is low on the response curve slope, then the high Q transformer T104, (which is peaked at 25.3 mc.—near the picture carrier 25.75 mc.), should be retouched to bring the picture carrier response up to approximately 40%.

It will then probably be found that the response is generally high on the low frequency end of the curve as in Figure 33B. If this is the case, adjust L104, (25.2 mc. and fairly broad), to bring the high frequency end response up and the low frequency response down. The picture carrier is thus brought still further up the slope and an approximately flat topped response curve is obtained as in Figure 33C.

If T105 (bottom) required any adjustment, it will be necessary to reset T105 (top) for minimum response at 19.75 mc.

On final adjustment the picture carrier marker must be at approximately 45% response. The curve must be approximately flat topped and with the 22.3 mc. marker at approximately 100% response.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 45% response point.

If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture definition is impaired by loss of high frequency video response.

The above example is used to show the line of reasoning involved in making the retouching adjustments. Since there are five tuned circuits each aligned to a different frequency, it is obvious that many different conditions can exist, however, similar reasoning will apply to each case. With some experience in making these adjustments, it will be found that the desired response can be readily obtained. In making these adjustments, care should be taken that no two transformers are tuned to the same frequency as i-f oscillation may result.

Replace the 6AT6 a-g-c amplifier, V106.

SENSITIVITY CHECK—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through an attenuator pad of the type shown in Figure 25. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position.

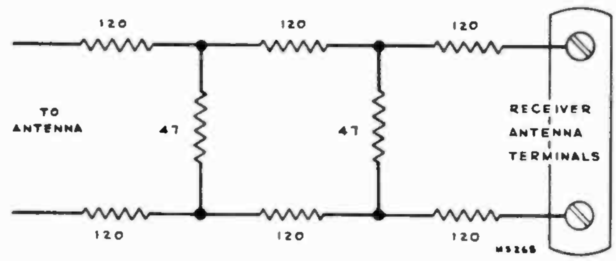


Figure 25—Attenuator Pad

Only carbon type resistors should be used to construct the attenuator pad. Since many of the low value moulded resistors generally available are of wire wound construction, it is advisable to break and examine one of each type of resistor used in order to determine its construction.

RESPONSE CURVES—The response curves shown on page 31 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected. Channel 2 response (not shown) is similar to that of channel 3.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

ALIGNMENT TABLE—Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment.

648PTK, 648PV

TELEVISION ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 22 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
DISCRIMINATOR AND SOUND I-F ALIGNMENT									
1	3rd sound i-f grid (pin 1, V103)	21.25 .1 volt output	Not used		Not used	In series with 1 meg. to junction of R135 & R136		Detune T103 (bottom). Adjust T103 (top) for max. on meter	Fig. 28 Fig. 27 Fig. 26
2	"	"	"		"	Junct of R135 & C146	Meter on 3 volt scale	T103 (bottom) for zero on meter	Fig. 28 Fig. 27
3	"	"	3rd sound i-f grid (pin 1, V103)	21.25 center 1 mc. wide .1 v. out	Junct of R135 & C146	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T103 (top) until they are equal		Fig. 28 Fig. 30 A
4	2nd sound i-f grid (pin 1, V102)	21.25 reduced output	2nd sound i-f grid	21.25 reduced output	Terminal A, T102 in series with 33,000 ohms	"	Sweep output reduced to provide .3 volt p-to-p on scope	T102 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 28 Fig. 26 Fig. 27 Fig. 30 B
5	Trap winding on T2 (top of chassis)	21.25 reduced output	Trap winding on T2	21.25 reduced output	"	"	"	T101 (top & bottom) for max. gain and symmetry at 21.25 mc.	Fig. 26 Fig. 27 Fig. 28 Fig. 30 B
PICTURE I-F AND TRAP ADJUSTMENT									
6	Not used		Not used		Not used	Pin 1 V107	Remove V106. Conect bias box + to and — to Pin 1 V107 socket	Picture control max. Bias box —3 volts.	Fig. 28
7	Junction L80 and R6 *	21.25	"		"	Junction of L109 & R154	Meter on 3 volt scale. Receiver on channel 13	T106 (top) for min. on meter	Fig. 26
8	"	21.25	"		"	"	"	T2 (top) for min.	Fig. 28 Fig. 26
9	"	27.25	"		"	"	"	T104 (top) for min.	"
10	"	27.25	"		"	"	"	T109 (bottom) for min. †	Fig. 27
11	"	19.75	"		"	"	"	T105 (top) for min.	Fig. 26
12	"	21.8	"		"	"	"	T2 (bottom) for max.	Fig. 27
13	"	25.3	"		"	"	"	T104 (bottom) for max.	" "
14	"	22.3	"		"	"	"	T105 (bottom) for max.	"
15	"	25.2	"		"	"	"	T109 (top chassis) for max.	Fig. 26
16	"	23.4	"		"	"	"	L106 (top chassis for max.	"
17	If T105 (bottom) required adjustment in step 14, repeat step 11.								
R-F AND CONVERTER LINE ALIGNMENT									
18	Not used		Not used		Not used		Set C14 1½ turns out from max.	Picture control max. Bias box —1 volts.	Fig. 28 Fig. 27
19	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (see text for precaution)	Sweeping channel 7	Junction L80 and R6 through 10,000 ohm series resistor	Not used	1st i-f grid bypass to gnd. with 1000 mmf. Receiver on channel 7	L25, L26, L51 & L52 for approx. flat top response between markers. Markers above 70%	Fig. 28 Fig. 27 Fig. 31 (7)
20	"	181.25 185.75	"	channel 8	"	"	Receiver on channel 8	Check to see that response is as above	Fig. 31 (8)
21	"	187.25 191.75	"	channel 9	"	"	Receiver on channel 9	"	Fig. 31 (9)
22	"	193.25 197.75	"	channel 10	"	"	Receiver on channel 10	"	Fig. 31 (10)
23	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 31 (11)
24	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 31 (12)
25	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 31 (13)
26	If the response on any channel (steps 20 through 25) is below 70% at either marker, switch to that channel and adjust L25, L26, L51 & L52 to pull response up on that channel. Then recheck steps 19 through 25.								

* Junction of C14 and R6 in units where C14 is fixed.

† In some receivers, T109 is replaced by L104 which has no bottom adjustment.

TELEVISION ALIGNMENT TABLE

R-F AND CONVERTER LINE ALIGNMENT (Cont'd)

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
27	Antenna terminal (loosely)	83.25 87.75	Antenna terminals (see text for precaution)	Sweeping channel 6	Junction L80 and R6 through 10,000 ohm series resistor *	Not used	Receiver on channel 6	L11, L12, L37 & L38 for response as above	Fig. 31 (6)
28	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 31 (5)
29	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 31 (4)
30	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 31 (3)
31	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	
32	"	45.25 49.75	"	channel 1	"	"	Receiver on channel 1	"	Fig. 31 (1)
33	If the response on any channel (steps 28 through 32) is below 70% at either marker, switch to that channel and adjust L11, L12, L37 & L38 to pull response up on that channel. Then recheck steps 27 through 32.								

R-F OSCILLATOR ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
34	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Junction of R135 & C146 for sig. gen. method only	Fine tuning centered for all adjustments Receiver on channel 13	L77 & L78 for zero on meter or beat on het. freq. meter	Fig. 28 Fig. 27
35	"	209.75	"	231	"	"	Receiver on channel 12	L76 as above	Fig. 29
36	"	203.75	"	225	"	"	Receiver on channel 11	L74 as above	"
37	"	197.75	"	219	"	"	Receiver on channel 10	L72 as above	"
38	"	191.75	"	213	"	"	Receiver on channel 9	L70 as above	"
39	"	185.75	"	207	"	"	Receiver on channel 8	L68 as above	"
40	"	179.75	"	201	"	"	Receiver on channel 7	L66 as above	"
41	"	87.75	"	109	"	"	Receiver on channel 6	L63 & L64 as above	Fig. 27
42	"	81.75	"	103	"	"	Receiver on channel 5	L62 as above	Fig. 29
43	"	71.75	"	93	"	"	Receiver on channel 4	L60 as above	"
44	"	65.75	"	87	"	"	Receiver on channel 3	L58 as above	"
45	"	59.75	"	81	"	"	Receiver on channel 2	L56 as above	"
46	"	49.75	"	71	"	"	Receiver on channel 1	L54 as above	"
47	Repeat steps 34 through 46 as a check.								

CONVERTER GRID TRAP ADJUSTMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
48	Antenna terminal (loosely)	Sound and Pix Carrier of Selected Channel	Not used		Junction L80 and R6 (in r-f unit) through 10,000 ohm series resistor	Not used	Connect sweep to ant. terms. 1st pix i-f grid bypassed to gnd. with 1000 mmf.	Switch through channels 1 through 6. Select channel with flat response and markers above 80%	Fig. 28 Fig. 32 (A)
49	"	"	"		"	"	Move 1000 mmf. bypass from 1st pix i-f grid to 2nd i-f grid	Adjust C14 for response curve similar to that obtained above	Fig. 28 Fig. 32 (B)

RETOUCHING PICTURE I-F TRANSFORMERS

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
50			Not used		Not used		Receiver & sweep on same channel as above. Remove i-f grid bypass	Picture control max, Bias box −3 volts.	Fig. 28
51	Antenna terminals (loosely)	22.3 25.75	"		Junction L109 and R154	Not used	Retouch pix i-f adjustments (T2, T104, T105 bottoms T109 top & L106) as necessary to provide proper response †		Fig. 28 Fig. 27 Fig. 33
52	If T105 (bottom) was adjusted in step 51, repeat step 10 and step 51 Replace V106 upon completion.								

* Junction of C14 and R6 in units where C14 is fixed.   † In some receivers, T109 is replaced by L104.

TELEVISION ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
				ANTENNA TRAP ADJUSTMENT					
	Select 1 of the 6 steps below for suitable method for type of interference encountered.								
53-1	Antenna terminals through termination	193.25	Loosely coupled to r-f osc.	109	Not used	Junction of L109 & R154	Rec. on chan. 6	L81 & L82 for min. on meter	Fig. 28 Fig. 26
-2	"	109	"	87	"	"	Rec. on chan. 3	"	"
-3	"	179.75	"	103	"	"	Rec. on chan. 5	"	"
-4	"	103	"	81	"	"	Rec. on chan. 2	"	"
-5	"	FM Sta. Freq.	"	81	"	"	"	"	"
-6	Not used		Not used		Not used	Not used	Rec. on interfered channel	L81 & L82 for min. interference	"
				SENSITIVITY CHECK					
54	Connect antenna to receiver through attenuator pad to provide weak signal. Compare picture and sound obtained to that obtained on other receivers under the same conditions.								

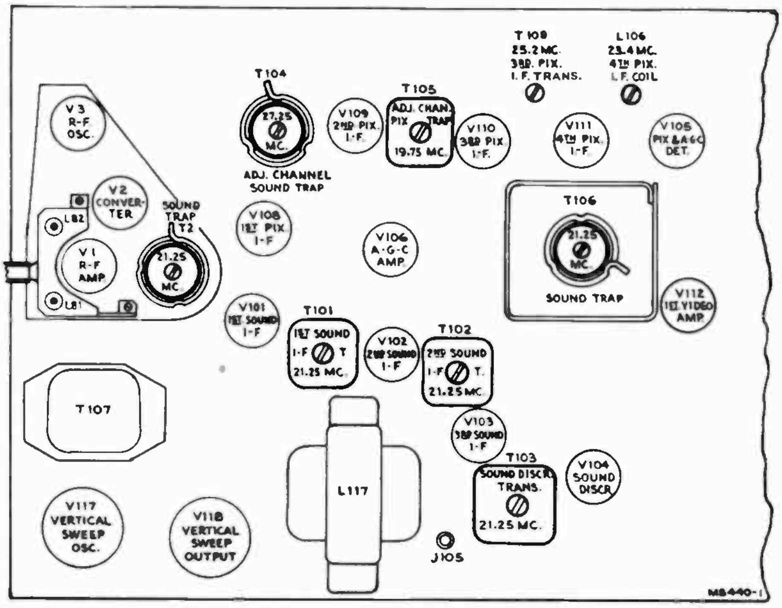


Figure 26—Top Chassis Adjustments

L81 and L82 are omitted in some units.

L104 is used in Model 648PTK only—in other chassis it is replaced by T109.

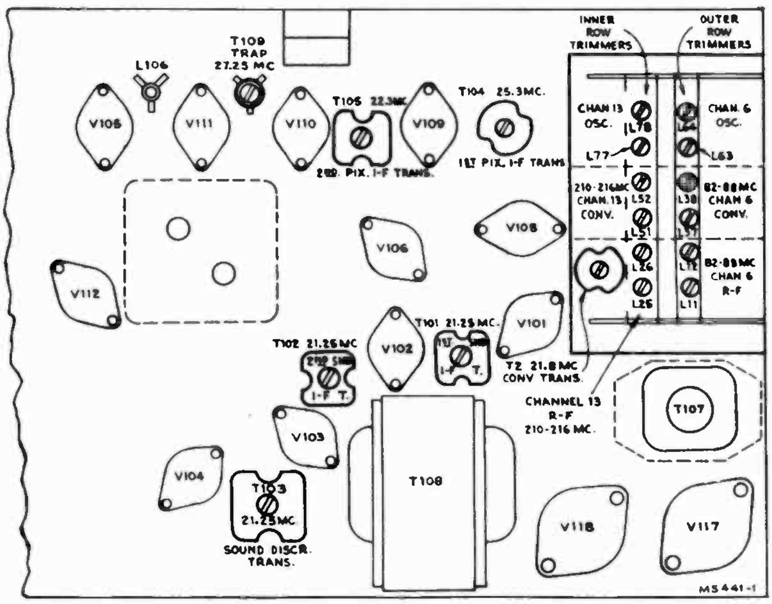


Figure 27—Bottom Chassis Adjustments

In most units C14 is fixed.

Model 648PTK only—

T109 is replaced by L104

L104 has no bottom adjustment.

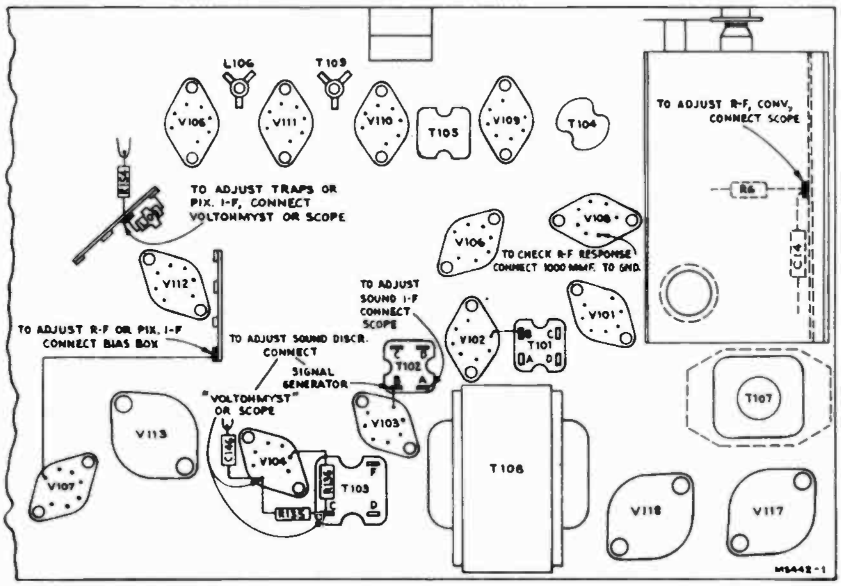


Figure 28—Test Connection Points

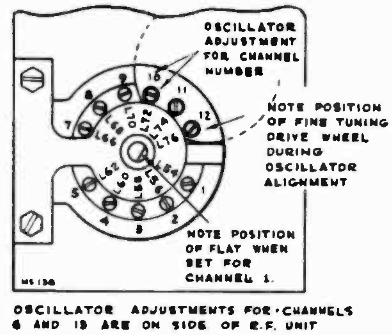


Figure 29—R-F Oscillator Adjustments

L104 is used in Model 648PTK only—in other chassis it is replaced by T109.

In most units C14 is fixed.

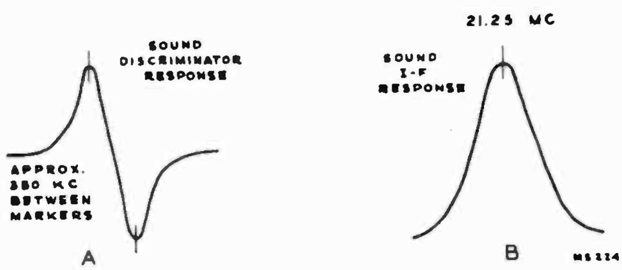


Figure 30—Sound Discriminator and I-F Response

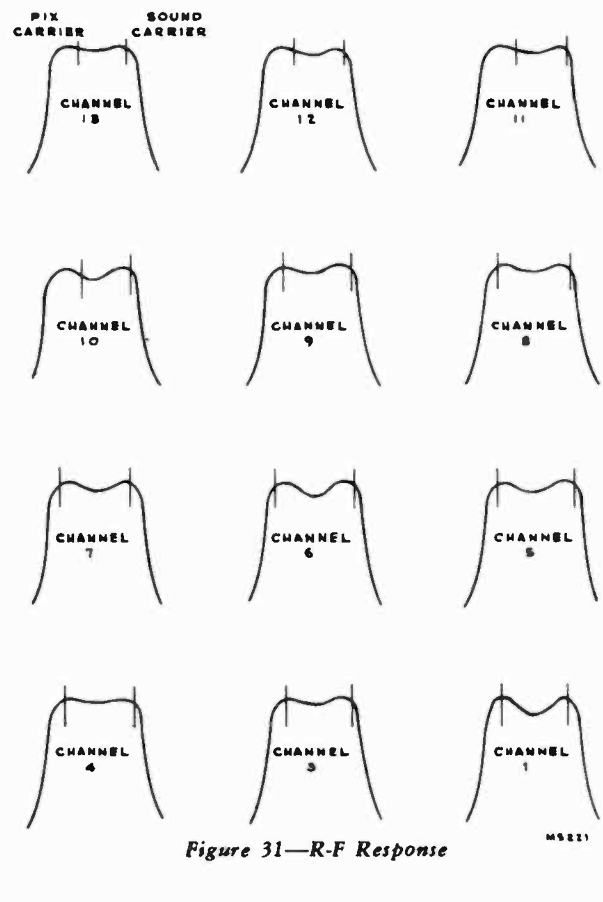


Figure 31—R-F Response

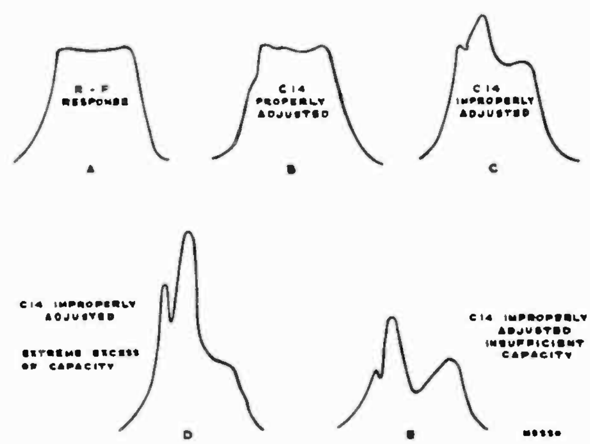


Figure 32—Effects of C14 Adjustments

Figure 33—Overall Response

TELEVISION SERVICE SUGGESTIONS

NO RASTER ON SCREEN:

(1) P303 or kinescope socket disconnected.

(2) No high voltage due to failure of power supply. P401 or interlock disconnected. Fuse in power supply blown or defective. V401 and V402 defective—filter capacitor or choke shorted or filter choke open.

(3) No high voltage—If horizontal deflection is operating as evidenced by the correct waveform on terminal 4 of horizontal output transformer, the trouble can be isolated to the 8016 circuits. Either the T302 high voltage winding is open, (points 2 to 3), the 8016 tubes are defective, the 8016 filament circuits are open or one or more of the following capacitors are open or shorted: C326, C327, C328, C329, and C330.

(4) V302 and V304 circuits inoperative—check for sine wave on V302 grid, pulse on V304 grid, and sawtooth on V305 grid. Refer to schematic and wave form chart.

(5) Damper tubes V310 or V311 inoperative.

(6) Defective Kinescope.

(7) R162 defective, R173 open, (terminal 3 to ground).

WRINKLES ON LEFT SIDE OF RASTER:

(1) R184, R186 or C334 defective.

(2) Defective yoke.

RASTER & SIGNAL ON SCREEN BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f or discriminator inoperative—check V101, V102, V103, V104 and their socket voltages.

(3) Radio audio system inoperative.

(4) Speaker defective.

RASTER BUT NO SOUND, PICTURE OR SYNC.

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—check V1, V2, V3 and their socket voltages.

SOUND & RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V108, V109, V110, V111, V105, V112 and V113—check socket voltages.

(2) Bad contact to kinescope grid.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER:

(1) C334 defective.

(2) Defective yoke.

SMALL RASTER:

(1) Low Plus B or low line voltage.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V118.

(2) Vertical output transformer (T108) defective.

(3) V117 inoperative—check voltage and wave forms on grid and plate.

(4) R164, C160, C165-B or C172-C defective.

(5) Low bias or plate voltage—check rectifiers and capacitors in supply circuits.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V305, V306, V310 or V311.

(2) T302 or L302 defective.

(3) R346, R348, R350, R351, C331 or C332 defective.

(4) R332, R340 or C318 defective.

(5) R316 defective.

PICTURE OUT OF PHASE HORIZONTALLY:

(1) T301 winding D to F incorrectly tuned or connected in reverse.

(2) R312 or R314 defective.

NO VERTICAL DEFLECTION:

(1) P101 disconnected or cable defective.

(2) P301 disconnected or cable defective.

(3) V117 or V118 inoperative. Check voltage and wave forms on grids and plates.

(4) T108 open.

(5) Vertical deflection coils open.

NO HORIZONTAL DEFLECTION:

(1) P401 disconnected or cable defective.

(2) Interlock cable disconnected or defective.

(3) P302 disconnected or cable defective.

(4) V302, V304, V305, V306, V310 or V311 inoperative—check voltage and wave forms on grids and plate.

(5) T302 open.

(6) Horizontal deflection coil open.

SIGNAL ON SCREEN BUT NO SYNC:

(1) Picture control advanced too far.

(2) V107-B, V114, V115, or V116 inoperative. Check voltage and waveforms at their grids and plates.

(3) C171 defective.

SIGNAL ON SCREEN BUT NO VERTICAL SYNC:

(1) Check V117 and associated circuit—C155, T107, etc.

(2) Integrating network inoperative—check C143, C148, C149, C150, R140, R142, R143 and R144.

SIGNAL ON SCREEN BUT NO HORIZONTAL SYNC:

(1) T301 misadjusted—readjust as instructed on page 8.

(2) V301 or V303 inoperative—check socket voltages and waveforms.

(3) T301 defective.

(4) C301, C303, C304, C306 or R306 defective.

(5) If horizontal speed is completely off and cannot be adjusted check C302, C304, C305, C308, C313, C145, R304, R309 and R141.

PICTURE STABLE BUT POOR RESOLUTION:

(1) Make sure that the focus control operates on both sides of proper focus.

(2) Optical barrel adjustments misadjusted.

(3) V105, V112 or V113 defective.

(4) Peaking coils defective—check for specified resistance.

(5) C157, C164, C168 or C171 defective.

(6) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) Video amplifier overloaded by excessive input—reduce picture control setting.

(2) Close switch S101.

(3) Insufficient bias on V112 and V113 resulting in grid current on video signal. Check bias and possible grid current.

(4) Defective coupling condenser or grid load resistor—check C157, C164, C168, C173-B, R160, R177, R185, R189, etc.

(5) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) Picture control operated at excessive level.

(2) If regular sections at the left picture are displaced change V305 and V306.

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync. Connect sync link to terminal 1 and 2.

(5) C304, R306 or V303 defective.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V305 and V306.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C334 defective.

(2) V310 or V311 defective.

CRITICAL LEAD DRESS:

(1) Dress spaghetti-covered leads from A and B on discriminator transformer T301 to pin 3 and 5 on V301 tube socket approximately 3/16" above chassis.

(2) Dress video capacitors C157, C164 and C168 up and away from chassis.

(3) Dress video peaking coils L108, L109, L110, L111, L112, L113 and L114 up and away from chassis.

(4) Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.

(5) Dress T302 winding leads as shown in Figure 34.

RADIO CIRCUIT DESCRIPTION

The radio receiver in the 648PTK is comprised of an eight-tube AM-FM tuner unit and a four-tube audio amplifier and power supply.

The tuner unit employs an r-f amplifier on all bands. One 455 kc. i-f stage and a conventional diode detector are employed on AM. On the FM band, three 10.7 mc. i-f stages and a ratio detector are employed.

When the radio function switch is in the phono position, the second FM i-f amplifier is used as a phono preamplifier. The .002 mf. capacitor on the screen of the 6AU6 bypasses the screen for i-f but not for audio. Therefore, for audio the 6AU6 screen has approximately the same characteristics as the plate of a triode. The audio output from the screen is fed to the volume control and into the radio audio system. The phono preamplifier permits the use of a low output-voltage crystal-pickup in the record player attachment.

In order to make the maximum use of space and components V4 is used as an i-f amplifier on AM and FM. When switching between AM and FM, the i-f transformers are switched simultaneously with the ant, r-f and osc coils.

The ratio detector, appearing in RCA post-war FM receivers, is a new device for converting a frequency modulated carrier to an audio signal, while at the same time offering a high degree of attenuation to any incident amplitude modulation. The relative insensitivity to amplitude variations, which is an inherent characteristic of ratio detectors, enables them to be used without the usual preceding limiter stage, thus affording the use of a high gain i-f stage instead of the low-gain limiter.

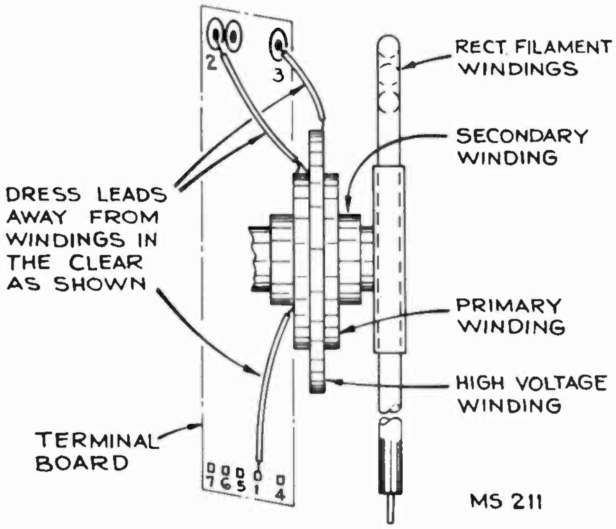


Figure 34—T302 Lead Dress

PICTURE I-F RESPONSE—At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method.

Select a channel with a flat r-f response as outlined in the converter grid trap adjustment section of the alignment procedure.

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

Figures 35 through 39 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

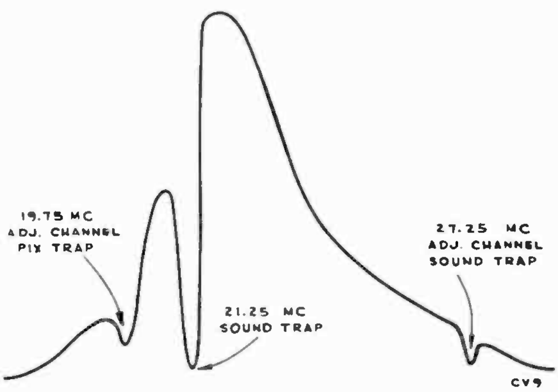


Figure 35—T2 Response

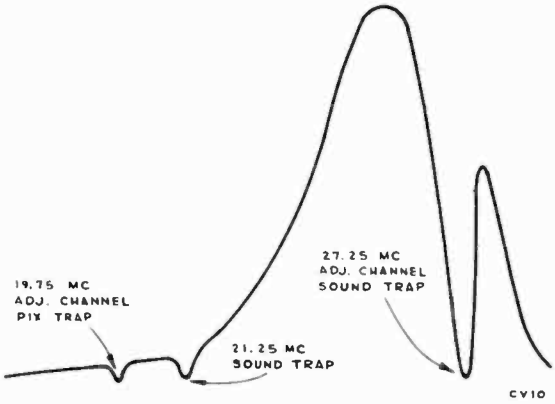


Figure 36—T104 Response

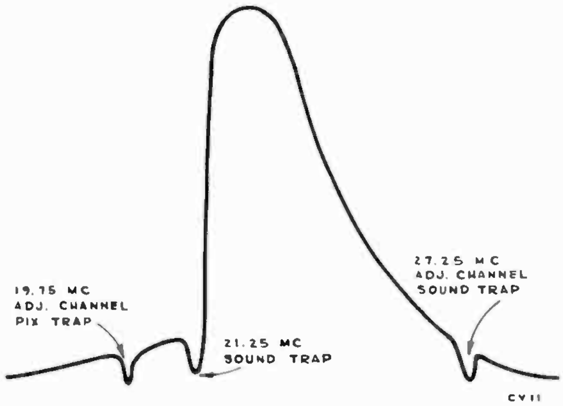


Figure 37—T105 Response

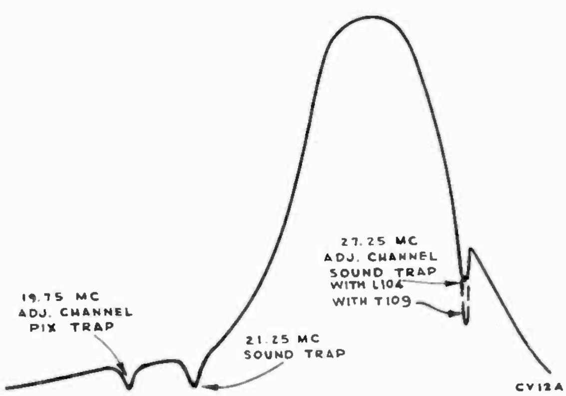


Figure 38—L104 Response

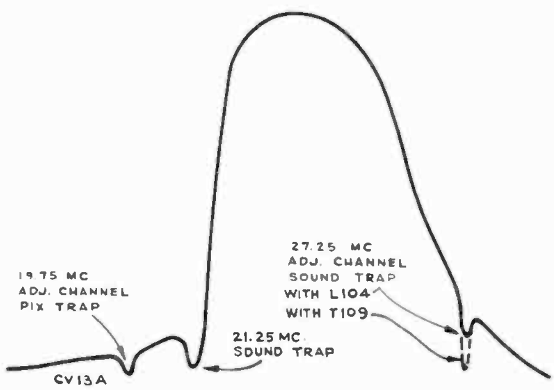
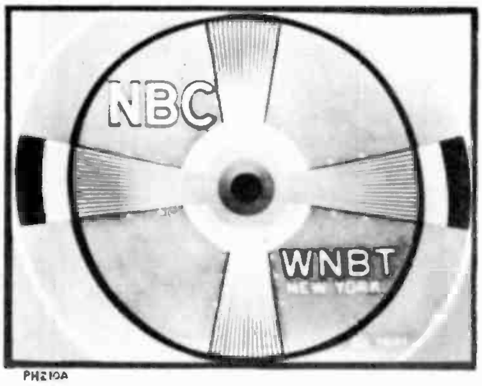


Figure 39—L106 Response



PH210A

Figure 40—Normal Picture

Figure 41—Vertical Hold Control Misadjusted

PH210B

PH210C

Figure 42—Picture Control Misadjusted

Figure 43—Brightness Control Misadjusted

PH210D

PH211A

Figure 44—Weak Signal

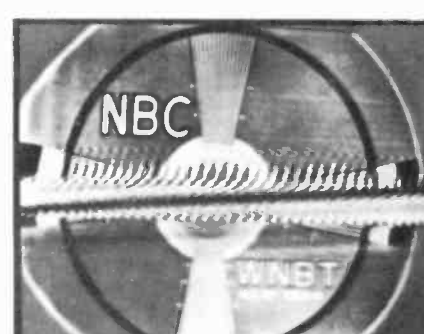
Figure 45—Interference from Another Signal

PH211B

PH211C

Figure 46—Sound in the Picture

Figure 47—Interference, Diathermy, etc.



PH211D

TEST PATTERN PHOTOGRAPHS

PH220

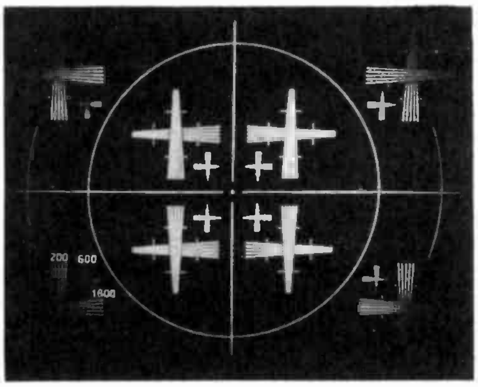


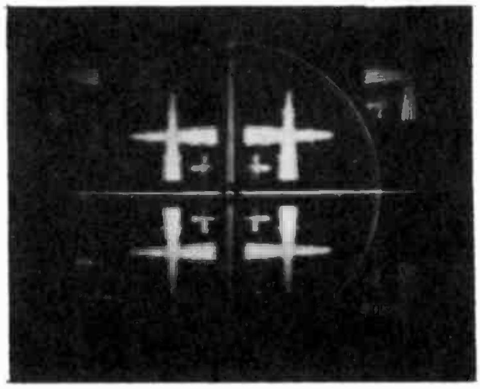
Figure 48—Correct Picture of Optical Test Lamp Pattern

←

Figure 49—Optical Barrel Focus Adjustment Misadjusted

→

PH221



PH222

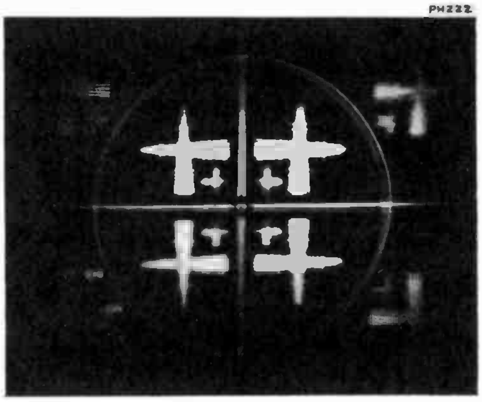


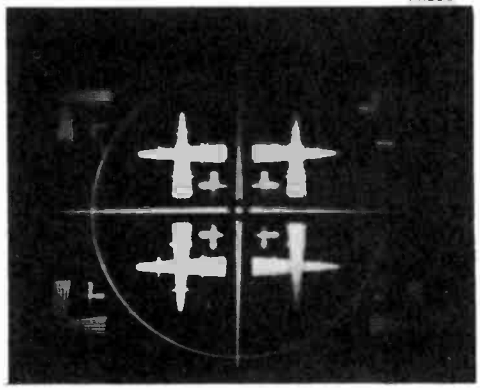
Figure 50—Optical Barrel Horizontal Centering Adjustment Misadjusted

←

Figure 51—Optical Barrel Lateral Centering Adjustment Misadjusted

→

PH223



PH212D

Figure 52—Electrical Horizontal Centering Control Misadjusted

←

Figure 53—Electrical Vertical Centering Control Misadjusted

→

PH213A

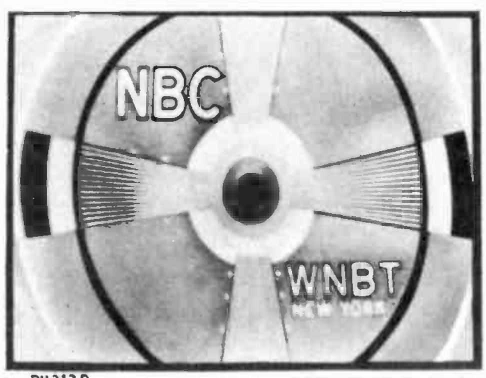
PH213C

Figure 54—Vertical Linearity Control Misadjusted

←

Figure 55—Height Control Misadjusted

→



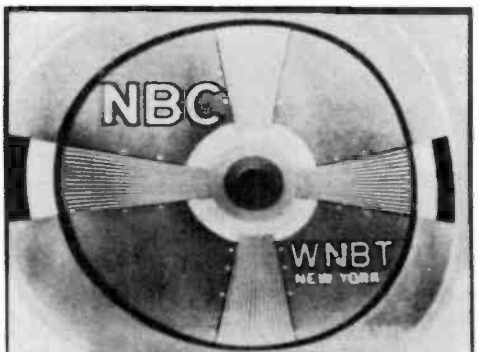
PH213D

PH214A

Figure 56—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

Figure 57—Width Control Misadjusted

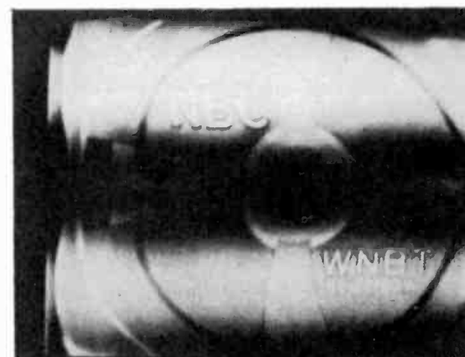
PH214B



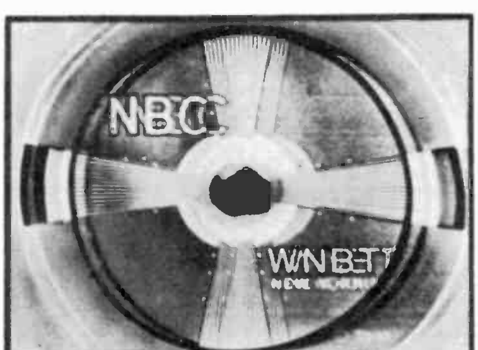
PH214C

Figure 58—Horizontal Drive Control Misadjusted

Figure 59—Hum in Video and Sync (Picture Off Center to Show Edge of Raster)



PH214D

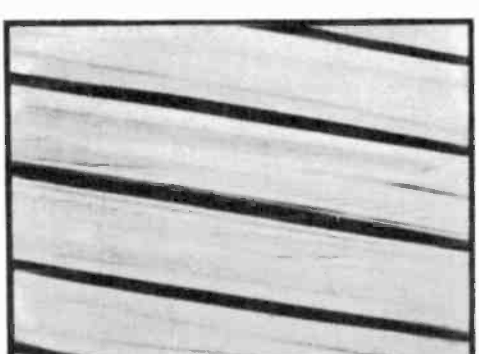


PH215A

Figure 60—Reflections

Figure 61—Transients (Check position of S101)

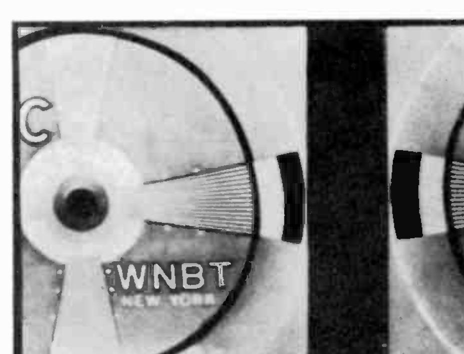
PH215B



PH215C

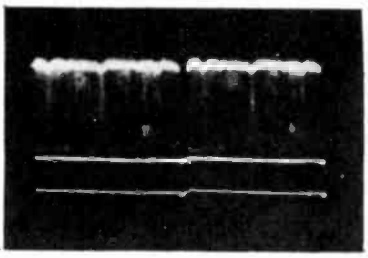
Figure 62—Horizontal Sync Discriminator Transformer Frequency Adjustment Misadjusted

Figure 63—Horizontal Sync Discriminator Transformer Phase Adjustment Misadjusted



PH215D

WAVEFORM PHOTOGRAPHS



CV16B

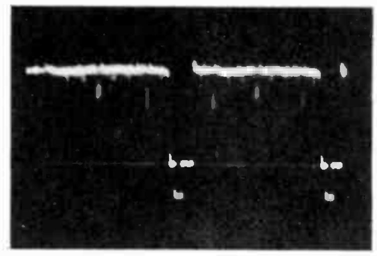
Video Signal Input to 1st Video Amplifier (Junction of L108 and C157)

Figure 64—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (1.8 Volts PP)

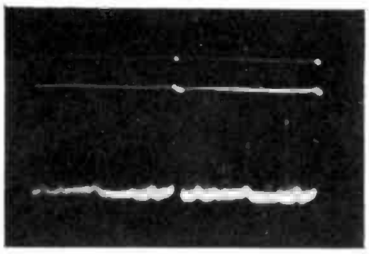
←

Figure 65—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (1.8 Volts PP)

→



CV16A



CV16D

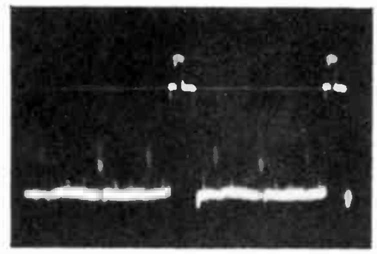
Output of 1st Video Amplifier (Junction of L110 and C164)

Figure 66—Vertical (18 Volts PP)

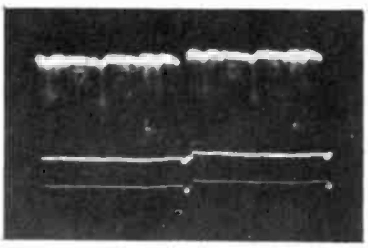
←

Figure 67—Horizontal (18 Volts PP)

→



CV16C



CV16F

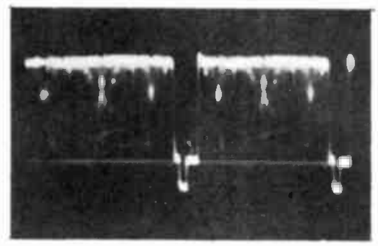
Input to Kinescope Grid (S101 open)

Figure 68—Vertical (60 Volts PP)

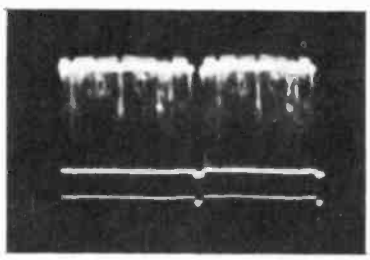
←

Figure 69—Horizontal (60 Volts PP)

→



CV16E



CV17B

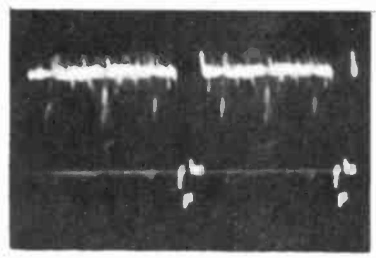
Input to Kinescope Grid (S101 closed)

Figure 70—Vertical (60 Volts PP)

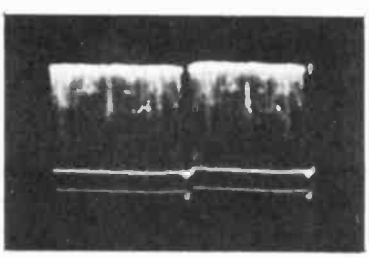
←

Figure 71—Horizontal (60 Volts PP)

→



CV17A



CV17D

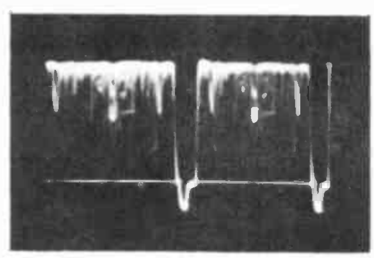
Cathode of D-C Restorer (Pin 5 of V107-B) (6AL5)

Figure 72—Vertical (58 Volts PP)

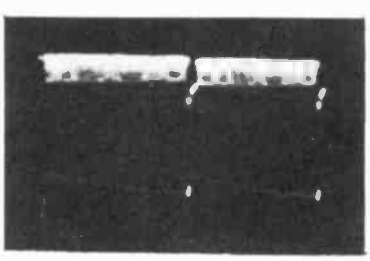
←

Figure 73—Horizontal (58 Volts PP)

→



CV17C



CV17F

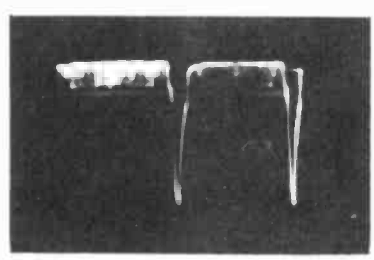
Plate of D-C Restorer (Pin 2 of V107-B) (6AL5)

Figure 74—Vertical (14 Volts PP)

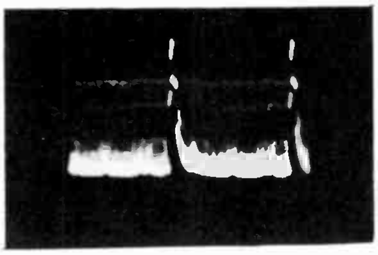
←

Figure 75—Horizontal (14 Volts PP)

→



CV17E

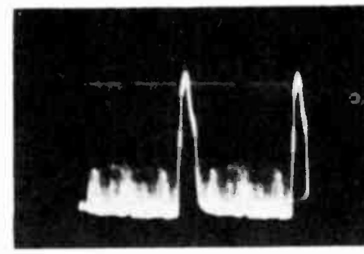


CV18B

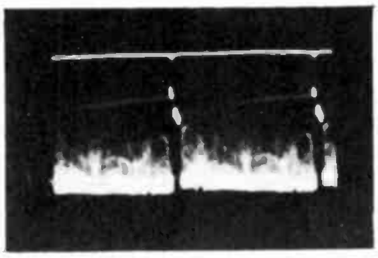
Plate of 1st Sync. Amplifier (Pin 8 of V114) (6SK7)

Figure 76—Vertical (70 Volts PP)
←

Figure 77—Horizontal (52 Volts PP)
→



CV18A

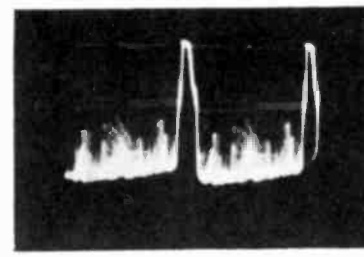


CV18D

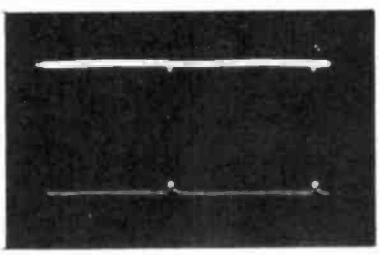
Grid of 2nd Sync. Amplifier (Pin 4 of V115) (6SH7)

Figure 78—Vertical (42 Volts PP)
←

Figure 79—Horizontal (42 Volts PP)
→



CV18C

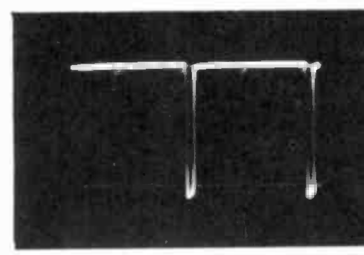


CV18F

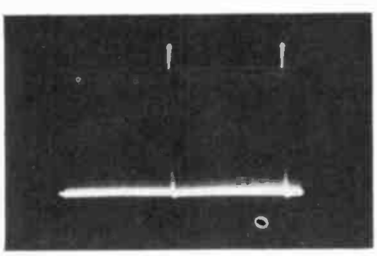
Plate of 2nd Sync. Amplifier (Pin 8 of V115) (6SH7)

Figure 80—Vertical (110 Volts PP)
←

Figure 81—Horizontal (110 Volts PP)
→



CV18E

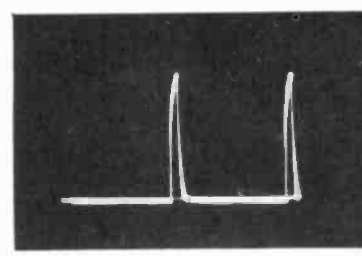


CV19B

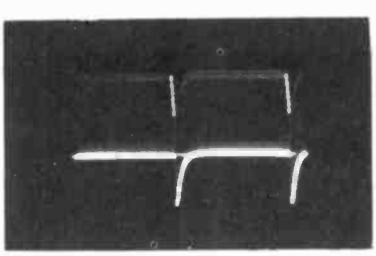
Plate of 3rd Sync. Amplifier (Pin 3 of V116) (6J5)

Figure 82—Vertical (36 Volts PP)
←

Figure 83—Horizontal (30 Volts PP)
→



CV19A

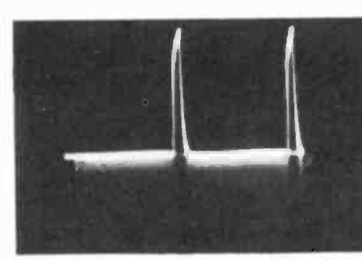


CV19D

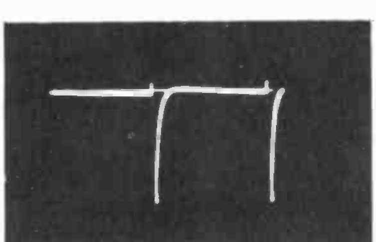
Input to Integrating Network (Junction of C143, R140 and R142)

Figure 84—Vertical (48 Volts PP)
←

Figure 85—Horizontal (30 Volts PP)
→



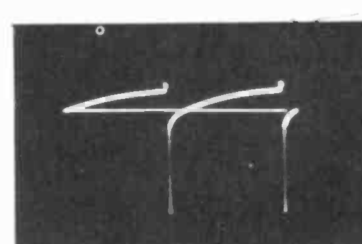
CV19C



CV19E

Figure 86—Output of Integrating Network (Junction of R144, C150 and Yellow Lead of T107). Vertical (41 Volts PP)
←

Figure 87—Grid of Vertical Osc. (440 Volts PP) (Pin 5 of V117) (6J5)
→



CV19F

WAVEFORM PHOTOGRAPHS

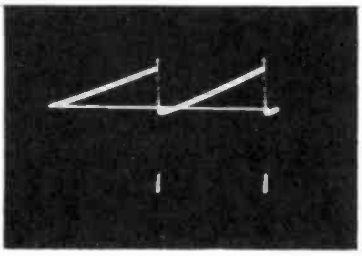
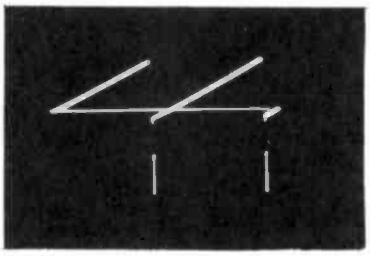

CV20A

Figure 88—Plate of Vertical Osc. (160 Volts PP) (Pin 3 of V117) (6J5)
←

Figure 89—Input Coupling of Vertical Output (130 Volts PP) (Junction of C159, C160 and Read Lead of T107)
→


CV20B

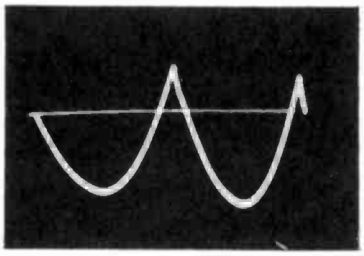
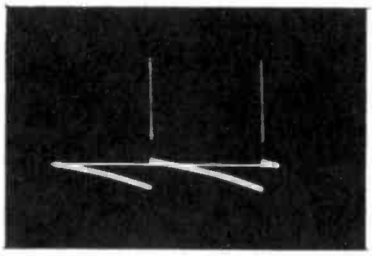

CV20C

Figure 90—Cathode of Vertical Output (1.3 Volts PP) (Pin 8 of V118) (6K6GT)
←

Figure 91—Plate of Vertical Output (800 Volts PP) (Pin 3 of V118) (6K6GT)
→


CV20D

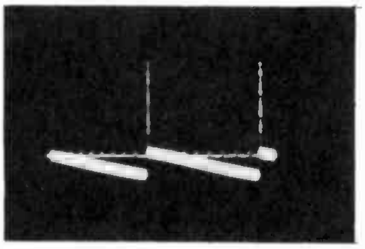
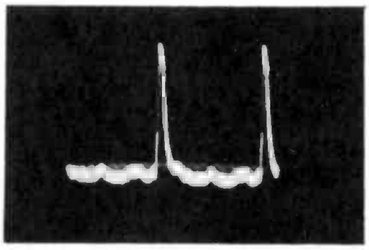
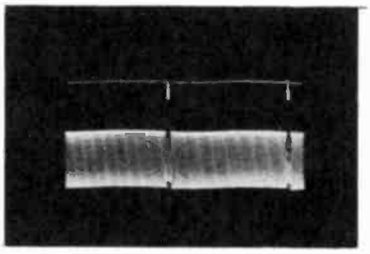

CV20E

Figure 92—Input to Vertical Deflection Coils (100 Volts PP) (Pins 2 and 3 on J102)
←

Figure 93—Vertical Boost of 1st Sync. Amplifier (16 Volts PP) (Junction of R121, R122 and C122)
→

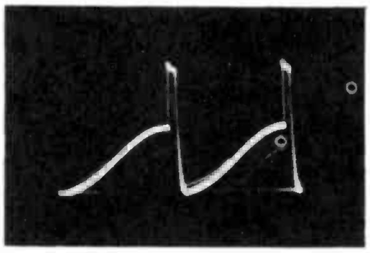

CV21B

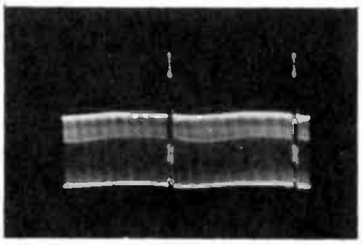

CV21D

Terminal "E" of Sync. Discriminator Transformer (T301)

Figure 94—Vertical (21 Volts PP)
←

Figure 95—Horizontal (18 Volts PP)
→

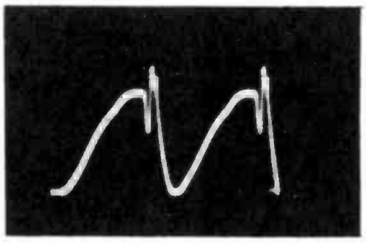

CV21C

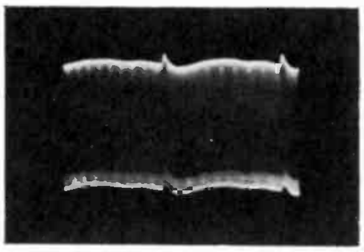

CV21F

Junction of R301 and R303 (Cathode Resistors of Horizontal Sync. Discriminator)

Figure 96—Vertical (7 Volts PP)
←

Figure 97—Horizontal (4.7 Volts PP)
→

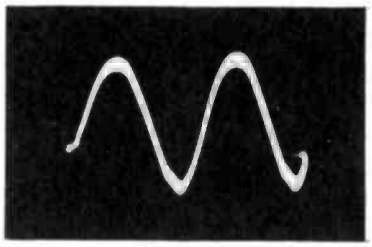

CV21E

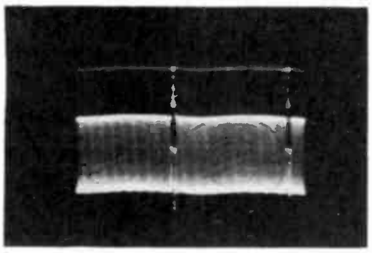

CV22B

Cathode of Hor. Sync. Discriminator (Pin 4 of V301) (6H6)

Figure 98—Vertical (1.7 Volts PP)
←

Figure 99—Horizontal (1.7 Volts PP)
→


CV22A

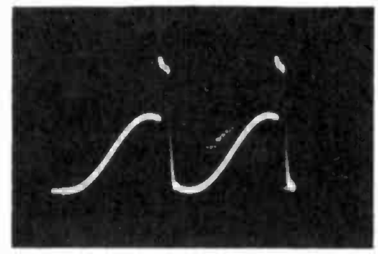


CV23A

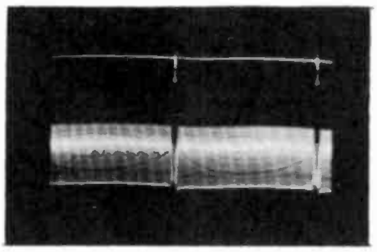
Plate of Hor. Sync. Discr. (Pin 5 of V301) (6H6)

Figure 100—Vertical (22 Volts PP) ←

Figure 101—Horizontal (18 Volts PP) →



CV22F

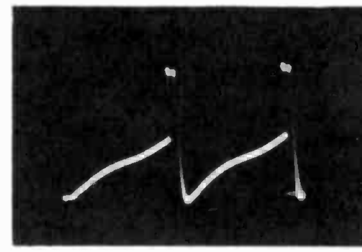


CV22E

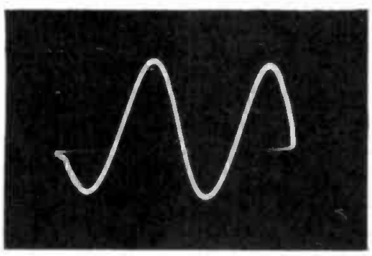
Plate of Hor. Sync. Discr. (Pin 3 of V301) (6H6)

Figure 102—Vertical (22 Volts PP) ←

Figure 103—Horizontal (16 Volts PP) →



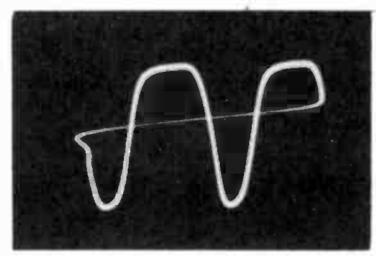
CV22D



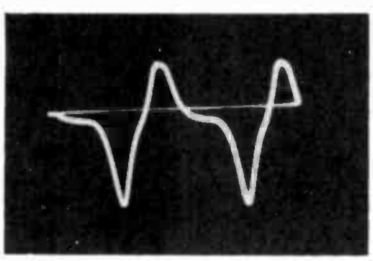
CV23B

Figure 104—Terminal "A" of Sync. Discriminator Transformer (T301) Horizontal (100 Volts PP) ←

Figure 105—Plate of Horizontal Oscillator (260 Volts PP) (Pin 3 of V302) (6K6GT) →



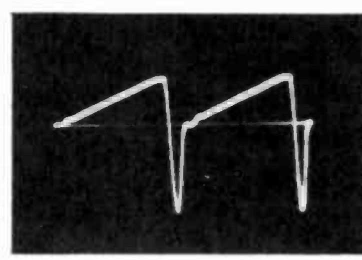
CV23D



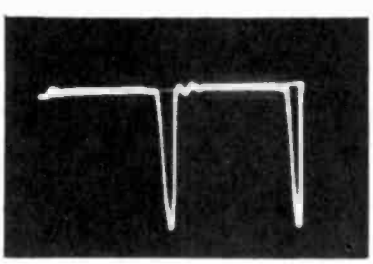
CV23E

Figure 106—Input of Hor. Discharge (90 Volts PP) (Junction of C312, C314 and R314) ←

Figure 107—Plate of Hor. Discharge (100 Volts PP) (Pin 3 of V304) (6J5) →



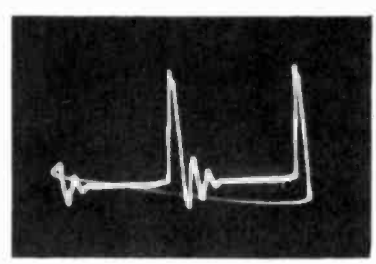
CV23F



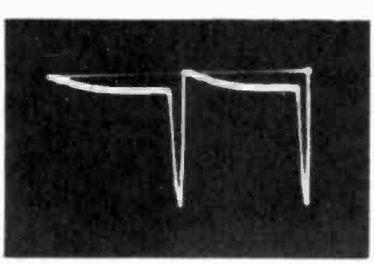
CV24B

Figure 108—Horizontal Feedback (90 Volts PP) (Arm of Potentiometer R340) ←

Figure 109—Plate of Horizontal Output (Approx. 6000 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V306 to Ground) →



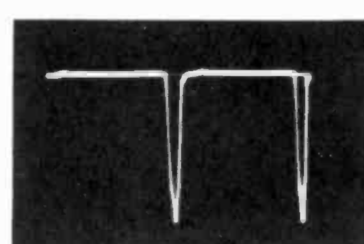
CV24A



CV24D

Figure 110—Grid of Damper (1200 Volts PP) (Pin 1 of V310) (6AS7G) ←

Figure 111—Input to Horizontal Deflection Coils (1500 Volts PP) (Pin 2 of V310) (6AS7G) →



CV24C

TELEVISION VOLTAGE CHART

Measurements made with receiver operating on 117 volts 60 cycles a-c and with no signal input. Voltages shown are read with Jr. "VoltOhmyst" between indicated terminal and chassis ground. Symbol < means "less than."

R-F, I-F CHASSIS, KCS24-1

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V1	6J6	R-F Amplifier	Pictr. Min.	1 & 2	133	—	—	7	0	5 & 6	–34	<.1*	—	*Per Plate
			Pictr. Max.	1 & 2	58	—	—	7	0	5 & 6	–.25	6.0*	—	*Per Plate
V2	6J6	Converter	Pictr. Min.	1 & 2	128	—	—	7	0	5 & 6	–3 to –6.	.5 to 4*	—	*Per Plate
			Pictr. Max.	1 & 2	93	—	—	7	0	5 & 6	–2 to –5.	.2 to 3*	—	*Per Plate
V3	6J6	R-F Oscillator	Pictr. Min.	1 & 2	110	—	—	7	.3	5 & 6	–4.5 to –6.5	2.5*	—	*Per Plate
			Pictr. Max.	1 & 2	80	—	—	7	.2	5 & 6	–3.5 to –5.	1.7*	—	*Per Plate
V101	6BA6	1st Sound I-F Amplifier	Pictr. Min.	5	125	6	125	7	2.0	1	0	15.2	6.2	
			Pictr. Max.	5	107	6	107	7	1.65	1	0	13.	5.1	
V102	6BA6	2d Sound I-F Amplifier	Pictr. Min.	5	125	6	125	7	2.0	1	0	15.4	6.2	
			Pictr. Max.	5	107	6	107	7	1.65	1	0	13.2	5.0	
V103	6AU6	3d Sound I-F Amplifier	Pictr. Min.	5	47	6	47	7	0	1	–.23	2.8	2.8	
			Pictr. Max.	5	41	6	41	7	0	1	–.23	2.9	1.8	
V104	6AL5	Sound Discrim.	Pictr. Min.	2 & 7	–.35	—	—	4 & 5	—	—	—	—	—	
			Pictr. Max.	2 & 7	–.45	—	—	4 & 5	—	—	—	—	—	
V105-A	6AL5	AGC Detector	Pictr. Min.	2	–110	—	—	5	–110	—	—	—	—	
			Pictr. Max.	2	–110	—	—	5	–110	—	—	—	—	
V105-B	6AL5	Picture 2d Det.	Pictr. Min.	7	.15	—	—	1	0	—	—	—	—	
V106	6AT6	AGC Amplifier	Pictr. Min.	7	-33	—	—	2	–110	1	–108	—	—	
			Pictr. Max.	7	0	—	—	2	–100	1	–105	—	—	
V107-A	6AL5	AGC Diode	Pictr. Min.	7	–8.0	—	—	1	–8.0	—	—	—	—	
			Pictr. Max.	7	–3.2	—	—	1	–0.9	—	—	—	—	
V107-B	6AL5	DC Restorer	Brightness Min.	2	–110	—	—	5	–97	—	—	—	—	
			Brightness Max.	2	–1	—	—	5	0	—	—	—	—	
V108	6AG5	1st Pix. I-F Amplifier	Pictr. Min.	5	143	6	143	2 & 7	0	1	–8.1	0	0	
			Pictr. Max.	5	103	6	103	2 & 7	.2	1	–1.0	4.5	1.1	
V109	6AG5	2d Pix. I-F Amplifier	Pictr. Min.	5	145	6	145	2 & 7	0	1	–8.1	0	0	
			Pictr. Max.	5	117	6	117	2 & 7	.2	1	–1.0	3.9	1.3	
V110	6AG5	3d Pix. I-F Amplifier	Pictr. Min.	5	147	6	147	2 & 7	0	1	–8.1	0	0	
			Pictr. Max.	5	100	6	111	2 & 7	.21	1	–1.0	4.5	1.3	
V111	6AG5	4th Pix. I-F Amplifier	Pictr. Min.	5	98	6	138	2 & 7	1.4	1	0	7.3	2.3	
			Pictr. Max.	5	82	6	115	2 & 7	1.15	1	0	6.1	1.9	
V112	6AU6	1st Video Amplifier	Pictr. Min.	5	188	6	150	7	0	1	–2.25	6.7	2.6	
			Pictr. Max.	5	205	6	130	7	0	1	–2.35	4.3	1.6	
V113	6V6-GT	2d Video Amplifier	Pictr. Min.	3	180	4	255	8	8.9	5	–3.9	31.5	9.0	
			Pictr. Max.	3	175	4	249	8	8.5	5	–3.9	30.0	8.5	

TELEVISION VOLTAGE CHART

R-F, I-F CHASSIS, KCS24-1 (Continued)

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V114	6SK7	1st Sync. Amplifier	Pictr. Min.	8	165	6	113	5	0	4	-4.5	8.5	1.2	
			Pictr. Max.	8	180	6	99	5	0	4	-4.7	4.3	1.1	
V115	6SH7	2d Sync. Amplifier	Pictr. Min.	8	150	6	150	5	0	4	-5.3	0	0	
			Pictr. Max.	8	130	6	130	5	0	4	-5.6*	0	0	*Depends on noise
V116	6J5	3d Sync. Amplifier	Pictr. Min.	3	82	—	—	8	0	5	-.4	8.5	—	
			Pictr. Max.	3	73	—	—	8	0	5	-.4*	6.8	—	*Depends on noise
V117	6J5	Vertical Oscillator	Pictr. Min.	3	40*	—	—	8	-110	5	-144	.17	—	*Height, linearity and hold affect readings 2 to 1
V118	6K6-GT	Vertical Output	Pictr. Min.	3	215	4	215*	8	-81	5	-97	16.3	*	*Screen connected to plate

HORIZONTAL DEFLECTION CHASSIS, KRS20-1

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V301	6H6	Horizontal Sync. Discr.	Pictr. Min.	3 5	-5.0 -5.0	—	—	4 8	-3.2 -2.2	—	—	—	—	
V302	6K6-GT	Horizontal Oscillator	Hold Max. Resistance	3	240	4	220	8	.30	5	-27.5	23.3	6.12	
			Hold Min. Resistance	3	230	4	192	8	.32	5	-23.0	24.8	6.87	
V303	6AC7	Horizontal Osc. Control	Pictr. Min.	8	246	6	127	5	0	4	-3	2.9	.75	
V304	6J5	Horizontal Discharge	Pictr. Min.	3	78	—	—	8	0	5	-38	.9	—	
V305	6BG6-G	Horizontal Output	Pictr. Min.	Cap	Do not Meas.*	8	280	3	14.0	5	-8	78	9.6	*6000 volt pulse present
V306	6BG6-G	Horizontal Output	Pictr. Min.	Cap	Do not Meas.*	8	280	3	14.0	5	-8	78	9.6	*6000 volt pulse present
V307	8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	10,500	—	—	—	—	*10,500 volt pulse present
			Brightness Max.	Cap	*	—	—	2 & 7	10,000	—	—	—	—	*10,500 volt pulse present
V308	8016	H. V. Rectifier	Brightness Min.	Cap	10,000	—	—	2 & 7	20,000	—	—	—	—	
			Brightness Max.	Cap	9,500	—	—	2 & 7	19,500	—	—	—	—	
V309	8016	H. V. Rectifier	Brightness Min.	Cap	19,500	—	—	2 & 7	29,000	—	—	—	—	
			Brightness Max.	Cap	18,500	—	—	2 & 7	28,000	—	—	—	—	
V310	6AS7-G	Damper	Pictr. Min.	2 & 5	Do not Meas.‡	—	—	3 & 6	470	1 & 4	290	78*	—	*Total both plates ‡1200 volt pulse present
V311	5V4G	Damper	Pictr. Min.	4 & 6		—	—	8	570	—	—	156*	—	
V312	5TP4	Kinescope	Brightness Min.	Cap	29,000*	10	200	11	0	2	-98	0	—	*Measured with "VoltOhmyst" and high voltage multiplier probe
			Brightness Max.	Cap	28,000*	10	200	11	0	2	-43	.35	—	

POWER SUPPLY CHASSIS, KRS21-1

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V401	5U4G	Lo. V. Rectifier	Pictr. Min.	4 & 6	—	—	—	2 & 8	493	—	—	235*	—	*Total for both tubes
V402	5U4G	Lo. V. Rectifier	Pictr. Min.	4 & 6	—	—	—	2 & 8	493	—	—	*	—	
V403	5U4G	Lo. V. Rectifier	Pictr. Min.	4 & 6	—	—	—	2 & 8	265	—	—	172	—	

** Where separate readings are not listed for max. and min. gain settings of the picture control, the effect of the control is slight and readings are given for "Picture Min."

648PTK, 648PV

RADIO ALIGNMENT PROCEDURE

If any lead dressing is necessary, it should be done before aligning the receiver. See Critical Lead Dress on page 51.
Before aligning set, completely mesh the gang and set the dial pointer to the mechanical max. calibration point at extreme left end of dial.
When making a complete alignment follow the tabulated form below in sequence.
If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the chart.
Any adjustments made on the FM 10.7 mc. I-F's make it necessary to adjust the AM 455 kc. I-F's.

FM RATIO DETECTOR ALIGNMENT

Steps	Connect High Side of the Test Osc. to—	Tune Test Osc. to—	Turn Vol. Cont. to—	Adjust
1	Connect a 680-ohm resistor between lugs D and E of the ratio detector transformer T7. Connect d-c probe of a "VoltOhmyst" to the negative lead of capacitor C81. Connect the common lead of the meter to chassis. Set the function switch to the FM position.			
2	Driver grid, pin 1, of V6 in series with .01 mfd	10.7 mc., 30% mod., 400 cycles AM	Maximum volume	Driver transformer T6 for maximum d-c voltage across C81
3	Remove meter leads and disconnect the 680-ohm resistor from D and E on T7. Connect two 68,000-ohm resistors (within 1% of each other) in series, across C81. Connect the common lead to the "VoltOhmyst" to the center point of the 68,000-ohm resistors and the d-c probe to contact No. 7 on the rear of S7. Use the 30-volt meter range.			
4	Same as step 2	Same as step 2	Maximum volume	*T7 bottom core for zero d-c balance on "VoltOhmyst" **T7 top core for minimum audio output. (Output meter across voice coil)
5	Reconnect "VoltOhmyst" as in step 1, omitting the 680-ohm resistor.			
6	Repeat step 2, omitting 680 ohms.			
7	Remove all connections.			

* Near the correct core position the zero point is approached rapidly and continued adjustment causes the indicated polarity to reverse. A slow approach to the zero point is an indication of severe detuning, and the bottom core should be turned in the opposite direction.

** The zero d-c balance and the min. a-f output should occur at the same point; if such is not the case, the two cores should be adjusted until both occur with no further adjustment of either core. It may be advantageous to adjust both cores simultaneously, watching the "VoltOhmyst," and an output meter connected across the voice coil for the point at which both zero d-c and min. output occur.

NOTE.—Two or more points may be found which will satisfy the condition required in step 4. T7 top core should be correctly adjusted when approximately ⅛ inch of threads extend above the can, therefore, it is desirable to start adjustment with top core at the max. "in" position and turn out, while adjusting the bottom core, until the first point of minimum a-f and minimum d-c is reached.

FM I-F ALIGNMENT

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Test Osc. to—	Radio Dial Tuned to—	Adjust
1	Connect "VoltOhmyst" d-c probe to negative lead of C81, and the meter common lead to chassis ground.				
2	Mixer grid (pin #1) of 6BA6 (V2) in series with .01 mfd (Adjust test osc. output for 6-10 volts developed across C81)	To r-f tube shelf ground	10.7 mc., 30% modulated at 400 cycles AM	Max. cap. (Fully meshed) (Function switch in FM position)	***T5, T3 and T1 top and bottom cores alternately loading pri. and sec. of each trans. with 680 ohms while the opposite side of the same trans. is being adjusted. Adjust all for max. voltage across C81

*** This method, which is known as alternate loading, involves the use of a 680-ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680-ohm resistor while the plate winding is being peaked. When windings are loaded, it is necessary to increase the 10.7 mc. input, since gain will decrease and voltage across C81 will be less.

AM I-F, OSC, R-F AND ANT ALIGNMENT

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Output Meter.—Connect the meter across the speaker voice coil, and turn the receiver volume control to maximum.

Steps	Connect the High Side of the Test Osc. to—	Tune Test Osc. to—	Function Switch	Turn Radio Dial to—	Adjust the following
1	Pin #1 of 6BA6 (V2) in series with .01 mfd	455 kc.	"C" Band	High Freq. end of Dial	†Top and bottom cores of T2 and T4. (For max. voltage across voice coil.)
2	Ant. term #4 through dummy ant. of 25 mmfs in series with 150 ohms	15.5 mc.	"C" Band	15.5 mc.	††Osc.—C37; R-F—C15; Ant.—C8.
3		9.5 mc.	"C" Band	9.5 mc.	†††Osc.—L17; R-F—L12; Ant.—L5.
4	Repeat steps 2 and 3 for accurate alignment.				
5	Ant. term #4 through dummy ant. of 200 mmfs.	1400 kc.	"A" Band	1400 kc.	Osc.—C36; R-F—C84; Ant.—C90. (For max. voltage across voice coil.)
6		600 kc.	"A" Band	600 kc.	Osc.—L18; R-F—L13; Ant.—L21. (For max. voltage across voice coil.)
7	Repeat steps 5 and 6 for maximum output.				

RADIO ALIGNMENT PROCEDURE

648PTK, 648PV

AM I-F, OSC, R-F AND ANT ALIGNMENT (Continued)

†It is necessary to alternately load the primary and secondary of each 455-kc. i-f transformer with 10,000 ohms while the opposite side of the same transformer is being adjusted.

††To guard against the possibility of alignment of L17 and C37 to image frequencies, tune the test oscillator to 16.41 mc. (image frequency). By increasing the test oscillator output, a signal should be heard.

†††Tune the test oscillator to 10.41 mc. (image frequency). By increasing the test oscillator output, a signal should be heard. (If these image frequencies cannot be heard, the set is incorrectly aligned, therefore repeat steps 2 and 3.)

FM OSC, R-F AND ANT ALIGNMENT

Steps	Connect High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune Test Osc. to—	Radio Dial Tuned to—	Adjust
1	Ant. term. #4 in series with 120-ohm resistor	Ant. term. #5 in series with 120 ohms	106 mc.	106 mc.	OSC, C20 for max. voltage across C81.
2			88 mc.	88 mc.	*OSC, L9 for max. voltage across C81.
3	Repeat steps 1 and 2 for accurate alignment.				
4	Remove or turn Test Oscillator off.			106 mc.	**R-F, C13 for max. noise voltage across C81.
5				90 mc.	*R-F, L11 for max. noise voltage across C81.
6	Repeat steps 4 and 5 for maximum output.				
7	Ant. term. #4 in series with 120-ohm resistor	Ant. term. #5 in series with 120 ohms	106 mc.	106 mc.	Ant. C5 for max. voltage across C81.
8			90 mc.	90 mc.	Ant. L3 for max. voltage across C81.
9	Repeat steps 7 and 8 for maximum output.				

* Two points may be found to fulfill the requirements. Use the one with the longest threaded end extending out of the transformer.

** Two points can be found having the greatest noise voltage developed. Use the one with the greater capacity (tighter adjustment).

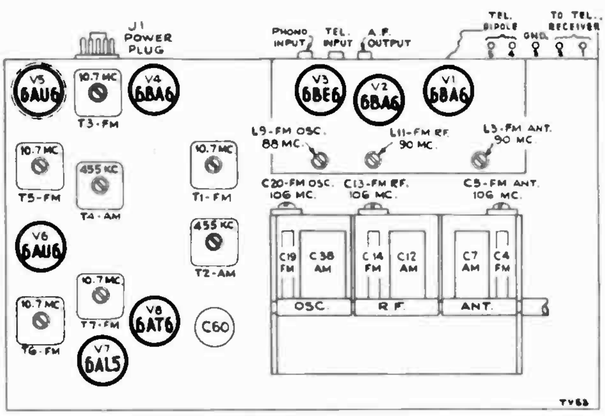


Figure 116—Chassis, Top View, Showing Adjustments

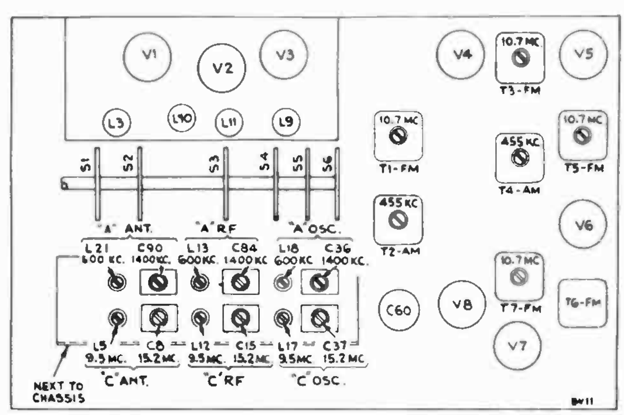


Figure 117—Chassis, Bottom View, Showing Adjustments

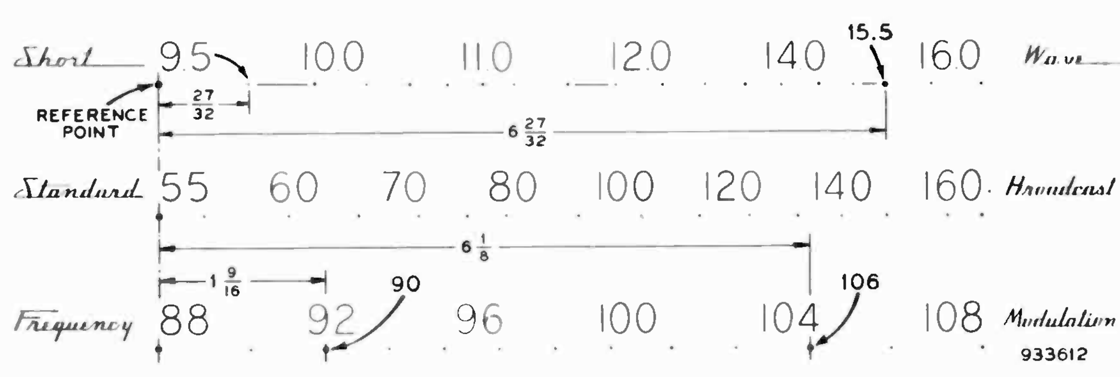


Figure 118— Dial Scale Drawing.

RADIO WIRING DIAGRAM

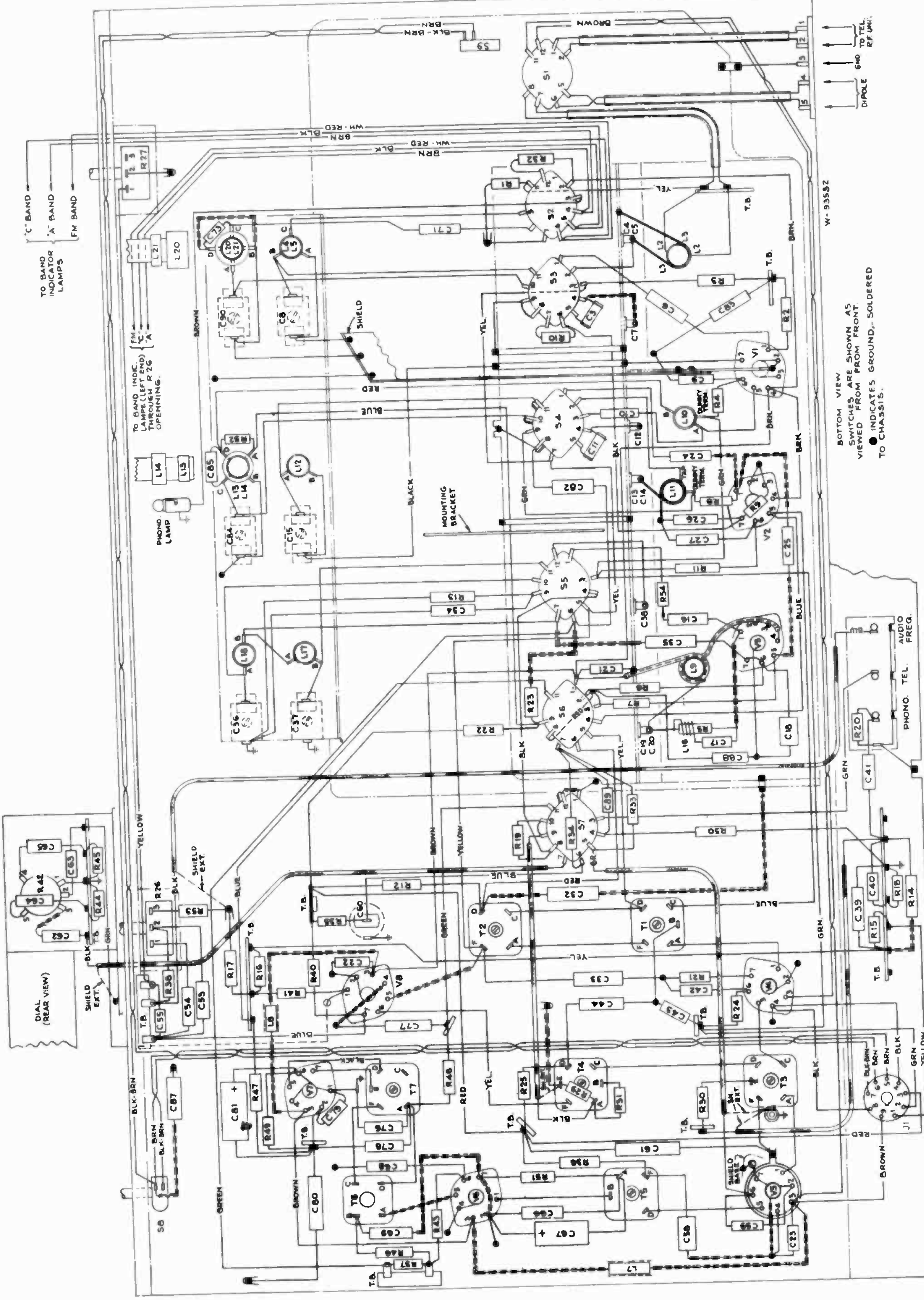


Figure 119—Radio Chassis Wiring Diagram **648PTK**

RADIO WIRING DIAGRAM 648PTK, 648PV

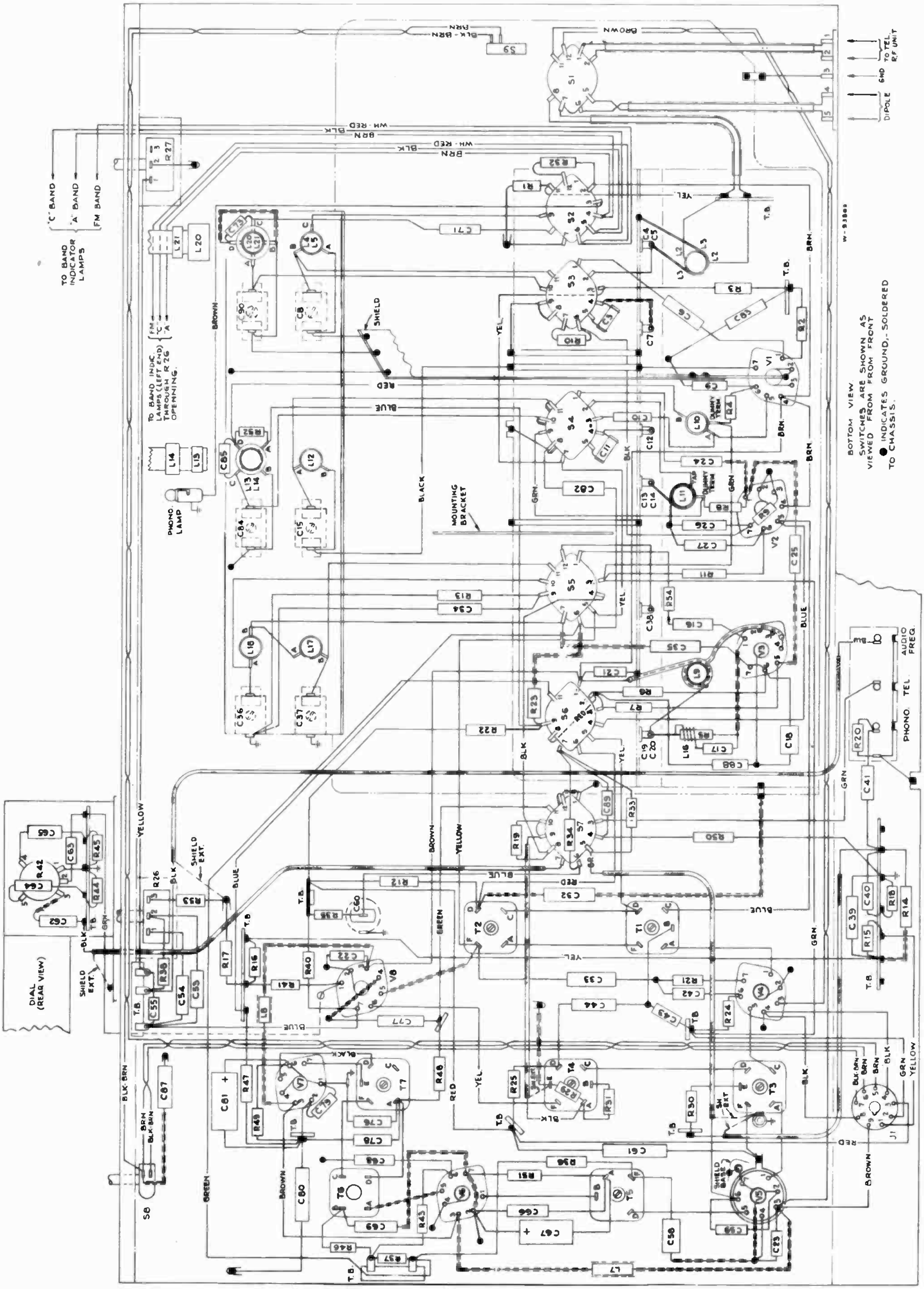


Figure 119—Radio Chassis Wiring Diagram **648PV**

648PTK, 648PV RADIO SCHEMATIC DIAGRAM

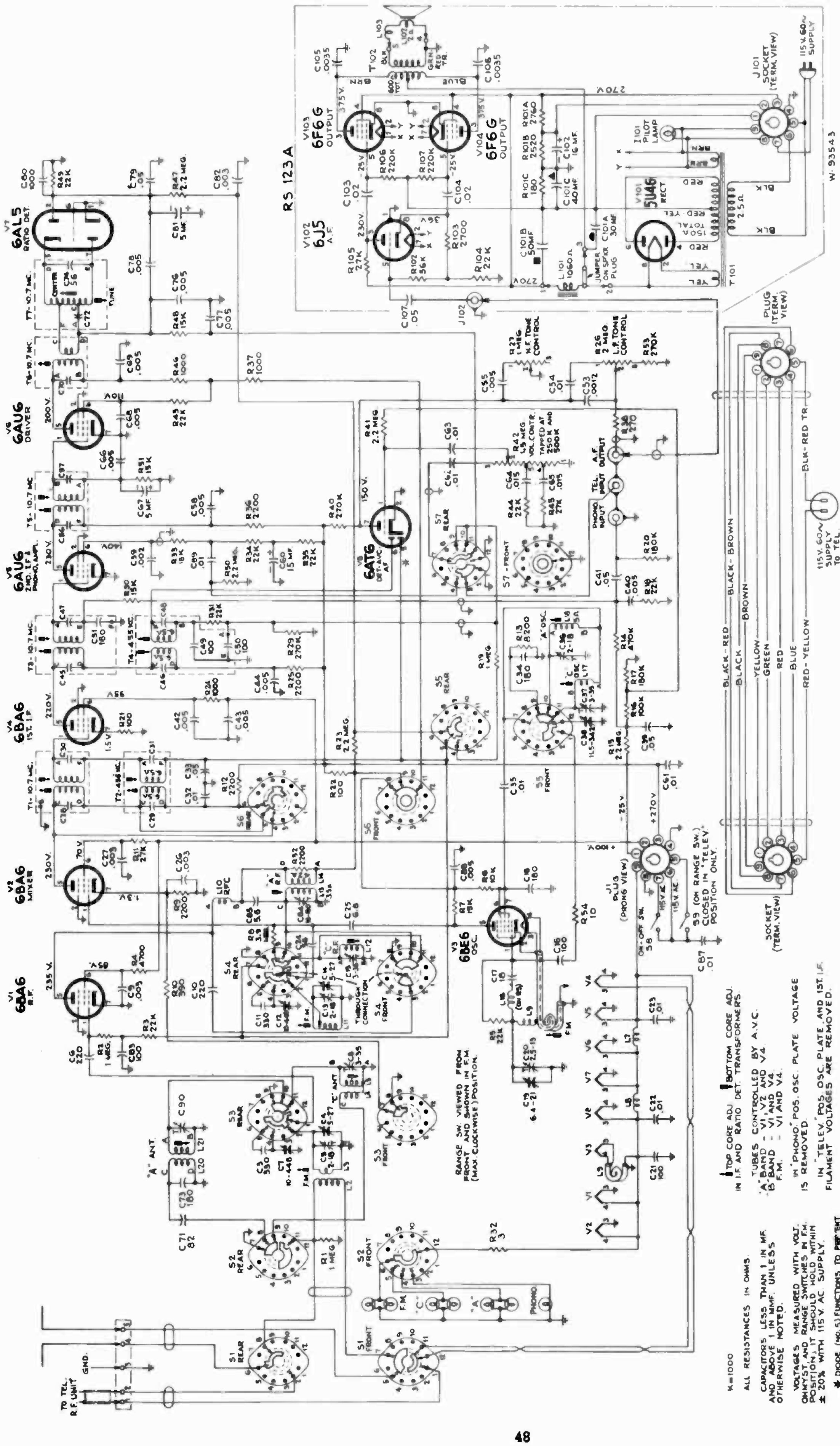


Figure 120—Radio and Audio Amplifier Schematic Diagram **648PTK**

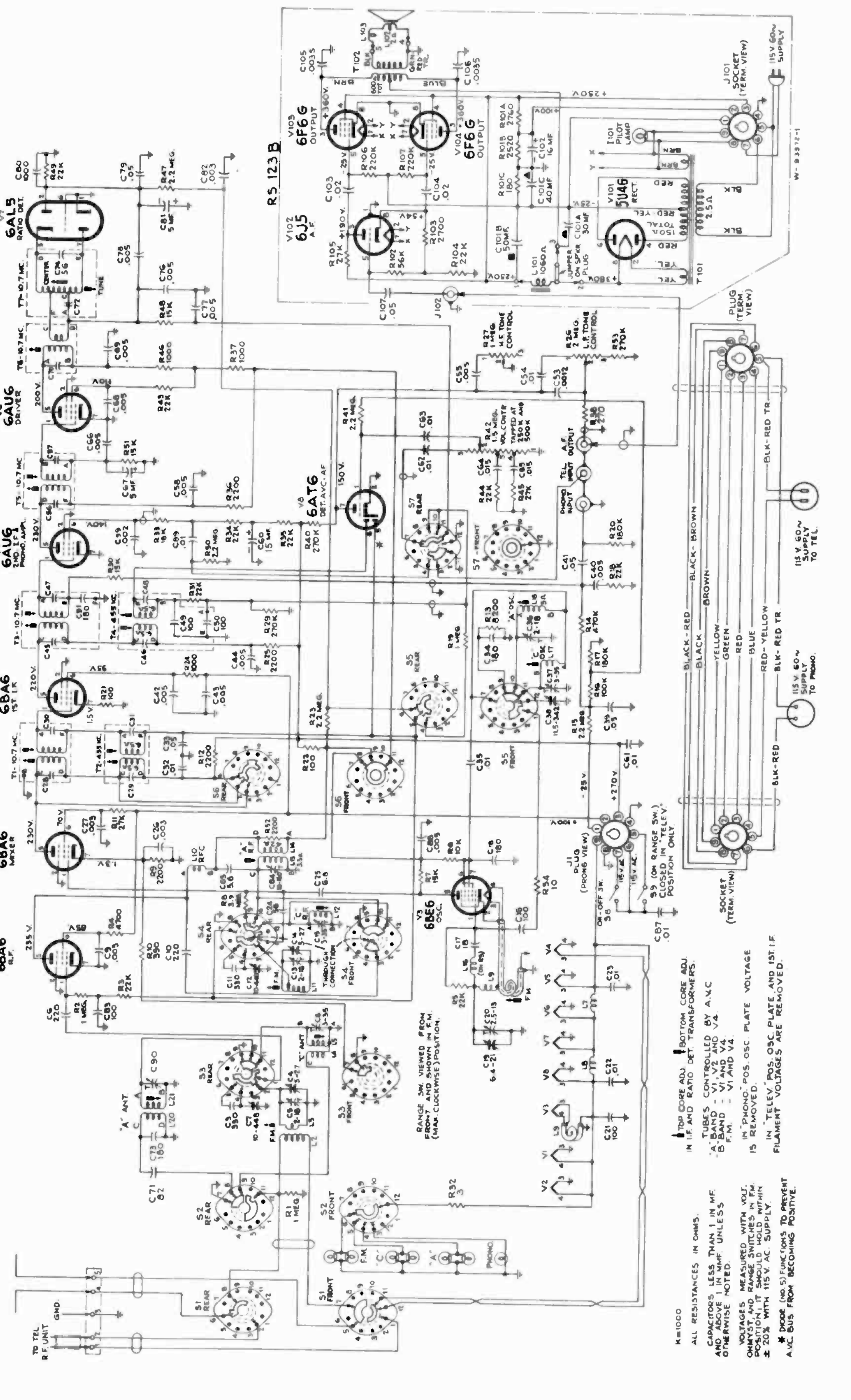


Figure 120—Radio and Audio Amplifier Schematic Diagram **648PV**

648PTK, 648PV • RADIO MISCELLANEOUS DATA

RADIO VOLTAGE CHART

All voltages were measured with respect to ground, using a "VoltOhmyst."

Tube	Type		Pin #	Tel. or Phono	B.C.	S.W.	F.M.
V1	6BA6	Plate	5	260	225	220	235
		SCG	6	95	110	90	85
V2	6BA6	Plate	5	260	255	240	230
		SCG	6	90	100	70	70
		Cathode	7	6	6.5	1.8	1.3
V3	6BE6	Plate	5	0	160	155	140
		Grids 2-3-4	6, 7	0	155	160	140
		Grid 1	1	—	−5.2 (1600 KC)	−10.5 (9.5 MC)	−6.6 (108 MC)
		Grid 1	1	—	−2.7 (550 KC)	−15.5 (16.2 MC)	−9 (88 MC)
V4	6BA6	Plate	5	245	250	230	220
		SCG	6	110	120	105	95
		Cathode	7	1.4	1.2	1.4	1.5
V5	6AU6	Plate	5	255	245	240	230
		SCG	6	145	140	140	140
V6	6AU6	Plate	5	0	0	0	200
		SCG	6	0	0	0	110
V7	6AL5	—	—	—	—	—	—
V8	6AT6	Plate	7	150	150	150	150
V101	5U4G	Fil.	8	380	—	—	—
V102	6J5	Plate	3	230	—	—	—
		Cathode	8	36	—	—	—
V103 V104	6F6G	Plate	3	375	—	—	—
		SCG	4	270	—	—	—
		Grid	5	−25	—	—	—

CATHODE CURRENTS WITH FUNCTION SWITCH IN FM POSITION

V1	R-F Amp.	14 ma.	V7	Ratio Det.	—
V2	Mixer	4.7 ma.	V8	Det.-Avc.-AF	.5 ma.
V3	Osc.	15.9 ma.		Power Amp. RS123A	
V4	First I-F	12.4 ma.	V101	Rectifier	140 ma.
V5	2nd I-F-Phono. Amp.	5.6 ma.	V102	Phase Inverter	2.15 ma.
V6	Driver FM	13.7 ma.	V103, V104	Power Output	27 ma. each

* Listed voltages are correct for Model 648PTK. In Model 648PV; there is no plate voltage on V5 except in the FM position, the screen grid voltage on this tube is approximately 30 volts lower in TV, PH, BC and SW positions.

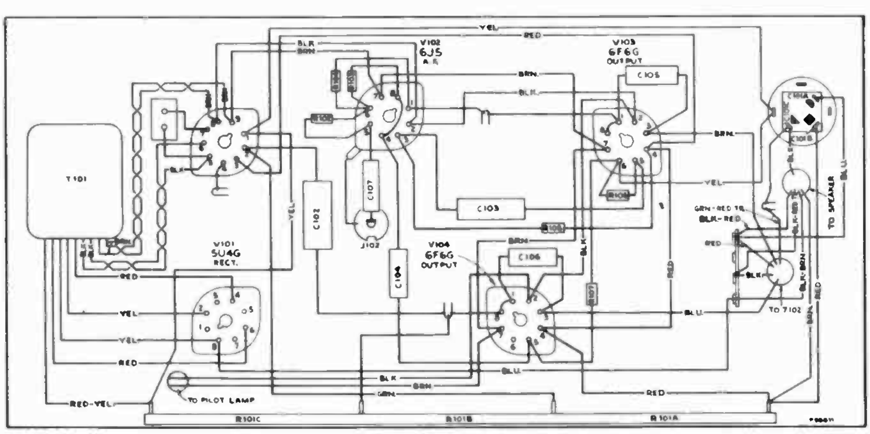


Figure 121—Audio Amplifier Wiring Diagram

CRITICAL LEAD DRESS

(Any lead dress should be made before alignment.)

1. Lead from pin 5, tube V2, to terminal "C" on transformer T1 should be dressed close to chassis.
2. Leads to terminals "C" and "D" on transformer T2 should be dressed close together.
3. The following capacitors must be dressed close to the chassis with leads kept as short as possible: C32, C33, C66, C69, C79, and C80.
4. All FM coil connections must be soldered in exact place as the original. (One-sixteenth inch difference in length may be excessive.)
5. Lead from pin 7, tube V8, must be dressed away from lead to terminal "D" of transformer T7.
6. All r-f and i-f wiring in the receiver is critical as to length and placement. It is therefore important when servicing, that extreme care should be taken so as not to disturb more of the wiring than absolutely necessary.

NOTE: Keep tuning capacitor rotor grounding brushes clean and making good contact.

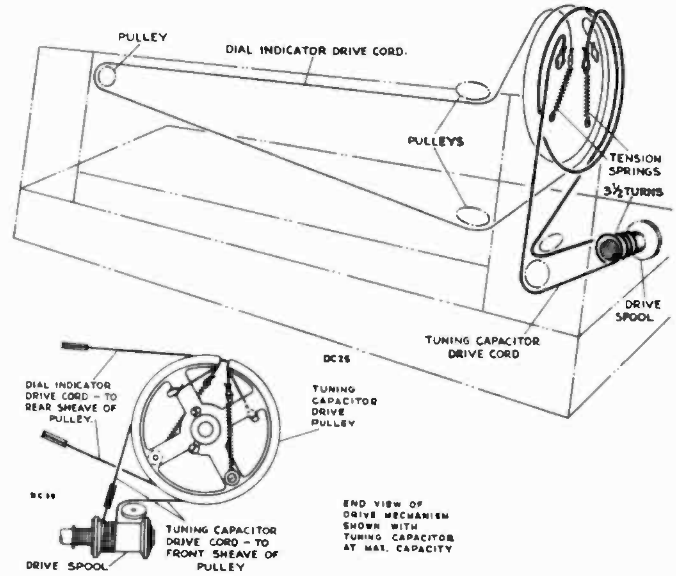


Figure 122—Dial and Drive Cord Assembly

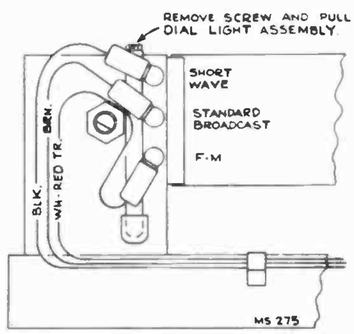


Figure 123—Removal of Dial Lamps

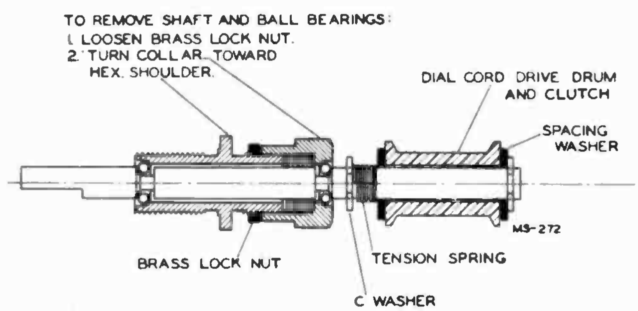


Figure 124—Tuning Shaft and Clutch Assembly

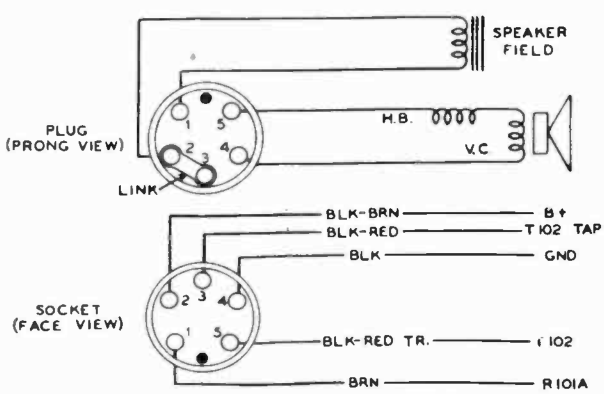


Figure 125—Speaker Connections

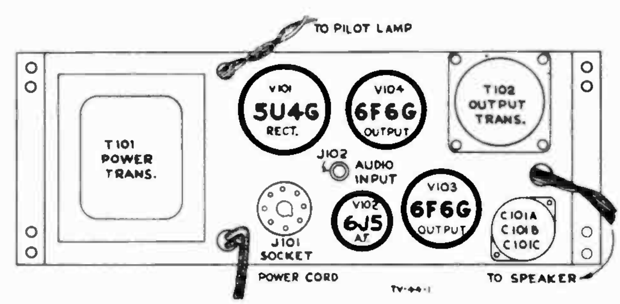


Figure 126—Top View of RS123A

PUSH BUTTON ADJUSTMENT

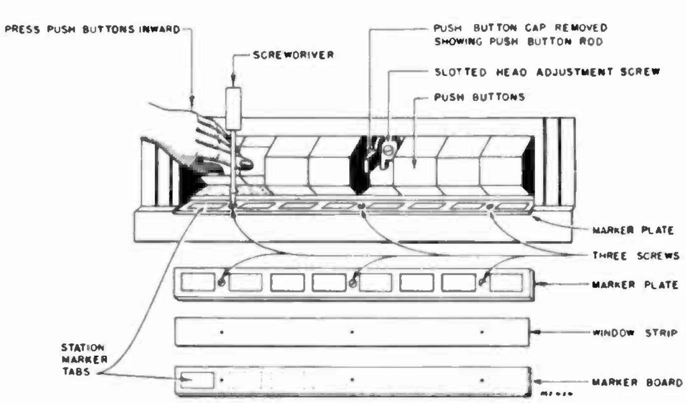


Figure 127—Push Button Adjustments

The push buttons should be adjusted for eight favorite stations after the receiver is operating, and has had a 5 or 10 minute warm-up period.

Any standard broadcast or frequency modulation stations may be chosen. The preferable arrangement is to adjust for stations in the order of frequency, from low to high. Proceed as follows:

1. Remove the first push button (just pull) and note the adjustment screw beneath.
2. Loosen the adjustment screw.
3. Manually tune very accurately for the desired station.
4. Push the push button rod in till it is against stop.
5. Tighten adjustment screw.
6. Make adjustment for the other buttons, setting up and checking each for the chosen station in a similar manner.
7. Recheck all push buttons and reset if found necessary.

648PTK, 648PV

RADIO SIMPLIFIED SCHEMATICS

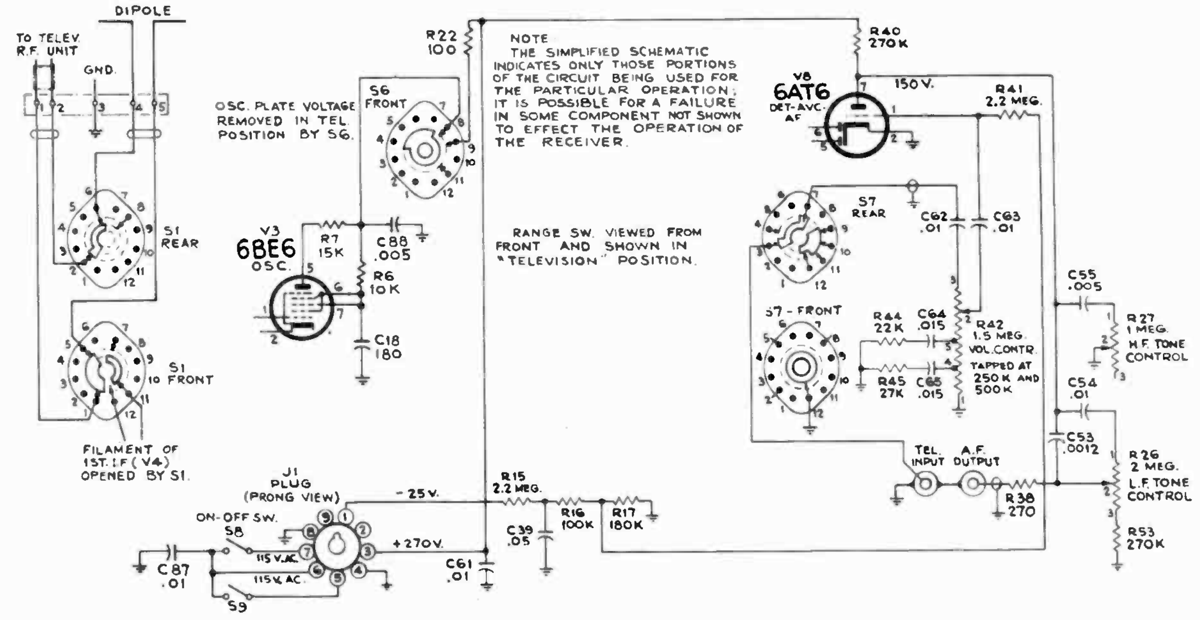


Figure 128—Simplified Schematic—Shown in Television Position

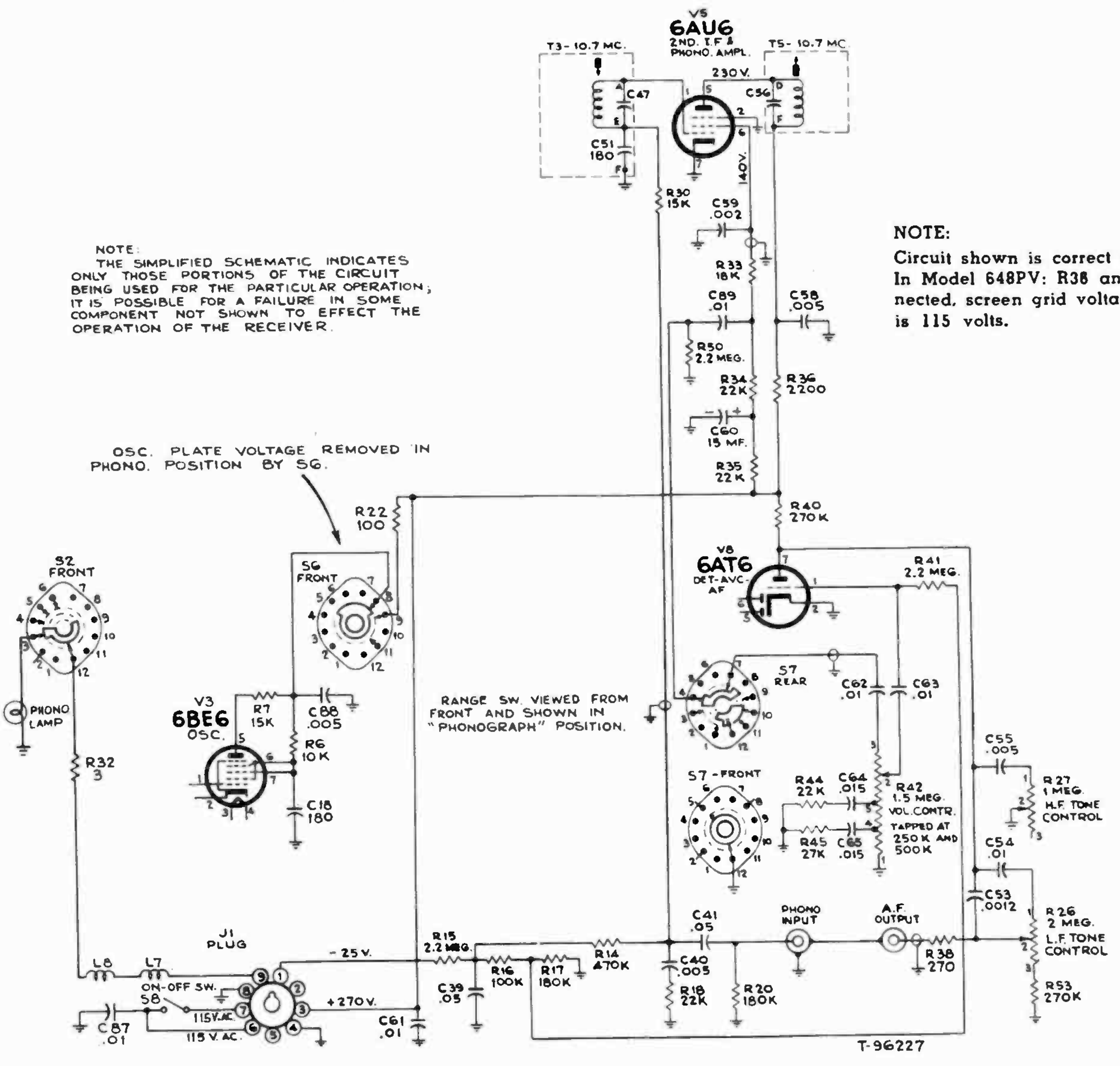


Figure 129—Simplified Schematic—Shown in Phono Position

NOTE:
Circuit shown is correct for Model 648PTK. In Model 648PV: R38 and T5 are not connected, screen grid voltage (pin #6 of V5) is 115 volts.

RADIO SIMPLIFIED SCHEMATIC 648PTK, 648PV

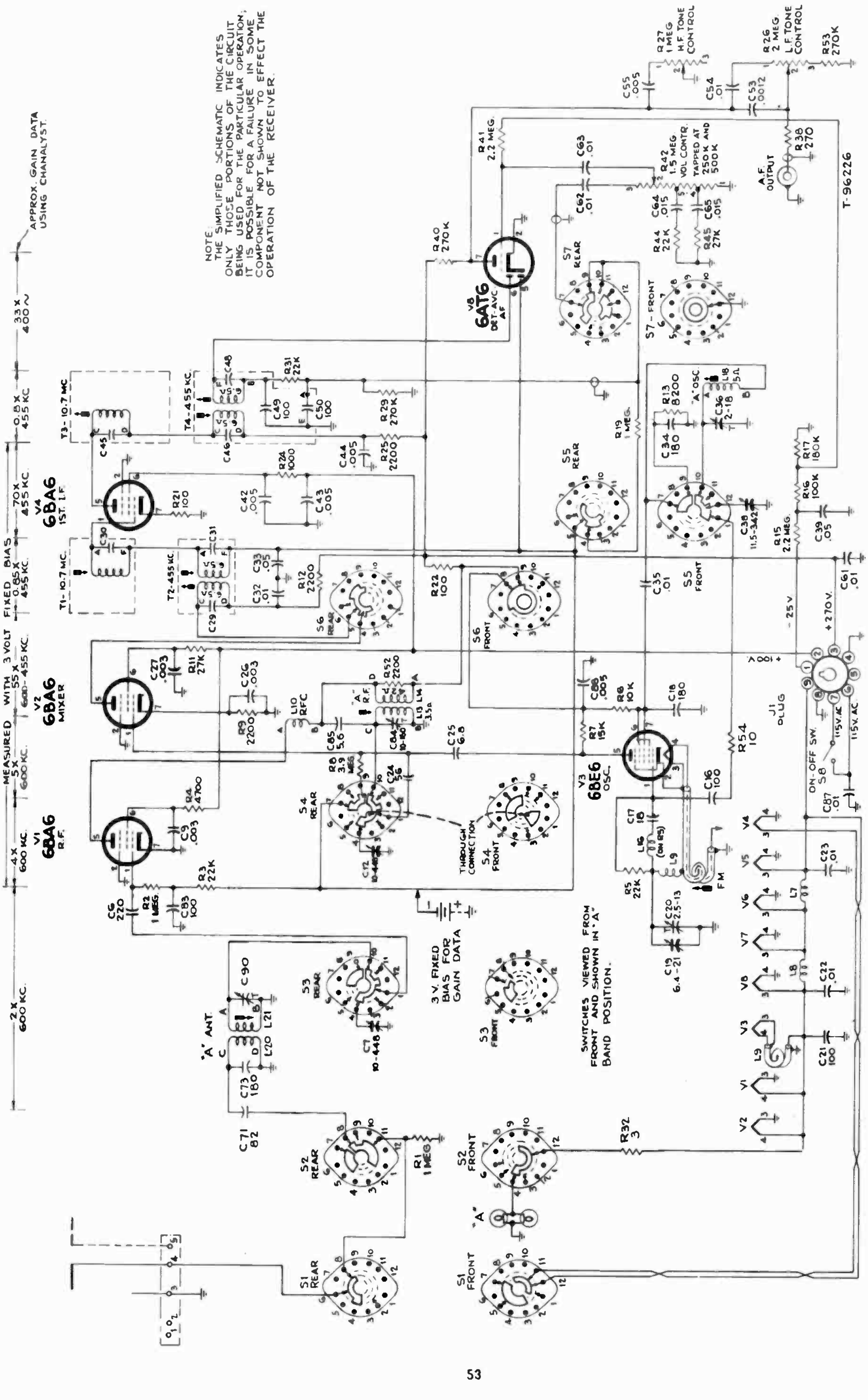


Figure 130—Simplified Schematic—Shown in "A" Band Position

RADIO SIMPLIFIED SCHEMATIC

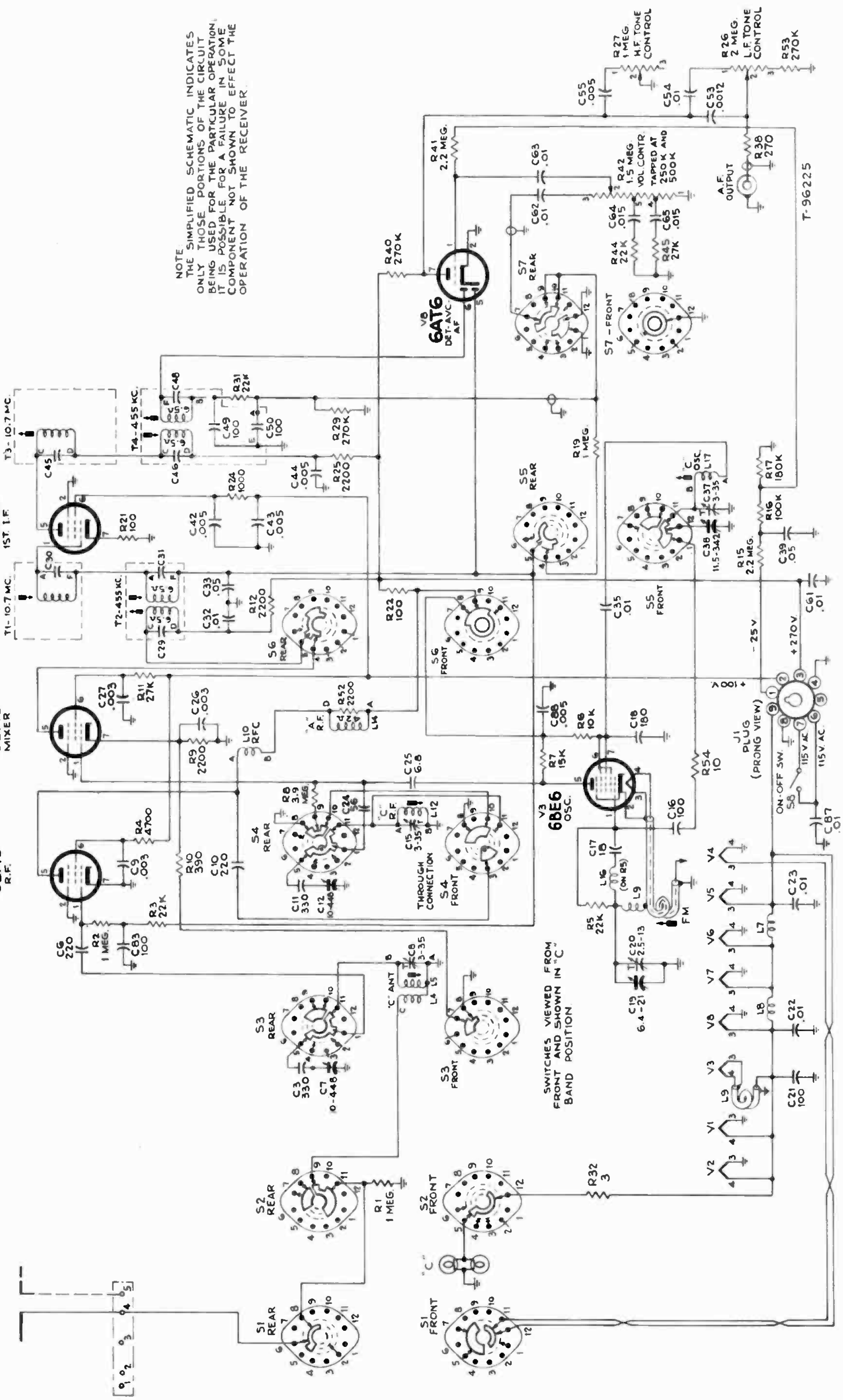


Figure 131—Simplified Schematic—Shown in "C" Band Position

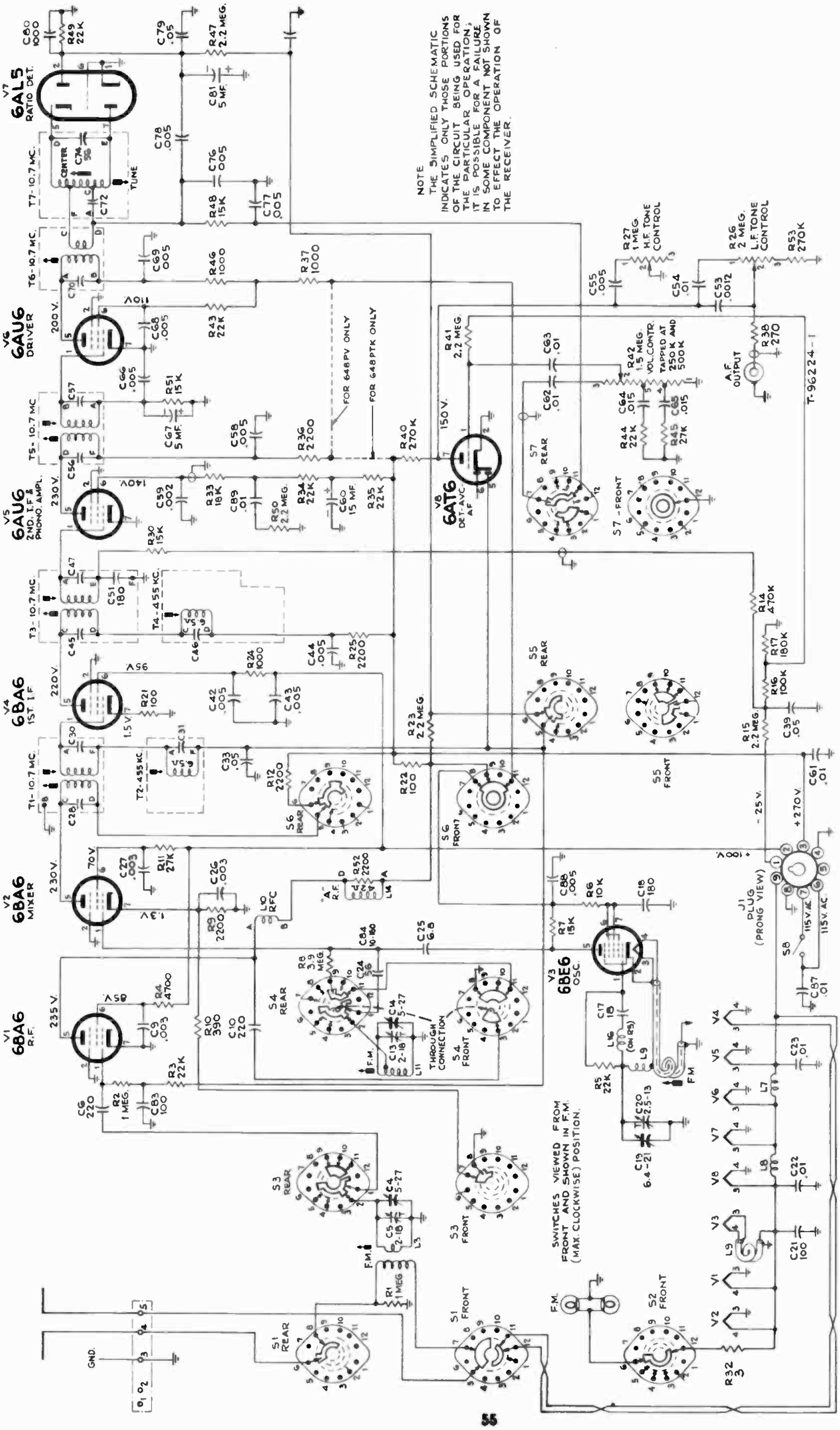


Figure 132—Simplified Schematic—Shown in FM Position

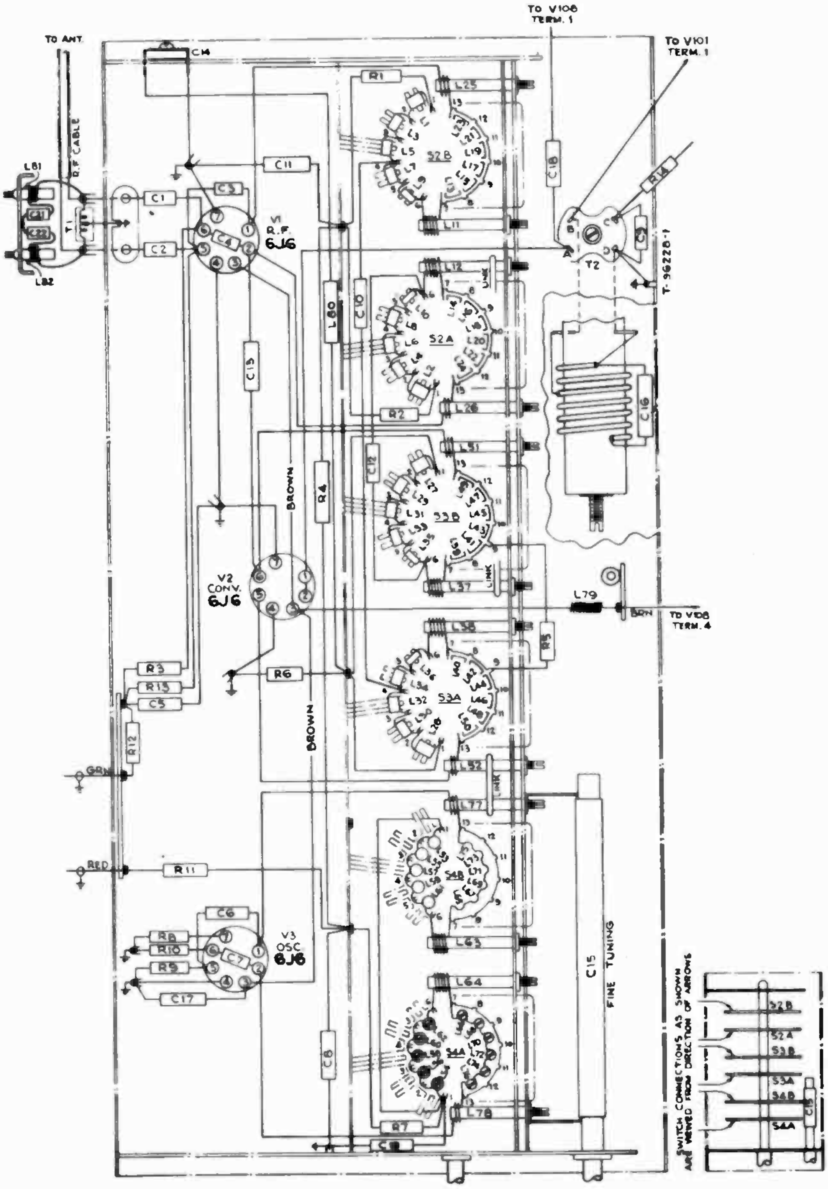


Figure 133—Television R-F Unit Wiring Diagram

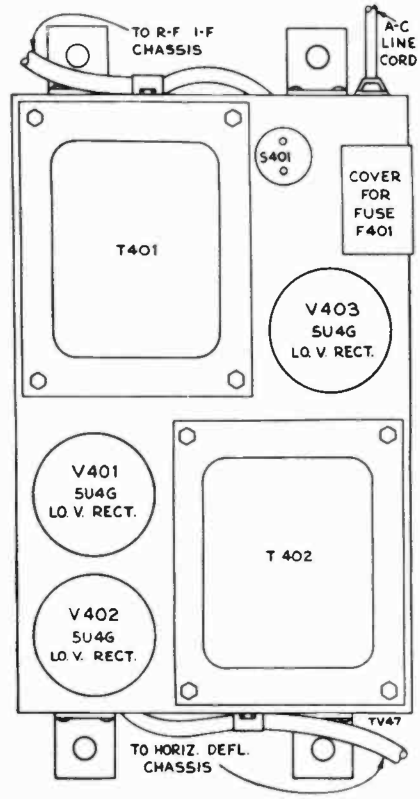
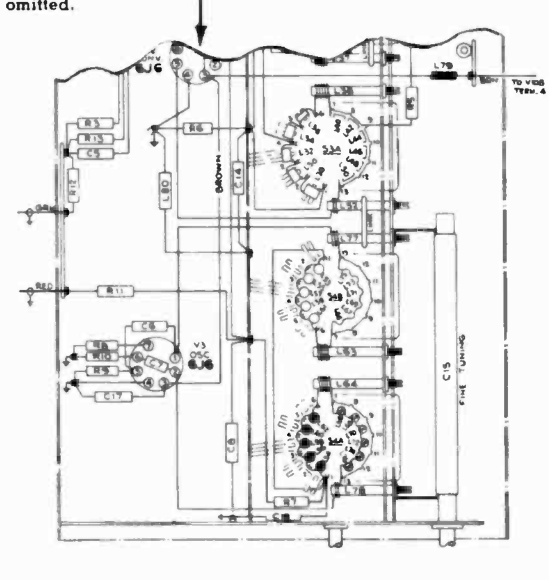


Figure 134—Power Supply, Top View

Note: In some units C19 is omitted.

In most units C14 is fixed.



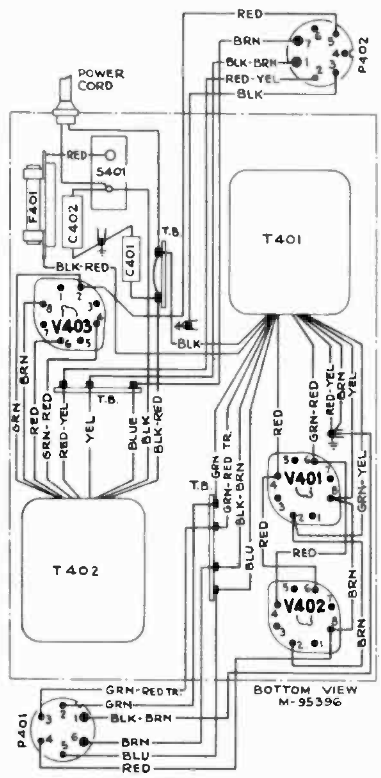
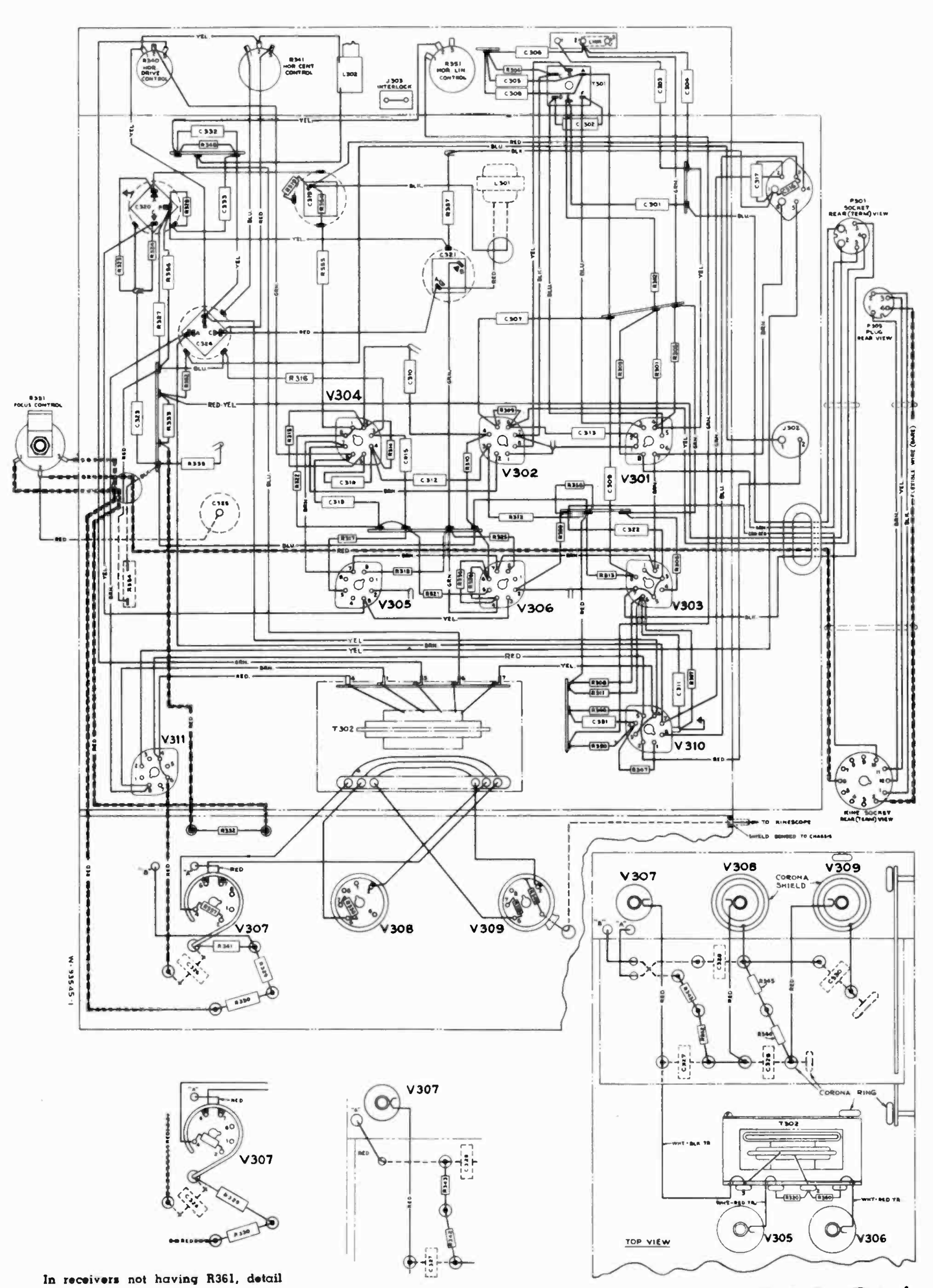


Figure 135—Power Supply Wiring Diagram



In receivers not having R361, detail is as shown above.

In some receivers R360 may be omitted.

Figure 139—Horizontal Deflection Chassis Wiring Diagram

648 PV

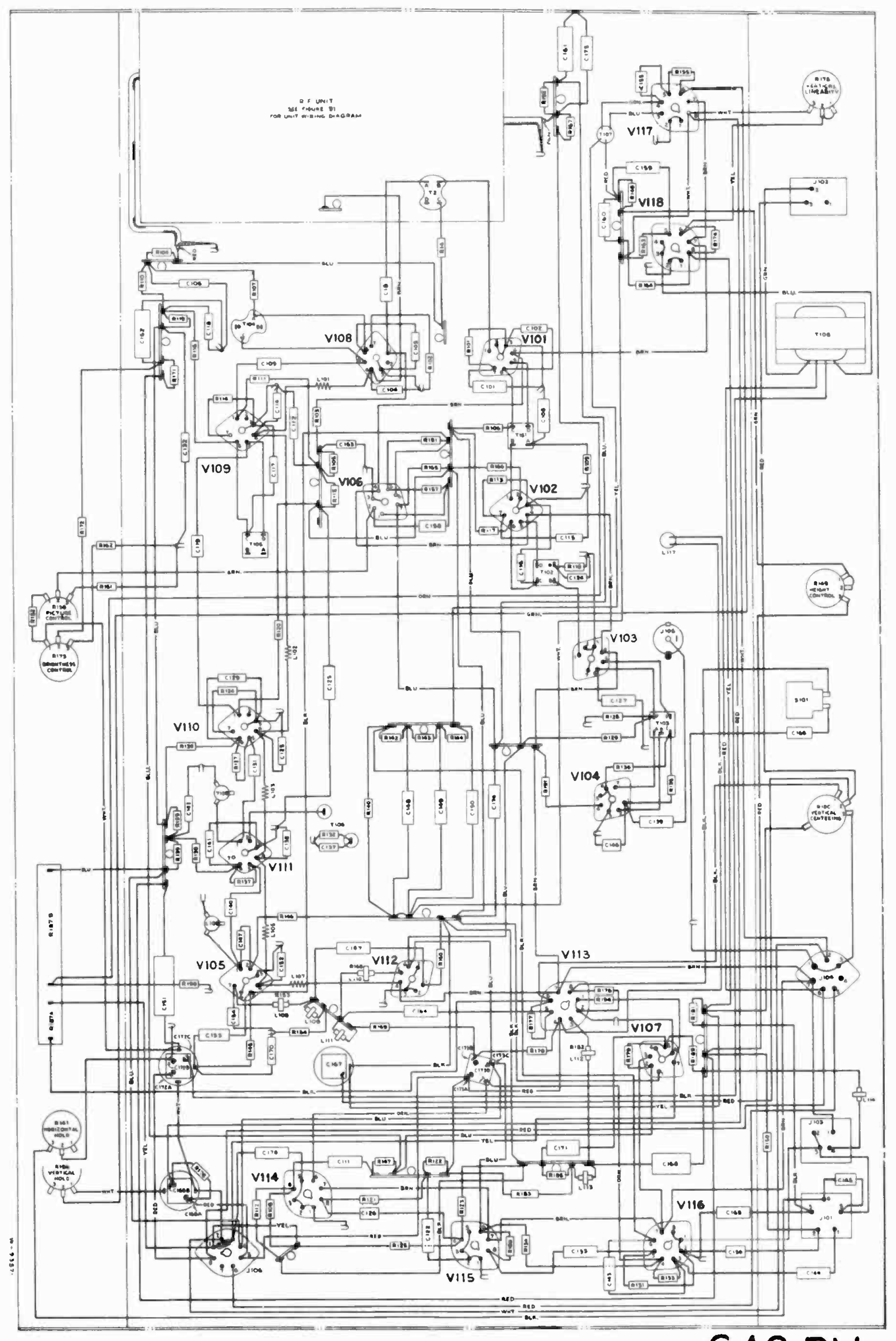
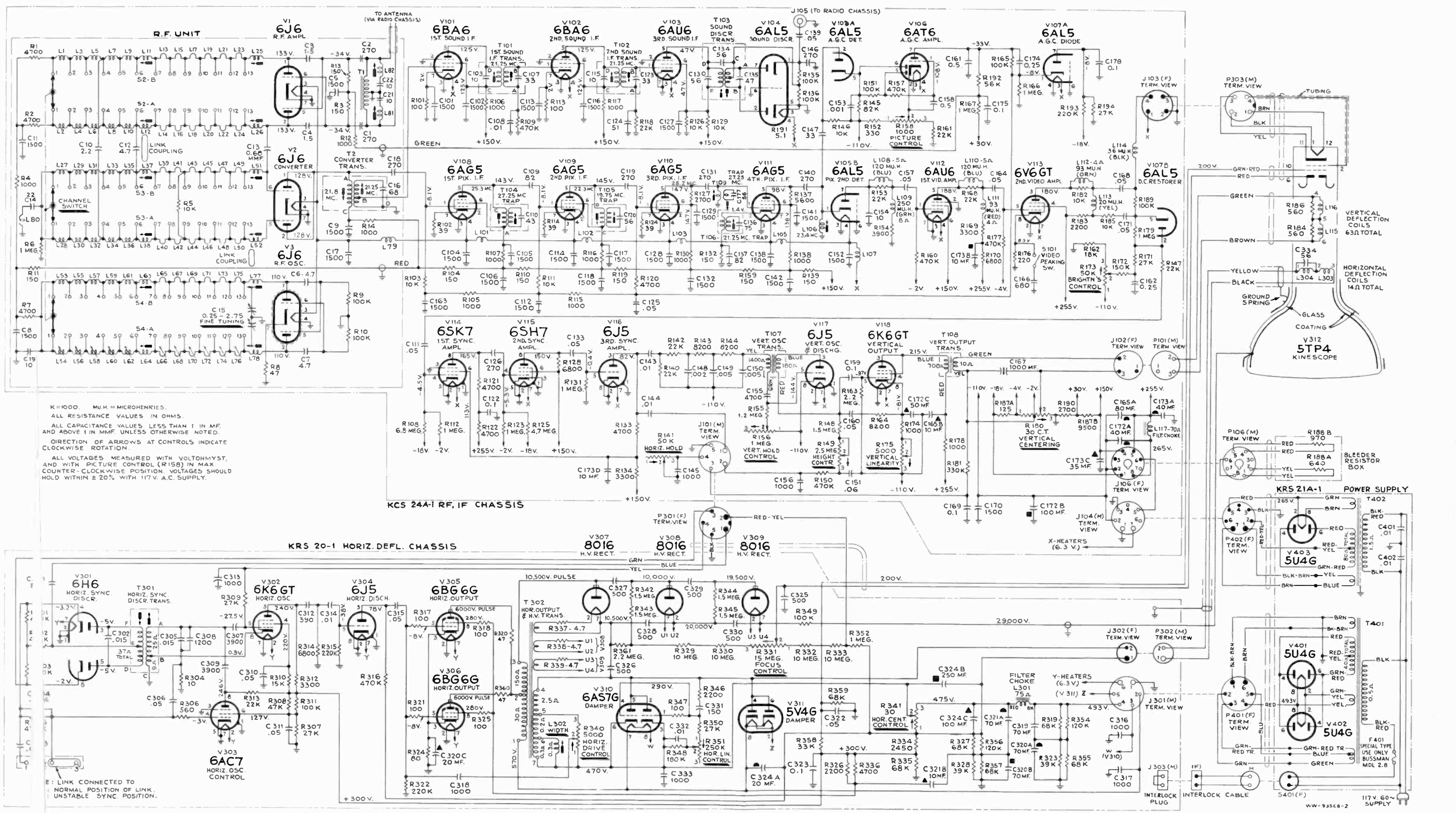


Figure 140—R-F, I-F Chassis Wiring Diagram

648 PV



The schematic diagram shows the circuit with all the latest changes incorporated at the time of printing.

In some receivers R162 may be 33K.

In some receivers, the trap winding of T109 may be omitted.

In some receivers R164 may be 6.8K.
In some receivers R155 may be 1 Meg.

In some receivers R360 may be omitted.

648 PV

Figure 141—Television Schematic Diagram

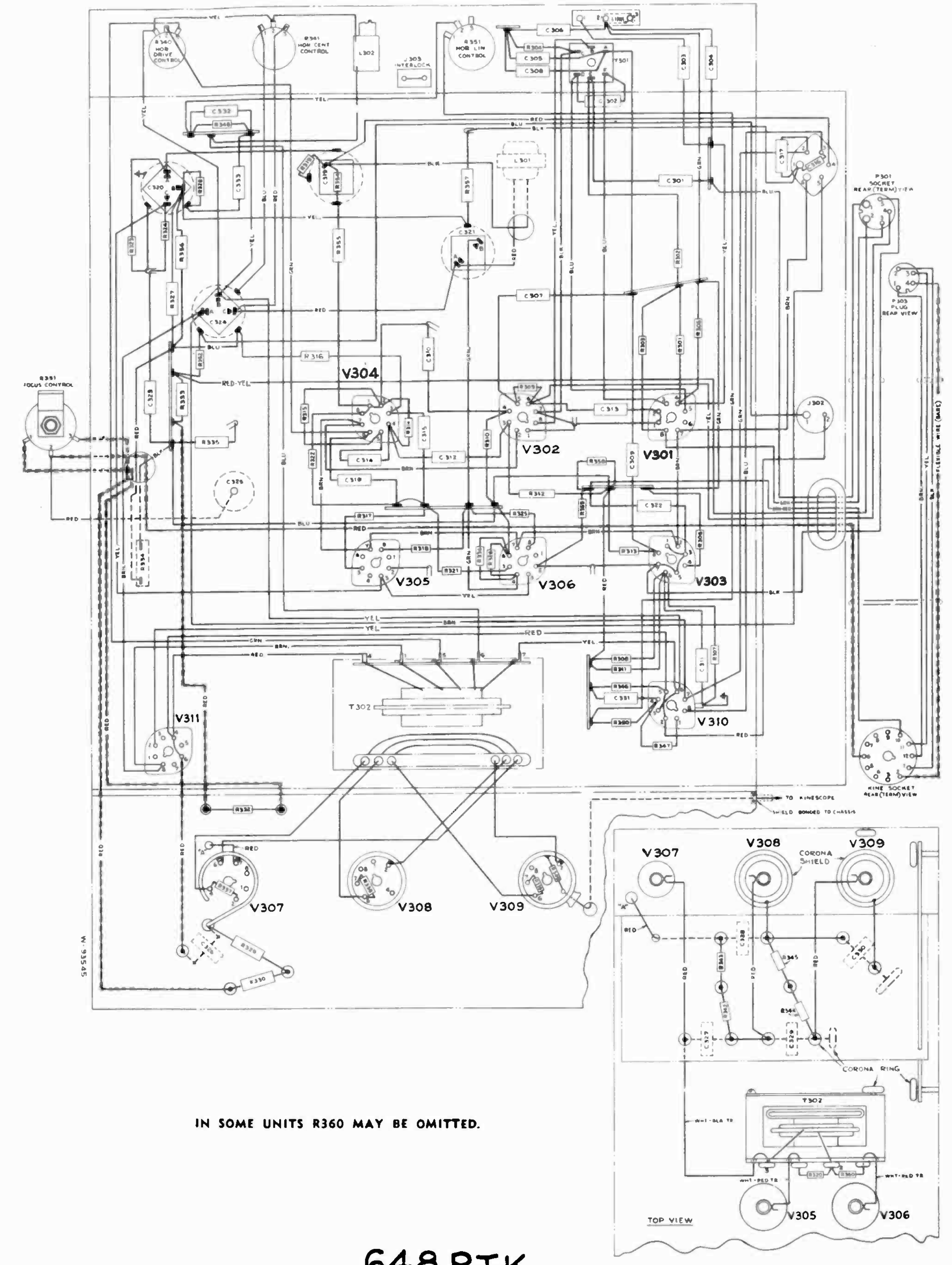


Figure 136—Horizontal Deflection Chassis Wiring Diagram

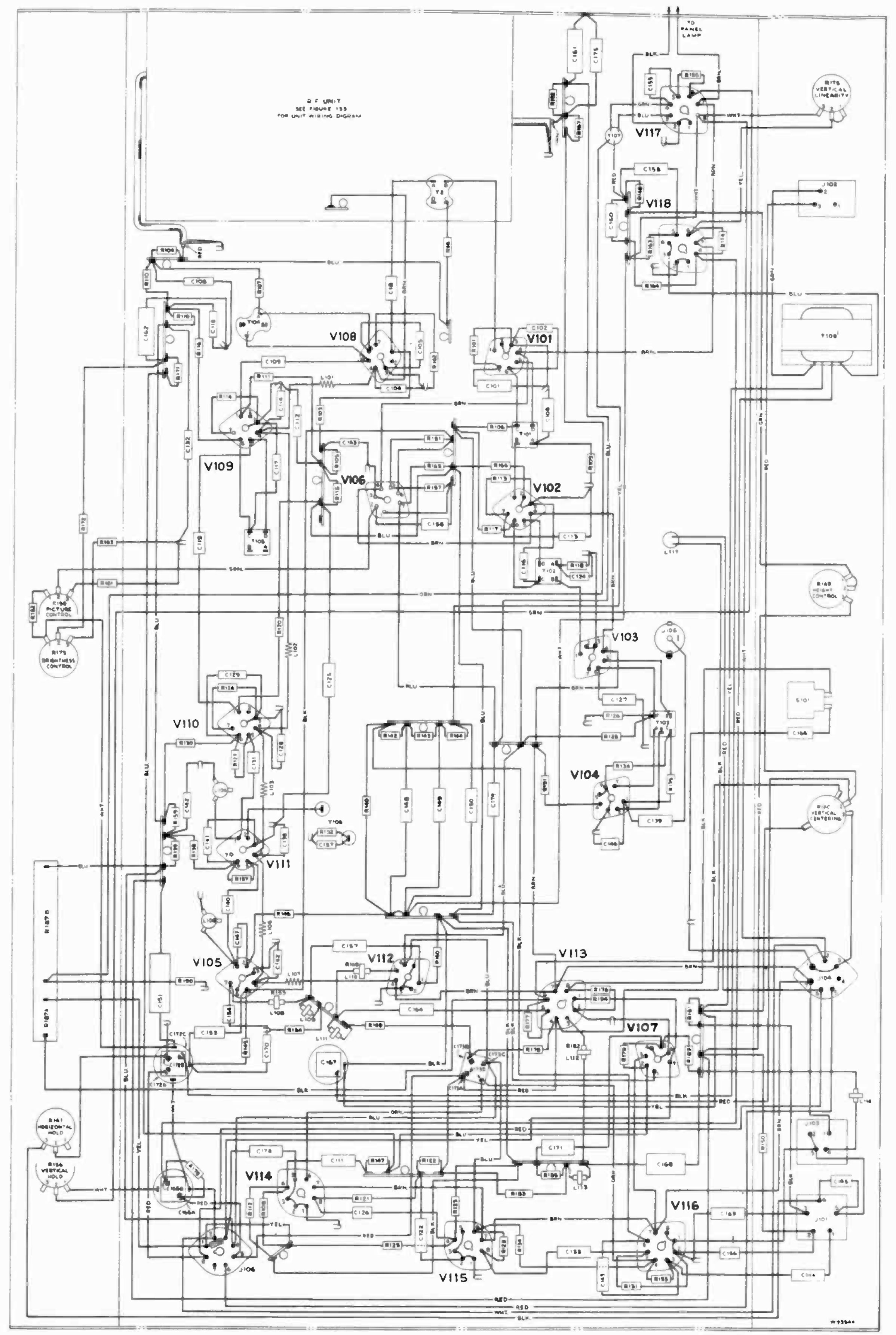


Figure 137—R-F, I-F Chassis Wiring Diagram

648 PTK

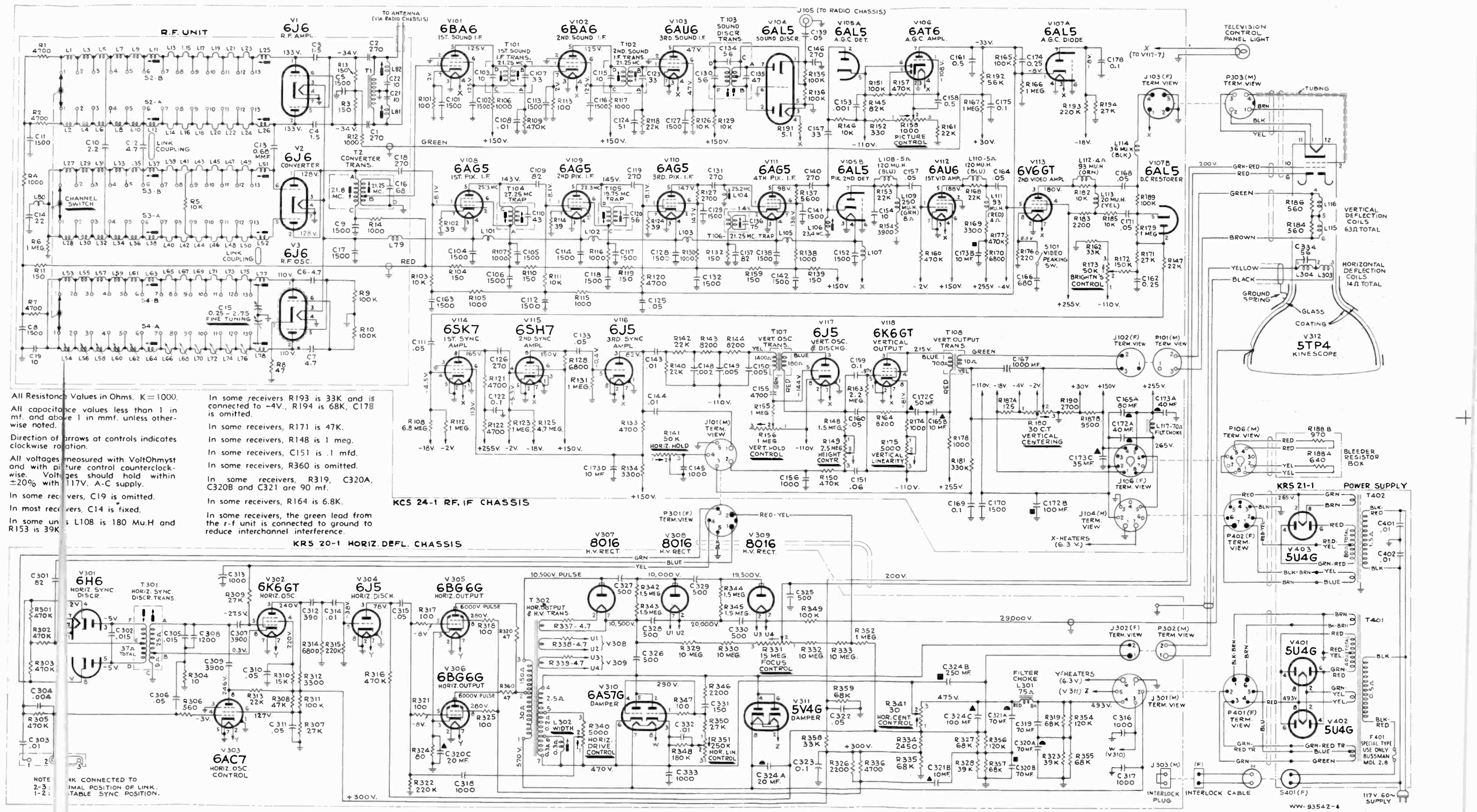


Figure 138—Television Schematic Diagram

STOCK No.	DESCRIPTION
	TELEVISION R-F UNIT—KRK2A
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
45466	Capacitor—Ceramic, 10 mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
39638	Capacitor—Mica, 270 mmf. (C18)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 r-f amplifier plate coil—front or rear section or channel #1 converter grid coil—front or rear section (L1, L2, L27, L28)
71479	Coil—Channels #2 and #3 r-f amplifier plate coil—front or rear section or channels #2 and #4 converter grid coil—front or rear section (L3, L4, L5, L6, L29, L30, L33, L34)
71480	Coil—Channel #4 r-f amplifier plate coil—front or rear section (L7, L8)
71481	Coil—Channel #5 r-f amplifier plate coil—front or rear section or channel #5 converter grid coil—front or rear section (L9, L10, L35, L36)
71492	Coil—Channel #6 oscillator, converter grid or r-f amplifier plate coil—front or rear sections (L11, L12, L37, L38, L63, L64)
71491	Coil—Channel #13 converter grid or r-f amplifier plate coil—rear section (L25, L51)
71490	Coil—Channel #13 converter grid or r-f amplifier plate coil—front section (L26, L52)
72597	Coil—Channel #3 converter grid coil—front or rear section (L31, L32)
71469	Coil—Channel #1 oscillator coil—front or rear section (L53, L54)
71471	Coil—Channel #5 oscillator coil—front section or channel #2 oscillator coil—rear section (L55, L62)
71470	Coil—Channels #2, #3 and #4 oscillator coil—front sections (L56, L58, L60)
72552	Coil—Channel #3 oscillator coil—rear section (L57)
72553	Coil—Channel #4 oscillator coil—rear section (L59)
71472	Coil—Channel #5 oscillator coil—rear section (L61)
71489	Coil—Channel #13 oscillator coil—rear section (L77)
71488	Coil—Channel #13 oscillator coil—front section (L78)
71505	Coil—Heater choke coil (L79)
71506	Coil—Converter grid i-f choke coil (L80)
71493	Connector—Segment connector
71597	Core—Channel #13 front and rear oscillator coils' adjustable core and stud
71498	Core—Channels #6 and #13 front and rear converter grid coils or front and rear r-f amplifier plate coils' adjustable core and stud
71497	Core—Channel #6 front and rear oscillator coils' adjustable core and stud
71463	Detent—R-F unit detent mechanism and fiber shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
71464	Drive—Fine tuning pinch washer drive
71487	Form—Coil form only for channels #6 and #13 coils—less winding
71462	Loop—Oscillator to converter grid coupling loop
	Resistor—Fixed, composition, 47 ohms ±20% ½ watt (R8)
	Resistor—Fixed, composition, 150 ohms ±10%, ½ watt (R3, R11, R13)
	Resistor—Fixed, composition, 1000 ohms ±20%, ½ watt (R4, R12, R14)
	Resistor—Fixed, composition, 4700 ohms ±20%, ½ watt (R1, R2, R7)
	Resistor—Fixed, composition, 10,000 ohms ±10%, ½ watt (R5)
	Resistor—Fixed, composition, 100,000 ohms ±20% ½ watt (R9, R10)
	Resistor—Fixed, composition, 1 megohm ±20%, ½ watt (R6)
14343	Ring—Retaining ring for drive
71475	Screw—#4-40 x 15/32" adjusting screw for coils L54, L56, L58, L60, L62
71476	Screw—#4-40 x ¼" binder head screw for adjusting coils L66, L68, L70, L72, L74, L76
71473	Segment—Converter grid section front segment—less coils or r-f amplifier plate section front segment—less coils (Part of S2, S3)
71474	Segment—Converter grid section rear segment—less coils or r-f amplifier plate section rear segment—less coils (Part of S2, S3)
71467	Segment—Oscillator section front segment—less coils (Part of S4)
71468	Segment—Oscillator section rear segment—less coils (Part of S4)
72951	Shield—Lead tube shield for V3
71494	Socket—Miniature tube socket
71461	Spring—Snap spring to hold fine tuning shaft
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
71495	Transformer—Converter transformer (T2, C16)
73239	Trap—Antenna Trap (L81, L82, C21, C22)
	TELEVISION RF, I-F CHASSIS—KCS24-1
71894	Bearing—R-F unit shaft bearing
72620	Cable—Television antenna cable
72615	Capacitor—Mica, 10 mmf. (C154)
38868	Capacitor—Ceramic, 33 mmf. (C147)
71771	Capacitor—Ceramic, 51 mmf. (C124)
73090	Capacitor—Mica, 82 mmf. 1000 volts (C109)
71514	Capacitor—Ceramic, 82 mmf. (C137)
73091	Capacitor—Mica, 270 mmf. 1000 volts (C119, C126, C131, C140, C146)
39648	Capacitor—Mica, 680 mmf. (C166)
39652	Capacitor—Mica, 1000 mmf. (C145)
72616	Capacitor—Mica, 1000 mmf. (C156)
71501	Capacitor—Ceramic, 1500 mmf. (C101, C102, C104, C105, C106, C112, C113, C114, C116, C117, C118, C127, C128, C129, C132, C138, C141, C142, C152, C163, C170)
72524	Capacitor—Mica, 4700 mmf. (C155)
70600	Capacitor—Tubular, .001 mfd., 400 volts (C153)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C148)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C149, C150)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C108, C143, C144)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C111, C125, C133, C139, C157)
70636	Capacitor—Tubular, .05 mfd. 600 volts (C164)
72996	Capacitor—Moulded paper, .05 mfd., 600 volts (C168, C171)
73093	Capacitor—Oil, .05 mfd., 1000 volts (C160)
73092	Capacitor—Tubular, .06 mfd., 1600 volts
70617	Capacitor—Tubular, 0.1 mfd., 400 volts (C122, C169, C175, C178)
70659	Capacitor—Tubular, 0.1 mfd., 1000 volts (C159)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C162, C174)
70619	Capacitor—Tubular, 0.5 mfd., 400 volts (C158, C161)
72611	Capacitor—Electrolytic, 1000 mfd., 3 volts non-polarized (C167)
71780	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 450 volts, and 1 section of 10 mfd., 450 volts (C165A, C165B)
72612	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 100 mfd., 150 volts, and 1 section of 50 mfd., 50 volts (C172A, C172B, C172C)
72169	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts, 1 section of 35 mfd., 350 volts, and 1 section of 10 mfd., 350 volts (C173A, C173B, C173C, C173D)
72167	Choke—Filter choke (L117)
71505	Coil—Filament choke coil (L101, L102, L103, L105, L107)
71426	Coil—Third or fourth picture i-f coil (L104, L106)
71526	Coil—Choke coil (L109)
71527	Coil—Choke coil (L111)
72618	Coil—Choke coil (L113)
71793	Coil—Choke coil (L114)
72619	Coil—Peaking coil (L112, R182)
71529	Coil—Peaking coil (L110, R168, L108, R153)
71971	Control—Brightness and picture control (R158, R173)
71440	Control—Height control (R149)
72168	Control—Vertical centering control (R180)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
71441	Control—Vertical linearity control (R175)
72758	Control—Vertical and horizontal hold control (R141, R156)
72175	Cover—Insulating cover for electrolytics #71780 and #72612
11889	Grommet—Rubber grommet for front apron of chassis
35787	Jack—Output jack for audio cable
18469	Plate—Bakelite mounting plate for electrolytics #71780, #72611, #72612
72174	Plug—5-prong male plug for cable from high-voltage horizontal deflection supply (J101)
14404	Plug—7-prong male plug for cable from television power supply (J104)
72850	Plug—2 prong male plug for antenna cable
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R191)
	Resistor—Fixed, composition, 39 ohms ±10%, ½ watt (R102, R114, R124)
	Resistor—Fixed, composition, 100 ohms ±10%, ½ watt (R101, R113)
	Resistor—Fixed, composition, 150 ohms ±20%, ½ watt (R104, R110, R119, R139, R159)
	Resistor—Fixed, composition, 150 ohms ±10%, ½ watt (R132)
	Resistor—Fixed, composition, 220 ohms ±10%, ½ watt (R176)
	Resistor—Fixed, composition, 330 ohms ±5%, ½ watt (R152)
	Resistor—Fixed, composition, 1000 ohms ±20%, ½ watt (R105, R106, R107, R115, R116, R117, R130, R138, R174)
	Resistor—Fixed, composition, 1000 ohms ±20%, 1 watt (R178)
72613	Resistor—Wire wound, 2200 ohms, 10 watts (R183)
	Resistor—Fixed composition, 2700 ohms ±5%, ½ watt (R127)
	Resistor—Fixed, composition, 2700 ohms ±10%, 1 watt (R190)
	Resistor—Fixed, composition, 3300 ohms ±5%, ½ watt (R169)
	Resistor—Fixed, composition, 3300 ohms ±10%, 1 watt (R134)
	Resistor—Fixed, composition, 3900 ohms ±10%, ½ watt (R154)
	Resistor—Fixed, composition, 4700 ohms ±5%, ½ watt (R120)
	Resistor—Fixed, composition, 4700 ohms ±10%, 1 watt (R121, R122, R133)
	Resistor—Fixed, composition, 5600 ohms ±5%, ½ watt (R137)
	Resistor—Fixed, composition, 6800 ohms ±20%, 1 watt (R127, R170)
	Resistor—Fixed, composition, 8200 ohms ±10%, ½ watt (R143, R144)
	Resistor—Fixed, composition, 8200 ohms ±5%, ½ watt (R164)
	Resistor—Fixed, composition, 10,000 ohms ±20%, ½ watt (R185)
	Resistor—Fixed, composition, 10,000 ohms ±5%, ½ watt (R103, R111, R146)
	Resistor—Fixed, composition, 10,000 ohms ±10%, 1 watt (R126, R129)
	Resistor—Fixed, composition, 18,000 ohms ±10%, ½ watt (late production) (R162)
	Resistor—Fixed, composition, 22,000 ohms ±20%, ½ watt (R118, R140, R142, R147)
	Resistor—Fixed, composition, 22,000 ohms ±5%, 1 watt (R161)
	Resistor—Fixed, composition, 27,000 ohms ±10%, ½ watt (R171, R194)
	Resistor—Fixed, composition, 33,000 ohms ±10%, ½ watt (early production) (R162)
	Resistor—Fixed, composition, 56,000 ohms ±10%, ½ watt (R192)
	Resistor—Fixed, composition, 82,000 ohms ±10%, ½ watt (R145)
	Resistor — Fixed, composition, 100,000 ohms ±20%, ½ watt (R135, R136, R151, R165, R189)
	Resistor — Fixed, composition, 150,000 ohms ±20%, ½ watt (R172)
	Resistor — Fixed, composition, 220,000 ohms ±10%, ½ watt (R193)
	Resistor — Fixed, composition, 330,000 ohms ±20%, ½ watt (R181)
	Resistor — Fixed, composition, 470,000 ohms ±20%, ½ watt (R109, R150, R157, R177)
	Resistor — Fixed, composition, 470,000 ohms ±10%, ½ watt (R160)
72171	Resistor—Voltage divider, comprising 1 section of 9500 ohms, 2 watts and 1 section of 125 ohms, 2.5 watts (R187A, R187B)
	Resistor—Fixed, composition, 1 megohm ±20%, ½ watt (R123, R131, R179)
	Resistor—Fixed, composition, 1 megohm ±10%, ½ watt (R112, R166, R167)
	Resistor—Fixed, composition, 1 megohm ±10%, ½ watt (early production) (R155)
	Resistor—Fixed, composition, 1.2 megohms ±10%, ½ watt (late production) (R155)
	Resistor—Fixed, composition, 1.5 megohm ±10%, ½ watt (R148)
	Resistor—Fixed, composition, 2.2 megohm ±10%, ½ watt (R163)
	Resistor—Fixed, composition, 4.7 megohms ±20%, ½ watt (R125)
	Resistor—Fixed, composition, 6.8 megohms ±10%, ½ watt (R108)
73632	Shield—Tube shield for V104
72172	Socket—3-contact female socket for deflection yoke cable (J102)
31027	Socket—4-contact female socket for cable from horizontal deflection chassis (J103)
31364	Socket—Lamp socket —for 648PTK control panel.
72516	Socket—Tube socket—miniature
31251	Socket—Tube socket—wafer
30953	Switch—Video peaking switch (S101)
71424	Transformer—First or second sound i-f transformer (T101, T102, C103, C107, C115, C123)
71427	Transformer—Sound discriminator transformer (T103, C130, C134, C135)
71423	Transformer—First picture i-f transformer (T104, C110)
71425	Transformer—Second picture i-f transformer (T105, C120)
73708	Transformer—Third picture i-f transformer for late 648PV (T109, C177)
71775	Transformer—Vertical oscillator transformer (T107)
72952	Transformer—Vertical output transformer (T108)
71422	Trap—Sound trap (T106, C136)
	HORIZONTAL DEFLECTION CHASSIS—KRS20-1
71454	Board—"Sync Link" board
70151	Bushing—Anode cable threaded bushing
73160	Cable—Anode cable only less fastener, spring, screws and bushing
72614	Capacitor—Mica, 82 mmf. (C301)
73095	Capacitor—Mica, 150 mmf., 1000 volts (C331)
73094	Capacitor—Mica, 390 mmf., 1000 volts (C312)
71450	Capacitor—High-voltage filter, 500 mmf. (C325, C326, C327, C328, C329, C330)
39652	Capacitor—Mica, 1000 mmf. (C313, C316, C317, C318, C333)
72638	Capacitor—Ceramic, 1200 mmf. (C308)
39666	Capacitor—Mica, 3900 mmf. (C307, C309)
70605	Capacitor—Tubular, .004 mfd., 400 volts (C304)
71516	Capacitor—Tubular, oil impregnated, .015 mfd., 400 volts (C302, C305)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C303, C314, C332)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C306, C311, C322)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C310, C315)
70638	Capacitor—Tubular, 0.1 mfd., 600 volts (C323)
72621	Capacitor—Electrolytic, 70 mfd., 400 volts (C319)
72622	Capacitor—Electrolytic, comprising 2 sections of 70 mfd., 250 volts, and 1 section of 20 mfd., 50 volts (C320A, C320B, C320C)

STOCK No.	DESCRIPTION
72623	Capacitor—Electrolytic, comprising 1 section of 70 mfd., 400 volts, and 1 section of 10 mfd., 400 volts (C321A, C321B)
72624	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 150 volts, 1 section of 250 mfd., 15 volts, and 1 section of 100 mfd., 15 volts (C324A, C324B, C324C)
72179	Choke—Filter choke (L301)
72180	Coil—Width control coil (L302)
73414	Connector—High-voltage rectifier and horizontal output plate cap connector
71521	Connector—High-voltage filter capacitor connector
72183	Control—Focus control (R331)
71441	Control—Horizontal drive control (R340)
72181	Control—Horizontal centering control (R341)
72182	Control—Horizontal linearity control (R351)
72186	Cord—Interlock cord less male plug
33846	Coupling—Focus control shaft coupling
72175	Cover—Insulating cover for electrolytics #72621 and #72623
71437	Cover—Insulating cover for electrolytic #72624
70154	Fastener—Anode cable fastener only less screws
71451	Nut—Speed nut to mount high-voltage capacitor
18469	Plate—Bakelite mounting plate for electrolytic capacitors 72621, 72623 and 72624
72642	Plug—5-contact female plug on cable from horizontal deflection chassis to r-f, i-f chassis (P301)
72625	Plug—6-pin male plug for cable from television power supply (J301)
71448	Plug—2-prong male plug for power cable
14793	Plug—2-prong male plug for interlock cable
30568	Plug—4-prong male plug on cable from horizontal deflection chassis to r-f, i-f chassis (P303)
72633	Resistor—Wire wound, 4.7 ohms, ½ watt (R337, R338, R339)
	Resistor—Fixed, composition, 10 ohms ±5%, ½ watt (R304)
	Resistor—Fixed, composition, 47 ohms ±20%, ½ watt (R320)
72631	Resistor—Wire wound, 80 ohms, 5 watts (R324)
	Resistor—Fixed, composition, 100 ohms ±20%, ½ watt (R317, R318, R321, R325, R347)
	Resistor—Fixed, composition, 560 ohms ±10%, ½ watt (R306)
	Resistor—Fixed, composition, 2200 ohms ±20%, ½ watt (R346)
	Resistor—Fixed, composition, 2200 ohms ±10%, 1 watt (R326)
72184	Resistor—Wire wound, 2450 ohms, 16.5 w (R334)
48207	Resistor—Wire wound, 3300 ohms, 5 watts (R312)
	Resistor—Fixed, composition, 4700 ohms ±10%, ½ watt (R336)
	Resistor—Fixed, composition, 6800 ohms ±20%, ½ watt (R314)
	Resistor—Fixed, composition, 15,000 ohms ±10%, 1 watt (R310)
	Resistor—Fixed, composition, 22,000 ohms ±20%, 2 watts (R313)
	Resistor—Fixed, composition, 27,000 ohms ±10%, ½ watt (R309)
	Resistor—Fixed, composition, 27,000 ohms ±10%, 1 watt (R307, R350)
	Resistor—Fixed, composition, 33,000 ohms ±10%, ½ watt (R358)
	Resistor—Fixed, composition, 39,000 ohms ±10%, 2 watts (R323, R328)
	Resistor—Fixed, composition, 47,000 ohms ±10%, 1 watt (R308)
	Resistor—Fixed, composition, 68,000 ohms ±10%, 1 watt (R355, R357, R359)
	Resistor—Fixed, composition, 68,000 ohms ±10%, 2 watts (R319, R327, R335)
	Resistor — Fixed, composition, 100,000 ohms ±20%, 1 watt (R349)
	Resistor — Fixed, composition, 100,000 ohms ±20%, ½ watt (R311)
	Resistor — Fixed, composition, 120,000 ohms ±10%, 1 watt (R354, R356)
	Resistor — Fixed, composition, 180,000 ohms ±10%, ½ watt (R348)
	Resistor — Fixed, composition, 220,000 ohms ±20%, ½ watt (R315, R322)
	Resistor — Fixed, composition, 470,000 ohms ±10%, ½ watt (R316)
	Resistor — Fixed, composition, 470,000 ohms ±20%, ½ watt (R301, R302, R303, R305)
	Resistor—Fixed, composition, 1 megohm ±10%, ½ watt (R352)
	Resistor—Fixed, composition, 1.5 megohm ±20%, 2 watts (R342, R343, R344, R345)
	Resistor—Fixed, composition, 2.2 megohm ±10%, 2 watts —for late 648PV (R361)
	Resistor—Fixed, composition, 10 megohms ±20%, 2 watts (R329, R330, R332, R333)
72008	Retainer—Focus control shaft flexible coupling
72185	Shaft—Focus control fiber extension shaft
72626	Socket—2 contact female socket for deflection yoke cable (J302)
72641	Socket—Kinescope socket
71508	Socket—Tube socket for 8016 rectifier tubes
72627	Socket—Tube socket, ceramic
31251	Socket—Tube socket, wafer
73161	Spring—Hi-voltage connecting spring for anode cable (in optical barrel)
71559	Spring—Grounding spring for high-voltage capacitor
71428	Transformer—Horizontal sync. discriminator transformer (T301)
72178	Transformer—Horizontal output and high-voltage transformer (T302, R320)
	TELEVISION POWER SUPPLY—KRS21-1
72838	Capacitor—Moulded paper, .01 mfd., 400 volts (C401, C402)
73151	Fuse—2.8 ampere (F401) (Bussman MDL 2.8)
13526	Mounting—Fuse mounting
72644	Plug—6 contact female plug on cable from television power supply to horizontal deflection unit (P401)
14409	Plug—7 contact female plug on cable from television power supply to r-f, i-f chassis (P402)
14275	Socket—2 contact female socket for interlock cable
31251	Socket—Tube socket
72176	Transformer—Power transformer 115 volts, 60 cycles, for horizontal deflection chassis (T401)
72177	Transformer—Power transformer 115 volts, 60 cycles, for r-f and i-f chassis (T402)
73191	Transformer—Power Transformer (115 volts, 50 cycle) for horizontal deflection chassis (T401)
73192	Transformer—Power Transformer (115 volts, 50 cycle) for r-f, i-f chassis (T402)
	OPTICAL BARREL ASSEMBLY—KRK1
72188	Lens—Corrector lens
72187	Mirror—Spherical mirror
72661	Screw—3/8-32 x 3¼" optical barrel tilt adjustment screw (3 required)
72662	Screw—8-32 x 15/16" screw for spherical mirror mounting springs (6 required)
72191	Screw—8-32 x ½" screw for locking horizontal centering adjustment (2 required) or screw for locking focus adjustment (2 required)
72660	Screw—12-24 x 2⅜" focus adjustment screw
72192	Screw—12-24 x 1 19/32" horizontal centering adjustment screw
72663	Spring—Spherical mirror mounting spring (6 required)
72189	Spring—6 turn spring for kinescope holder
72190	Spring—8 turn spring for kinescope holder
72664	Support—Melamine insulator support for kinescope holder (2 required)
11909	Washer—"C" washer for focus adjustment screw or for horizontal centering screw
	RADIO CHASSIS—RK121A
71964	Arm—Push button arm and cam for tuning condenser
3658	Ball—Steel ball (3/32" dia.) for tuning condenser
10705	Ball—Steel ball (5/32" dia.) for tuning condenser
71651	Ball—Steel ball for manual tuning shaft
71638	Board—5 contact terminal board for antenna lead-in
71637	Board—Television, audio and phono input jack board

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
71811	Bracket—Idler bracket less pulleys
71643	Bracket—L.H. dial plate support bracket
71642	Bracket—R.H. dial plate support bracket
72986	Bushing—threaded bushing for knob end of switch coupling shaft—for 648PV only.
71791	Cable—R-F cable
71804	Capacitor—Adjustable, 1.6-18 mmf. (C5, C13)
71809	Capacitor—Adjustable, 1.6-18 mmf. (C36)
71803	Capacitor—Adjustable, 2.5-13 mmf. (C20)
71808	Capacitor—Adjustable, 3-35 mmf. (C37, C84)
71930	Capacitor—Ceramic, 5.6 mmf. (C85)
39043	Capacitor—Ceramic, 6.8 mmf. (C25)
71807	Capacitor—Adjustable, 10-160 mmf. (C8, C15, C90)
71924	Capacitor—Ceramic, 56 mmf. (C24)
71514	Capacitor—Ceramic, 82 mmf. (C71)
39396	Capacitor—Ceramic, 100 mmf. (C16, C21, C83)
71933	Capacitor—Mica, 180 mmf. (C18)
71922	Capacitor—Ceramic, 180 mmf. (C34, C73)
71920	Capacitor—Ceramic, 220 mmf. (C6, C10)
71919	Capacitor—Ceramic, 330 mmf (C3, C11)
71929	Capacitor—Ceramic, 1000 mmf. (C80)
72117	Capacitor—Tubular, .0012 mfd., 400 volts (C53)
71927	Capacitor—Tubular, .002 mfd., 400 volts (C59)
71921	Capacitor—Tubular, .003 mfd., 200 volts (C9, C26, C27, C82)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C40, C42, C43, C66, C76, C77, C78)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C44, C55, C58, C68, C69, C88)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C64, C65)
71588	Capacitor—Moulded paper, .01 mfd., 600 volts (C87)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C22, C23, C63)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C32, C35, C54, C62, C89)
70631	Capacitor—Tubular, .01 mfd., 600 volts (C61)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C33, C39, C41, C79)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C67, C81)
32223	Capacitor—Electrolytic, 15 mfd., 300 volts (C60)
71646	Clamp—Dial clamp (2 required)
71940	Coil—F-M antenna coil (L2, L3)
71856	Coil—"C" band antenna coil (L4, L5)
71942	Coil—Filament choke coil (L7, L8)
71937	Coil—F-M oscillator coil (L9)
71939	Coil—Choke coil (L10)
71938	Coil—F-M r-f coil (L11)
71854	Coil—"C" band r-f coil (L12)
71857	Coil—"A" band r-f coil (L13, L14)
71853	Coil—"C" band oscillator coil (L17)
71852	Coil—"A" band oscillator coil (L18)
72071	Coil—"A" band antenna coil (L20, L21)
38405	Control—H-F tone control (R27)
38401	Control—L-F tone control (R26)
71596	Control—Volume control (R42)
72987	Cord—Indicator drive cord (approx. 42" overall length) NOTE: Before assembling, stretch to full length
72987	Cord—Manual drive cord (approx. 30" overall length) NOTE: Before assembling, stretch to full length
71941	Coupling—F-M coupling unit (L16, C17, R5)
71652	Dial—Short wave glass dial scale
71653	Dial—Standard broadcast glass dial scale
71654	Dial—F-M glass dial scale
71805	Drum—Drive drum
71800	Gear—12-tooth gear fastened to range switch flexible shaft coupling
71801	Gear—18-tooth gear fastened to range switch shaft
35844	Gear—Scissor gear for tuning condenser
71851	Grommet—Rubber grommet to mount socket (4 required)
71799	Grommet—Rubber grommet to mount cradle (6 required)
71647	Guide—Indicator slide guide
71832	Indicator—Station selector indicator
11765	Lamp—Dial lamp, Mazda #51
11891	Lamp—Pilot lamp, Mazda #44
71962	Pinion—Pinion and shaft for tuning condenser
71963	Plate—Bearing plate for tuning condenser pinion
72984	Plate—Connecting plate for selector switch coupling shafts—for 648PV only.
71644	Plate—Dial back plate only, less window, dials, support, pulleys and indicator
71636	Plug—9-prong male plug for connecting to radio power cable (J1)
71648	Pulley—Idler pulley or indicator cord pulley
71650	Pulley—Manual tuning shaft cord pulley
72323	Resistor Wire wound, 3 ohms, ½ watt (R32)
	Resistor Fixed, composition, 10 ohms ±20%, ½ watt (R54)
	Resistor Fixed, composition, 100 ohms ±10%, ½ watt (R21, R22)
	Resistor Fixed, composition, 270 ohms ±10%, ½ watt (R38)
	Resistor Fixed, composition, 390 ohms ±10%, ½ watt (R10)
	Resistor Fixed, composition, 1000 ohms ±20%, ½ watt (R24, R37, R46)
	Resistor Fixed, composition, 2200 ohms ±20%, ½ watt (R12, R25, R36)
	Resistor Fixed, composition, 2200 ohms ±10%, ½ watt (R9, R52)
	Resistor Fixed, composition, 4700 ohms ±20%, ½ watt (R4)
	Resistor Fixed, composition, 8200 ohms ±10%, ½ watt (R13)
	Resistor Fixed, composition, 10,000 ohms ±10%, 1 watt (R6)
	Resistor Fixed, composition, 15,000 ohms ±20%, ½ watt (R30, R51)
	Resistor Fixed, composition, 15,000 ohms ±10%, ½ watt (R48)
	Resistor Fixed, composition, 15,000 ohms ±10%, 1 watt (R7)
	Resistor Fixed, composition, 18,000 ohms ±10%, ½ watt (R33)
	Resistor Fixed, composition, 22,000 ohms ±20%, ½ watt (R3, R31, R35, R49)
	Resistor Fixed, composition, 22,000 ohms ±10%, ½ watt (R18, R34, R44)
	Resistor Fixed, composition, 22,000 ohms ±20%, 1 watt (R43)
	Resistor Fixed, composition, 27,000 ohms ±10%, ½ watt (R11, R45)
	Resistor – Fixed, composition, 100,000 ohms ±10%, ½ watt (R16)
	Resistor – Fixed, composition, 100,000 ohms ±10%, ½ watt (R16)
	Resistor – Fixed, composition, 180,000 ohms ±10%, ½ watt (R17, R20)
	Resistor – Fixed, composition, 270,000 ohms ±10%, ½ watt (R29, R40, R53)
	Resistor – Fixed, composition, 470,000 ohms ±20%, ½ watt (R14)
	Resistor– Fixed, composition, 1 megohm ±20%, ½ watt (R1, R2, R19)
	Resistor– Fixed, composition, 2.2 megohm ±10%, ½ watt (R15, R41, R47, R50)
	Resistor– Fixed, composition, 3.9 megohm ±10%, ½ watt (R8)
	Resistor Fixed, composition, 22 megohms ±20%, ½ watt (R23)
71798	Screw—#8-32 x 13/64" square head set screw for flexible shaft
71965	Screw—Push button arm locking screw
71806	Shaft—Coupling shaft for selector switch flexible shaft—for 648PTK only.
71641	Shaft—Flexible shaft for selector switch knob—for 648PTK only.
72982	Shaft—Selector switch coupling shaft (switch end)—for 648PV only.
72983	Shaft—Selector switch coupling shaft (knob end)—for 648PV only.

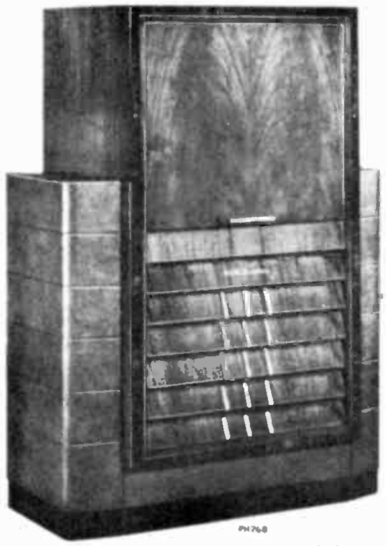
STOCK No.	DESCRIPTION
71812	Shaft—Manual tuning shaft less spring and pulley
72951	Shield—Lead tube shield
71834	Socket—Lamp socket, L. H.
71833	Socket—Lamp socket, R. H.
71931	Socket—Pilot lamp socket
71850	Socket—Tube socket, rubber mounted
72516	Socket—Tube socket, miniature
71649	Spring—Coil spring for manual tuning shaft
71936	Spring—Drive cord spring
33622	Spring—Push button arm return spring
71645	Support—Glass support, rubber (2 required)
72062	Switch—Power switch (S8)
72063	Switch—Range switch less television a-c power switch (S1, S2, S3, S4, S5, S6, S7)
72517	Switch—Television a-c power switch (mounted or range switch) (S9)
71845	Transformer—First f-m, i-f transformer (T1 (C28, C30))
71846	Transformer—First a-m, i-f transformer (T2, (C29, C31))
71847	Transformer—Second f-m, i-f transformer (T3, (C45, C47, C51))
71848	Transformer—Second a-m, i-f transformer (T4 (C46, C48, C49, C50))
71849	Transformer—Third f-m, i-f transformer (T5 (C56, C57))
71935	Transformer—Driver transformer (T6 (C70))
71934	Transformer—Ratio detector transformer (T7 (C72, C74))
37435	Washer—"C" washer to hold gear on coupling shaft
31608	Washer—Spring washers for drive cord pulleys or idler cord pulley
2917	Washer—Spring washer for flexible or manual tuning shaft
71810	Window—Glass dial window
	RADIO POWER SUPPLY RS123A
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C105, C106)
70632	Capacitor—Tubular, .02 mfd., 600 volts (C103, C104)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C107)
31323	Capacitor—Electrolytic, 16 mfd., 150 volts (C102)
72955	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts, 1 section of 50 mfd., 400 volts, and 1 section of 40 mfd., 25 volts (C101A, C101B, C101C)
18469	Insulator—Mounting insulator for electrolytic
11765	Lamp—Pilot lamp, Mazda #51
12493	Plug—Speaker cable plug
30730	Resistor—2700 ohms, ½ watt (R103)
30492	Resistor—22,000 ohms, ½ watt (R104)
30409	Resistor—27,000 ohms, ½ watt (R105)
30650	Resistor—56,000 ohms, ½ watt (R102)
14583	Resistor—220,000 ohms, ½ watt (R105, R107)
71660	Resistor—Comprising 1 section of 180 ohms, 3.5 watts, 1 section of 2520 ohms, 3.97 watts, and 1 section of 2760 ohms, 9.3 watts (R101A, R101B, R101C)
71659	Socket—9-prong power socket (J101)
35787	Socket—Audio input socket (J102)
31364	Socket—Pilot lamp socket
31319	Socket—Tube socket
37048	Transformer—Power transformer, 115 volts, 50/60 cycle (T101)
71661	Transformer—Audio output transformer (T102)
	SPEAKER ASSEMBLIES—92567-2W, RL70R1
13867	Cap—Dust cap
71147	Clamp—Clamp to hold metal cone suspension (2 required)
71146	Coil—Field coil, 1060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
71560	Plug—5-prong male plug for speaker
71144	Speaker—12" E.M. speaker complete with cone and voice coil less plug
71145	Suspension—Metal cone suspension
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.

STOCK No.	DESCRIPTION
	MISCELLANEOUS
72749	Back—Cabinet back
12716	Board—"Antenna-Ground" board—part of antenna cable
71888	Bottom—Radio chassis bottom cover
72446	Bracket—Television control panel light rod lamp bracket
36639	Bracket—Pilot lamp bracket
71874	Bushing—Bushing and fibre washer for large knobs (4 required)
71884	Button—Radio push button
72665	Cable—Antenna cable to radio chassis
72447	Cable—Shielded audio cable complete with pin plugs—part of interconnecting cable—from radio power supply to radio receiver
72195	Cable—Shielded audio lead between r-f, i-f chassis and radio chassis—complete with pin plugs
71892	Catch—Door catch and strike
72669	Clamp—Television control panel light rod clamp
72667	Clip—Kinescope second anode clip
72666	Cover—Optical barrel dust cover
72748	Decal—Control panel decal (1 set)
71984	Decal—Trade mark decal
72677	Escutcheon—Radio escutcheon only, less screen, window and marker plate—for walnut instruments
73076	Escutcheon—Radio escutcheon only, less screen, window, and marker plate—for mahogany instruments
72197	Escutcheon—Television channel marker escutcheon
X1637	Grille—Grille cloth
72674	Grommet—Rubber grommet to cushion side of radio chassis (2 required)
72069	Grommet—Rubber grommet for rear mounting feet of radio chassis (2 required)
72670	Hinge—Radio compartment door hinge—L.H.
72671	Hinge—Radio compartment door hinge—R.H.
13103	Jewel—Pilot lamp cap
71534	Knob—Television channel selector knob
71533	Knob—Television fine tuning knob
71536	Knob—Television horizontal hold or brightness control knob (inner)
71535	Knob—Television vertical hold or picture control knob (outer)
71883	Knob—Radio tone control knob
71821	Knob—Radio volume control, power switch, range switch or tuning knob
11765	Lamp—Television panel light rod lamp, Mazda #51
71969	Marker—Push button call letter marker
72193	Mirror—45 degree plane mirror
72673	Plate—Backing plate for hinges
71879	Plate—Backing plate for Victrola indicator screen
71881	Plate—Push button call letter marker plate
4573	Plug—2-contact female plug on radio interconnecting cable—connects radio cable to television power supply cable
71967	Plug—9-contact female plug on interconnecting cable—between radio and radio power supply
71968	Plug—9-prong male plug on interconnecting cable—between radio and radio power supply
14793	Plug—2-prong male plug on deflection yoke cable (P302)
14782	Plug—3-prong male plug on deflection yoke cable (P101)
35383	Plug—8-prong male plug on cable from television bleeder resistor box to r-f, i-f chassis (P106)
31048	Plug—Pin plug for shielded audio cable #72195 and #72447
72712	Pull—Door pull for upper doors on television compartment (2 required)
72705	Pull—Radio compartment door pull
72170	Resistor—Wire wound resistor in television bleeder resistor box, comprising 1 section of 970 ohms, 9 watts, and 1 section of 640 ohms, 10.5 watts (R188A, R188B)
72668	Rod—Television control panel lucite light rod
71878	Screen—Victrola indicator screen
72194	Screen—Television viewing screen
72675	Side—Radio chassis side panel—R.H.
72676	Side—Radio chassis side panel—L.H.

STOCK No.	DESCRIPTION
71538	Spring—Channel marker escutcheon spring
72672	Spring—Check spring for R.H. door
14270	Spring—Retaining spring for television channel selector knob #71534 or television vertical hold or picture control knob #71535
4982	Spring—Retaining spring for television fine tuning knob #71533
30330	Spring—Retaining spring for television horizontal hold or brightness control knob #71536
71867	Spring—Retaining spring for radio push button
30900	Spring—Retaining spring for radio control knobs #71821 and #71883
71880	Strip—Backing strip for call letter marker plate
71875	Washer—Spring—washer for fastening rubber spacer cushioning on radio chassis side
71882	Window—Window for station call letter markers
72196	Yoke—Deflection yoke complete with cables (L115, L116, L303, L304, C334, R184, R186, P101, P302)
	MISCELLANEOUS
73481	Back—Cabinet back for walnut instruments
73418	Back—Cabinet back for mahogany instruments
73731	Board—Cabinet antenna terminal board
71888	Bottom—Bottom cover (pan) for rollout mechanism
71599	Bracket—Pilot lamp bracket
70148	Bracket—45 degree mirror mounting bracket complete with felt pad (3 required)
70151	Bushing—Anode cable bushing
71874	Bushing—Bushing and washer for large knobs (4 required)
72899	Button—Plug button for rollout assembly sides (2 required)
71884	Button—Radio push button
72447	Cable—Shielded audio cable complete with pin plugs—part of interconnecting cable
72195	Cable—Shielded audio cable complete with pin plugs
13103	Cap—Pilot lamp jewel
71892	Catch—Door strike and catch
73933	Chain—Lid stop chain
70152	Clamp—Anode cable clamp set
72667	Clip—Second anode clip
X1813	Cloth—Grille cloth
73213	Cover—Dust cover
72748	Decal—Control panel decal
71966	Decal—Trade mark decal (Victrola)
71593	Escutcheon—Television channel marker escutcheon
71877	Escutcheon—Radio escutcheon only, less victrola indicator screen, window and marker strips for mahogany instruments
71876	Escutcheon—Radio escutcheon only, less victrola indicator screen, window and marker strips for walnut instruments
73180	Emblem—Metal emblem (RCA Victor)
70154	Fastener—Anode cable hi-voltage spring fastener
71868	Frame—Mounting frame and bracket
70153	Gasket—Sealing gasket for anode cable clamp
73734	Grille—Metal grille
72763	Handle—Pull handle for rollout mechanism
73219	Hinge—Cabinet lid hinge (2 required)
73735	Hinge—Knife hinge for radio-phono compartment drop door (2 required) and for television support panel (2 required)
73932	Hinges—Top and bottom hinges for R. H. speaker compartment door, for L. H. speaker compartment door or record storage compartment door
72901	Hinge—Television control door hinge (2 required)
71883	Knob—Radio tone control knob
71821	Knob—Radio tuning, volume control, power switch or selector switch knob
71536	Knob—Television horizontal hold control or brightness control knob
71533	Knob—Television fine tuning knob
71534	Knob—Television channel selector knob
71535	Knob—Television vertical hold control or picture control knob

STOCK No.	DESCRIPTION
71969	Markers—Call letter markers
70145	Mirror—45° mirror
73336	Nut—Aluminum nut to fasten anode cable
70150	Nut—Locknut for optical barrel elevating screw (3 required)
72765	Nut—Speed nut to fasten victrola indicator screen (2 required)
70146	Pin—Mounting pin (2 required) for front end of television chassis
72764	Plate—Backing plates (1 set) for pull handle
71879	Plate—Backing plate for victrola indicator screen
71881	Plate—Call letter marker plate
73218	Plate—Plate complete with bullet catch and bracket with pin for cabinet hood—L.H.
73217	Plate—Plate complete with bullet catch and bracket with pin for cabinet hood—R.H.
31048	Plug—Pin plug for audio cable (2 required)
4573	Plug—2 contact female plug on inter-connecting cable—between radio and television power supply
30863	Plug—2 contact female plug on interconnecting cable—for record changer
71967	Plug—9 contact female plug on interconnecting cable—between radio and radio power supply
14793	Plug—2 prong male plug for deflection yoke
14782	Plug—3 prong male plug for deflection yoke
73730	Plug—3 prong male plug for antenna cable
35383	Plug—8 prong male plug on cable from bleeder resistor box to r-f, i-f television chassis
71968	Plug—9 prong male plug on interconnecting cable—between radio and radio power
73732	Pull—Door pull for television and radio-phone compartments
73733	Pull—Door pull for speaker and record storage compartments
72170	Resistor—Television chassis bleeder resistor—wire wound, comprising 1 section of 970 ohms, 9 watts and 1 section of 640 ohms, 10.5 watts
71873	Retainer—Rubber retainer to mount record changer (2 required)
73416	Ring—Rubber ring between deflection yoke and correction lens
71878	Screen—Victrola indicator screen
72194	Screen—Television viewing screen
70149	Screw—Elevating screw for optional barrel (3 required)
71538	Spring—Channel marker escutcheon spring
71865	Spring—Coil spring to hold cable from mechanism
38873	Spring—Conical spring to mount record changer (4 required)
72454	Spring—Lid support spring
4982	Spring—Retaining spring for knobs
14270	Spring—Retaining spring for knobs
30330	Spring—Retaining spring for knob
30900	Spring—Retaining spring for knobs
71867	Spring—Retaining spring for push button
71866	Stop—Rollout carriage stop consisting of disc, rubber sleeve and spacer
73069	Stop—Drop door fall supports metal stop (2 required)
71880	Strip—Backing strip for call letter marker plate
72999	Support—Drop door fall support—R.H.
73000	Support—Drop door fall support—L.H.
73646	Support—Lid support—R.H.
73645	Support—Lid support—L.H.
73212	Switch—Television interlock switch
71871	Tire—Rubber tire for rear wheels (2 required)
71872	Tire—Rubber tire for front wheels (2 required)
2917	Washer—"C" washer for rubber retainer (2 required)
71875	Washer—Spring washer for fastening wheels
71887	Wheel—Front wheel and tire assembly (2 required)
72858	Wheel—Rear wheel and tire assembly (2 required)
71882	Window—Window for call letter markers
72196	Yoke—Deflection yoke complete with cables and plugs

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Model 741PCS

RCA VICTOR

PROJECTION TELEVISION, RECEIVER

MODELS 741PCS and 8PCS41

Chassis Nos. KCS 24B-1 or KCS 24C-1, KRS 20A-1 or KRS 20B-1, KRS 21A-1, KRK 1A-1 or KRK 4, and RS 123C — Mfr. No. 274

SERVICE DATA

— 1947 No. T7 —

— 1948 No. T2 —

SUPPLEMENT TO 1947 No. T2

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Model 8PCS41

GENERAL DESCRIPTION

Models 741PCS and 8PCS41 are forty-one tube Projection Television consoles. The receivers employ five chassis with a total of forty tubes and a five-inch projection kinescope. A Reflective Optical System provides a 15" x 20" picture on the screen.

Model 8PCS41 has been produced in three versions (different chassis) and are distinguished in this Service Data as 8PCS41, 8PCS41-B, and 8PCS41-C.

This publication includes all the data applicable only to these models such as the Installation Instructions, Wiring Diagram, Circuit Diagram and Replacement Parts Lists. For additional information, refer to the Service Data for Model 648PTK.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .... 15" x 20"

TELEVISION R-F FREQUENCY RANGES

All 13 television channels, 44 mc to 88 mc, 174 mc to 216 mc.

TELEVISION FINE TUNING RANGE

Plus and minus approximately 800 kc on channel 1, and plus and minus approximately 1.9 mc on channel 13.

RECEIVER ANTENNA INPUT IMPEDANCE .. 300 ohms balanced

POWER SUPPLY RATING .... 115 volts, 60 cycles, 530 watts

AUDIO POWER OUTPUT RATING

Undistorted Power Output .... 10 watts
Maximum Power Output .... 11 watts

CHASSIS DESIGNATIONS

R-F, I-F Chassis .... KCS24B-1 in 741PCS and 8PCS41, KCS24C-1 in 8PCS41-B and 8PCS41-C
Horizontal Deflection Chassis .... KRS20A-1 in 741PCS, 8PCS41, and 8PCS41-C, KRS20B-1 in 8PCS41-B
Power Supply Chassis KRS21A-1
Optical Barrel .... KRK1A-1 in 741PCS, 8PCS41 and 8PCS41-C, KRK4 in 8PCS41-B
Audio Amplifier RS123C

RCA TUBE COMPLEMENT

KCS24B-1 OR KCS24C-1 R-F, I-F CHASSIS

	Tube Used	Function
(1)	RCA-6J6	R-F Amplifier
(2)	RCA-6J6	R-F Oscillator
(3)	RCA-6J6	Converter
(4)	RCA-6BA6	1st Sound I-F Amplifier
(5)	RCA-6BA6	2nd Sound I-F Amplifier
(6)	RCA-6AU6	3rd Sound I-F Amplifier
(7)	RCA-6AL5	Sound Discriminator
(8)	RCA-6AT6	Audio Amplifier
(9)	RCA-6AT6	A-G-C Amplifier
(10)	RCA-6AL5	A-G-C Diode and D-C Restorer
(11)	RCA-6AG5	1st Picture I-F Amplifier
(12)	RCA-6AG5	2nd Picture I-F Amplifier
(13)	RCA-6AG5	3rd Picture I-F Amplifier
(14)	RCA-6AG5	4th Picture I-F Amplifier
(15)	RCA-6AL5	Picture 2nd Detector and A-G-C Detector
(16)	RCA-6AU6	1st Video Amplifier
(17)	RCA-6V6GT	2nd Video Amplifier
(18)	RCA-6SK7	1st Sync Amplifier
(19)	RCA-6SH7	2nd Sync Amplifier
(20)	RCA-6J5	3rd Sync Amplifier
(21)	RCA-6J5	Vertical Sweep Oscillator and Discharge
(22)	RCA-6K6GT	Vertical Sweep Output

Specifications continued on page 2

KRS20A-1 OR KRS20B-1 HORIZONTAL DEFLECTION CHASSIS

(1)	RCA-6H6	Horizontal Sync Discriminator
(2)	RCA-6K6GT	Horizontal Sweep Oscillator
(3)	RCA-6J5	Horizontal Discharge
(4)	RCA-6AC7	Horizontal Sweep Oscillator Control
(5)	RCA-6BG6G	Horizontal Sweep Output (2 tubes)
(6)	RCA-5V4G	Horizontal Damper
(7)	RCA-6AS7G	Horizontal Damper
(8)	RCA-1B3-GT/8016	High Voltage Rectifier (3 tubes)
(9)	RCA-5TP4	Projection Kinescope

KRS21A-1 TELEVISION POWER SUPPLY CHASSIS

(1)	RCA-5U4G	Rectifier (3 tubes)

RS123C AUDIO AMPLIFIER

(1)	RCA-5U4G	Rectifier
(2)	RCA-6J5	Phase Inverter
(3)	RCA-6F6G	Power Output (2 tubes)

LOUDSPEAKER (92567-2)

Type .... 12-inch Electrodynamic
Voice Coil Impedance .... 2.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet .... Model 741PCS .... 302 lbs.
Shipping Weight .... 405 lbs.
Chassis with Tubes in Cabinet .. Model 8PCS41 .... 247 lbs.
Shipping Weight .... 314 lbs.

DIMENSIONS (inches)		Width	Height	Depth
Cabinet (outside)	741PCS	42	58½	24
Cabinet (outside)	8PCS41	36¼	39⅛	24¼

PICTURE I-F FREQUENCIES

Picture Carrier Frequency .... 25.75 mc
Adjacent Channel Sound Trap .... 27.25 mc
Accompanying Sound Traps .... 21.25 mc
Adjacent Channel Picture Carrier Trap .... 19.75 mc

SOUND I-F FREQUENCIES

Sound Carrier Frequency .... 21.25 mc
Sound Discriminator Band Width (between peaks) .... 350 kc

VIDEO RESPONSE .... To 4 mc

FOCUS .... Electrostatic

SWEEP DEFLECTION .... Magnetic

SCANNING .... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY .... 15,750 cps

VERTICAL SCANNING FREQUENCY .... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) .... 30 cps

OPERATING CONTROLS (front panel)

Channel Selector / Fine Tuning .... Dual Control Knobs
Picture / Brightness .... Dual Control Knobs
Picture Horizontal Hold / Picture Vertical Hold .... Dual Control Knobs
On-Off Switch .... Single Control Knob
Sound Volume .... Single Control Knob
Remote Brightness and Picture Controls on some sets.

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Vertical Centering .... R-F, I-F chassis rear adjustment
Height .... R-F, I-F chassis rear adjustment
Vertical Linearity .... R-F, I-F chassis rear adjustment
Video Peaking Switch .... R-F, I-F chassis rear switch
Width .... Horizontal Deflection chassis screwdriver adjustment
Horizontal Linearity ....Horizontal Deflection chassis adjustment
Horizontal Drive .... Horizontal Deflection chassis adjustment
Horizontal Centering .. Horizontal Deflection chassis adjustment
Horizontal Oscillator Frequency — Horizontal Deflection chassis adjustment
Horizontal Oscillator Phase — Horizontal Deflection chassis adjustment
Focus (Electrical) .. Horizontal Deflection chassis rear adjustment
Focus (Mechanical) .... Optical Barrel adjustment
Deflection Coil .... Optical Barrel adjustment
Horizontal Optical Centering .... Optical Barrel adjustment
Lateral Optical Centering .... Optical Barrel adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE TELEVISION RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The following adjustments are necessary when turning the receiver on for the first time.

1. Lift the lid and open the control panel.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Turn the PICTURE control fully counter-clockwise.

5. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen, then counter-clockwise until the glow just disappears.

6. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.

7. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

8. Adjust the VERTICAL hold control until the pattern stops vertical movement.

9. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

10. Adjust the PICTURE control for suitable picture contrast.

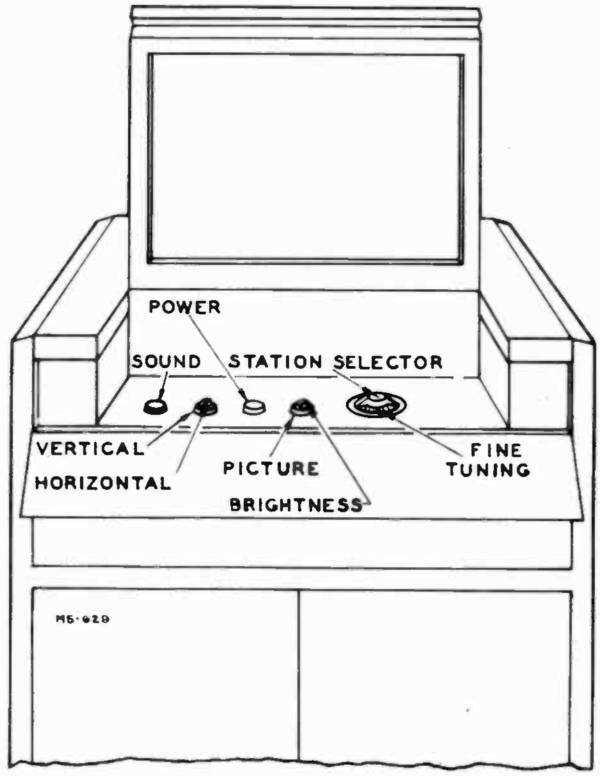
11. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

12. In switching from one station to another, it may be necessary to repeat steps number 7 and 10.

13. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 7 is generally sufficient.

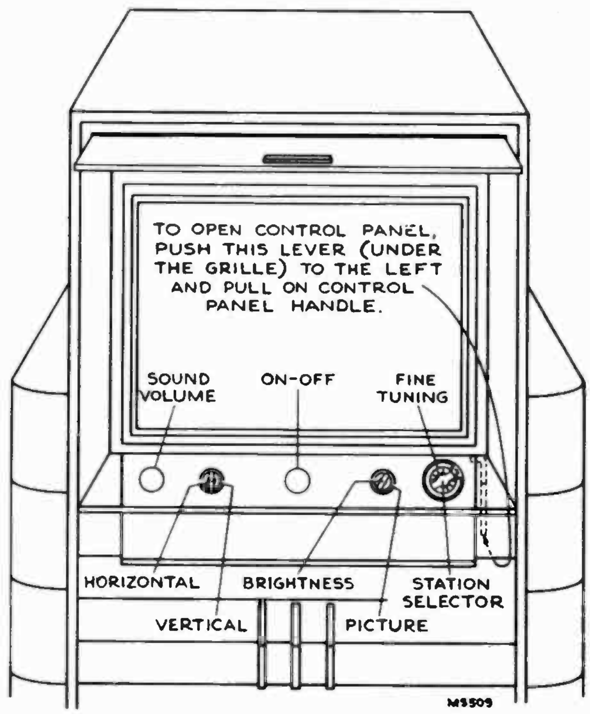
14. If the position of the controls has been changed, it may be necessary to repeat steps number 2 through 10.

Note: The lid is provided with an interlock switch to insure that the receiver will be turned off when the cabinet is closed.
8PCS41 only



Model 8PCS41

Figure 1—Receiver Operating Controls



Model 741PCS

Figure 1—Receiver Operating Controls

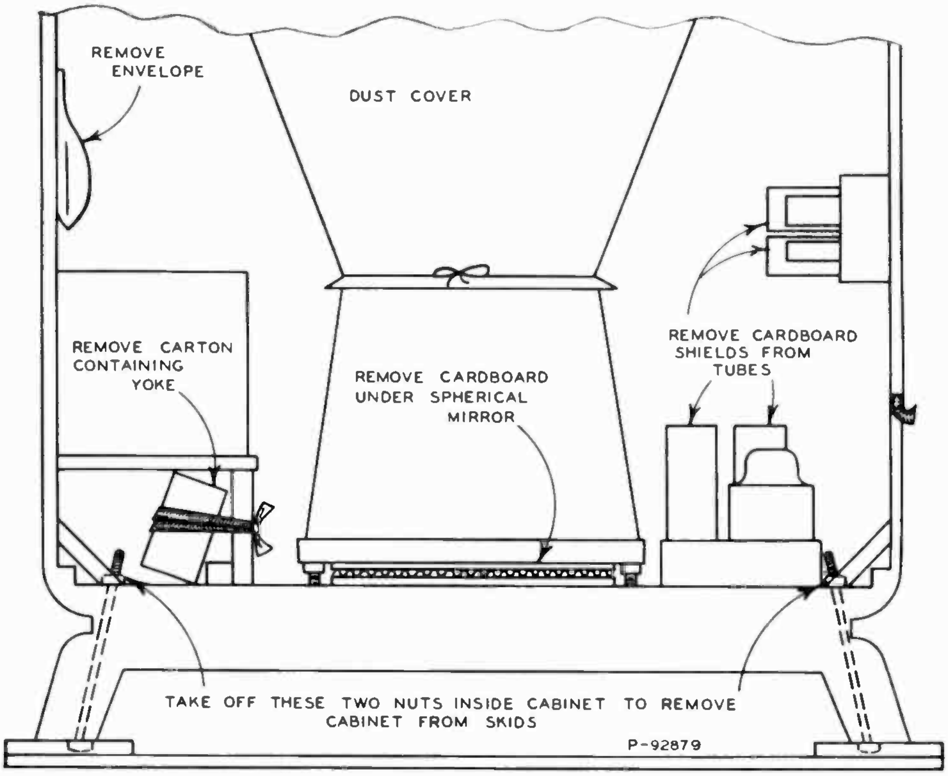


Figure 2—Removal of Shipping Material

Remove the shipping material as shown in Figure 2. Make sure that all tubes are firmly seated in their sockets.

Untie the canvas dust cover for the optical barrel and tie it off to one side.

Remove the speaker grille; 741PCS—pull out on top of grille; 8PCS41—take out four screws from the front corners of the grille. Disconnect the speaker cable from the speaker and set the grille to one side.

Models 741PCS, 8PCS41 and 8PCS41-C employ a KRK1A-1 optical barrel. 8PCS41-B employs a KRK4 optical barrel.

Adjustment procedure and nomenclature for the two barrels are similar and the following instructions are given for both types.

Caution: Handle the corrector lens with care. This lens is made of a plastic material, is soft and can be easily scratched by improper handling or even by rubbing with a cloth. Do not use cleaning fluid on the lens as it may be attacked by some of the chemicals used in such solutions. In short, the lens should be given the care due any precision optical equipment.

Remove the corrector lens from the top of the optical barrel by loosening the screws holding the mountings clips as shown in Figure 4. Caution: Do not loosen the screws holding the corrector lens centering cams or plate.

Although the high voltage filter capacitors of a new receiver are not likely to be charged, it is a good idea to form the habit of discharging the optical barrel before making any internal adjustments. Take a clip lead, fasten the clip end to the barrel and discharge the unit by making repeated contacts to the kinescope holder with the other end of the lead.

Clean the back of the screen, the front of the 45° mirror and the optical barrel spherical mirror by "sweeping" the surface with a small camel's hair brush. Any dust on the spherical mirror should be swept into the black center portion where it can be picked up with a piece of scotch tape. Caution: Do not touch the silvered portion of the mirrors. The mirrors are surface silvered and can be damaged by contact with the moist hand. If the screen or mirrors require cleaning, a solution of "Dreft" and water should be employed.

Place a type 202-B-1 test lamp in the kinescope holder and adjust the ball screws to center the lamp in the holder. Connect the lamp cord into a 110-volt power outlet and turn the lamp on. Replace the corrector lens. Rotate the lamp so as to produce a picture on the screen in the proper aspect. Cover the center hole in the corrector lens with a piece of black cardboard in order to prevent light from this source from lowering the resolution.

Loosen the optical focus adjustment lock screws and adjust the optical focus adjustment for the best overall definition on the screen. The optical system should show at least 900 line resolution over all the screen. If the system shows less definition, it will be necessary to make the adjustments under "Alignment of Optical Barrel."

Choose the proper alignment procedure for the barrel concerned and upon completion procede with "Check of Optical Barrel Tilt" which applies to both types of barrels.

ALIGNMENT OF KRK-4 OPTICAL BARREL—With the test lamp in place as described above, turn the optical focus adjustment until the vertical and horizontal lines become double. When the test lamp is properly centered, the lines are parallel. If the lines are not parallel, the kinescope holder requires horizontal or lateral centering.

Horizontal or Lateral Centering Adjustment—Loosen the focus sprocket support mounting screws and the idler support mounting screws and slide the three focus sprockets back and forth until the vertical and horizontal lines are parallel.

If the vertical lines are not parallel, the sprockets should be slid straight forwards or backwards until the vertical lines are parallel. If the horizontal lines are not parallel, the sprockets should be slid to one side or the other until the lines are parallel. Upon completion tighten the sprocket support mounting screws taking care that the sprockets do not shift in the process. Make sure the focus sprocket drive chain is in place on all sprockets, slide the idler sprocket back until the drive chain is tight, then tighten the idler sprocket support mounting screws.

Caution: The focus screw extensions above the focus sprockets should be equal for all sprockets. If during the adjustment procedure, the drive chain should fall from the sprockets and the sprockets accidentally turned, it will be necessary to readjust the sprockets until the screw extensions are equal.

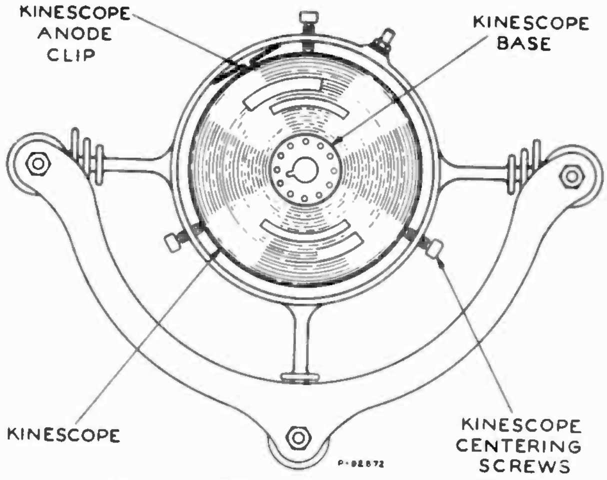


Figure 3—KRK-4 Kinescope Holder

Corrector Lens Centering—Turn the focus adjustment until a halo appears around the dot in the center of the test lamp. If the halo is not symmetrical around the dot, loosen the four corrector lens centering cam lock screws and slide the lens about until the halo is symmetrical. Turn the cams up firmly against the lens and tighten the cam lock screws. Care should be taken not to disturb the lens position during the tightening process.

ALIGNMENT OF KRK-1A OPTICAL BARREL—With the test lamp in place as described above, turn the optical focus adjustment until the vertical and horizontal lines become double. When the test lamp is properly centered, the lines are parallel. If the lines are not parallel, the Horizontal or Lateral optical centering controls require readjustment.

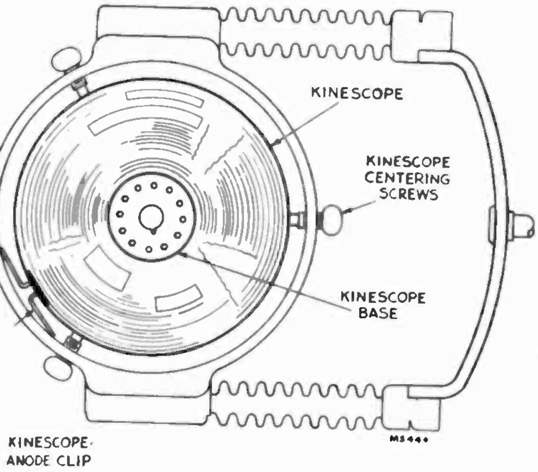


Figure 3—Kinescope Holder —KRK-1A

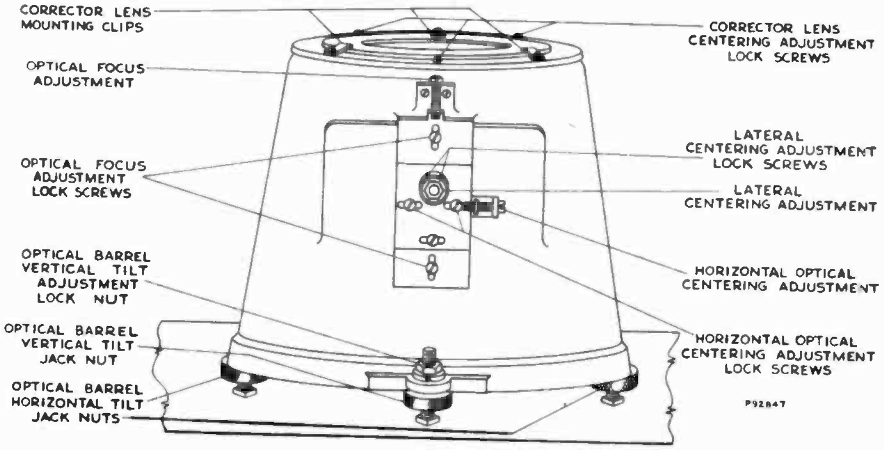


Figure 4—KRK-1A Optical Barrel Adjustments

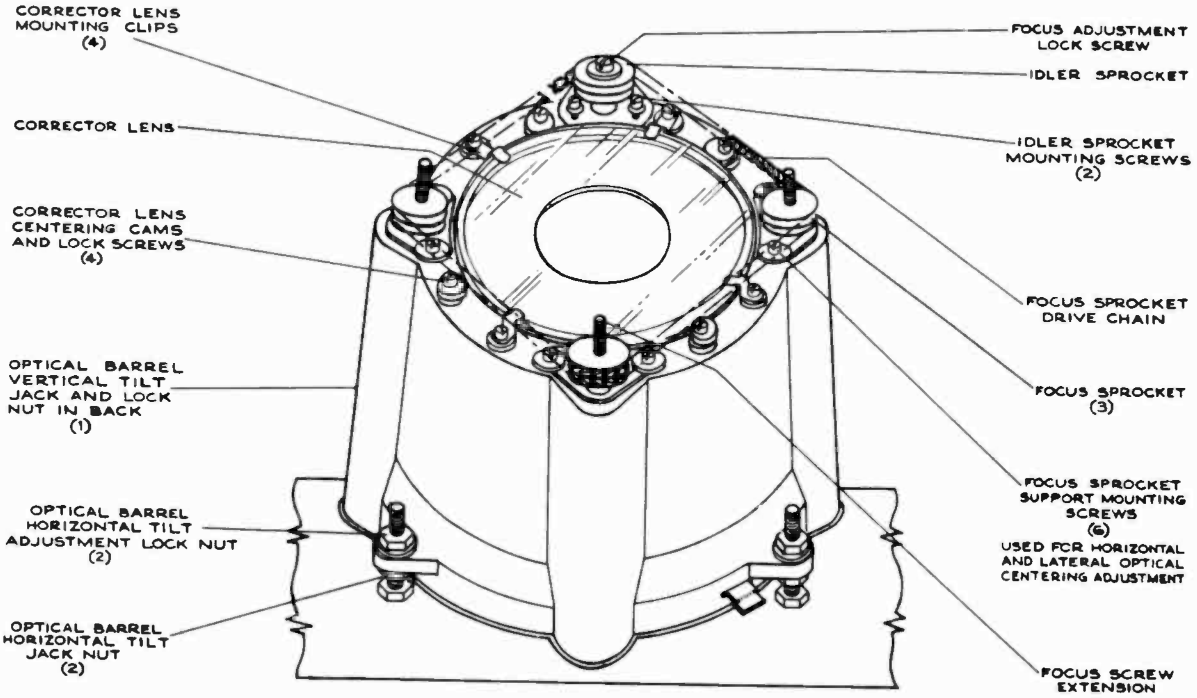


Figure 4—KRK-4 Optical Barrel Adjustments

Lateral Optical Adjustment—If the vertical lines are not parallel, loosen the lateral adjustment set screws and turn the lateral adjustment until the vertical lines are parallel. Tighten the adjustment set screws.

Horizontal Optical Adjustment—If the horizontal lines are not parallel, loosen the optical horizontal centering lock screws and turn the optical horizontal centering adjustment until the lines are parallel. Tighten the adjustment lock screws.

Corrector Lens Centering—Turn the focus adjustment until a halo appears around the dot in the center of the test lamp. If the halo is not symmetrical around the dot, loosen the three corrector lens lock screws and the three corrector lens mounting clip screws and shift the lens until the halo is symmetrical. Tighten the lens centering lock screws with the lens in this position.

Check of Optical Barrel Tilt—Adjust the optical focus control to and through the focus range. The picture should go through focus all over at the same time. This does not mean that the definition will be equal over all the picture, but it should be the best definition obtainable. If this is not the case, the optical barrel is not in alignment with the cabinet and requires adjustment as outlined in the following paragraph.

Optical Barrel Tilt Alignment—Turn the optical focus adjustment counterclockwise until the picture is out of focus then clockwise until the picture begins to come in focus. If one side comes into focus before the rest of the picture, it indicates that that side of the optical barrel should be raised. Loosen the lock nuts and turn the inner jack nuts, shown in Figure 4, to raise that side of the barrel and the other jack nut down to lower the other side of the barrel, until both sides of the picture come into focus at the same time.

If the top of the picture comes into focus first as the optical focus adjustment is turned clockwise, it indicates that the outer jack nut (nearest the focus controls) should be adjusted to raise the front of the optical barrel, until top and bottom come into focus at the same time.

When the barrel is properly adjusted, the entire picture will come into best focus all over at the same time as the focus control is rocked through the focus point. At this point the pattern should be in the center of the screen. When this condition of alignment is obtained, tighten the lock nuts being careful not to disturb the adjustments.

If the optical barrel tilt adjustments are made, it will be necessary to recheck the adjustments under Horizontal Optical Adjustments and Lateral Optical Adjustments.

Loosen all the kinescope ball head screws equally and just sufficiently to permit removal of the test lamp.

INSTALLATION OF KINESCOPE—The kinescope second anode contact is a recessed metal well in the side of the bulb. A small brass clip (from the carton containing the deflection yoke and front panel control knobs) must be placed in the kinescope anode connector and the tube inserted in the holder as shown in Figure 3. The tube must be installed so that the socket key on the base of the tube is pointed towards the horizontal chassis. Make sure that the anode clip is horizontal so that it cannot protrude out of the holder.

Open the kinescope shipping carton and remove the tube. Handle this tube by the neck. Do not cover the envelope of the tube with fingermarks as it will produce leakage paths between the high voltage rim near the screen and the grounded coating on the neck. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride, which is obtainable at most drug stores.

Wipe the kinescope screen clean of all dust or finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

Tighten the three ball screws equally to center the tube in the support. Caution: Do not apply too much pressure in tightening the ball screws as the tube can be cracked by so doing.

Wipe the corrector lens clean with a piece of lens tissue and replace making sure that the arrow on the lens points to the rear of the cabinet as before. Turn the lens mounting clips in place and tighten the clip screws.

Turn the deflection yoke so that the slotted end of the bakelite center tube is up and slide the yoke down over the neck of the kinescope. Connect the kinescope socket to the base of the tube. Turn the yoke so that the leads come out towards the rear of the cabinet.

Slip the yoke cables out through the cable sleeve in the optical barrel dust cover. The three-prong plug on the unshielded yoke cable should be plugged into the television r-f, i-f chassis as shown in Figure 5. The two-prong plug on the shielded yoke cable should be plugged into the horizontal deflection chassis. The shield braid extension from this cable should be grounded to the chassis by means of the screw provided for this purpose.

Caution—Do not turn the television receiver on with the deflection yoke cables disconnected. To do so may cause the destruction of the kinescope screen.

Remove the cover from the horizontal deflection chassis and take out the strings holding the high voltage filter capacitors in the clips during shipment. Replace the chassis cover.

Reconnect the speaker. Check all chassis interconnecting cables to make sure that all are plugged into the proper sockets as shown in Figure 5.

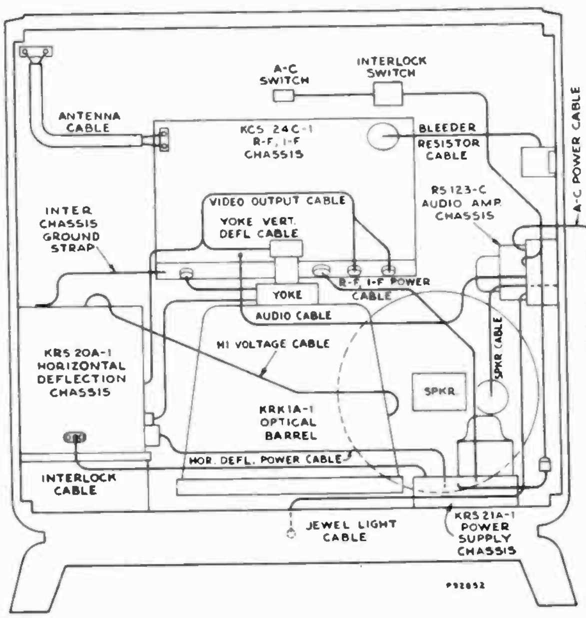


Figure 5—Chassis Interconnecting Cables

The antenna and power connections should now be made. Turn the power switch to the "on" position, the picture control counterclockwise and the brightness control clockwise until a glow appears on the screen.

Adjust the electrical focus control R331 on the horizontal deflection chassis until the raster lines are in sharpest focus as seen when looking down into the barrel. If necessary, reduce the brilliance control setting, and readjust the focus control.

Adjust the optical focus adjustment until the raster lines are in focus on the screen. Turn the deflection yoke until the raster lines are horizontal on the screen and tighten the yoke clamp in this position. Pull the dust cover down around the optical barrel.

Picture Adjustments—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See step 3 through step 10 of the receiver operating instructions on page 3.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—The sync link (see Figure 7) must be in the normal position (2 to 3). Turn the horizontal hold control to the extreme counterclockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will pull into sync.

Turn the horizontal hold control to the extreme clockwise position. The picture should remain in sync. Momentarily remove the signal. Again the picture should normally pull into sync.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at either extreme or failed to pull into sync after momentary removals of the signal, make the adjustments under "Slight Retouching Adjustments." If, after making these retouching adjustments, the receiver fails to pass the above checks or if the horizontal oscillator is completely out of adjustment, then make the adjustments under "Complete Realignment."

Slight Retouching Adjustments—Tune in a Television Station and adjust the fine tuning control for best sound quality. Sync the picture and adjust the picture control for slightly less than normal contrast. Turn the horizontal hold control to the extreme position in which the oscillator fails to hold or to pull in. Momentarily remove the signal. Turn the T301 frequency adjustment on the chassis rear apron until the oscillator pulls into sync. Check hold and pull-in for the other extreme position of the hold control.

Complete Realignment—Tune in a Television Station and adjust the fine tuning control for best sound quality.

With the sync link in the normal position (2-3), turn the T301 frequency adjustment (on rear apron), until the picture is synchronized. (If the picture is not synchronized vertically, adjust the vertical hold.) Adjust the picture control so that the picture is somewhat below average contrast level.

Turn the T301 phase adjustment screw (under chassis, see Figure 19) until the blanking bar, which may appear in the picture, moves to the right and off the raster. The range of this adjustment is such that it is possible to hit an unstable condition (ripples in the raster). The screw must be turned clockwise from the unstable position. The length of stud beyond the bushing in its correct position is usually about ½ inch.

Turn horizontal hold to extreme counterclockwise position. Turn T301 frequency adjustment clockwise until the picture falls out of sync. Then turn it slowly counterclockwise to the point where the picture falls in sync again.

Readjust T301 phase adjustment so that the left side of the picture is close to the left side of the raster, but does not begin to fold over.

Turn horizontal hold to extreme clockwise. The right side of the picture should be close to the right side of the raster, but should not begin to fold over. If it does, readjust the phase.

Momentarily remove the signal. When the signal is restored, the picture should fall in sync. If it doesn't, turn T301 frequency adjustment counterclockwise until the picture falls in sync.

Turn horizontal hold to extreme counterclockwise position. Remove the signal momentarily. When signal is restored, the picture should fall in sync.

NOTE: If the picture does not pull in sync after momentary removals of signal in both extreme positions of horizontal hold, the pull-in range may be inadequate, though not necessarily. A pull-in through ¾ of the hold control range may still be satisfactory.

There is a difference between the pull-in range and hold-in range of frequencies. Once in sync, the circuit will hold about 50% to 100% more variation in frequency than it can pull in. The range of the horizontal hold control is only approximately equal to the pull-in range, considerable variation may be found due to variations in the cut-off characteristic of the horizontal oscillator control tubes, V303.

Excessive pull-in is objectionable because the higher sensitivity of the control circuits means also greater susceptibility to noise, and to the vertical sync and equalizing pulses which tend to cause a bend in the upper part of the raster. This effect is more noticeable when the sync link is in the 1-2 position.

Now that a picture has been obtained we may proceed with the picture adjustments.

Adjust the electrical and optical focusing adjustments for maximum definition in the vertical wedge of the test pattern.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R149 on r-f, i-f chassis rear apron) until the picture fills the screen vertically. Adjust vertical linearity (R175 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask. In some cases it may be necessary to shift the position of the kinescope in the holder (see Figure 3) in order to obtain proper centering of the picture.

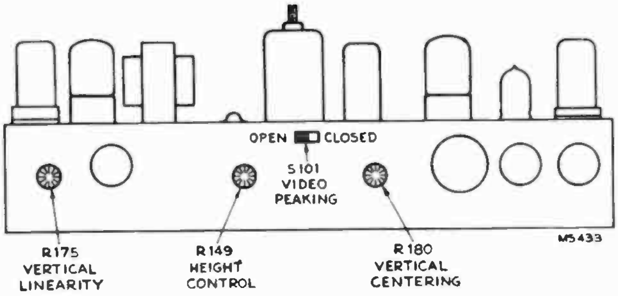


Figure 6—R-F, I-F Rear Chassis Adjustments

WIDTH AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the horizontal drive (R340 on rear apron) clockwise as far as possible without causing crowding of the right of the picture. This position provides maximum high voltage to the kinescope second anode. Adjust the horizontal linearity control R351 (see Figure 7) until the test pattern is symmetrical left to right. A slight readjustment of the horizontal drive control may be necessary when the linearity control is used. Adjust the width control (L302 on rear chassis) until the picture just fills the screen horizontally. Adjust horizontal centering to align the picture with the mask. In some cases it may be necessary to shift the position of the kinescope in the holder in order to obtain proper centering of the picture.

Do not turn the horizontal drive control beyond approximately ⅞ of its maximum clockwise position. To do so may cause the output stage to oscillate and result in the loss of horizontal sync.

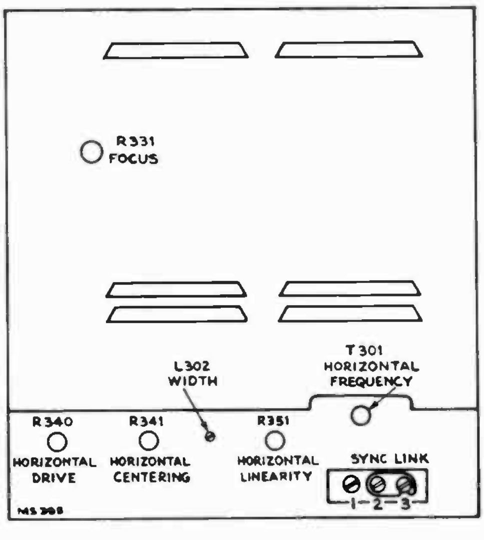


Figure 7—Horizontal Deflection Chassis Adjustments

FOCUS—Adjust the focus control for maximum definition in the test pattern vertical "wedge." Adjust the optical focus adjustment for best overall focus on the screen.

Check to see that all yoke and optical barrel lock screws are tight.

Pull the dust cover down around the top of the optical barrel and tie it securely and tightly in place as shown in Figure 2. Tie the cable sleeve tight around the leads to prevent the entry of dust. These precautions are very important for if dust is permitted to enter and settle on the corrector lens, the optical efficiency of the system will be greatly impaired, resulting in a dim picture with poor definition.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—Tune in all available Television Stations to see if the receiver r-f oscillator is adjusted to the proper frequency on these channels. If adjustments are required, these should be made by the method outlined in the alignment procedure of the Service Data for Model 648PTK. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 8. Adjustments for channels 6 and 13 are under the chassis. Observe the picture for detail, for proper interlacing and for the presence of interference or reflections.

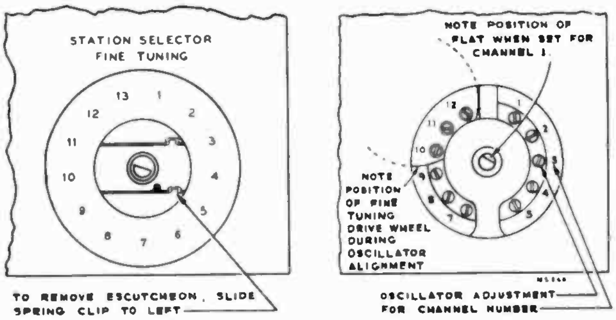


Figure 8—R-F Oscillator Adjustments

ANTENNA TRAP—In some instances interference may be encountered from FM stations that are on the image frequency of a television station. In other instances interference may be observed on channel 6 from a station on channel 10 or on channel 5 from a station on channel 7.

In some sets, a series resonant trap across the r-f amplifier grid circuit is provided to eliminate this type of interference.

To adjust the trap in the field, tune in the station on which the interference is observed. Tune both cores of the trap for minimum interference in the picture. See Figure 14 for the location of the trap. Keep both cores approximately the same by visual inspection. Then, turn one core ½ turn from the original position and repeak the second for maximum rejection. Repeat this process until the best rejection is obtained.

VIDEO PEAKING SWITCH—A video peaking switch is provided (see Figure 6) to permit changing the video response. Normally the switch should be left open. However, if the pictures from the majority of stations look better with the switch closed, then the switch should be placed in that position. However, if transients are produced on high contrast pictures then the switch should be left open.

Replace the cabinet back grille. Make sure the screws which hold the back grille in place are tight, otherwise the back may rattle or buzz when the receiver is operating at high volume.

The KCS24C-1 R-F, I-F chassis employed in 8PCS41-B and 8PCS41-C receivers is wired so that a remote picture and brightness control can be added as an attachment. The attachment is not provided and the chassis attachment socket is fitted with a dummy plug. The attachment schematic is shown in Fig. 23.

VENTILATION CAUTION—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way. If the receiver is to be operated with the back of the cabinet near a wall, at least a two-inch clearance should be maintained between cabinet and wall.

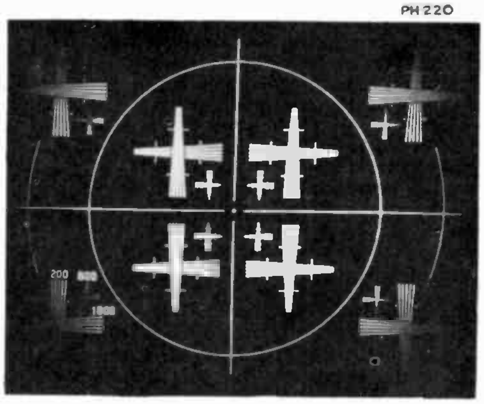


Figure 9—Correct Picture of Optical Test Lamp Pattern

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Figure 10—Optical Barrel Focus Adjustment Misadjusted

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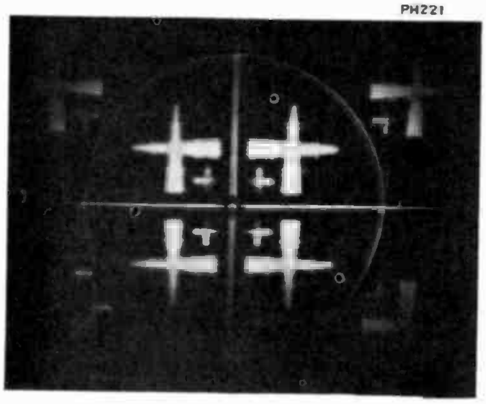

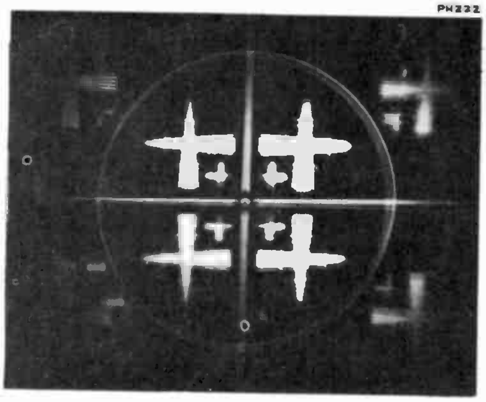

Figure 11—Optical Barrel Horizontal Centering Adjustment Misadjusted

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Figure 12—Optical Barrel Lateral Centering Adjustment Misadjusted

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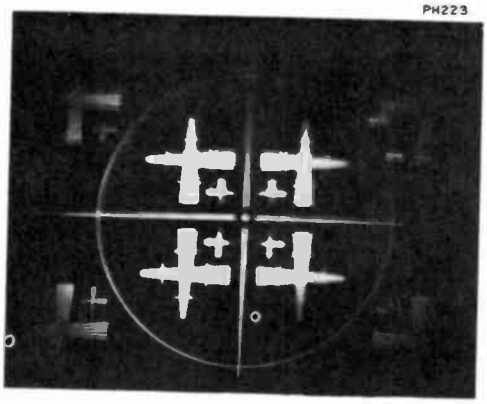


CHASSIS VIEWS

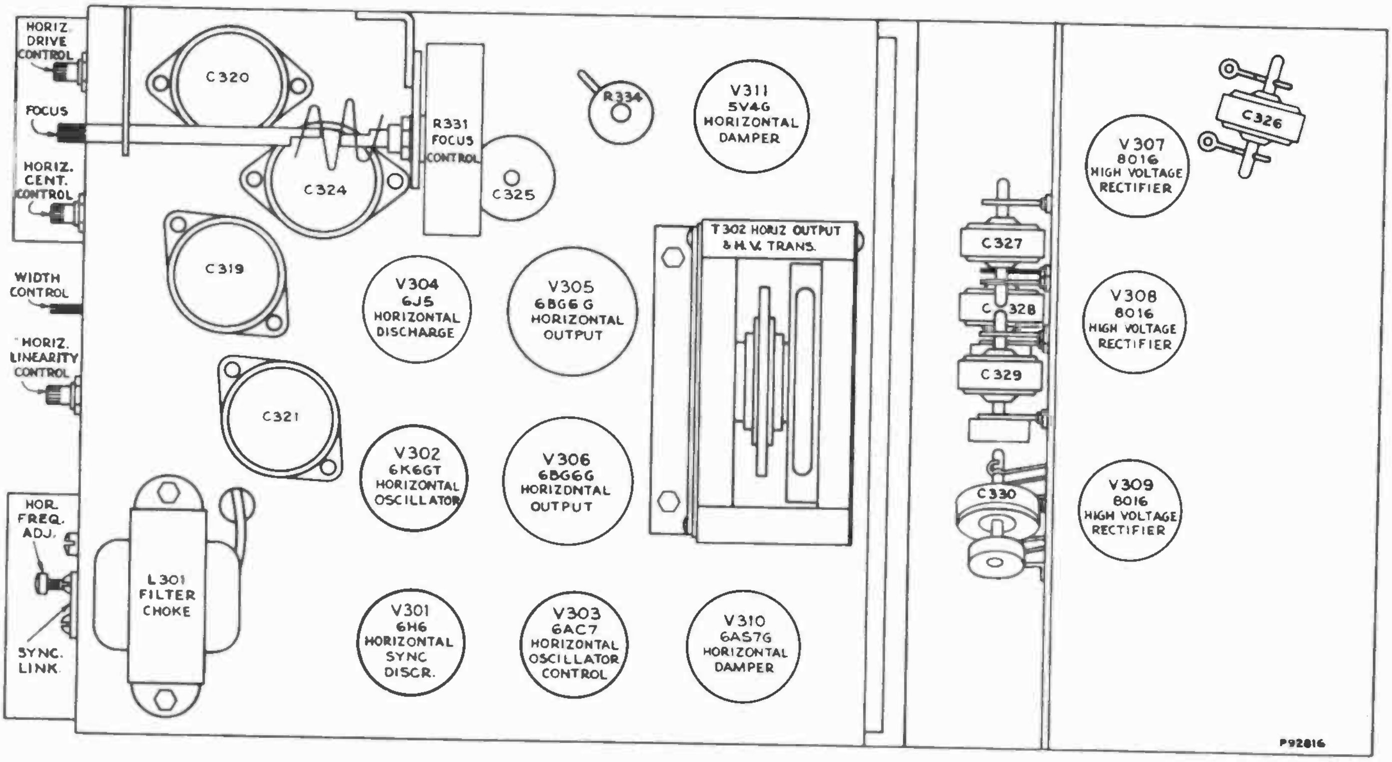


Figure 13—Horizontal Deflection Chassis Top View

741PCS, 8PCS41 — VOLTAGE CHART

Measurements made with receiver operating on 117 volts 60 cycles a-c and with no signal input. Voltages shown are read with Jr. "VoltOhmyst" between indicated terminal and chassis ground. Symbol < means "less than."

R-F, I-F CHASSIS, KCS 24B-1 OR KCS 24C-1

Tube No.	Tube Type	Function	Operating Condition **	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6J6	R-F Amplifier	Pictr. Min.	1 & 2	133	—	—	7	0	5 & 6	–34	<.1*	—	*Per Plate
			Pictr. Max.	1 & 2	58	—	—	7	0	5 & 6	–.25	6.0*	—	*Per Plate
V2	6J6	Converter	Pictr. Min.	1 & 2	128	—	—	7	0	5 & 6	–3 to –6.	.5 to 4*	—	*Per Plate
			Pictr. Max.	1 & 2	93	—	—	7	0	5 & 6	–2 to –5.	.2 to 3*	—	*Per Plate
V3	6J6	R-F Oscillator	Pictr. Min.	1 & 2	110	—	—	7	.3	5 & 6	–4.5 to –6.5	2.5*	—	*Per Plate
			Pictr. Max.	1 & 2	80	—	—	7	.2	5 & 6	–3.5 to –5.	1.7*	—	*Per Plate
V101	6BA6	1st Sound I-F Amplifier	Pictr. Min.	5	125	6	125	7	2.0	1	0	15.2	6.2	
			Pictr. Max.	5	107	6	107	7	1.65	1	0	13.	5.1	
V102	6BA6	2d Sound I-F Amplifier	Pictr. Min.	5	125	6	125	7	2.0	1	0	15.4	6.2	
			Pictr. Max.	5	107	6	107	7	1.65	1	0	13.2	5.0	
V103	6AU6	3d Sound I-F Amplifier	Pictr. Min.	5	47	6	47	7	0	1	–.23	2.8	2.8	
			Pictr. Max.	5	41	6	41	7	0	1	–.23	2.9	1.8	
V104	6AL5	Sound Discrim.	Pictr. Min.	2 & 7	–.35	—	—	4 & 5	—	—	—	—	—	
			Pictr. Max.	2 & 7	–.45	—	—	4 & 5	—	—	—	—	—	
V105-A	6AL5	AGC Detector	Pictr. Min.	2	–110	—	—	5	–110	—	—	—	—	
			Pictr. Max.	2	–110	—	—	5	–110	—	—	—	—	
V105-B	6AL5	Picture 2d Det.	Pictr. Min.	7	.15	—	—	1	0	—	—	—	—	
V106	6AT6	AGC Amplifier	Pictr. Min.	7	–33	—	—	2	–110	1	–108	—	—	
			Pictr. Max.	7	0	—	—	2	–110	1	–105	—	—	
V107-A	6AL5	AGC Diode	Pictr. Min.	7	–8.0	—	—	1	–8.0	—	—	—	—	
			Pictr. Max.	7	–3.2	—	—	1	–0.9	—	—	—	—	
V107-B	6AL5	DC Restorer	Brightness Min.	2	–110	—	—	5	–97	—	—	—	—	
			Brightness Max.	2	–1	—	—	5	0	—	—	—	—	
V108	6AG5	1st Pix. I-F Amplifier	Pictr. Min.	5	143	6	143	2 & 7	0	1	–8.1	0	0	
			Pictr. Max.	5	103	6	103	2 & 7	.2	1	–1.0	4.5	1.1	
V109	6AG5	2d Pix. I-F Amplifier	Pictr. Min.	5	145	6	145	2 & 7	0	1	–8.1	0	0	
			Pictr. Max.	5	117	6	117	2 & 7	.2	1	–1.0	3.9	1.3	
V110	6AG5	3d Pix. I-F Amplifier	Pictr. Min.	5	147	6	147	2 & 7	0	1	–8.1	0	0	
			Pictr. Max.	5	100	6	111	2 & 7	.21	1	–1.0	4.5	1.3	
V111	6AG5	4th Pix. I-F Amplifier	Pictr. Min.	5	98	6	138	2 & 7	1.4	1	0	7.3	2.3	
			Pictr. Max.	5	82	6	115	2 & 7	1.15	1	0	6.1	1.9	
V112	6AU6	1st Video Amplifier	Pictr. Min.	5	188	6	150	7	0	1	–2.25	6.7	2.6	
			Pictr. Max.	5	205	6	130	7	0	1	–2.35	4.3	1.6	
V113	6V6-GT	2d Video Amplifier	Pictr. Min.	3	180	4	255	8	8.9	5	–3.9	31.5	9.0	
			Pictr. Max.	3	175	4	249	8	8.5	5	–3.9	30.0	8.5	

R-F, I-F CHASSIS, KCS 24B-1 OR KCS 24C-1 (Continued)

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V114	6SK7	1st Sync. Amplifier	Pictr. Min.	8	165	6	113	5	0	4	–4.5	8.5	1.2	
			Pictr. Max.	8	180	6	99	5	0	4	–4.7	4.3	1.1	
V115	6SH7	2d Sync. Amplifier	Pictr. Min.	8	150	6	150	5	0	4	–5.3	0	0	
			Pictr. Max.	8	130	6	130	5	0	4	–5.6*	0	0	*Depends on noise
V116	6J5	3d Sync. Amplifier	Pictr. Min.	3	82	—	—	8	0	5	–.4	8.5	—	
			Pictr. Max.	3	73	—	—	8	0	5	–.4*	6.8	—	*Depends on noise
V117	6J5	Vertical Oscillator	Pictr. Min.	3	40*	—	—	8	–110	5	–144	.17	—	*Height, linearity and hold affect readings 2 to 1
V118	6K6-GT	Vertical Output	Pictr. Min.	3	215	4	215*	8	–81	5	–97	16.3	*	*Screen connected to plate
V119	6AT6	Audio Amplifier	Pictr. Min	7	+75	—	—	2	0	1	–1	.13	—	

HORIZONTAL DEFLECTION CHASSIS, KRS 20A-1 OR KRS 20B-1

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V301	6H6	Horizontal Sync. Discr.	Pictr. Min.	3 5	–5.0 –5.0	—	—	4 8	–3.2 –2.2	—	—	—	—	
V302	6K6-GT	Horizontal Oscillator	Hold Max. Resistance	3	240	4	220	8	.30	5	–27.5	23.3	6.12	
			Hold Min. Resistance	3	230	4	192	8	.32	5	–23.0	24.8	6.87	
V303	6AC7	Horizontal Osc. Control	Pictr. Min.	8	246	6	127	5	0	4	–3	2.9	.75	
V304	6J5	Horizontal Discharge	Pictr. Min.	3	78	—	—	8	0	5	–38	.9	—	
V305	6BG6-G	Horizontal Output	Pictr. Min.	Cap	Do not Meas.*	8	280	3	14.0	5	–8	78	9.6	*6000 volt pulse present
V306	6BG6-G	Horizontal Output	Pictr. Min.	Cap	Do not Meas.*	8	280	3	14.0	5	–8	78	9.6	*6000 volt pulse present
V307	8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	10,500	—	—	—	—	*10,500 volt pulse present
			Brightness Max.	Cap	*	—	—	2 & 7	10,000	—	—	—	—	*10,500 volt pulse present
V308	8016	H. V. Rectifier	Brightness Min.	Cap	10,000	—	—	2 & 7	20,000	—	—	—	—	
			Brightness Max.	Cap	9,500	—	—	2 & 7	19,500	—	—	—	—	
V309	8016	H. V. Rectifier	Brightness Min.	Cap	19,500	—	—	2 & 7	29,000	—	—	—	—	
			Brightness Max.	Cap	18,500	—	—	2 & 7	28,000	—	—	—	—	
V310	6AS7-G	Damper	Pictr. Min.	2 & 5	Do not	—	—	3 & 6	470	1 & 4	290	78*	—	*Total both plates
V311	5V4G	Damper	Pictr. Min.	4 & 6	Meas.‡	—	—	8	570	—	—	156*	—	‡1200 volt pulse present
V312	5TP4	Kinescope	Brightness Min.	Cap	29,000*	10	200	11	0	2	–98	0	—	*Measured with "VoltOhmyst"
			Brightness Max.	Cap	28,000*	10	200	11	0	2	–43	.35	–	and high voltage multiplier probe

POWER SUPPLY CHASSIS, KRS 21A-1

Tube No.	Tube Type	Function	Operating Condition **	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V401	5U4G	Lo. V. Rectifier	Pictr. Min.	4 & 6	—	—	—	2 & 8	493	—	—	235*	—	*Total for both tubes
V402	5U4G	Lo. V. Rectifier	Pictr. Min.	4 & 6	—	—	—	2 & 8	493	—	—	*	—	
V403	5U4G	Lo. V. Rectifier	Pictr. Min.	4 & 6	—	—	—	2 & 8	265	—	—	172	—	

** Where separate readings are not listed for max. and min. gain settings of the picture control, the effect of the control is slight and readings are given for "Picture Min."

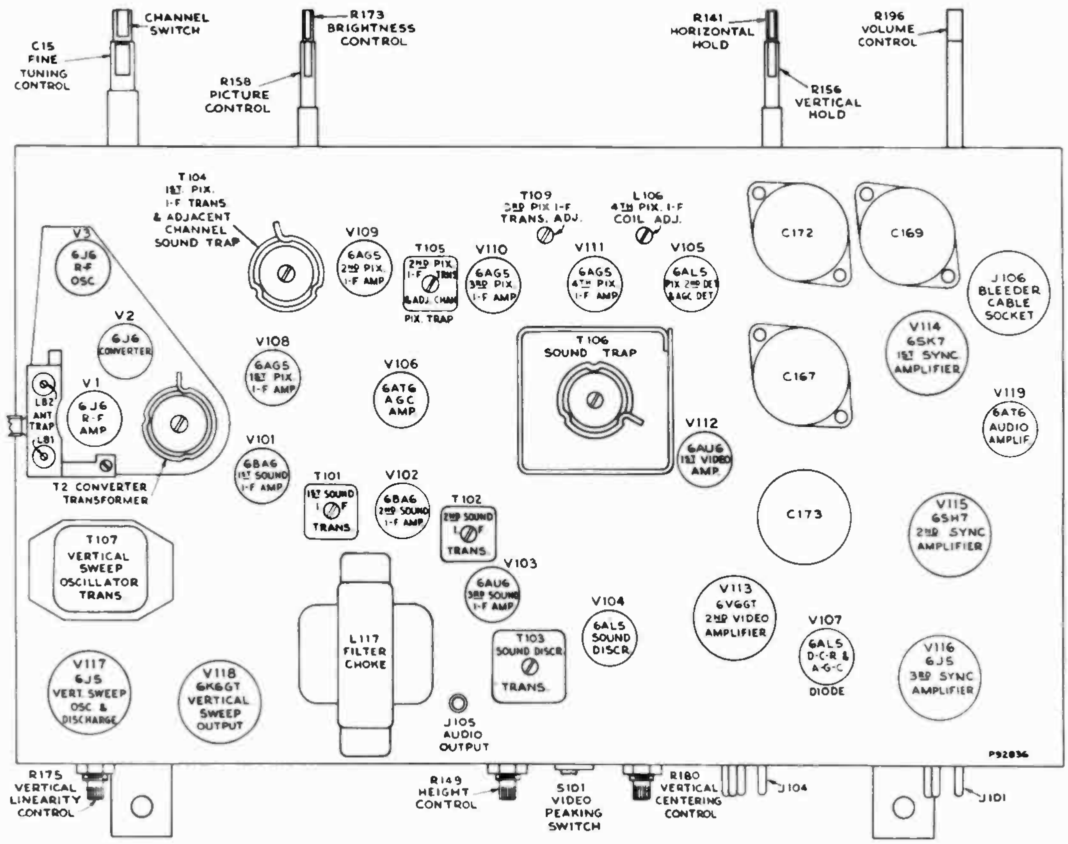


Figure 14—R-F, I-F Chassis Top View

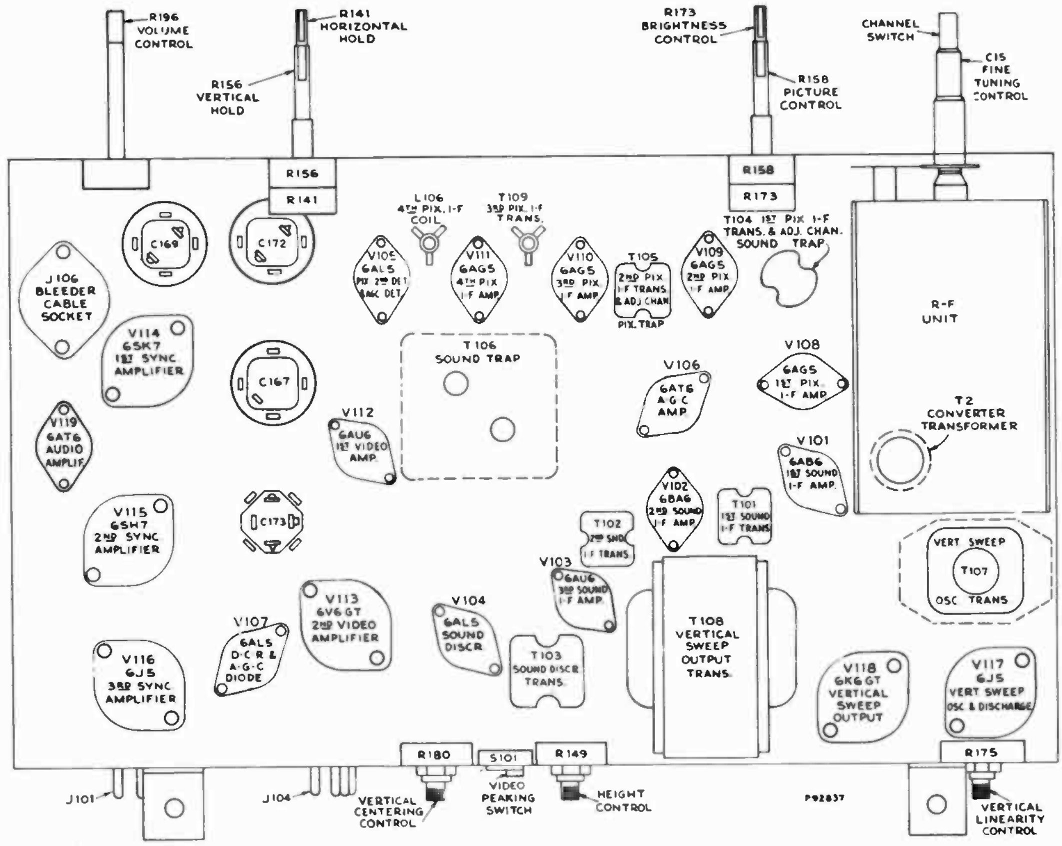
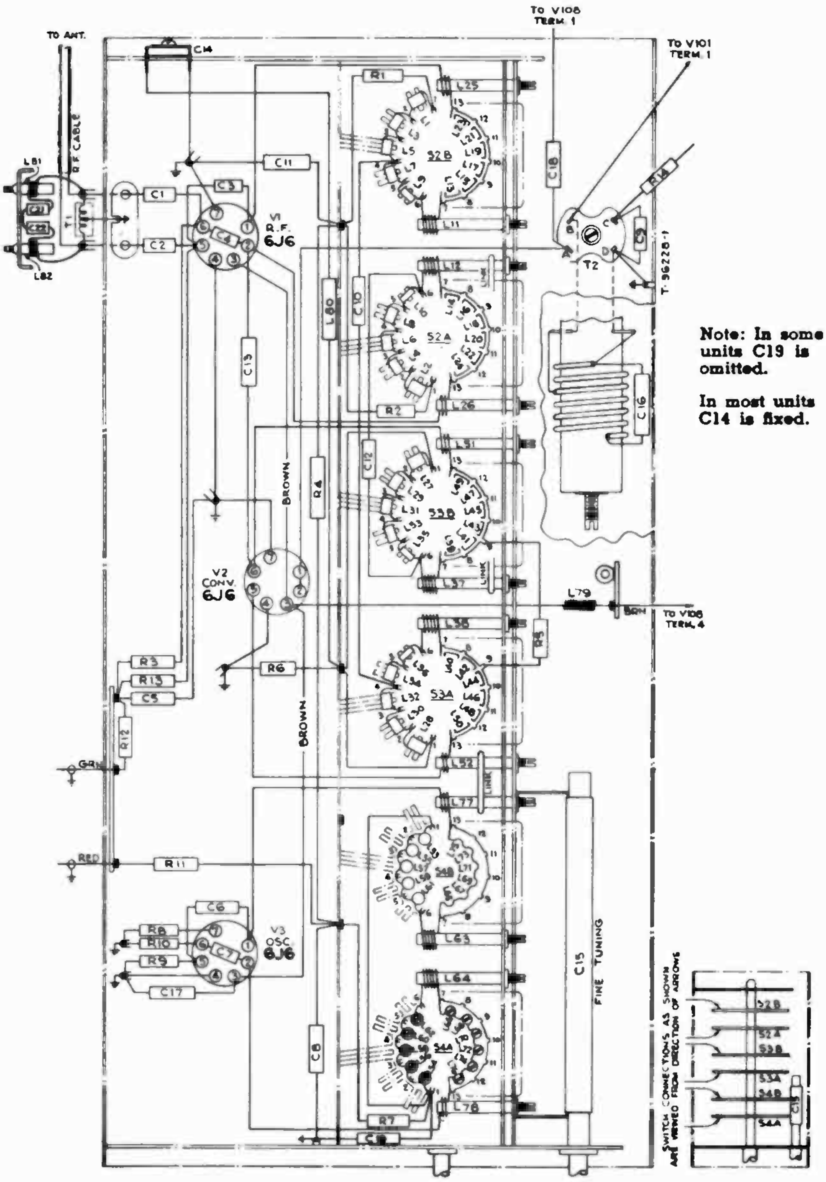


Figure 15—R-F, I-F Chassis Bottom View



Note: In some units C19 is omitted.

In most units C14 is fixed.

Figure 16—Television R-F Unit Wiring Diagram

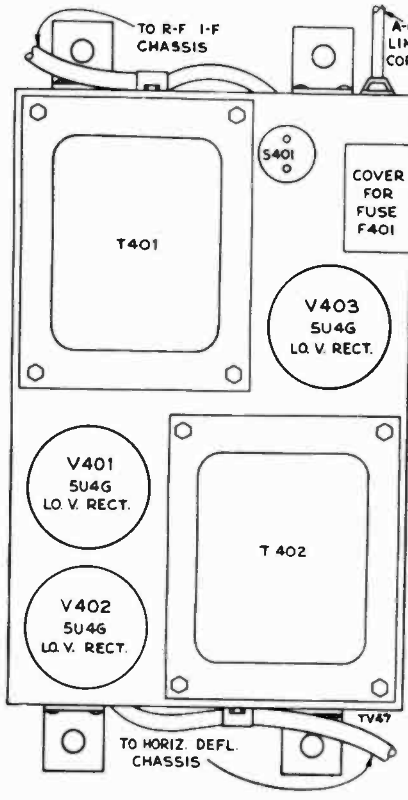


Figure 17—Power Supply, Top View

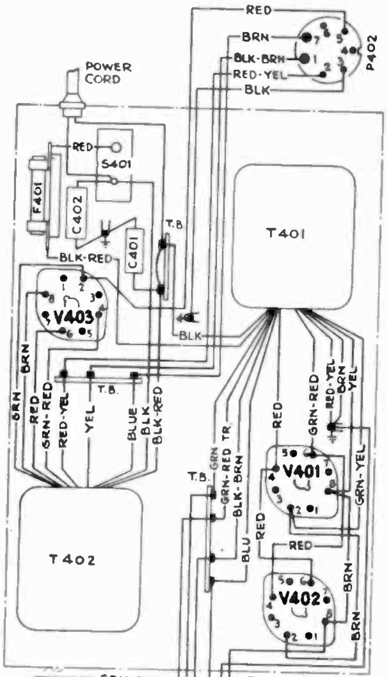
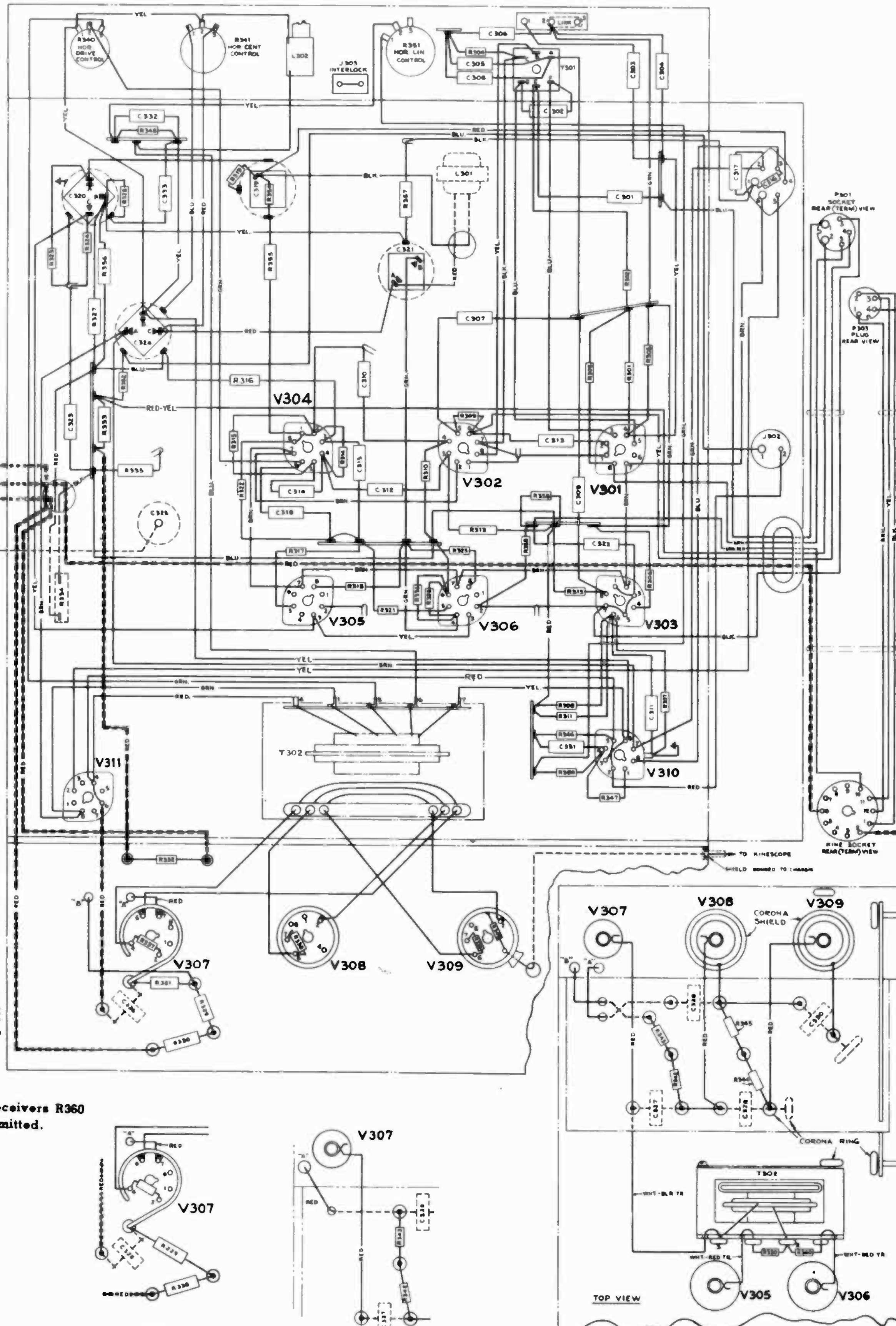


Figure 18—Power Supply Wiring Diagram

CHASSIS WIRING DIAGRAM



In some receivers R360 may be omitted.

In receivers not having R361, detail is as shown above.

Figure 19—Horizontal Deflection Chassis Wiring Diagram

CHASSIS WIRING DIAGRAM

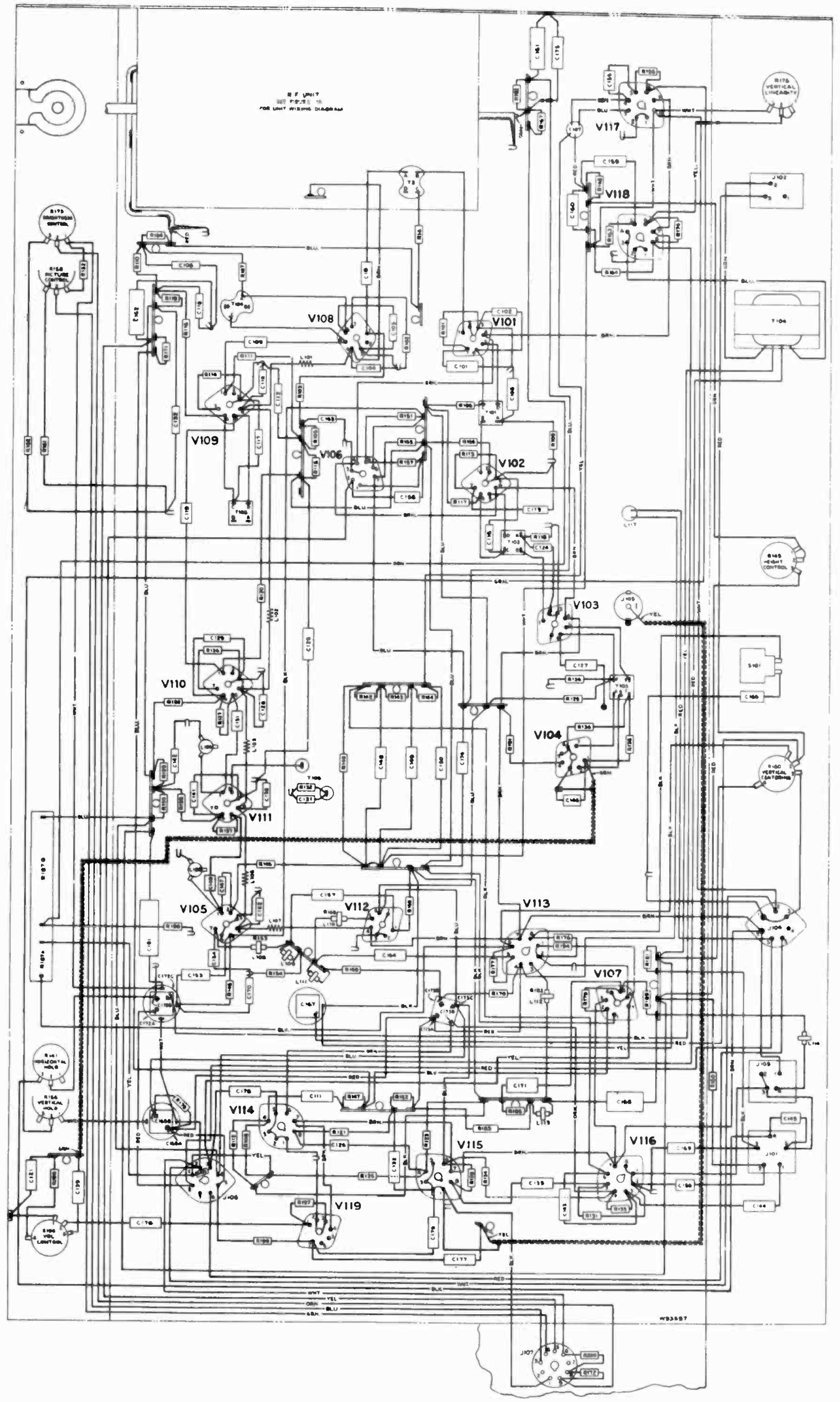
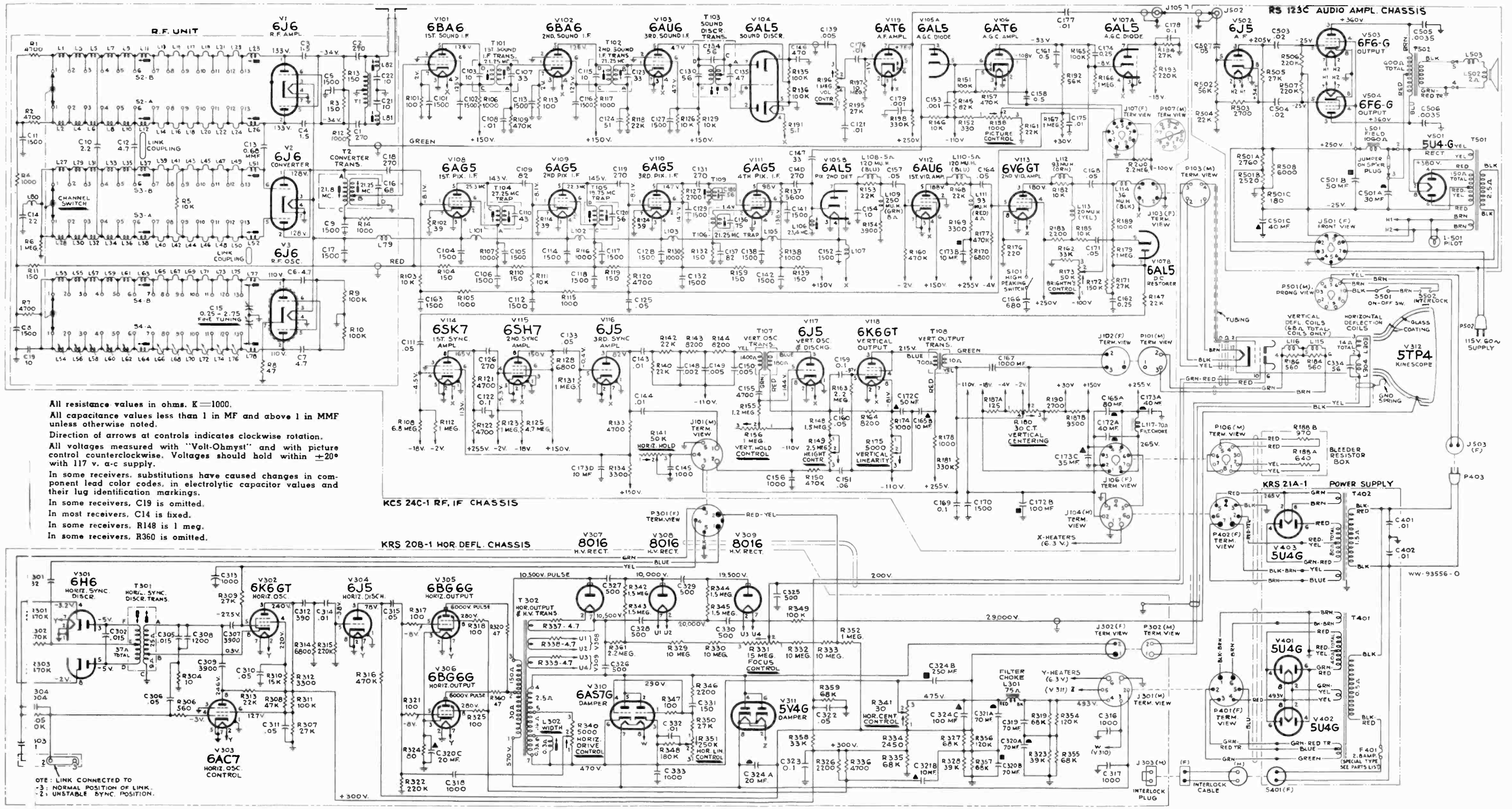


Figure 22—R-F, I-F Chassis Wiring Diagram (KCS 24C-1)

SCHEMATIC DIAGRAM



All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "Volt-Ohmyst" and with picture control counterclockwise. Voltages should hold within ±20° with 117 v. a-c supply.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

In some receivers, C19 is omitted.

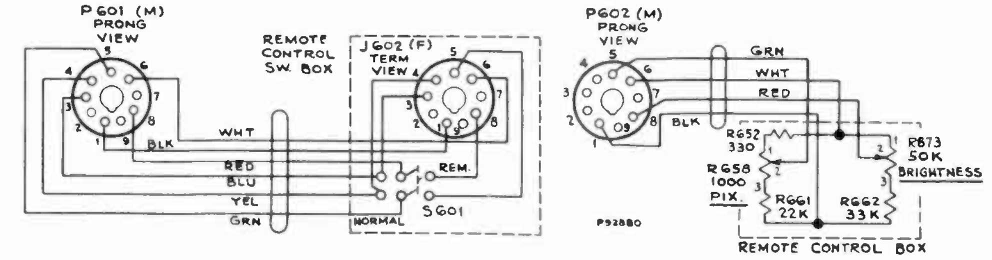
In most receivers, C14 is fixed.

In some receivers, R148 is 1 meg.

In some receivers, R360 is omitted.

8PCS41 receivers employed a KCS24B-1 R-F, I-F chassis, the schematic and wiring diagram for which is shown in the 741PCS service data.

8PCS41-B and 8PCS41-C receivers employed a KCS24C-1 R-F, I-F chassis shown in the schematic above and the wiring diagram, Fig. 22.



The KCS24C-1 R-F, I-F chassis is wired so that a remote Brightness and Picture control can be connected. This connection is made to J107. The schematic for the Local-Remote switch and the Remote Control Box is shown to the left.

MODEL 8PCS41

Figure 23—Schematic Diagram

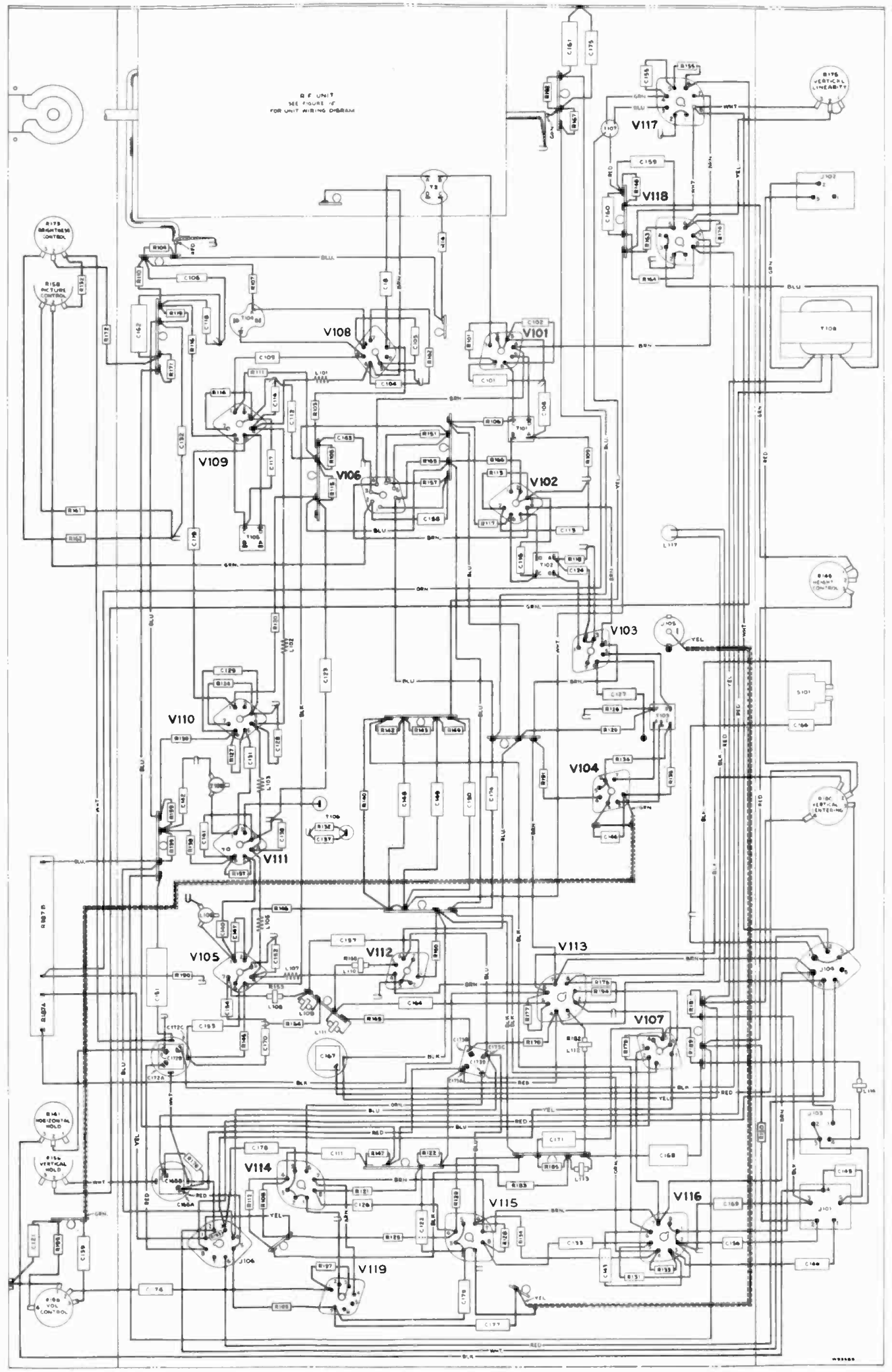
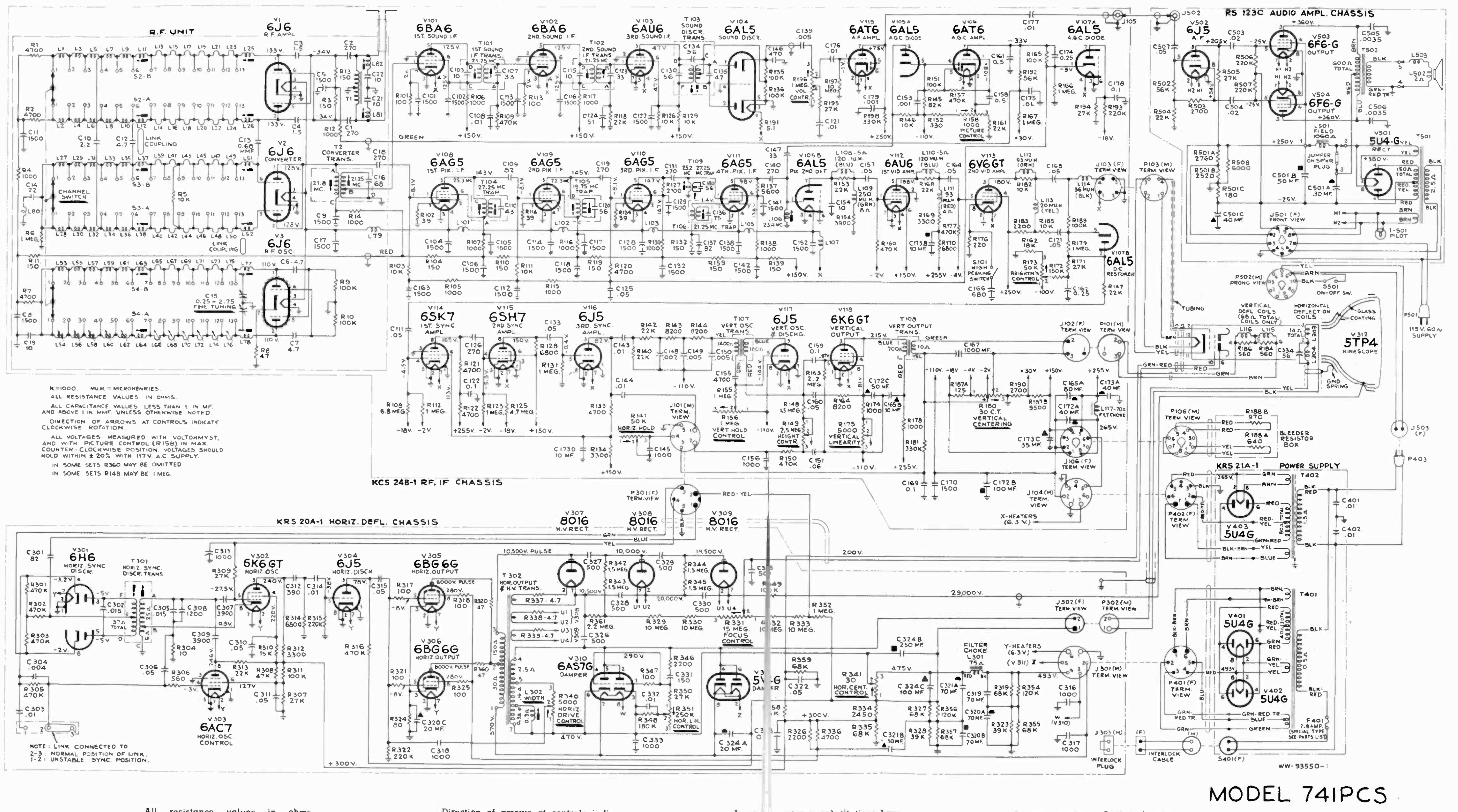


Figure 20—R-F, I-F Chassis Wiring Diagram KCS 24B-1



All resistance values in ohms. K=1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "Volt-Ohmyst" and with picture control counterclockwise. Voltages should hold within ±20% with 117 v. a-c supply.

In so[illegible] receivers, substitutions have caused [illegible]anges in component lead color c[illegible]s, in electrolytic capacitor values [illegible]d their lug identification marking[illegible].

In so[illegible] receivers, C-19 is omitted.

In m[illegible] receivers, C14 is fixed.

In so[illegible] receivers R162 is 33K.

In so[illegible] receivers, the trap winding on T10[illegible] omitted.

In some receivers, R148 is 1 meg.

In some receivers, R360 is omitted.

In some receivers, R164 is 6800.

In some receivers, R361 is replaced by a short circuit.

Figure 21—Schematic Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT KRK2A
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
45466	Capacitor—Ceramic, 10 mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
39638	Capacitor—Mica, 270 mmf. (C18)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 r-f amplifier plate coil—front or rear section or channel #1 converter grid coil—front or rear section (L1, L2, L27, L28)
71479	Coil—Channels #2 and #3 r-f amplifier plate coil—front or rear section or channels #2 and #4 converter grid coil—front or rear section (L3, L4, L5, L6, L29, L30, L33, L34)
71480	Coil—Channel #4 r-f amplifier plate coil—front or rear section (L7, L8)
71481	Coil—Channel #5 r-f amplifier plate coil—front or rear section or channel #5 converter grid coil—front or rear section (L9, L10, L35, L36)
71492	Coil—Channel #6 oscillator, converter grid or r-f amplifier plate coil—front or rear sections (L11, L12, L37, L38, L63, L64)
71491	Coil—Channel #13 converter grid or r-f amplifier plate coil —rear section (L25, L51)
71490	Coil—Channel #13 converter grid or r-f amplifier plate coil —front section (L26, L52)
72597	Coil—Channel #3 converter grid coil—front or rear section (L31, L32)
71469	Coil—Channel #1 oscillator coil—front or rear section (L53, L54)
71471	Coil—Channel #5 oscillator coil—front section or channel #2 oscillator coil—rear section (L55, L62)
71470	Coil—Channels #2, 3 and 4 oscillator coil—front section (L56, L58, L60)
72552	Coil—Channel #3 oscillator coil—rear section (L57)
72553	Coil—Channel #4 oscillator coil—rear section (L59)
71472	Coil—Channel #5 oscillator coil—rear section (L61)
71489	Coil—Channel #13 oscillator coil—reor section (L77)
71488	Coil—Channel #13 oscillator coil—front section (L78)
71505	Coil—Heater choke coil (L79)
71506	Coil—Converter grid i-f choke coil (L80)
71493	Connector—Segment connector
71597	Core—Channel #13 front and rear oscillator coils' adjustable core and stud
71498	Core—Channels #6 and 13 front and rear converter grid coils or front and rear r-f amplifier plate coils' adjustable core and stud
71497	Core—Channel #6 front and rear oscillator coils' adjustable core and stud
71463	Detent—Detent mechanism and fiber shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
71464	Drive—Fine tuning pinch washer drive
71487	Form—coil form only for channels #6 and 13 coils—less winding
71462	Loop—Oscillator to converter grid coupling loop
	Resistor—Fixed composition, 47 ohms ±20%, ½ watt (R8)
	Resistor—Fixed composition, 150 ohms ±10%, ½ watt (R3, R11, R13)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R4, R12, R14)
	Resistor—Fixed composition, 4700 ohms ±20%, ½ watt (R1, R2, R7)
	Resistor—Fixed composition, 10,000 ohms ±10%, ½ watt (R5)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R9, R10)
	Resistor—Fixed Composition, 1 meg. ±20%, ½ watt (R6)
14343	Ring—Retaining ring for drive
71475	Screw—#4-40 x 15/32" adjusting screw for coils L54, L56, L58, L60, L62
71476	Screw—#4-40 x ¼" binder head screw for adjusting coils L66, L68, L70, L72, L74, L76
71473	Segment—Converter grid section front segment—less coils or r-f amplifier plate section front segment—less coils (Part of S2, S3)
71474	Segment—Converter grid section rear section less coils or r-f amplifier plate section roar segment—less coils (Part of S2, S3)
71467	Segment—Oscillator section front segment—less coils (Part of S4)
71468	Segment—Oscillator segment rear section—less coils (Part of S4)
71494	Socket—Tube socket—miniature
71461	Spring—Snap spring to hold fine tuning disc
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
71495	Transformer—Converter transformer (T2 (C16))
73239	Trap—Antenna Trap (L81, L82, C21, C22)
	R-F, I-F CHASSIS KCS 24B-1 OR KCS 24C-1
71894	Bearing—RF Unit shaft bearing
72857	Board—"Antenna" board only
72615	Capacitor—Mica, 10 mmf. (C154)
38868	Capacitor—Ceramic, 33 mmf. (C147)
71771	Capacitor—Ceramic, 51 mmf. (C124)
73090	Capacitor—Mica, 82 mmf. (C109)
71514	Capacitor—Ceramic, 82 mmf. (C137)
73091	Capacitor—Mica, 270 mmf. (C119, C126, C131, C140)
39644	Capacitor—Mica, 470 mmf. (C146)
53274	Capacitor—Mica, 680 mmf. (C166)
72616	Capacitor—Mica, 1000 mmf. (C156)
54346	Capacitor—Mica, 1000 mmf. (C145)

STOCK No.	DESCRIPTION
71501	Capacitor—Ceramic, 1500 mmf. (C101, C102, C104, C105, C106, C112, C113, C114, C116, C117, C118, C127, C128, C129, C132, C138, C141, C142, C152, C163, C170)
72524	Capacitor—Mica, 4700 mmf. (C155)
70600	Capacitor—Tubular, .001 mfd., 600 volts (C153, C179)
70601	Capacitor—Tubular, .002 mfd., 400 bolts (C148)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C139, C149, C150)
70610	Capacitor—Tubulor, .01 mfd., 400 volts (C108, C143, C144, C121, C176, C177)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C111, C125, C133, C157)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C164)
72996	Capacitor—Moulded paper, .05 mfd., 600 volts (C168, C171)
73093	Capacitor—Oil impregnated, .05 mfd., 1000 volts (C180)
73092	Capacitor—Tubular, .06 mfd., 1600 volts (C151)
70617	Capacitor—Tubular, .01 mfd., 400 volts (C122, C169, C175, C178)
70659	Capacitor—Tubular, 0.1 mfd., 1000 volts (C159)
70619	Capacitor—Tubulor, 0.5 mfd., 200 volts (C158, C161)
70618	Capacitor—Tubular, 0.25 mfd., 200 volts (C162, C174)
72169	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts, 1 section of 35 mfd., 350 volts, and 1 section of 10 mfd., 350 volts (C173A, C173B, C173C, C173D)
72612	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 100 mfd., 150 volts, and 1 section of 50 mfd., 50 volts (C172A, C172B, C172C)
71780	Capacitor—electrolytic, comprising 1 section of 80 mfd., 450 volts and 1 section of 10 mfd., 450 volts (C165A, C165B)
72611	Capacitor—Electrolytic, 1000 mfd., 3 volts, non-polarized (C167)
71505	Coil—Filament Choke coil (L101, L102, L103, L105, L107)
71426	Coil—Fourth pix i-f coil (L106)
71526	Coil—Choke coil (L109)
71529	Coil—Peaking coil (L108, L110, R153, R168)
71527	Coil—Choke coil (L111)
72619	Peaking coil (L112, R182)
72618	Coil—Choke coil (L113)
71793	Coil—Choke coil (L114)
72167	Coil—Filter choke coil (L117)
71971	Control—Brightness and contrast control (R158, R173)
71440	Control—Height control (R149)
71441	Control—Vertical linearity control (R175)
72758	Control—Vertical & Horizontal Hold Control (R141, R156)
72168	Control—Verticol centering control (R180)
70143	Control—Volume control (R196)
71437	Cover—Insulating cover for capacitor #71780 and #72612
18469	Plate—Bakelite mounting plate for capacitors #71780, 72611 and 72612
72174	Plug—5 prong male plug for cable from horizontal deflection chassis (J101)
14404	Plug—7 prong male plug for cable from power supply (J104)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R191)
	Resistor—Fixed composition, 39 ohms ±10%, ½ watt (R102, R114, R124)
	Resistor—Fixed composition, 100 ohms ±10%, ½ watt (R101, R113)
	Resistor—Fixed Composition, 150 ohms ±20%, ½ Watt (R104, R110, R119, R139, R159)
	Resistor—Fixed composition, 150 ohms ±10%, ½ watt (R132)
	Resistor—Fixed Composition, 220 ohms ±10%, ½ watt (R176)
	Resistor—Fixed composition, 330 ohms ± 5%, ½ watt (R152)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R105, R106, R107, R115, R116, R117, R130, R138, R174)
	Resistor—Fixed composition, 1000 ohms ±20%, 1 watt (R178)
72613	Resistor—Wire wound, 2200 ohms, 10 watts (R183)
	Resistor—Fixed composition, 2700 ohms ±10%, ½ watt (R127)
	Resistor—Fixed composition, 2700 ohms ±10%, 1 watt (R190)
	Resistor—Fixed composition, 3300 ohms ± 5%, ½ watt (R169)
	Resistor—Fixed composition, 3300 ohms ±10%, 1 watt (R134)
	Resistor—Fixed composition, 3900 ohms ±10%, ½ watt (R154)
	Resistor—Fixed composition, 4700 ohms ±10%, 1 watt (R121, R122, R133)
	Resistor—Fixed composition, 4700 ohms ± 5%, ½ watt (R120)
	Resistor—Fixed composition, 5600 ohms ± 5%, ½ watt (R137)
	Resistor—Fixed composition, 6800 ohms ±20%, ½ watt (R128, R170)
	Resistor—Fixed composition, 8200 ohms ± 5%, ½ watt (R164)
	Resistor—Fixed composition, 8200 ohms ±10%, ½ watt (R143, R144)
72171	Resistor—Voltage divider, comprising 1 section of 9500 ohms, 2 watts and 1 section of 125 ohms, 2.5 watts (R187A, R187B)
	Resistor—Fixed composition, 10,000 ohms ±20%, ½ watt (R185)
	Resistor—Fixed composition, 10,000 ohms ± 5%, ½ watt (R103, R111, R146)
	Resistor—Fixed composition, 18,000 ohms ±10%, ½ watt (R162)
	Resistor—Fixed composition, 22,000 ohms ±20%, ½ watt (R140, R142, R147)

STOCK No.	DESCRIPTION
	Resistor—Fixed composition, 22,000 ohms ±10%, ½ watt (R118)
	Resistor—Fixed composition, 22,000 ohms ± 5%, 1 watt (R161)
	Resistor—Fixed composition, 27,000 ohms ±10%, ½ watt (R171, R194, R195)
	Resistor—Fixed composition, 56,000 ohms ±10%, ½ watt (R192)
	Resistor—Fixed composition, 82,000 ohms ±10%, ½ watt (R145)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R135, R136, R151, R165, R189)
	Resistor—Fixed composition, 150,000 ohms ±20%, ½ watt (R172)
	Resistor—Fixed composition, 220,000 ohms ±10%, ½ watt (R193)
	Resistor—Fixed composition, 330,000 ohms ±20%, ½ watt (R181, R198)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R109, R150, R157, R177)
	Resistor—Fixed composition, 470,000 ohms ±10%, ½ watt (R160)
	Resistor—Fixed composition, 1 megohm ±20%, ½ watt (R123, R131, R179)
	Resistor—Fixed composition, 1 megohm ±10%, ½ watt (R112, R166, R167)
	Resistor—Fixed composition, 1.2 megohm ±10%, ½ watt (R155)
	Resistor—Fixed composition, 1 megohm ±10%, ½ watt (R155 in KCS 24B-1).
	Resistor—Fixed composition, 1.2 megohms ±10%, ½ watt (R155 in KCS 24C-1).
	Resistor—Fixed composition, 1.5 megohms ±10%, ½ watt (R148)
	Resistor—Fixed composition, 2.2 megohms ±10%, ½ watt (R163, R200) (R200 used in KCS 24C-1 only)
	Resistor—Fixed composition, 4.7 megohms ±20%, ½ watt (R125)
	Resistor—Fixed composition, 6.8 megohms ±10%, ½ watt (R108)
	Resistor—Fixed composition, 10 megohms ±20%, ½ wott (R197)
72172	Socket—3 contact socket for deflection yoke cable (J102)
31027	Socket—4 contact female socket for cable from horizontal deflection chassis (J103)
35787	Socket—Output socket for audio cable
31251	Socket—Tube socket, wafer
72516	Socket—Tube socket, miniature
71659	Socket—9 contact socket for KCS24C-1 (J107)
30953	Switch—Video-peaking switch (S101)
71424	Transformer—First or second sound i-f transformer (T101, T102 (C103, C107, C115, C123))
71427	Transformer—Sound discriminator transformer (T103, (C130, C134, C135))
71423	Transformer—First pix i-f transformer (T104 (C110))
71425	Transformer—Second pix i-f transformer (T105 (C120))
73708	Transformer—Third picture i-f transformer (T109, C177)
71775	Transformer—Vertical oscillator transformer (T107)
72952	Transformer—Vertical output transformer (T108)
71422	Trap—Sound trap (T106 (C136))
HORIZONTAL DEFLECTION CHASSIS KRS 20A-1 OR KRS 20B-1	
71454	Board—Sync-link board
72643	Cable—Anode cable (KRS20A-1 (only)
73335	Cable—Anode cable (KRS20B-1 only)
71532	Cap—Hi-voltage rectifier and horizontal output plate cap
72614	Capacitor—Mica, 82 mmf. (C301)
73095	Capacitor—Mica, 150 mmf. (C331)
73094	Capacitor—Mica, 390 mmf. (312)
71450	Capacitor—Hi-voltage filter, 500 mmf. (325, C326, C327, C328, C329, C330)
39652	Capacitor—Mica, 1000 mmf. (C313, C316, C317, C318, C333)
72638	Capacitor—Ceramic, 1200 mmf. (C308)
39666	Capacitor—Mica, 3900 mmf. (C307, C309)
70605	Capacitor—Tubular, .004 mfd., 400 volts (C304)
71516	Capacitor—Tubular, oil impregnated, .015 mfd. 400 volts (C302, C305)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C303, C314, C332)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C306, C311, C322)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C310, C315)
70638	Capacitor—Tubular, 0.1 mfd., 600 volts (C323)
72621	Capacitor—Electrolytic, 70 mfd., 400 volts (C319)
72623	Capacitor—Electrolytic, comprising 1 section of 70 mfd., 400 volts and 1 section of 10 mfd., 400 volts (C321A, C321B)
72622	Capacitor—Electrolytic, comprising 2 sections of 70 mfd., 250 volts and 1 section of 20 mfd., 50 volts (C320A, C320B, C320C)
72624	Capacitor—Electrolytic, comprising 1 section of 20 mfd., 150 volts, 1 section of 250 mfd., 15 volts and 1 section of 100 mfd., 15 volts (C324A, C324B, C324C)
72179	Coil—Filter choke coil (L301)
72180	Coil—Width control coil (L302)
71521	Connector—Hi-voltage capacitor connector
73414	Connector—Hi-voltage rectifier and horizontal output plate cap connector
72183	Control—Focus control (R331)
72181	Control—Horizontal centering control (R341)
71441	Control—Horizontal drive control (R340)
72182	Control—Horizontal linearity control (R351)

STOCK No.	DESCRIPTION
70144	Cord—Interlock cord less male plug
33846	Coupling—Focus control shaft coupling
72175	Cover—Insulating cover for electrolytics RCA 72621 and 72623
71437	Cover—Insulating cover for electrolytic RCA 72624
71451	Nut—Speed nut to mount hi-voltage capacitor
18469	Plate—Bakelite mounting plate for electrolytics RCA 72621, 72623 and 72624
72642	Plug—5 contact female plug on cable from horizontal deflection chassis to r-f, i-f chassis
72625	Plug—6 pin male plug for cable from television power supply (J301)
14793	Plug—2 prong male plug for interlock cable
71448	Plug—2 prong male plug for power cable
30568	Plug—4 prong male plug on cable from horizontal deflection chassis to r-f, i-f chassis
72008	Retainer—Focus control coupling shaft retainer
72633	Resistor—Wire wound, 4.7 ohms, 1/3 watt (R337, R338, R339)
	Resistor—Fixed composition, 10 ohms ±5%, ½ watt (R304)
72631	Resistor—Wire wound, 80 ohms, 5 watts (R324)
	Resistor—Fixed composition, 100 ohms ±20%, ½ watt (R317, R318, R321, R325, R347)
	Resistor—Fixed composition, 560 ohms ±10%, ½ watt (R306)
	Resistor—Fixed composition, 2200 ohms ±10%, 1 watt (R326)
	Resistor—Fixed composition, 2200 ohms ±20%, ½ watt (R346)
72184	Resistor—Wire wound, 2450 ohms, 16.5 watts (R334)
48207	Resistor—Wire wound, 3300 ohms, 5 watts (R312)
	Resistor—Fixed composition, 4700 ohms ±10%, ½ watt (R336)
	Resistor—Fixed composition, 6800 ohms ±20%, ½ wott (R314)
	Resistor—Fixed composition, 15,000 ohms ±10%, ½ watt (R310)
	Resistor—Fixed composition, 22,000 ohms ±20%, 2 watts (R313)
	Resistor—Fixed composition, 27,000 ohms ±10%, ½ watt (R309)
	Resistor—Fixed composition, 27,000 ohms ±10%, 1 watt (R307, R350)
	Resistor—Fixed composition, 33,000 ohms ±10%, ½ watt (R358)
	Resistor—Fixed composition, 39,000 ohms ±10%, 2 watts (R323, R328)
	Resistor—Fixed composition, 47,000 ohms ±10%, 1 watt (R308)
	Resistor—Fixed composition, 68,000 ohms ±10%, 1 watt (R355, R357, R359)
	Resistor—Fixed composition, 68,000 ohms ±10%, 2 watts (R319, R327, R335)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R311)
	Resistor—Fixed composition, 100,000 ohms ±20%, 1 watt (R349)
	Resistor—Fixed composition, 120,000 ohms ±10%, 1 watt (R354, R356)
	Resistor—Fixed composition, 180,000 ohms ±10%, ½ watt (R348)
	Resistor—Fixed composition, 220,000 ohms ±20%, ½ watt (R315, R322, R353)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R301, R302, R303, R305)
	Resistor—Fixed composition, 470,000 ohms ±10%, ½ watt (R316)
	Resistor—Fixed composition, 1 megohm ±10%, ½ watt (R352)
	Resistor—Fixed composition, 1.5 megohms ±20%, 2 watts (R342, R343, R344, R345)
	Resistor—Fixed composition, 2.2 megohms ±10%, 2 watts (R361)
	Resistor—Fixed composition, 10 megohms ±20%, 2 watts (R329, R330, R332, R333)
72185	Shaft—Focus control extension shaft
72626	Socket—2 contact socket for deflection yoke cable (J302)
72641	Socket—Kinescope socket
72627	Socket—Tube socket, ceramic
31251	Socket—Tube socket, wafer
71508	Socket—Tube socket for 8016 rectifier tubes
71559	Spring—Grounding spring for hi-voltage capacitor
71428	Transformer—Horizontal oscillator transformer (T301)
72178	Transformer—Horizontal output and hi-voltage transformer (T302, (R320))
	TELEVISION POWER SUPPLY KRS 21A-1
71770	Capacitor—Moulded paper, .01 mfd., 400 volts (C401, C402)
73151	Fuse—2.8 amperes (F401)
13526	Mounting—Fuse mounting
72644	Plug—6 contact female plug on cable from power supply to horizontal deflection chassis (P401)
14409	Plug—7 contact female plug on cable from power supply to r-f, i-f chassis (P402)
14275	Socket—2 contact female socket for interlock cable
31251	Socket—Tube socket
73191	Transformer—Power transformer (115 volt, 50 cycle) for horizontal deflection chassis (T401)
73192	Transformer—Power transformer (115 volt, 50 cycle) for r-f, i-f television chassis (T402)
72176	Transformer—Power transformer (115 volt, 60 cycle) for horizontal deflection chassis (T401)
72177	Transformer—Power transformer (115 volt, 60 cycle) for r-f, i-f television chassis (T402)

REPLACEMENT PARTS—(Continued) 741PCS, 8PCS41

STOCK No.	DESCRIPTION
	AUDIO OUTPUT CHASSIS RS 123C
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C505, C506)
70632	Capacitor—Tubular, .02 mfd., 600 volts (C503, C504)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C507)
72955	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts, 1 section of 50 mfd., 400 volts and 1 section of 40 mfd., 25 volts (C501A, C501B, C501C)
18469	Insulator—Mounting insulator for electrolytic
11765	Lamp—Pilot lamp—Mazda #51
12493	Plug—5 contact female plug for speaker cable
71660	Resistor—Comprising 1 section of 180 ohms, 3.5 watts, 1 section of 2520 ohms, 3.97 watts and 1 section of 2760 ohms, 9.3 watts (R501A, R501B, R501C)
48344	Resistor—Wire wound, 2000 ohms, 5 watts (R508A, R508B, R508C)
	Resistor—Fixed composition, 2700 ohms ±10%, ½ watt (R503)
	Resistor—Fixed composition, 22,000 ohms ±10%, ½ watt (R504)
	Resistor—Fixed composition, 27,000 ohms ±10%, ½ watt (R505)
	Resistor—Fixed composition, 56,000 ohms ±10%, ½ watt (R502)
	Resistor—Fixed composition, 220,000 ohms ±20%, ½ watt (R506, R507)
35787	Socket—Input socket
31364	Socket—Pilot lamp socket
71659	Socket—9 prong power socket (J501)
31319	Socket—Tube socket
37048	Transformer—Power transformer, 115 volt, 50/60 cycle (T501)
71661	Transformer—Output transformer (T502)
	OPTICAL BARREL ASSEMBLY KRK 1A
72188	Lens—Corrector lens
72187	Mirror—Spherical mirror
72191	Screw—#8-32 x ½" screw for locking horizontal centering adjustment (2 required) or for locking focus adjustment (2 required)
72660	Screw—#12-24 x 2⅝" screw for focus adjustment
72662	Screw—#8-32 x 15/16" screw for spherical mirror mounting springs (6 required)
72192	Screw—#12-24 x 1 19/32" screw for horizontal centering adjustment
72189	Spring—Six (6) turn spring for kinescope holder
72190	Spring—Eight (8) turn spring for kinescope holder
72663	Spring—Spherical mirror mounting spring (6 required)
72664	Support—Insulating support for kinescope (2 required)
11909	Washer—"C" washer for horizontal adjusting plate screw
	OPTICAL BARREL ASSEMBLY KRK 4
73328	Band—Kinescope holder contact band
73323	Band—Spring band for supporting spherical mirror
73322	Cam—Corrector lens centering cam (4 required)
73324	Chain—Drive chain
73899	Gasket—Dust seal gasket on bottom of optical barrel
72188	Lens—Corrector lens
73326	Holder—Insulating holder for kinescope
73325	Mirror—Spherical mirror (12")
73329	Screw—Centering screw for kinescope (3 required)
73321	Spring—Focus screw compression spring (3 required)
73319	Sprocket—Focus sprocket (3 required)
73320	Sprocket—Idler sprocket
73327	Support—Support for kinescope holder
	SPEAKER ASSEMBLIES 92567-2W RL 70R1
13867	Cap—Dust cap
71147	Clamp—Clamp to hold metal cone suspension (2 required)
71146	Coil—Field coil—1060 ohms
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
31539	Plug—5 prong male plug for speaker
71144	Speaker—12" EM speaker complete with cone and voice coil less plug
71145	Suspension—Metal cone suspension
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	741PCS
	MISCELLANEOUS
73189	Back—Cabinet back—bottom section
73188	Back—Cabinet back—top section
71599	Bracket—Pilot lamp bracket
70148	Bracket—Forty-five-degree mirror mounting bracket complete with felt pad (4 required)
70151	Bushing—Anode cable bushing
72195	Cable—Shielded audio lead complete with pin plugs
13103	Cap—Pilot lamp jewel
71892	Catch—Drop door catch and strike (2 required)
73199	Catch—Grille frame strike and catch (2 required)
70152	Clamp—Anode cable clamp set
X1756	Cloth—Grille cloth
72667	Clip—Kinescope anode clip
72666	Cover—Optical barrel dust cover
73204	Decal—Control function decal
X1754	Door—Sliding drop door (2 sections) for covering screen, less hinges
71598	Escutcheon—Channel marker escutcheon
70154	Fastener—Anode cable hi-voltage spring fastener
70153	Gasket—Sealing gasket for anode cable clamp
73200	Hinge—Control panel knife hinge (2 required)
73201	Hinge—Drop door hinge (2 required)
71536	Knob—Brightness control or horizontal hold control knob
71534	Knob—Channel selector knob
71535	Knob—Picture control or vertical hold control knob
71533	Knob—Fine tuning knob
71821	Knob—Volume control or power switch knob
70145	Mirror—Forty-five-degree mirror
73202	Name Plate—"RCA-Victor" name plate
70150	Nut—Locknut for optic barrel tilt screw (3 required)
73203	Nut—Speed nut to fasten name plate (3 required)
70146	Pin—Mounting pin (2 required) to mount front end of television chassis
70147	Plate—Mounting plate for power switch
73208	Plate—Control panel lock strap plate
4573	Plug—2 contact female plug for power switch cable
14793	Plug—2 prong male plug on deflection yoke cable
14782	Plug—3 prong male plug on deflection yoke cable (P101)
35383	Plug—8 prong male plug on bleeder resistor cable
71968	Plug—9 prong male plug for power switch cable
31048	Plug—Pin plug for audio cable
73203	Pull—Control panel pull
73205	Pull—Drop door pull
72170	Resistor—Wire wound comprising 1 section of 970 ohms, 9 watts, and 1 section of 640 ohms, 10.5 watts
72194	Screen—Viewing screen
70149	Screw—Tilt adjustment screw for optic barrel (3 required)
71538	Spring—Channel marker escutcheon spring
30330	Spring—Retaining spring for knob #71536
30900	Spring—Retaining spring for knob #71821
14270	Spring—Retaining spring for knob #71534 and 71535
4982	Spring—Retaining spring for knob #71533
73207	Strap—Control panel lock strap
70155	Switch—Power switch
72196	Yoke—Deflection yoke complete with cables (L115, L116, L303, L304, C334, R184, R186, P101, P302)
	8PCS41
	MISCELLANEOUS
73210	Back—Cabinet back—mahogany
73211	Back—Cabinet back—walnut
73245	Back—Cabinet back—toasted mahogany
71599	Bracket—Pilot lamp bracket
70148	Bracket—45 degree mirror mounting bracket complete with felt pad (3 required)
70151	Bushing—Anode cable bushing (8PCS41 only)
72195	Cable—Shielded audio lead complete with pin plugs
13103	Cap—Pilot lamp jewel
71892	Catch—Door catch and strike (3 required)
70152	Clamp—Anode cable clamp set (8PCS41 only)
72667	Clip—Second anode clip
x1759	Cloth—Grille cloth for toasted mahogany instruments
x1757	Cloth—Grille cloth for walnut and mahogany instruments
73213	Cover—Dust cover
73246	Decal—Control panel decal for toasted mahogany instruments
73204	Decal—Control panel decal for walnut and mahogany instruments
73865	Decal—"Local-remote" switch decal
71598	Escutcheon—Channel marker escutcheon
70154	Fastener—Anode cable hi-voltage spring fastener (8PCS41 only)
70153	Gasket—Sealing gasket for anode cable clamp (8PCS41 only)
73215	Grille—Metal grille
73219	Hinge—Cabinet hood hinge (2 required)
36610	Hinge—Door hinge
73024	Hinge—Hinge for movable panel behind control panel (2 required)

741PCS, 8PCS41 REPLACEMENT PARTS—(Continued)

STOCK No.	DESCRIPTION	STOCK No.	DESCRIPTION
71536	Knob—Brightness control or horizontal hold control knob for walnut and mahogany instruments	14793	Plug—2 prong male plug on deflection yoke cable
72569	Knob—Brightness control or horizontal hold control knob for toasted mahogany instruments	14782	Plug—3 prong male plug on deflection yoke cable
71534	Knob—Channel selector knob for walnut and mahogany instruments	35383	Plug—8 prong male plug on bleeder resistor
72568	Knob—Channel selector knob for toasted mahogany instruments	71968	Plug—9 prong male plug on power switch cable
71535	Knob—Picture control or vertical hold control knob for walnut and mahogany instruments	4573	Plug—2 contact female plug on power switch cable
72565	Knob—Picture control or vertical hold control knob for toasted mahogany instruments	31048	Plug—Pin plug for audio cable
71533	Knob—Fine tuning knob for walnut and mahogany instruments	72291	Plug—Dummy plug for sets not using remote control
72567	Knob—Fine tuning knob for toasted mahogany instruments	71968	Plug—9 prong male plug for remote control adapter cable
71821	Knob—Volume control or power switch knob for walnut and mahogany instruments	73214	Pull—Door pull
72800	Knob—Volume control or power switch knob for toasted mahogany instruments	72170	Resistor—Wire wound, comprising 1 section of 970 ohms, 9 watts, and 1 section of 640 ohms, 10.5 watts
72824	Knob—Remote control switch knob—brown—for toasted mahogany instruments	73416	Ring-Rubber Ring between yoke and correction lens
71822	Knob—Remote control switch knob—maroon—for mahogany or toasted mahogany instruments	72194	Screen—Viewing screen
70145	Mirror—45 degree mirror	70149	Screw—Elevating screw for optic barrel (3 required)
73180	Name Plate—"RCA-Victor" name plate	70150	Screw—Locknut for optic barrell (early type) elevating screw (3 required)
73336	Nut—Aluminum nut to fasten KCS24B-1 type anode cable	71659	Socket—9 contact female socket for remote control cable
70146	Pin—Mounting pin (2 required) to mount front end of r-f, i-f chassis	30900	Spring—Retaining spring for knobs #71822 and #71824
73218	Plate—Plate complete with bullet catch and bracket with pin for cabinet hood—L.H.	71538	Spring—Channel marker escutcheon spring
73217	Plate—Plate complete with bullet catch and bracket with pin for cabinet hood—R.H.	72454	Spring—Lid support spring
70147	Plate—Mounting plate for power switch	30900	Spring—Retaining spring for knobs #71534, 71535, 72565 and 72568
		14270	Spring—Retaining spring for knobs #71800 and 71821
		4982	Spring—Retaining spring for knobs 71533 and 72567
		30330	Retaining spring for knobs 71536 and 72569
		70164	Stop—Door stop
		73216	Support—Lid support—R.H.
		72453	Support—Lid support—L.H.
		73212	Switch—Interlock switch
		70155	Switch—Power switch
		73852	Switch—Remote control switch
		72196	Yoke—Deflection yoke complete with cables

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 721TS
Walnut or Mahogany

Model 721TCS
Walnut or Mahogany

RCA VICTOR

TELEVISION RECEIVER MODELS 721TS, 721TCS

Chassis No. KCS 26-1 (60 cycles) KCS 26A-1 (60 cycles)
KCS 26-2 (50 cycles) KCS 26A-2 (50 cycles)
Mfr. No. 274

SERVICE DATA

— 1947 No. T4 —
— 1947 No. T6 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Model 721TS is a twenty-one tube, direct-viewing, table-model Television Receiver having a 10" picture tube (kinescope). The receiver is complete in one unit and is operated by the use of seven front-panel controls. Features of the receiver include:

Full thirteen channel coverage; f-m sound system; improved picture brilliance; two stages of video amplification; A-F-C horizontal hold, stabilized vertical hold; improved sync amplifier and separator; and reduced-hazard high-voltage supply.

Model 721TCS is a twenty-one tube, direct-viewing, console-model Television Receiver having a 10" picture tube (kinescope). The receiver is complete in one unit and is operated by the use of seven front-panel controls.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .... 6⅜" x 8½"

RADIO FREQUENCY RANGES

Channel Number	Channel Freq. Mc	Picture Carrier Freq. Mc	Sound Carrier Freq. Mc	Receiver R-F Osc. Freq. Mc
1	44-50	45.25	49.75	71
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE

Plus and minus approximately 800 kc on channel 1, and plus and minus approximately 1.9 mc on channel 13.

RECEIVER ANTENNA INPUT IMPEDANCE .... 300 ohms balanced

POWER-SUPPLY RATING

KCS 26-1 .... 115 volts, 60 cycles, 220 watts
KCS 26-2 .... 115 volts, 50 cycles, 220 watts

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6J6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6J6	Converter
(4)	RCA 6BA6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AT6	1st Audio Amplifier and Bias Clamp
(8)	RCA 6K6-GT	Audio Output
(9)	RCA 6AG5	1st Picture I-F Amplifier
(10)	RCA 6AG5	2nd Picture I-F Amplifier
(11)	RCA 6AG5	3rd Picture I-F Amplifier
(12)	RCA 6AL5	Picture 2nd Detector and Sync Limiter
(13)	RCA 12AU7	1st and 2nd Video Amplifier
(14)	RCA 6SN7-GT	Sync Amplifier and Sync Separator
(15)	RCA 6SN7-GT	Vertical Sweep Oscillator, Discharge and Vertical Sweep Output
(16)	RCA 6SN7-GT	Horizontal Sweep Oscillator and Control
(17)	RCA 6BG6-G	Horizontal Sweep Output
(18)	RCA 5V4-G	Damper
(19)	RCA 1B3-GT/8016	High Voltage Rectifier
(20)	RCA 5U4-G	Power Supply Rectifier
(21)	RCA 10BP4	Kinescope

Specifications continued on page 2

PICTURE INTERMEDIATE FREQUENCIES

Picture Carrier Frequency....25.75 Mc
Accompanying Sound Traps....21.25 Mc

SOUND INTERMEDIATE FREQUENCIES

Sound Carrier Frequency....21.25 Mc
Sound Discriminator Band Width (between peaks)....350 Kc

VIDEO RESPONSE....To 3 Mc

FOCUS....Magnetic

SWEEP DEFLECTION....Magnetic

SCANNING....Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY....15,750 cps

VERTICAL SCANNING FREQUENCY....60 cps

FRAME FREQUENCY (Picture Repetition Rate)....30 cps

OPERATING CONTROLS (front panel)

Station Selector, Fine Tuning....Dual Control Knobs
Sound Volume and On-Off Switch....Single Control Knob
Horizontal (Picture Horizontal Hold), Vertical (Picture Vertical Hold)....Dual Control Knobs
Picture (Contrast), Brightness (Brilliance)....Dual Control Knobs

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Horizontal Centering....rear chassis adjustment
Vertical Centering....rear chassis adjustment
Width....rear chassis screwdriver adjustment
Height....rear chassis adjustment
Horizontal Linearity....top chassis screwdriver adjustment
Vertical Linearity....rear chassis adjustment
Horizontal Drive....rear chassis screwdriver adjustment
Horizontal Frequency (Fine)....rear chassis screwdriver adjustment
Horizontal Oscillator Frequency (coarse)....bottom chassis screwdriver adjustment
Horizontal Locking Range....rear chassis screwdriver adjustment
Focus....rear chassis adjustment
Focus Coil....top chassis wing screw adjustment
Ion Trap Magnet....top chassis thumb screw adjustment
Deflection Coil....top chassis wing nut adjustment

AUDIO POWER-OUTPUT RATING

Undistorted....2 watts
Maximum....3 watts

LOUDSPEAKER (92565-1) Model 721TS

Type....6 x 4 inch Electro Magnet Dynamic
Voice-Coil Impedance....3.2 ohms at 400 cycles

LOUDSPEAKER (92567-3) Model 721TCS

Type....12 inch Electro Magnet Dynamic
Voice-Coil Impedance....2.2 ohms at 400 cycles

WEIGHT Model 721TS.

Chassis with Tubes in Cabinet (less kinescope)....67 lbs.
Shipping Weight (less kinescope)....78 lbs.

WEIGHT Model 721TCS

Chassis with Tubes in Cabinet (less kinescope)....101 lbs.
Shipping Weight (less kinescope)....117 lbs.

Model 721TS

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (Outside)	20	40½	17½

Model 721TCS

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (Outside)	19	19	19

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH-VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH-VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE, OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The large end of the kinescope bulb—particularly the rim of the viewing surface—must not be struck, scratched, or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly through the deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation.

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the receiver "ON" and advance the SOUND volume control to approximately mid-position.

2. Set the STATION SELECTOR to the desired channel.

3. Turn the PICTURE control fully counter-clockwise.

4. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a faint glow just appears on the screen.

5. Turn the PICTURE control approximately three-fourths clockwise.

6. Adjust the FINE TUNING control for best sound fidelity and the SOUND control for suitable volume.

7. Adjust the VERTICAL hold control until the pattern stops vertical movement.

8. Adjust the HORIZONTAL hold control until the picture appears on the screen.

9. Adjust the PICTURE control for suitable picture contrast.

10. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

11. In switching from one station to another, it may be necessary to repeat steps number 6 and 9.

12. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 6 is generally sufficient.

13. If the positions of the controls have been changed, it may be necessary to repeat steps number 1 through 9.

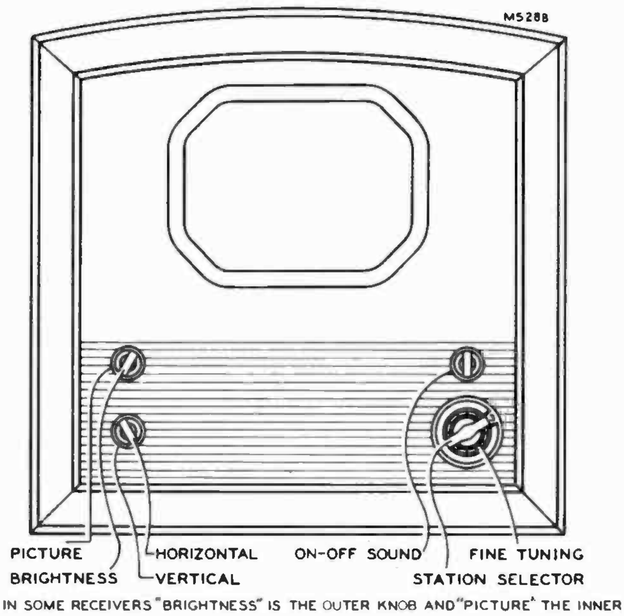


Figure 1—Receiver Operating Controls

CIRCUIT DESCRIPTION

The general design features of the 721TS television receiver are conventional. However, the a-f-c horizontal hold circuit is new and will be described briefly.

Fundamentally the horizontal oscillator is a free running blocking oscillator and discharge circuit. The incoming sync is superimposed on the horizontal oscillator waveform and applied to the control tube grid. If the two voltages are not in the proper frequency and phase relations, the control tube applies a bias to the oscillator to bring it into sync.

A portion of the bias from the blocking oscillator is applied to the grid of the control tube and is sufficient to keep the control tube cut off except when the sync pulse is high on the slope of the grid waveform as shown in Figure 2-A. If the oscillator changes phase so that the pulse slides down the slope, the plate conduction time decreases as shown in Figure 2-B. If the pulse slides up the slope, then the plate conduction time increases as shown in Figure 2-C. When the control tube conducts capacitors C161 and C167 in its cathode circuit charge to a d-c potential proportional to the plate conduction time. This potential is applied as a bias to the oscillator grid thus shifting the oscillator frequency and pulling it into phase with the sync pulses.

The effect of the various controls associated with the circuit are as follows. L121 is tuned with a slug to effect coarse adjustments in oscillator frequency. C136C is provided to effect fine adjustments in frequency. R156 the horizontal hold control is provided on the front panel to permit a 5% variation of frequency by varying the control tube plate voltage. C136A is a variable portion of a capacity voltage divider and is provided to set the amplitude of the waveform on the grid of the control tube so that conduction occurs only on the positive peaks of the waveform. The horizontal drive control C136B is part of a capacity voltage divider and is provided to vary the amount of sawtooth voltage on the V109 grid and hence is a control for picture linearity.

Several components of the oscillator and control circuits have special coefficients or characteristics and in case of failure, should be replaced only by exact replacement. R173 is a special resistor capable of stability of 1% or better. R191 is a high negative coefficient resistor to compensate for warm up drift. It is mounted within about ¼ inch of the power transformer and chassis for good heat transfer. The dress of this component should not be disturbed.

Strains or excessive heat should not be applied to the leads or bodies of the resistors associated with the horizontal oscillator and control circuits. Such conditions may cause excessive changes of resistance with age. See "Critical Lead Dress" on page 18.

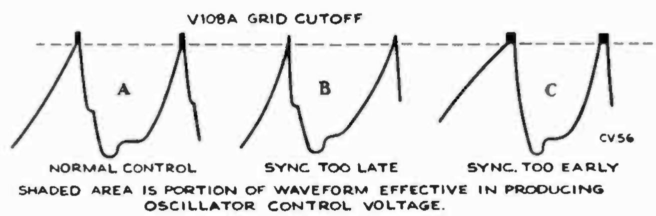


Figure 2—Horizontal Control Waveforms

UNPACKING—To unpack the receiver, tear open the carton flaps, pick the receiver up from under the bottom of the cabinet and lift it out of the shipping carton.

Take the metal grill off the back of the cabinet. Remove the front panel from the cabinet as indicated in Figure 3.

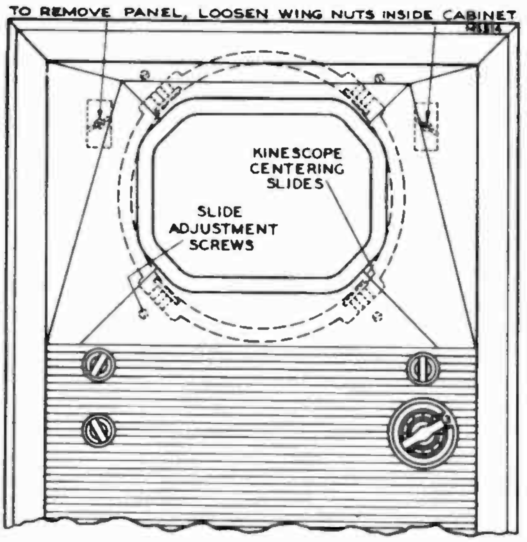


Figure 2—Cabinet, Front View 721TCS

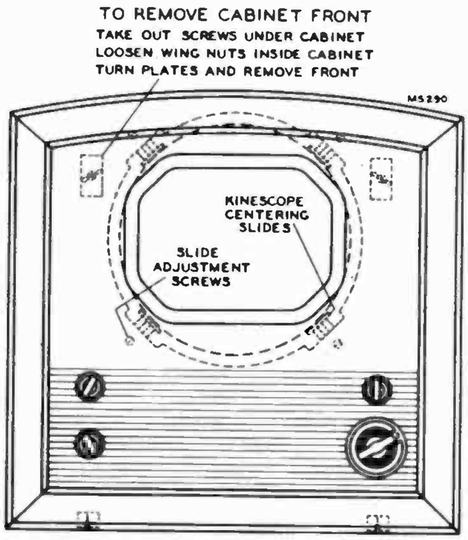


Figure 3—Cabinet, Front View 721TS

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten. See Figure 4 for the location of the cushion and yoke adjustments.

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wingnuts and raise, lower, or rotate the coil until alignment is obtained. Tighten the wingnuts with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 3 for location of the slides and their adjustment screws. Loosen the ion trap magnet adjustment thumb screws.

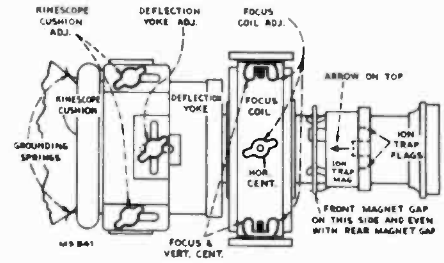


Figure 4—Yoke and Focus Coil Adjustments

KINESCOPE HANDLING PRECAUTION—**Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.**

INSTALLATION OF KINESCOPE—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is approximately on top. The final orientation of the tube will be determined by the position of the ion trap flags. Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags, as shown in Figure 5. The kinescope must be installed so that when looking down on the chassis, the two flags will be seen as shown in Figure 4.

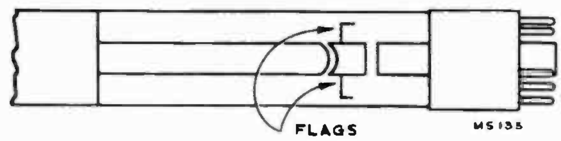


Figure 5—Ion Trap Flags

Insert the neck of the kinescope through the deflection and focus coils as shown in Figure 6 until the base of the tube protrudes approximately two inches beyond the focus coil. **If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.**

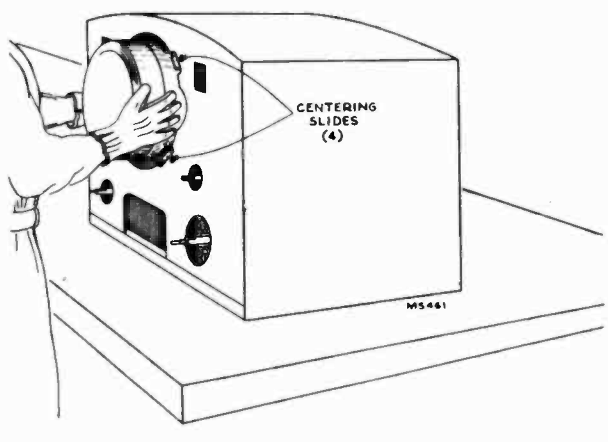


Figure 6—Kinescope Insertion

Early production receivers employed an EM type of ion trap magnet like that in the model 630TS receiver. Late production receivers employed a PM type magnet as shown in Figure 4.

If an EM type of magnet is applied, slip the assembly over the neck of the kinescope with the coils down and the large coil towards the base of the tube. Tighten the magnet adjustment thumbscrews sufficiently to hold it in position but still free enough to permit adjustment.

If the PM type is employed, slip the assembly over the neck of the kinescope with the large magnet towards the base of the tube and with the arrow on the assembly up as shown in Figure 4. The front magnet is movable on the assembly. The correct position of the front magnet is with the gap on the left side (from the rear of the cabinet) and even with the gap of the rear magnet.

Connect the kinescope socket to the tube base. Insert the kinescope until the face of the tube protrudes approximately one-eighth of an inch outside the front of the cabinet. Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely. Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent. Install the cabinet front panel by reversal of the removing process as shown in Figure 3. Install the control knobs on the proper control shafts.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. Connect the high voltage lead to the kinescope second anode socket.

The antenna and power connections should now be made. Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT—The ion trap rear magnet poles should be placed over the ion trap flags as shown in Figure 4. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R129 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

FOCUS COIL ADJUSTMENTS—Turn the centering controls R152 and R166 to mid position. See Figure 7 for location of these rear apron controls.

If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil adjustment wing nuts and rotate the coil about its vertical and horizontal axes until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the coil in this position.

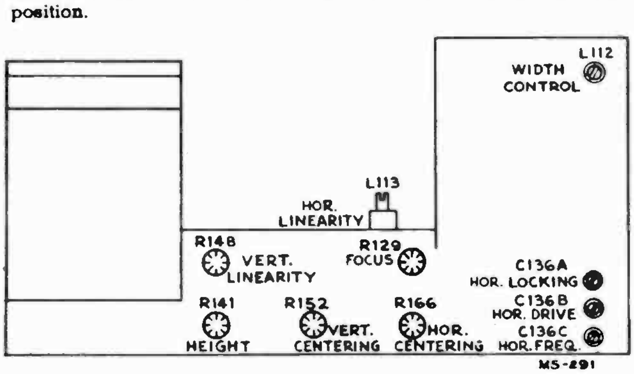


Figure 7—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 9, of the receiver operating instructions on page 3.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel and then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal bars will be gradually reduced and when only 3½ to 4½ bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull in should occur when the control is approximately 90 degrees from the extreme counterclockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show from 3½ to 4½ bars sloping downward to the right.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus" adjustment.

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at the extreme counterclockwise position or failed to hold sync at least 60 degrees of clockwise rotation of the control from the pull in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the rear apron horizontal frequency trimmer C136C until the picture is out of sync and shows 3½ to 4½ bars sloping downward to the right. If the trimmer has insufficient range, set the trimmer to mid-position (1 turn out from max. capacity) and adjust the L121 horizontal frequency adjustment until this condition is obtained. See figure 22 for the location of L121.

Horizontal Locking Range Adjustment—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel and then back.

Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 4½ bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C136A slightly clockwise. If less than 3½ bars are present, adjust C136A slightly counterclockwise. Turn the horizontal hold control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat this procedure until 3½ to 4½ bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R141 on chassis rear apron) until the picture fills the mask vertically (6⅝ inches). Adjust vertical linearity (R148 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the width control L112 to the maximum clockwise position. Vary the horizontal drive trimmer C136B to yield the best compromise between brightness and linearity. Adjust the horizontal linearity control L113 for best linearity of the right half of the picture. Readjust the width control until the picture just fills the mask. Adjust horizontal centering to align the picture with the mask.

FOCUS—Adjust the focus control R129 for maximum definition of the vertical wedge of the test pattern.

Check to see that all cushion, yoke, focus coil and ion trap magnet thumb screws are tight. Replace the cabinet back grille. Make sure that the back is on tight, otherwise it may rattle at high volume.

CHECK OF R-F OSCILLATOR ADJUSTMENTS—With a crystal calibrated test oscillator or heterodyne frequency meter, check to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 8. Adjustments for channels 6 and 13 are under the chassis.

Tune in all available Television Stations. Observe the picture for detail, for proper interlacing and for the presence of interference or reflections. If these are encountered, see the section on antennas on page 6.

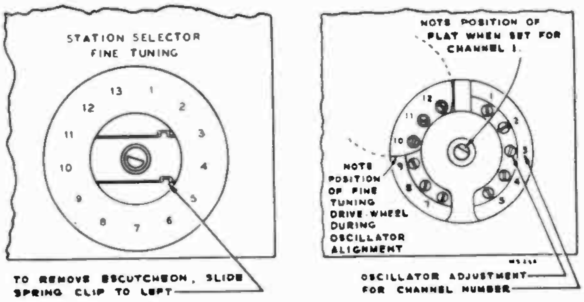


Figure 8—R-F Oscillator Adjustments

VIDEO PEAKING LINK—A video peaking link is provided to permit changing the video response. This link is connected at the factory with the peaking in. However, if transients are produced on high contrast pictures the peaking should be taken out by removing the link on the terminal board under the chassis near the V104 socket. See Figures 49 and 51 for the connection and location of the link.

ANTENNA TRAP—In some sets, a series resonant trap across the r-f amplifier grid circuit is provided to eliminate interference from FM stations on the image of channel 2, from interference on channel 6 from a station on channel 10 or interference on channel 5 from a station on channel 7. In production, this trap is adjusted to reject the channel 6-10 interference. However, in the field, it may be necessary to retouch the adjustments or to readjust the trap for channel 5-7 or FM image interference.

To adjust the trap in the field, tune in the station on which the interference is observed. Tune both cores of the trap for minimum interference in the picture. See Figure 21 for the location of the trap. Keep both cores approximately the same by visual inspection. Then, turn one core ½ turn from the original position and repeak the second for maximum rejection. Repeat this process until the best rejection is obtained. In severe cases of such interference, it may be necessary to reorient the antenna to eliminate this difficulty.

RECEIVER LOCATION—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

VENTILATION CAUTION—The receiver is provided with adequate ventilation holes in the bottom and back of the cabinet. Care should be taken not to allow these holes to be covered or ventilation to be impeded in any way.

ANTENNAS—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and to use care in its installation.

RCA Television Antennas, stock No. 225 and No. 226, are designed for reception on all thirteen television channels. These antennas use the 300-ohm RCA "Bright Picture" television transmission line. Installation personnel are cautioned not to make any changes in the antenna or to substitute other types of transmission line as such changes may result in unsatisfactory picture reproduction.

In some cases, the antenna should not be installed permanently until the quality of the picture reception has been observed on a television receiver. A temporary transmission line can be run between receiver and the antenna, allowing sufficient slack to permit moving the antenna. Then, with a telephone system connecting an observer at the receiver and an assistant at the antenna, the antenna can be positioned to give the most satisfactory results on the received signal. A shift of direction or a few feet in antenna position may effect a tremendous difference in picture reception.

REFLECTIONS—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections but that will instead cause a loss of definition in the picture.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

Under certain extremely unusual conditions, it may be possible to rotate or position the antenna so that it receives the cleanest picture over a reflected path. If such is the case, the antenna should be so positioned. However, such a position may give variable results as the nature of reflecting surfaces may vary with weather conditions. Wet surfaces have been known to have different reflecting characteristics than dry surfaces.

INTERFERENCE—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices, and similar sources of interference. In mounting the antenna, care must be taken to keep the antenna rods at least ¼ wave length (at least 6 feet) away from other antennas, metal roofs, gutters, or other metal objects.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

WEAK PICTURE—When the installation is near the limit of the area served by the transmitting station, the picture may be speckled, having a "snow" effect, and may not hold steady on the screen. This condition is due to lack of signal strength from the transmitter.

Some of the possible troubles that may be encountered, with their effects and causes, are listed below:

NO RASTER ON KINESCOPE—The effect of no raster can be caused by the following:

(1) Incorrect adjustment of ion trap magnet.

(2) No high voltage. Check V109 (6BG6-G) and V110 (8016) tubes and circuits. If the horizontal-deflection circuits are operating, as evidenced by the correct waveform measured on terminal 4 of horizontal output transformer T105, the trouble can be isolated to the high-voltage rectifier (V110) circuit. Either the high-voltage winding (points 2 to 3 on T105) is open; the 8016 tube is defective; its filament circuit is open; or the high-voltage filter capacitor C142 is shorted.

(3) Damper tube (V111, 5V4-G) inoperative. Plate voltage supply for 6BG6-G horizontal output tube is obtained through the damper tube. Check tube, and heater winding on T106. If tube is O.K., check L113 (horizontal linearity coil) for continuity, and capacitors C139 and C140 for short circuit.

(4) Defective kinescope. Heater open; cathode "return" circuit open.

(5) No plate voltage. Shorted electrolytic capacitor; open speaker field coil. All +B measurements are accessible for measurement by removing cover from bleeder box.

(6) Horizontal osc. and control tube (V108, 6SN7-GT) inoperative. Check for sawtooth on grid of horizontal output tube (V109, 6BG6-G). If not present, check waveforms, voltages, and components in V108 circuits.

HORIZONTAL DEFLECTION ONLY—If horizontal deflection only is obtained, evidenced by a "straight line" across the face of the kinescope, it can be caused by the following:

(1) Vertical oscillator and output tube (V107, 6SN7-GT) inoperative. Check waveforms and voltages on grid and plate.

(2) Vertical output transformer (T103) open.

(3) Yoke vertical coils open.

POOR VERTICAL LINEARITY—If adjustment of the vertical height and linearity controls will not correct this condition, any of the following may be the cause:

(1) Vertical output transformer (T103) defective.

(2) Capacitors C128-C or C127-B defective.

(3) V107 (6SN7-GT) defective. Check waveforms and voltages.

(4) Excess leakage or incorrect value in capacitor C130.

(5) Low plate and bias voltages. Check rectifier tube and capacitors in +B supply circuits.

(6) Capacitor C129 defective.

POOR HORIZONTAL LINEARITY If adjustment of controls does not correct this condition, check the following:

(1) Check or replace horizontal output tube (V109, 6BG6-G).

(2) Check or replace damper tube (V111, 5V4-G).

(3) Check waveform on grid of V109.

(4) Check linearity coil L113 for short circuit.

(5) Check capacitors C139 and C140 for defects.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER This condition can be caused by:

Defective yoke.

WRINKLES ON LEFT SIDE OF RASTER—This condition can be caused by:

Defective yoke due to R101, R151, or C141 (internal in yoke assembly) being wrong value or open. These components are mounted in rear of yoke assembly.

SMALL RASTER This condition can be caused by:

(1) Low +B or line voltage.

(2) Insufficient output from horizontal output tube V109 (6BG6-G). Replace tube.

RASTER—NO IMAGE, BUT ACCOMPANYING SOUND—This condition can be caused by:

(1) No signal on kinescope grid. Check picture i-f amplifier tubes V101 (6AG5), V102 (6AG5), V103 (6AG5), second detector V104 (6AL5), and video amplifier V105 (12AU7).

(2) Bad contact to kinescope grid. (Lead to socket broken.)

SIGNAL APPEARS ON KINESCOPE GRID BUT IMPOSSIBLE TO SYNCHRONIZE THE PICTURE VERTICALLY AND HORIZONTALLY—A condition of this nature can be caused by:

(1) Defective sync amplifier and separator (V106, 6SN7-GT).

(2) If tube is O.K., check voltages, waveforms and associated circuits.

SIGNAL ON KINESCOPE GRID AND HORIZONTAL SYNC ONLY—If this condition is encountered, check:

Vertical integrating network capacitors C164, C123, C124, C125, and resistors R136, R137, R138.

PICTURE STABLE BUT WITH POOR RESOLUTION—If the picture resolution is not up to standard, it may be caused by any of the following:

(1) Defective picture detector (V104, 6AL5) or video amplifier (V105, 12AU7).

(2) Open video peaking coil. Check all peaking coils (L104, L105, L106, L107) for continuity. Note that L105 and L106 have shunting resistors.

(3) Leakage in V105 grid capacitor C115.

If above components are not found to be defective, check the following:

(1) Check all potentials in video circuits.

(2) Check kinescope grid circuit for poor or dirty contact.

(3) Check adjustment of focus control (R129). It should be effective on either side of proper focus.

(4) Check and realign, if necessary, the picture i-f and r-f circuits.

PICTURE SMEAR—

(1) Normally, smear can be attributed to phase shift at the low-frequency end of the video characteristic. This can be caused by improper values of R and C in the video circuits. Check for grid current on video amplifier tube V105.

(2) This trouble can originate in either the transmitter or the receiver. Check reception from another station.

PICTURE JITTER—

(1) If regular sections at the left of the picture are displaced, replace the horizontal output tube (V109, 6BG6-G).

(2) Vertical instability may be due to loose connections or "noise" received with the signal.

(3) Horizontal instability may be due to unstable transmitted sync, or to "noise."

TEST EQUIPMENT—To service this receiver properly, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency ranges:

18 to 30 mc, 1 mc sweep width
40 to 90 mc, 10 mc sweep width
170 to 225 mc, 10 mc sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output in all attenuator positions.

Cathode-ray Oscilloscope, preferably one with a wide band vertical deflection and an input calibrating source.

Signal Generator to provide the following frequencies: (Output on these ranges should be adjustable and at least .1 volt maximum.)

(a) Intermediate frequencies:

21.25 mc sound i-f and sound traps
22.8 mc converter transformer
23.9 mc first picture i-f coil
24.5 mc third picture i-f coil
26.0 mc second picture i-f primary
27.25 mc second picture i-f secondary

(b) Radio frequencies:

Channel Number	Picture Carrier Freq. Mc	Sound Carrier Freq. Mc
1	45.25	49.75
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of "Junior VoltOhmyst type" and a high voltage probe for use with this meter to permit measurements up to 10 kv.

SERVICE PRECAUTIONS—Cutouts in the bottom of the cabinet make it possible to do some of the servicing of the receiver without removing the chassis. If the receiver is serviced in the cabinet, a soft pad should be placed under the cabinet when it is inverted, in order to avoid scratching the surface. In manufacture, the cabinet receives a Class 1 rub finish and every effort should be made to preserve that finish.

If necessary to remove the chassis from cabinet, the kinescope must first be removed. See Figures 3, 4 and 6. If possible, the chassis should then be serviced without the kinescope. However, if it is necessary to view the raster during servicing, the kinescope should be inserted only after the chassis is turned on end. The kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer "up," all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not permit the kinescope second-anode lead to become "shorted" to the chassis. To do so will cause a considerable overload on the high-voltage filter resistor R167.

ADJUSTMENTS REQUIRED Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require readjustment.

Due to the high frequencies at which the receiver operates, the r-f oscillator-line adjustment is critical and may be affected by a tube change. The line can be adjusted to the proper frequency on channel 13 with practically any 6J6 tube in the socket. However, it may not then be possible to adjust the line to frequency on all of channels 7, 8, 9, 10, 11, and 12. For an oscillator tube to be satisfactory, it should be possible to adjust the line to proper frequency with the fine-tuning control in the middle of its range. It may therefore be necessary to select a tube for the oscillator socket. In replacing, if the old tube can be matched for frequency by trying several new ones, this practice is recommended. At best, however, it will probably be necessary to realign the oscillator line completely after changing the tube.

Tubes which cannot be used as an oscillator may work satisfactorily as an r-f amplifier or a converter.

The detailed alignment procedure which follows is intended primarily as a discussion of the method used, precautions to be taken, and the reasons for these precautions. Then, for more convenient reference during alignment, a tabulation of the method is given. All the information necessary for alignment is given in the tables; however, alignment by the tables should not be attempted before reading the detailed instructions.

ALIGNMENT PROCEDURE (Continued) 721TS, 721TCS

ORDER OF ALIGNMENT—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

- Sound discriminator
- Sound i-f transformers
- Picture i-f traps
- Picture i-f coils
- R-F and converter lines
- R-F oscillator line
- Retouch picture i-f transformers
- Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT—

Set the signal generator for approximately .1 volt output at 21.25 mc. and connect it to the second sound i-f grid.

Detune T108 secondary (bottom).

Set the "VoltOhmyst" on the 10 volt scale.

Connect the meter in series with a one megohm resistor to the junction of diode resistors R181 and R182.

Adjust the primary of T108 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to pin 1 of V116 and set on the 3 volt scale.

Adjust T108 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T108 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the second sound i-f amplifier.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 and with an output of approximately .1 volt.

Connect the oscilloscope to pin 1 of V116.

The pattern obtained should be similar to that shown in Figure 13A. If it is not, adjust T108 (top) until the wave form is symmetrical.

The peak to peak bandwidth of the discriminator should be approximately 350 kc. and should be linear from 21.175 mc. to 21.325 mc.

SOUND I-F ALIGNMENT—

Connect the sweep and signal generator to the top end of the trap winding of T3 (on top of the chassis).

Connect the oscilloscope to the second sound i-f grid return (terminal A T107) in series with a 33,000 ohm isolating resistor.

Connect a 5600 ohm resistor from terminal A, T107 to ground. Insert a 21.25 mc. marker signal from the signal generator into the first sound i-f grid.

Adjust T107 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 13B. The band width at 80% response from the first sound i-f grid to the second i-f grid should be approximately 250 kc.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the second sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

PICTURE I-F TRAP ADJUSTMENT—

Connect the "VoltOhmyst" to the junction of R106 and R107 and adjust the picture control for −3 volts on the meter.

Set the channel switch to channel 13.

Connect the "VoltOhmyst" across the picture second detector load resistor R118 and set it on the 3 volt scale.

Connect the output of the signal generator to the junction of C14 and R6. This connection is available on a terminal lug through a hole in the side apron of the chassis, beside the r-f unit.

Set the generator to 21.25 mc. and check it against a crystal calibrator to insure that the generator is exactly on frequency. Adjust T3 (top) and T101 for minimum indication on the "VoltOhmyst."

Set the generator to 27.25 mc. and adjust T104* secondary (bottom) for minimum indication on the "VoltOhmyst."

PICTURE I-F COIL ADJUSTMENTS—

Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst."

- 22.8 mc.—T3 (bottom)
- 23.9 mc.—L101 (top of chassis)
- 26.0 mc.—T104 primary (top of chassis)
- 24.5 mc.—L103 (top of chassis)

Picture I-F Oscillation—If the receiver is badly misaligned and two or more of the i-f coils are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a voltage in excess of 3 volts at the picture detector load resistor. This voltage is unaffected by r-f signal input and sometimes is independent of picture control setting.

If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the coils approximately to frequency by setting the adjustment stud extensions of T3, L101, T104 and L103 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias. If so, it should then be possible to align the coils by the usual method. Once aligned in this manner, the i-f should be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first two i-f amplifiers to ground with 1000 mmf. capacitors.

Connect the signal generator to the third i-f grid and adjust L103 to frequency.

Remove the shunting capacitor from the second i-f grid, connect the signal generator to this grid and align T104.

Remove the shunting capacitor from the first i-f grid, connect the signal generator and align L101.

Connect the signal generator to the junction of C14 and R6 (in the r-f tuning unit) and align T3 to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is very stable when properly aligned. Check all i-f by-pass condensers, coil loading resistors, tubes, socket voltages, etc.

* In some receivers, T104 is replaced by L102 which has no bottom adjustment.

R-F AND CONVERTER LINE ADJUSTMENT—

Connect the r-f sweep oscillator to the receiver antenna terminals. If the sweep oscillator has a 50 ohm single-ended output, it will be necessary to obtain balanced output by connecting as shown in Figure 9.

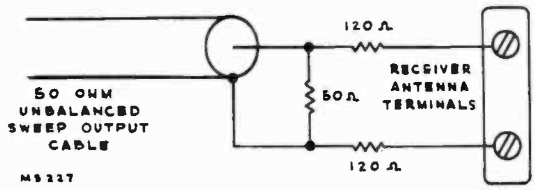


Figure 9—Unbalanced Sweep Cable Termination

Connect the oscilloscope to the junction of C14 and R6 (in the r-f tuning unit) through a 10,000 ohm resistor.

By-pass the first picture i-f grid to ground through a 1000 mmfd. capacitor. Keep the leads to this by-pass as short as possible. If this is not done, lead resonance may fall in the r-f range and cause an incorrect picture of the r-f response.

Connect the "VoltOhmyst" to the junction of R170 and R171 and adjust the picture control for −1 volt on the meter.

Connect the signal generator loosely to the receiver antenna terminals.

Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7 (see Figure 18 for switch shaft flat location versus channel).

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier 175.25 mc. and 179.75 mc.

Adjust L25, L26, L51 and L52 (see Figure 16) for an approximately flat topped response curve located symmetrically between the markers. Normally this curve appears somewhat overcoupled or double humped with a 10 or 15% peak to valley excursion and the markers occur at approximately 90% response. See Figure 17, channel 7. In making these adjustments, the stud extension of all cores should be kept approximately equal.

Check the response of channels 8 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observe the response obtained. See Figure 17 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 70% response. If the markers do not fall within this requirement on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L25, L26, L51 and L52, and possibly compromise some channel slightly in order to get the markers up on other channels. Normally however, no difficulty of this type should be experienced since the higher frequency channels become comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L11, L12, L37 and L38, for an approximately flat-topped response curve located symmetrically, between the markers.

Check channels 5 down through channel 1 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 70% response point. If this is not the case, L11, L12, L37 and L38 should be retouched. On final adjustment, all channels must be within the 70% specification.

Coupling between r-f and converter lines is augmented by a link between L12 and L37. This link is adjusted in the factory and should not require adjustment in the field. On channel 6 with the link in the minimum coupling position, the response is slightly overcoupled with approximately a 10% excursion from peak-to-valley. With the coupling at maximum, the response is somewhat broader and the peak-to-valley excursion is approximately 40%. The amount of coupling permissible is limited by the peak-to-valley excursion which should not be greater than 30% on any channel.

Remove the 1000 mmf capacitor from the first picture i-f grid.

R-F OSCILLATOR LINE ADJUSTMENT—

The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, the frequencies listed under "R-F Osc. Freq." in the table must be available.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, the frequencies listed under "R-F Sound Carrier" must be available.

Channel Number	Receiver R-F Osc. Freq. Mc.	R-F Sound Carrier Freq. Mc.
1	71	49.75
2	81	59.75
3	87	65.75
4	93	71.75
5	103	81.75
6	109	87.75
7	201	179.75
8	207	185.75
9	213	191.75
10	219	197.75
11	225	203.75
12	231	209.75
13	237	215.75

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the "VoltOhmyst" to pin 1 of V116.

Connect the signal generator to the receiver antenna terminals.

The order of alignment remains the same regardless of which method is used.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to channel 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust L77 and L78 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. The core stud extensions should be maintained equal by visual inspection.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L76 for indications as above.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

RETOUCHING OF PICTURE I-F ADJUSTMENTS—

The picture i-f response curve varies somewhat with change of bias and for this reason it should be aligned with approximately the same signal input as it will receive in operation.

If the receiver is located at the edge of the service area, it should be aligned with approximately −1 volt i-f grid bias. However, for normal conditions, (signals of 1000 microvolts or greater), it is recommended that the picture i-f be aligned with a grid bias of −3 volts. Set the picture control for −3 volts at the junction of R106 and R107.

Connect the r-f sweep generator to the receiver antenna terminals.

Connect the signal generator to the antenna terminals and feed in the 25.75 mc. i-f picture carrier marker and a 23 mc. marker.

Connect the oscilloscope across the picture detector load resistor, R118.

Set the channel switch to channel (between 1 and 6) found to have the best response during the r-f and converter line adjustment.

Set the sweep output to produce approximately .3 volt peak-to-peak across the picture detector load resistor.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. In making these adjustments, care should be taken that no two transformers are tuned to the same frequency as i-f oscillation may result.

On final adjustment the picture carrier marker must be at approximately 45% response. The curve must be approximately flat topped and with the 23 mc. marker at approximately 90% response.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 45% response point. If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture definition is impaired by loss of high frequency video response.

SENSITIVITY CHECK—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through an attenuator pad of the type shown in Figure 10. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position.

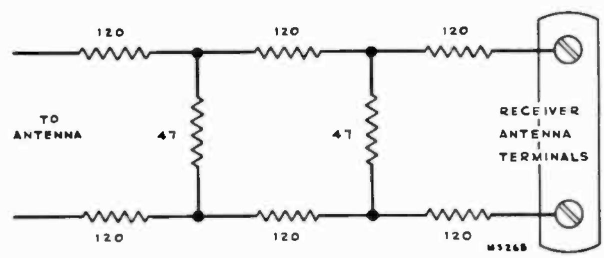


Figure 10—Attenuator Pad

Only carbon type resistors should be used to construct the attenuator pad. Since many of the low value moulded resistors generally available are of wire wound construction, it is advisable to break and examine one of each type of resistor used in order to determine its construction.

RESPONSE CURVES—The response curves shown on pages 12, 14 and 15 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected. Channel 2 r-f response (not shown) is similar to that of channel 3.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

ALIGNMENT TABLE—Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment. If it is found that the dual listing is confusing, the unwanted listing can be easily erased.

ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLES IS ATTEMPTED.

DISCRIMINATOR AND SOUND I-F ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
1	2nd sound i-f grid (pin 1, V115)	21.25 .1 volt output	Not used		Not used	In series with 1 meg. to junction of R181 and R182	Meter on 10 volt scale	Detune T108 (bottom). Adjust T108 (top) for max. on meter.	Fig. 11 Fig. 12
2	"	"	"		"	Discriminator output (pin 1 of V116)	Meter on 3 volt scale	T108 (bottom) for zero on meter	Fig. 12
3	"	"	2nd sound i-f grid (pin 1, V115)	21.25 center 1 mc. .1 volt output	Discriminator output (pin 1 of V116)	Not used	Check for symmetrical response waveform (positive and negative). If not equal adjust T108 (top) until they are equal. See Note 1.		Fig. 11 Fig. 12 Fig. 13 A
4	Trap winding on T3 (top of chassis)	21.25 reduced output	Trap winding on T3	21.25 reduced output	Terminal A, T107 in series with 33,000 ohms. See Note 2.	"	Sweep output reduced to provide .3 volt p-to-p on scope. See Note 3.	T107 (top and bottom) for max. gain and symmetry at 21.25 mc.	Fig. 11 Fig. 12 Fig. 13 B

NOTE 1: The peak-to-peak bandwidth of the discriminator should be approximately 350 kc. and should be linear from 21.175 mc. to 21.325 mc.

NOTE 2: If a 60 cycle sweep rate is used, it will be necessary to reduce the time constant in the 2nd sound i-f grid circuit in order to reproduce the desired response curve. To do this, shunt R176 (Terminal "A" of T107 to chassis) with 5600 ohms.

NOTE 3: The sweep generator output should be set to produce approximately 0.3 volt peak-to-peak at the second sound i-f grid return (Terminal "A" of T107) for final touch-up on this adjustment. Signal voltage in excess of 0.3 volt will tend to broaden the response curve—permitting misadjustment to pass unnoticed.

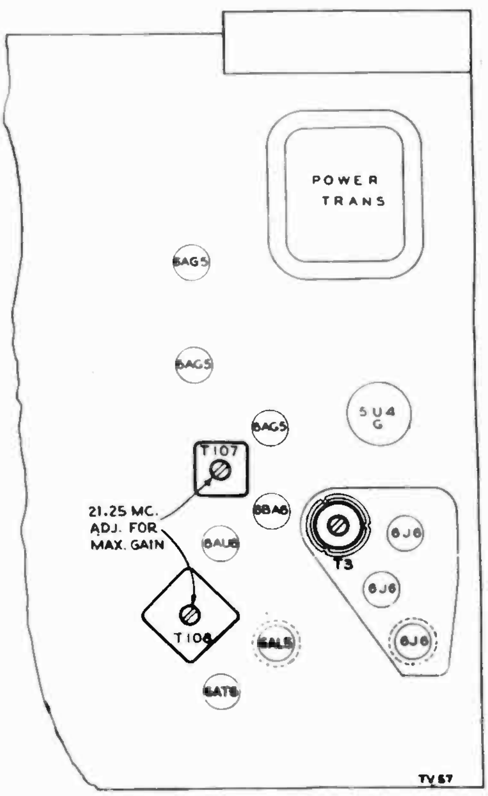


Figure 11—Top Chassis Sound I-F Adjustments

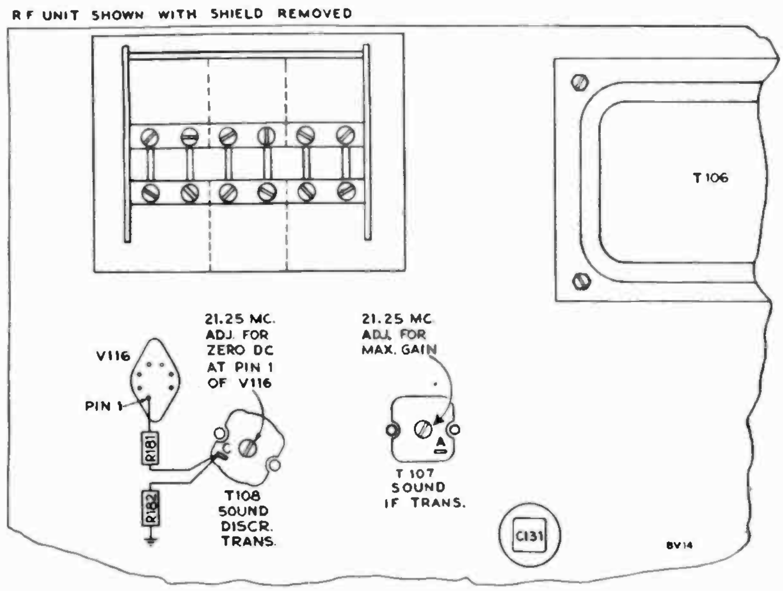


Figure 12—Bottom Chassis Sound I-F and Discriminator Adjustments

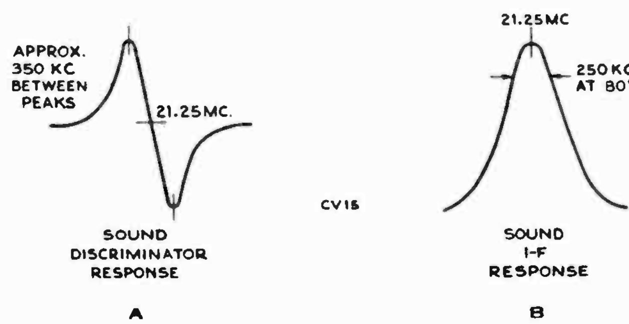


Figure 13—Sound Discriminator and I-F Response

ALIGNMENT TABLE (Continued)

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLES IS ATTEMPTED.

PICTURE I-F AND TRAP ADJUSTMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
5	Not used		Not used		Not used	Junction R106 and R107	Set "Station Selector" switch to channel 13	Adjust "Picture" control for -3 volts reading on "Volt-Ohmyst"	Fig. 15
6	Junction C14 and R6	21.25	"		"	Junction of L104 and R118	Meter on 3 volt scale	T3 (top) and T101 for min. on meter	Fig. 14
7	"	27.25	"		"	"	"	T104* (bottom) for min.	Fig. 15
8	"	22.8	"		"	"		T3 (bottom) for max.	Fig. 15
9	"	23.9	"		"	"		L101 (top chassis) for max.	Fig. 14
10	"	26.0	"		"	"		T104* (top chassis) for max.	Fig. 14
11	"	24.5	"		"	"		L103 (top chassis) for max.	Fig. 14

NOTE: Oscillation may occur if the i-f section is badly out of alignment. This will be evidenced by a meter reading in excess of 3 volts and is caused by the "staggered" i-f stages being tuned to approximately the same frequency. If this condition is encountered, adjust the core studs of T3 (bottom) L101, T104 (top), and L103 until oscillation ceases. Oscillation may not be encountered until proceeding with steps 9, 10, or 11. (See "Picture I-F Oscillation," page 9.)

* In some receivers, T104 is replaced by L102 which has no bottom adjustment.

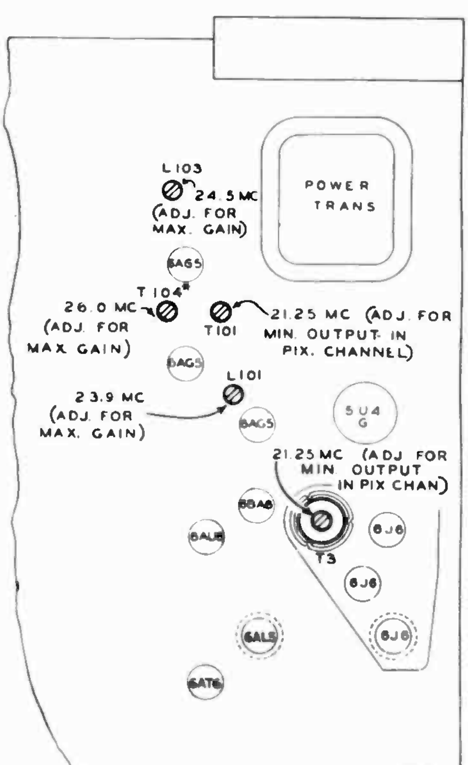


Figure 14—Top Chassis Pix I-F and Trap Adjustments

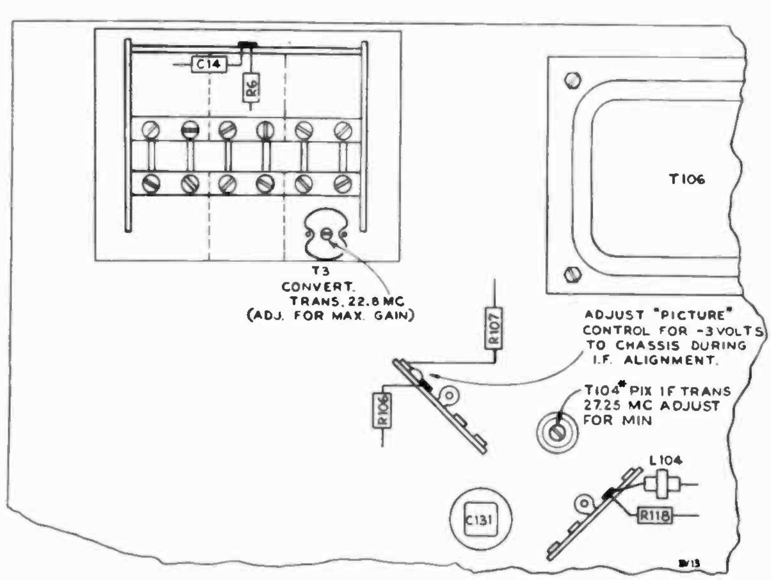


Figure 15—Bottom Chassis Pix I-F Adjustments

* In some receivers, T104 is replaced with L102.

721TS, 721TCS

ALIGNMENT TABLE (Continued)

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLES IS ATTEMPTED.

R-F AND CONVERTER LINE ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
12	Not used		Not used		Not used	Junction of R170 and R171		Picture control for −1 volts on meter	Fig. 16
13	Antenna terminal (loosely)	175.25 and 179.75	Antenna terminals (see note for precaution)	Sweeping channel 7	Junction C14 and R6 through 10,000 ohm series resistor	Not used	1st i-f grid bypass to gnd. with 1000 mmf. Receiver on channel 7	L25, L26, L51 and L52 for approx. flat top response between markers. Markers above 70%	Fig. 16 Fig. 17 (7)
14	"	181.25 185.75	"	channel 8	"	"	Receiver on channel 8	Check to see that response is as above	Fig. 17 (8)
15	"	187.25 191.75	"	channel 9	"	"	Receiver on channel 9	"	Fig. 17 (9)
16	"	193.25 197.75	"	channel 10	"	"	Receiver on channel 10	"	Fig. 17 (10)
17	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 17 (11)
18	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 17 (12)
19	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 17 (13)
20	If the response on any channel (steps 14 through 19) is below 70% at either marker, switch to that channel and adjust L25, L26, L51 and L52 to pull response up on that channel. Then recheck steps 13 through 19.								
21	Antenna terminal (loosely)	83.25 87.75	Antenna terminals (see note for precaution)	Sweeping channel 6	Junction C14 and R6 through 10,000 ohm series resistor	Not used	Receiver on channel 6	L11, L12, L37 and L38 for response as above	Fig. 17 (6)
22	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 17 (5)
23	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 17 (4)
24	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 17 (3)
25	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	
26	"	45.25 49.75	"	channel 1	"	"	Receiver on channel 1	"	Fig. 17 (1)
27	If the response on any channel (steps 22 through 26) is below 70% at either marker, switch to that channel and adjust L11, L12, L37 and L38 to pull response up on that channel. Then, recheck steps 21 through 26. Remove 1000 mmf. capacitor from 1st pix i-f grid upon completion.								

NOTE: If sweep generator has "single ended" output, it will be necessary to use the terminating arrangement shown in Figure 9, page 10.

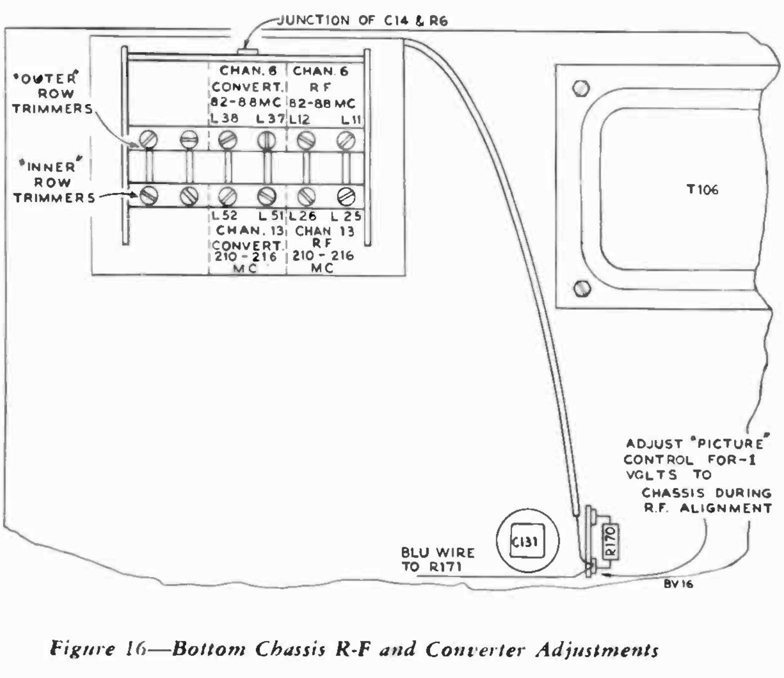


Figure 16—Bottom Chassis R-F and Converter Adjustments

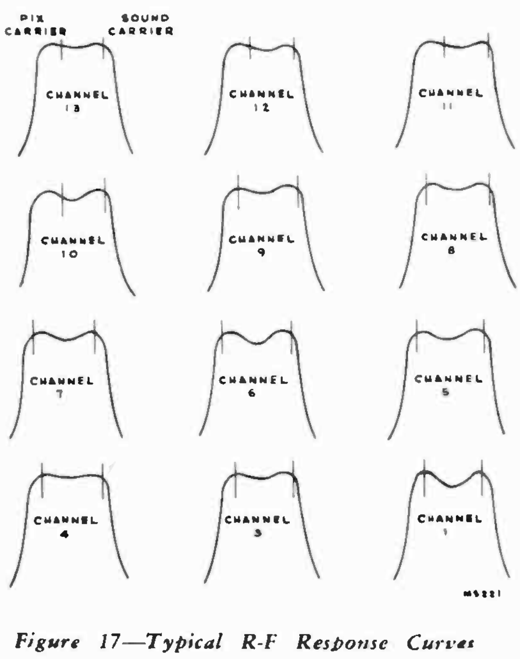


Figure 17—Typical R-F Response Curves

ALIGNMENT TABLE (Continued)

R-F OSCILLATOR ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
28	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Pin 1 of V116 for sig. gen. method only	Fine tuning centered for all adjustments Receiver on channel 13	L77 and L78 for zero on meter or beat on het. freq. meter	Fig. 19
29	"	209.75	"	231	"	"	Receiver on channel 12	L76 as above	Fig. 18
30	"	203.75	"	225	"	"	Receiver on channel 11	L74 as above	"
31	"	197.75	"	219	"	"	Receiver on channel 10	L72 as above	"
32	"	191.75	"	213	"	"	Receiver on channel 9	L70 as above	"
33	"	185.75	"	207	"	"	Receiver on channel 8	L68 as above	"
34	"	179.75	"	201	"	"	Receiver on channel 7	L66 as above	"
35	"	87.75	"	109	"	"	Receiver on channel 6	L63 and L64 as above	Fig. 19
36	"	81.75	"	103	"	"	Receiver on channel 5	L62 as above	Fig. 18
37	"	71.75	"	93	"	"	Receiver on channel 4	L60 as above	"
38	"	65.75	"	87	"	"	Receiver on channel 3	L58 as above	"
39	"	59.75	"	81	"	"	Receiver on channel 2	L56 as above	"
40	"	49.75	"	71	"	"	Receiver on channel 1	L54 as above	"
41	Repeat steps 28 through 40 as a check.								

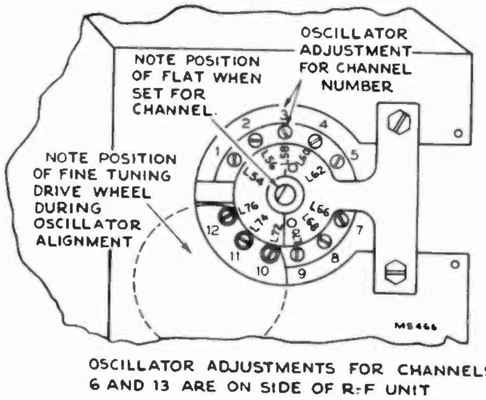


Figure 18—Front Chassis Oscillator Adjustments

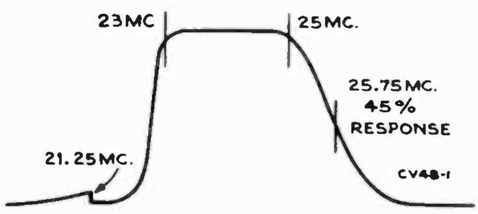
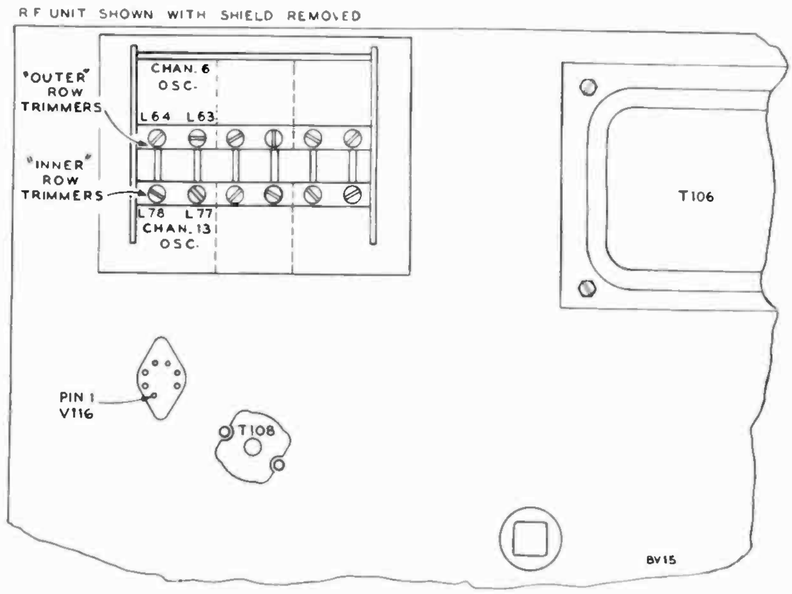


Figure 20—Typical Overall Response Curve



BOTTOM CHASSIS OSCILLATOR ADJUSTMENTS 721TS 10" TABLE TELEVISION

Figure 19—Bottom Chassis Oscillator Adjustments

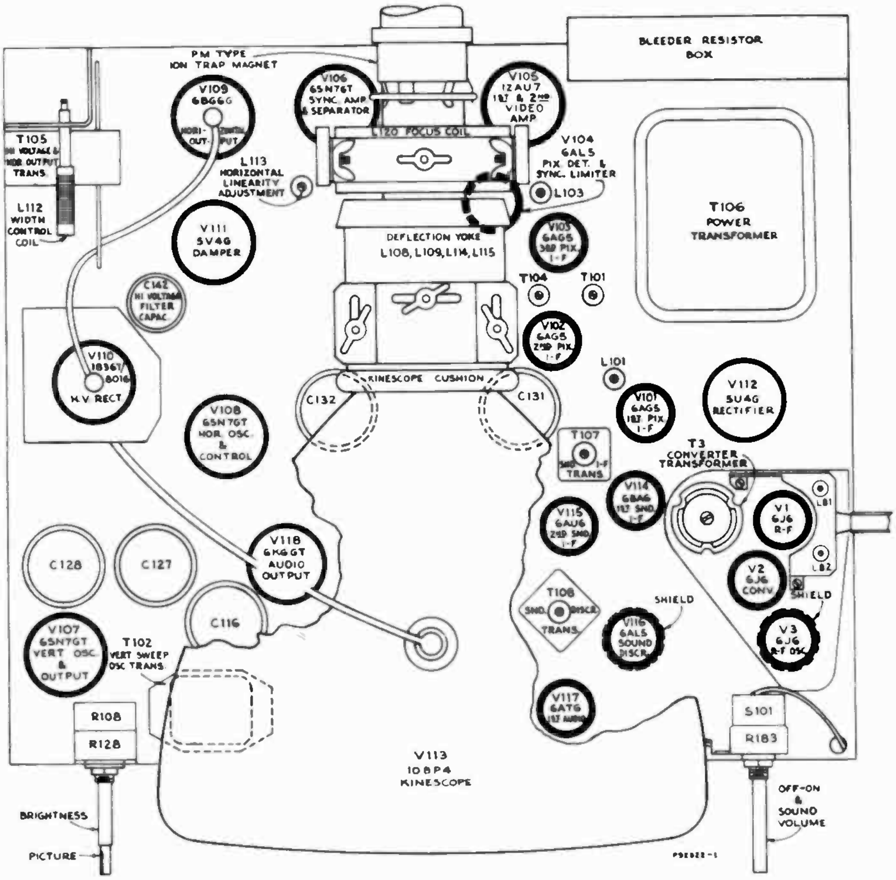
RETOUCHING PICTURE I-F TRANSFORMERS

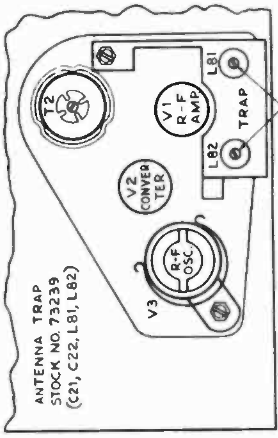
STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
42			Not used		Not used	Junction of R106 and R107		Picture control for −3 volts on meter	Fig. 19
43	Antenna terminals (loosely)	23.0 25.75	Antenna terminals		Junction L104 and R118	Not used	Retouch pix i-f adjustments (T3, bottom, L101, T104 top and L103) as necessary to provide proper response		Fig. 15 Fig. 14 Fig. 20

SENSITIVITY CHECK

44	Connect antenna to the receiver through the attenuator pad to provide a weak signal. Compare the picture and sound obtained to that obtained on other receivers under the same conditions.

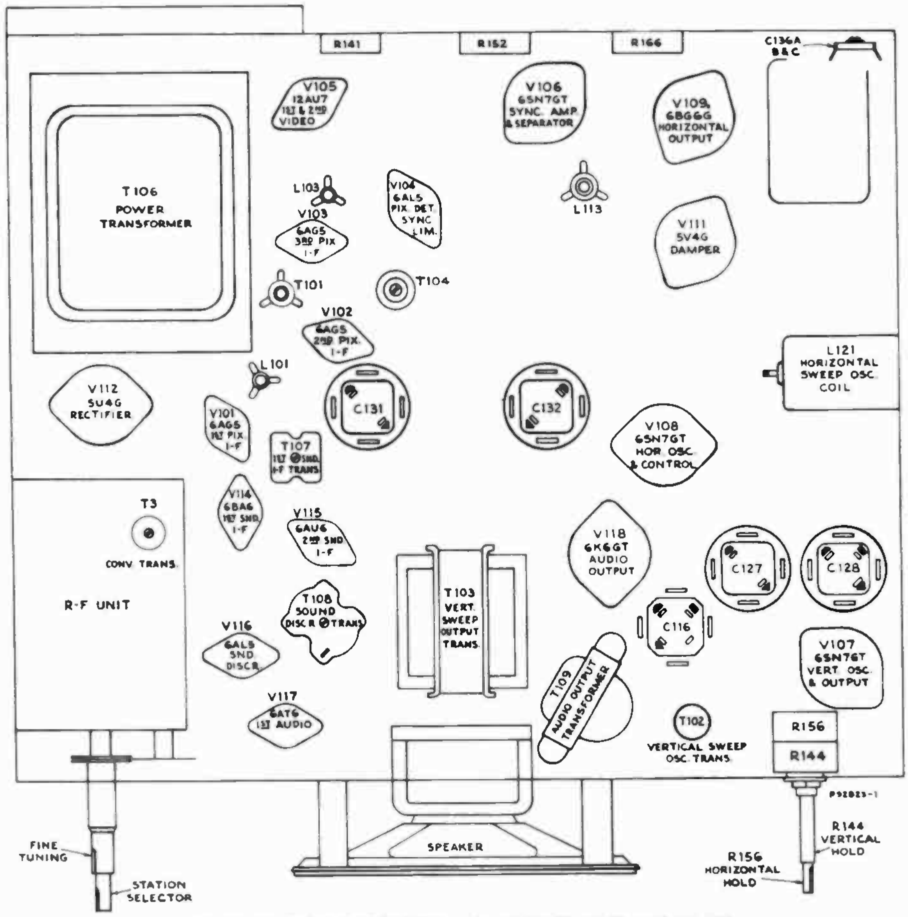
CHASSIS VIEWS





Antenna Trap Adjustments

Figure 21—Chassis Top View (Showing Location of Major Components)



NOTE: IN SOME RECEIVERS, L102 IS USED IN PLACE OF T104

Figure 22—Chassis Bottom View (Showing Location of Major Components)

Peak to peak voltages shown are nominal when 1 volt peak to peak video signal is applied to 1st video amplifier (V105).

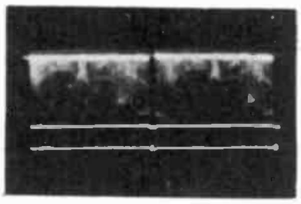


Figure 23—Vertical (1.0 Volts, P to P)

Video Signal Input to 1st Video Amplifier (At Pin 2 of V105)

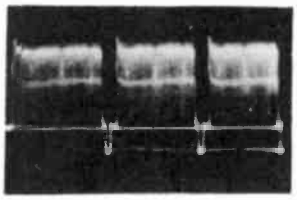


Figure 24—Horizontal (1.0 Volts, P to P)

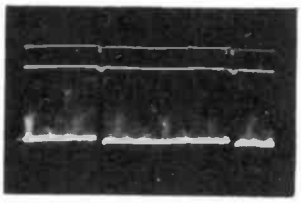


Figure 25—Vertical (5.0 Volts, P to P)

Output of 1st Video Amplifier (Pin 1 of V105)

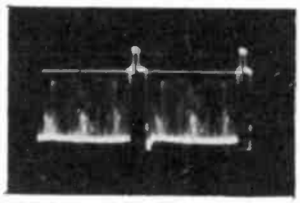


Figure 26—Horizontal (5.0 Volts, P to P)

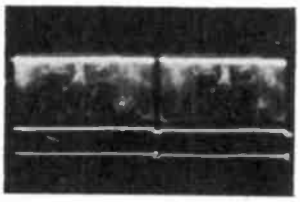


Figure 27—Vertical (32 Volts, P to P)

Input to Kinescope Grid (Junction of L106 and Green Lead to Kinescope Socket)

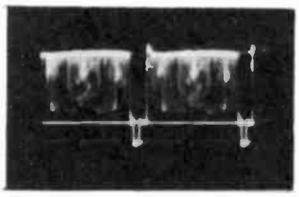


Figure 28—Horizontal (32 Volts, P to P)

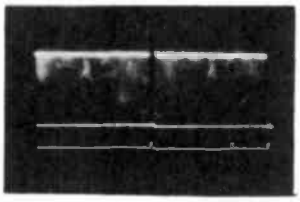


Figure 29—Vertical (8 Volts, P to P)

Input to Grid Sync Amplifier (Pin 1 of V106)

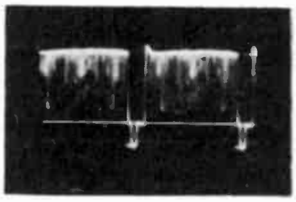


Figure 30—Horizontal (8 Volts, P to P)

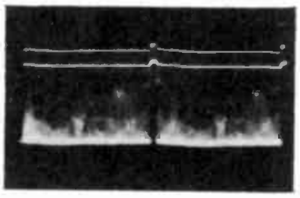


Figure 31—Vertical (90 Volts, P to P)

Input to Sync Separator (Pin 2 of V106)

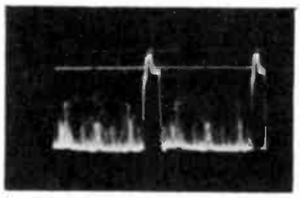


Figure 32—Horizontal (90 Volts, P to P)

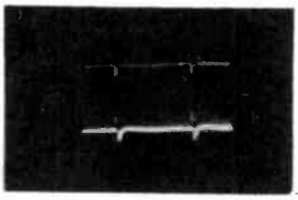


Figure 33—Vertical (10 Volts, P to P)

Output of Sync Separator (Pin 6 of V106)

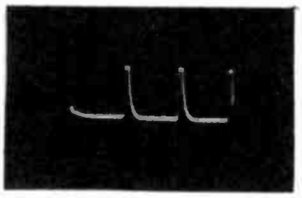


Figure 34—Horizontal (10 Volts, P to P)

WAVEFORM PHOTOGRAPHS (Continued)

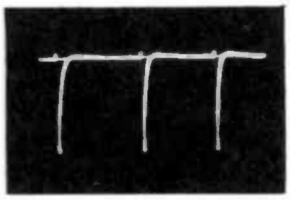


Figure 35—Vertical (25 Volts, P to P) Output of Integrating Network (Junction of R138 and C125)

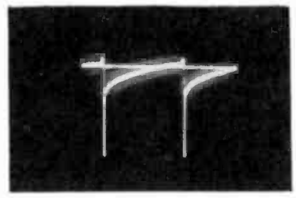


Figure 36—Grid of Vertical Oscillator Tube (175 Volts, P to P) (Pin 1 of V107)

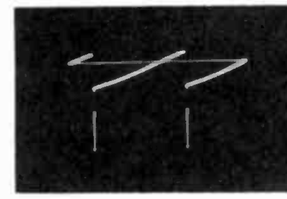


Figure 37—Input to Vertical Output Tube (65 Volts, P to P) (Junction of C129 and C130)

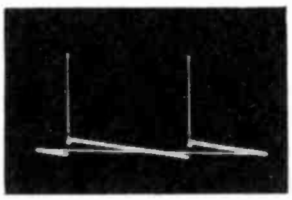


Figure 38—Plate of Vertical Output Tube (750 Volts, P to P) (Pin 5 of V107)

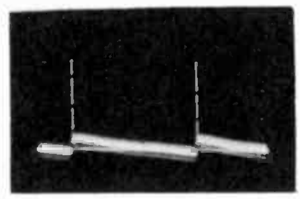


Figure 39—Voltage Across Vertical Deflection Coils (L108, L109) (90 Volts, P to P) (At Green Lead of T103 to Ground)

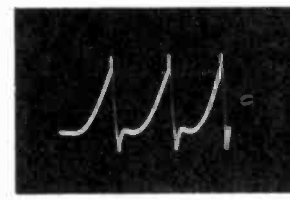


Figure 40—Horizontal Oscillator Waveforms and Sync Pulse (20 Volts, P to P) (Junction of C122 and C133)

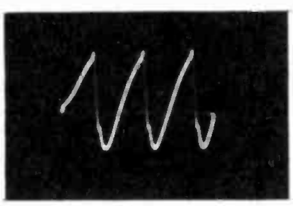


Figure 41—Horizontal Oscillator Control (45 Volts, P to P) (Junction R158 and R164)

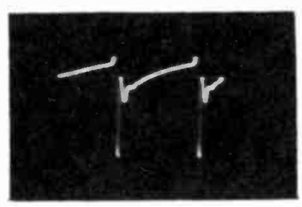


Figure 42—Grid of Horizontal Oscillator (400 Volts, P to P) (Pin 4 of V108)

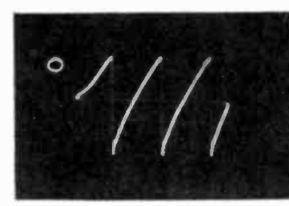


Figure 43—Horizontal Oscillator Output (60 Volts, P to P) (Junction of C135 and C163)

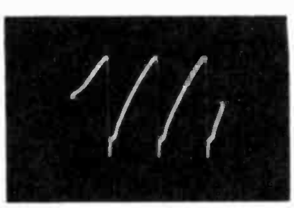


Figure 44—Grid of Horizontal Output (40 Volts, P to P) (Pin 5 of V109)

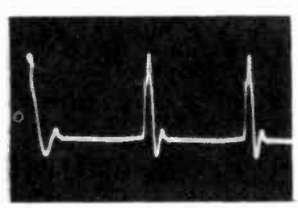


Figure 45—Plate of Horizontal Output (Approx. 5000 Volts, P to P) (Measured Through a Capacity Divider Connected from Plate to Ground)

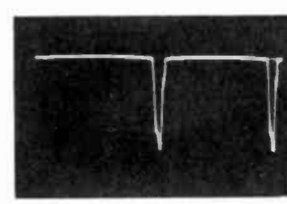


Figure 46—Voltage Across Horizontal Deflection Coils (Approx. 1100 Volts, P to P) (Pin 4 or 6 of V111 to Ground)

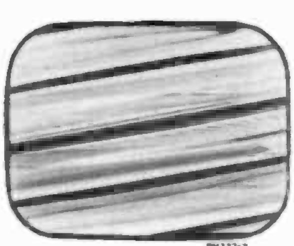


Figure 47—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is in a Counterclockwise Position—Just Before Pulling Into Sync

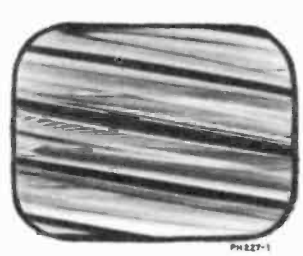
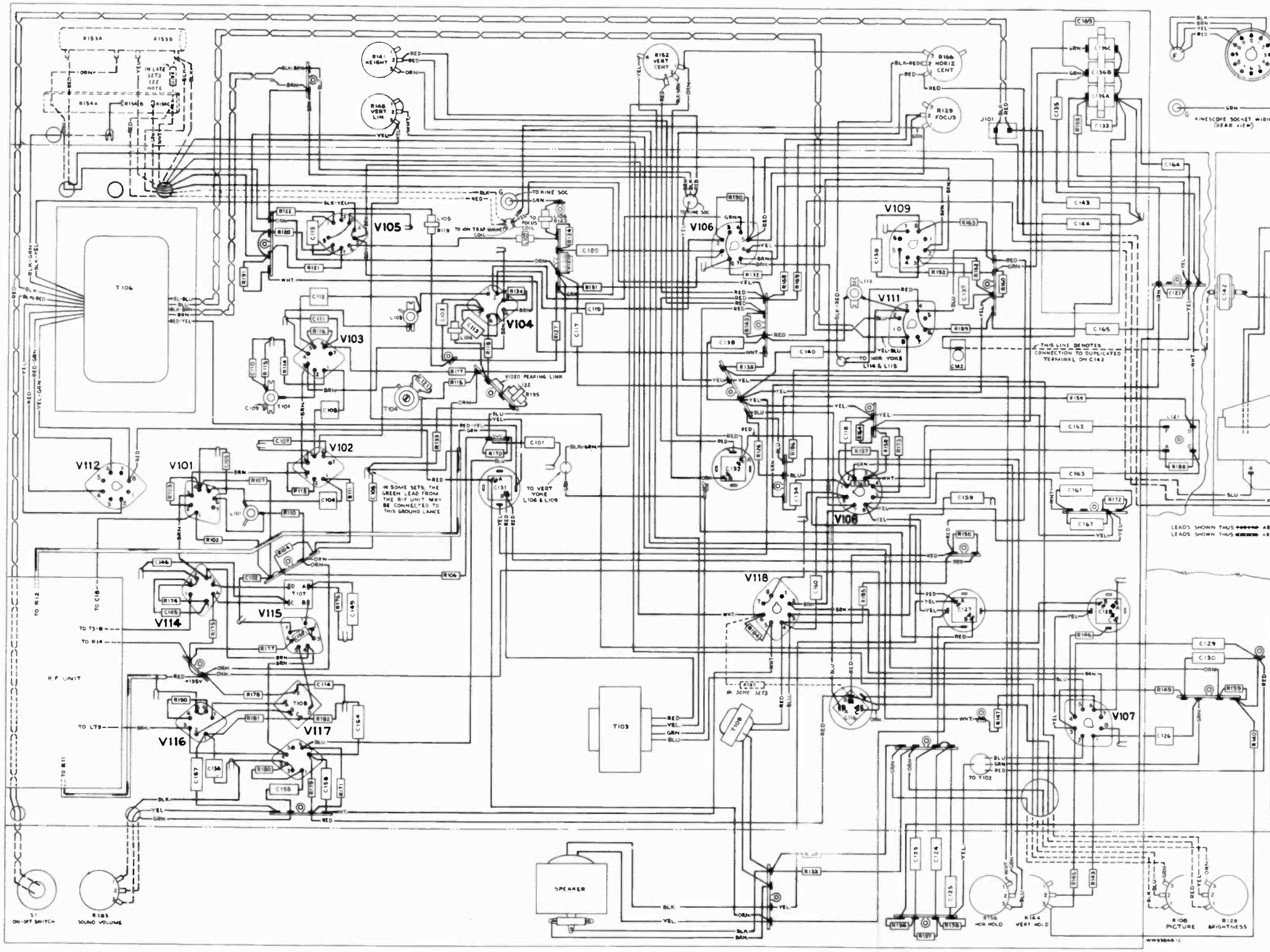


Figure 48—Test Pattern Showing Out Of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position.

CRITICAL LEAD DRESS

1. Do not permit any strains to be placed on the leads of R126, R157, R158, R164, R165, R173, R188 and R191. Do not permit these resistors to be exposed to the heat of a soldering iron any more than is absolutely necessary.
2. Dress the temperature compensating resistor R191 approximately one-quarter inch from the power transformer and the chassis.
3. Dress all video coupling capacitors and peaking coils up and away from the chassis.
4. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.



MODEL 721TS

Early production sets employed brightness and picture control #71784 in which the brightness is the outer knob and picture, the center knob. Late production, shown in the above wiring diagram employs control #73193 in which picture is the outer knob and brightness the center.

The front panel control decals are affected by the control changes. Decal #72805 is for control #71784. Decal #73194 is for control #73193.

The operating instruction book is also affected by the control change. Instruction Book #49050-1 is for sets employing control #71784.

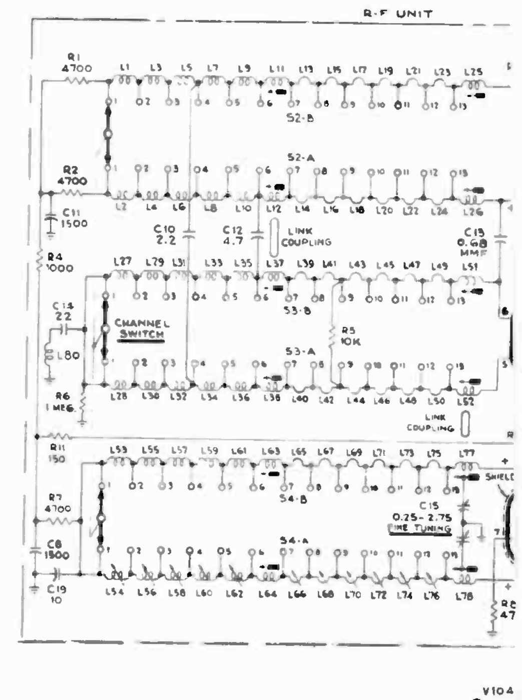
Supplementary sheet #49050-1S has been issued to convert -1 books for use with sets employing control #73193. Subsequent printings of late production instruction books will be designated as #49050-2.

In early production receivers, an EM type of ion trap magnet was employed and was connected as shown by the dotted lines.

R196 was omitted in receivers employing an EM type magnet.

R197 was employed only in receivers with the 247-ohm focus coil.

Figure 49—Chassis Wiring Diagram



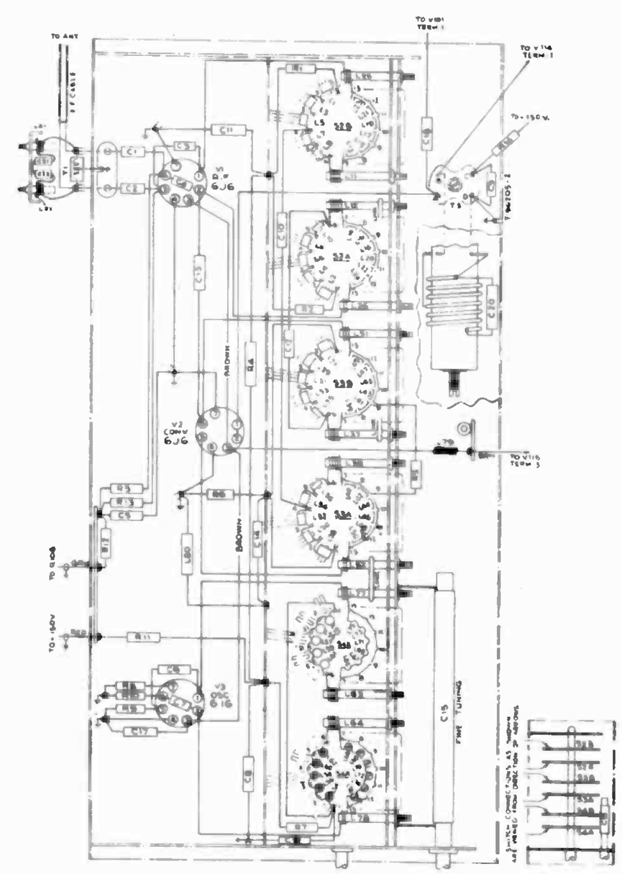
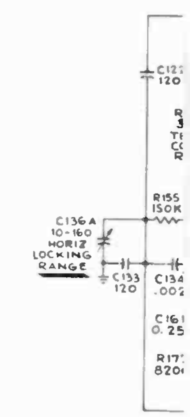


Figure 50—R-F Unit Wiring Diagram



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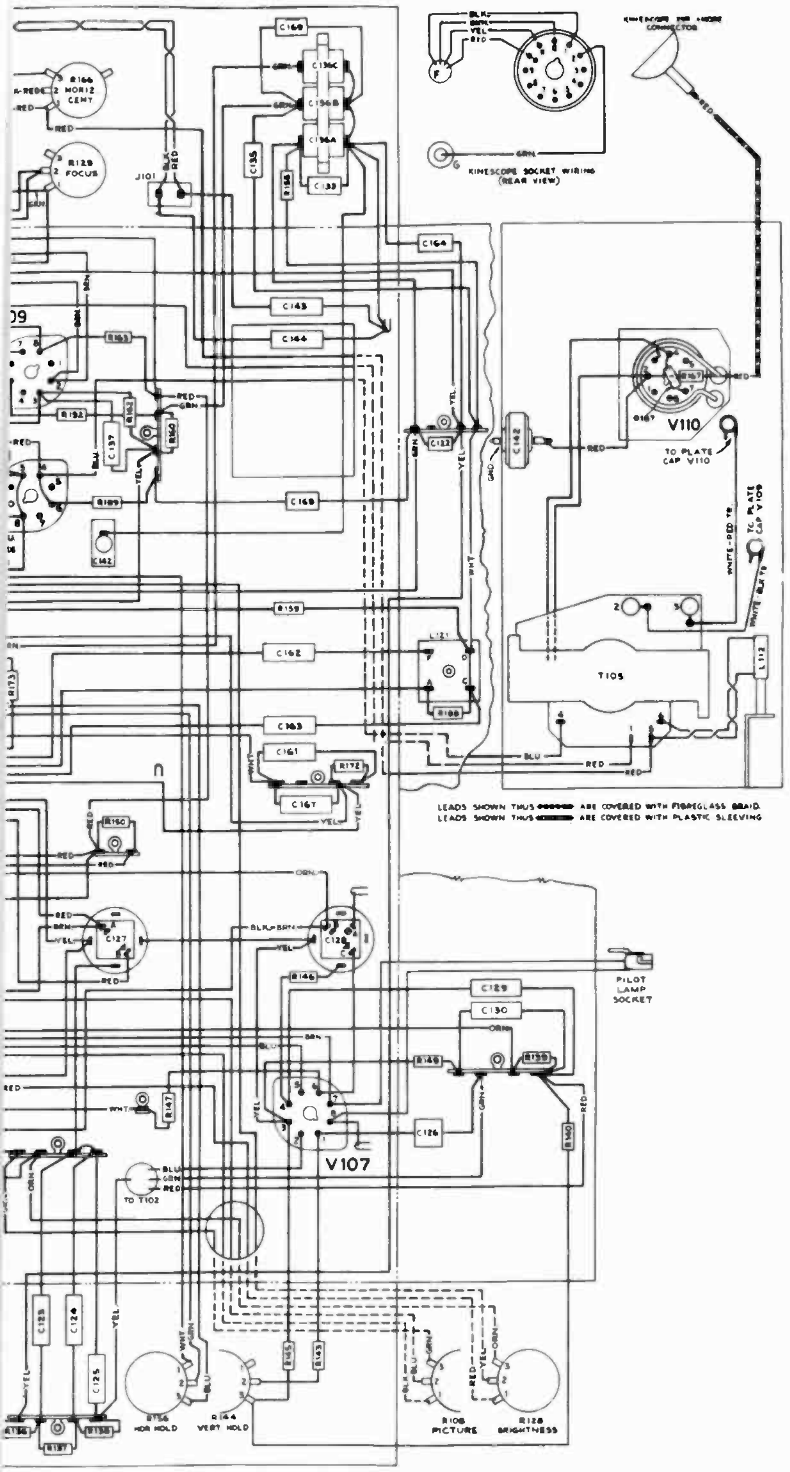
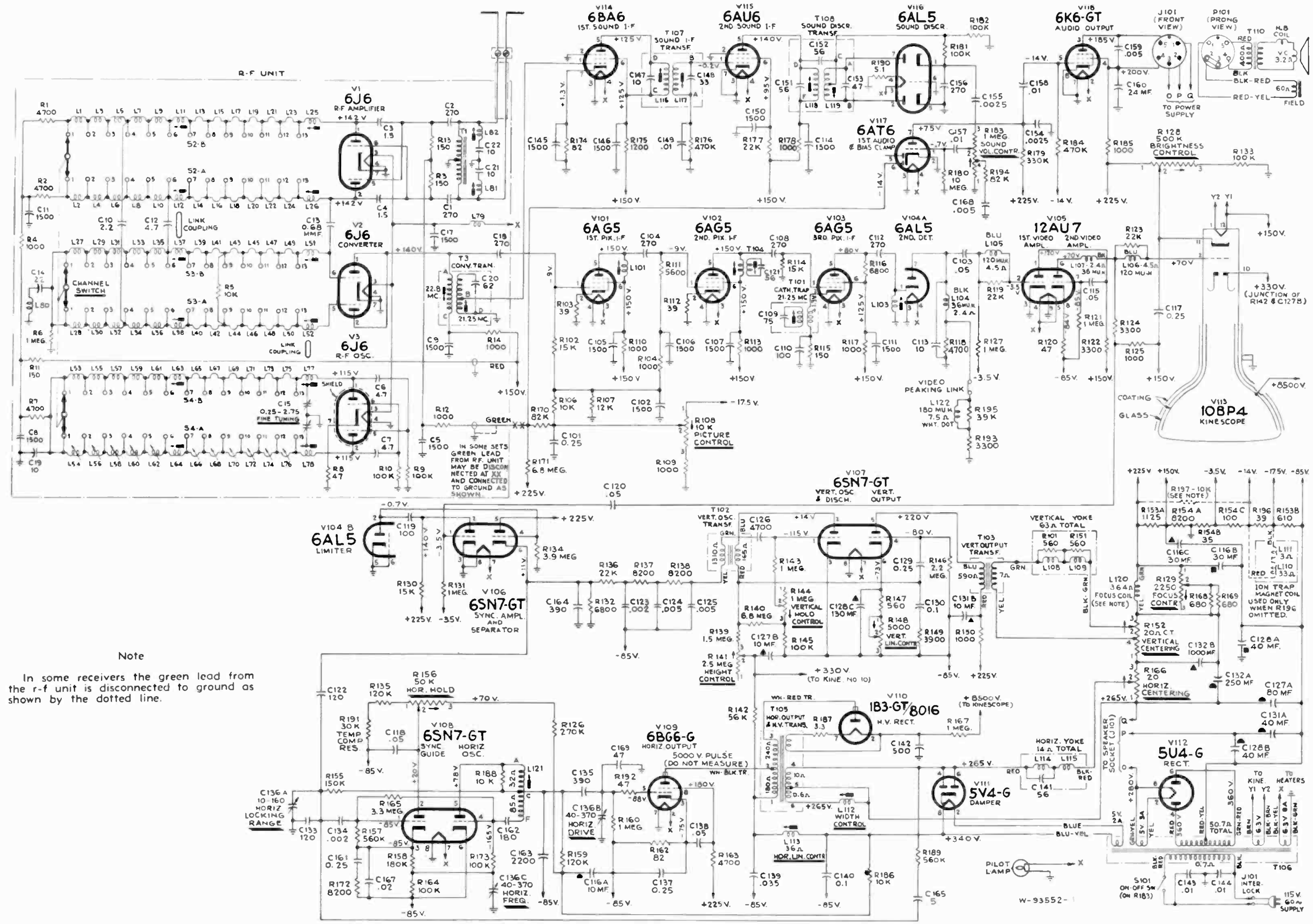




Note

In some receivers the green lead from the r-f unit is disconnected to ground as shown by the dotted line.

R196 was omitted in receivers employing an EM type magnet.

All resistance values in ohms. K = 1000.

All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "VoltOhmyst" and with picture control counterclockwise. Voltages should hold within ±20% with 117 v. a-c supply.

Coil resistance values less than 1 ohm are not shown.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

Optional video peaking is provided by the video peaking link. Normally the link is connected in place. However, if transients are produced on high contrast pictures, the link should be opened. See figure 13 for location of the link.

In early production receivers an EM type of ion trap magnet was employed and was connected as shown by the dotted lines.

MODEL 721TCS

R196 was omitted in receivers employing an EM type magnet.

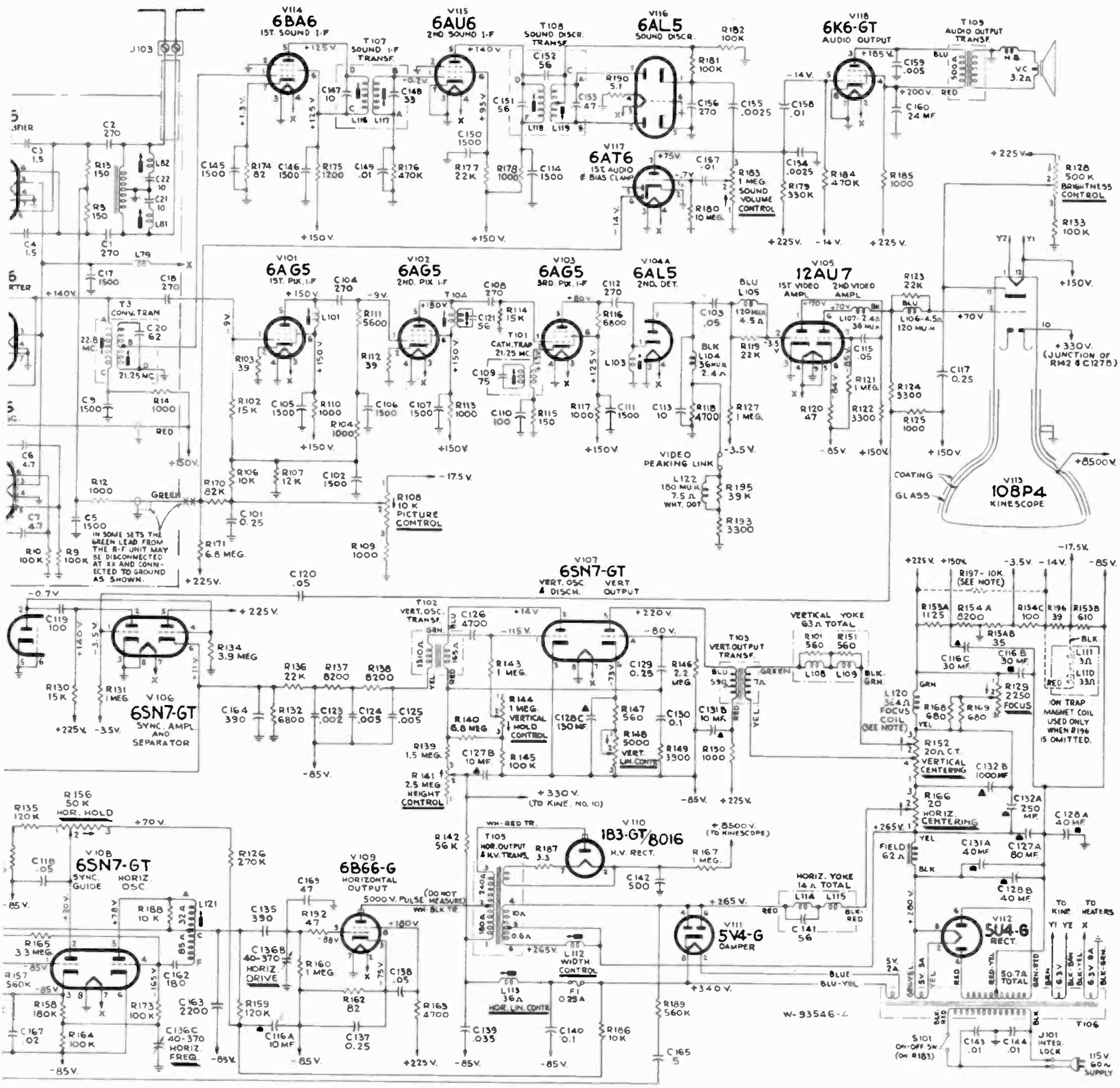
In some receivres, R-149 was 3300 ohms.

In early production receivers the resistance of the focus coil was 247 ohms.

R197 was employed only in receivers with the 247-ohm focus coil.

In some receivers, the trap winding of T104 was omitted and the primary coil was designated as L102.

Figure 53—Circuit Schematic Diagram



MODEL 721TS

…e values in ohms. K = 1000.

…ance values less than 1 in MF … in MMF unless otherwise …

… arrows at controls indicates …tion.

… measured with "VoltOhmyst" …ure control counterclockwise. …ld hold within ±20% with …pply.

…nce values less than 1 ohm ….

…eceivers, substitutions have …es in component lead color …trolytic capacitor values and …tification markings.

In some sets R108 is connected to −14V.

In some sets L122, R195 and R193 are omitted.

In early production receivers an EM type of ion trap magnet was employed and was connected as shown by the dotted lines.

R196 was omitted in receivers employing an EM type magnet.

In some receivers, the antenna trap (L81 L82, C21 and C22) may be omitted.

In some receivers, the bottom end of C142 is connected to pin 4 of V111.

In some receivers, a single coil, L102, is used in place of T104. L102 is tuned to 26 mc.

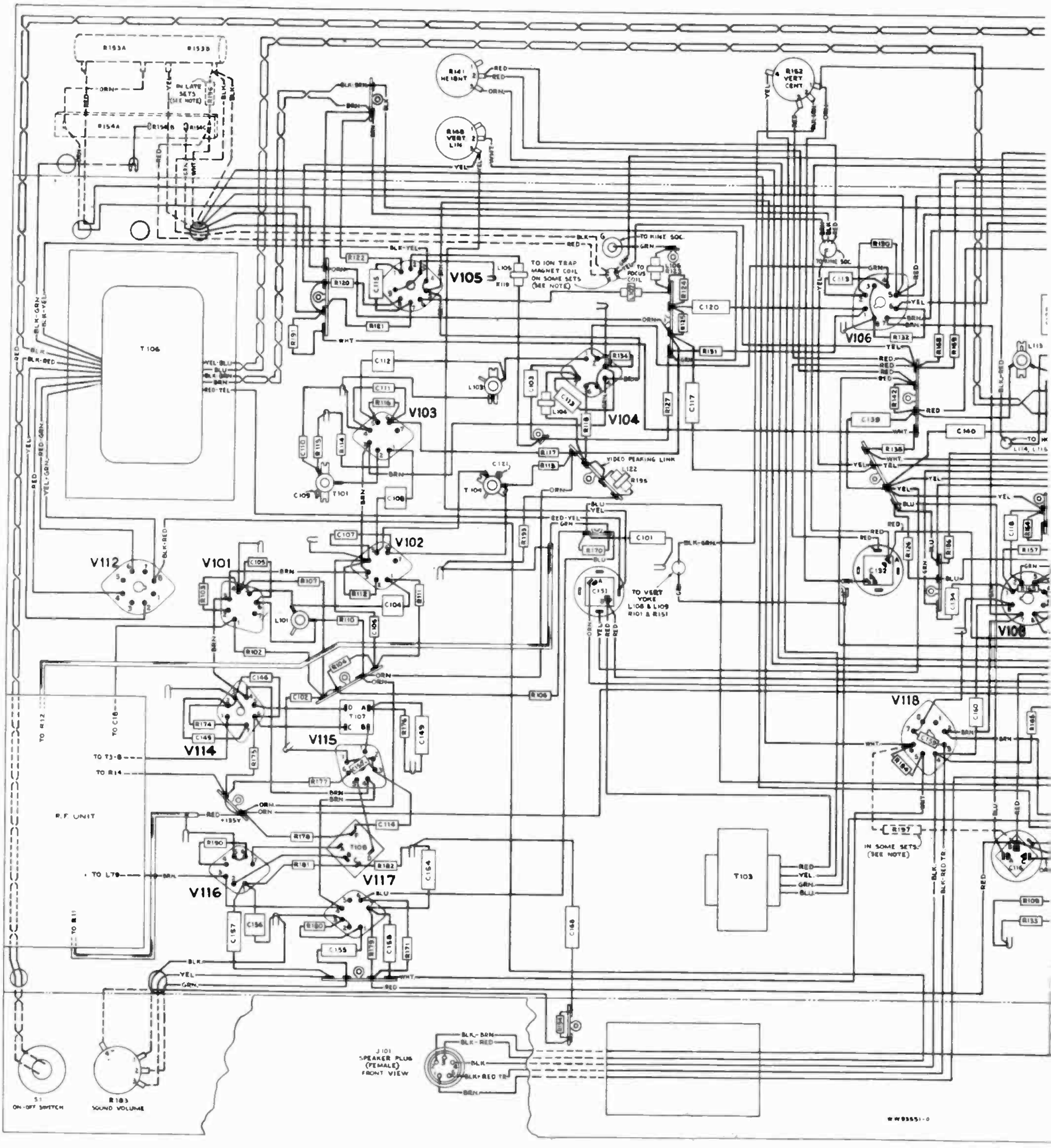
In early production receivers the resistance of the focus coil was 247 ohms.

R197 was employed only in receivers with the 247-ohm focus coil.

Optional video peaking is provided by the video peaking link. Normally the link is connected in place. However, if transients are produced on high contrast pictures, the link should be opened. See figure 49 for location of the link.

In some receivers, R-149 is 3300 ohms.

Figure 51—Overall Circuit Schematic Diagram



MODEL 721TCS

R197 was employed only in receivers with the 247-ohm focus coil. See Figure 14.

In early production receivers, an EM type of ion trap magnet was employed and was connected as shown by the dotted lines.

Figure 52—Chassis Wiring Diagram

REPLACEMENT PARTS

STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY KRK 2B-1
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
53511	Capacitor—Ceramic, 10 mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
65401	Capacitor—Mica, 270 mmf. (C18)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 r-f amplifier plate coil—front or rear section of channel #1 converter grid coil—front or rear section (L1, L2, L27, L28)
71469	Coil—Channel #1 oscillator coil—front or rear section (L53, L54)
71479	Coil—Channel #2 and #3 r-f amplifier plate coil—front or rear section or channel #2 and #4 converter grid coil—front or rear section (L3, L4, L5, L6, L29, L30, L33, L34)
71470	Coil—Channel #2 and #3 and #4 oscillator coil—front section L56, L58, L60)
72597	Coil—Channel #3 converter grid coil—front or rear section (L31, L32)
72552	Coil—Channel #3 oscillator coil—rear section (L57)
71480	Coil—Channel #4 r-f amplifier plate coil front or rear section (L7, L8)
72553	Coil—Channel #4 oscillator coil—rear section (L59)
71481	Coil—Channel #5 r-f amplifier plate coil—front or rear section or channel #5 converter grid coil—front or rear section (L9, L10, L35, L36)
71472	Coil—Channel #5 oscillator coil—rear section (L61)
71471	Coil—Channel #5 oscillator coil—front section or channel #2 oscillator coil—rear section (L55, L62)
71492	Coil—Channel #6 oscillator, converter grid or r-f amplifier plate coil—front or rear section (L11, L12, L37, L38, L63, L64)
71491	Coil—Channel #13 converter grid or r-f amplifier plate coil—rear section (L25, L51)
71490	Coil—Channel #13 converter grid or r-f amplifier plate coil—front section (L26, L52)
71489	Coil—Channel #13 oscillator coil—rear section (L77)
71488	Coil—Channel #13 oscillator coil—front section (L78)
71506	Coil—Converter grid i-f choke coil (L80)
71505	Coil—Heater choke coil (L79)
71493	Connector—Segment connector
71497	Core—Channel #6 front and rear oscillator coils adjustable core and stud
71498	Core—Channel #6 and #13 front and rear converter grid coils or front and rear amplifier plate coils adjustable core and stud
71597	Core—Channel #13 front and rear oscillator coils adjustable core and stud
72743	Detent—Detent mechanism and fibre shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
72744	Drive—Fine tuning pinch washer drive
71487	Form—Coil form only for channels #6 and #13 coils—less winding
71462	Loop—Oscillator to converter grid coupling loop
	Resistor—Fixed composition, 47 ohms, ±20%, ½ watt (R8)
	Resistor—Fixed composition, 150 ohms, ±10%, ½ watt (R3, R11, R13)
	Resistor—Fixed composition, 1000 ohms, ±20%, ½ watt (R4, R12, R14)
	Resistor—Fixed composition, 4700 ohms, ±20%, ½ watt (R1, R2, R7)
	Resistor—Fixed composition, 10,000 ohms, ±10%, ½ watt (R5)
	Resistor—Fixed composition, 100,000 ohms, ±20%, ½ watt (R9, R10)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R6)
14343	Ring—Retaining ring for drive
71475	Screw—#4-40 x 15/32" adjusting screw for coils L54, L56, L58, L60, L62
71476	Screw—#4-40 x 1/4" binder head screw for adjusting coils L66, L68, L70, L72, L74, L76
71474	Segment—Converter grid section rear segment less coils or r-f amplifier plate section rear segment less coils (Part of S2, S3)
71473	Segment—Converter grid section front segment less coils or r-f amplifier plate section front segment less coils (Part of S2, S3)
71467	Segment—Oscillator section front segment less coils (Part of S4)
71468	Segment—Oscillator section rear segment less coils (Part of S4)
72951	Shield—Lead tube shield for V3
71494	Socket—Tube socket—miniature
71461	Spring—Snap spring to hold fine tuning disc
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
72811	Transformer—Converter transformer T3 (C20)
73239	Trap—Antenna trap (L81, L82, C21, C22)
	TELEVISION CHASSIS KCS 26-1, KCS 26-2
71894	Bearing—R-F shaft bearing assembly
72857	Board—"Antenna" board—two contact—solders to r-f cable
72809	Capacitor—Mica, 5 mmf., 1500 volts (C165)
72615	Capacitor—Mica, 10 mmf. (C113)
39620	Capacitor—Mica, 47 mmf. (C169)
39628	Capacitor—Mica, 100 mmf. (C119)
45469	Capacitor—Ceramic, 100 mmf. (C110)
39630	Capacitor—Mica, 120 mmf. (C122, C133)
73102	Capacitor—Mica, 180 mmf. (C162)
73091	Capacitor—Mica, 270 mmf. (C104, C108, C112, C156)
73094	Capacitor—Mica, 390 mmf. (C135, C164)
71450	Capacitor—Hi-voltage capacitor, 500 mmf. (C142)
71501	Capacitor—Ceramic, 1500 mmf. (C102, C105, C106, C107, C111, C114, C145, C146, C150)
39660	Capacitor—Mica, 2200 mmf. (C163)
72524	Capacitor—Mica, 4700 mmf. (C126)
72771	Capacitor—Mica trimmer, consisting of 1 section of 10-160 mmf. and 2 sections of 40-370 mmf. (C136A, C136B, C136C)
70602	Capacitor—Tubular, .0025 mfd., 400 v. (C154, C155)
70601	Capacitor—Tubular, .002 mfd., 400 v. (C123)
70622	Capacitor—Tubular, .002 mfd., 600 v. (C134)
70606	Capacitor—Tubular, .005 mfd., 400 v. (C124, C125, C168)
70627	Capacitor—Tubular, .005 mfd., 600 v. (C159)
73100	Capacitor—Tubular, oil impregnated, .035 mfd., 1000 v. (C139)
70610	Capacitor—Tubular, .01 mfd., 400 v. (C149, C157 C158)
71770	Capacitor—Molded paper, .01 mfd., 400 v. (C143, C144)
70611	Capacitor—Tubular, .02 mfd., 400 v. (C167)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
70615	Capacitor—Tubular, .05 mfd., 400 v. (C103, C115, C118, C120)
70636	Capacitor—Tubular, .05 mfd., 600 v. (C138)
73101	Capacitor—Tubular, oil impregnated, 0.1 mfd., 1000 v. (C130, C140)
70618	Capacitor—Tubular, 0.25 mfd., 400 v. (C101, C117, C129, C137, C161)
72740	Capacitor—Electrolytic, dry, 24 mfd., 300 v. (C160)
71780	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 450 v. and 1 section of 10 mfd., 450 v. (C127A, C127B)
71436	Capacitor—Electrolytic, comprising 1 section of 250 mfd., 10 v. and 1 section of 1000 mfd., 6 v. (C132A, C132B)
72736	Capacitor—Electrolytic, dry, comprising 1 section of 10 mfd., 400 v., 1 section of 30 mfd., 350 v., and 1 section of 30 mfd., 250 v. (C116A, C116B, C116C)
71782	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 v., and 1 section of 10 mfd., 350 v. (C131A, C131B)
71781	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 v., 1 section of 40 mfd., 150 v., and 1 section of 130 mfd., 50 v. (C128A, C128B, C128C)
71426	Coil—First, or third pix i-f coils (L101, L103)
71529	Coil—Peaking coil (L105, L106, R119, R123)
71793	Coil—Peaking coil (L104, L107)
71528	Coil—Peaking coil (L122, R195)
71429	Coil—Width control coil (L112)
71449	Coil—Horizontal linearity coil (L113)
73233	Coil—Focus coil (L120)
71789	Connector—Kinescope anode connector
71521	Connector—Hi-voltage capacitor lead connector
71784	Control—Brightness, picture control (R108, R128) (use decal #72805)
73193	Control—Brightness, picture control (R108, R128) (use decal #73194)
72735	Control—Focus control (R129)
71440	Control—Height control (R141)
71443	Control—Horizontal or vertical centering control (R152, R166)
72734	Control—Vertical and horizontal hold control (R144, R156)
71441	Control—Vertical linearity control (R148)
71785	Control—Volume control and power switch (R183, S101)
71457	Cord—Power cord complete with connector
71437	Cover—Insulating cover for electrolytics RCA #71780 and #71781
71783	Cover—Insulating cover for electrolytics RCA #71436 and #71782
72772	Cover—Insulating cover for electrolytic RCA #72736
71510	Cushion—Rubber cushion—lower—for deflection yoke hood
71509	Cushion—Rubber cushion—upper—for deflection yoke hood
37396	Grommet—Rubber grommet to mount socket RCA #73249 (2 required)
71792	Magnet—Ion trap magnet (EM type) (L110, L111)
73301	Magnet—Ion trap magnet (PM type)
72737	Nut—#8-32 speed nut for r-f unit shield (2 required)
71455	Nut—#8-32 wing nut for mounting focus coil (3 required)
18469	Plate—Bakelite mounting plate for electrolytic capacitor
71448	Plug—2 prong male plug for power cord
12493	Pulg—5 contact female plug for speaker cable—Model 721TCS only

STOCK No.	DESCRIPTION
71513	Resistor—Wire wound, 3.3 ohms, ⅓ watt (R187)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R190)
32813	Resistor—39 ohms, 1 watt (R196)
	Resistor—Fixed composition, 39 ohms, ±10%, ½ watt (R103, R112)
	Resistor—Fixed composition, 47 ohms, ±20%, ½ watt (R120, R192)
	Resistor—Fixed composition, 82 ohms, ±10%, ½ watt (R174)
	Resistor—Fixed composition, 82 ohms, ±10%, 1 watt (R162)
	Resistor—Fixed composition, 150 ohms, ±10%, ½ watt (R115)
	Resistor—Fixed composition, 560 ohms, ±10%, ½ watt (R147)
	Resistor—Fixed composition, 680 ohms, ±20%, ½ watt (R168, R169)
	Resistor—Fixed composition, 1000 ohms, ±20%, ½ watt (R104, R110, R113, R117, R150, R178)
	Resistor—Fixed composition, 1000 ohms, ±10%, ½ watt (R109, R125)
	Resistor—Fixed composition, 1000 ohms, ±20%, 1 watt (R185)
	Resistor—Fixed composition, 1200 ohms, ±10%, ½ watt (R175)
	Resistor—Fixed compositon, 3300 ohms, ±10%, ½ watt (R122)
	Resistor—Fixed composition, 3300 ohms, ±5%, ½ watt (R193)
	Resistor—Fixed composition, 3300 ohms, ±10%, 1 watt (R124)
	Resistor—Fixed composition, 3900 ohms, ±10%, ½ watt (R149)
	Resistor—Fixed composition, 4700 ohms, ±5%, ½ watt (R118)
	Resistor—Fixed composition, 4700 ohms, ±10%, 1 watt (R163)
	Resistor—Fixed composition, 5600 ohms, ±5%, ½ watt (R111)
	Resistor—Fixed composition, 6800 ohms, ±20%, ½ watt (R132)
	Resistor—Fixed composition, 6800 ohms, ±5%, ½ watt (R116)
	Resistor—Fixed composition, 8200 ohms, ±10%, ½ watt (R137, R138, R172)
	Resistor—Fixed composition, 10,000 ohms, ±10%, ½ watt (R106, R186, R188)
12876	Resistor—Wire wound, 10,000 ohms, 10 watt (R197) (in some sets)
	Resistor—Fixed composition, 12,000 ohms, ±10%, ½ watt (R107)
	Resistor—Fixed composition, 15,000 ohms, ±5%, ½ watt (R102, R114)
	Resistor—Fixed composition, 15,000 ohms, ±20%, 1 watt (R130)
	Resistor—Fixed composition, 22,000 ohms, ±20%, ½ watt (R136, R177)
72928	Resistor—Temperature compensating, 30,000 ohms, ±20%, ¼ watt (R191)
	Resistor—Fixed composition, 56,000 ohms, ±10%, ½ watt (R142)
	Resistor—Fixed composition, 82,000 ohms, ±10%, ½ watt (R170, R194)
	Resistor—Fixed composition, 100,000 ohms, ±20%, ½ watt (R133)
	Resistor—Fixed composition, 100,000 ohms, ±10%, ½ watt (R145)
	Resistor—Fixed composition, 100,000 ohms, ±5%, ½ watt (R181, R182)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
72893	Resistor—Carbon film, type, 100,000 ohms, ±1%, ½ watt (R173)
	Resistor—Fixed composition, 100,000 ohms, ±5%, 1 watt (R164)
	Resistor—Fixed composition, 120,000 ohms, ±10%, ½ watt (R135)
	Resistor—Fixed composition, 120,000 ohms, ±10%, 1 watt (R159)
	Resistor—Fixed composition, 150,000 ohms, ±10%, ½ watt (R155)
	Resistor—Fixed composition, 180,000 ohms, ±10%, ½ watt (R158)
	Resistor—Fixed composition, 270,000 ohms, ±10%, 1 watt (R126)
	Resistor—Fixed composition, 330,000 ohms, ±10%, ½ watt (R179)
	Resistor—Fixed composition, 470,000 ohms, ±20%, ½ watt (R176, R184)
	Resistor—Fixed composition, 560,000 ohms, ±10%, ½ watt (R189)
	Resistor—Fixed composition, 560,000 ohms, ±5%, ½ watt (R157)
	Resistor—Fixed composition, 1 megohm, ±20%, ½ watt (R121, R127, R131, R160)
	Resistor—Fixed composition, 1 megohm, ±5%, ½ watt (R143)
	Resistor—Fixed composition, 1 megohm, ±20%, 1 watt (R167)
	Resistor—Fixed composition, 1.5 meg., ±10%, ½ watt (R139)
	Resistor—Fixed composition, 2.2 meg., ±20%, ½ watt (R146)
	Resistor—Fixed composition, 3.3 meg., ±5%, 1 watt (R165)
	Resistor—Fixed composition, 3.9 meg., ±10%, ½ watt (R134)
	Resistor—Fixed composition, 6.8 meg., ±20%, ½ watt (R171)
	Resistor—Fixed composition, 6.8 meg., ±10%, ½ watt (R140)
	Resistor—Fixed composition, 10 meg., ±20%, ½ watt (R180)
72738	Resistor—Wire wound, comprising 1 section of 1125 ohms, 20 watts and 1 section of 610 ohms, 20 watts (R153A, R153B)
72739	Resistor—Voltage divider, comprising 1 section of 8200 ohms, 5 watts; 1 section of 35 ohms, 0.8 watts; and 1 section of 100 ohms, 2 watts (R154A, R154B, R154C)
71452	Sleeve—Rubber sleeve for focus coil
71456	Screw—#8-32 wing screw for deflection yoke (3 required)
72741	Socket—Kinescope socket
31364	Socket—Lamp socket
72773	Socket—Single contact female socket for C142
71508	Socket—Tube socket for 8016 tube
9914	Socket—Tube socket, miniature
72516	Socket—Tube socket, miniature (with shield attached)
72927	Socket—Tube socket, noval wafer type
31251	Socket—Tube socket, octal
73249	Socket—Tube socket, octal, ceramic, plate mounted
71453	Stud—Mounting stud for focus coil (2 required)
71775	Transformer—Vertical oscillator transformer (T102)
71774	Transformer—Vertical output transformer (T103)
71416	Transformer—Horizontal output and high voltage transformer (T105)
71772	Transformer—Power transformer, 115 volt, 60 cycle (T106)
73150	Transformer—Power transformer, 115 volt, 50 cycle (T106)
71424	Transformer—Sound i-f transformer T107 (C147, C148, L116, L117))
71776	Transformer—Audio output transformer for Model 721TS only (T109)
71427	Transformer—Sound discriminator transformer T108 (C151, C152, C153, L118, L119))
73708	Transformer—Second pix, i-f transformer (T104, C121)
72770	Transformer—Horizontal oscillator transformer (L121)
71777	Yoke—Deflection yoke (L108, L109, L114, L115, C141, R101, R151)
71778	Trap—Sound trap (T101, C109)
	SPEAKER ASSEMBLY 92565-1W
	FOR 721 TS
71797	Speaker—4" x 6" elliptical E.M. speaker complete with cone and voice coil
	SPEAKER ASSEMBLIES 92567-3W RL 70R4
	FOR 721 TCS
13867	Cap—Dust cap
71557	Coil—Field coil (60 ohms)
11469	Coil—Neutralizing coil
36145	Cone—Cone complete with voice coil
71560	Plug—5 prong male plug for speaker
71556	Speaker—12" EM speaker (60 ohms) complete with cone and voice coil less transformer and plug
71145	Suspension—Metal cone suspension
31301	Transformer—Output transformer
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MODEL 721 TS
	MISCELLANEOUS
72786	Back—Cabinet back
X1648	Board—Baffle board
72819	Bracket—Decorative bracket for front panel
72805	Decal—Control marker decal (use with control #71784)
73194	Decal—Control marker decal (use with control #73193)
71984	Decal—Trade mark decal
71598	Escutcheon—Channel marker escutcheon
72113	Feet—Rubber feet for cabinet (4 required)
72818	Glass—Safety glass
71539	Slide—Kinescope centering slide with rubber cushion (4 required)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
71534	Knob—Channel selector knob
71533	Knob—Fine tuning knob
71536	Knob—Horizontal hold or picture control knob
71537	Knob—Volume control and power switch knob
71535	Knob—Volume control and power switch, vertical hold or brightness control knob
72817	Plate—Retaining plate complete with wing nut and spring for top section of cabinet front (2 required)
14270	Spring—Retaining spring for knobs, #71535, #71537 and #71534
30330	Spring—Retaining spring for knob #71536
4982	Spring—Retaining spring for knob #71533
71538	Spring—Spring clip for escutcheon
	MODEL 721 TCS
	MISCELLANEOUS
72786	Back—Cabinet back
72819	Bracket—Grille bracket to hold baffle
71599	Bracket—Pilot lamp bracket
72805	Decal—Control panel decal (for control #71784)
73194	Decal—Control panel decal (for control #73193)
71984	Decal—Trade mark decal
71598	Escutcheon—Channel marker escutcheon
70126	Glass—Safety glass
13103	Jewel—Pilot lamp cap
71534	Knob—Channel selector knob
71533	Knob—Fine tuning knob
71536	Knob—Horizontal hold or picture control knob
71537	Knob—Volume control and power switch knob
71535	Knob—Volume control and power switch, vertical hold or brightness control knob
11765	Lamp—Pilot lamp—Mazda 51
72817	Plate—Retaining plate complete with wing nut and spring for removable section of cabinet front panel (2 required)
71539	Slide—Kinescope centering slide with rubber cushion (4 required)
4982	Spring—Retaining spring for knob #71533
14270	Spring—Retaining spring for knobs #71534, #71535 and #71537
30330	Spring—Retaining spring for knob #71536
71538	Spring—Spring clip for escutcheon

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 730TV1
Walnut or
Mahogany

RCA VICTOR

TELEVISION, AM-FM RADIO, PHONOGRAPH COMBINATION

MODELS 730TV1, 730TV2

Chassis Nos. KCS 27-1 (60 cycles)
KCS 27-2 (50 cycles)
RC 610A in 730TV1, RC 610B in 730TV2
Mfr. No. 274

SERVICE DATA

— 1947 No. T5 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

Model 730TV2
Walnut,
Mahogany
or Toasted
Mahogany

GENERAL DESCRIPTION

Models 730TV1 and 730TV2 are thirty tube Television, AM-FM Radio, Phonograph console combinations. The television receiver employs a twenty-tube chassis with a ten-inch kinescope and features full thirteen channel coverage; FM sound system; improved picture brilliance; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; two stage sync separator and clipper; and reduced hazard high voltage supply. The radio receiver employs a ten tube chassis which covers the standard broadcast and the FM band. An automatic record changer of the "slicer" type is employed and features a crystal pickup with the "Silent Sapphire" stylus.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

RADIO TUNING RANGE

Broadcast .... 540-1,600 kc
Frequency Modulation .... 88-108 mc
Intermediate Frequency—AM .... 455 kc
Intermediate Frequency—FM .... 10.7 mc

PICTURE SIZE .... 6⅜" x 8½"

TELEVISION R-F FREQUENCY RANGE

All 13 television channels, 44 mc to 88 mc, 174 mc to 216 mc

RECEIVER ANTENNA INPUT IMPEDANCE .. 300 ohms, balanced

POWER SUPPLY RATING

Television Operation .... 115 volts, 345 watts
Radio Operation .... 115 volts, 90 watts
Phonograph Operation .... 115 volts, 110 watts

AUDIO POWER OUTPUT RATING

Undistorted Power Output .... 5 watts
Maximum Power Output .... 6.5 watts

CHASSIS DESIGNATIONS

Television Chassis KCS27-1
Radio Chassis .... RC 610A (730TV1), RC 610B (730TV2)

LOUDSPEAKER (92569-1)

Type .... 12-inch PM Dynamic
Voice Coil Impedance .... 2.2 ohms at 400 cycles

RECORD PLAYER

RP177 .... In 730TV1 and 730TV2
Refer to Service Data RP177 for information on record player.

RCA TUBE COMPLEMENT

	Tube Used (KCS27-1) (KCS27-2)	Function
(1)	RCA 6J6	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6J6	Converter
(4)	RCA 6BA6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AT6	Bias Clamp
(8)	RCA 6AG5	1st Picture I-F Amplifier
(9)	RCA 6AG5	2nd Picture I-F Amplifier
(10)	RCA 6AG5	3rd Picture I-F Amplifier
(11)	RCA 6AL5	Picture 2nd Detector and Sync Limiter
(12)	RCA 12AU7	1st and 2nd Video Amplifier
(13)	RCA 6SN7GT	Sync Amplifier and Separator
(14)	RCA 6SN7GT	Vertical Sweep Oscillator, Discharge and Output
(15)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(16)	RCA 6BG6G	Horizontal Sweep Output
(17)	RCA 5V4G	Horizontal Damper
(18)	RCA 1B3-GT/8016	High Voltage Rectifier
(19)	RCA 5U4G	Power Supply Rectifier
(20)	RCA 10BP4	Kinescope

(RC 610A or RC 610B)

(1)	RCA-6BE6	FM 1st Detector and Oscillator
(2)	RCA-6BE6	AM 1st Detector and Oscillator
(3)	RCA-6BA6	I-F Amplifier
(4)	RCA-6AU6	Driver
(5)	RCA-6AL5	Ratio Detector
(6)	RCA-6SQ7	AM Det., AVC and Phase Inverter
(7)	RCA-6SQ7	Audio Amplifier
(8)	RCA-6K6GT	Power Output (2 tubes)
(9)	RCA-5Y3GT	Rectifier

Specifications continued on page 2

730TV1, 730TV2 ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

WEIGHT

Chassis with Tubes in Cabinet (730TV1) (less kinescope) ... 151 lbs.
Chassis with Tubes in Cabinet (730TV2) (less kinescope) ... 172 lbs.
Shipping Weight (730TV2) (less kinescope) ... 186 lbs.
Shipping Weight (730TV2) (less kinescope) ... 243 lbs.
10BP4 kinescope net ... 10.5 lbs.
Shipping weight 10BP4 ... 14.5 lbs.

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (730TV1) (outside)	34¾	39¼	21¼
Cabinet (730TV2) (outside)	37⅞	41⅞	22½
KCS27-1 (overall)	15⅝	14½	16¼
RC 610A (overall)	14	6½	8
RC 610B (overall)	17	6½	8
RP177 (overall)	14¼	7⅝	14¼

TELEVISION FINE TUNING RANGE

Plus and minus approximately 800 kc on channel 1, and plus and minus approximately 1.9 mc on channel 13.

VIDEO RESPONSE ... To 3 Mc.

FOCUS ... Magnetic

SWEEP DEFLECTION ... Magnetic

SCANNING ... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY ... 15,750 cps

VERTICAL SCANNING FREQUENCY ... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) ... 30 cps

PICTURE I-F FREQUENCIES

Picture Carrier Frequency ... 25.75 Mc.
Accompanying Sound Traps ... 21.25 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency ... 21.25 Mc.
Sound Discriminator Band Width (between peaks) ... 350 kc

TELEVISION OPERATING CONTROLS (front panel)

Channel Selector / Fine Tuning ... Dual Control Knobs
Picture / Brightness ... Dual Control Knobs
Picture Horizontal Hold / Picture Vertical Hold ... Dual Control Knobs
Sound Volume and On-Off Switch ... Radio Control Knob

TELEVISION NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Horizontal Centering ... rear chassis adjustment
Vertical Centering ... rear chassis adjustment
Width ... rear chassis screwdriver adjustment
Height ... rear chassis adjustment
Horizontal Linearity ... top chassis screwdriver adjustment
Vertical Linearity ... rear chassis adjustment
Horizontal Drive ... rear chassis screwdriver adjustment
Horizontal Oscillator Frequency (fine) ... rear chassis screwdriver adjustment
Horizontal Oscillator Frequency (coarse) ... bottom chassis screwdriver adjustment
Horizontal Locking Range....rear chassis screwdriver adjustment
Focus ... rear chassis adjustment
Focus Coil ... top chassis wing nut adjustment
Ion Trap Magnet ... top chassis thumb screw adjustment
Deflection Coil ... top chassis wing nut adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

TELEVISION OPERATION

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the radio FUNCTION switch to Tel.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

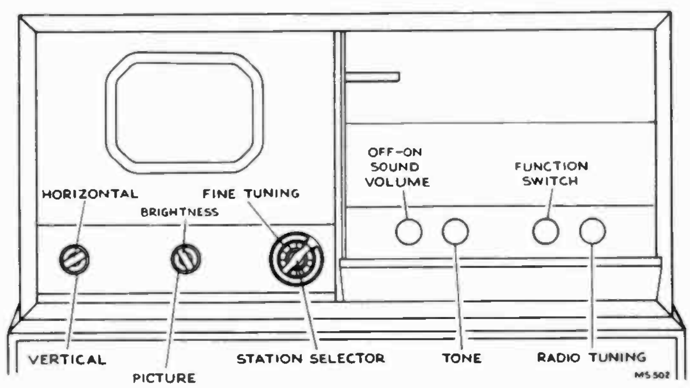
4. Turn the PICTURE control fully counter-clockwise.

5. Turn the BRIGHTNESS control clockwise, until a glow appears on the screen, then counter-clockwise until the glow just disappears.

6. Turn the PICTURE control clockwise until a glow or pattern appears on the screen.

7. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

8. Adjust the VERTICAL hold control until the pattern stops vertical measurement.



IN SOME SETS, THE PICTURE CONTROL IS THE INNER KNOB, AND BRIGHTNESS CONTROL THE OUTER KNOB.

Figure 1—Receiver Operating Controls

9. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

10. Adjust the PICTURE control for suitable picture contrast.

11. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

12. In switching from one station to another, it may be necessary to repeat steps number 7 and 10.

13. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 7 is generally sufficient.

14. If the positions of the controls have been changed, it may be necessary to repeat steps number 2 through 10.

RADIO OPERATION

1. Turn the radio FUNCTION switch to the desired band (BC or FM).

2. Tune in the desired station with the TUNING control.

PHONOGRAPH OPERATION

1. Turn the radio FUNCTION switch to Pho.

MANUAL OPERATION

2. Slide the changer power switch to "ON."

3. Move the changer tone arm over to the pickup rest position, or, if the changer is in cycle and the arm cannot be moved, push the Record Changer Control Lever to the manual position until the arm stops in the rest position.

4. Place the record on the turntable.

5. Lift the pickup arm from the rest position and place the needle in the outer groove of the record.

AUTOMATIC OPERATION

6. Move the changer tone arm over to the pickup rest position, or if changer is in cycle and the arm cannot be moved, push the Record Changer Control Lever to the manual position until the arm stops in the rest position.

7. Turn the Record Support Shelf on the left side of the changer to the position corresponding to the size of record to be played.

8. Place the stack of records over the turntable spindle and on the Record Supports.

9. Push the Record Changer Control Lever to the reject position and release. The changer will cycle automatically and will stop after the last record has been played.

REFER TO PAGES 395 TO 406 INC. FOR ALIGNMENT PROCEDURE, SERVICE SUGGESTIONS AND WAVEFORM PHOTOGRAPHS.

730TV1, 730TV2

INSTALLATION INSTRUCTIONS

Models 730TV1 and 730TV2 television receivers are shipped complete in one carton except for the 10BP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING—The 730TV1 is shipped in a cardboard carton. To unpack the receiver, turn the shipping carton on its side and tear open the carton bottom flaps. Fold the flaps up along the side of the carton and turn the carton back up. Lift the carton up and off of the cabinet.

The 730TV2 is shipped in a plywood case. To open, remove the front side as indicated on the case. If the front is removed by prying, do not permit the prying tool to enter the case as the cabinet may become scratched. Remove the shipping case rail across the front of the cabinet. Do not remove the two rail support screws on each side of the cabinet. Slide the cabinet out of the case by pulling on each side of the cabinet shipping skid.

The flat skid attached to the bottom of the receiver cabinet which will permit the cabinet to be moved about without danger of breaking a cabinet leg or stressing the cabinet joints. This skid should be left on the cabinet until the receiver is placed on display or installed in the home. To remove the skid, take off two nuts on the inside of the cabinet as shown in Figure 2. Then, with a man at each end of the cabinet, lift the cabinet off the skid.

Remove the front panel by removing two ornamental screws at the top of the panel as shown in Figure 4.

The operating control knobs are packed in a paper bag which is stapled to the inside of the cabinet. Remove the bag and install the knobs on the control shafts.

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets.

Loosen the channel nut at each corner of the changer as shown in detail B in Figure 2 and remove the two wooden shipping strips.

Remove the sapphire guard clip from the record changer tone arm as shown in detail A in Figure 2.

Loosen the two wing screws shown in detail C of Figure 2 and take off the changer motor shipping bracket.

In 730TV1 receivers remove the two red "J" bolts holding the radio chassis. In 730TV2 receivers, loosen the radio mounting screws, remove the two wooden shipping strips, then tighten.

Take off the television compartment back grille. Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten. See Figure 3 for the location of the cushion and yoke adjustments.

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the three focus coil adjustment wingnuts and raise, lower, or rotate the coil until alignment is obtained. Tighten the wingnuts with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 4 for location of the slides and their adjustment screws. Loosen the ion trap magnet adjustment thumb screws.

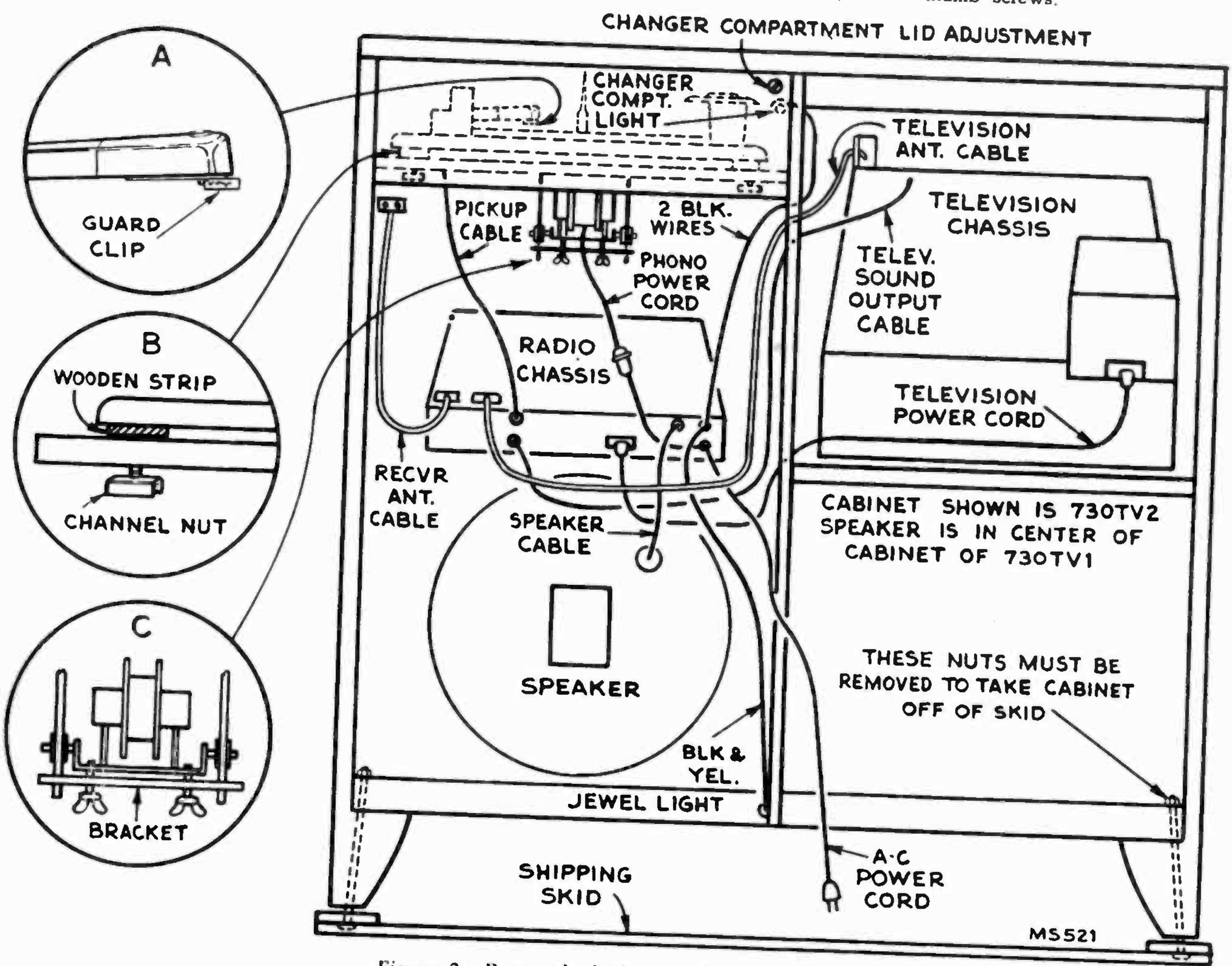


Figure 2—Removal of Shipping Material

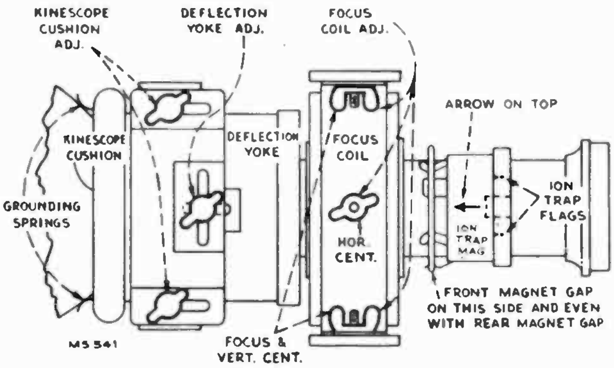


Figure 3—Yoke and Focus Coil Adjustments

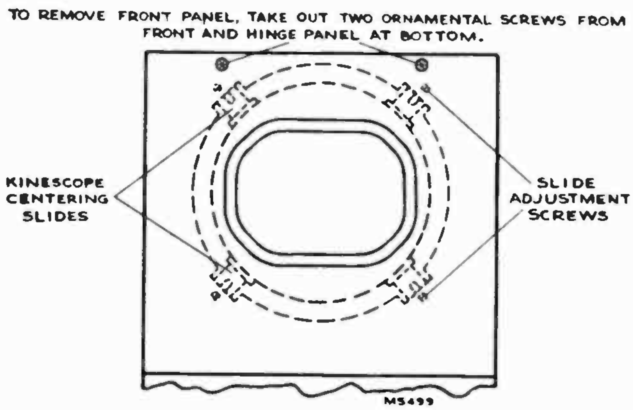


Figure 4—Cabinet, Front View

KINESCOPE HANDLING PRECAUTION—Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

INSTALLATION OF KINESCOPE—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is approximately on top. The final orientation of the tube will be determined by the position of the ion trap flags. Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags. The kinescope must be installed so that when looking down on the chassis, the two flags will be seen as shown in Figure 5.

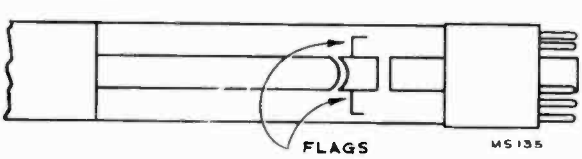


Figure 5—Ion Trap Flags

Insert the neck of the kinescope through the deflection and focus coil as shown in Figure 6 until the base of the tube protrudes approximately two inches beyond the focus coil. **If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.**

Early production receivers employed an EM type ion trap magnet like that in the model 630TS receiver. Late production receivers employed a PM type magnet as shown in Figure 3.

If an EM type is employed, slip the assembly over the neck of the kinescope with the coils down and the large coil towards the base of the tube. Tighten the magnet adjustment thumbscrews sufficiently to hold it in position but still free enough to permit adjustment.

If the PM type is employed, slip the assembly over the neck of the kinescope with the large magnet towards the base of the tube and with the arrow on the assembly up as shown in Figure3. The front magnet is movable on the assembly. The correct position is with the gap of the front magnet to the left (from the rear of the chassis) and even with the gap of the rear magnet.

CAUTION—In inserting the kinescope, care should be taken not to push the tube so far into the cabinet that it can fall off the lower centering slides. To do so would place a strain on the neck of the tube and possiby cause the tube to break.

Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

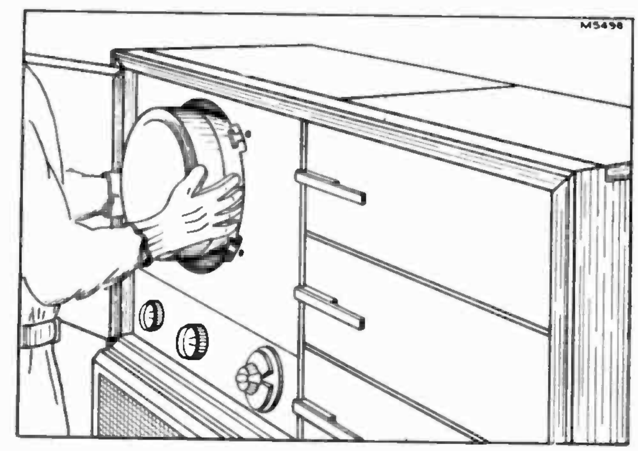


Figure 6—Kinescope Insertion

To install the front panel, place the recess in the lower edge of the panel in the lip below the kinescope opening and push the top of the panel in. Insert the two ornamental screws into the front of panel as shown in Figure 4.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. Connect the high voltage lead to the kinescope second anode socket.

The antenna and power connections should now be made. Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT—The ion trap rear magnet poles should be approximately over the ion trap flags as shown in Figure 3. Starting from this position adjust the magnet by moving it forward or backward, at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Tighten the magnet adjustment thumbscrews sufficiently to hold it in this position but still free enough to permit further adjustment. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R129 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

FOCUS COIL ADJUSTMENTS—Turn the centering controls R152 and R166 to mid position. See Figure 7 for location of these rear apron controls.

If a corner of the raster is shadowed, it indicates that the electron beam is striking the neck of the tube. Loosen the focus coil adjustment wing nuts and rotate the coil about its vertical and horizontal axis until the entire raster is visible, approximately centered and with no shadowed corners. Tighten the focus coil adjustment wing nuts with the coil in this position.

DEFLECTION YOKE ADJUSTMENT—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 9 of the receiver operating instructions on page 3.

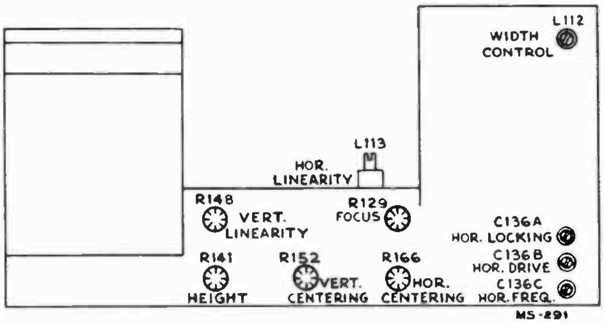


Figure 7—Rear Chassis Adjustments

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal bars will be gradually reduced and when only 3½ to 4½ bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull in should occur when the control is approximately 90 degrees from the extreme counterclockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 3½ to 4½ bars sloping downward to the right.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Focus" adjustment.

ALIGNMENT OF HORIZONTAL OSCILLATOR—If in the above check the receiver failed to hold sync with the hold control at the extreme counterclockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the rear apron horizontal frequency trimmer C136C until the picture is out of sync and shows 3½ to 4½ bars sloping downward to the right. If the trimmer has insufficient range set the trimmer to mid-range (1 turn from maximum capacity) and adjust the L121 horizontal frequency adjustment until this condition is obtained. See figure 21 for the location of L121.

Horizontal Lock in Range Adjustment—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back.

Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 4½ bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C136A slightly clockwise. If less than 3½ bars are present, adjust C136A slightly counterclockwise. Turn the horizontal hold control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat this procedure until 3½ to 4½ bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS—Adjust the height control (R141 on chassis rear apron) until the picture fills the mask vertically (6⅜ inches). Adjust vertical linearity (R148 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS—Turn the width control L112 to the maximum clockwise position. Vary the horizontal drive trimmer C136B to yield the best compromise between brightness and linearity. Adjust the horizontal linearity control L113 for best linearity of the right half of the picture. Readjust the width control until the picture just fills the mask. Adjust horizontal centering to align the picture with the mask.

FOCUS—Adjust the focus control (R129 on chassis rear apron) for maximum definition in the test pattern vertical "wedge." **Check to see that all cushion, yoke, focus coil and ion trap magnet thumb screws are tight.**

CHECK OF R-F OSCILLATOR ADJUSTMENTS—Tune in all available television stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure. The adjustments for channels 1 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 8. Adjustments for channels 6 and 13 are under the chassis.

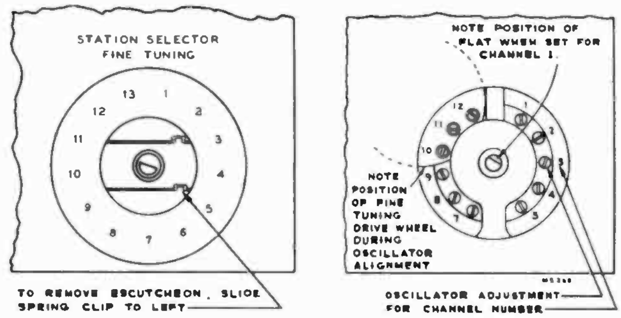


Figure 8—R-F Oscillator Adjustments

VIDEO PEAKING LINK—A video peaking link is provided to permit changing the video response. This link is connected at the factory with the peaking in. However, if transients are produced on high contrast pictures the peaking should be taken out by removing the link on the terminal board under the chassis near the V104 socket.

Observe the picture for detail, for proper interlacing and for the presence of interference or reflections.

ANTENNA TRAP—In some instances interference may be encountered from FM stations that are on the image frequency of channel 2. In other instances, interference may be observed on channel 6 from a station on channel 10 or on channel 5 from a station on channel 7.

In some sets a series resonant trap across the r-f amplifier grid circuit is provided to eliminate this type of interference. To adjust the trap in the field, tune in the station on which the interference is observed. Tune both cores of the trap for minimum interference in the picture. See Figure 20 or the location of the trap. Keep both cores approximately the same by visual inspection. Then, turn one core ½ turn from the original position and repeak the second for maximum rejection. Repeat this process until the best rejection is obtained. In severe cases of interference it may be necessary to reorient the antenna to eliminate the interference.

RADIO OPERATION—Turn the receiver function switch to AM and FM positions and check the radio for proper operation. In switching from radio to television or from television to radio, approximately 30 seconds warm-up time is required.

RECORD CHANGER OPERATION—Move the tone arm to the rest position. Place a record on the turntable. Turn the record shelf to the position to take the size of records used. Place a stack of records on the shelf. Turn the radio function switch to phono position. Pull the record changer control switch to the reject position and release.

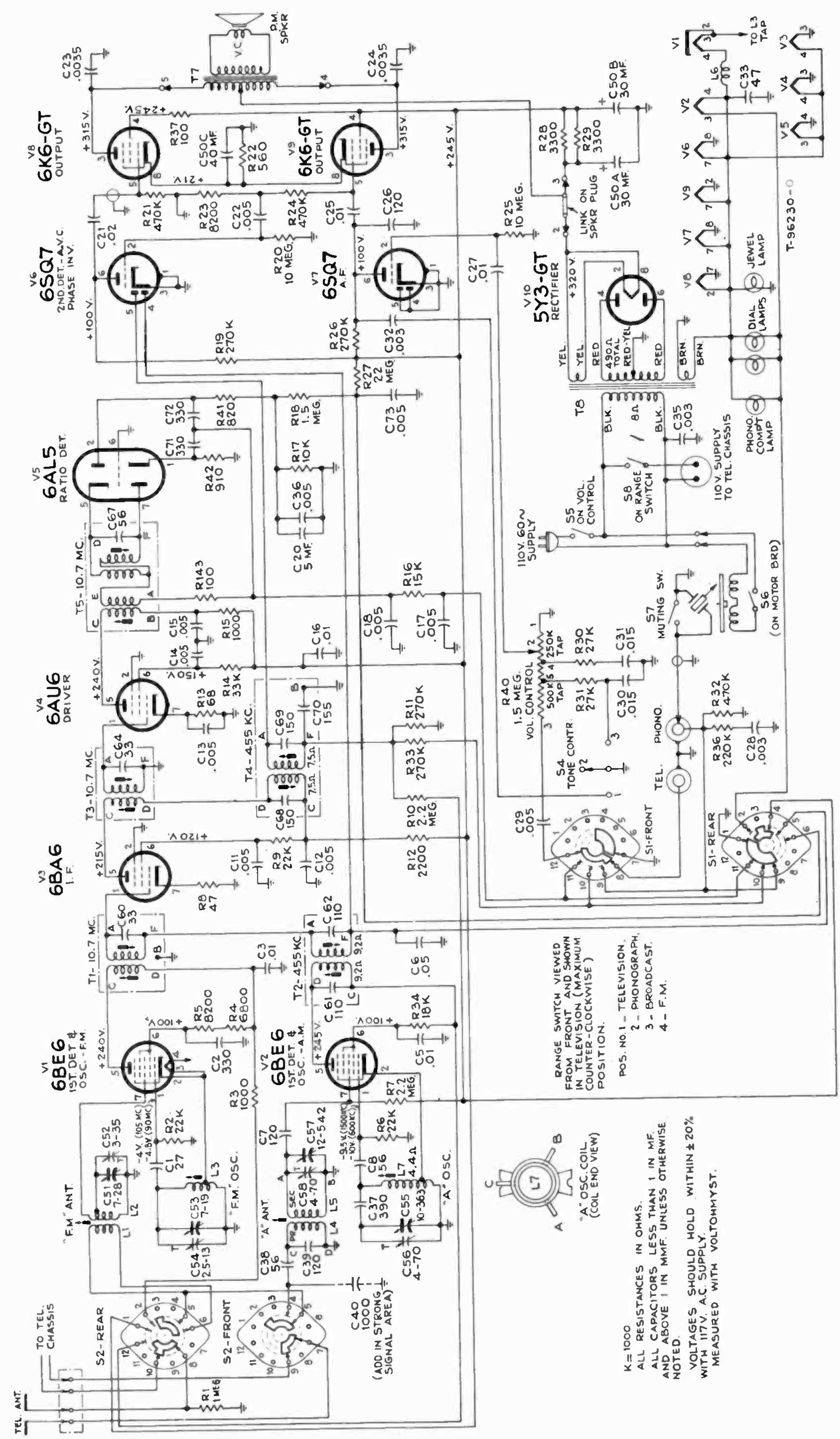


Figure 9—Radio Schematic Diagram

730TV1, 730TV2

RADIO ALIGNMENT PROCEDURE

If any lead dressing is necessary, it should be done before aligning the receiver. See Critical Lead Dress on page 12. Before aligning set, completely mesh the gang condenser and set the dial pointer to the mechanical max. calibration point at extreme left end of dial.

When making a complete alignment, follow the tabulated form below in sequence.
If only a portion of the circuit is to be aligned, select the portion required and follow with the remaining steps in the chart.
Any adjustments made on the FM 10.7 mc I-F's make it necessary to adjust the AM 455 kc. I-F's.

FM ALIGNMENT
"FM" RATIO DETECTOR ALIGNMENT
SET RANGE SWITCH TO FM POSITION

Steps	Connect High Side of Osc. to—	Tune Osc. to—	Adjust
1	Connect d-c probe of a "VoltOhmyst" to the negative lead of the 5 mfd electrolytic capacitor C20. Connect the common lead of the meter to chassis. Connect an output meter across the speaker voice coil, and turn the receiver volume control to maximum.		
2	Driver grid (pin #1) of V4 in series with .01 mfd	10.7 mc., 30% mod., 400 cycles AM Output approx. .1 volt	Ratio Detector transformer T5 top core for maximum d-c voltage across C20 (Approx. 4 volts) T5 bottom core for minimum audio output.
3	Repeat the adjustments in step 2 until no improvements can be obtained.		

"FM" R-F–I-F ALIGNMENT
RANGE SWITCH SET IN FM POSITION

Steps	Connect the High Side of the Test Osc. to—	Connect Ground Side of the Test Osc.	Tune the Osc. to—	Radio Dial Tuned to—	Adjust
1	Connect "VoltOhmyst" d-c probe to negative lead of C20 and the meter common lead to chassis ground.				
2	One ant. term. in series with .01 mfd.	Other ant. term.	10.7 mc., 30% modulated at 400 cycles AM output sufficient to provide 2 to 3 volts indication on "VoltOhmyst" during alignment.	Max. Cap. (Fully meshed)	T3 and T1 top and bottom cores alternately loading pri. and sec. of each transformer with 680 ohms while the opposite side of the same transformer is being adjusted. Adjust all transformers for maximum voltage across C20.
3	One ant. term. in series with 120 ohms.	Other ant. term. in series with 120 ohms.	106 mc	106 mc	Osc-C54; Ant-C52 for max. reading on the "VoltOhmyst."
4	"	"	90 mc	90 mc	Osc-L3; Ant-L2 for max. reading on the "VoltOhmyst."

AM ALIGNMENT

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action.

Output Meter.—Connect the meter across the speaker voice coil, and turn the receiver volume control to maximum.

Steps	Connect the High Side of the Test Osc. to—	Tune Test Osc. to—	Range Switch	Turn Radio Dial to—	Adjust the following
1	Pin #7 of 6BE6 (V2) in series with .01 mfd	455 kc.	"A" Band	Quiet point at low Freq. end of Dial	*Top and bottom cores of T2 and T4. (For max. voltage across voice coil.)
2	Ant. term. #2 through dummy ant. comprised of 200 mmf	1400 kc.	"A" Band	1400 kc.	Osc.—C56; Ant.—C58. (For max. voltage across voice coil.)
3	"	600 kc.	"A" Band	600 kc.	Osc.—L7; Ant.—L5. (For max. voltage across voice coil.)
5	Repeat steps 3 and 4 for maximum output.				

*It is necessary to alternately load the primary and secondary of each 455-kc. i-f transformer with 47,000 ohms while the opposite side of the same transformer is being adjusted.

Critical Lead Dress

1. Dress capacitor C1 near chassis base.
2. Dress lead from pin 5, V-1, to terminal C, of transformer T1, as near bottom of FM shelf as possible.
3. The lead from capacitor C29 to the high side of the volume control must be dressed next to chassis along front apron.
4. Dress resistor R20 near chassis base.
5. Dress all A.C. leads away from volume control.
6. Solder FM antenna coil primary leads to terminal board with as short a lead length as is practical.
7. Make all FM leads as short as possible.
8. The lead from pin 2, V-3, to chassis ground must be dressed as close to base and as near to the back apron as possible. This lead provides degeneration for the IF stage and neither its length nor the point at which it is grounded to the chassis should be changed.
9. Dress all leads away from the 3300 ohm resistors R28 and R29.
10. Dress lead from dummy terminal #3 on S1 to C58 away from "A" band oscillator coil.

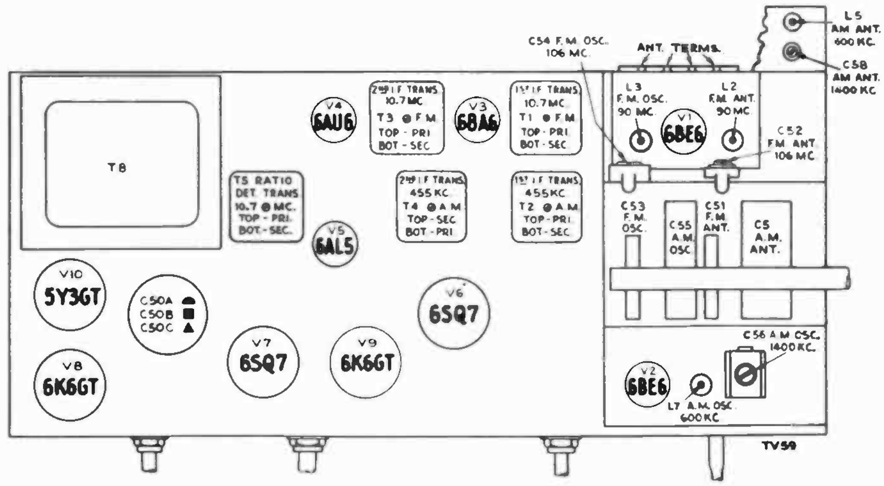


Figure 10—Chassis, Top View, Showing Adjustments

Figure 11—Radio Panel Controls

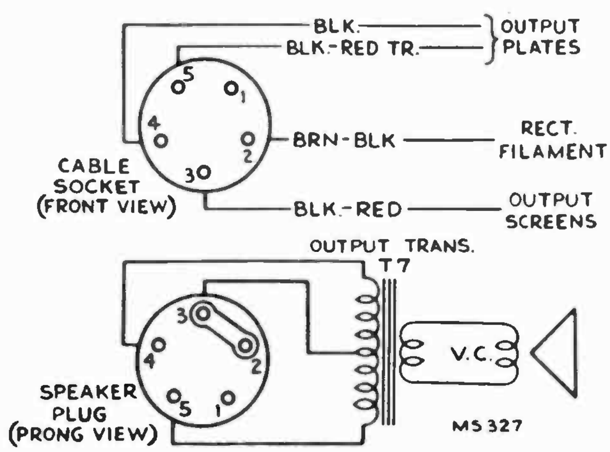


Figure 12—Speaker Connections

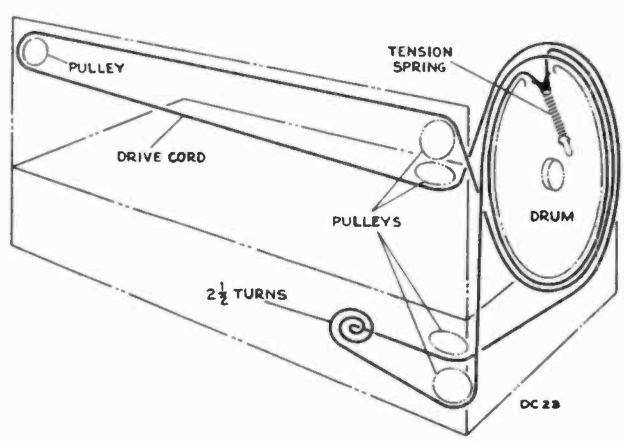
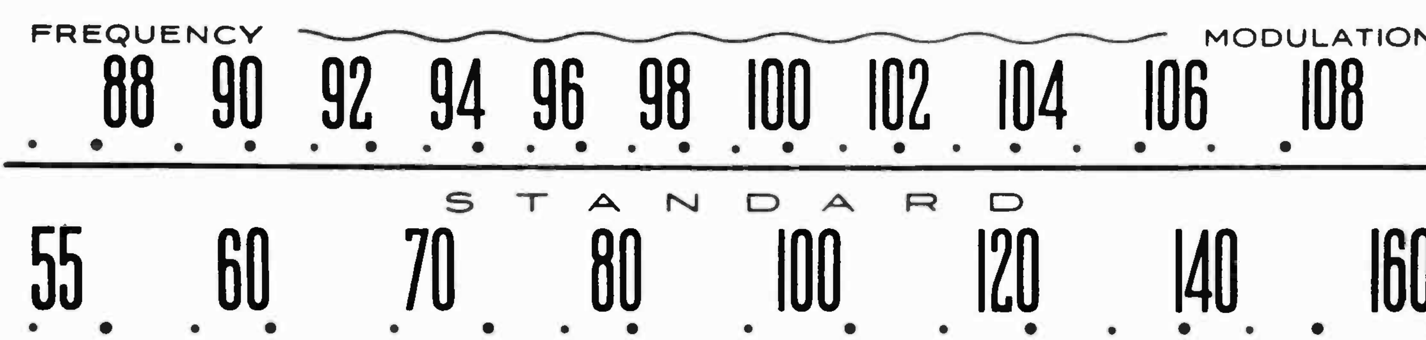


Figure 13—Dial and Drive Cord Assembly



The dial scale drawing shown is a full size reproduction. It can be used as a reference during alignment.

Figure 14—Radio Dial Scale

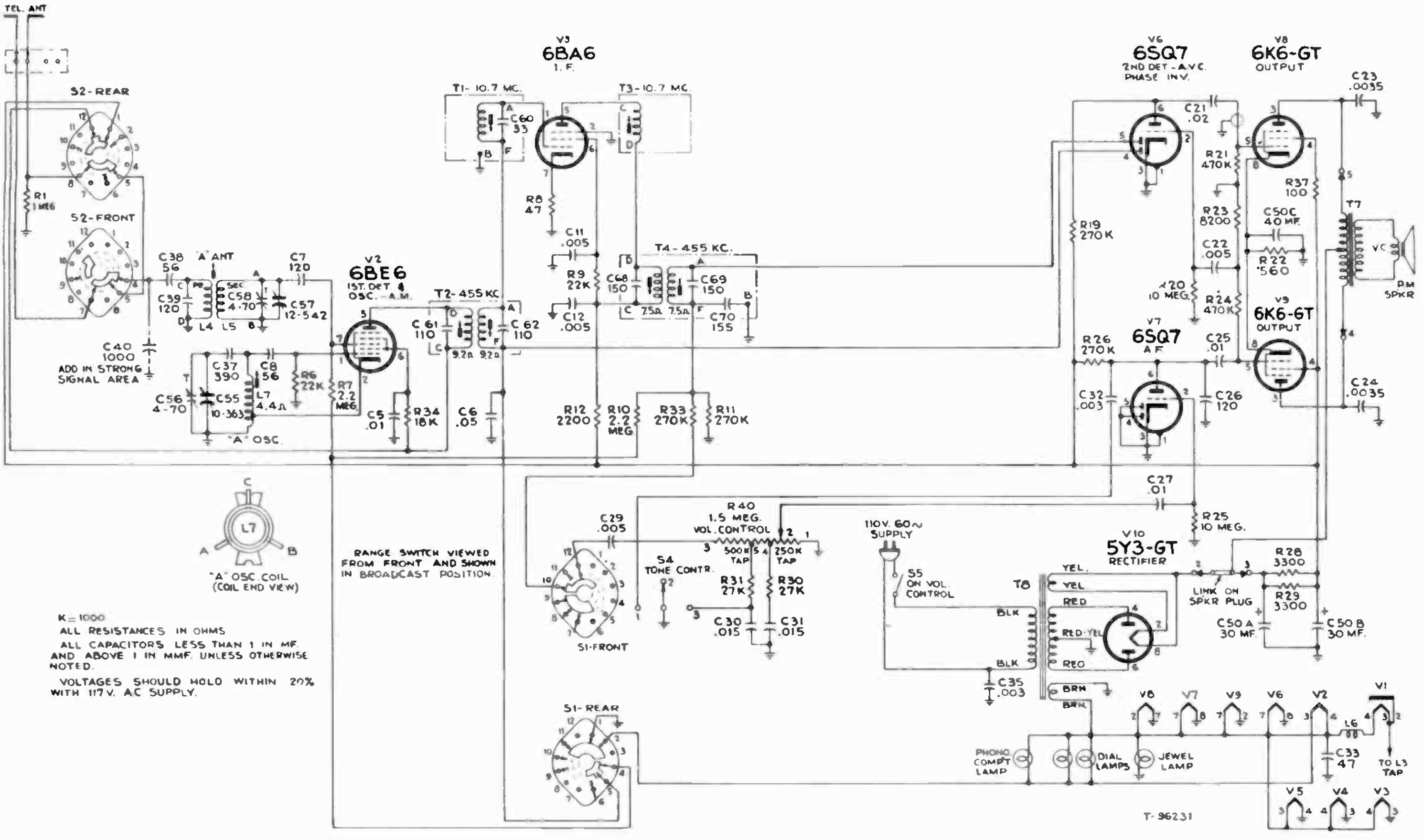


Figure 15—Simplified Schematic—Shown in "A" Band Position

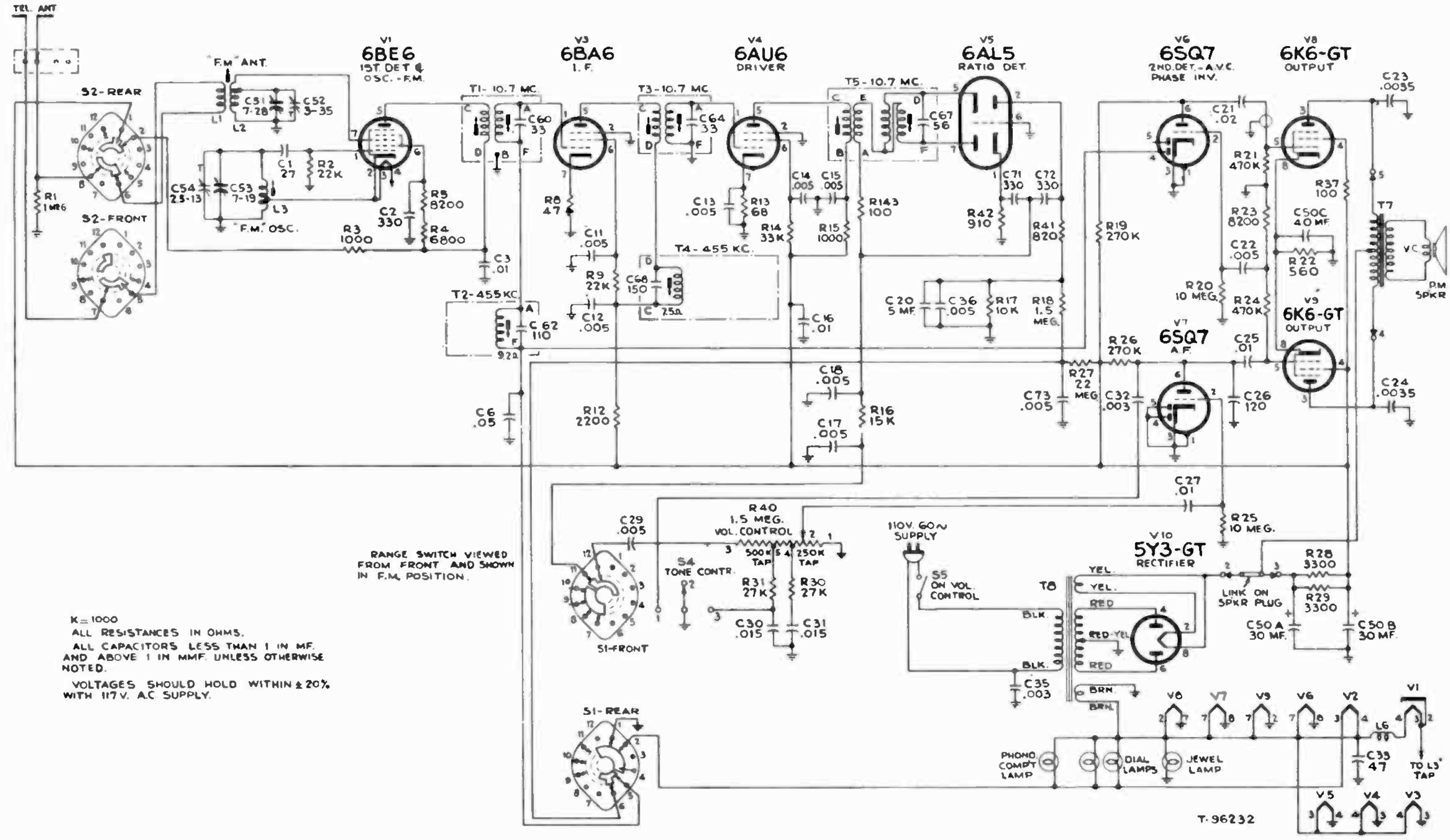
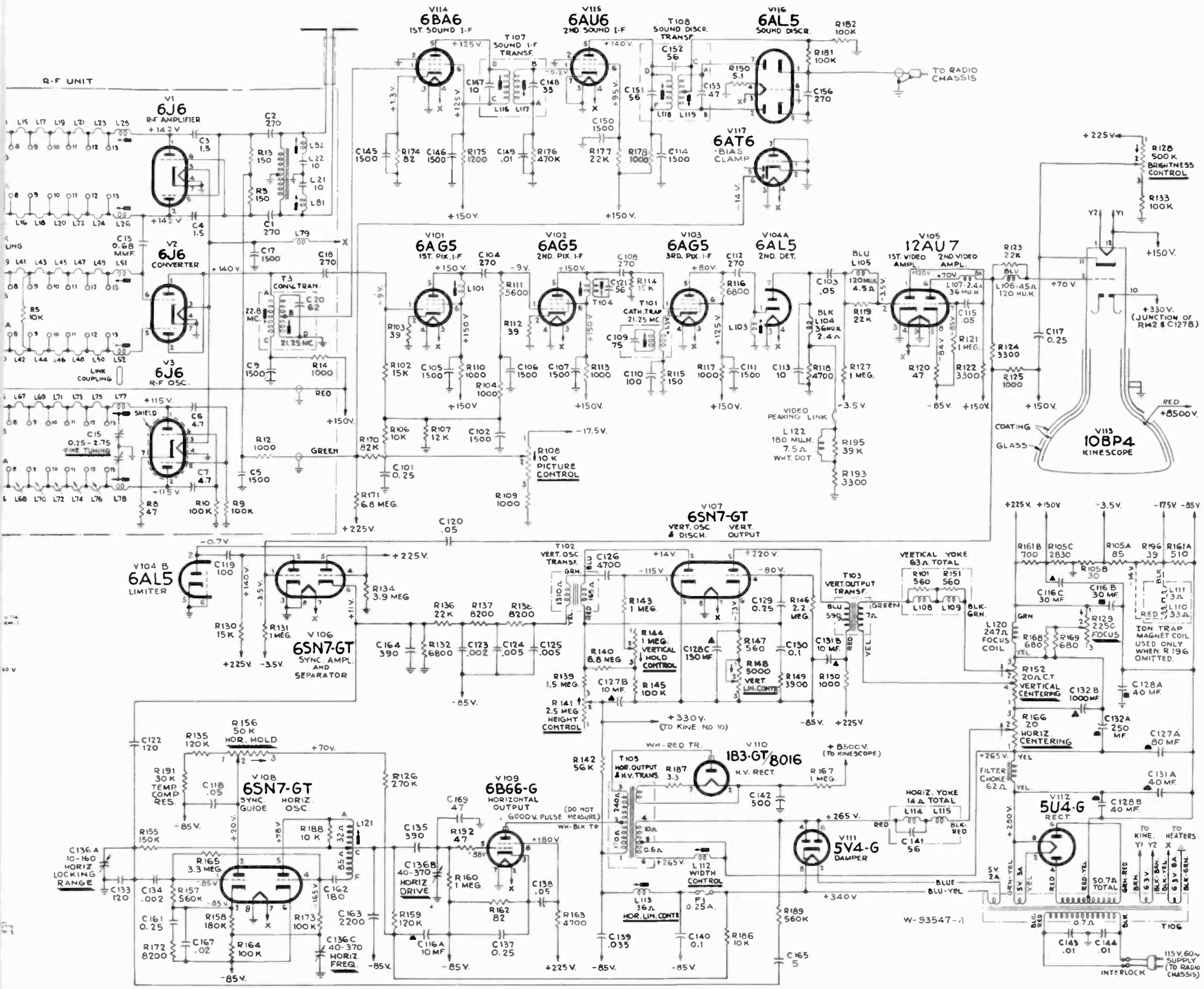


Figure 16—Simplified Schematic—Shown in FM Position

STOCK No.	DESCRIPTION
	TELEVISION R-F UNIT KRK2B-1
71504	Capacitor—Ceramic, 0.68 mmf. (C13)
71500	Capacitor—Ceramic, 1.5 mmf. (C3, C4)
71502	Capacitor—Ceramic, 2.2 mmf. (C10)
71520	Capacitor—Ceramic, 4.7 mmf. (C6, C7, C12)
45466	Capacitor—Ceramic, 10 mmf. (C19)
33101	Capacitor—Ceramic, 22 mmf. (C14)
71540	Capacitor—Ceramic, 270 mmf. (C1, C2)
65401	Capacitor—Mica, 270 mmf. (C18)
71501	Capacitor—Ceramic, 1500 mmf. (C5, C8, C9, C11, C17)
72122	Coil—Channel #1 r-f amplifier plate coil—front or rear section or channel #1 converter grid coil—front or rear section (L1, L2, L27, L28)
71479	Coil—Channels #2 and #3 r-f amplifier plate coil—front or rear section or channels #2 and #4 converter grid coil—front or rear section (L3, L4, L5, L6, L29, L30, L33, L34)
71480	Coil—Channel #4 r-f amplifier plate coil—front or rear section (L7, L8)
71481	Coil—Channel #5 r-f amplifier plate coil—front or rear section or channel #5 converter grid coil—front or rear section (L9, L10, L35, L36)
71492	Coil—Channel #6 oscillator, converter grid or r-f amplifier plate coil—front or rear sections (L11, L12, L37, L38, L63, L64)
71491	Coil—Channel #13 converter grid r-f amplifier plate coil—rear section (L25, L51)
71490	Coil—Channel #13 converter grid or r-f amplifier plate coil—front section (L26, L52)
72597	Coil—Channel #3 converter grid coil—front or rear section (L31, L32)
71469	Coil—Channel #1 oscillator coil—front or rear section (L53, L54)
71471	Coil—Channel #5 oscillator coil—front section or channel #2 oscillator coil—rear section (L55, L62)
71470	Coil—Channels #2, #3 and #4 oscillator coil—front sections (L56, L58, L60)
72552	Coil—Channel #3 oscillator coil—rear section (L57)
72553	Coil—Channel #4 oscillator coil—rear section (L59)
71472	Coil—Channel #5 oscillator coil—rear section (L61)
71489	Coil—Channel #13 oscillator coil—rear section (L77)
71488	Coil—Channel #13 oscillator coil—front section (L78)
71505	Coil—Heater choke coil (L79)
71506	Coil—Converter grid i-f coil (L80)
71493	Connector—Segment connector
71597	Core—Channel #13 front or rear oscillator coils' adjustable core and stud
71498	Core—Channels #6 and #13 front and rear converter grid coils or front and rear r-f amplifier plate coils' adjustable core and stud
71497	Core—Channel #6 front and rear oscillator coils' adjustable core and stud
72743	Detent—Detent mechanism and fiber shaft
71465	Disc—Rotor disc for fine tuning control (Part of C15)
72744	Drive—Fine tuning drive
71487	Form—Coil form only for channels #6 and #13 coils—less winding
71462	Loop—Oscillator to converter grid coupling loop
	Resistor—Fixed composition, 47 ohms ±20%, ½ watt (R8)
	Resistor—Fixed composition, 150 ohms ±10%, ½ watt (R3, R11, R13)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R4, R12, R14)
	Resistor—Fixed composition, 4700 ohms ±20%, ½ watt (R1, R2, R7)
	Resistor—Fixed composition, 10,000 ohms ±10%, ½ watt (R5)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R9, R10)
	Resistor—Fixed composition, 1 megohm ±20%, ½ watt (R6)
14343	Ring—Retaining ring for drive
71475	Screw—#4-40 x $\frac{15}{32}$" adjusting screw for coils L54, L56, L58, L60 and L62
71476	Screw—#4-40 x ¼" binder head screw for adjusting coils L66, L68, L70, L72, L74 and L76
71473	Segment—Converter grid section front segment—less coils or r-f amplifier plate section front segment—less coils (Part of S2, S3)
71474	Segment—Converter grid section rear segment—less coils or r-f amplifier plate section rear segment—less coils (Part of S2, S3)
71467	Segment—Oscillator section front segment—less coils (Part of S4)
71468	Segment—Oscillator section rear segment—less coils (Part of S4)
72951	Shield—Lead tube shield for V3
71494	Socket—Tube socket—miniature
71461	Spring—Snap spring to hold fine tuning rotor
71466	Stator—Oscillator fine tuning stator and bushing (Part of C15)
71507	Transformer—Antenna transformer (T1)
72811	Transformer—Converter transformer (T3, C20)
	TELEVISION CHASSIS KCS 27-1, KCS 27-2
71894	Bearing—Bearing for r-f unit shaft
72435	Cable—R-F cable complete with 2-prong male plug (36" long)
72437	Cable—Shielded audio cable complete with pin plug (37" long)
72809	Capacitor—Mica, 5 mmf. (C165)
72615	Capacitor—Mica, 10 mmf. (C113)
39620	Capacitor—Mica, 47 mmf. (C169)
45469	Capacitor—Ceramic, 100 mmf. (C110)
39628	Capacitor—Mica, 100 mmf. (C119)
39630	Capacitor—Mica, 120 mmf. (C122, C133)
73102	Capacitor—Mica, 180 mmf., 1000 volts (C162)
73091	Capacitor—Mica, 270 mmf., 1000 volts (C104, C108, C112, C156)
73094	Capacitor—Mica, 390 mmf., 1000 volts (C135, C164)
71450	Capacitor—Hi-voltage capacitor, 500 mmf. (C142)
71501	Capacitor—Ceramic, 1500 mmf. (C102, C105, C106, C107, C111, C114, C145, C146, C150)
39660	Capacitor—Mica, 2200 mmf. (C163)
72524	Capacitor—Mica, 4700 mmf. (C126)
72771	Capacitor—Mica trimmer, consisting of 1 section of 10-160 mmf. and 2 sections of 40-370 mmf. (C136A, C136B, C136C)
70601	Capacitor—Tubular, .002 mfd., 400 volts (C123)
70622	Capacitor—Tubular, .002 mfd., 600 volts (C134)
70606	Capacitor—Tubular, .005 mfd., 400 volts (C124, C125)
73100	Capacitor—Tubular, oil impregnated, .035 mfd., 1000 volts (C139)
71770	Capacitor—Molded paper, .01 mfd., 400 volts (C143, C144)
70610	Capacitor—Tubular, .01 mfd., 400 volts (C149)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C167)
70615	Capacitor—Tubular, .05 mfd., 400 volts (C103, C115, C118, C120)
70636	Capacitor—Tubular, .05 mfd., 600 volts (C138)
73101	Capacitor—Tubular, oil impregnated, 0.1 mfd., 1000 volts (C130, C140)
70618	Capacitor—Tubular, 0.25 mfd., 400 volts (C101, C117, C129, C137, C161)
72736	Capacitor—Electrolytic, comprising 1 section of 10 mfd., 400 volts, 1 section of 30 mfd., 350 volts and 1 section of 30 mfd., 250 volts (C116A, C116B, C116C)
71780	Capacitor—Electrolytic, comprising 1 section of 80 mfd., 450 volts and 1 section of 10 mfd., 450 volts (C127A, C127B)
71781	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts; 1 section of 40 mfd., 150 volts; and 1 section of 130 mfd., 50 volts (C128A, C128B, C128C)
71782	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts and 1 section of 10 mfd., 350 volts (C131A, C131B)
71436	Capacitor—Electrolytic, comprising 1 section of 250 mfd., 10 volts and 1 section of 1000 mfd., 6 volts C132A, C132B)
71970	Choke—Filter choke
71426	Coil—First, or third pix i-f coil (L101, L103)

STOCK No.	DESCRIPTION
71793	Coil—Peaking coil (L104, L107)
71529	Coil—Peaking coil (L105, R119, L106, R123)
71528	Coil—Peaking coil (L122, R195)
71429	Coil—Width control coil (L112)
71449	Coil—Horizontal linearity coil (L113)
72770	Coil—Horizontal oscillator coil (L121)
73233	Coil—Focus coil (L120)
71789	Connector—Kinescope anode connector
71521	Connector—Hi-voltage capacitor lead connector
71784	Control—Brightness and picture control (R108, R128) (use with decal #73028 or #73045)
73193	Control—Brightness and picture control (R108, R128) (use with decal #73196 or #73197)
72735	Control—Focus control (R129)
71440	Control—Height control (R141)
71443	Control—Horizontal centering or vertical centering control (R152, R166)
72734	Control—Vertical and horizontal hold control (R144, R156)
71441	Control—Vertical linearity control (R148)
72065	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytics RCA #71780 and RCA #71781
71783	Cover—Insulating cover for electrolytics RCA #71436 and RCA #71782
72772	Cover—Insulating cover for electrolytic RCA #72736
71509	Cushion—Deflection yoke hood upper cushion only
71510	Cushion—Deflection yoke hood bottom cushion only
71792	Magnet—Ion trap magnet (L110, L111)
72737	Nut—Speed nut for fastening r-f unit shield
71455	Nut—#8-32 wing nut for mounting focus coil (3 required)
18469	Plate—Bakelite mounting plate for electrolytic capacitors
31048	Plug—Pin plug for audio cable
71448	Plug—2-prong male plug for power cable
72850	Plug—2-prong male plug for r-f cable
71513	Resistor—Wire wound, 3.3 ohms, ¼ watt (R187)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R190)
	Resistor—Fixed composition, 39 ohms ±10%, ½ watt (R103, R112)
	Resistor—Fixed composition, 47 ohms ±20%, ½ watt (R120, R192)
	Resistor—Fixed composition, 82 ohms ±10%, ½ watt (R174)
	Resistor—Fixed composition, 82 ohms ±10%, 1 watt (R162)
	Resistor—Fixed composition, 150 ohms ±10%, ½ watt (R115)
	Resistor—Fixed composition, 560 ohms ±10%, ½ watt (R147)
	Resistor—Fixed composition, 680 ohms ±20%, 1 watt (R168, R169)
	Resistor—Fixed composition, 1000 ohms ±10%, ½ watt (R109, R125)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R104, R110, R113, R117, R150, R178)
	Resistor—Fixed composition, 1200 ohms ±10%, ½ watt (R175)
	Resistor—Fixed composition, 3300 ohms, ±5%, ½ watt (R193)
	Resistor—Fixed composition, 3300 ohms ±10%, ½ watt (R122)
	Resistor—Fixed composition, 3300 ohms ±10%, 1 watt (R124)
	Resistor—Fixed composition, 3900 ohms ±10%, ½ watt (R149)
	Resistor—Fixed composition, 4700 ohms ±5%, ½ watt (R118)
	Resistor—Fixed composition, 4700 ohms ±10%, 1 watt (R163)
	Resistor—Fixed composition, 5600 ohms ±5%, ½ watt (R111)
	Resistor—Fixed composition, 6800 ohms ±5%, ½ watt (R116)
	Resistor—Fixed composition, 6800 ohms ±20%, ½ watt (R132)
	Resistor—Fixed composition, 8200 ohms ±10%, ½ watt (R137, R138, R172)
	Resistor—Fixed composition, 10,000 ohms ±10%, ½ watt (R106, R186, R188)
	Resistor—Fixed composition, 12,000 ohms ±10%, ½ watt (R107)
	Resistor—Fixed composition, 15,000 ohms ±5%, ½ watt (R102, R114)
	Resistor—Fixed composition, 15,000 ohms ±20%, 1 watt (R130)
	Resistor—Fixed composition, 22,000 ohms ±20%, ½ watt (R136, R177)
72928	Resistor—Temperature compensating resistor, 30,000 ohms, ¼ watt (R191)
	Resistor—Fixed composition, 56,000 ohms ±10%, ½ watt (R142)
	Resistor—Fixed composition, 82,000 ohms ±10%, ½ watt (R170)
	Resistor—Fixed composition, 100,000 ohms ±5%, 1 watt (R164)
	Resistor—Fixed composition, 100,000 ohms ±10%, ½ watt (R145)
	Resistor—Fixed composition, 100,000 ohms ±20%, ½ watt (R133)
	Resistor—Fixed composition, 100,000 ohms ±5%, ½ watt (R181, R182)
72893	Resistor—Carbon film type, 100,000 ohms ±1%, ½ watt (R173)
	Resistor—Fixed composition, 120,000 ohms ±10%, ½ watt (R135)
	Resistor—Fixed composition, 120,000 ohms ±10%, 1 watt (R159)
	Resistor—Fixed composition, 150,000 ohms ±10%, ½ watt (R155)
	Resistor—Fixed composition, 180,000 ohms ±10%, ½ watt (R158)
	Resistor—Fixed composition, 270,000 ohms ±10%, 1 watt (R126)
	Resistor—Fixed composition, 470,000 ohms ±20%, ½ watt (R176)
	Resistor—Fixed composition, 560,000 ohms ±5%, ½ watt (R157)
	Resistor—Fixed composition, 560,000 ohms ±10%, ½ watt (R189)
72849	Resistor—Voltage divider consisting of 1 section of 2830 ohms, 7 watts, 1 section of 30 ohms, 1 watt and 1 section of 85 ohms, 2 watts (R105a, R105b, R105c)
72848	Resistor—Wire wound consisting of 1 section of 700 ohms, 12 watts and 1 section of 510 ohms, 10 watts (R161a, R161b)
	Resistor—Fixed composition, 1 megohm ±5%, ½ watt (R143)
	Resistor—Fixed composition, 1 megohm ±20%, ½ watt (R121, R127, R131, R160)
	Resistor—Fixed composition, 1 megohm ±20%, 1 watt (R167)
	Resistor—Fixed composition, 1.5 megohm ±10%, ½ watt (R139)
	Resistor—Fixed composition, 2.2 megohms ±20%, ½ watt (R146)
	Resistor—Fixed composition, 3.3 megohms ±5%, 1 watt (R165)
	Resistor—Fixed composition, 3.9 megohms ±10%, ½ watt (R134)
	Resistor—Fixed composition, 6.8 megohms ±10%, ½ watt (R140)
	Resistor—Fixed composition, 6.8 megohms ±20%, ½ watt (R171)
71456	Screw—#8-32 wing screw for mounting deflection yoke (3 required)
71452	Sleeve—Rubber sleeve for focus coil
72741	Socket—Kinescope socket
72773	Socket—Mounting socket for hi-voltage capacitor
9914	Socket—Tube socket, miniature, unshielded
71508	Socket—Tube socket for 8016 tube
72927	Socket—Tube socket, noval wafer type
31251	Socket—Tube socket, octal



K = 1000

All resistance values in ohms, and capacitance values in mmfd., unless otherwise noted.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows or controls indicates clockwise rotation.

All voltages measured with "Volt-Ohmyst" and with picture control, brightness control, vertical hold control and the horizontal hold control in the maximum counterclockwise position. Voltages should hold within ±20% with 117 v. a-c supply.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

In some sets R108 is connected to −14V.

In some sets, L122, R195 and R193 are omitted.

In some receivers, R149 is 3,300.

In some receivers the trap winding is omitted from T104.

Optional video peaking is provided by the video peaking link. Normally the link is connected in place. However, if transients are produced on high contrast pictures, the link should be opened. See figure 57 for location of the link.

Figure 19—Television Circuit Schematic Diagram

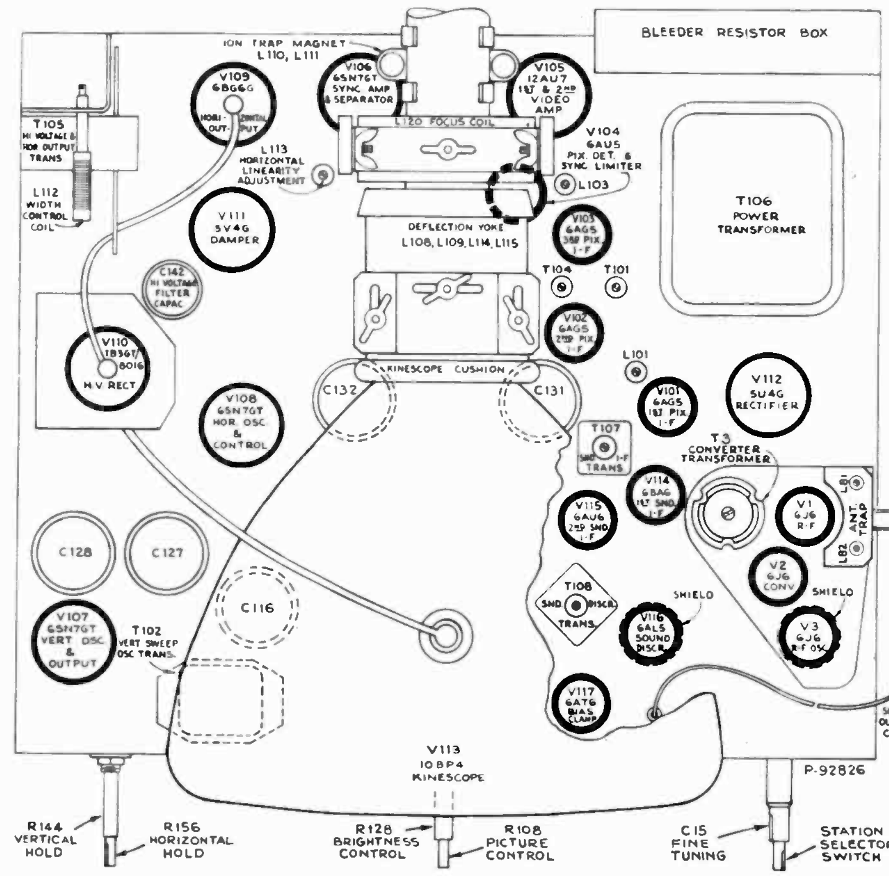


Figure 20—Chassis Top View (Showing Location of Major Components)

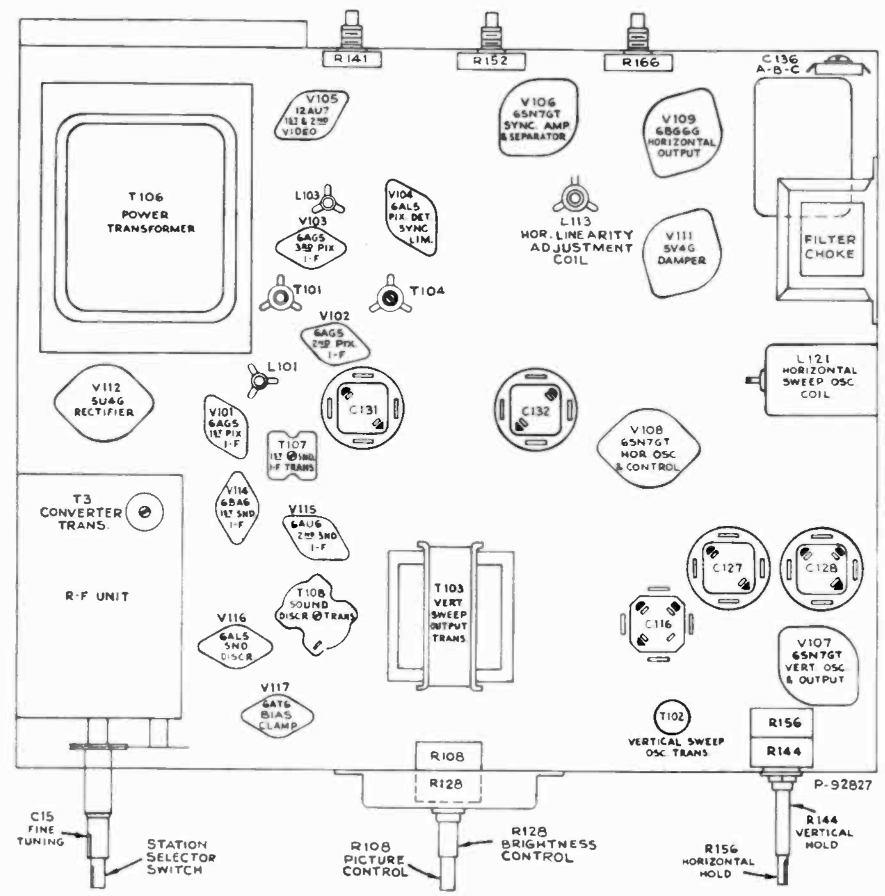
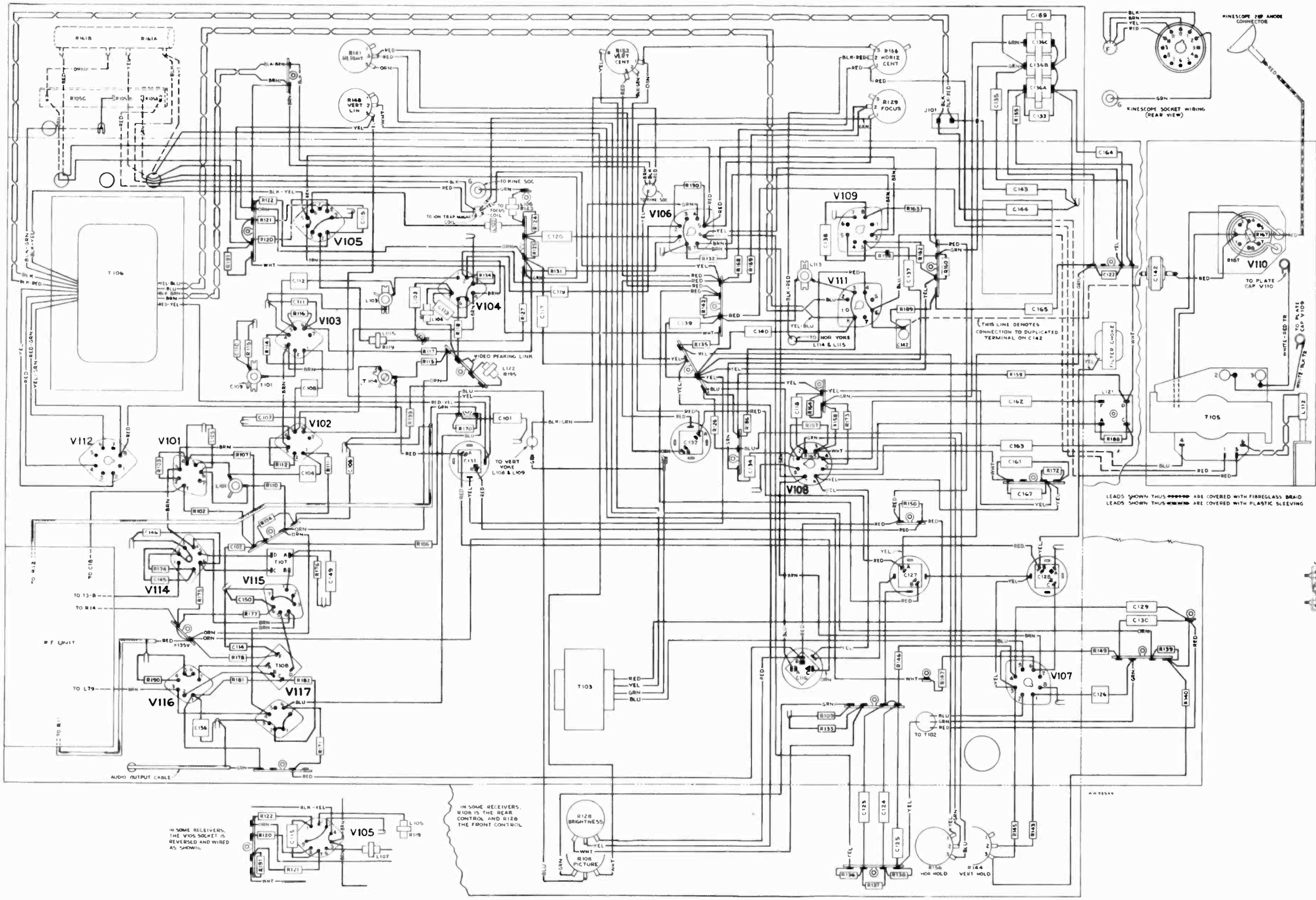
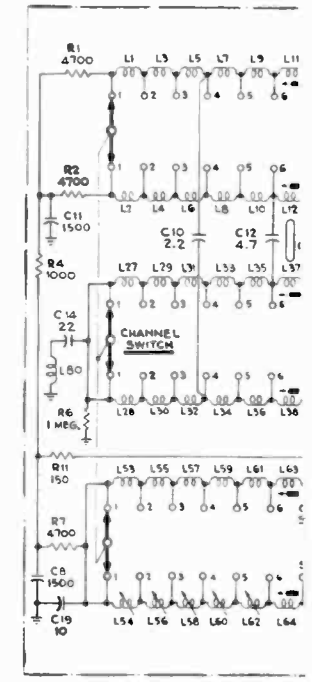


Figure 21—Chassis Bottom View (Showing Location of Major Components)

TELEVISION CHASSIS WIRING DIAGRAM

730TV1, 730TV2





Early production sets employed brightness and picture control #71784 in which the brightness is the outer knob and picture, the center knob. Late production, shown in the above wiring diagram employs control #73193 in which picture is the outer knob and brightness the center.

The front panel control decals are affected by the control changes. Decals #73028 or #73045 are for control #71784, Decals #73196 or #73197 are for control #73193.

REFER TO PAGES 395 TO 406 INC. FOR ALIGNMENT PROCEDURE, SERVICE SUGGESTIONS AND WAVEFORM PHOTOGRAPHS.

Figure 17—Television Chassis Wiring Diagram

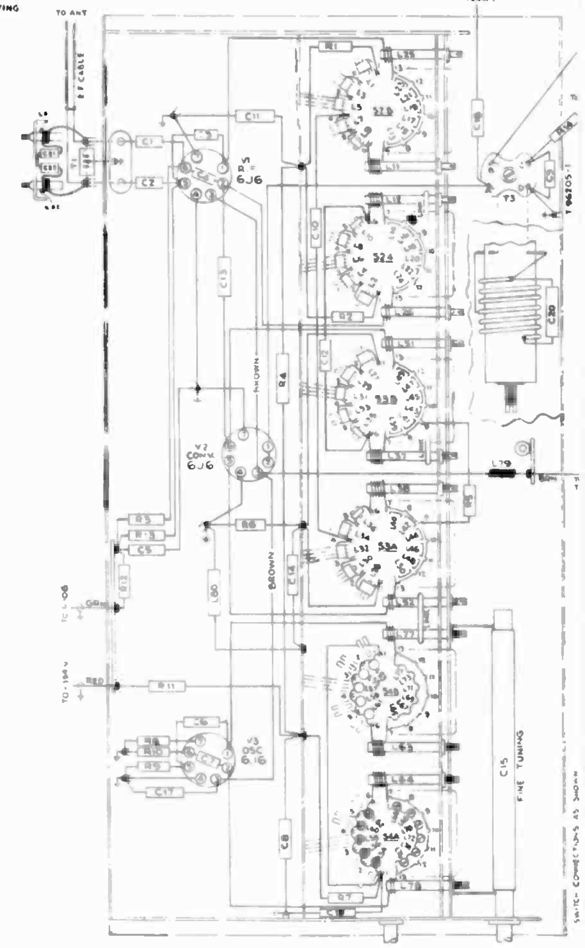


Figure 18—R-F Unit Wiring Diagram

STOCK No.	DESCRIPTION
72627	Socket—Tube socket, ceramic, octal
72516	Socket—Tube socket, miniature, shielded
71453	Stud—Focus coil mounting stud (2 required)
71775	Transformer—Vertical oscillator transformer (T102)
71774	Transformer—Vertical output transformer (T103)
71416	Transformer—Horizontal output and high-voltage transformer (T105)
71772	Transformer—Power transformer, 115 volt, 60 cycle (T106)
73150	Transformer—Power transformer, 115 volt, 50 cycle (T106)
71424	Transformer—Sound i-f transformer (T107, L116, L117, C147, C148)
71427	Transformer—Sound discriminator transformer (T108 L118, L119, C151, C152, C153)
73708	Transformer—Second pix i-f transformer (T104, C121)
71778	Trap—Sound trap (T101, C109)
71420	Yoke—Deflection yoke (L108, L109, L114, L115, C141, R101, R151)
	RADIO CHASSIS RC 610A—730TV1 RC 610B—730TV2
72853	Board—"Antenna-Television" terminal board
72046	Capacitor—Adjustable, 2.5-13 mmf. (C54)
71808	Capacitor—Adjustable, 3-35 mmf. (C52)
71496	Capacitor—Adjustable, 4-70 mmf. (C58)
72334	Capacitor—Adjustable, 4-70 mmf. (C56)
72570	Capacitor—Ceramic, 27 mmf. (C1)
39042	Capacitor—Ceramic, 47 mmf. (C33)
71924	Capacitor—Ceramic, 56 mmf. (C8, C38)
71614	Capacitor—Ceramic, 120 mmf. (C7, C26, C39)
72793	Capacitor—Mica, 330 mmf. (C2, C71, C72)
72875	Capacitor—Mica, 390 mmf. (C37)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C23, C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28, C32)
72874	Capacitor—Molded paper, .003 mfd., 600 volts (C35)
72490	Capacitor—Tubular, .005 mfd., 200 volts (C13, C17, C18, C22, C29, C36, C73)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C11, C12, C14, C15)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C30, C31)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C3, C5, C16, C25, C27)
70611	Capacitor—Tubular, .02 mfd., 400 volts (C21)
71551	Capacitor—Tubular, .05 mfd., 200 volts (C6)
72121	Capacitor—Electrolytic, 5 mfd., 50 volts (C20)
72052	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 450 volts; 1 section of 30 mfd., 350 volts; 1 section of 40 mfd., 25 volts (C50a, C50b, C50c)
72335	Coil—FM antenna coil (L1, L2)
72336	Coil—FM oscillator coil (L3)
72071	Coil—"A" band antenna coil (L4, L5)
72333	Coil—"A" band oscillator coil (L7)
72574	Coil—Filament choke coil (L6)
72059	Condenser—Variable tuning condenser (C51, C53, C55, C57)
30868	Connector—2 contact female plug for motor cable
72851	Control—Volume control and power switch (R40, S5)
72953	Cord—Drive cord (approx. 85" overall length) for 730TV1
72953	Cord—Drive cord (approx. 80" overall length) for 730TV2
70392	Cord—Power cord and plug
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
71799	Grommet—Rubber grommet for mounting i-f shell (3 required)
71608	Indicator—Station selector indicator
71607	Plate—Dial back plate only for Model 730TV2
73044	Plate—Dial back plate only for Model 730TV1
12493	Plug—5 contact female plug for speaker cable
72602	Pulley—Drive cord pulley
36637	Receptacle—2 contact female receptacle for power cord
33514	Receptacle—"Phono-Television" input receptacle
	Resistor—Fixed composition, 47 ohms ±10%, ½ watt (R8)

STOCK No.	DESCRIPTION
	Resistor—Fixed composition, 68 ohms ±10%, ½ watt (R13)
	Resistor—Fixed composition, 100 ohms ±10%, ½ watt (R37, R43)
72865	Resistor—Wire wound, 560 ohms, 2 watts (R22)
	Resistor—Fixed composition, 820 ohms ±10%, ½ watt (R41)
	Resistor—Fixed composition, 910 ohms ±5%, ½ watt (R42)
	Resistor—Fixed composition, 1000 ohms ±20%, ½ watt (R3, R15)
	Resistor—Fixed composition, 2200 ohms ±20%, 1 watt (R12)
	Resistor—Fixed composition, 3300 ohms ±10%, 2 watts (R28, R29)
	Resistor—Fixed composition, 6800 ohms ±10%, 1 watt (R4)
	Resistor—Fixed composition, 8200 ohms ±10%, 1 watt (R5)
	Resistor—Fixed composition, 8200 ohms ±10%, ½ watt (R23)
	Resistor—Fixed composition, 10,000 ohms ±10%, ½ watt (R17)
	Resistor—Fixed composition, 15,000 ohms ±10%, ½ watt (R16)
	Resistor—Fixed composition, 18,000 ohms ±10%, 2 watts (R34)
	Resistor—Fixed composition, 22,000 ohms ±10%, ½ watt (R2, R6)
	Resistor—Fixed composition, 22,000 ohms ±10%, 1 watt (R9)
	Resistor—Fixed composition, 27,000 ohms ±10%, ½ watt (R30, R31)
	Resistor—Fixed composition, 33,000 ohms ±10%, ½ watt (R14)
	Resistor—Fixed composition, 220,000 ohms ±10%, ½ watt (R36)
	Resistor—Fixed composition, 270,000 ohms ±10%, ½ watt (R11, R19, R26, R33)
	Resistor—Fixed composition, 470,000 ohms ±10%, ½ watt (R21, R24, R32)
	Resistor—Fixed composition, 1 megohm ±20%, ½ watt (R1)
	Resistor—Fixed composition, 1.5 megohms ±20%, ½ watt (R18)
	Resistor—Fixed composition, 2.2 megohms ±20%, ½ watt (R7, R10)
	Resistor—Fixed composition, 10 megohms ±20%, ½ watt (R20, R25)
	Resistor—Fixed composition, 22 megohms ±20%, ½ watt (R27)
72055	Shaft—Tuning knob shaft
72854	Socket—Dial lamp socket
31364	Socket—Pilot lamp or compartment lamp socket
72516	Socket—Tube socket, miniature
31251	Socket—Tube socket, octal
31418	Spring—Drive cord tension spring
72863	Support—L.H. dial back plate support and pulley assembly complete with one (1) drive cord pulley for 730TV1
72862	Support—R.H. dial back plate support and pulley assembly complete with four (4) drive cord pulleys for 730TV1
72847	Support—L.H. dial back plate support and pulley assembly complete with one (1) pulley for 730TV2
72846	Support—R.H. dial back plate support and pulley assembly complete with four (4) pulleys for 730TV2
72852	Switch—Range switch (S1, S2, S8)
71603	Switch—Tone switch (S4)
72887	Transformer—First FM i-f transformer (T1, C60)
71625	Transformer—First AM i-f transformer (T2, C61, C62)
72888	Transformer—Second FM i-f transformer (T3, C64)
71631	Transformer—Second AM i-f transformer (T4, C68, C69, C70)
72889	Transformer—Ratio detector transformer (T5, C67)
71975	Transformer—Power transformer, 115 volt, 60 cycle (T8)
35969	Washer—"C" washer for tuning shaft

STOCK No.	DESCRIPTION
	SPEAKER ASSEMBLIES 92569-1W RL 103-1
13867	Cap—Dust cap
36145	Cone—Cone and voice coil assembly
71560	Plug—5 prong male plug for speaker
71961	Speaker—12" P.M. speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
37899	Transformer—Output transformer (T7)
	NOTE: If stamping on speaker in instrument does not agree with above speaker number, order replacement parts by referring to model number of instrument, number stamped on speaker and full description of part required.
	MISCELLANEOUS
73020	Back—Cabinet back for radio chassis for 730TV2 toasted mahogany instruments
73018	Back—Cabinet back for radio chassis for 730TV2 mahogany instruments
73019	Back—Cabinet back for radio chassis for 730TV2 walnut instruments
72855	Back—Cabinet back for television chassis
72857	Board—"Antenna" board (solders to antenna cable)
71819	Bracket—Door check mounting bracket for 730TV2
71599	Bracket—Mounting bracket for pilot lamp jewel
72714	Bumper—Rubber bumper for door
71524	Cable—Antenna cable (21¼" long)
72437	Cable—Shielded audio cable (15") complete with pin plug between record changer and radio chassis
13103	Cap—Pilot lamp jewel
71892	Catch—Door catch and strike
71820	Check—Radio compartment door check for 730TV2
72337	Clip—Dial scale spring clip (4 required) for 730TV1
X1659	Cloth—Grille cloth for 730TV1 mahogany instruments
X1658	Cloth—Grille cloth for 730TV1 walnut instruments
X1657	Cloth—Grille cloth for 730TV2 walnut or standard mahogany instruments
X1666	Cloth—Grille cloth for 730TV2 toasted mahogany instruments
73070	Dial—Glass dial scale for 730TV1
72682	Dial—Glass dial scale for 730TV2
73046	Decal—Radio control panel decal for toasted mahogany instruments
73029	Decal—Radio control panel decal for walnut or standard mahogany instruments
73028	Decal—Television control panel decals for walnut or standard mahogany instruments (use with control #71784)
73045	Decal—Television control panel decals for toasted mahogany instruments (use with control #71784)
73196	Decal—Television control panel decal for walnut and mahogany instruments (used with control #73193)
73197	Decal—Television control panel decal for toasted mahogany instruments (used with control #73193)
71910	Decal—Trade mark decal (RCA-Victor)
71966	Decal—Trade mark decal (Victrola)
76861	Escutcheon—Dial scale escutcheon less dial scale for 730TV2
71598	Escutcheon—Television channel marker escutcheon
73027	Glass—Safety glass
73035	Grille—Metal grille for 730TV1 (2 required)
11889	Grommet—Rubber grommet for mounting radio chassis (2 required)
30698	Hinge—Cabinet lid hinge (2 required) for walnut or standard mahogany instruments

STOCK No.	DESCRIPTION
70159	Hinge—Cabinet lid hinge (2 required) for 730TV2 toasted mahogany instruments
73033	Hinge—Door hinge (1 set) for 730TV1 (2 sets required)
73024	Hinge—Radio compartment door hinge (1 set) for 730TV2 walnut and standard mahogany instruments
70157	Hinge—Radio compartment door hinge (1 set) for 730TV2 toasted mahogany instruments
73023	Hinge—Television and record storage compartments door hinges (1 set) for 730TV2 walnut or standard mahogany instruments (2 sets required)
70156	Hinge—Television and record storage compartments door hinges (1 set) for 730TV2 toasted mahogany instruments (2 sets required)
71821	Knob—Radio control knob for walnut or mahogany instruments (4 required)
72800	Knob—Radio control knob for toasted mahogany instruments (4 required)
71533	Knob—Television fine tuning knob for walnut or mahogany instruments
71534	Knob—Television station selector knob for walnut or mahogany instruments
71535	Knob—Television brightness control or vertical hold control knob for walnut or mahogany instruments
71536	Knob—Television picture control or horizontal hold control knob for walnut or mahogany instruments
72565	Knob—Television brightness control or vertical hold control knob for toasted mahogany instruments
72566	Knob—Television picture control or horizontal hold control for toasted mahogany instruments
72567	Knob—Television fine tuning knob for toasted mahogany instruments
72568	Knob—Television station selector knob for toasted mahogany instruments
5117	Lamp—Compartment lamp, Mazda #55
11765	Lamp—Dial or pilot, Mazda #51
70546	Mounting—One set of hardware consisting of four (4) upper springs, four (4) bottom springs and four (4) clamp nuts to mount record changer
72850	Plug—2-prong male plug for antenna cable
73022	Pull—Door pull for speaker and record storage compartment for 730TV2 (2 required)
73021	Pull—Door pull for television and radio control panel doors for 730TV2 (2 required)
73034	Pull—Door pull for 730TV1 (2 required)
72324	Shade—Changer compartment lamp shade
71539	Slide—Kinescope centering slide (4 required)
73026	Spring—Cabinet lid support spring
71818	Spring—Door check tension spring for 730TV2
4982	Spring—Retaining spring for knobs RCA #71533 and #72567
14270	Spring—Retaining spring for knobs RCA #71534, #71535, #72565 and #72568
30330	Spring—Retaining spring for knobs RCA #71536 and #72566
30900	Spring—Retaining spring for knobs RCA #71821 and #72800
71530	Spring—Spring clip for television channel escutcheon
73479	Stud—¼-20 x 2¼" Stud to mount record changer (4 required)
73025	Support—Cabinet lid support complete for walnut or standard mahogany instruments
70158	Support—Cabinet lid support complete for 730TV2 toasted mahogany instruments
71814	Washer—Rubber washer for door check assembly of 730TV2

Alternate Speaker:

SPEAKER ASSEMBLIES
92569-1K.

70574 Cone—Cone and voice coil assembly.
31539 Plug—5 prong male plug for speaker.
37899 Transformer—Output transformer.
Replace complete speaker with Stock No. 71961 (92569-1W).

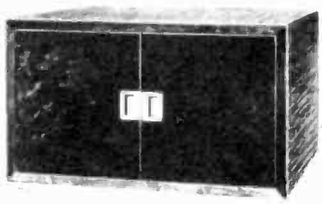
Addition to Parts List:

MISCELLANEOUS

74409 Cushion—Lid Cushion

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 8T241
Walnut, Mahogany or Toasted Mahogany



Model 8T243 *Model 8T244*
Walnut, Mahogany or Toasted Mahogany

RCA VICTOR

TELEVISION RECEIVERS

MODELS 8T241, 8T243, 8T244

Chassis No. KCS28 Mfr. No. 274

SERVICE DATA

—1948 No. T5—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Models 8T241, 8T243 and 8T244 are "10 inch" table model television receivers. These receivers employ twenty-one tubes plus 2 rectifiers and a 10BP4 kinescope. The receivers are identical except for cabinets.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE........ 6⅜" x 8½"—2" radius at corner

R-F FREQUENCY RANGES

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE
Plus and minus approximately 250 kc on channel 2 and plus and minus approximately 650 kc on channel 13.

POWER SUPPLY RATING
KCS 28 .... 115 volts, 60 cycles, 250 watts

AUDIO POWER OUTPUT RATING
Maximum ....2.4 watts

LOUDSPEAKER 92573-4
Type.......... 5 x 7 inch Permanent Magnet Dynamic
Voice Coil Impedance.......... 3.2 ohms at 400 cycles

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (outside) 8T241	22¼	15½	20⅝
Cabinet (outside) 8T243	23	16	20⅛
Cabinet (outside) 8T244	25½	14¾	22
Chassis Assembly (outside)	19½	10½	17
Chassis (Overall)	19½	13	20½

RECEIVER ANTENNA INPUT IMPEDANCE
Choice: 300 ohms balanced or 72 ohms unbalanced.

WEIGHT
Chassis with Tubes in Cabinet — 8T241 83 lbs., 8T243 85 lbs., 8T244 99 lbs.
Shipping Weight — 8T241....88 lbs., 8T243....90 lbs., 8T244....107 lbs.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6AG5	R-F Amplifier
(2)	RCA 6AG5	Converter
(3)	RCA 6J6	R-F Oscillator
(4)	RCA 6AU6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AV6	1st Audio Amplifier
(8)	RCA 6K6GT	Audio Output
(9)	RCA 6AG5	1st Picture I-F Amplifier
(10)	RCA 6AG5	2nd Picture I-F Amplifier
(11)	RCA 6AG5	3rd Picture I-F Amplifier
(12)	RCA 6AG5	4th Picture I-F Amplifier
(13)	RCA 6AL5	Picture 2nd Detector & Sync Limiter
(14)	RCA 12AU7	1st and 2nd Video Amplifier
(15)	RCA 6SN7GT	AGC Amplifier & Vertical Sweep Oscillator
(16)	RCA 6SN7GT	AGC Rectifier & 1st Sync Separator
(17)	RCA 6SN7GT	Sync Amplifier & 2nd Sync Separator
(18)	RCA 6K6GT	Vertical Sweep Output
(19)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(20)	RCA 6BG6G	Horizontal Sweep Output
(21)	RCA 5V4G	Damper
(22)	RCA 1B3-GT/8016	High Voltage Rectifier
(23)	RCA 5U4G	Power Supply Rectifier
(24)	RCA 10BP4	Kinescope

Specifications continued on page 2

8T241, 8T243, 8T244 **ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)**

PICTURE I-F FREQUENCIES

Picture Carrier Frequency .... 25.75 Mc.
Adjacent Channel Sound Trap .... 27.25 Mc.
Accompanying Sound Traps .... 21.25 Mc.
Adjacent Channel Picture Carrier Trap ...... 19.75 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency .... 21.25 Mc.
Sound Discriminator Band Width between peaks.. 350 kc

VIDEO RESPONSE .... To 4 Mc.

FOCUS .... Magnetic

SWEEP DEFLECTION .... Magnetic

SCANNING .... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY 15,750 cps

VERTICAL SCANNING FREQUENCY ..... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) 30 cps

OPERATING CONTROLS (front panel)

Channel Selector, Fine Tuning .... Dual Control Knobs
Picture, Sound Volume and On-Off Switch ... Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold .... Dual Control Knobs
Brightness .... Single Control Knob

NON-OPERATING CONTROLS (not including r-f & i-f adjustments)

Horizontal Centering. top chassis screwdriver adjustment
Vertical Centering... top chassis screwdriver adjustment
Width .... rear chassis screwdriver adjustment
Height .... rear chassis adjustment
Horizontal Linearity.. top chassis screwdriver adjustment
Vertical Linearity .... rear chassis adjustment
Horizontal Drive... rear chassis screwdriver adjustment
Horizontal Oscillator Frequency bottom chassis adjustment
Horizontal Oscillator Waveform side chassis adjustment
Focus .... rear chassis adjustment
Ion Trap Magnet .... top chassis adjustment
Deflection Coil .... top chassis wing nut adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

OPERATING INSTRUCTIONS

The following adjustments are necessary when tuning the receiver on for the first time.

1. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

2. Set the STATION SELECTOR to the desired channel.

3. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

4. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a light pattern appears on the screen.

5. Adjust the VERTICAL hold control until the pattern stops vertical movement.

6. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

7. Turn the BRIGHTNESS control counterclockwise until the retrace lines just disappear.

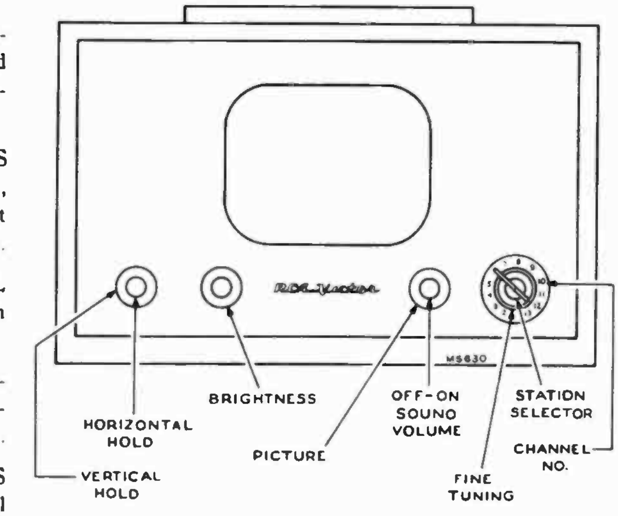


Figure 1—Receiver Operating Controls

8. Adjust the PICTURE control for suitable picture contrast.

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one station to another, it may be necessary to repeat steps numbers 3 and 8.

11. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 3 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps numbers 1 through 8.

INSTALLATION INSTRUCTIONS

The Model 8T241, 8T243 and 8T244 television receivers are shipped complete in one carton except for the 10BP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING.—To unpack the receiver, tear open the carton flaps, pick the receiver up from under the bottom of the cabinet and lift it out of the shipping carton.

Take off the cabinet top and back. Remove the cabinet front panel as shown for Model 8T241 in Figure 2. The cabinet front panels for Models 8T243 and 8T244 are removed by taking out two screws on the inside of the cabinet which hold the front panel in place.

The operating control knobs are packed in a paper bag which is tied to the inside of the cabinet brace.

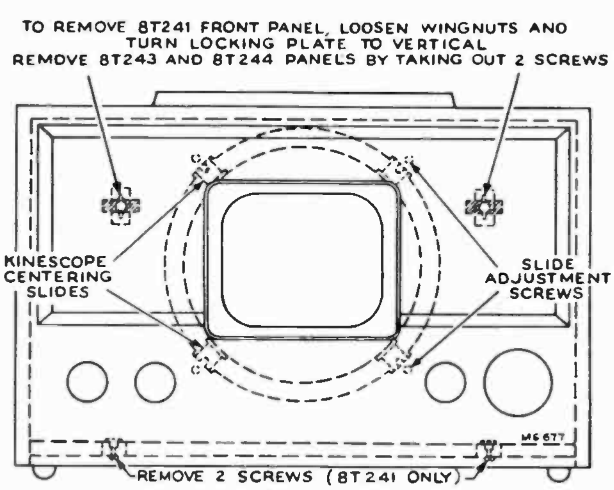


Figure 2—Cabinet, Front View

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets.

REMOVE THE TWO SELF-TAPPING SCREWS FROM THE KINESCOPE CUSHION SLIDE AS SHOWN IN FIGURE 3.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.

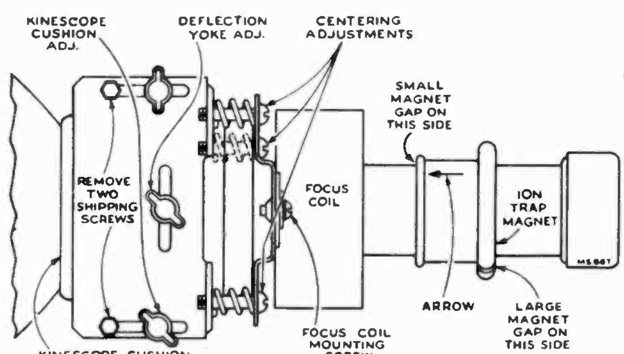


Figure 3—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the two focus coil mounting screws and move the coil until alignment is obtained. Tighten the mounting screws with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 2 for location of the slides and their adjustment screws.

KINESCOPE HANDLING PRECAUTION.—Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatter-proof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

INSTALLATION OF KINESCOPE.—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is up but rotated approximately 30 degrees toward the high voltage compartment.

Insert the neck of the kinescope through the deflection and focus coils as shown in Figure 4 until the base of the tube protrudes approximately two inches beyond the focus coil. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

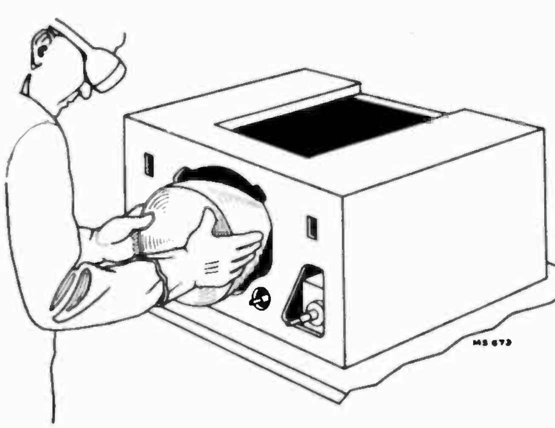


Figure 4—Kinescope Insertion

Slip the ion trap magnet assembly over the neck of the kinescope with the large magnet towards the base of the tube and with the arrow on the assembly up as shown in Figure 3. The front magnet is movable on the assembly. The correct position of the front magnet is with the gap on the right side from the rear of the cabinet. The gap of the large rear magnet should be on the left side and 180 degrees from the gap of the small magnet.

Connect the kinescope socket to the tube base.

Insert the kinescope until the face of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet. Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

Install the cabinet front panel by reversal of the procedure indicated in Figure 2.

For Models 8T243 and 8T244 to install the front panel, place the lip on the bottom of the panel in the recess below the kinescope opening and push the top in. Insert the two screws into the back of panel.

Install the front panel control knobs.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible.

Connect the high voltage lead to the kinescope second anode socket.

The antenna and power connections should now be made.

Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counter-clockwise.

ION TRAP MAGNET ADJUSTMENT.—Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags, as shown in Figure 5.

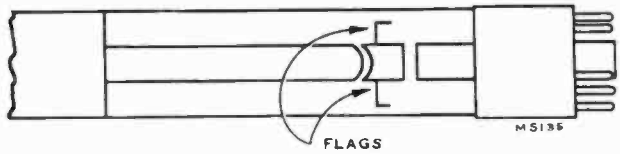


Figure 5—Ion Trap Flags

The ion trap rear magnet poles should be approximately over the ion trap flags. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R191 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

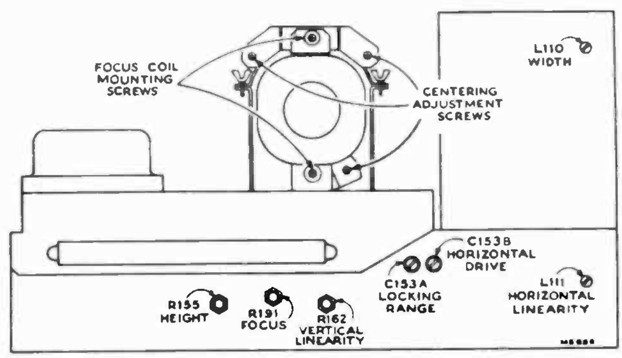


Figure 6—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 8 of the receiver operating instructions on page 3.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However if, the AGC threshold control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn R138 (on top of the chassis, see Figure 8) counter-clockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counter-clockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull in should occur when the control is approximately 90 degrees from the extreme counter-clockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Centering Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counter-clockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T109 horizontal frequency adjustment (under the chassis) until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Lock in Range Adjustment.—Set the horizontal hold control to the full counter-clockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counter-clockwise. Turn the picture control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat this procedure until 3 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure on page 11. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is obtained by mechanically orienting the focus coil with the three adjustment screws shown in Figure 3. Center the picture on the screen by adjustment of these screws. The focus coil should be concentric around the neck of the kinescope to prevent curvature of the raster.

FOCUS COIL ADJUSTMENTS.—If, after making the centering adjustments in the above paragraph, a corner of the picture is shadowed, it will be necessary to loosen the focus coil mounting screws (shown in Figure 3) and change the position of the coil to eliminate the shadow. Recenter the picture by adjustment of the centering screws.

Recheck the position of the ion trap magnet to insure that maximum brilliance is obtained.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R155 on chassis rear apron) until the picture fills the mask vertically (6¾ inches). Adjust vertical linearity (R162 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjust the horizontal drive control C153B to give a picture of maximum width within the limits of good linearity. Adjust the horizontal linearity control L111 to provide best linearity. Adjust the width control until the picture just fills the mask.

Adjustments of the horizontal drive control affect horizontal oscillator hold and locking range. If the drive control was adjusted, recheck the oscillator alignment.

FOCUS.—Adjust the focus control (R191 on chassis rear apron) for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

CHECK TO SEE THAT THE CUSHION AND YOKE THUMBSCREWS AND THE FOCUS COIL MOUNTING SCREWS ARE TIGHT.

AGC THRESHOLD CONTROL.—The AGC threshold control R138 is adjusted at the factory and normally should not require readjustment in the field.

To check the adjustment of the AGC Threshold Control, tune in a strong signal, sync the picture and turn the picture control to the maximum clockwise position. Turn the brightness control counter-clockwise until the vertical retrace lines are just invisible. Momentarily remove the signal by switching off channel then back. If the picture reappears immediately, the receiver is not overloading due to improper setting of R138. If the picture requires an appreciable portion of a second to reappear, R138 should be readjusted.

Set the picture control at the maximum clockwise position. Turn R138 fully counter-clockwise. The top one-half inch of the picture may be bent slightly. This should be disregarded. Turn R138 clockwise until there is a very, very slight bend or change of bend in the top one-half inch of the picture. Then turn R138 counter-clockwise just sufficiently to remove this bend or change of bend.

If the signal is very weak, the above method may not work as it may be impossible to get the picture to bend. In this case, turn R138 clockwise until the snow in the picture becomes more pronounced, then counter-clockwise until the best signal to noise ratio is obtained.

The AGC control adjustment should be made on a strong signal if possible. If the control is set too far clockwise on a weak signal, then the receiver may overload when a strong signal is received.

Replace the cabinet top. On Model 8T241, recheck picture centering after the top is replaced. Replace the cabinet back.

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 7. Adjustment for channel 13 is on top of the chassis and channel 6 adjustment is in the kinescope well. See Figures 11 and 12 for their location.

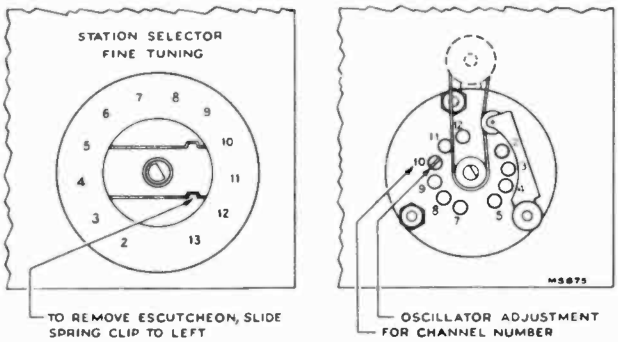


Figure 7—R-F Oscillator Adjustments

CHASSIS TOP VIEW

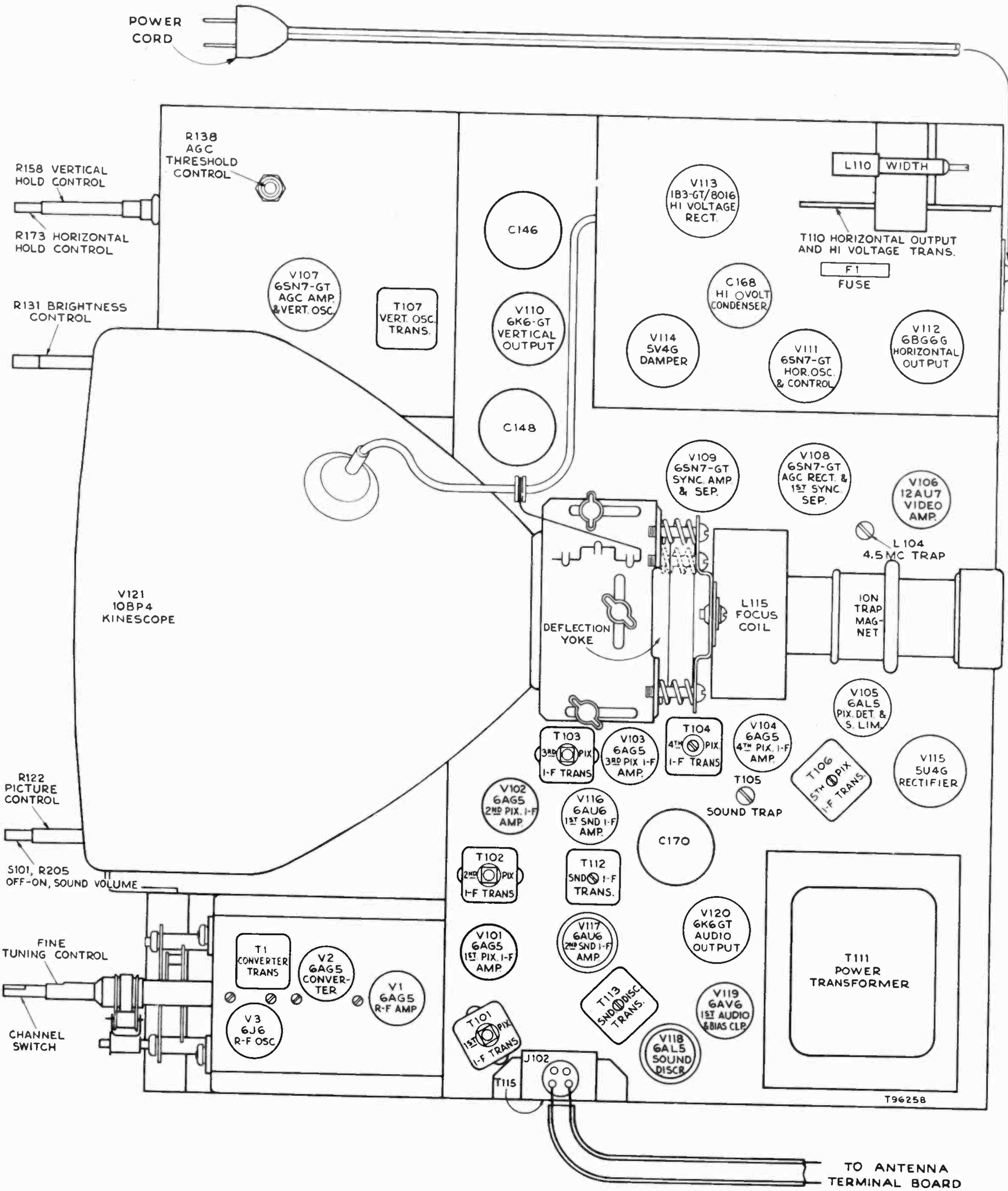


Figure 8—Chassis Top View

CHASSIS BOTTOM VIEW

8T241, 8T243, 8T244

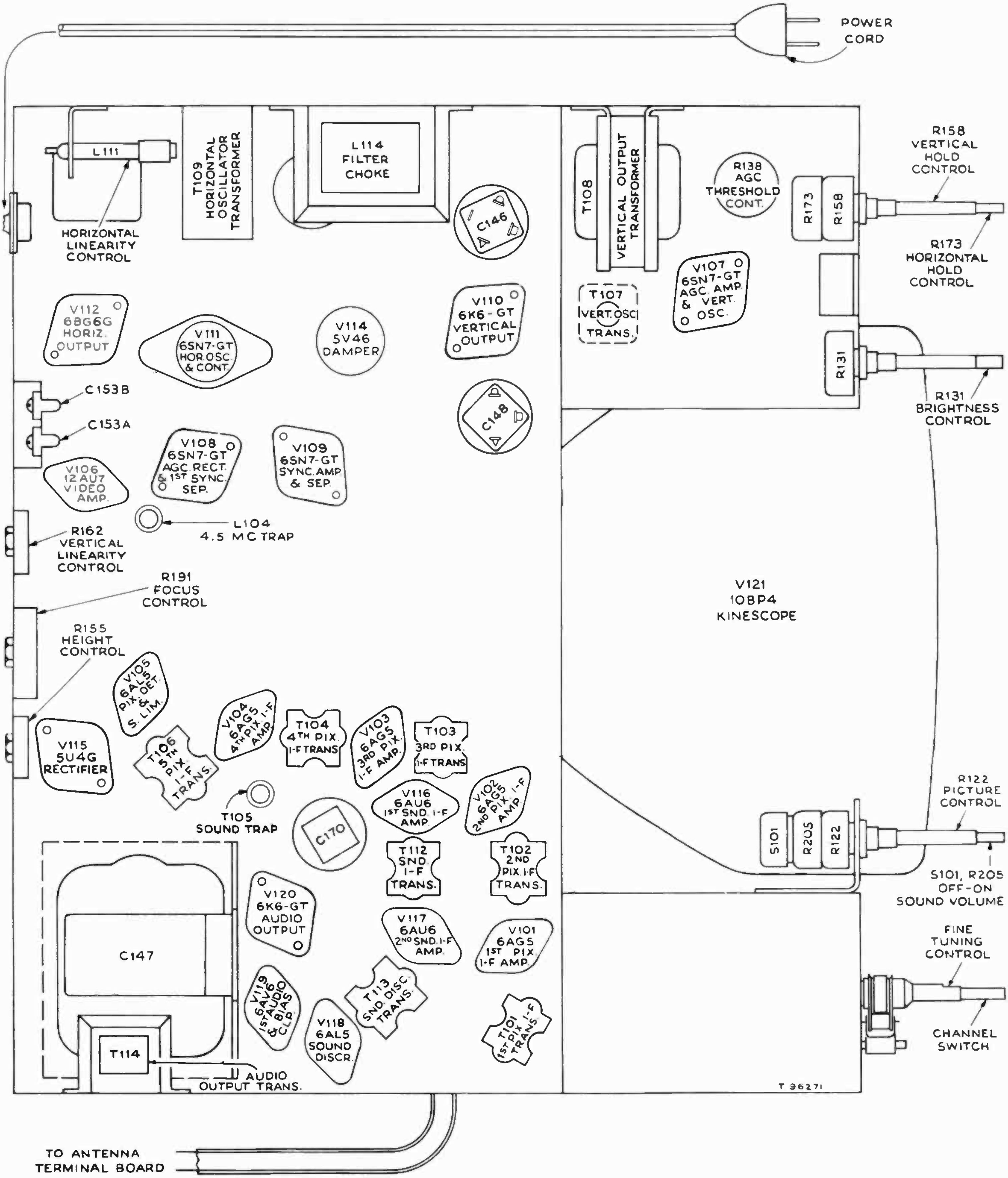


Figure 9—Chassis Bottom View

ALIGNMENT PROCEDURE

TEST EQUIPMENT.—To service properly the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges

20 to 30 mc., 1 mc. and 10 mc. sweep width
50 to 90 mc., 10 mc. sweep width
170 to 225 mc., 10 mc. sweep width

(b) Output adjustable with at least .1 volt maximum.

(c) Output constant on all ranges.

(d) "Flat" output on all attenuator positions.

Cathode-Ray Oscilloscope.—For alignment purposes, the oscilloscope employed must have excellent low frequency and phase response, and should be capable of passing a 60-cycle square wave without appreciable distortion. While this requirement is not met by many commercial instruments, RCA Oscilloscopes, types WO-55A, WO-58A, WO-79A, and WO-60C fill the requirement and any of these may be employed.

For video and sync waveform observations, the oscilloscope must have excellent frequency and phase response from 10 cycles to at least two megacycles in all positions of the gain control. The RCA types WO-58A and WO-79A are ideally suited for this purpose.

Signal Generator to provide the following frequencies:

(a) Intermediate frequencies

19.75 mc. adjacent channel picture trap
21.25 mc. sound i-f and sound traps
22.05 and 24.75 mc. conv. and first pix i-f trans.
25.9 mc. second picture i-f transformer
24.6 mc. fourth picture i-f transformer
22.0 mc. third picture i-f transformer
22.5 mc. fifth picture i-f transformer
25.75 mc. picture carrier
27.25 mc. adjacent channel sound trap

(b) Radio frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output on these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 10 kv.

Service Precautions.—If it is necessary to remove the chassis from cabinet, the kinescope must first be removed. If possible, the chassis should then be serviced without the kinescope. However, if it is necessary to view the raster during servicing, the kinescope should be inserted only after the chassis is turned on end. The kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer down, all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave all adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not short the kinescope second-anode lead. Its short circuit current is approximately 3 ma. This represents approximately 9 watts dissipation and a considerable overload on the high-voltage filter resistor R189.

Adjustments Required.—Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require re-adjustment.

The oscillator line is relatively non-critical. When oscillator tubes are changed, in all probability it will be necessary to adjust only C6 in order to bring the entire line into adjustment.

ORDER OF ALIGNMENT.—When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

(1) Sound discriminator
(2) Sound i-f transformers
(3) Picture i-f traps
(4) Picture i-f transformers
(5) R-F and converter lines
(6) R-F oscillator line
(7) 4.5 mc. video trap
(8) Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT.—Set the signal generator for approximately .1 volt output at 21.25 mc. and connect it to the second sound i-f grid.

Detune T113 secondary (bottom).

Set the "VoltOhmyst" on the 3-volt scale.

Connect the meter, in series with a one-megohm resistor, to the junction of diode resistors R203 and R204.

Adjust the primary of T113 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of C183 and R203. Adjust T113 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T113 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the second sound i-f amplifier.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 mc. and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of C183 and R203. The pattern obtained should be similar to that shown in Figure 15. If it is not, adjust T113 (top) until the wave form is symmetrical.

The peak to peak band width of the discriminator should be approximately 350 kc. and the trace should be linear from 21.175 mc. to 21.325 mc.

SOUND I-F ALIGNMENT.—Connect the sweep oscillator to the first sound i-f amplifier grid.

Connect the oscilloscope to the second sound i-f grid return (terminal A of T112) in series with a 33,000-ohm isolating resistor.

Insert a 21.25 mc. marker signal from the signal generator into the first sound i-f grid.

Adjust T112 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 14.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the second sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

The band width at 70% response from the first sound i-f grid to the second i-f grid should be approx. 200 kc.

PICTURE I-F TRAP ADJUSTMENT.—Connect the "VoltOhmyst" to the junction of R135 and R136.

Remove the 6SN7GT AGC Amplifier tube V107. Connect a 250,000-ohm variable resistance between pins 5 and 6 of the V107 socket. Adjust the resistance until the "VoltOhmyst" reads approximately –4.5 volts.

Set the channel switch to the blank position between channels number 2 and 13.

Connect the "VoltOhmyst" across the picture detector load resistor R119. Under this condition, both leads of the meter are at approximately –120 volts. In making this connection, care should be taken not to touch the case of the meter or to permit the meter case to become grounded.

Connect the output of the signal generator to the grid of the converter tube V2. To do this, remove the tube from the socket and fashion a clip by twisting one end of a small piece of wire around pin number 1. Replace the tube in the socket leaving the end of the wire protruding from under the tube. Connect the signal generator to this wire through a 1,500 mmf capacitor keeping the leads as short as possible.

Set the generator to each of the following frequencies and with a thin fiber screwdriver tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency.

(1) 21.25 mc.—T103 (top)	(4) 27.25 mc.—T104 (top)
(2) 21.25 mc.—T105 (top)	(5) 19.75 mc.—T106 (top)
(3) 27.25 mc.—T102 (top)	(6) 19.75 mc.—T101 (top)

In the above transformers using threaded cores, it is possible to run the cores completely through the coils and secure two peaks or nulls. The correct position is with the cores in the outside ends of the coils. If the cores are not in the correct position, the coupling will be incorrect and it will be impossible to secure the correct response.

PICTURE I-F TRANSFORMER ADJUSTMENTS.—Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst." During alignment, reduce the input signal if necessary to prevent overloading.

22.5 mc.—T106 (bottom)
24.6 mc.—T104 (bottom)
22.0 mc.—T103 (bottom)
25.9 mc.—T102 (bottom)

T1 and T101 are coupled by a link and in combination constitute an overcoupled transformer. The characteristics of such a transformer are such that it is impossible to adjust it to a single frequency.

To sweep align T1 and T101, connect a 330-ohm composition resistor across the primary coils of T102, T103, T104 and T106.

Connect the "VoltOhmyst" to the junction of R135 and R136. Adjust the 250,000-ohm variable resistor for –2.0 volts on the meter.

Connect the oscilloscope to the plate of the first video amplifier, pin 1 of V106.

Connect a sweep generator to the converter grid through a 1,500 mmf capacitor. Set the generator to sweep from 20.0 mc. to 30.0 mc. and adjust the output to provide a 4-volt peak-to-peak signal on the scope.

Connect the signal generator loosely to the converter grid and tune it to provide markers at 22.05 mc. and 24.75 mc.

Adjust T1 (top) and T101 (bottom) to obtain the response shown in Figure 15. The T1 core must penetrate to the terminal-board end of the coil in order to obtain the correct response.

Remove the 330 ohm resistors from across T102, T103, T104 and T106.

Adjust the 250,000 ohm potentiometer for a 15-volt peak to peak signal at the plate of the first video amplifier. The bias as measured by the "VoltOhmyst" should be –4.5 volts or less.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. See Figure 16.

On final adjustment the picture carrier marker must be at approximately 45% response. The curve must be approximately flat topped, with the 22.1 mc. marker at approximately 95% response and the 25.0 mc. marker below 90% response. A 26.5 mc. marker must fall between 5 and 10% response.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 45% response point. If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the reponse curve, the picture becomes smeared. In making these adjustments, care should be taken to see that no two transformers are tuned to the same frequency as i-f oscillation may result.

Remove the converter tube and take off the clip to pin number 1. Replace the tube in the socket.

Picture I-F Oscillation. If the receiver will operate without oscillating with the test equipment disconnected but breaks into oscillation or becomes unstable with the equipment connected, it may become necessary to establish a ground plane. Cover the test bench with a sheet of copper and set the chassis on the sheet. Set all the test equipment except the "VoltOhmyst" on the sheet and bond or bypass them to it. A Junior "VoltOhmyst" should not be bonded to the sheet since the negative test probe is not always connected to ground during alignment. If the receiver is badly misaligned and two or more of the i-f transformers are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a voltage across the picture detector load resistor that is unaffected by r-f signal input. If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the transformers approximately to frequency by setting the adjustment cores of T101, T102, T103, T104, T105 and T106 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias. If so, it should then be possible to align the transformers by the usual method. Once aligned in this manner, the i-f amplifier should be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first three pix i-f amplifiers to ground with 1,000 mmf. capacitors. Connect the signal generator to the fourth pix i-f grid and align T106 to frequency. Progressively remove the shunt from each grid and align the plate coil of that stage to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is stable when properly aligned. Check all i-f pass condensers, transformer shunting resistors, tubes, socket voltages, etc.

ANTENNA, R-F AND CONVERTER LINE ADJUSTMENT.—In order to align the r-f tuner, it will first be necessary to set the channel 13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.

The channel-13 oscillator may be aligned by adjusting it to beat with a crystal-calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available. Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, couple the meter probe loosely to the receiver oscillator.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, connect the signal generator to the receiver antenna terminals. Connect the "VoltOhmyst" to the sound discriminator output (junction of C183 and R203).

Set the receiver switch to 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust C6 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Now that the channel-13 oscillator is set to frequency, we may procede with the r-f alignment.

Connect the oscilloscope to the test connection at R-13 in the r-f tuning unit.

Connect the "VoltOhmyst" to the junction of R134 and R222. Adjust the variable resistance for –3.5 volts on the meter. Remove the first pix amplifier tube V101.

Connect the r-f sweep oscillator to the receiver antenna terminals. The method of connection depends upon the output impedance of the sweep. The P102 connections for 300-ohm balanced or 72-ohm single-ended input are shown in the circuit diagram in Figure 82. If the sweep oscillator has a 50-ohm single-ended output, 300-ohm balanced output can be obtained by connecting as shown in Figure 8.

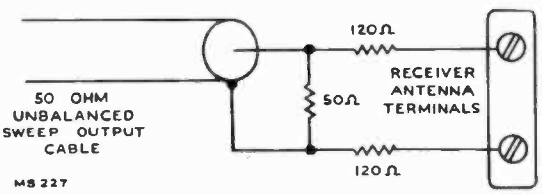


Figure 8—Unbalanced Sweep Cable Termination

Connect the signal generator loosely to the receiver antenna terminals.

Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7.

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier, 175.25 mc. and 179.75 mc.

Adjust C10 and C14 until the curve falls symmetrically between the sound and picture carrier markers. Adjust C11 to give the proper bandwidth. Roughly peak L6 in conjunction with slight adjustments of C10 and C14 for a flat-topped response curve with the sound and picture carriers at 90% to 95% response points on this curve. See Figure 17, channel 7.

Switch to channel 12 and adjust L6 for maximum response and minimum top slope of the curve.

Check the response of channels 7 through 13 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observing the response obtained. See Figure 17 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 80% response., If the markers do not fall within this requirement on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L6, C10, C11 and C14, and possibly compromise some channel slightly in order to, get the markers up on other channels. Normally, however, no difficulty of this type should be experienced since the higher frequency channels are comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L9, L13, L66, and C-12 for an approximately flat-topped response curve located symmetrically between the markers. L9, L13 and L66 are the center frequency adjustments. C12 is the band-width adjustment.

Check channels 5 down through channel 2 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 80% response point. If this is not the case, L9, L13, L66 and C12 should be retouched. On final adjustment, all channels must be within the 80% specification.

Disconnect the variable resistance, and replace V107 and V101.

Following an r-f alignment, the oscillator alignment must be checked.

R-F OSCILLATOR LINE ADJUSTMENT.—The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated. If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, the calibration frequency listed under R-F Osc. Freq. must be available.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier frequency, the frequencies listed under Sound Carrier Freq. must be available.

Channel Number	Receiver R-F Osc. Freq. Mc.	R-F Sound Carrier Freq. Mc.	Channel Oscillator Adjustment
2	81	59.75	L24
3	87	65.75	L23
4	93	71.75	L22
5	103	81.75	L21
6	109	87.75	L31
7	201	179.75	L19
8	207	185.75	L18
9	213	191.75	L17
10	219	197.75	L16
11	225	203.75	L15
12	231	209.75	L14
13	237	215.75	C6

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the "VoltOhmyst" to the sound discriminator output (junction of C183 and R203) and connect the signal generator to the receiver antenna terminals. The order of alignment remains the same regardless of which method is used.

The shield over the bottom of the r-f unit must be in place when making adjustments.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust C6 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. Oscillator adjustments L1 and L2 shown on the schematic are factory control adjustments and should not be touched in the field.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L14 for indications as above.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

AGC THRESHOLD ADJUSTMENT.—The AGC threshold adjustment can be made by the method outlined in the Installation Instructions. However, a more accurate adjustment can be obtained by the use of an oscilloscope.

Tune in a station and advance the picture control to the maximum clockwise position. Connect the low capacity probe from the oscilloscope to the plate of the first video amplifier, pin 1 of V106. Adjust the oscilloscope to observe the horizontal sync pulse.

Turn the AGC threshold control R138 fully counter-clockwise, then slowly clockwise. As the control is turned clockwise, the receiver gain will increase slowly, increasing the size of the pattern on the oscilloscope. R138 should be turned clockwise until the receiver begins to overload as indicated by clipping of the sync. The control should be left in the maximum gain position in which no clipping of sync is observed. See Figure 20 for proper waveforms.

HORIZONTAL OSCILLATOR ADJUSTMENT.—Normally the adjustment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment requires the use of an oscilloscope, it can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require readjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned or whenever the horizontal oscillator operation is improper.

Horizontal Frequency Adjustment.—With a clip lead, short circuit the coil between terminals C and D of the horizontal oscillator transformer T109. Tune in a television station and sync the picture if possible.

A.—Turn the horizontal hold control R173 to the extreme clockwise position. Adjust the T109 Frequency Adjustment (under the chassis) so that the picture is just out of sync and the horizontal blanking appears in the picture as a vertical bar. The position of the bar is unimportant.

B.—Turn the hold control approximately one quarter of a turn from the extreme clockwise position and examine the width and linearity of the picture. If picture width or linearity is incorrect, adjust the horizontal drive control C153B, the width control L110 and the linearity control L111 until the picture is correct. If C153B, L110 or L111 were adjusted, repeat step A above.

Horizontal Locking Range Adjustment.—Turn the horizontal hold control fully counter-clockwise. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 9 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 7 bars are present, adjust C153A slightly counter-clockwise. Turn the horizontal hold control counter-clockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat the procedure until 7 to 9 bars are present.

Horizontal Oscillator Waveform Adjustment.—Remove the shorting clip from terminals C and D of T109. Turn the horizontal hold control to the extreme clockwise position. With a thin fibre screwdriver, adjust the Oscillator Waveform Adjustment Core of T109 (on the outside of the chassis) until the horizontal blanking bar appears in the raster.

A.—Connect the low capacity probe of an oscilloscope to terminal C of T109. Turn the horizontal hold control one quarter turn from the clockwise position so that the picture is in sync. The pattern on the oscilloscope should be as shown in Figure 21 Adjust the Oscillator Waveform Adjustment Core of T109 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the hold control if necessary.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Check of Horizontal Oscillator Adjustments.—Set the horizontal hold control to the full counterclockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the horizontal hold control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 3 bars are present.

Turn the horizontal hold control to the maximum clockwise position. The picture should be just out of sync to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Adjust the T109 Frequency Adjustment until this condition is fulfilled.

4.5 MC VIDEO TRAP.—With a strong input from a station, detune the receiver from the correct fine tuning point. With a very short clip lead, short the trap winding of T103. Observe the picture for the appearance of a 4.5 mc. beat. If the beat appears in the picture, adjust L104 until the beat is eliminated.

SENSITIVITY CHECK.—A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through a ladder type attenuator pad. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position. Only carbon type resistors should be used to construct the pad.

RESPONSE CURVES.—The response curves shown on page 14 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, variations can be expected.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

ALIGNMENT TABLE.—Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment.

ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 8 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
					DISCRIMINATOR AND SOUND I-F ALIGNMENT				
1	2nd sound i-f grid (pin 1, V117)	21.25 .1 volt output	Not used		Not used	In series with 1 meg. to junction of R203 & R204		Detune T113 (bot.) Adjust T113 (top) for max. on meter	Fig. 13 Fig. 12 Fig. 11
2	"	"	"		"	Junction of C183 & R203	Meter on 3 volt scale	T113 (bottom) for zero on meter	Fig. 13 Fig. 12
3	"	"	2nd sound i-f grid (pin 1, V117)	21.25 center 1 mc. wide .1 v. out	Junct. of C183 & R203	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T113 (top) until they are equal		Fig. 13 Fig. 15
4	1st sound i-f grid (pin 1, V116)	21.25 re-duced output	1st sound i-f grid	21.25 reduced output	Terminal A, T112 in series with a 33,000 ohm resistor.	"	Sweep output re-duced to provide .3 volt p-to-p on scope	T112 (top & bot.) for max. gain and symmetry at 21.25 mc.	Fig. 13 Fig. 11 Fig. 12 Fig. 16
					PICTURE I-F AND TRAP ADJUSTMENT				
5	Not used		Not used		Not used	Junction of R135 & R136	Remove V107. Connect potenti-ometer between pins 5 & 6 of V107 socket	Adjust potentiom-eter for 4.5 volts on meter	Fig. 13 Fig. 11
6	Converter grid (pin 1, V2)	21.25	"		"	Across R119	Meter on 3 volt scale. Receiver be-tween 2 & 13	T103 (top) for min. on meter	Fig. 11 Fig. 13
7	"	21.25	"		"	"	"	T105 (top) for min.	Fig. 13 Fig. 11
8	"	27.25	"		"	"	"	T102 (top) for min.	"
9	"	27.25	"		"	"	"	T104 (top) for min.	"
10	"	19.75	"		"	"	"	T106 (top) for min.	"
11	"	19.75	"		"	"	"	T101 (top) for min.	"
12	"	22.5	"		"	"	"	T106 (bottom) for max. on meter	Fig. 12
13	"	24.6	"		"	"	"	T104 (bottom) for max.	"
14	"	22.0	"		"	"	"	T103 (bottom) for max.	"
15	"	25.9	"		"	"	"	T102 (bottom) for max.	"
16	"	21.95 24.8	Converter grid (pin 1, V2)	Sweep-ing 20 to 30 mc.	Pin 1, V106	Junction of R135 & R136	Shunt 300 ohms across pri. T102, T103, T104, T106. Set bias -2 V. Set swp. gen. for 4 V. P-P on scope.	Adjust T1 (top) and T101 (bot-tom) for proper response	Fig. 12 Fig. 17
17	"		"	"	"	"	Remove shunt re-sistors. Set bias to give 15 volts P to P on scope.	Adjust T1 (top), T101, T102, T103, T104, T106 (bot.) for proper resp.	Fig. 11 Fig. 12 Fig. 13 Fig. 18
					ANTENNA, R-F AND CONVERTER LINE ALIGNMENT				
18	Antenna terminals	215.75	Not used		Not used	Junction of C183 & R203 for signal gen. method only	Fine tuning cen-tered. Receiver on channel 13. Het-erodyne meter coupled to oscil-lator if used.	C6 for zero on meter or beat on het. freq. meter	Fig. 13 Fig. 11
19						Junction of R134 & R222	Remove V101	Potentiometer for -3.5 volts on meter	Fig. 13 Fig. 11
20	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (see text for precaution)	Sweep-ing channel 7	Test Connection R13	Not used	Receiver on chan-nel 7	L6, C10, C11 & C14 for flat top response between markers. Markers above 90%.	Fig. 13 Fig. 12 Fig. 11 Fig. 19 (7)
21	"	205.25 209.75	"	channel 12	"	"	Receiver on chan-nel 12	L6 for max. re-sponse and min. slope of top of curve	Fig. 18 Fig. 19 (12)
22	"	175.25 179.75	"	channel 7	"	"	Receiver on chan-nel 7	Check to see that response is as above	Fig. 19 (7)
23	"	181.25 185.75	"	channel 8	"	"	Receiver on chan-nel 8	"	Fig. 19 (8)
24	"	187.25 191.75	"	channel 9	"	"	Receiver on chan-nel 9	"	Fig. 19 (9)
25	"	193.25 197.75	"	channel 10	"	"	Receiver on chan-nel 10	"	Fig. 19 (10)

ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	RF AND CONVERTER LINE ALIGNMENT (Cont'd)								
26	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 19 (11)
27	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 19 (12)
28	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 19 (13)
29	If the response on any channel (steps 22 through 28) is below 80% at either marker, switch to that channel and adjust L6, C10, C11 & C14 to pull response up on that channel. Then recheck steps 22 through 28.								
30	Antenna terminals (loosely)	83.25 87.75	Ant. terminals (see text for precaution)	Sweeping chan. 6	Test Connection R13	Not used	Receiver on channel 6	L9, L13, L66 & C12 for response as above	Fig. 19 (6)
31	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 19 (5)
32	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 19 (4)
33	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 19 (3)
34	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	Fig. 19 (2)
35	If the response on any channel (steps 31 through 34) is below 80% at either marker, switch to that channel and adjust L9, L13, L66 & C12 to pull response up on that channel. Then recheck steps 30 through 34. Disconnect bias pot and replace V101 and V107.								

R-F OSCILLATOR ALIGNMENT

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT HETERODYNE FREQ. METER TO	HET. METER FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
36	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Junction of C183 & R203 for sig. gen. method only	Fine tuning centered. Receiver on channel 13	C6 for zero on meter or beat on het. freq. meter	Fig. 13 Fig. 12 Fig. 11
37	"	209.75	"	231	"	"	Rec. on chan. 12	L14 as above	Fig. 14
38	"	203.75	"	225	"	"	Rec. on chan. 11	L15 as above	"
39	"	197.75	"	219	"	"	Rec. on chan. 10	L16 as above	"
40	"	191.75	"	213	"	"	Rec. on chan. 9	L17 as above	"
41	"	185.75	"	207	"	"	Rec. on chan. 8	L18 as above	"
42	"	179.75	"	201	"	"	Rec. on chan. 7	L19 as above	"
43	"	87.75	"	109	"	"	Rec. on chan. 6	L31 as above	Fig. 12
44	"	81.75	"	103	"	"	Rec. on chan. 5	L21 as above	Fig. 14
45	"	71.75	"	93	"	"	Rec. on chan. 4	L22 as above	"
46	"	65.75	"	87	"	"	Rec. on chan. 3	L23 as above	"
47	"	59.75	"	81	"	"	Rec. on chan. 2	L24 as above	"
48	Repeat steps 36 through 47 as a check.								
	AGC THRESHOLD ADJUSTMENT								
49	Not used		Not used		Pin 1, V106	Not used	Tune in station, turn pix control clockwise. Adjust R138 for max. gain without clipping sync on scope		Fig. 13 Fig. 20

HORIZONTAL OSCILLATOR ADJUSTMENT

STEP No.	
50	Short circuit terminals C and D of T109. Tune in a station.
51	Turn hold control fully clockwise. Adjust T109 Frequency Adjustment until horizontal blanking bar appears in the picture.
52	Turn hold control ¼ turn from clockwise to sync picture. Adjust width (L110), linearity (L111) and drive (C153B) controls until picture is correct. Repeat step 51.
53	Turn hold control fully counterclockwise. Momentarily remove signal. Turn hold control slowly clockwise. Note least number of bars before pull-in. Adjust Locking Range Control (C153A) for 7 to 9 bar pull-in.
54	Remove clip from terminals C and D of T109. Turn hold control fully clockwise. Adjust T109 Oscillator Waveform Adjustment until horizontal blanking bar appears in picture.
55	Connect low capacity probe of oscilloscope to terminal C of T109. Turn hold control ¼ turn from clockwise. Adjust T109 Oscillator Waveform Adjustment until broad and sharp peaks of wave on oscilloscope are same height. Keep picture in sync with hold control during adjustment. Remove oscilloscope.
56	Turn hold control fully counterclockwise. Momentarily remove signal. Turn hold control slowly clockwise. Note least number of bars before pull-in. Adjust Locking Range Control (C153A) for 3 bar pull-in.
57	Turn hold control fully clockwise. Adjust T109 Freq. Adjustment until horizontal blanking appears as single vertical or diagonal bar in pix.
	4.5 MC VIDEO TRAP ADJUSTMENT
58	Tune in a strong station. Short the trap winding of T103. If a 4.5 mc beat appears in picture adjust L104 until beat is eliminated.
	SENSITIVITY CHECK
59	Connect antenna to receiver through attenuator pad to provide weak signal. Compare the picture and sound obtained to that obtained on other receivers under the same conditions.

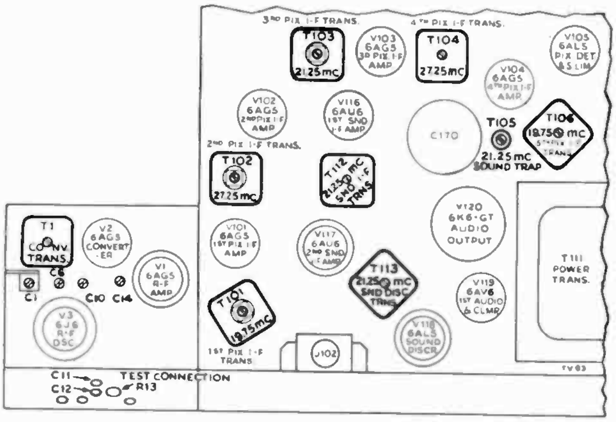


Figure 11—Top Chassis Adjustments

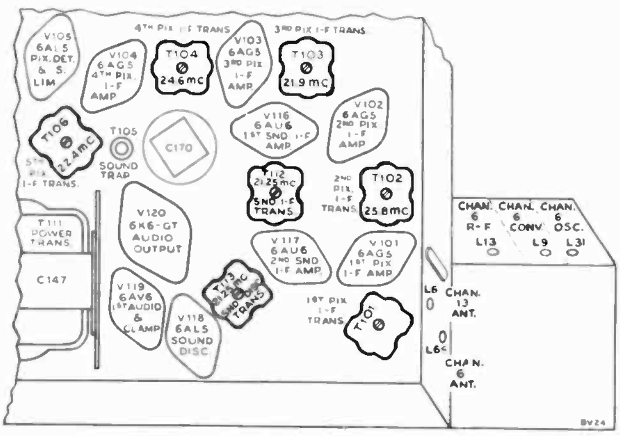


Figure 12—Bottom Chassis Adjustments

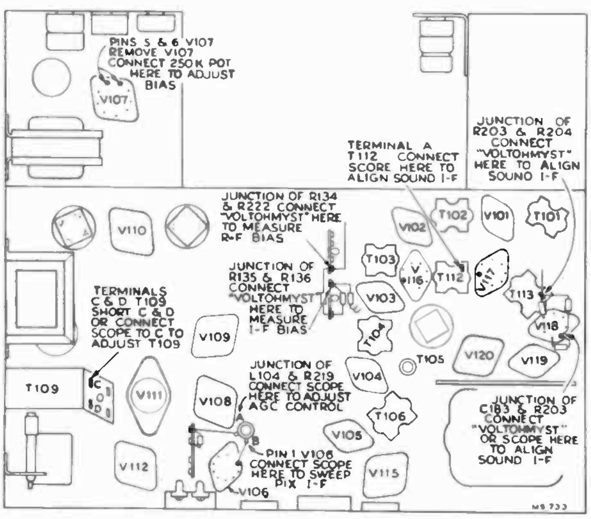
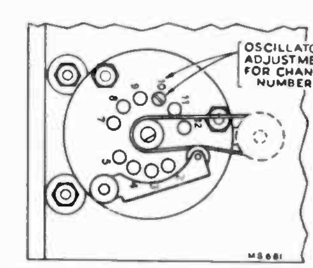


Figure 13—Test Connection Points



OSCILLATOR ADJUSTMENT FOR CHANNEL 13 IS ON TOP OF R-F UNIT AND CHANNEL 6 IS ON SIDE.

Figure 14—R-F Oscillator Adjustments

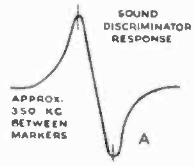


Figure 15
Discriminator
Response

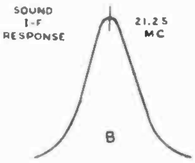


Figure 16
Sound I-F
Response

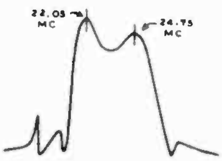


Figure 17
T1 and T101
Response

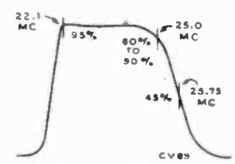


Figure 18
Overall I-F
R-F Response

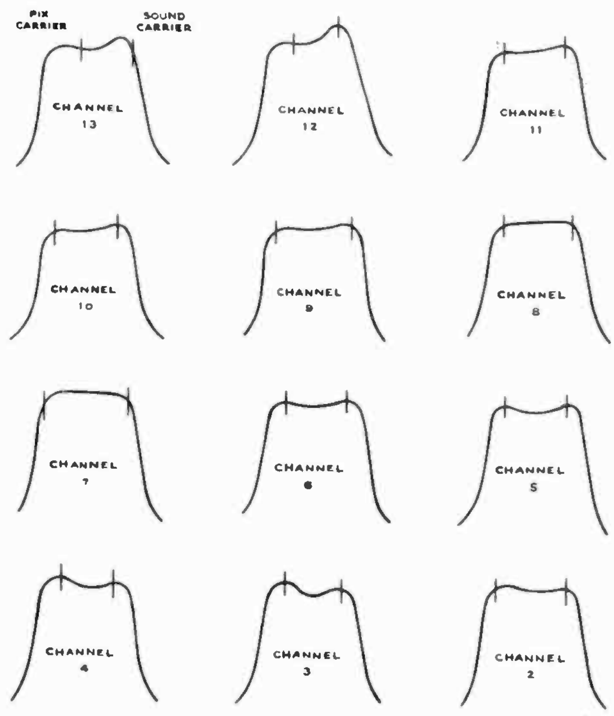


Figure 19—R-F Response

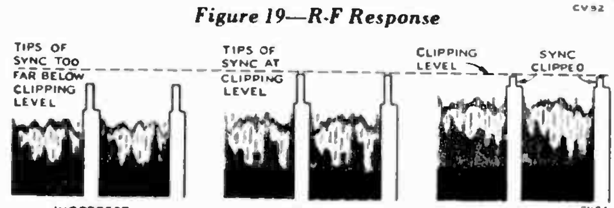


Figure 20—AGC Threshold Adjustment Waveforms

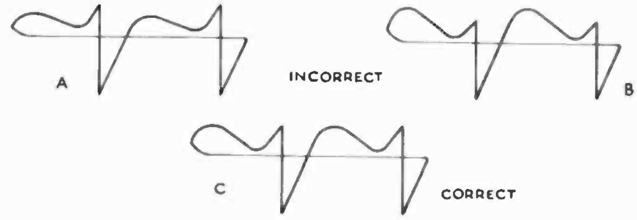


Figure 21—Horizontal Oscillator Waveforms

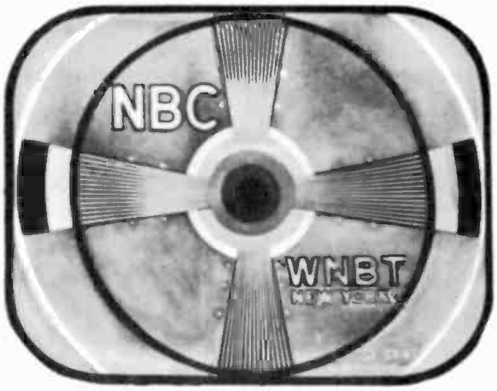
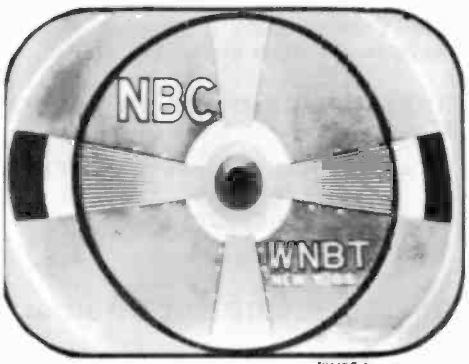


Figure 22—Normal Picture

Figure 23—Focus Coil and Ion Trap Magnet Misadjusted

PH106B



PH106A

Figure 24—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

Figure 25—Width Control Misadjusted

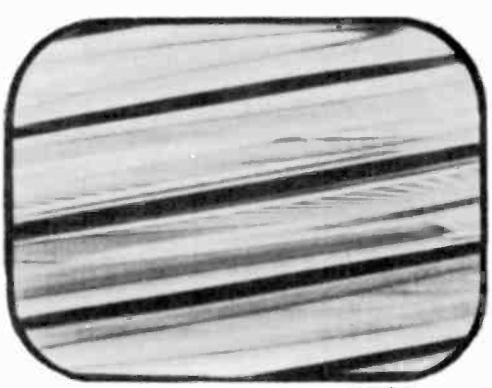
PH108B

PH108C

Figure 26—Horizontal Drive Control Misadjusted

Figure 27—Transients

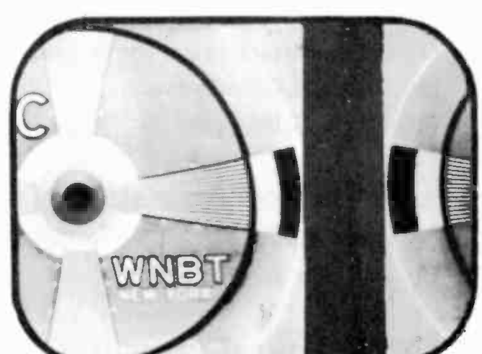
PH109B



PH227-2

Figure 28—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is in a Counterclockwise Position—Just Before Pulling Into Sync

Figure 29—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position



PH109D

SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults.

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet—Magnets reversed either front to back or top to bottom, front magnet incorrectly oriented.

(2) V112 or V113 inoperative—check voltage and waveform on grids and plates.

(3) No high voltage—If horizontal deflection is operating as evidenced by the correct waveform on terminal 4 of horizontal output transformer, the trouble can be isolated to the 8016 circuit. Either the T110 high voltage winding is open (points 2 to 3), the 8016 tube is defective, its filament circuit is open, C168 is shorted or R187 or R189 open.

(4) V111 circuit inoperative—Refer to schematic and waveform chart.

(5) Damper tube (V114) inoperative.

(6) Defective kinescope.

(7) R131 open (terminal 3 to ground).

(8) No receiver plate voltage—filter capacitor or filter choke shorted—bleeder or filter choke open.

NO VERTICAL DEFLECTION:

(1) V107B or V110 inoperative. Check voltage and waveforms on grids and plates.

(2) T107 or T108 open.

(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

(2) V112 defective.

POOR VERTICAL LINEARITY:

(1) If adjustments cannot correct, change V110.

(2) Vertical output transformer defective.

(3) V107B defective—check voltage and waveforms on grid and plate.

(4) C150, R164, C147B or C148-C defective.

(5) Low bias or plate voltage—check rectifiers and capacitors in supply circuits.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V112 or V114.

(2) T110 or L111 defective.

(3) C164 or C165 defective.

WRINKLES ON LEFT SIDE OF RASTER:

(1) R166, R167 or C169 defective.

(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) T109 incorrectly tuned.

(2) R172, R173 or R174 defective.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER

(1) Improper adjustment of focus coil or ion trap magnet.

(2) Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f, discriminator or audio amplifier inoperative—check V116, V117, V118, V119, V120 and their socket voltages.

(3) T114 or C186 defective.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) AGC threshold control R138 misadjusted.

(2) V105A, V107A, V108 or V109 inoperative. Check voltage and waveforms at their grids and plates.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V107B and associated circuit—C145, T107, etc.

(2) Integrating network inoperative—Check.

(3) R154, R155, R157, R158 or R159 defective.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T109 misadjusted—readjust as instructed on page 11.

(2) V111 inoperative—check socket voltages and waveforms.

(3) T109 defective.

(4) C140, C153A, C154, C155, C157 or C166 defective.

(5) If horizontal speed is completely off and cannot be adjusted check C158, C159, R172, R173, R174, R179 and R182.

SOUND AND RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V103, V104, V105 and V106—check socket voltages.

(2) Bad contact to kinescope grid.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V105A or V106 defective.

(2) Peaking coils defective—check for specified resistance.

(3) Make sure that the focus control operates on both sides of proper focus.

(4) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) R-F or I-F circuits misaligned.

(2) Open peaking coil.

(3) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) AGC threshold control R138 misadjusted.

(2) If regular sections at the left picture are displaced change V112.

(3) Vertical instability may be due to loose connections or noise.
(4) Horizontal instability may be due to unstable transmitted sync.

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.
(2) R-F oscillator off frequency.
(3) R-F unit inoperative—check V1, V2, V3.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.
(2) Replace V112.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C169 defective.
(2) V114 defective.

PICTURE I-F RESPONSE.—At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method:

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect a wide band sweep generator to the converter grid and adjust it to sweep from 18 mc. to 30 mc.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

Figures 30 through 34 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

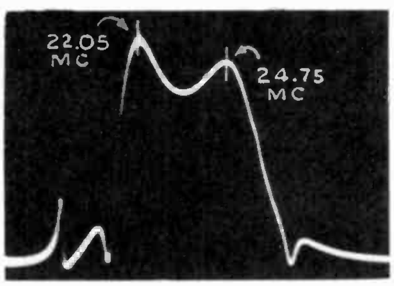


Figure 30—Response of Converter and First Pix I-F Transformer

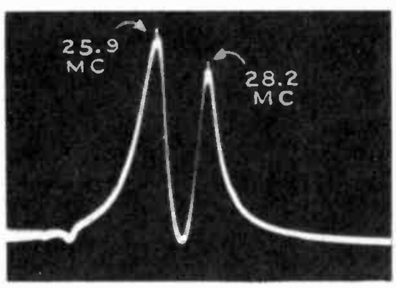


Figure 31—Response of Second Pix I-F Transformer

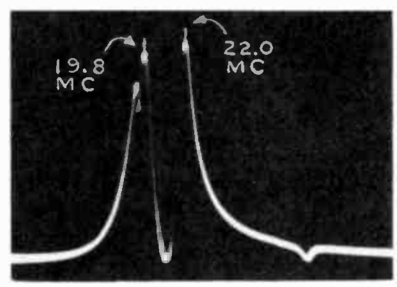


Figure 32—Response of Third Pix I-F Transformer

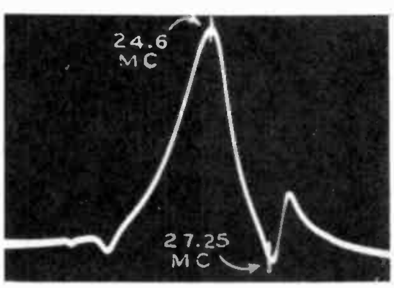


Figure 33—Response of Fourth Pix I-F Transformer

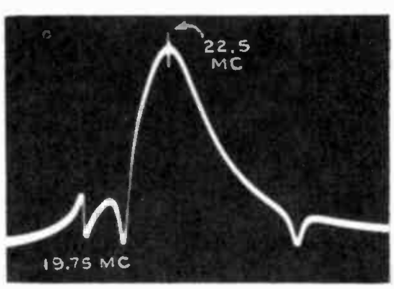


Figure 34—Response of Fifth Pix I-F Transformer

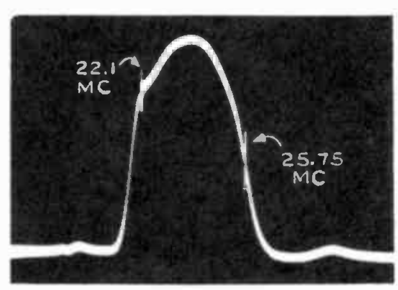


Figure 35—Response from First Pix I-F grid to Pix Det.

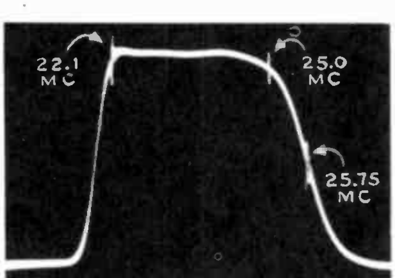


Figure 36—Overall Pix I-F Response

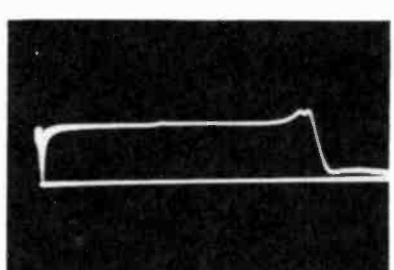


Figure 37—Video Response at Average Contrast

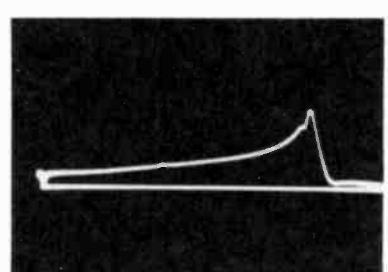
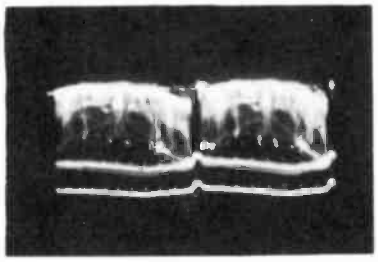


Figure 38—Video Response at Minimum Contrast

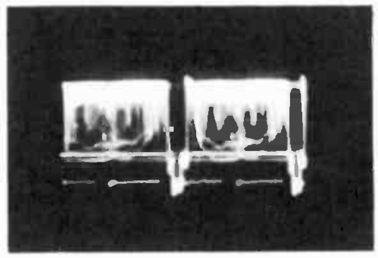
WAVEFORM PHOTOGRAPHS

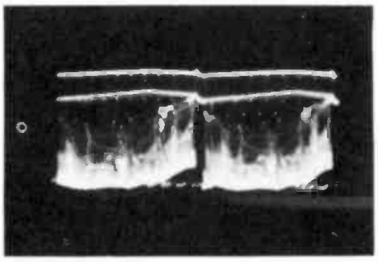


Video Signal Input to 1st Video Amplifier (Pin 2 of V106) (12AU7)

Figure 39—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (5.4 Volts PP)

Figure 40—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (5.4 Volts PP)

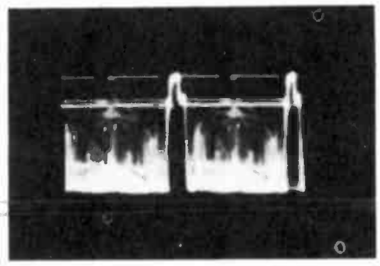


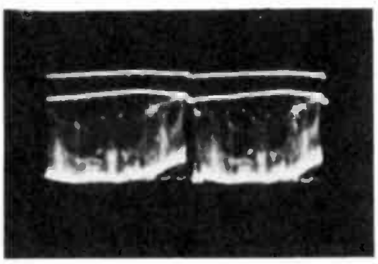


Sync Feed (Junction of L104, R219 and C194)

Figure 41—Vertical (28 Volts PP)

Figure 42—Horizontal (28 Volts PP)

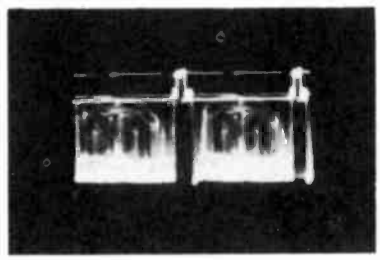


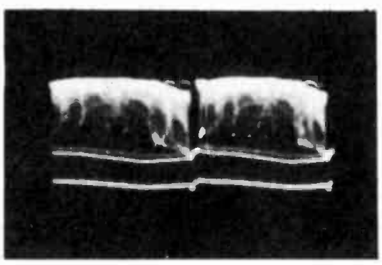


Input to 2nd Video Amplifier (Pin 7 of V106) (12AU7)

Figure 43—Vertical (17 Volts PP)

Figure 44—Horizontal (17 Volts PP)

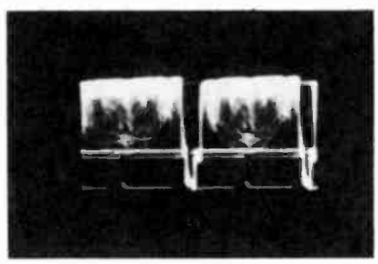


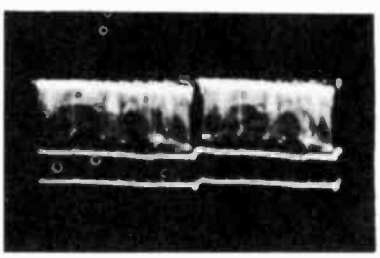


Output of 2nd Video Amplifier (Junction of L105 and R127) (Picture Max.)

Figure 45—Vertical (96 Volts PP)

Figure 46—Horizontal (96 volts PP)

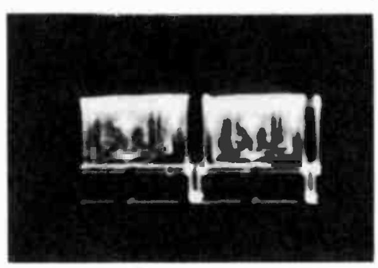


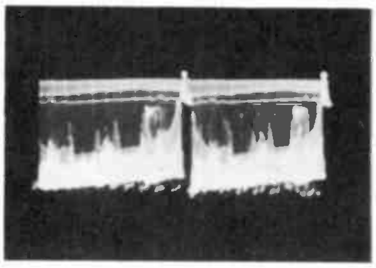


Input to Kinescope (Junction of R127 and R128) (Picture Max.)

Figure 47—Vertical (65 Volts PP)

Figure 48—Horizontal (65 Volts PP)

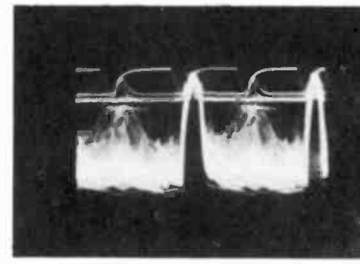


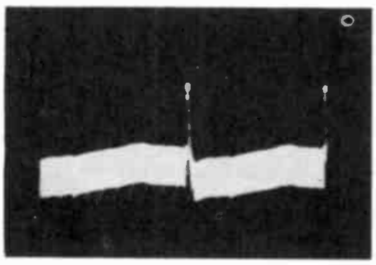


Input to 1st Sync Separator (Pin 1 of V108) (6SN7GT)

Figure 49—Vertical (25 Volts PP)

Figure 50—Horizontal (23 Volts PP)

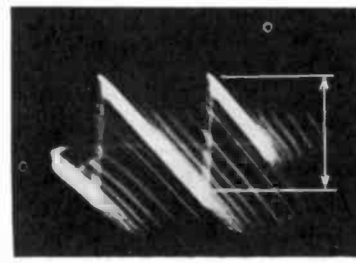


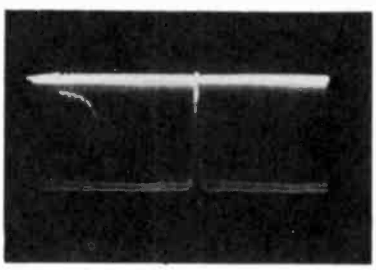


AGC Rectifier Cathode (Pin 6 of V108) (6SN7GT)

Figure 51—Vertical (4.7 Volts PP)

Figure 52—Horizontal (1.5 Volts PP)

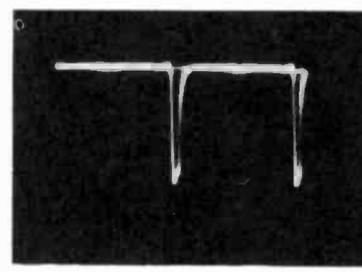


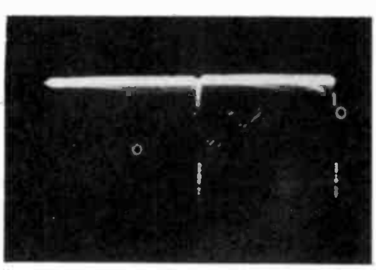


Output of 1st Sync Separator (Pin 5 of V108) (6SN7GT)

Figure 53—Vertical (24 Volts PP)

Figure 54—Horizontal (24 Volts PP)

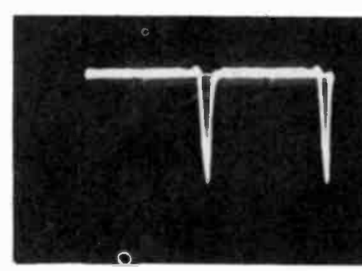


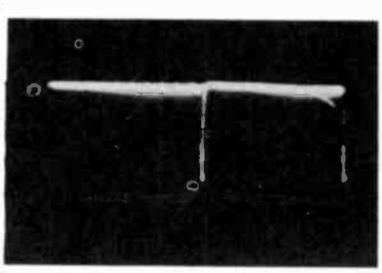


Output of 1st Sync Separator (Pin 2 of V108) (6SN7GT)

Figure 55—Vertical (26 Volts PP)

Figure 56—Horizontal (25.5 Volts PP)

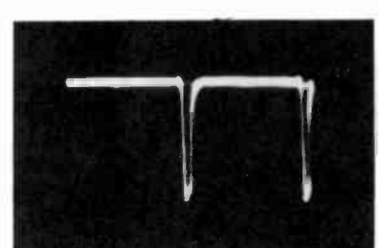




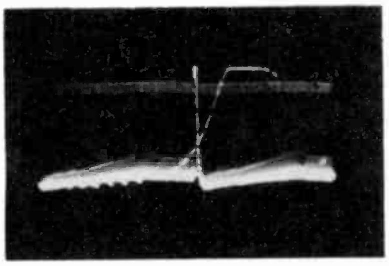
Input to Sync Amplifier (Junction of C137, C139 and R145)

Figure 57—Vertical (21 Volts PP)

Figure 58—Horizontal (21 Volts PP)



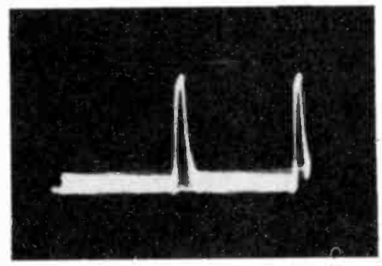
WAVEFORM PHOTOGRAPHS

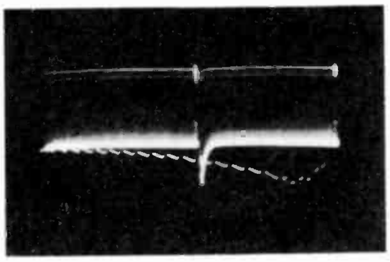


Output of Sync Amplifier (Pin 2 of V109) (6SN7GT)

Figure 59—Vertical (115 Volts PP)
←

Figure 60—Horizontal (105 Volts PP)
→

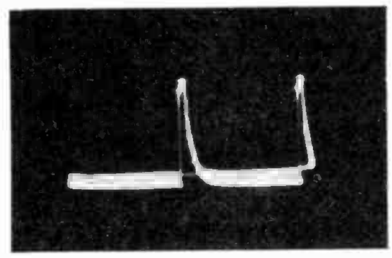




Cathode of 2nd Sync Separator (Pin 6 of V109) (6SN7GT)

Figure 61—Vertical (17 Volts PP)
←

Figure 62—Horizontal (11 Volts PP)
→



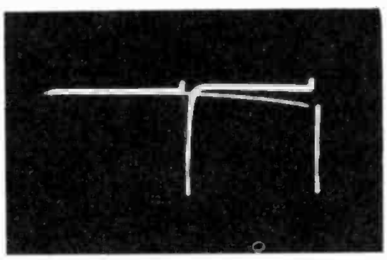
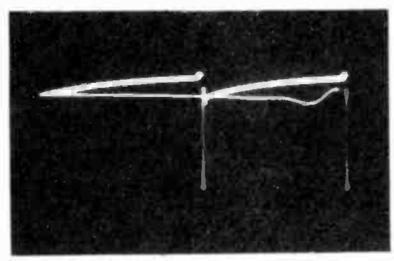


Figure 63—Output of Integrating Network (Junction of C144, C145 and R153) (45 Volts PP)
←

Figure 64—Grid of Vertical Oscillator (720 Volts PP) (Pin 1 of V107) (6SN7GT)
→



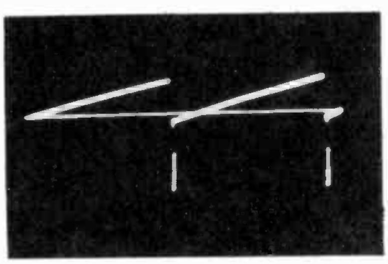
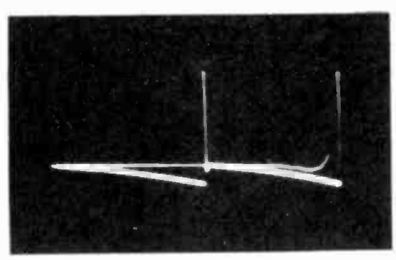


Figure 65—Grid of Vertical Output (160 Volts PP) (Pin 5 of V110) (6K6GT)
←

Figure 66—Plate of Vertical Output (750 Volts PP) (Pin 3 of V110) (6K6GT)
→



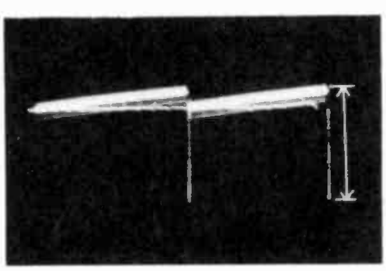
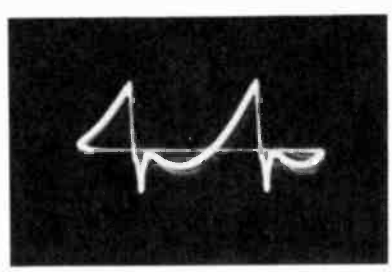


Figure 67—Input of Vertical Deflection Coils (75 Volts PP) (Junction of Green Lead of T108 and Green Lead of Yoke)
←

Figure 68—Input to Horizontal Oscillator (17.5 Volts PP) (Junction of C153A and C154)
→



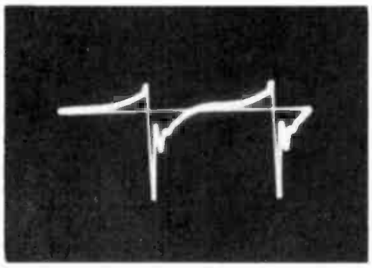
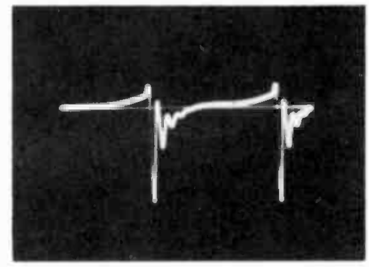


Figure 69—Junction of R168, R176 and R178 (150 Volts PP)

←

Figure 70—Grid of Horizontal Oscillator (480 Volts PP) (Pin 4 of V111) (6SN7GT)

→



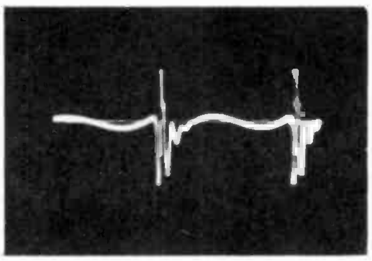
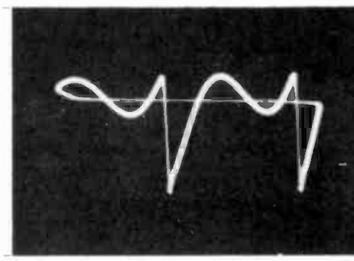


Figure 71—Plate of Horizontal Oscillator (270 Volts PP) (Pin 5 of V111) (6SN7GT)

←

Figure 72—Terminal "C" of T109 (70 Volts PP)

→



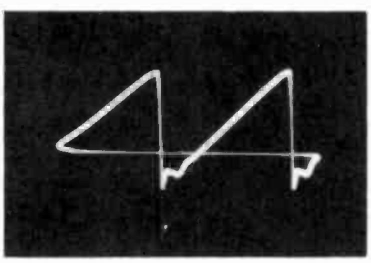
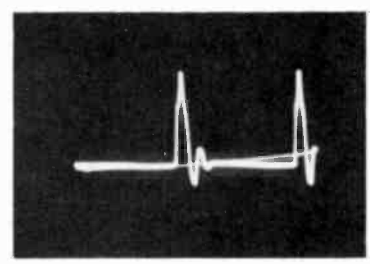


Figure 73—Input to Horizontal Output Tube (42 Volts PP) (Junction of C160, R183 and C153B)

←

Figure 74—Plate of Horizontal Output (Approx. 5,200 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V112 to Ground)

→



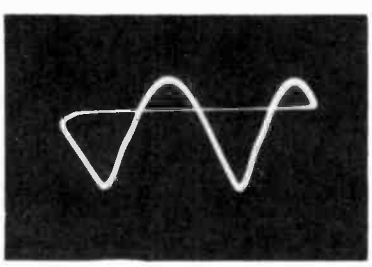
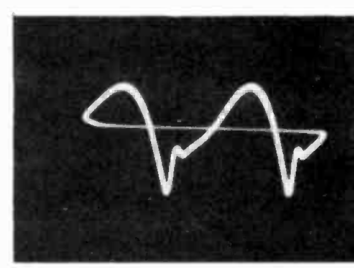


Figure 75—Junction of C165, L111 and Terminal 1 of T110 (80 Volts PP)

←

Figure 76—Cathode of Damper (33 Volts PP) (Pin 8 of V114) (5V4G)

→



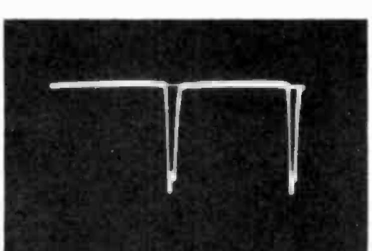
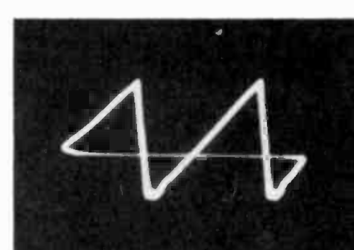


Figure 77—Input to Horizontal Deflection Coils (1,150 Volts PP) (Pin 4 of V114) (5V4G)

←

Figure 78—Junction of L115 and R192 (6 Volts PP)

→



VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition a 2200 microvolt test pattern signal was fed into the receiver, the picture was synced and the AGC threshold control was properly adjusted. The second condition was obtained by removing the antenna leads and short-circuiting the receiver antenna terminals. Voltages shown are as read with "Jr. VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V1	6AG5	R-F Amplifier	2200 Mu. V. Signal	5	146	6	148	2 & 7	0	1	–4.9	.72	.33	
			No Signal	5	85	6	120	2 & 7	0	1	–0.4v	12.0	4.0	
V2	6AG5	Converter	2200 Mu. V. Signal	5	*130 to 140	6	*130 to 140	2 & 7	0	1	*–3.0 to –7.0	*7.1 to 7.7	*2.3 to 2.7	*Depending upon channel
			No Signal	5	*104 to 109	6	*104 to 109	2 & 7	0	1	*–2.0 to –6.0	*5.3 to 5.9	*.8 to 1.0	
V3	6J6	R-F Oscillator	2200 Mu. V. Signal	1 & 2	*88 to 95	—	—	7	.19	5 & 6	*–5.1 to –7.3	*1.9 to 2.7	—	*Depending upon channel
			No Signal	1 & 2	*68 to 81	—	—	7	.16	5 & 6	*–4.5 to –6.6	*1.8 to 2.1	—	
V101	6AG5	1st Pix. I-F Amplifier	2200 Mu. V. Signal	5	141	6	141	2 & 7	.07	1	–3.9	.8	.22	
			No Signal	5	108	6	108	2 & 7	.11	1	–.09	4.97	1.73	
V102	6AG5	2d Pix. I-F Amplifier	2200 Mu. V. Signal	5	130	6	130	2 & 7	.86	1	0	9.48	3.12	
			No Signal	5	106	6	106	2 & 7	.6	1	0	7.6	2.6	
V103	6AG5	3d Pix. I-F Amplifier	2200 Mu. V. Signal	5	130	6	140	2 & 7	.03	1	–3.9	.51	.09	
			No Signal	5	94	6	109	2 & 7	.11	1	–.09	3.92	1.5	
V104	6AG5	4th Pix. I-F Amplifier	2200 Mu. V. Signal	5	175	6	145	2 & 7	1.38	1	0	7.0	2.0	
			No Signal	5	167	6	109	2 & 7	.95	1	0	5.7	1.5	
V105 A	6AL5	Picture 2d Det.	2200 Mu. V. Signal	7	–113	—	—	1	–112	—	—	.48	—	
			No Signal	7	–120	—	—	1	–120	—	—	—	—	
V105 B	6AL5	Sync Limiter	2200 Mu. V. Signal	2	–107	—	—	5	–56	—	—	—	—	
			No Signal	2	–80	—	—	5	–60	—	—	—	—	
V106	12AU7	1st Video Amplifier	2200 Mu. V. Signal	1	–23.2	—	—	3	–111	2	–113	4.38	—	
			No Signal	1	–19.2	—	—	3	–117	2	–120	3.82	—	
V106	12AU7	2d Video Amplifier	2200 Mu. V. Signal	6	*166	—	—	8	*–5.3	7	*–12.2	6.2	—	*At average contrast
			No Signal	6	*134	—	—	8	*–5.6	7	*–10.3	6.9	—	
V107 A	6SN7 GT	ACG Amplifier	2200 Mu. V. Signal	5	–17.9	—	—	6	–55.5	4	–56.5	.9	—	
			No Signal	5	–5.2	—	—	6	–60	4	–64	.3	—	
V107 B	6SN7 GT	Vertical Oscillator	2200 Mu. V. Signal	2	76	—	—	3	–111	1	–158	.2	—	
			No Signal	2	62	—	—	3	–120	1	–169	.2	—	
V108	6SN7 GT	AGC Rectifier	2200 Mu. V. Signal	5	97	—	—	6	–3.4	4	–19.3	.3	—	
			No Signal	5	81	—	—	6	–8.7	4	–19.3	.28	—	
V108	6SN7 GT	1st Sync Separator	2200 Mu. V. Signal	2	96	—	—	3	–1.8	1	–19.5	.1	—	
			No Signal	2	81	—	—		–9.7	1	–19.3	.1	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V109	6SN7 GT	Sync Amplifier	2200 Mu.V. Signal	2	158	—	—	3	0	1	−4.7	5.25	—	
			No Signal	2	154	—	—	3	0	1	−5.2	3.75	—	
V109	6SN7 GT	Sync Separator	2200 Mu.V. Signal	5	230	—	—	6	−51	4	−106	.4	—	
			No Signal	5	215	—	—	6	−59	4	−80	.35	—	
V110	6K6-GT	Vertical Output	2200 Mu.V. Signal	3	223	4	223	8	−67	5	−91		*7.85	*Screen connected to plate
			No Signal	3	208	4	208	8	−79	5	−101		*7.7	
V111	6SN7 GT	Horizontal Osc. Control	2200 Mu.V. Signal	2	*48	—	—	3	−110	1	−92	.2	—	*Variation of hold gives −21.9 to +56 volts on plate
			No Signal	2	*33	—	—	3	−120	1	−108	.2	—	
V111	6SN7 GT	Horizontal Oscillator	2200 Mu.V. Signal	5	70	—	—	6	−111	4	−185	2.4	—	
			No Signal	5	54	—	—	6	−120	4	−192	2.4	—	
V112	6BG6G	Horizontal Output	2200 Mu.V. Signal	Cap	*	8	160	3	−104	5	−101	93.5	11.5	*5200 volt pulse present
			No Signal	Cap	Do Not Meas.	8	142	3	−113	5	−112	90.8	11.2	
V113	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	8500	—	—	0	—	*8500 volt pulse present
			Brightness Average	Cap	Do Not Meas.	—	—	2 & 7	8400	—	—	.1	—	
V114	5V4G	Damper	2200 Mu.V. Signal	4 & 6	*	—	—	2 & 8	339	—	—	94.5	—	*1200 volt pulse present
			No Signal	4 & 6	Do Not Meas.	—	—	2 & 8	322	—	—	92	—	
V115	5U4G	Rectifier	2200 Mu.V. Signal	4 & 6	390	—	—	2 & 8	291	—	—	225	—	*A-C measured from plate to trans. center tap
			No Signal	4 & 6	390	—	—	2 & 8	272	—	—	230	—	
V116	6AU6	1st Sound I-F Amplifier	2200 Mu.V. Signal	5	134	6	134	7	.9	1	0	8.2	3.3	
			No Signal	5	110	6	110	7	.7	1	0	5.7	2.6	
V117	6AU6	2d Sound I-F Amplifier	2200 Mu.V. Signal	5	148	6	90	7	0	1	−9	1.6	.8	
			No Signal	5	115	6	60	7	0	1	−.65	3.35	1.15	
V118	6AL5	Sound Discrim.	2200 Mu.V. Signal	2	−8.4	—	—	5	5.8	—	—	—	—	
			No Signal	2	−2.0	—	—	5	.41	—	—	—	—	
			2200 Mu.V. Signal	7	−3.7	—	—	1	0	—	—	—	—	
			No Signal	7	−1.08	—	—	1	0	—	—	—	—	
V119	6AV6	1st Audio Amplifier	2200 Mu.V. Signal	7	85	—	—	2	0	1	−.89	.49	—	
			No Signal	7	83	—	—	2	0	1	−.89	.4	—	
V120	6K6-GT	Audio Output	2200 Mu.V. Signal	3	102	4	113	8	−99	5	−108	19.3	3.3	
			No Signal	3	72	4	80	8	−111	5	−114	18	3	
V121	10BP4	Kinescope	2200 Mu.V. Signal	Cap	*8400	10	339	11	51	2	20	.1	—	*Average Brightness
			No Signal	Cap	—	10	322	11	42	2	14	—	—	Average Brightness
			2200 Mu.V. Signal	Cap	—	10	339	11		2		.4	—	Maximum Brightness
			2200 Mu.V. Signal	Cap	*8500	10	339	11		2		0	—	Minimum Brightness

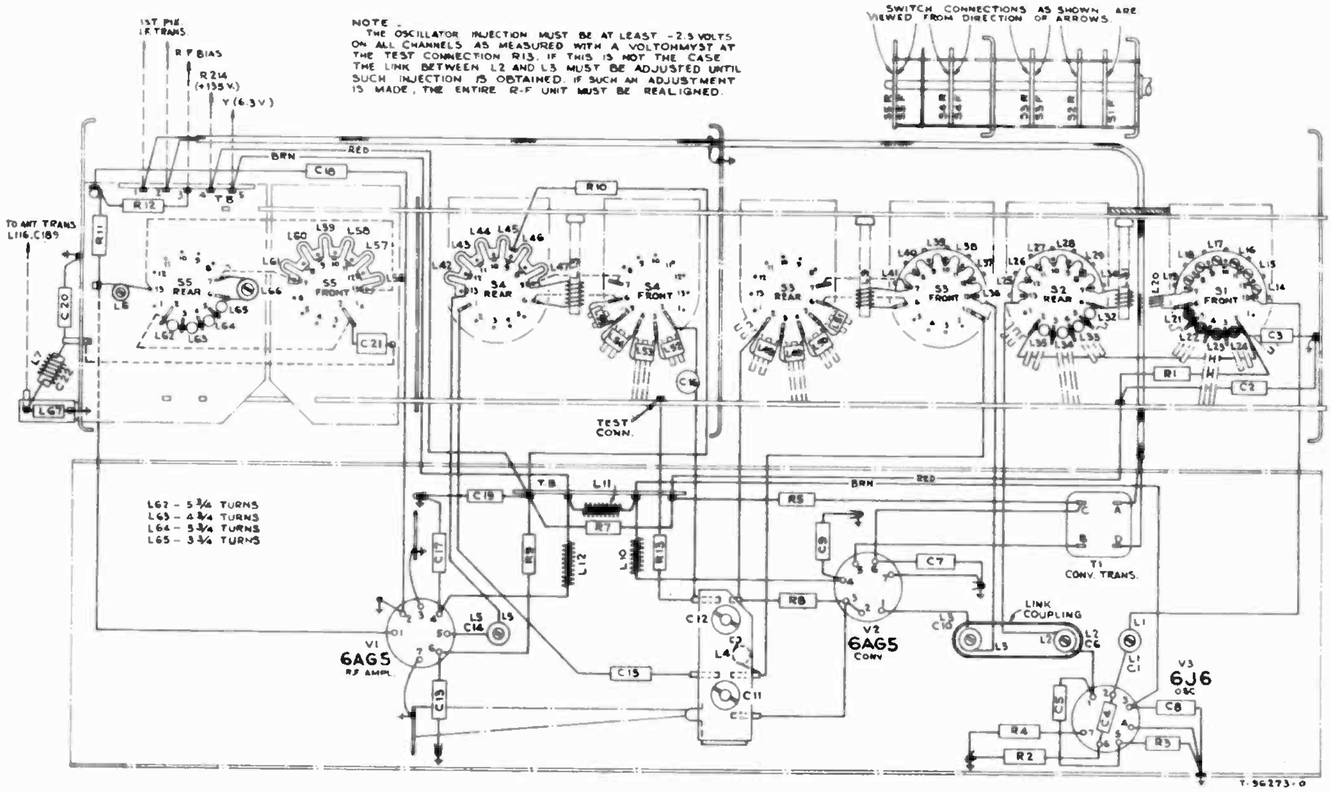


Figure 79—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. The ground bus from pin 2 and the center shield of V117 socket should not be shortened or rerouted.
2. Do not change the dress of the filament leads or the bypass capacitors in the picture or sound i-f circuits. The filament leads between V117, V118 and V119 should be down against the chassis and away from grid or plate leads.
3. If it is necessary to replace any of the 1500 mmf capacitors in the picture i-f circuit, the lead length must be kept as short as possible.
4. Picture i-f coupling capacitors C106, C111, C115 and C121 should be up and away from the chassis and should be clear of the pix i-f transformer adjustments by at least ¼ inch. If the dress of any of these capacitors is changed, the i-f alignment should be rechecked.
5. Leads to L102 and L103 must be as short as possible.
6. Dress peaking coils L105, L106 and L107 up and away from the chassis.
7. Dress C183 across tube pins 5 and 6 with leads not exceeding ⅜ inch.
8. Dress the blue lead from pin 5 of V119 down against the chassis.
9. Dress C129 and C130 up and away from the chassis.
10. Dress the yellow lead from the picture control away from the chassis. Dress the yellow lead from pin 8 of V106 away from the chassis.
11. Dress the green lead from pin 2 of V106 away from the chassis.
12. Dress R168, R169, R170, R176 and R178 up and away from the chassis.
13. The leads to the volume control should be dressed down against the chassis and away from V117 and V118.
14. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.
15. Dress leads from L110 (width control coil) away from the transformer frame.
16. Dress T110 winding leads as shown in Figure 80.

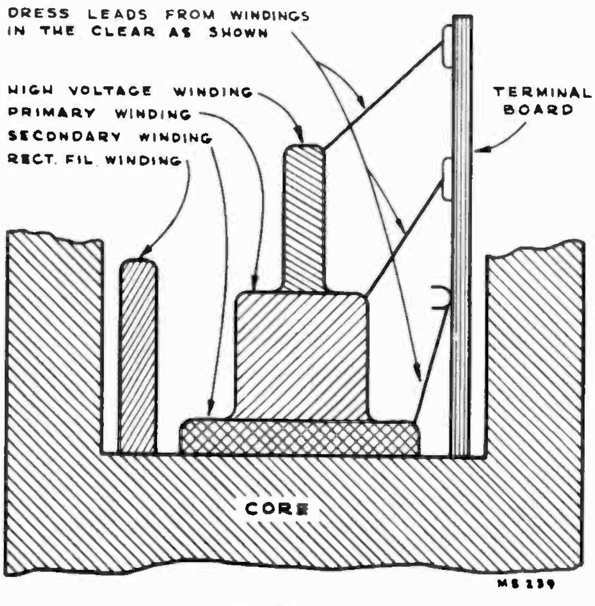


Figure 80—T110 Lead Dress

REPLACEMENT PARTS

Stock No.	DESCRIPTION
	R-F UNIT ASSEMBLIES KRK5
73465	Belt—Drive belt
73478	Cable—I-F transmission cable (4¾") (W1)
73441	Cam—Fine tuning adjustment cam
74035	Capacitor—Ceramic, 5 mmf. (C4, C5)
53511	Capacitor—Ceramic, 10 mmf. (C3)
54207	Capacitor—Ceramic, 18 mmf. (C20)
73449	Capacitor—Ceramic trimmer, comprising 1 section of 150-190 mmf. and 1 section of 65-95 mmf. (C11, C12)
73091	Capacitor—Ceramic, 270 mmf. (C21)
53494	Capacitor—Ceramic, 1,500 mmf. (C2, C7, C8, C9, C13, C15, C17, C18, C19)
73473	Capacitor—Ceramic, 5,000 mmf. (C16)
73475	Coil—Antenna filter shunt coil (L67)
73477	Coil—Choke coil (L10, L11, L12)
73874	Coil—Oscillator plate coil or converter grid coil for channel No. 6 (L9, L31)
73462	Coil—Coupling inductance coil (L4)
73443	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with plunger adjustment) (L1, C1)
74108	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with plunger adjustment) (L1, C1)
73476	Coil—I-F trap (L7, C22)
73461	Coil—Oscillator plate coil (4 turns) (L20)
73460	Coil—R-F plate coil for channel No. 6 (L13)
73444	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
74109	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
73446	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for r-f amplifier section (L5, C14)
74110	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for r-f amplifier section (L5, C14)
71493	Connector—Oscillator segment connector
73455	Core—Sliding core for fine tuning control trimmer
74187	Core—Adjustable core for L31
73440	Detent—R-F unit detent mechanism and fibre shaft
71487	Form—Coil form for oscillator plate coil for channel No. 6 (L31)
73453	Form—Coil form assembly for L9, L13
73442	Link—Link assembly fine tuning
71462	Loop—Oscillator to converter trimmer loop connector
73634	Nut—Speed nut for drive belt shield
73467	Nut—Speed nut to mount trimmer coils 73443, 73444 and 73446
73436	Plate—Front plate and bushing
73464	Pulley—Idler pulley
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R5, R9, R12)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R7)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, ½ watt (R11)

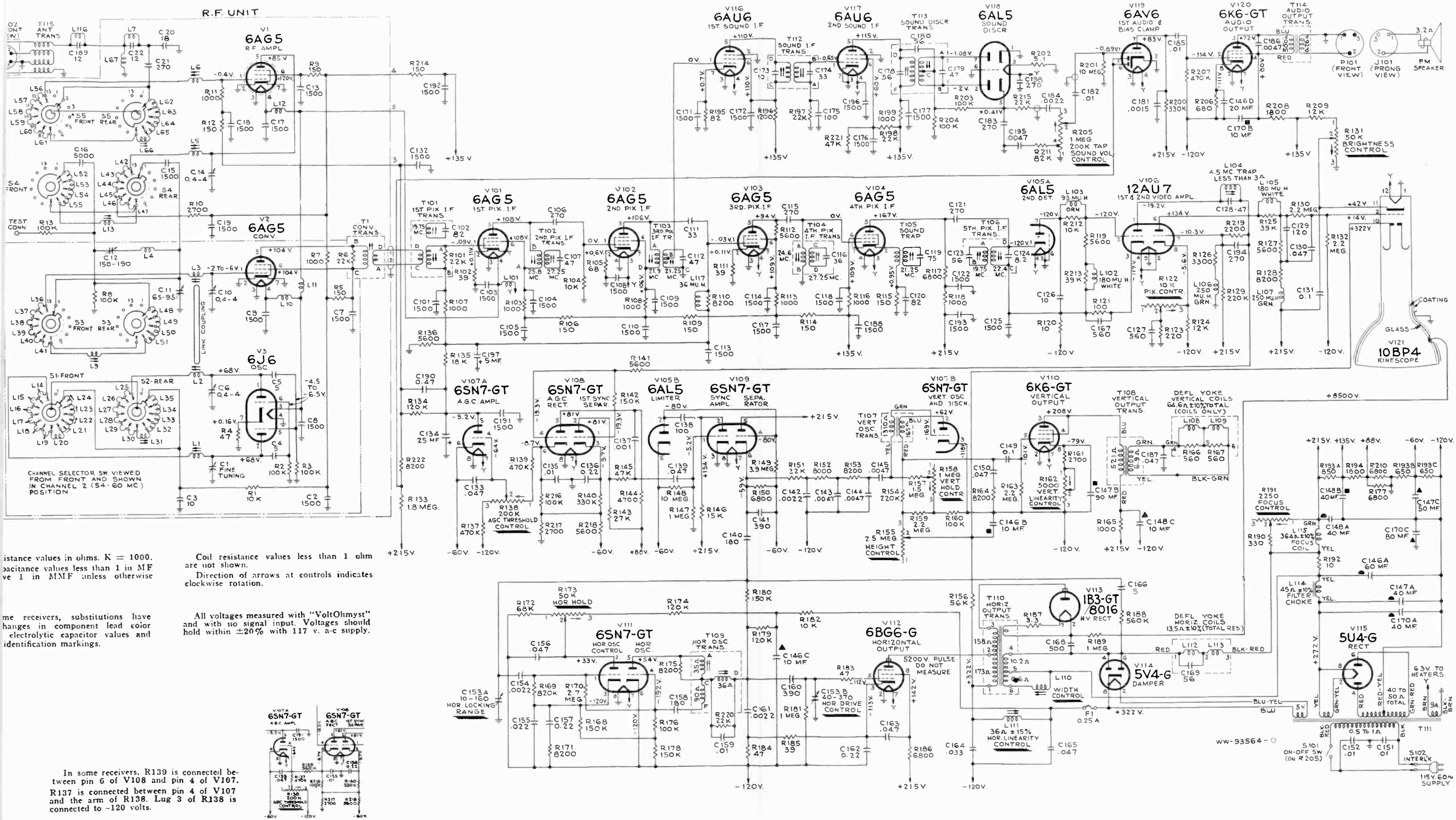
Stock No.	DESCRIPTION
	Resistor—Fixed, composition, 2,700 ohms, ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 10,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ watt (R2, R3, R8, R13)
14343	Retainer—Channel selector shaft retaining ring
30340	Retainer—Retainer for fine tuning link stud
71476	Screw—No. 4-40 x ¼" binder head screw for adjusting coils L14, L15, L16, L17, L18, L19
71475	Screw—No. 4-40 x .296 adjusting screw for coils L6, L21, L22, L23, L24
73640	Screw—No. 4-40 x ⅜" adjusting screw for L66
73439	Shaft—Actuating shaft for fine tuning control
73437	Shaft—Channel selector shaft complete with pawl and stud
73438	Shaft—Fine tuning control shaft and pulley
72951	Shield—Metal tube shield for V3
73454	Shield—Metal shield for drive belt
73632	Shield—Metal tube shield for V1
71494	Socket—Tube socket
73450	Socket—Tube socket, ceramic, 7 prong bottom mounted
73457	Spring—Return spring for fine tuning control core
74188	Spring—Retaining spring for adjustable core 74187
73456	Spring—Tension spring for drive belt shield
73633	Stator—Antenna stator complete with rotor and coils (S5, L6, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, C21)
73470	Stator—Converter stator complete with rotor and coils (S3, L36, L37, L38, L39, L40, L41, L48, L49, L50, L51)
73468	Stator—Front oscillator section stator complete with rotor, segment, coils and adjusting screws (S1, L14, L15, L16, L17, L18, L19, L21, L22, L23, L24)
73469	Stator—Rear oscillator section stator complete with rotor, segment and coils (S2, L25, L26, L27, L28, L29, L30, L32, L33, L34, L35)
73471	Stator—R-F amplifier stator complete with rotor and coils (S4, L42, L43, L44, L45, L46, L47, L52, L53, L54, L55)
2917	Washer—"C" washer for channel selector shaft
73466	Washer—Insulating washers for front shield (1 set)
73448	Transformer—Converter transformer (T1, R6)
	CHASSIS ASSEMBLIES KCS28
72809	Capacitor—Mica, 5 mmf. (C166)
72615	Capacitor—Mica, 10 mmf. (C126)
74105	Capacitor—Mica, 33 mmf. (C111)
64062	Capacitor—Ceramic, 82 mmf. (C120)
75060	Capacitor—Mica, 100 mmf. 1000 v. (C138)
39396	Capacitor—Ceramic, 100 mmf. (C175)
73921	Capacitor—Ceramic, 120 mmf. (C129)
73102	Capacitor—Mica, 180 mmf. (C158)
51416	Capacitor—Mica, 180 mmf. (C140)
73091	Capacitor—Mica, 270 mmf. (C106, C115, C121)
73922	Capacitor—Ceramic, 270 mmf. (C183, C194, C198)
39642	Capacitor—Mica, 390 mmf. (C141, C160)
71450	Capacitor—Hi-voltage, 500 mmf., 15,000 v. (C168)
39646	Capacitor—Mica, 560 mmf. (C127, C167)
53494	Capacitor—Ceramic, 1,500 mmf. (C101, C103, C104, C105, C108, C109, C110, C113, C114, C117, C118, C122, C125, C132, C171, C172, C176, C177, C188, C191, C192, C193, C196)

REPLACEMENT PARTS (Continued)

Stock No.	DESCRIPTION
73580	Capacitor—Mica trimmer, comprising 1 section of 10-160 mmf. and 1 section of 40-370 mmf. (C153A, C153B)
73801	Capacitor—Tubular, moulded paper, .001 mfd., 600 volts (C137)
73598	Capacitor—Tubular, moulded paper, .0015 mfd., 600 volts (C181)
73559	Capacitor—Tubular, moulded paper, .0022 mfd., 600 volts (C142, C154)
73595	Capacitor—Tubular, moulded paper, oil filled, .0022 mfd., 600 volts (C161)
73803	Capacitor—Tubular, moulded paper, .0022 mfd., 600 volts (C184)
73550	Capacitor—Tubular, moulded paper, .0047 mfd., 600 volts (C143, C144, C186, C195)
73920	Capacitor—Tubular, moulded paper, oil filled, .0047 mfd., 600 volts (C145)
73561	Capacitor—Tubular, moulded paper, .01 mfd., 400 volts (C135, C151, C152, C182)
73594	Capacitor—Tubular, moulded paper, oil filled, .01 mfd., 600 volts (C159)
73565	Capacitor—Tubular, moulded paper, .01 mfd., 1,000 volts (C185)
73562	Capacitor—Tubular, moulded paper, .022 mfd., 400 volts (C155)
73596	Capacitor—Tubular, moulded paper, oil filled. .033 mfd., 1,000 volts (C164)
73558	Capacitor—Tubular, moulded paper, .047 mfd., 200 volts (C133, C187)
73553	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C130, C139)
73592	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 600 volts (C150)
73563	Capacitor—Tubular, moulded paper, .047 mfd., 600 volts (C156)
73564	Capacitor—Tubular, moulded paper, .047 mfd., 1,000 volts (C163)
73597	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 1,000 volts (C165)
73551	Capacitor—Tubular, moulded paper, 0.1 mfd., 400 volts (C149)
73557	Capacitor—Tubular, moulded paper, 0.1 mfd., 600 volts (C131)
73560	Capacitor—Tubular, moulded paper, 0.22 mfd., 200 volts (C136)
73593	Capacitor—Tubular, moulded paper, 0.22 mfd., 400 volts (C157, C162)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd., 200 volts (C190)
74106	Capacitor—Electrolytic, 5 mfd., 50 volts (C197)
53147	Capacitor—Electrolytic, 25 mfd., 50 v. (C134)
73581	Capacitor—Electrolytic, comprising 1 sec. 60 mfd., 450 v., 2 sec. 10 mfd., 450 v. and 1 sec. 20 mfd., 150 v. (C146A, C146B, C146C, C146D)
73583	Capacitor—Electrolytic, comprising 1 sec. 40 mfd., 450 v., 1 sec. of 90 mfd., 150 v. and 1 sec. 50 mfd., 100 v. (C147A, C147B, C147C)
71432	Capacitor—Electrolytic, comprising 2 sec. 40 mfd., 450 v. and 1 sec. 10 mfd., 450 v. (C148A, C148B, C148C)
73582	Capacitor—Electrolytic, comprising 1 sec. 40 mfd., 450 v., 1 sec. of 10 mfd., 450 v. and 1 sec. 80 mfd., 200 v. (C170A, C170B, C170C)
73154	Choke—Filter choke (L114)
73477	Coil—Choke coil (L101)
73566	Coil—Focus coil (L115)
71449	Coil—Horizontal linearity control coil (L111)
74170	Coil—Peaking coil (36 mh.) (L117, R110)
72619	Coil—Peaking coil (93 mh.) (L103, R212)
71528	Coil—Peaking coil (180 mh.) (L102, L105, R125, R213)
71526	Coil—Peaking coil (250 mh.) (L106, L107)
71429	Coil—Width control coil (L110)

Stock No.	DESCRIPTION
71521	Connector—Hi-voltage capacitor connector
71789	Connector—Kinescope anode connector
73579	Control—AGC threshold control (R138)
73156	Control—Brightness control (R131)
72735	Control—Focus control (R191)
71440	Control—Height control (R155)
72734	Control—Horizontal and vertical hold control (R158, R173)
73910	Control—Picture control, volume control and power switch (R122, R205, S101)
71441	Control—Vertical linearity control (R162)
71457	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytics Nos. 71432, 73581 and 73582
73590	Cushion—Cushion for deflection yoke hood (2 required)
73600	Fuse—0.25 amp., 250 volts (F1)
37396	Grommet—Rubber grommet for mounting ceramic tube socket
71799	Grommet—Rubber grommet for yoke horizontal lead exit
73587	Nut—Speed nut to mount hi-voltage capacitor
73301	Magnet—Ion trap magnet (PM type)
18469	Plate—Bakelite mounting plate for electrolytics
5119	Plug—3 contact female plug for speaker cable
71448	Plug—Male plug for power cable
71513	Resistor—Wire wound, 3.3 ohms, ½ watt (R187)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R202)
	Resistor—Fixed, composition, 10 ohms, ±20%, ½ watt (R120, R192)
	Resistor—Fixed, composition, 39 ohms, ±10%, ½ watt (R102, R111)
	Resistor—Fixed, composition, 39 ohms, ±10%, 1 watt (R185)
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R183)
	Resistor—Fixed, composition, 47 ohms, ±10%, 1 watt (R184)
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R105)
	Resistor—Fixed, composition, 82 ohms, ±10%, ½ watt (R195)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R121)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R106, R109, R114, R214)
	Resistor—Fixed, composition, 150 ohms, ±10%, ½ watt (R115)
	Resistor—Fixed, composition, 220 ohms, ±10%, ½ watt (R123)
37502	Resistor—Wire wound, 330 ohms, 2 watt (R190)
	Resistor—Fixed, composition, 680 ohms, ±10%, 1 watt (R206)
73588	Resistor—Voltage divider, comprising 1 section of 850 ohms, 12 watt and 2 sections of 650 ohms, 6 watts (R193A, R193B, R193C)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R103, R107, R108, R113, R116, R118, R165, R199)
	Resistor—Fixed, composition, 1,200 ohms, ±10%, ½ watt (R196)
	Resistor—Fixed, composition, 1,800 ohms, ±10%, 2 watt (R194, R208)
	Resistor—Fixed, composition, 2,200 ohms, ±10%, ½ watt (R219)
	Resistor—Fixed, composition, 2,700 ohms, ±10%, ½ watt (R161, R217)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R126)

CIRCUIT SCHEMATIC DIAGRAM



istance values in ohms. K = 1000.
›acitance values less than 1 in MF
ve 1 in MMF unless otherwise

me receivers, substitutions have
hanges in component lead color
electrolytic capacitor values and
identification markings.

Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.

All voltages measured with "VoltOhmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.

In some receivers, R139 is connected between pin 6 of V108 and pin 4 of V107. R137 is connected between pin 4 of V107 and the arm of R138. Lug 3 of R138 is connected to -120 volts.

In some receivers, C198 was omitted.
In some receivers R222 was omitted.
In some receivers R124 was 18K.
In some receivers, two .47 mfd capacitors in parallel were used for C197.

In some receivers, R134 was 100K and R142 was 47K.
In some receivers, R117 was 8.2K.
In some receivers, R172 was 82K and R174 was 150K.

Figure 82—Circuit Schematic Diagram

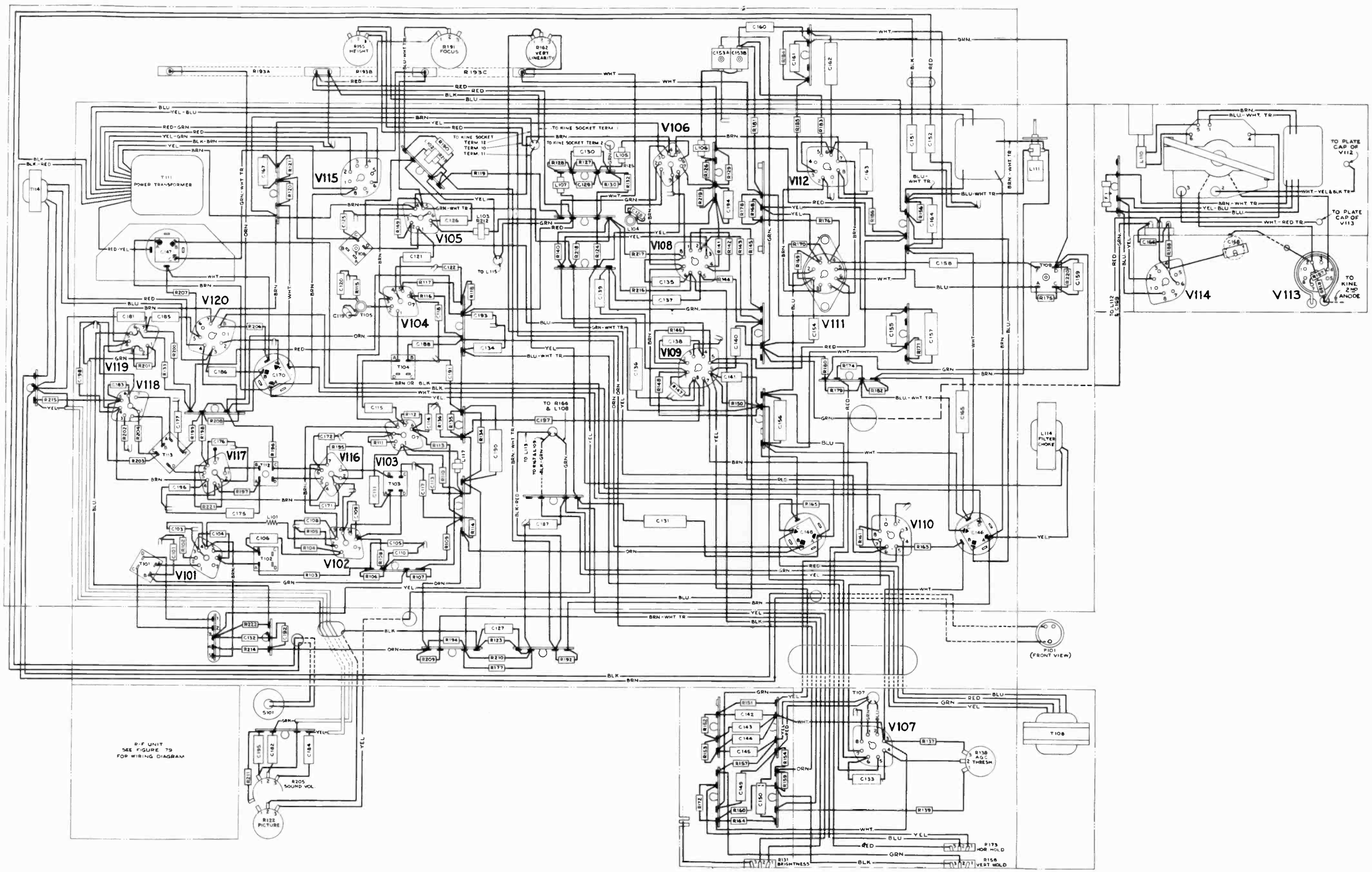


Figure 81—Chassis Wiring Diagram

Stock No.	DESCRIPTION
	Resistor—Fixed, composition, 4,700 ohms, ±10%, ½ watt (R144)
	Resistor—Fixed, composition, 5,600 ohms, ±10%, ½ watt (R141, R218)
	Resistor—Fixed, composition, 5,600 ohms, ±10%, 1 watt (R127)
	Resistor—Fixed, composition, 5,600 ohms, ±5%, ½ watt (R112, R119, R136)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, ½ watt (R150)
	Resistor—Fixed, composition, 6,800 ohms, ±5%, 1 watt (R117)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, 1 watt (R186)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, 2 watt (R177, R210)
	Resistor—Fixed, composition, 8,200 ohms, ±10%, ½ watt (R152, R153, R171)
	Resistor—Fixed, composition, 8,200 ohms, ±5%, ½ watt (R164, R175, R222)
	Resistor—Fixed, composition, 8,200 ohms, ±5%, 1 watt (R128)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R182)
	Resistor—Fixed, composition, 10,000 ohms, ±5%, ½ watt (R104)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, ½ watt (R209)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 watt (R124)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, 1 watt (R146)
	Resistor—Fixed, composition, 18,000 ohms, ±5%, ½ watt (R135)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R198, R215)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R151, R197, R220)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R143)
	Resistor—Fixed, composition, 47,000 ohms, ±20%, ½ watt (R221)
	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ watt (R145)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R156)
	Resistor—Fixed, composition, 68,000 ohms, ±10%, ½ watt (R172)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R211)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R160, R216)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, ½ watt (R203, R204)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 watt (R176)
	Resistor—Fixed, composition, 120,000 ohms, ±5%, ½ watt (R134)
	Resistor—Fixed, composition, 120,000 ohms, ±10%, 1 watt (R174, R179)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ watt (R168, R180)
	Resistor—Fixed, composition, 150,000 ohms, ±20%, ½ watt (R142)
	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 watt (R178)
	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ watt (R129, R154)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R140, R200)

Stock No.	DESCRIPTION
	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ watt (R137 R139,
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R207)
	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ watt R188)
	Resistor—Fixed, composition, 820,000 ohms, ±5%, ½ watt (R169)
	Resistor—Fixed, composition, 1 megohm, ±10%, ½ watt (R147, R181)
	Resistor—Fixed, composition, 1 megohm, ±20%, 1 watt (R189)
	Resistor—Fixed, composition, 1.5 megohm, ±5%, ½ watt (R157)
	Resistor—Fixed, composition, 1.8 megohm, ±5%, ½ watt (R133)
	Resistor—Fixed, composition, 2.2 megohm, ±10%, ½ watt (R130, R132, R159, R163)
	Resistor—Fixed, composition, 2.7 megohm, ±5%, 1 watt (R170)
	Resistor—Fixed, composition, 3.9 megohm, ±10%, ½ watt (R149)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R201)
	Resistor—Fixed, composition, 10 megohms. ±10%, ½ watt (R148)
71456	Screw—No. 8-32 wing screw to mount yoke and hood (3 required)
73584	Shield—Tube shield for V117 and V118
38853	Socket—Four contact female socket (J102)
72741	Socket—Kinescope socket
31251	Socket—Tube socket, octal, wafer
73249	Socket—Tube socket, octal, ceramic, plate mounted
72927	Socket—Tube socket, 9 pin, miniature
73117	Socket—Tube socket, 7 pin, miniature
71508	Socket—Tube socket for 8016
73586	Spring—Compression springs used under centering control screws (3 required)
73585	Spring—Supporting spring for anode lead
73591	Transformer—Antenna transformer — less mounting bracket and socket (T115)
73578	Transformer—Antenna transformer, complete with socket and bracket (T115, J102)
73571	Transformer—First pix i-f transformer (T101, C102, R101)
73572	Transformer—Second pix i-f transformer (T102, C107)
73573	Transformer—Third pix i-f transformer (T103, C112)
73574	Transformer—Fourth pix i-f transformer (T104, C116)
73575	Transformer—Fifth pix i-f transformer (T106, C123, C124)
73569	Transformer—Vertical oscillator trans. (T107)
73568	Transformer—Vertical output trans. (T108)
73576	Transformer—Horizontal oscillator transformer (T109)
73570	Transformer—Horizontal output and hi-voltage transformer (T110)
73567	Transformer—Power transformer, 115 volt, 60 cycle (T111)
71424	Transformer—Sound i-f transformer (T112, C173, C174)
71427	Transformer—Sound discriminator transformer (T113, C178, C179, C180)
71419	Transformer—Audio output transformer (T114)
71778	Trap—Sound trap (T105, C119)

Stock No.	DESCRIPTION
73476	Trap—i-f trap (L116, C189)
73577	Trap—4.5 mc trap (L104, C128)
71420	Yoke—Deflection yoke (L108, L109, L112, L113, C169, R166, R167)
	SPEAKER ASSEMBLIES 92573-4W RL 109-5
5118	Plug—3 prong male plug for speaker
73993	Speaker—5 x 7" PM elliptical speaker complete with cone and voice coil
	MISCELLANEOUS
73641	Back—Cabinet back
74004	Bezel—Plastic bezel for cabinet window (8T241)
73862	Bezel—Kinescope tube bezel or window frame (8T243, 8T244)
73864	Bracket—Retainer bracket for removable top panel (2 required) (8T243)
72857	Board—Antenna board
X1753	Cloth—Grille cloth (8T241)
73858	Catch—Bullet catch and strike (8T244)
74033	Decal—Control panel decals for mahogany or walnut instruments (8T241)
73860	Decal—Control panel decal for mahogany or walnut instruments (8T243, 8T244)
74034	Decal—Control panel decal for toasted mahogany instruments (8T241)
73861	Decal—Control panel decal for toasted mahogany instruments (8T243, 8T244)
71910	Decal—Trade mark decal (8T244)
73740	Escutcheon—Channel marker escutcheon for toasted mahogany instruments
73781	Escutcheon—Channel marker escutcheon for mahogany and walnut instruments (8T243)
73642	Escutcheon—Channel marker escutcheon for mahogany or walnut instruments (8T241, 8T244)
72113	Foot—Rubber foot (4 required)
73863	Glass—Safety glass (8T243, 8T244)
74005	Glass—Safety glass (8T241)
73857	Hinge—Cabinet door hinge (top and bottom) (2 required) (8T244)
73230	Knob—Brightness control knob (burgundy) for walnut and mahogany instruments (8T244)
73231	Knob—Brightness control knob (tan) for toasted mahogany instruments (8T243, 8T244)
73854	Knob—Brightness control knob (black) for walnut and mahogany instruments (8T243)
73782	Knob—Fine tuning control knob (black) for walnut and mahogany instruments (8T243)
73222	Knob—Fine tuning control knob (burgundy) for walnut and mahogany instruments (8T244)
73223	Knob—Fine tuning control knob (tan) for toasted mahogany instruments (8T243, 8T244)
73226	Knob—Picture control, vertical hold control or brightness control knob (burgundy) for walnut and mahogany instruments (8T244)
73227	Knob—Picture control, vertical hold control or brightness control knob (tan) for toasted mahogany instruments (8T243, 8T244)

Stock No.	DESCRIPTION
73785	Knob—Picture control, vertical hold control or brightness control knob (black) for mahogany or walnut instruments (8T243)
73224	Knob—Station selector knob (burgundy) for walnut or mahogany instruments (8T244)
73225	Knob—Station selector knob (tan) for toasted mahogany instruments (8T243, 8T244)
73783	Knob—Station selector knob (black) for walnut or mahogany instruments (8T243)
73228	Knob—Volume control and power switch or horizontal hold control knob (burgundy) for walnut and mahogany instruments (8T244)
73229	Knob—Volume control and power switch or horizontal hold control knob (tan) for toasted mahogany instruments (8T243, 8T244)
73853	Knob—Volume control and power switch or horizontal hold control knob (black) for walnut and mahogany instruments (8T243)
74002	Knob—Brightness control knob (dark) for mahogany instruments (8T241)
74003	Knob—Brightness control knob (tan) for toasted mahogany instruments (8T241)
73994	Knob—Fine tuning knob (dark) for mahogany instruments (8T241)
73995	Knob—Fine tuning knob (tan) for toasted mahogany instruments (8T241)
74000	Knob—Horizontal hold control or volume control and power switch knob (dark) for mahogany instruments (8T241)
74001	Knob—Horizontal hold control or volume control and power switch knob (tan) for toasted mahogany instruments (8T241)
73998	Knob—Picture control or vertical hold control knob (dark) for mahogany instruments (8T241)
73999	Knob—Picture control or vertical hold control knob (tan) for toasted mahogany instruments (8T241)
73996	Knob—Station selector knob (dark) for mahogany instruments (8T241)
73997	Knob—Station selector knob (tan) for toasted mahogany instruments (8T241)
73180	Nameplate—"RCA-Victor" nameplate
73913	Plate—Retainer stud plate and wing nut assembly for removable front panel (2 required) (8T243)
74006	Plate—Retainer plate, stud and wing nut assembly for kine shield (2 required) (8T241)
39153	Plug—4 prong male plug for antenna cable
73855	Pull—Door pull for R.H. door (8T244)
73856	Pull—Door pull for L.H. door (8T244)
73859	Roller—Guide rail roller for doors (8T244)
71539	Slide—Kinescope centering slide with rubber cushion (4 required)
14270	Spring—Retaining spring for knobs, Nos. 73224, 73225, 73226, 73227, 73230, 73231, 73996, 73997, 73998, 73999, 74002 and 74003
30330	Spring—Retaining spring for knobs, Nos. 73228, 73229, 74000 and 74001
72845	Spring—Retaining spring for knobs, Nos. 73222, 73223, 73994 and 73995
73643	Spring—Spring clip for channel marker escutcheon.

To obtain resistors for which no stock number is given, order by stating type, value of resistance, tolerance and wattage.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 8TR29 Walnut, Mahogany or Toasted Mahogany

Model 8TK29 Walnut, Mahogany or Toasted Mahogany

RCA VICTOR

TELEVISION, AM-FM RADIO RECEIVERS
MODELS 8TR29, 8TK29

Chassis Nos. KCS32, KCS32A, KCS32B or KCS32C and RK135 or RK135A
Mfr. No. 274

SERVICE DATA

— 1949 No. T2 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

REFER TO PAGES 442 TO 455 INC. FOR TELEVISION ALIGNMENT, SERVICE SUGGESTIONS, TEST PATTERN PHOTOGRAPHS AND WAVEFORM PHOTOGRAPHS.

GENERAL DESCRIPTION

Models 8TR29 and 8TK29 are "10 inch" television, AM-FM radio combinations. These receivers employ twenty-six tubes plus two rectifiers and a 10BP4 kinescope. The receivers are identical except for cabinets, speakers and jewel lights. An auxiliary input is provided for an external record player.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .... 57 square inches on 10 inch tube

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
Fine Tuning Range .. ±250 kc on chan. 2, ±650 kc on chan. 13
Picture Carrier Frequency .... 25.75 mc.
Sound Carrier Frequency .... 21.25 mc.

RADIO TUNING RANGE

Broadcast .... 540-1,600 kc
Frequency Modulation .... 88-108 mc.
Intermediate Frequency—AM .... 455 kc
Intermediate Frequency—FM .... 10.7 mc.

POWER SUPPLY RATING ...... 115 volts, 60 cycles, 250 watts

AUDIO POWER OUTPUT RATING .... 2.4 watts max.

CHASSIS DESIGNATIONS

KCS32, RK135, or KCS32B, RK135A .... in 8TR29
KCS32A, RK135, or KCS32C, RK135A .... in 8TK29

LOUDSPEAKERS

8TR29 .... 92573-4 .... 5" x 7" PM Dynamic, 3.2 ohms
8TK29 .... 92569-7 .... 12" PM Dynamic, 3.2 ohms

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside) 8TR29	22½	18¼	20
Cabinet (outside) 8TK29	24½	39½	22
Chassis Assembly (overall)	19½	12¼	20

WEIGHT

Chassis with Tubes in Cabinet	8TR29	77 lbs.
	8TK29	110 lbs.
Shipping Weight	8TR29	95 lbs.
	8TK29	131 lbs.

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

RCA TUBE COMPLEMENT

(Television Chassis)

	Tube Used	Function
(1)	RCA 6AG5	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6AG5	Converter
(4)	RCA 6AU6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AV6	1st Audio Amplifier
(8)	RCA 6K6GT (or 6V6GT)	Audio Output
(9)	RCA 6AG5	1st Picture I-F Amplifier
(10)	RCA 6AG5	2nd Picture I-F Amplifier
(11)	RCA 6AG5	3rd Picture I-F Amplifier
(12)	RCA 6AG5	4th Picture I-F Amplifier
(13)	RCA 6AL5	Picture 2nd Detector and Sync Limiter
(14)	RCA 12AU7	1st and 2nd Video Amplifier
(15)	RCA 6SN7GT	AGC Amplifier and Vertical Sweep Oscillator
(16)	RCA 6SN7GT	AGC Rectifier and 1st Sync Separator
(17)	RCA 6SN7GT	Sync Amplifier and 2nd Sync Separator
(18)	RCA 6K6GT	Vertical Sweep Output
(19)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(20)	RCA 6BG6G	Horizontal Sweep Output
(21)	RCA 5V4G	Damper
(22)	RCA 1B3GT/8016	High Voltage Rectifier
(23)	RCA 5U4G	Power Supply Rectifier
(24)	RCA 10BP4	Kinescope

(Radio Tuner Chassis)

	Tube Used	Function
(1)	RCA 6J6	Mixer and Oscillator
(2)	RCA 6BA6	I-F Amplifier
(3)	RCA 6AU6	F-M Driver
(4)	RCA 6AL5	Ratio Detector
(5)	RCA 6AV6	AM Detector AVC

Specifications continued on page 2

PICTURE I-F FREQUENCIES

Picture Carrier Frequency .... 25.75 mc.
Adjacent Channel Sound Trap .... 27.25 mc.
Accompanying Sound Traps .... 21.25 mc.
Adjacent Channel Picture Carrier Trap .... 19.75 mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency .... 21.25 mc.
Sound Discriminator Band Width between peaks .... 350 kc

VIDEO RESPONSE .... To 4 mc.

FOCUS .... Magnetic

SWEEP DEFLECTION .... Magnetic

SCANNING .... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY .... 15,750 cps

VERTICAL SCANNING FREQUENCY .... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) .... 30 cps

OPERATING CONTROLS (front panel)

Channel Selector / Fine Tuning .... Dual Control Knobs
Tone / Sound Volume and On-Off Switch .... Dual Control Knobs
Picture Horizontal Hold / Picture Vertical Hold .... Dual Control Knobs
Picture / Brightness .... Dual Control Knobs
Function Switch .... Single Control Knob
Radio Tuning .... Single Control Knob

NON-OPERATING CONTROLS

Horizontal Centering .... top chassis screwdriver adjustment
Vertical Centering .... top chassis screwdriver adjustment
Width .... rear chassis screwdriver adjustment
Height .... rear chassis adjustment
Horizontal Linearity .... rear chassis screwdriver adjustment
Vertical Linearity .... rear chassis adjustment
Horizontal Drive .... rear chassis screwdriver adjustment
Horizontal Oscillator Frequency .... bottom chassis adjustment
Horizontal Oscillator Waveform .... side chassis adjustment
Focus .... rear chassis adjustment
Ion Trap Magnet .... top chassis adjustment
Deflection Coil .... top chassis wing nut adjustment
AGC Threshold Control .... top chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the radio FUNCTION switch to Tel.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

5. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Turn the BRIGHTNESS control counterclockwise until the retrace lines just disappear.

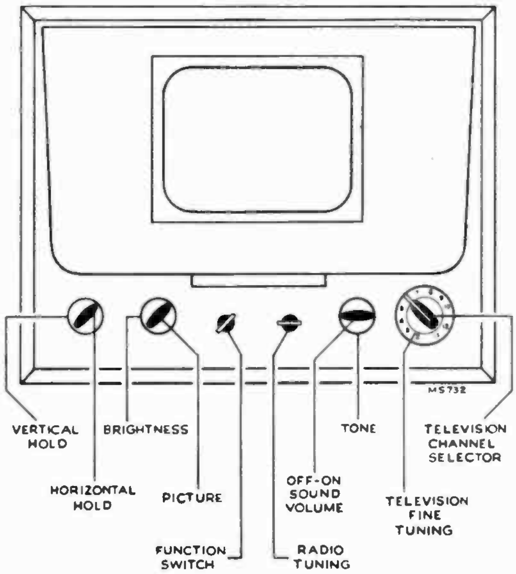


Figure 1—Receiver Operating Controls

9. Adjust the PICTURE control for suitable picture contrast.

10. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

11. In switching from one station to another, it may be necessary to repeat steps numbers 4 and 9.

12. When the set is turned on again after an idle period, it should not be necessary to repeat the adjuustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

13. If the positions of the controls have been changed, it may be necessary to repeat steps numbers 1 through 9.

14. For radio operation turn the FUNCTION switch to AM or FM and tune in station with the radio TUNING control.

15. For phono operation connect phono attachment to receiver and turn FUNCTION switch to AUX.

INSTALLATION INSTRUCTIONS

The Model 8TR29 and 8TK29 television receivers are shipped complete in one carton except for the 10BP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING. — The 8TR29 receiver is packed in a cardboard carton. To unpack, tear open the carton flaps, remove the side packing material and with a man on two sides of the cabinet, lift it out of the shipping carton.

The Model 8TK29 receiver is also packed in a cardboard carton. To unpack, turn the carton on its side, tear open the bottom flaps, fold the flaps along the side and turn the carton back up. Lift the carton up and off of the cabinet.

Take off the cabinet back. To remove the front panel, loosen the two wingnuts inside the cabinet and turn the two locking plates as shown in Figure 2. Tilt the panel out at the top, reach

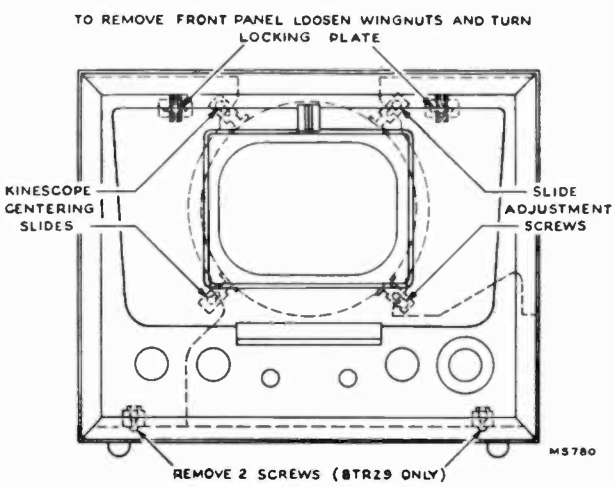


Figure 2—Cabinet, Front View

in and remove the radio dial light sockets from the bracket on the front panel.

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets.

Remove the two self-tapping screws from the kinescope cushion slide as shown in Figure 3.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.

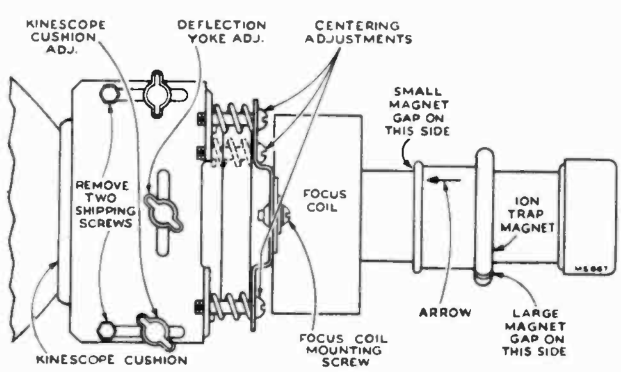


Figure 3—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the two focus coil mounting screws and move the coil until alignment is obtained. Tighten the mounting screws with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid-position. See Figure 2 for location of the slides and their adjustment screws. Loosen the two upper slides, slip them up as far as possible and tighten.

KINESCOPE HANDLING PRECAUTION. — Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatter-proof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

INSTALLATION OF KINESCOPE. — The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is up but rotated approximately 30 degrees toward the high voltage compartment.

Insert the neck of the kinescope through the deflection and focus coils as shown in Figure 4 until the base of the tube protrudes approximately two inches beyond the focus coil. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

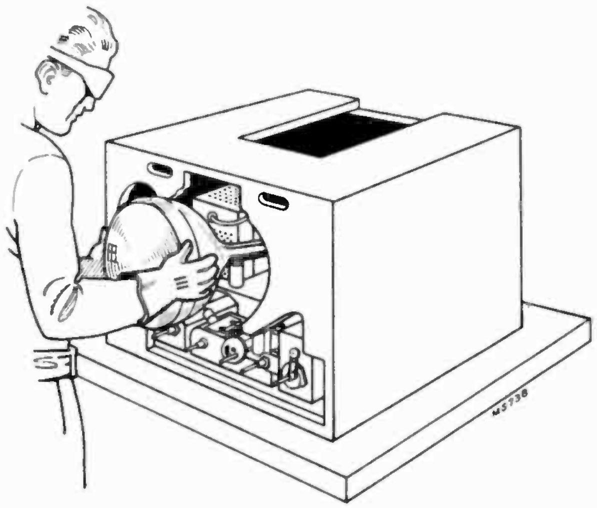


Figure 4—Kinescope Insertion

Slip the ion trap magnet assembly over the neck of the kinescope with the large magnet towards the base of the tube and with the arrow on the assembly up as shown in Figure 3.

Connect the kinescope socket to the tube base.

Insert the kinescope until the face of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet. Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks.

As may be seen by inspection, the radio dial lights and dial pointer are attached to the cabinet front panel. The dial cord is attached to the receiver chassis. The method of attachment may be seen in Figure 5.

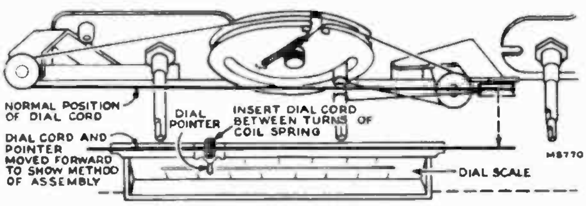


Figure 5—Dial Cord and Pointer Assembly

Before replacing the front panel, inspect the slit shields on the pilot light brackets to see that they are properly seated and that the slits line up with the dial light plate. Inspect the dial pointer, associated carriage and dial cord to see the method of assembly. Slip the radio pilot lights on the brackets and use the attached piece of scotch tape to tape the pilot light leads to the front panel between the lights. Turn the set on and to radio position to see that the dial lighting is correct. If it is not, adjust the dial lights and shields. Install the front panel.

To hook up the dial pointer, turn the tuning shaft until the gang is fully meshed. Reach up under the bottom of the cabinet through the finger slot, slip the dial pointer to the low frequency end of the dial and press the dial cord well into the coil spring.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible.

Connect the high voltage lead to the kinescope second anode socket.

The antenna connection should now be made. The link on the antenna terminal board on the back of the cabinet is for use in case it is desirable to connect a separate "A" band antenna.

Install the front panel control knobs.

Turn the power switch to the "on" position, the function switch to Tel, the brightness control fully clockwise, and picture control counterclockwise.

ION TRAP MAGNET ADJUSTMENT. — Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags. The ion trap rear magnet poles should be approximately over the ion trap flags. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R191 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

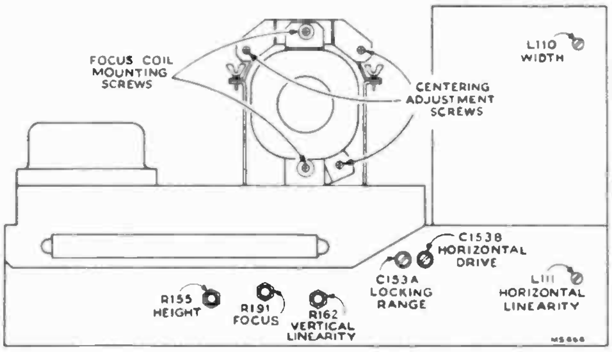


Figure 6—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT. — If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS. — It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 3 through 9 of the receiver operating instructions on page 3.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC threshold control is misadjusted, and the receiver overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn R138 (on top of the chassis, see Figure 8) counterclockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT. — Turn the horizontal hold control to the extreme counterclockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull-in should occur when the control is approximately 90 degrees from the extreme counterclockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Centering Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR. — If in the above check the receiver failed to hold sync with the hold control at the extreme counterclockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull-in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment. — Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T109 horizontal frequency adjustment (under the chassis) until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Lock in Range Adjustment. — Set the horizontal hold control to the full counterclockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the picture control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 3 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

CENTERING ADJUSTMENT. — No electrical centering controls are provided. Centering is obtained by mechanically orienting the focus coil with the three adjustment screws shown in Figure 3. Center the picture on the screen by adjustment of these screws. The focus coil should be concentric around the neck of the kinescope to prevent curvature of the raster.

FOCUS COIL ADJUSTMENTS. — If, after making the centering adjustments in the above paragraph, a corner of the picture is shadowed, it will be necessary to loosen the focus coil mounting screws (shown in Figure 3) and change the position of the coil to eliminate the shadow. Recenter the picture by adjustment of the centering screws.

Recheck the position of the ion trap magnet to insure that maximum brilliance is obtained.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS. — Adjust the height control (R155 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R162 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS. — Adjust the horizontal drive control C153B to give a picture of maximum width within the limits of good linearity. Adjust the horizontal linearity control L111 to provide best linearity. Adjust the width control until the picture just fills the mask.

Adjustments of the horizontal drive control affect horizontal oscillator hold and locking range. If the drive control was adjusted, recheck the oscillator alignment.

FOCUS. — Adjust the focus control (R191 on chassis rear apron) for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

CHECK TO SEE THAT THE CUSHION AND YOKE THUMB-SCREWS AND THE FOCUS COIL MOUNTING SCREWS ARE TIGHT.

AGC THRESHOLD CONTROL. — The AGC threshold control R138 is adjusted at the factory and normally should not require readjustment in the field.

To check the adjustment of the AGC Threshold Control, tune in a strong signal, sync the picture and turn the picture control to the maximum clockwise position. Turn the brightness control counterclockwise until the vertical retrace lines are just invisible. Momentarily remove the signal by switching off channel then back. If the picture reappears immediately, the receiver is not overloading due to improper setting of R138. If the picture requires an appreciable portion of a second to reappear, R138 should be readjusted.

Set the picture control at the maximum clockwise position. Turn R138 fully counterclockwise. The top one-half inch of the picture may be bent slightly. This should be disregarded. Turn R133 clockwise until there is a very, very slight bend or change of bend in the top one-half inch of the picture. Then turn R138 counterclockwise just sufficiently to remove this bend or change of bend.

If the signal is very weak, the above method may not work as it may be impossible to get the picture to bend. In this case, turn R138 clockwise until the snow in the picture becomes more pronounced, then counterclockwise until the best signal to noise ratio is obtained.

The AGC control adjustment should be made on a strong signal if possible. If the control is set too far clockwise on a weak signal, then the receiver may overload when a strong signal is received.

Replace the cabinet back.

CHECK OF R-F OSCILLATOR ADJUSTMENTS. — Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure. The adjustments for channels 2 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 7. Adjustment for channel 13 is on top of the chassis and channel 6 adjustment is in the kinescope well.

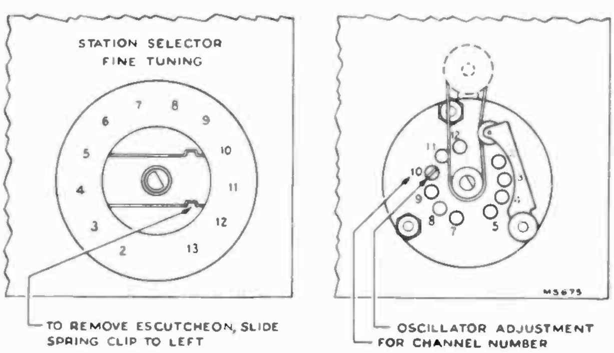


Figure 7—R-F Oscillator Adjustments

RADIO OPERATION. — Turn the receiver function switch to AM and FM positions and check the radio for proper operation. Tune in a station of known frequency. If the dial pointer does not point to the correct spot on the dial, slip the dial pointer on the dial cord to the proper frequency mark on the dial.

CHASSIS TOP VIEW

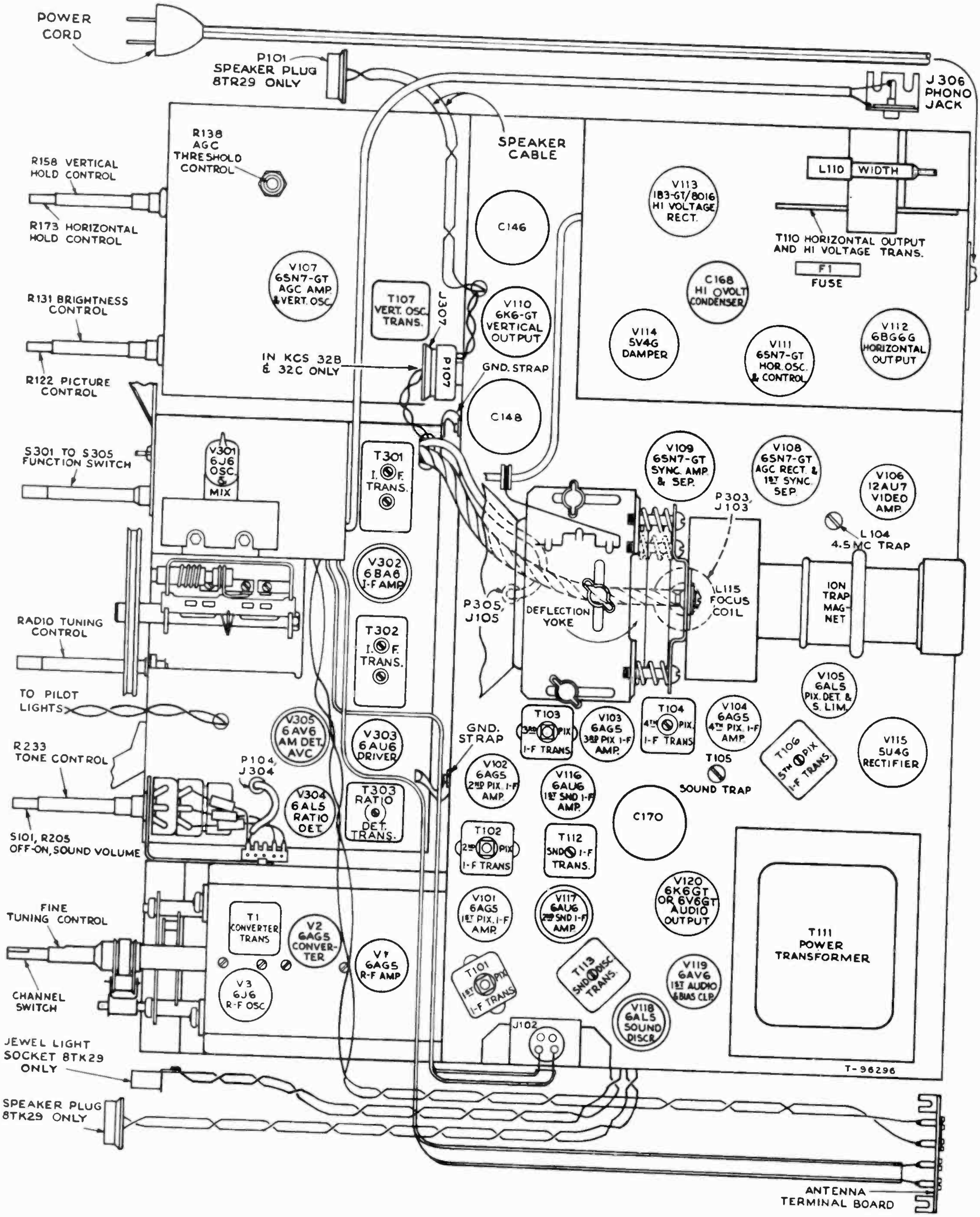


Figure 8—Chassis Top View

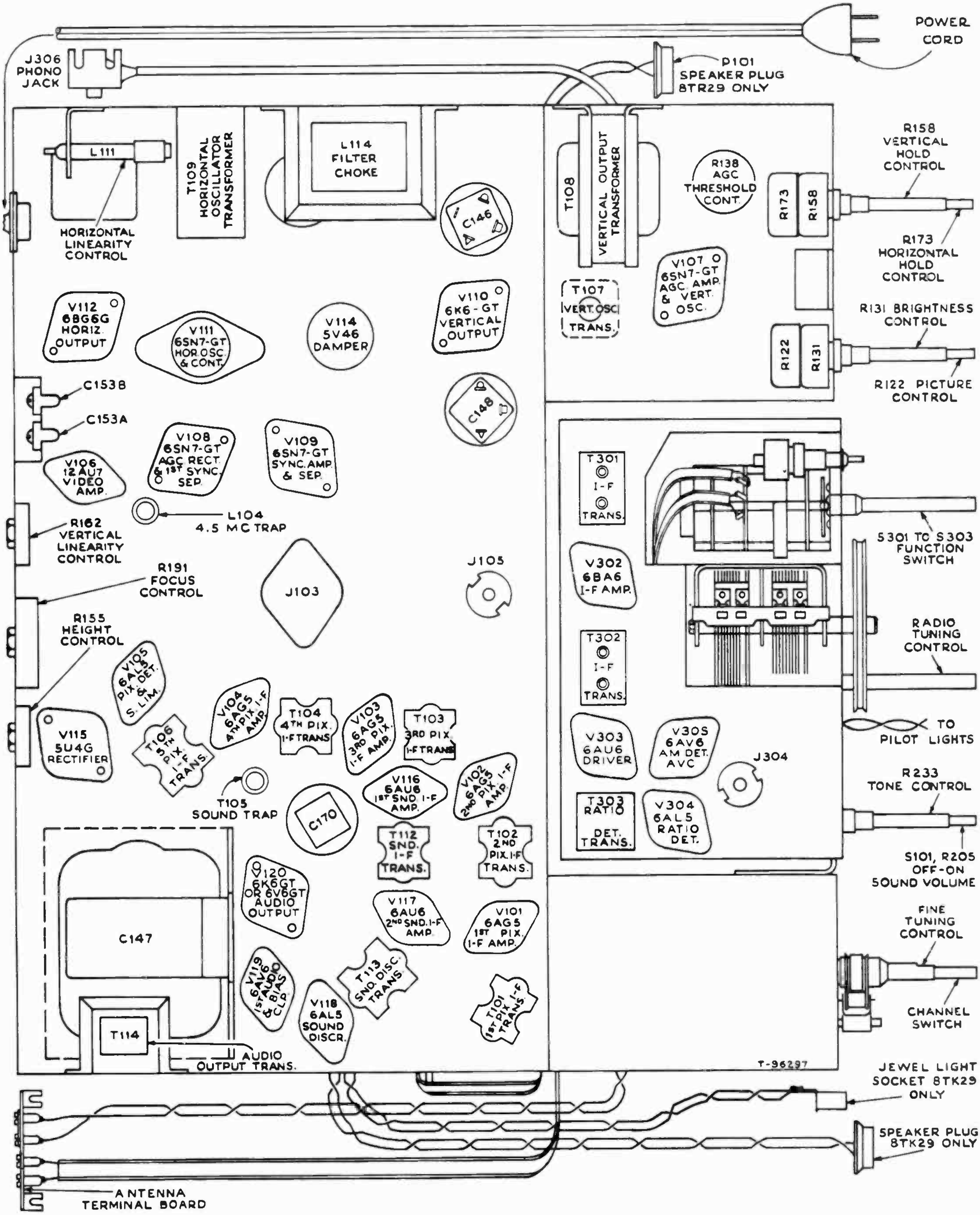


Figure 9—Chassis Bottom View

RADIO ALIGNMENT PROCEDURE

If any lead dressing is necessary, it should be done before aligning the receiver. When making a complete alignment follow the table below in sequence. If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the section. Any adjustments made on the 455 kc I-F's make it necessary to adjust the 10.7 mc. I-F's.

"AM" R-F—I-F ALIGNMENT

Test-Oscillator. — For all alignment operations, connect low side of the test-osc. to the receiver chassis, and keep the osc. output as low as possible to avoid a-v-c action. Output Meter. — Connect the meter across the speaker voice coil, and turn the receiver volume control to max.

Steps	Connect the High Side of the Test. Osc. to—	Tune Test Osc. to—	Function Switch	Turn Radio Dial to—	Adjust the following
1	Antenna terminal in series with .01 mfd.	455 kc. Modulated	AM	Low Freq. end of Dial	†Top and bot. cores of T301 and T302. (For max. voltage across voice coil.)
2	Ant. terminal through dummy ant. of 200 mmfs.	1,620 kc.	AM	Min. capacity	Osc. C308 for maximum output.
3		1,400 kc.	AM	Tune to signal	Ant. C304 for maximum output.
4		600 kc.	AM	600 kc.	Osc. L306 and Ant. L303.
5	Repeat steps 2, 3 and 4 for maximum output.				

† Use alternate loading. Connect an 18,000 ohm resistor across the primary to load the plate winding while the grid winding of the same transformer is being peaked. Then load the grid winding with the 18,000-ohm resistor while the plate winding is being peaked.

RATIO DETECTOR ALIGNMENT

Connect probe of "VoltOhmyst" to negative side of C328 and low side to chassis. Connect output meter across speaker voice coil.

Steps	Connect the High Side of the Test. Osc. to—	Tune Test Osc. to—	Function Switch	Radio Dial Tuned to—	Adjust
6	Pin No. 1 of 6AU6 (V303) in series with .01 mfd.	10.7 mc. 30% AM Modulated	FM	———	Top of T303 for maximum DC on "VoltOhmyst."
7	Pin No. 1 of 6AU6 (V303) in series with .01 mfd.		FM	———	Bottom of T303 for minimum audio output on meter.
8	Repeat steps 6 and 7 as necessary making final adjustment with r-f input level set to give approximately −3.0 volts d-c on "VoltOhmyst."				

"FM" R-F—I-F ALIGNMENT

Steps	Connect the High Side of the Test. Osc. to—	Tune Test Osc. to—	Function Switch	Radio Dial Tuned to—	Adjust
9	Terminal 3 of S302 rear through 270 ohms.	10.7 mc.	FM	88 mc.	*T301 and T302 with r-f Input set to give −3 volts on "VoltOhmyst."
10	Terminal 3 of S302 rear through 270 ohms.	106 mc.	FM	106 mc.	Set C302 to max. capacity. Squeeze L307 and adjust C302 for max. output.
11	Terminal 3 of S302 rear through 270 ohms.	90 mc.	FM	Tune to signal	Squeeze L301 and rock gang for maximum output.
12	Repeat steps 10 and 11 as required.				

* Use a 680-ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680-ohm resistor while the plate winding is being peaked.

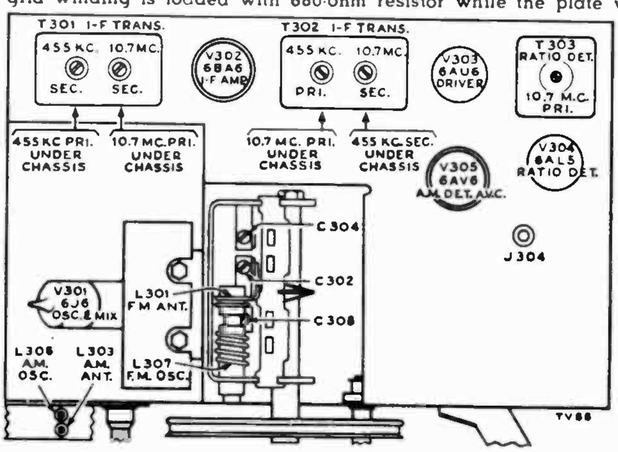


Figure 10—Chassis, Top View, Showing Adjustments

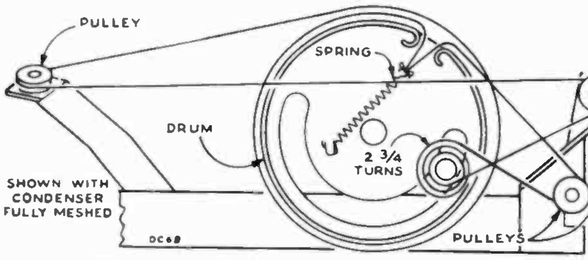
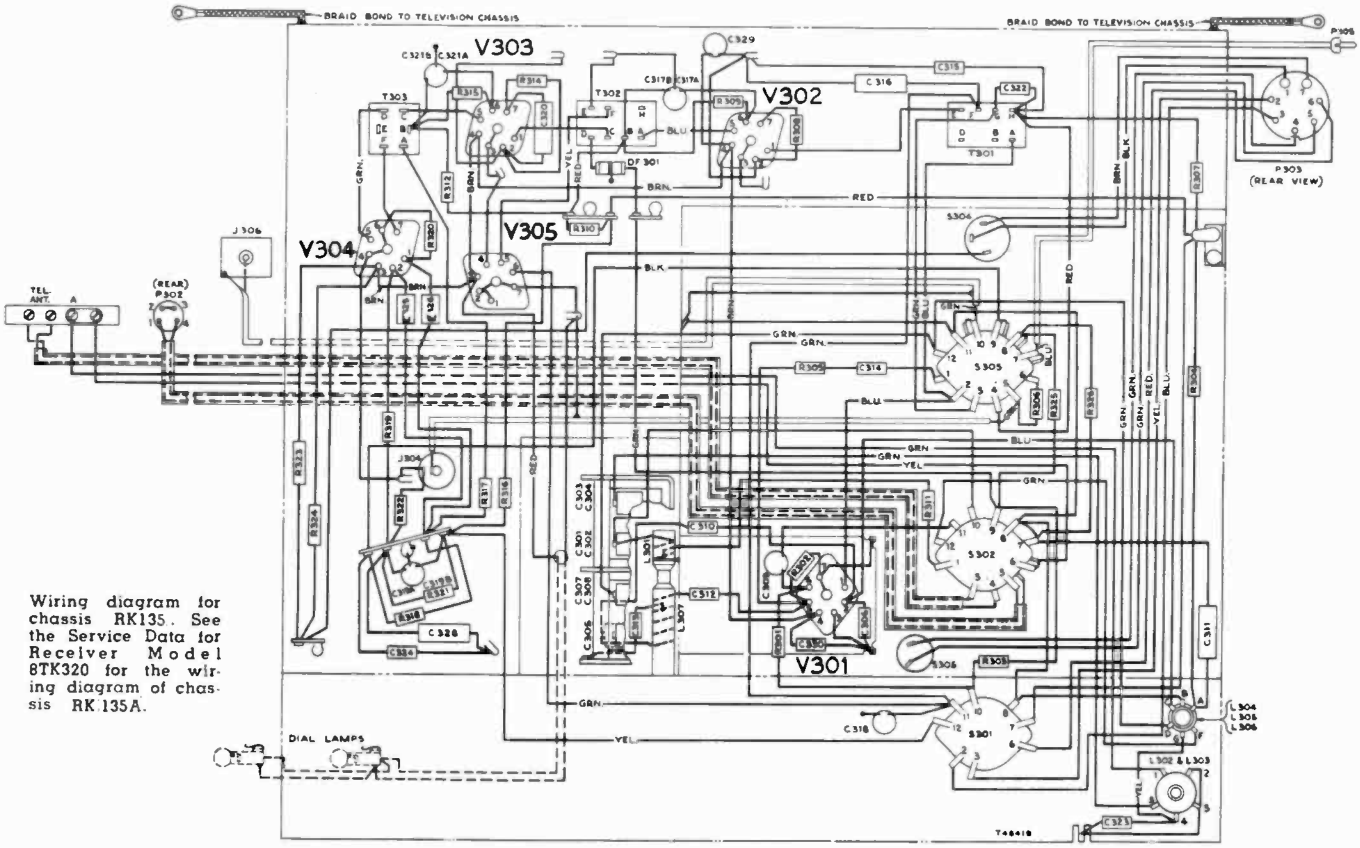


Figure 11—Dial and Drive Cord Assembly

CRITICAL LEAD DRESS:

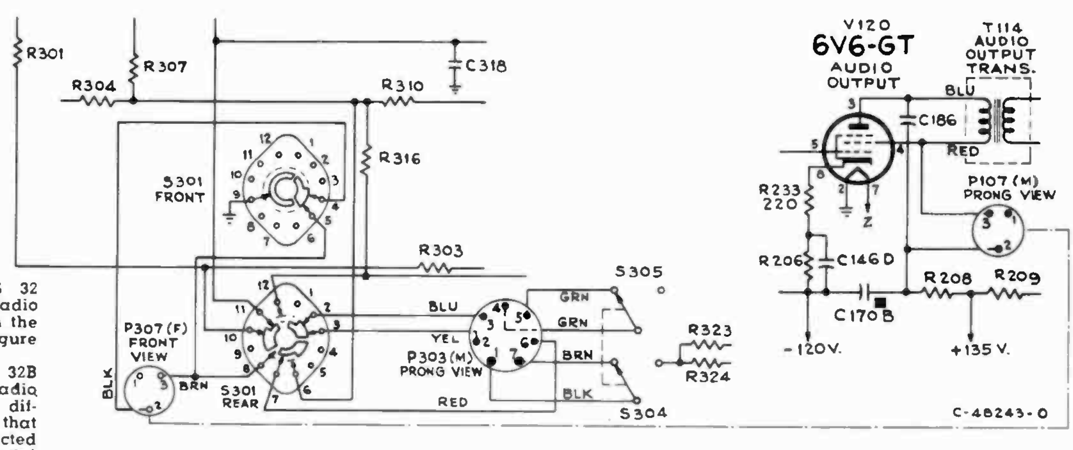
1. Ground lead on pin 2 of V302 and V303 should be dressed down flat on chassis.
2. Dual .005 mfd. capacitors and diode filter should be dressed to clear the bottom of the cabinet.
3. Dress C329 across V302 sockets with short and direct leads.
4. Dress V302 plate lead from pin 5 down to the chassis.
5. Dress AVC lead from R321 to switch down to chassis and against back of gang mounting plate.
6. Dress lead from pin 6 of V305 down to chassis and against back of gang mounting plate.
7. Dress AVC lead from 1st I-F to switch against chassis and against gang mounting plate.
8. Dress lead from switch to pin 1 of V301 against plate supporting gang.
9. Dress all insulated F-M leads down to chassis.
10. Connect C309 with short lead to pin 6 of V301 keeping body of cap away from plate lead and switch terminals.
11. The coupling between L301 and L307 should be adjusted to give proper injection voltage to the mixer grid. This has been found to be correct when the distance between adjacent end turns is 3/8" to 7/16" measured at top of the form.
12. Dress cabled leads away from antenna transmission lines.
13. Dress all uninsulated bus wire so as to avoid short circuits.



Wiring diagram for chassis RK135. See the Service Data for Receiver Model 8TK320 for the wiring diagram of chassis RK135A.

Figure 12—Radio Wiring Diagram (RK135)

Figure 13—Partial Schematic KCS32B or C and RK135A



Television chassis KCS 32 and KCS 32A employ radio chassis RK 135 shown in the complete schematic, Figure 18.

Television chassis KCS 32B and KCS 32C employ radio chassis RK 135A which differs from RK 135 in that P307 is added and connected as shown in the partial schematics, Figures 13 and 14. Two different versions of RK 135A are shown.

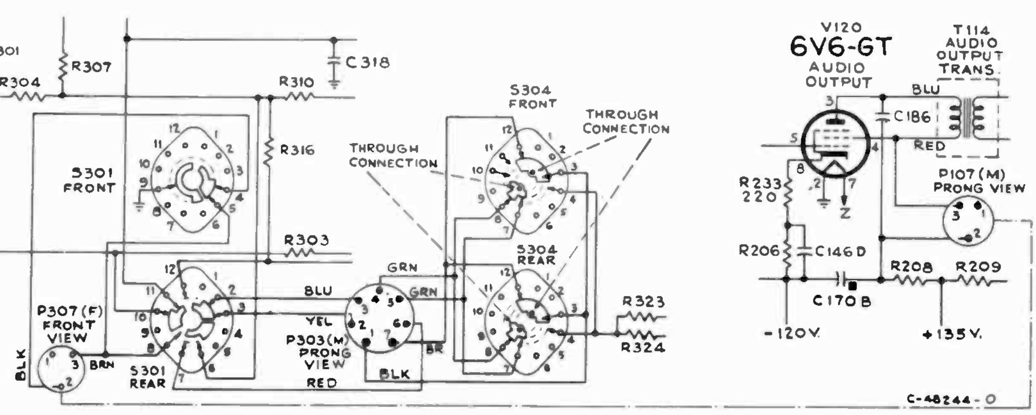


Figure 14—Partial Schematic KCS32B or C and RK135A

8TR29, 8TK29 VOLTAGE CHART

The following measurements represent three sets of conditions. In the first condition, the function switch is in the television position and a 2200 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC threshold control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. In the third condition, in order to get radio operating voltages, the function switch was placed in the F-M position. Voltages shown are read with "Jr. VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V1	6AG5	R-F Amplifier	2200 Mu.V. Signal	5	146	6	148	2 & 7	0	1	−4.9	.72	.33	
			No Signal	5	85	6	120	2 & 7	0	1	−0.4v	12.0	4.0	
V2	6AG5	Converter	2200 Mu.V. Signal	5	*130 to 140	6	*130 to 140	2 & 7	0	1	*−3.0 to −7.0	*7.1 to 7.7	*2.3 to 2.7	*Depending upon channel
			No Signal	5	*104 to 109	6	*104 to 109	2 & 7	0	1	*−2.0 to −6.0	*5.3 to 5.9	*.8 to 1.0	
V3	6J6	R-F Oscillator	2200 Mu.V. Signal	1 & 2	*88 to 95	—	—	7	.19	5 & 6	*−5.1 to −7.3	*1.9 to 2.7	—	*Depending upon channel
			No Signal	1 & 2	*68 to 81	—	—	7	.16	5 & 6	*−4.5 to −6.6	*1.8 to 2.1	—	
V101	6AG5	1st Pix. I-F Amplifier	2200 Mu.V. Signal	5	141	6	141	2 & 7	.07	1	−3.9	.8	.22	
			No Signal	5	108	6	108	2 & 7	.11	1	−.09	4.97	1.73	
V102	6AG5	2d Pix. I-F Amplifier	2200 Mu.V. Signal	5	130	6	130	2 & 7	.86	1	0	9.48	3.12	
			No Signal	5	106	6	106	2 & 7	.6	1	0	7.6	2.6	
V103	6AG5	3d Pix. I-F Amplifier	2200 Mu.V. Signal	5	130	6	140	2 & 7	.03	1	−3.9	.51	.09	
			No Signal	5	94	6	109	2 & 7	.11	1	−.09	3.92	1.5	
V104	6AG5	4th Pix. I-F Amplifier	2200 Mu.V. Signal	5	175	6	145	2 & 7	1.38	1	0	7.0	2.0	
			No Signal	5	167	6	109	2 & 7	.95	1	0	5.7	1.5	
V105 A	6AL5	Picture 2d Det.	2200 Mu.V. Signal	7	−113	—	—	1	−112	—	—	48	—	
			No Signal	7	−120	—	—	1	−120	—	—	—	—	
V105 B	6AL5	Sync Limiter	2200 Mu.V. Signal	2	−107	—	—	5	−56	—	—	—	—	
			No Signal	2	−80	—	—	5	−60	—	—	—	—	
V106	12AU7	1st Video Amplifier	2200 Mu.V. Signal	1	−23.2	—	—	3	−111	2	−113	4.38	—	
			No Signal	1	−19.2	—	—	3	−117	2	−120	3.82	—	
V106	12AU7	2d Video Amplifier	2200 Mu.V. Signal	6	*166	—	—	8	*−5.3	7	*−12.2	6.2	—	*At average contrast
			No Signal	6	*134	—	—	8	*−5.6	7	*−10.3	6.9	—	
V107 A	6SN7 GT	AGC Amplifier	2200 Mu.V. Signal	5	−17.9	—	—	6	−55.5	4	−56.5	.9	—	
			No Signal	5	−5.2	—	—	6	−60	4	−64	.3	—	
V107 B	6SN7 GT	Vertical Oscillator	2200 Mu.V. Signal	2	76	—	—	3	−111	1	−158	.2	—	
			No Signal	2	62	—	—	3	−120	1	−169	.2	—	
V108	6SN7 GT	AGC Rectifier	2200 Mu.V. Signal	5	97	—	—	6	−3.4	4	−19.3	.3	—	
			No Signal	5	81	—	—	6	−8.7	4	−19.3	.28	—	
V108	6SN7 GT	1st Sync Separator	2200 Mu.V. Signal	2	96	—	—	3	−1.8	1	−19.5	.1	—	
			No Signal	2	81	—	—	3	−9.7	1	−19.3	.1	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V109	6SN7 GT	Sync Amplifier	2200 Mu. V. Signal	2	158	—	—	3	0	1	−4.7	5.25	—	
			No Signal	2	154	—	—	3	0	1	−5.2	3.75	—	
V109	6SN7 GT	Sync Separator	2200 Mu. V. Signal	5	230	—	—	6	−51	4	−106	4	—	
			No Signal	5	215	—	—	6	−59	4	−80	35	—	
V110	6K6-GT	Vertical Output	2200 Mu. V. Signal	3	223	4	223	8	−67	5	−91		*7.85	*Screen connected to plate
			No Signal	3	208	4	208	8	−79	5	−101		*7.7	
V111	6SN7 GT	Horizontal Osc. Control	2200 Mu. V. Signal	2	*48	—	—	3	−110	1	−92	2	—	*Variation of hold gives −21.9 to +56 volts on plate
			No Signal	2	*33	—	—	3	−120	1	−108	2	—	
V111	6SN7 GT	Horizontal Oscillator	2200 Mu. V. Signal	5	70	—	—	6	−111	4	−185	2.4	—	
			No Signal	5	54	—	—	6	−120	4	−192	2.4	—	
V112	6BG6G	Horizontal Output	2200 Mu. V. Signal	Cap	*	8	160	3	−104	5	−101	93.5	11.5	*5200 volt pulse present
			No Signal	Cap	Do Not Meas.	8	142	3	−113	5	−112	90.8	11.2	
V113	1B3GT 8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	8500	—	—	0	—	*8500 volt pulse present
			Brightness Average	Cap	Do Not Meas.	—	—	2 & 7	8400	—	—	1	—	
V114	5V4G	Damper	2200 Mu. V. Signal	4 & 6	*	—	—	2 & 8	339	—	—	94.5	—	*1200 volt pulse present
			No Signal	4 & 6	Do Not Meas.	—	—	2 & 8	322	—	—	92	—	
V115	5U4G	Rectifier	2200 Mu. V. Signal	4 & 6	390	—	—	2 & 8	291	—	—	225	—	*A-C measured from plate to trans. center tap
			No Signal	4 & 6	390	—	—	2 & 8	272	—	—	230	—	
V116	6AU6	1st Sound I-F Amplifier	2200 Mu. V. Signal	5	134	6	134	7	9	1	0	8.2	3.3	
			No Signal	5	110	6	110	7	7	1	0	5.7	2.6	
V117	6AU6	2d Sound I-F Amplifier	2200 Mu. V. Signal	5	148	6	90	7	0	1	−9	1.6	8	
			No Signal	5	115	6	60	7	0	1	−65	3.35	1.15	
V118	6AL5	Sound Discrim.	2200 Mu. V. Signal	2 7	−8.4 −3.7	—	—	5 1	5.8 0	— —	— —	— —	— —	
			No Signal	2 7	−2.0 −1.08	—	—	5 1	41 0	—	—	—	—	
V119	6AV6	1st Audio Amplifier	2200 Mu. V. Signal	7	85	—	—	2	0	1	−89	49	—	
			No Signal	7	83	—	—	2	0	1	−89	4	—	
V120	6K6-GT	Audio Output	2200 Mu. V. Signal	3	102	4	113	8	−99	5	−108	19.3	3.3	
			No Signal	3	72	4	80	8	−111	5	−114	18	3	
V121	10BP4	Kinescope	2200 Mu. V. Signal	Cap	*8400	10	339	11	51	2	20	1	—	*Average Brightness
			No Signal	Cap	—	10	322	11	42	2	14	—	—	
V301	6J6	Mixer and Oscillator	No Signal	1 2	107 90	— —	— —	7	0	6 5	−2.0 −5.0	—	—	
V302	6BA6	Radio I-F Amplifier	No Signal	5	185	6	100	7	0.4	1	−0.1	—	—	Function switch in F-M position
V303	6AU6	Radio F-M Driver	No Signal	5	180	6	135	7	0.7	1	0	—	—	
V304	6AL5	Radio Ratio Det.	No Signal	2 7	−0.2 −0.2	—	—	5 1	−0.2 0.1	—	—	—	—	
V305	6AV6	Radio A-M Det.	No Signal	5 Diode	−0.2	—	—	2	0	1	0	—	—	

8TR29, 8TK29

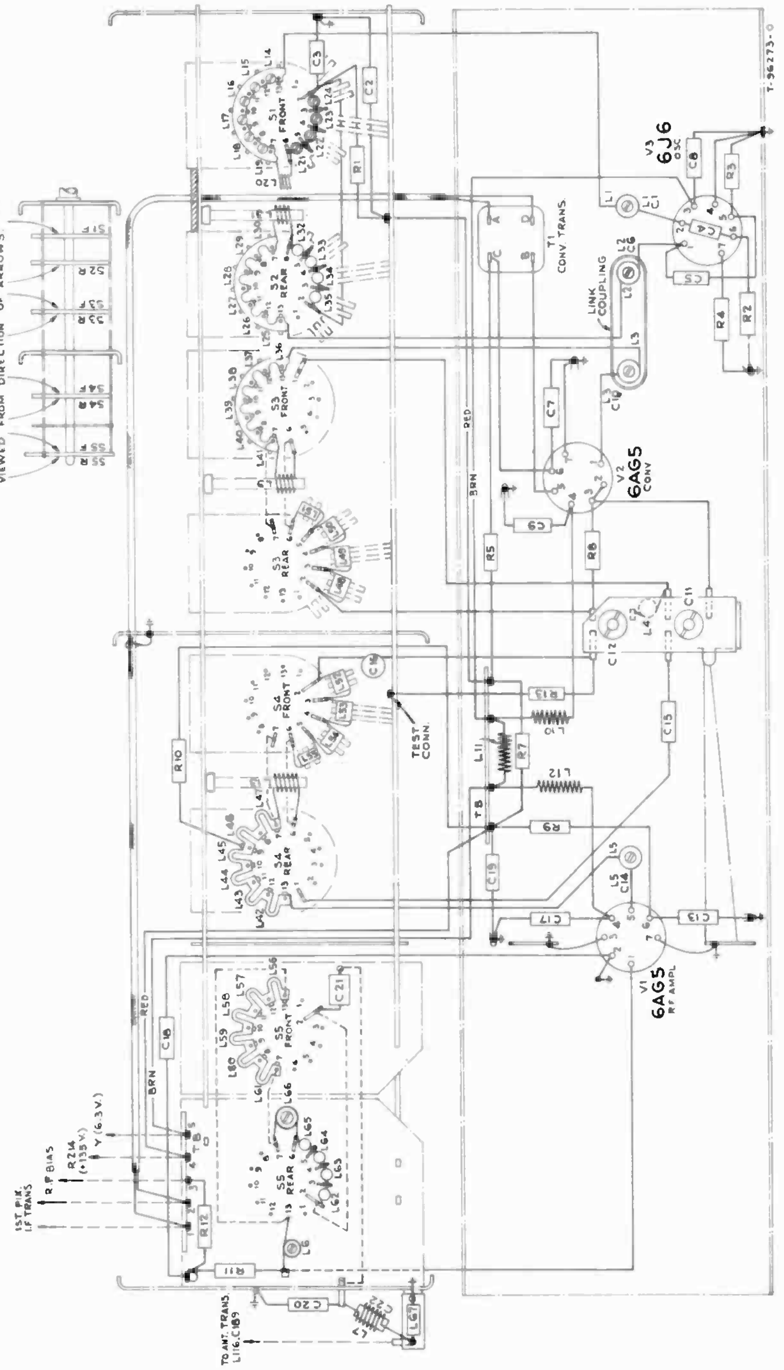
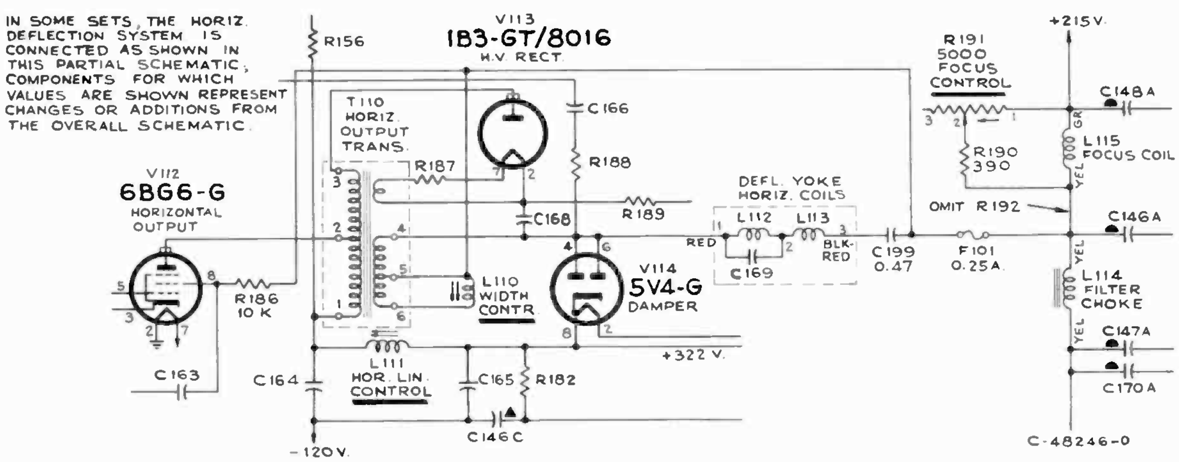


Figure 15—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. The ground bus from pin 2 and the center shield of V117 socket should not be shortened or rerouted.
2. Do not change the dress of the filament leads or the by-pass capacitors in the picture or sound i-f circuits. The filament leads between V117, V118 and V119 should be down against the chassis and away from grid or plate leads.
3. If it is necessary to replace any of the 1500 mmf. capacitors in the picture i-f circuit, the lead length must be kept as short as possible.
4. Picture i-f coupling capacitors C106, C111, C115 and C121 should be up and away from the chassis and should be clear of the pix i-f transformer adjustments by at least ¼ inch. If the dress of any of these capacitors is changed, the i-f alignment should be rechecked.
5. Leads to L102 and L103 must be as short as possible.
6. Dress peaking coils L105, L106 and L107 up and away from the chassis.
7. Dress C183 across tube pins 5 and 6 with leads not exceeding ⅜ inch.
8. Dress the blue lead from pin 5 of V119 down against the chassis.
9. Dress C129 and C130 up and away from the chassis.
10. Dress the yellow lead from the picture control away from the chassis. Dress the yellow lead from pin 8 of V106 away from the chassis.
11. Dress the green lead from pin 2 of V106 away from the chassis.
12. Dress R168, R169, R170, R176 and R178 up and away from the chassis.
13. The leads to the volume control should be dressed down against the chassis and away from V117 and V118.
14. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.
15. Dress leads from L110 (width control coil) away from the transformer frame.

Figure 16—Revised Horizontal Deflection System



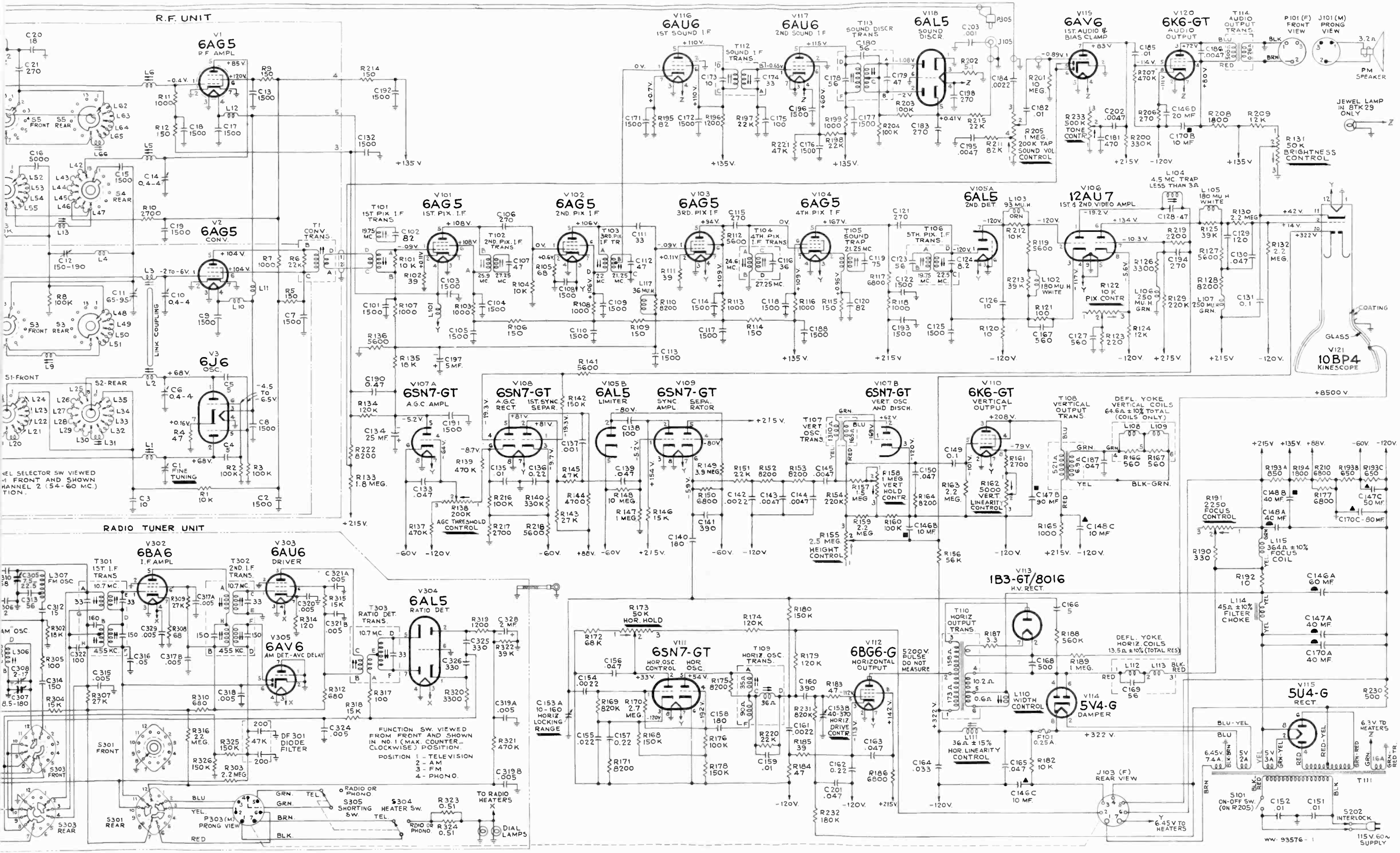
STOCK No.	DESCRIPTION
	TELEVISION R-F UNIT KRK 5
73465	Belt—Drive belt
73478	Cable—I-F transmission cable (4⅞") (W1)
73441	Cam—Fine tuning adjustment cam
74035	Capacitor—Ceramic, 5 mmf. (C4, C5)
53511	Capacitor—Ceramic, 10 mmf. (C3)
54207	Capacitor—Ceramic, 18 mmf. (C20)
73449	Capacitor—Ceramic trimmer, comprising 1 section of 150-190 mmf. and 1 section of 65-95 mmf. (C11, C12)
73091	Capacitor—Ceramic, 270 mmf. (C21)
53494	Capacitor—Ceramic, 1,500 mmf. (C2, C7, C8, C9, C13, C15, C17, C18, C19)
73473	Capacitor—Ceramic, 5,000 mmf. (C16)
73475	Coil—Antenna filter shunt coil (L67)
73477	Coil—Choke coil (L10, L11, L12)
73874	Coil—Converter grid coil for channel No. 6 (L9, L31)
73462	Coil—Coupling inductance coil (L4)
74108	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with plunger adjustment) (L1, C1)
73443	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with plunger adjustment) (L1, C1)
73476	Coil—I-F trap (L7, C22)
73461	Coil—Oscillator plate coil (4 turns) for channel No. 6 (L20)
73460	Coil—R-F plate coil for channel No. 6 (L13)
74109	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
73444	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
74110	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for r-f amplifier section (L5, C14)
73446	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for r-f amplifier section (L5, C14)
71493	Connector—Oscillator segment connector
74187	Core—Adjustable core for L31
73455	Core—Sliding core for fine tuning control trimmer
73440	Detent—R-F unit detent mechanism and fibre shaft
73453	Form—Coil form assembly for L9, L13
71487	Form—Coil form for oscillator plate coil (L31)
73442	Link—Link assembly for fine tuning
71462	Loop—Oscillator to converter trimmer loop connector
73634	Nut—Speed nut for drive belt shield
73467	Nut—Speed nut to mount trimmer coils 73443, 73444 and 73446
73436	Plate—Front plate and bushing
73464	Pulley—Idler pulley
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R5, R9, R12)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R7)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, ½ watt (R11)
	Resistor—Fixed, composition, 2,700 ohms, ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 10,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ watt (R2, R3, R8, R13)
14343	Retainer—Channel selector shaft retaining ring
30340	Retainer—Retainer for fine tuning link stud
71476	Screw—No. 4-40 x ¼" binder head screw for adjusting coils L14, L15, L16, L17, L18, L19
71475	Screw—No. 4-40 x .296 adjusting screw for coils L6, L21, L22, L23, L24
73640	Screw—No. 4-40 x ⅜" adjusting screw for L66

STOCK No.	DESCRIPTION
73439	Shaft—Actuating shaft for fine tuning control
73437	Shaft—Channel selector shaft complete with pawl and stud
73438	Shaft—Fine tuning control shaft and pulley
72951	Shield—Metal tube shield for V3
73454	Shield—Metal shield for drive belt
73632	Shield—Metal tube shield for V1
71494	Socket—Tube socket
73450	Socket—Tube socket, ceramic, 7 prong, bottom mounted
74188	Spring—Retaining spring for adjustable core No. 74187
73457	Spring—Return spring for fine tuning control core
73456	Spring—Tension spring for drive belt shield
73633	Stator—Antenna stator complete with rotor and coils (S5, L6, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, C21)
73470	Stator—Converter stator complete with rotor and coils (S3, L36, L37, L38, L39, L40, L41, L48, L49, L50, L51)
73468	Stator—Front oscillator section stator complete with rotor, segment, coils and adjusting screws (S1, L14, L15, L16, L17, L18, L19, L21, L22, L23, L24)
73469	Stator—Rear oscillator section stator complete with rotor, segment and coils (S2, L25, L26, L27, L28, L29, L30, L32, L33, L34, L35)
73471	Stator—R-F amplifier stator complete with rotor and coils (S4, L42, L43, L44, L45, L46, L47, L52, L53, L54, L55)
2917	Washer—"C" washer for channel selector shaft
73466	Washer—Insulating washers for front shield (1 set)
73448	Transformer—Converter transformer (T1, R6)
	TELEVISION CHASSIS KCS32, KCS32A KCS32B, KCS32C
72437	Cable—Shielded cable complete with pin plug
72809	Capacitor—Mica, 5 mmf. (C166)
72615	Capacitor—Mica, 10 mmf. (C126)
74105	Capacitor—Mica, 33 mmf. (C111)
64062	Capacitor—Ceramic, 82 mmf. (C120)
75060	Capacitor—Mica, 100 mmf., 1000 v. (C138)
39396	Capacitor—Ceramic, 100 mmf. (C175)
73921	Capacitor—Ceramic, 120 mmf. (C129)
51416	Capacitor—Mica, 180 mmf. (C140)
73102	Capacitor—Mica, 180 mmf. (C158)
73091	Capacitor—Mica, 270 mmf. (C106, C115, C121)
73922	Capacitor—Ceramic, 270 mmf. (C183, C194, C198)
39642	Capacitor—Mica, 390 mmf. (C141, C160)
39644	Capacitor—Mica, 470 mmf. (C181)
71450	Capacitor—Hi-voltage, 500 mmf. (C168)
39646	Capacitor—Mica, 560 mmf. (C127, C167)
73580	Capacitor—Mica trimmer, comprising 1 section 10-160 mmf. and 1 section 40-370 mmf. (C153A, C153B)
53494	Capacitor—Ceramic, 1,500 mmf. (C101, C103, C104, C105, C108, C109, C110, C113, C114, C117, C118, C122, C125, C132, C171, C172, C176, C177, C188, C191, C192, C193, C196)
73803	Capacitor—Tubular, moulded paper, .0022 mfd., 600 volts (C142, C154, C184)
73595	Capacitor—Tubular, moulded paper, oil filled, .0022 mfd., 600 volts (C161)
73920	Capacitor—Tubular, moulded paper, oil filled, .0047 mfd., 600 volts (C145)
73550	Capacitor—Tubular, moulded paper, .0047 mfd., 600 volts (C143, C144, C186, C195, C202)
73801	Capacitor—Tubular, moulded paper, .001 mfd., 1,000 volts (C137, C203)
73562	Capacitor—Tubular, moulded paper, .022 mfd., 400 volts (C155)
73596	Capacitor—Tubular, moulded paper, oil filled, .033 mfd., 1,000 volts (C164)
73558	Capacitor—Tubular, moulded paper, .047 mfd., 200 volts (C133, C187)
73553	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C130, C139, C201)
73592	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 600 volts (C150, C156)
73564	Capacitor—Tubular, moulded paper, .047 mfd., 1,000 volts (C163)

STOCK No.	DESCRIPTION
73597	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 1,000 volts (C165)
73561	Capacitor—Tubular, moulded paper, .01 mfd., 400 volts (C135, C151, C152, C182)
73594	Capacitor—Tubular, moulded paper, oil filled, .01 mfd., 600 volts (C159)
73565	Capacitor—Tubular, moulded paper, .01 mfd., 1,000 volts (C185)
73551	Capacitor—Tubular, moulded paper, 0.1 mfd., 400 volts (C149)
73557	Capacitor—Tubular, moulded paper, 0.1 mfd., 600 volts (C131)
73560	Capacitor—Tubular, moulded paper, 0.22 mfd., 200 volts (C136)
73794	Capacitor—Tubular, moulded paper, 0.22 mfd., 400 volts (C157, C162)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd., 200 volts (C190, C199)
74106	Capacitor—Electrolytic, 5 mfd., 50 volts (C197)
53147	Capacitor—Electrolytic, 25 mfd., 50 volts (C134)
73581	Capacitor—Electrolytic, comprising 1 section of 60 mfd., 450 volts, 2 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 150 volts (C146A, C146B, C146C, C146D)
73583	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 90 mfd., 150 volts, and 1 section of 50 mfd., 150 volts (C147A, C147B, C147C)
71432	Capacitor—Electrolytic, comprising 2 sections of 40 mfd., 450 volts, and 1 section of 10 mfd., 450 volts (C148A, C148B, C148C)
73582	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts, and 1 section of 80 mfd., 200 volts (C170A, C170B C170C)
73154	Choke—Filter choke (L114)
73477	Coil—Choke coil (L101)
73566	Coil—Focus coil (L115)
71449	Coil—Horizontal linearity control coil (L111)
74170	Coil—Peaking coil (36 mh.) (L117, R110)
72619	Coil—Peaking coil (93 mh.) (L103, R212)
71528	Coil—Peaking coil (180 mh.) (L102, R213, L105, R125)
71526	Coil—Peaking coil (250 mh.) (L106, L107)
71429	Coil—Width control coil (L110)
71521	Connector—Hi-voltage capacitor connector
71789	Connector—Kinescope anode connector
73579	Control—AGC threshold control (R138)
74047	Control—Brightness and picture control (R122, R131)
72735	Control—Focus control —2250 ohms (R191)
74442	Control—Focus control —5000 ohms (R191)
71440	Control—Height control (R155)
72734	Control—Horizontal and vertical hold control (R158, R173)
71441	Control—Vertical linearity control (R162)
74048	Control—Volume control, tone control and power switch (R205, R233, S101)
71457	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytics Nos. 71432, 73581 and 73582
73590	Cushion—Cushion for deflection yoke hood (2 required)
73600	Fuse—0.25 ampere, 250 volts (F101)
74030	Grommet—Rubber grommet to mount AM-FM radio tuner chassis (3 required)
37396	Grommet—Rubber grommet to mount ceramic tube socket (2 required)
71799	Grommet—Rubber grommet for anode lead supporting spring and hi-voltage fixed shield
73301	Magnet—Ion trap magnet (P-M type)
73587	Nut—Speed nut to mount hi-voltage capacitor
18469	Plate—Bakelite mounting plate for electrolytics
5119	Plug—3 contact female plug for speaker cable
71448	Plug—Male plug for power cable
74316	Plug—3 prong male plug for RK 135A audio power supply cable
71513	Resistor—Wire wound, 3.3 ohms, 1/3 watt (R187)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R202)
	Resistor—Fixed, composition, 10 ohms, ±20%, ½ watt (R120)

STOCK No.	DESCRIPTION
	Resistor—Fixed, composition, 39 ohms, ±10%, ½ watt (R102, R111)
	Resistor—Fixed, composition, 39 ohms, ±10%, 1 watt (R185)
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R183)
	Resistor—Fixed, composition, 47 ohms, ±10%, 1 watt (R184)
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R105)
	Resistor—Fixed, composition, 82 ohms, ±10%, ½ watt (R195)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R121)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R106, R109, R114, R214)
	Resistor—Fixed, composition, 150 ohms, ±10%, ½ watt (R115)
	Resistor—Fixed, composition, 220 ohms, ±10%, ½ watt (R123)
	Resistor—Fixed, composition, 220 ohms, ±10%, 1 watt (R223)
37502	Resistor—Wire wound, 330 ohms, 2 watts (R190) (early production—see Figure 18)
72325	Resistor—Wire wound, 390 ohms, 2 watts (R190) (late production—see Figure 16)
74049	Resistor—Wire wound, 500 ohms, 20 watts (R230)
	Resistor—Fixed, composition, 680 ohms, ±10%, 1 watt (R206)
73588	Resistor—Voltage divider, comprising 1 section of 850 ohms, 12 watts, and 2 sections of 650 ohms, 6 watts (C193A, C193B, C193C)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R103, R107, R108, R113, R116, R118, R165, R199)
	Resistor—Fixed, composition, 1,200 ohms, ±10%, ½ watt (R196)
	Resistor—Fixed, composition, 1,800 ohms, ±10%, 2 watts (R194, R208)
	Resistor—Fixed, composition, 2,200 ohms, ±10%, ½ watt (R219)
	Resistor—Fixed, composition, 2,700 ohms, ±10%, ½ watt (R161, R217)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R126)
	Resistor—Fixed, composition, 4,700 ohms, ±10%, ½ watt (R144)
	Resistor—Fixed, composition, 5,600 ohms, ±10%, ½ watt (R141, R218)
	Resistor—Fixed, composition, 5,600 ohms, ±5%, ½ watt (R112, R119, R136)
	Resistor—Fixed, composition, 5,600 ohms, ±10%, 1 watt (R127)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, ½ watt (R150)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, 1 watt (R186) (early production—see Figure 18)
	Resistor—Fixed, composition, 6,800 ohms, ±5%, 1 watt (R117)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, 2 watts (R177, R210)
	Resistor—Fixed, composition, 8,200 ohms, ±10%, ½ watt (R152, R153, R171)
	Resistor—Fixed, composition, 8,200 ohms, ±5%, ½ watt (R164, R175, R222)
	Resistor—Fixed, composition, 8,200 ohms, ±5%, 1 watt (R128)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R182)
	Resistor—Fixed, composition, 10,000 ohms, ±5%, ½ watt (R104)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, 2 watts (R186) (late production—see Figure 16)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, ½ watt (R209)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 watts (R124)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, 1 watt (R146)

CIRCUIT SCHEMATIC DIAGRAM



All capacitance values less than 1 in MF and above 1 in MMF unless noted.

Coil resistance values less than 1 ohm are not shown.

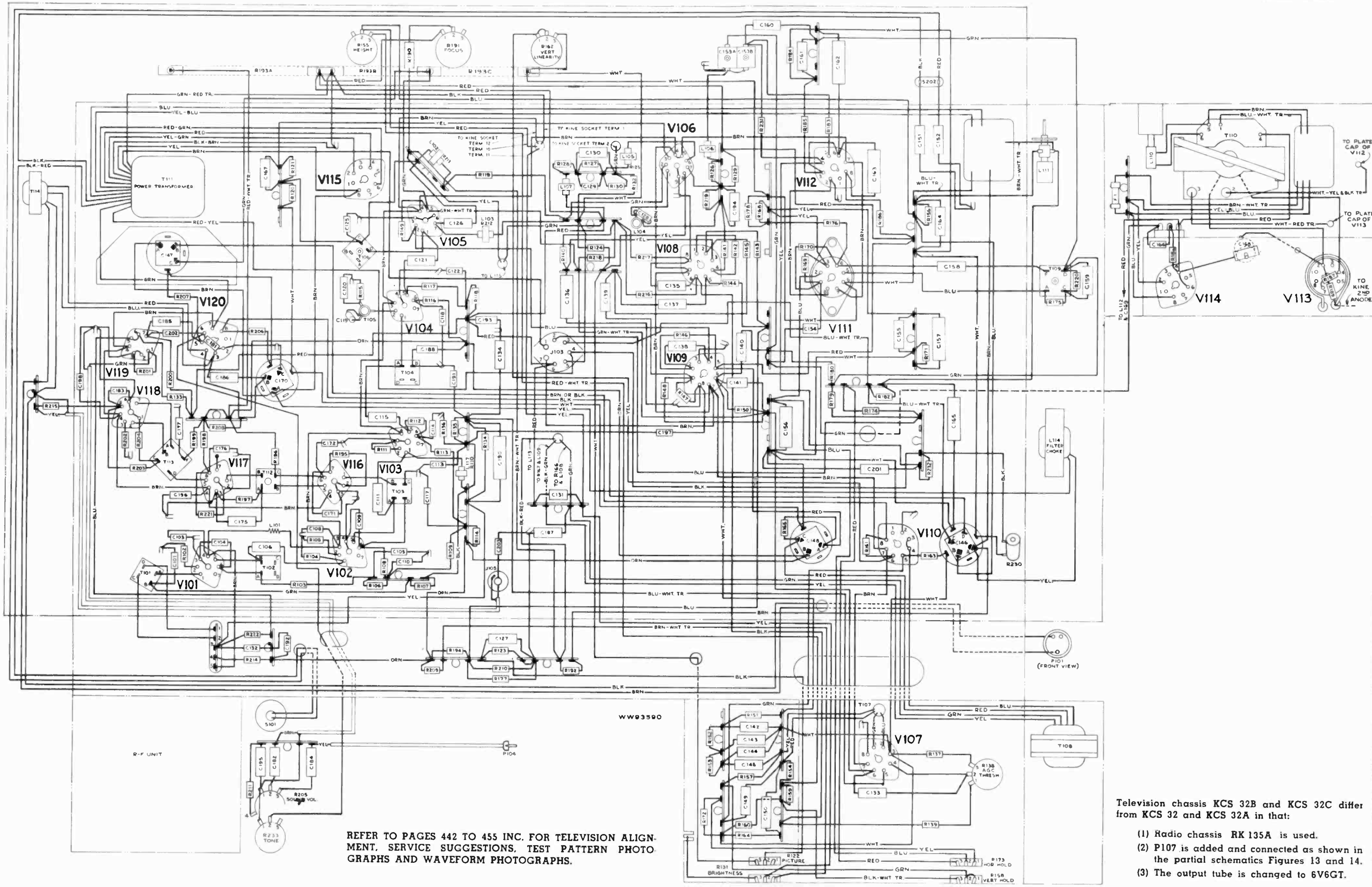
Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "VoltOhmyst," no signal input and with 117 v. a-c supply.

Figure 18 —Circuit Schematic Diagram (KCS32 and KCS32A)

CHASSIS WIRING DIAGRAM



REFER TO PAGES 442 TO 455 INC. FOR TELEVISION ALIGNMENT, SERVICE SUGGESTIONS, TEST PATTERN PHOTOGRAPHS AND WAVEFORM PHOTOGRAPHS.

Television chassis KCS 32B and KCS 32C differ from KCS 32 and KCS 32A in that:

(1) Radio chassis RK 135A is used.
(2) P107 is added and connected as shown in the partial schematics Figures 13 and 14.
(3) The output tube is changed to 6V6GT.

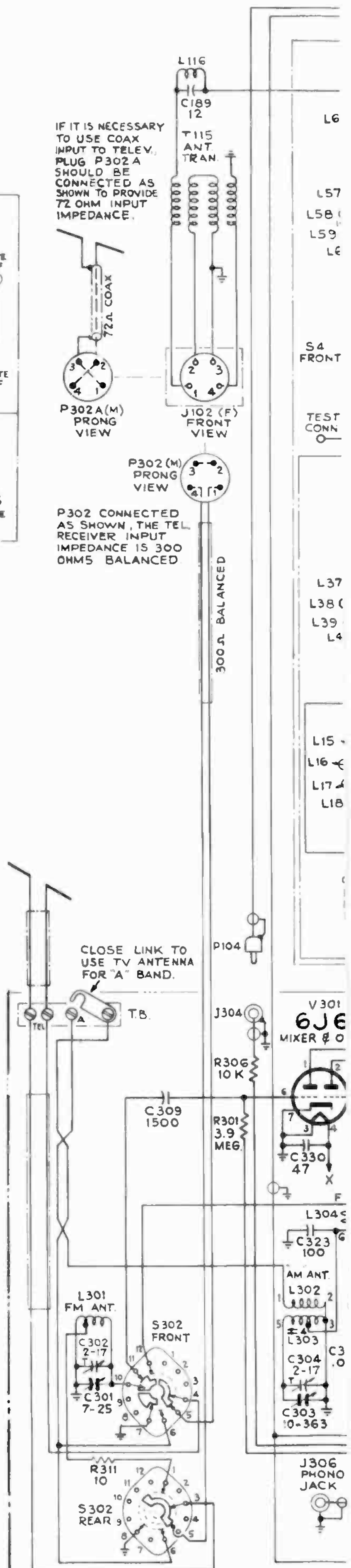


Figure 17—Chassis Wiring Diagram (KCS32 and KCS32A)

IN SOME SETS THE HORIZONTAL DEFLECTION CIRCUIT IS CONNECTED AS SHOWN IN FIGURE 16.

All resistance values in ohms K = 1,000.

STOCK No.	DESCRIPTION
	Resistor—Fixed, composition, 18,000 ohms, ±5%, ½ watt (R135)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R198, R215)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R151, R197, R220)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R143)
	Resistor—Fixed, composition, 47,000 ohms, ±20%, ½ watt (R221)
	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ watt (R145)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R156)
	Resistor—Fixed, composition, 68,000 ohms, ±10%, ½ watt (R172)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R211)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R160, R216)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, ½ watt (R203, R204)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 watt (R176)
	Resistor—Fixed, composition, 120,000 ohms, ±5%, ½ watt (R134)
	Resistor—Fixed, composition, 120,000 ohms, ±10%, 1 watt (R174, R179)
	Resistor—Fixed, composition, 150,000 ohms, ±20%, ½ watt (R142)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ watt (R168, R180)
	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 watt (R178)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, ½ watt (R232)
	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ watt (R129, R154)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R140, R200)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R207)
	Resistor—Fixed, composition, 470,000 ohms, ±10%, ½ watt (R137, R139)
	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ watt (R188)
	Resistor—Fixed, composition, 820,000 ohms, ±10%, ½ watt (R231)
	Resistor—Fixed, composition, 820,000 ohms, ±5%, ½ watt (R169)
	Resistor—Fixed, composition, 1 megohm, ±10%, ½ watt (R147)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R189)
	Resistor—Fixed, composition, 1.5 megohm, ±5%, ½ watt (R157)
	Resistor—Fixed, composition, 1.8 megohm, ±5%, ½ watt (R133)
	Resistor—Fixed, composition, 2.2 megohms, ±10%, ½ watt (R130, R132, R159, R163)
	Resistor—Fixed, composition, 2.7 megohms, ±5%, 1 watt (R170)
	Resistor—Fixed, composition, 3.9 megohms, ±10%, ½ watt (R149)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R201)
	Resistor—Fixed, composition, 10 megohms, ±10%, ½ watt (R148)
71456	Screw—No. 8-32 wing screw to mount yoke and hood (3 required)
73584	Shield—Tube shield
35787	Socket—Input socket
72741	Socket—Kinescope socket
31364	Socket—Lamp socket
72108	Socket—Power input socket, 7 contact
71508	Socket—Tube socket for 8016
73117	Socket—Tube socket, 7 pin, miniature
72927	Socket—Tube socket, 9 pin, miniature
73249	Socket—Tube socket, octal, ceramic, plate mounted

STOCK No.	DESCRIPTION
31251	Socket—Tube socket, octal, wafer
73586	Spring—Hood and yoke pressure spring (3 required)
73585	Spring—Supporting spring for anode lead
73578	Transformer—Antenna transformer complete with socket and bracket (T115, J102)
73571	Transformer—First pix i-f transformer (T101, C102, R101)
73572	Transformer—Second pix i-f transformer (T102, C107)
73573	Transformer—Third pix i-f transformer (T103, C112)
73574	Transformer—Fourth pix i-f transformer (T104, C116)
73575	Transformer—Fifth pix i-f transformer (T106, C123, C124)
73569	Transformer—Vertical oscillator transformer (T107)
73568	Transformer—Vertical output transformer (T108)
73576	Transformer—Horizontal oscillator transformer (T109)
73570	Transformer—Horizontal output and hi-voltage transformer (T110)
74046	Transformer—Power transformer, 115 volt, 60 cycle (T111)
71424	Transformer—Sound i-f transformer (T112, C173, C174)
71427	Transformer—Sound discriminator transformer (T113, C178, C179, C180)
71419	Transformer—Audio output transformer (T114)
71778	Trap—Sound trap (T105, C119)
73476	Trap—I-F trap (L116, C189)
73577	Trap—4.5 mc video trap (L104, C128)
71420	Yoke—Deflection yoke (L108, L109, L112, L113, C169, R166, R167)
	RADIO TUNER UNIT RK 135, RK 135A
74039	Board—"Tel-Ant" terminal board (4 contacts with link)
74027	Bracket—Drive cord bracket complete with pulley—L. H.
74026	Bracket—Drive cord bracket complete with two pulleys—R. H.
71105	Cable—Shielded cable complete with pin plug (W301)
74017	Capacitor—Variable tuning capacitor (C301, C302, C303, C304, C305, C307, C308)
73866	Capacitor—Ceramic, 2 mmf. (C306)
31353	Capacitor—Ceramic, 15 mmf. (C312)
39042	Capacitor—Ceramic, 47 mmf. (C330)
73867	Capacitor—Ceramic, 56 mmf. (C313)
33103	Capacitor—Ceramic, 68 mmf. (C310)
39396	Capacitor—Ceramic, 100 mmf. (C322, C323)
48125	Capacitor—Ceramic, 150 mmf. (C314)
39640	Capacitor—Mica, 330 mmf. (C325, C326)
73748	Capacitor—Ceramic, 1,500 mmf. (C309)
74009	Capacitor—Ceramic, dual, 4,000 mmf. (C317, C319, C321)
73473	Capacitor—Ceramic, 5,000 mmf. (C318, C329)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C315, C320, C324)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C311)
54859	Capacitor—Tubular, .05 mfd., 400 volts (C316)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C328)
74024	Coil—Antenna coil—FM (No. 16 buss tinned, 8 turns per inch, 2½ turns L. H., .430 I. D.) (L301)
74020	Coil—Antenna coil—AM (L302, L303)
73744	Coil—Oscillator coil—AM (L304, L305, L306
74025	Coil—Oscillator coil—FM (No. 16 buss tinned, 9 turns per inch, 4⅞ turns L. H., .430 I. D.) (L307)
72953	Cord—Drive cord (approx. 42" overall length)
74011	Filter—Diode filter, dual 200 mmf. and 47,000 ohms (DF301)
39153	Plug—4 prong male plug
36395	Plug—7 prong male plug
5119	Plug—3 contact female plug for audio power supply cable
74023	Resistor—Wire wound, 0.51 ohms, 1 watt (R323, R324)
	Resistor—Fixed, composition, 3.9 ohms, ±10%, ½ watt (R301)
	Resistor—Fixed, composition, 10 ohms, ±20%, ½ watt (R311)
	Resistor—Fixed, composition, 68 ohms, ±20%, ½ watt (R308)

STOCK No.	DESCRIPTION
	Resistor—Fixed, composition, 100 ohms, ±20%, ½ watt (R305, R317)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R314)
	Resistor—Fixed, composition, 680 ohms, ±20%, ½ watt (R310, R312)
	Resistor—Fixed, composition, 1,200 ohms, ±5%, ½ watt (R319)
	Resistor—Fixed, composition, 3,300 ohms, ±5%, ½ watt (R320)
	Resistor—Fixed, composition, 10,000 ohms, ±20%, ½ watt (R306)
	Resistor—Fixed, composition, 15,000 ohms, ±10%, ½ watt (R304)
	Resistor—Fixed, composition, 15,000 ohms, ±20%, ½ watt (R315, R318)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R302)
	Resistor—Fixed, composition, 27,000 ohms, ±10%, ½ watt (R307, R309)
	Resistor—Fixed, composition, 39,000 ohms, ±10%, ½ watt (R322)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ watt (R325, R326)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R321)
	Resistor—Fixed, composition, 2.2 megohms, ±20%, ½ watt (R303)
	Resistor—Fixed, composition, 22 megohms, ±20%, ½ watt (R316)
74028	Shaft—Tuning knob shaft
73632	Shield—Tube shield
35787	Socket—Audio cable input socket
31364	Socket—Lamp socket
74128	Socket—Phono input socket and bracket assembly
74179	Socket—Tube socket for V302 and V303
73117	Socket—Tube socket
74038	Spring—Drive cord spring
74018	Switch—Selector switch complete with heater and shorting switch (S301, S302, S303, S304, S305) (RK 135)
74260	Switch—Selector switch complete with heater and shorting switch (S301, S302, S303, S304, S305) (RK 135A)
74031	Switch—Heater switch (S304)
74032	Switch—Shorting switch (S305)
73745	Transformer—First i-f transformer, dual (T301)
74019	Transformer—Second i-f transformer, dual (T302)
73743	Transformer—Ratio detector transformer (T303)
33726	Washer—"C" washer for tuning shaft (rear)
74172	Washer—Fibre washer to prevent dial cord slippage.
34457	Washer—Spring washer for tuning shaft (front)
	SPEAKER ASSEMBLIES (8TK29) 92569-7W RL103C4
13867	Cap—Dust cap
73934	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker
73635	Speaker—12" P-M speaker complete with cone and voice coil less plug
71145	Suspension—Metal cone suspension
	SPEAKER ASSEMBLIES (8TR29) 92573-4W RL109-5
5118	Plug—3 prong male plug for speaker
73993	Speaker—5" x 7" P-M speaker complete with cone and voice coil
	MISCELLANEOUS
74058	Back—Cabinet back for Model 8TK29
74053	Back—Cabinet back for Model 8TR29
73862	Bezel—Kine tube bezel or window frame
74052	Bezel—Lucite bezel and dial scale assembly
74054	Bracket—Dial lamp bracket (2 required)
71599	Bracket—Pilot lamp bracket—Model 8TK29
74114	Button—Rosette button for wood grille bars—Model 8TK29

STOCK No.	DESCRIPTION
13103	Cap—Pilot lamp jewel for Model 8TK29
71892	Catch—Bullet catch and strike for doors (2 required)—Model 8TK29
74055	Clip—Spring clip for bezel and dial (2 required)
X1913	Cloth—Grille cloth for mahogany or walnut instruments—Model 8TK29
X1914	Cloth—Grille cloth for toasted mahogany instruments—Model 8TK29
X1915	Cloth—Grille cloth for mahogany or walnut instruments—Model 8TR29
X1916	Cloth—Grille cloth for toasted mahogany instruments (8TR29)
74232	Decal—Control panel decal for mahogany or walnut instruments
74233	Decal—Control panel decal for toasted mahogany instruments
71910	Decal—Trade mark decal—Model 8TK29
73180	Emblem—"RCA-Victor" emblem—Model 8TK29
73549	Emblem—"RCA Victor" emblem for Model 8TR29
73642	Escutcheon—Channel marker escutcheon for walnut or mahogany instruments
73740	Escutcheon—Channel marker escutcheon for toasted mahogany instruments
72113	Foot—Rubber foot (4 required)—Model 8TR29
73863	Glass—Safety glass
37396	Grommet—Rubber grommet for mounting speaker—Model 8TK29 (4 required)
74050	Guide—Station selector indicator guide
74308	Hinge—Door hinge (1 set)—for Model 8TK29 (2 required)
74051	Indicator—Station selector indicator
74056	Knob—Radio tuning or selector switch knob—dark—for walnut or mahogany instruments
74057	Knob—Radio tuning or selector switch knob—tan—for toasted mahogany instruments
73224	Knob—Television channel selector knob—dark—for walnut or mahogany instruments
73225	Knob—Television channel selector knob—tan—for toasted mahoany instruments
73222	Knob—Television fine tuning control knob—dark—for walnut or mahogany instruments.
73223	Knob—Television fine tuning control knob—tan—for toasted mahogany instruments
73227	Knob—Tone control, brightness control or vertical hold control knob—tan—for toasted mahogany instruments
73226	Knob—Tone control, brightness control or vertical hold control knob—dark—for walnut or mahogany instruments
73228	Knob—Volume control, brightness control or horizontal hold control knob—dark—for walnut or mahogany instruments
73229	Knob—Volume control, brightness control or horizontal hold control knob—tan—for toasted mahogany instruments
11765	Lamp—Dial lamp
74120	Ornament—Metal ornament for front panel—Model 8TR29
74111	Plate—Back plate for R. H. door pull—Model 8TK29
74112	Plate—Back plate for L. H. door pull—Model 8TK29
74449	Plate—Stud and plate assembly complete with wing nut and spring for front panel (2 required)
73771	Pull—Door pull (2 required)—Model 8TK29
74113	Screw—No. 8-32 tremit (cross-recessed) head screw for door pull back plates—Model 8TK29
71539	Slide—Kinescope centering slide (4 required)
30330	Spring—Retaining spring for knobs 73228 and 73229
72845	Spring—Retaining spring for knobs 73222 and 73223
14270	Spring—Retaining spring for knobs 73224, 73225, 73226, 73227, 74056 and 74057
73643	Spring—Spring clip for channel marker escutcheon
72936	Stop—Door stop—Model 8TK29
74006	Stud—Stud and plate for front panel (2 required)—for Model 8TR29
74118	Trim—Front panel metal trim—R. H.—Model 8TR29
74119	Trim—Front panel metal trim—L. H.—Model 8TR29

To obtain resistors for which no stock number is given, order by stating type, value of resistance, tolerance and wattage.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Model 8TV321
Walnut,
Mahogany
or Toasted
Mahogany

Model 8TV323
Walnut,
Mahogany
or Toasted
Mahogany

RCA VICTOR

TELEVISION, AM-FM RADIO, PHONOGRAPH COMBINATION

MODELS 8TV321, 8TV323

Chassis Nos. KCS30-1 and either RC616B RC616C, RC616J or RC616K. Mfr. No. 274

SERVICE DATA

—1948 No. T6—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Models 8TV321 and 8TV323 are thirty-two tube Television, AM-FM Radio, Phonograph console combinations. The television receiver employs twenty tubes plus two rectifiers and a 10BP4 Kinescope. The AM-FM radio chassis employs eight tubes plus one rectifier. An automatic record changer of the "center post, push-off" type is employed and features a crystal pickup with the "Silent Sapphire" stylus.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

RADIO TUNING RANGE

Broadcast .... 540-1,600 kc
Frequency Modulation .... 88-108 mc
Intermediate Frequency—AM .... 455 kc
Intermediate Frequency—FM .... 10.7 mc

PICTURE SIZE .... 6⅜" x 8½"

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc to 88 mc, 174 mc to 216 mc

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

POWER SUPPLY RATING

Television Operation .... 115 volts, 310 watts
Radio Operation .... 115 volts, 70 watts
Phonograph Operation .... 115 volts, 95 watts

AUDIO POWER OUTPUT RATING

Maximum Power Output .... 6.5 watts

CHASSIS DESIGNATIONS

Television Chassis .... KCS 30-1
Radio Chassis .... RC616B or RC616J in 8TV323
RC616C or RC616K in 8TV321

LOUDSPEAKER (92569-5)

Type .... 12-inch PM Dynamic
Voice Coil Impedance .... 3.2 ohms at 400 cycles

RECORD PLAYER

RP178 ....In 8TV321 and 8TV323
Refer to Service Data RP178 for information on record player.

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (outside) 8TV321	39	39¾	22
Cabinet (outside) 8TV323	40½	40	22½

SHIPPING WEIGHT (less kinescope)

8TV321 .... 190 lbs. 8TV323 .... 238 lbs.

RCA TUBE COMPLEMENT

(KCS 30-1)

	Tube Used	Function
(1)	RCA 6AG5	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6AG5	Converter
(4)	RCA 6AU6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AV6	Bias Clamp
(8)	RCA 6AG5	1st Picture I-F Amplifier
(9)	RCA 6AG5	2nd Picture I-F Amplifier
(10)	RCA 6AG5	3rd Picture I-F Amplifier
(11)	RCA 6AG5	4th Picture I-F Amplifier
(12)	RCA 6AL5	Picture 2nd Detector and Sync Limiter
(13)	RCA 12AU7	1st and 2nd Video Amplifier
(14)	RCA 6SN7GT	AGC Amplifier and Vertical Sweep Oscillator
(15)	RCA 6SN7GT	AGC Rectifier and 1st Sync Separator
(16)	RCA 6SN7GT	Sync Amplifier and 2nd Sync Separator
(17)	RCA 6K6GT	Vertical Sweep Output
(18)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(19)	RCA 6BG6G	Horizontal Sweep Output
(20)	RCA 5V4G	Damper
(21)	RCA 1B3-GT/8016	High Voltage Rectifier
(22)	RCA 5U4G	Power Supply Rectifier
(23)	RCA 10BP4	Kinescope

(RC616B, RC616C, RC616J, RC616K)

	Tube Used	Function
(1)	RCA 6J6	Mixer and Oscillator
(2)	RCA 6BA6	I-F Amplifier
(3)	RCA 6AU6	Driver
(4)	RCA 6AL5	Ratio Detector
(5)	RCA 6AV6	AM Detector and Phase Inverter
(6)	RCA 6AV6	Audio Amplifier
(7)	RCA 6V6GT	Audio Output (2 tubes)
(8)	RCA 6X5GT	Rectifier

Specifications continued on page 2

8TV321, 8TV323 ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE I-F FREQUENCIES

Picture Carrier Frequency	25.75 mc
Adjacent Channel Sound Trap	27.25 mc
Accompanying Sound Traps	21.25 mc
Adjacent Channel Picture Carrier Trap	19.75 mc

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 mc
Sound Discriminator Band Width between peaks	350 kc

VIDEO RESPONSE .... To 4 mc

FOCUS .... Magnetic

SWEEP DEFLECTION .... Magnetic

SCANNING .... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY 15,750 cps

VERTICAL SCANNING FREQUENCY .... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) 30 cps

TELEVISION OPERATING CONTROLS
(front panel)

Channel Selector Fine Tuning	Dual Control Knobs
Picture	Single Control Knob
Picture Horizontal Hold Picture Vertical Hold	Dual Control Knobs
Brightness	Single Control Knob

TELEVISION NON-OPERATING CONTROLS
(not including r-f and i-f adjustments)

Horizontal Centering	top chassis screwdriver adjustment
Vertical Centering	top chassis screwdriver adjustment
Width	rear chassis screwdriver adjustment
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Osc. Frequency	bottom chassis adjustment
Horizontal Oscillator Waveform	side chassis adjustment
Focus	rear chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
AGC Threshold Control	top chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE, OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE KINESCOPES ARE BEING HANDLED. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For this reason, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched, or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

TELEVISION OPERATION

The following adjustments are necessary when turning the receiver on for the first time:

1. Turn the radio FUNCTION switch to Tel.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity.

5. Adjust SOUND VOLUME for suitable volume.

6. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a light pattern appears on the screen.

7. Adjust the VERTICAL hold control until the pattern stops vertical movement.

8. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

9. Turn the BRIGHTNESS control counterclockwise until the retrace lines just disappear.

10. Adjust the PICTURE control for suitable picture contrast.

11. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

12. In switching from one station to another, it may be necessary to repeat steps numbers 9 and 10.

13. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

14. If the positions of the controls have been changed, it may be necessary to repeat steps numbers 2 through 10.

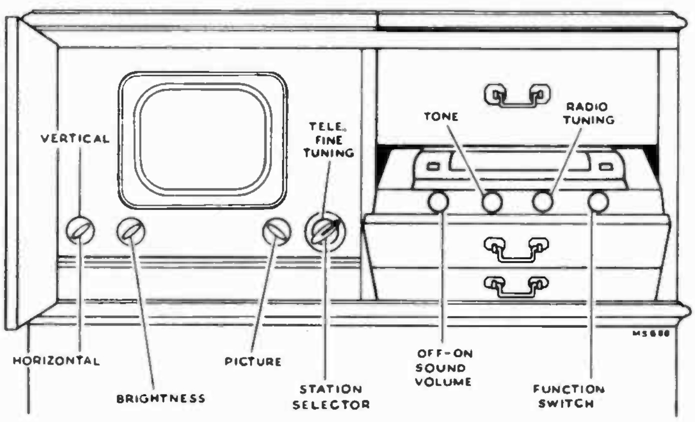


Figure 1—Receiver Operating Controls

RADIO OPERATION

1. Turn the radio FUNCTION switch to the desired band (BC or FM).

2. Tune in the desired station with the TUNING control.

PHONOGRAPH OPERATION

1. Turn the radio FUNCTION switch to Pho.

MANUAL OPERATION

1. Slide the record support shelf in towards the center post for 10-inch or away from the center post for 12-inch position.

2. Place the record to be played on the turntable and turn the power switch on.

3. Place the pickup on the start of the record.

NOTE: The mechanism should be allowed to complete cycle before attempting to move tone arm to the rest position.

4. Turn power switch off manually.

5. Remove the record by raising straight up without tilting.

AUTOMATIC OPERATION

1. With the power switch in the off position slide the record support shelf as required for 10- or 12-inch records.

2. Place the records to be played in a stack with desired selections upward and in proper sequence with the last record on top. Load them on the changer by placing them over the center post and resting on the record support shelf. Place record stabilizing clamp on top of the record stack.

3. Turn power switch on and press the reject button. The changer will play automatically one side of each record in the stack.

The tone arm can be moved to the rest position any time the mechanism is not in cycle.

4. Turn the power switch off, lift the stabilizing clamp and remove the stack from the turntable by placing fingers of both hands on opposite sides of the turntable and under the stack. Lift the stack of records straight up. Do not tilt or squeeze the stack while removing.

Models 8TV321 and 8TV323 television receivers are shipped complete in one carton except for the 10BP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING.—The 8TV321 is shipped in a cardboard carton. To unpack the receiver, turn the shipping carton on its side and tear open the carton bottom flaps. Fold the flaps up along the side of the carton and turn the carton back up. Lift the carton up and off of the cabinet.

The 8TV323 is shipped in a plywood case. To open, remove the front side as indicated on the case. If the front is removed by prying, do not permit the prying tool to enter the case as the cabinet may become scratched. Remove the shipping case rail across the front of the cabinet. Do not remove the two rail support screws on each side of the cabinet. Slide the cabinet out of the case by pulling on each side of the cabinet shipping skid.

A flat skid is attached to the bottom of the receiver cabinet which will permit the cabinet to be moved about without danger of breaking a cabinet leg or stressing the cabinet joints. This skid should be left on the cabinet until the receiver is placed on display or installed in the home. To remove the skid, take off the cabinet back and remove two nuts on the inside of the cabinet as shown in Figure 2. Then, with a man at each end of the cabinet, lift the cabinet off the skid.

Caution: The 8TV323 radio panel is held in the closed position by two wood screws in a shipping bracket attached to the radio chassis. The radio panel must not be tipped out until these screws are removed as it may cause the cabinet front to be split or the radio chassis to be badly deformed. Remove the screws shown at Detail B in Figure 2 and take out the two red brackets. Somewhat similar brackets are employed in the 8TV321. These brackets should also be removed.

Loosen the three phillips head shipping screws which may be seen in the top of the record changer motor board. Remove all changer shipping material. Remove the sapphire guard clip from the record changer tone arm as shown in detail A of Figure 2.

Take off the television compartment back grille. Remove the front panel, taking out two ornamental screws from the front panel of the 8TV321 cabinet or by loosening two wing nuts in back of the panel in the 8TV323 cabinet.

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets.

The operating control knobs are packed in a paper bag which is taped to the cabinet back rail. Remove the bag.

Remove the two self-tapping screws from the deflection yoke mounting as shown in Figure 4.

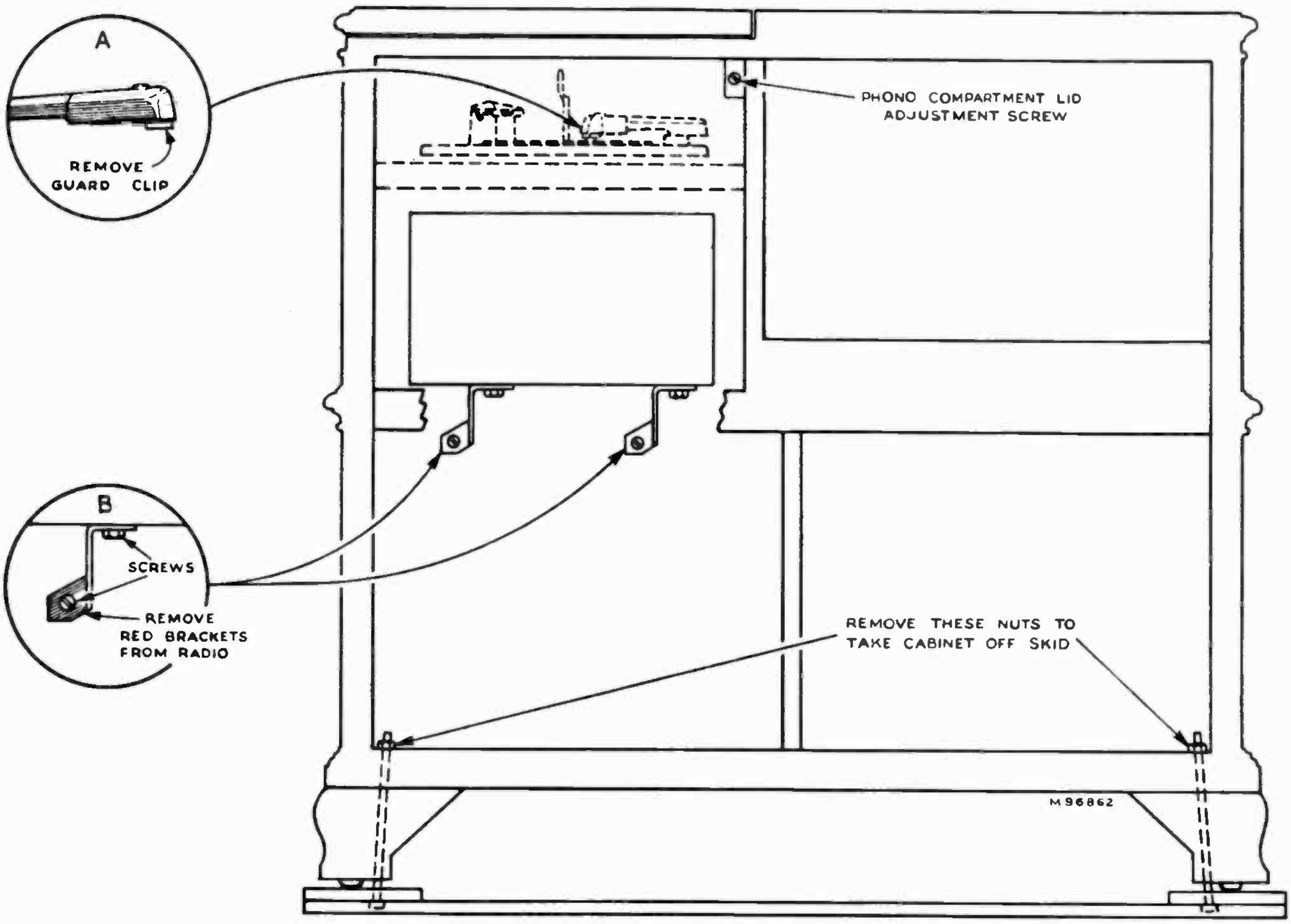


Figure 2—Removal of Shipping Material

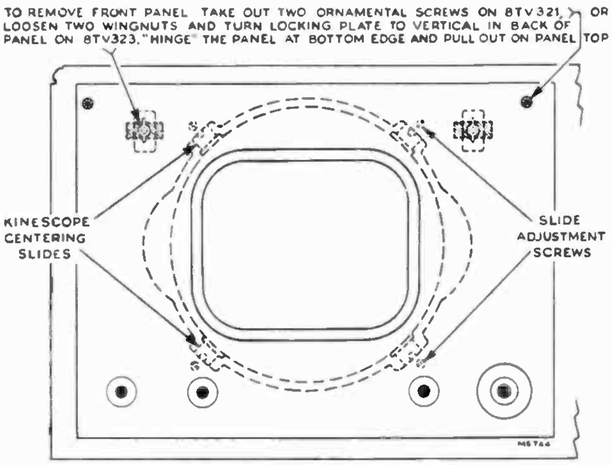


Figure 3—Cabinet, Front View

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten. See Figure 4 for the location of the cushion and yoke adjustments.

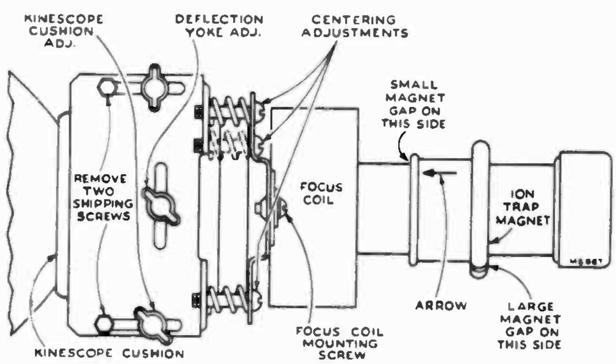


Figure 4—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the two focus coil mounting screws and move the coil until alignment is obtained. Tighten the mounting screws with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid position. See Figure 3 for location of the slides and their adjustment screws.

KINESCOPE HANDLING PRECAUTION.—Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatterproof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

INSTALLATION OF KINESCOPE.—The kinescope second anode contact is a recessed metal well in the side of the bulb. The tube must be installed so that this contact is up but inclined approximately 30 degrees toward the high voltage compartment.

Insert the neck of the kinescope through the deflection and focus coils as shown in Figure 5. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

Slip the ion trap magnet assembly over the neck of the kinescope with the large magnet towards the base of the

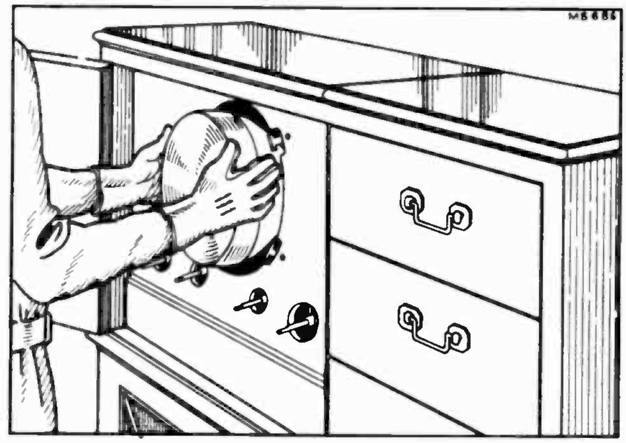


Figure 5—Kinescope Insertion

kinescope. The gap of the large magnet should be to the left (as seen from the back of the cabinet) and the gap of the small magnet should be to the right.

The final orientation of the ion trap magnet will be determined by the position of the ion trap flags. Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags, as shown in Figure 6. The magnet must be installed so that the rear magnet is approximately over the flags and is oriented as shown in Figure 4.

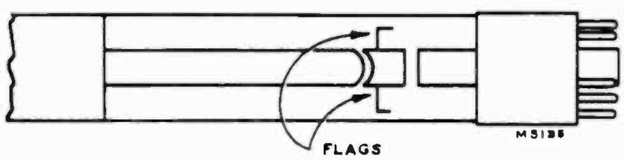


Figure 6—Ion Trap Flags

Connect the kinescope socket to the tube base.

Insert the kinescope until the face of the tube protrudes approximately one-quarter of an inch outside the front of the cabinet. Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

Install the cabinet front panel by reversal of the procedure indicated in Figure 3. Install the control knobs on the control shafts.

Check all chassis interconnecting cables to make sure that all are plugged into the proper sockets as shown in Figure 7.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible.

Connect the high voltage lead to the kinescope second anode socket. The glass to metal seal of this connector is fragile and care should be used in making the connection. Only a small amount of pressure should be applied to the connector when inserting the clip. If appreciable pressure is applied the seal may be fractured permitting air to leak into the tube thus ruining the kinescope.

The antenna and power connections should now be made.

Turn the power switch to the "on" position, the function switch to the television position, the brightness control fully clockwise, and picture control counterclockwise.

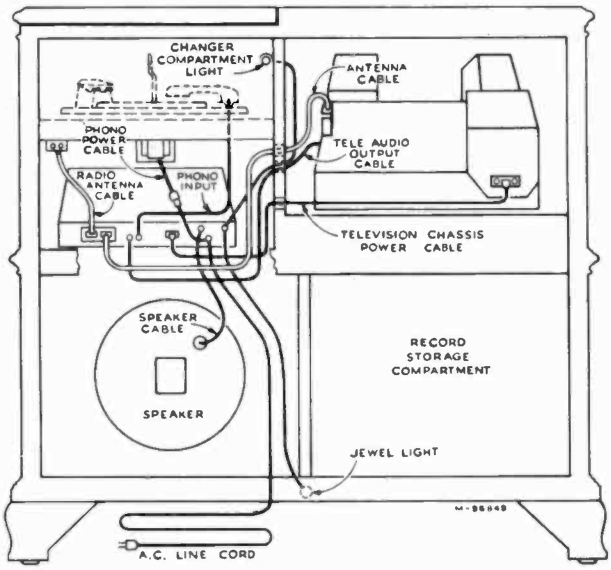


Figure 7—Chassis Interconnecting Cables

ION TRAP MAGNET ADJUSTMENT.—The ion trap rear magnet poles should be approximately over the ion trap flags. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R191 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

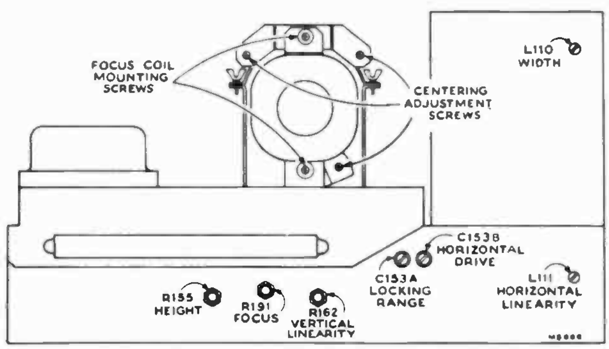


Figure 8—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS.—It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 8 of the receiver operating instructions on page 3.

If the Horizontal Oscillator and AGC System are operating properly, it should be possible to sync the picture at this point. However, if the AGC threshold control is misadjusted, and the receiver is overloading, it may be impossible to sync the picture.

If the receiver is overloading, turn R138 (on top of the chassis, see Figure 10) counterclockwise until the set operates normally and the picture can be synced.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT.—Turn the horizontal hold control to the extreme counterclockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control.

Pull in should occur when the control is approximately 90 degrees from the extreme counterclockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Centering Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR.—If in the above check the receiver failed to hold sync with the hold control at the extreme counterclockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull in point, it will be necessary to make the following adjustments:

Horizontal Frequency Adjustment.—Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T109 horizontal frequency adjustment (under the chassis) until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Lock in Range Adjustment.—Set the horizontal hold control to the full counterclockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the picture control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat this procedure until 3 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is in proper adjustment it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment." may be omitted.

CENTERING ADJUSTMENT.—No electrical centering controls are provided. Centering is obtained by mechanically orienting the focus coil with the three adjustment screws shown in Figure 8. Center the picture on the screen by adjustment of these screws. The focus coil should be approximately concentric around the neck of the kinescope to prevent curvature of the raster.

FOCUS COIL ADJUSTMENTS.—If, after making the centering adjustments in the above paragraph, a corner of the picture is shadowed, it will be necessary to loosen the focus coil mounting screws (shown in Figure 8) and change the position of the coil to eliminate the shadow. Recenter the picture by adjustment of the centering screws.

Recheck the position of the ion trap magnet to insure that maximum brilliance is obtained.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS.—Adjust the height control (R155 on chassis rear apron) until the picture fills the mask vertically (6⅜ inches). Adjust vertical linearity (R162 on rear apron), until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS.—Adjust the horizontal drive control C153B to give a picture of maximum width within the limits of good linearity. Adjust the horizontal linearity control L111 to provide best linearity. Adjust the width control until the picture just fills the mask.

Adjustments of the horizontal drive control affect horizontal oscillator hold and locking range. If the drive control was adjusted, recheck the oscillator alignment.

FOCUS.—Adjust the focus control (R191 on chassis rear apron) for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

CHECK TO SEE THAT THE CUSHION AND YOKE THUMBSCREWS AND THE FOCUS COIL MOUNTING SCREWS ARE TIGHT.

AGC THRESHOLD CONTROL ADJUSTMENT.—The AGC threshold control R138 is adjusted at the factory and normally should not require readjustment in the field.

To check the adjustment of the AGC Threshold Control, tune in a strong signal, sync the picture and turn the picture control to the maximum clockwise position. Turn the brightness control counterclockwise until the vertical retrace lines are just invisible.

Momentarily remove the signal by switching off channel then back. If the picture reappears immediately, the receiver is not overloading due to improper setting of R138. If the picture requires an appreciable portion of a second to reappear, R138 should be readjusted.

Set the picture control at the maximum clockwise position. Turn R138 fully counterclockwise. The top one-half inch of the picture may be bent slightly. This should be disregarded. Turn R138 clockwise until there is a very slight bend or change of bend in the top one-half inch of the picture. Then turn R138 counterclockwise just sufficiently to remove this bend or change of bend.

If the signal is very weak, the above method may not work as it may be impossible to get the picture to bend. In this case, turn R138 clockwise until the snow in the picture becomes more pronounced, then counterclockwise until the best signal to noise ratio is obtained.

The AGC control adjustment should be made on a strong signal if possible. If the control is set too far clockwise on a weak signal, then the receiver may overload when a strong signal is received. If it is not set sufficiently clockwise then the sync noise immunity is decreased.

CHECK OF R-F OSCILLATOR ADJUSTMENTS.—Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made

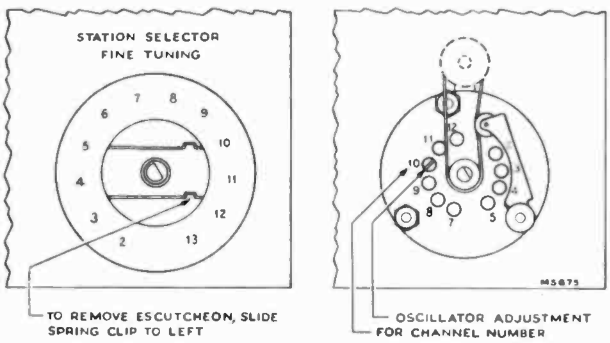


Figure 9—R-F Oscillator Adjustments

by the method outlined in the alignment procedure.

The adjustments for channels 2 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 9. Adjustment for channel 13 is on top of the chassis and channel 6 adjustment is in the kinescope well.

Observe the picture on all stations for detail, for proper interlacing and for the presence of interference or reflections.

REFER TO PAGES 442 TO 455 INC. FOR TELEVISION ALIGNMENT, SERVICE SUGGESTIONS, TEST PATTERN PHOTOGRAPHS AND WAVEFORM PHOTOGRAPHS.

RADIO OPERATION.—Turn the receiver function switch to AM and FM positions and check the radio for proper operation. In switching from radio to television or from television to radio, approximately 30 seconds warm-up time is required.

RECORD CHANGER OPERATION.—Open the record changer compartment lid and move the tone arm to the rest position. Place a record on the turntable. Slide the record shelf to the position to take the size of records used. Place a stack of records on the shelf. Turn the radio function switch to phono position. Slide the record changer power switch to the on position and push the reject button.

Replace the television receiver metal back grille. Replace the cabinet back. Make sure that the screws holding both backs are up tight otherwise the backs may rattle or buzz when the receiver is operating at high volume.

Advise the customer to keep all packing cartons and hardware for use in case of future moves.

RECEIVER LOCATION.—The owner should be advised of the importance of placing the receiver in the proper location in the room.

The location should be chosen—

—Away from bright windows and so that no bright light will fall directly on the screen. (Some illumination in the room is desirable, however.)

—To give easy access for operation and comfortable viewing.

—To permit convenient connection to the antenna.

—Convenient to an electrical outlet.

—To allow adequate ventilation.

ANTENNAS.—The finest television receiver built may be said to be only as good as the antenna design and installation. It is therefore important to use a correctly designed antenna, and to use care in its installation.

REFLECTIONS.—Multiple images sometimes known as echoes or ghosts, are caused by the signal arriving at the antenna by two or more routes. The second or subsequent image occurs when a signal arrives at the antenna after being reflected off a building, a hill or other object. In severe cases of reflections, even the sound may be distorted. In less severe cases, reflections may occur that are not noticeable as reflections, but that will instead cause a loss of definition in the picture.

Depending upon the circumstances, it may be possible to eliminate the reflections by rotating the antenna or by moving it to a new location. In extreme cases, it may be impossible to eliminate the reflection.

INTERFERENCE.—Auto ignition, street cars, electrical machinery and diathermy apparatus may cause interference which spoils the picture. Whenever possible, the antenna location should be removed as far as possible from highways, hospitals, doctors' offices, and similar sources of interference.

Short-wave radio transmitting and receiving equipment may cause interference in the picture in the form of moving ripples. In some instances it may be possible to eliminate the interference by the use of a trap in the antenna transmission line. However, if the interfering signal is on the same frequency as the television station, a trap will provide no improvement.

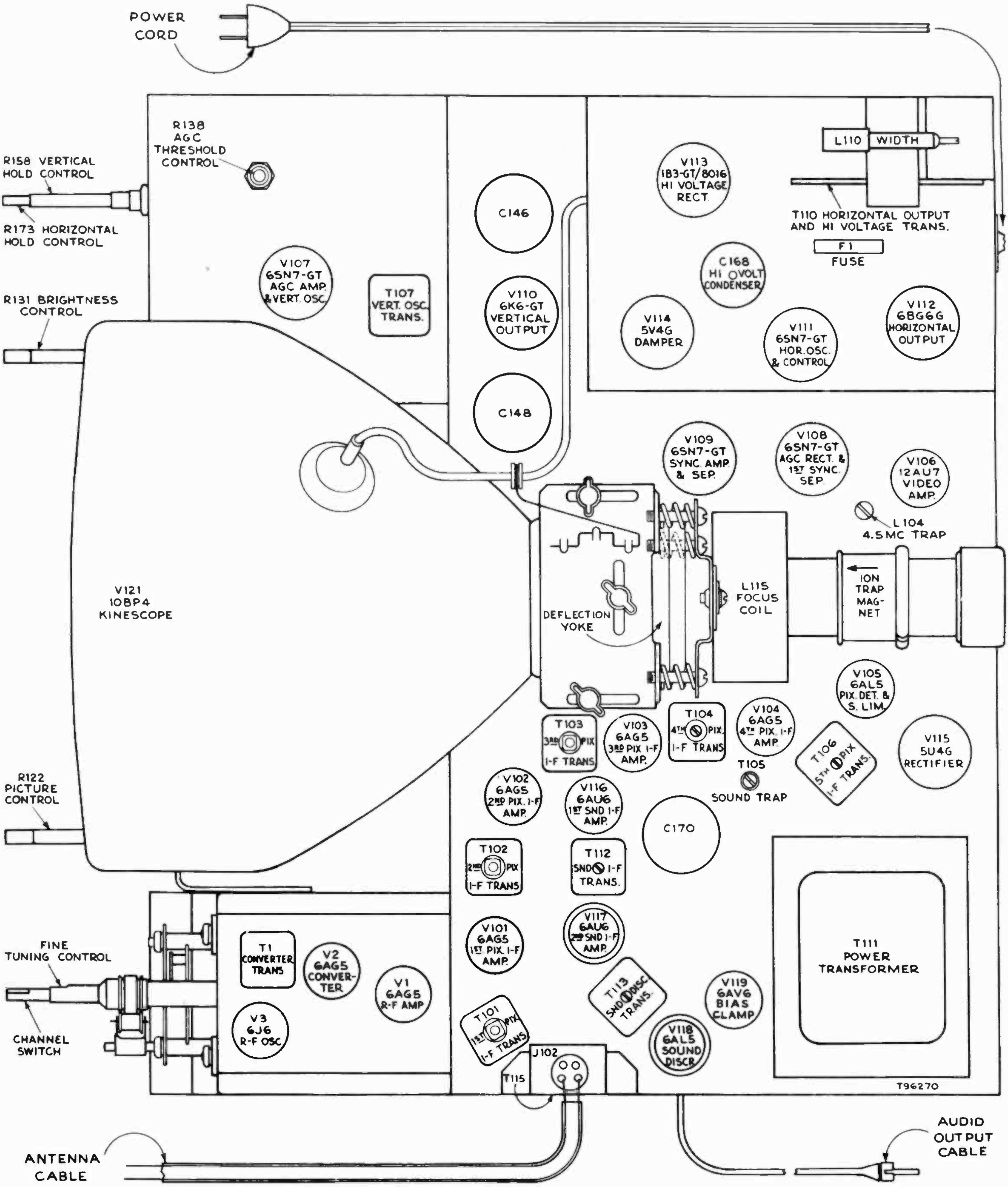


Figure 10—Television Chassis Top View

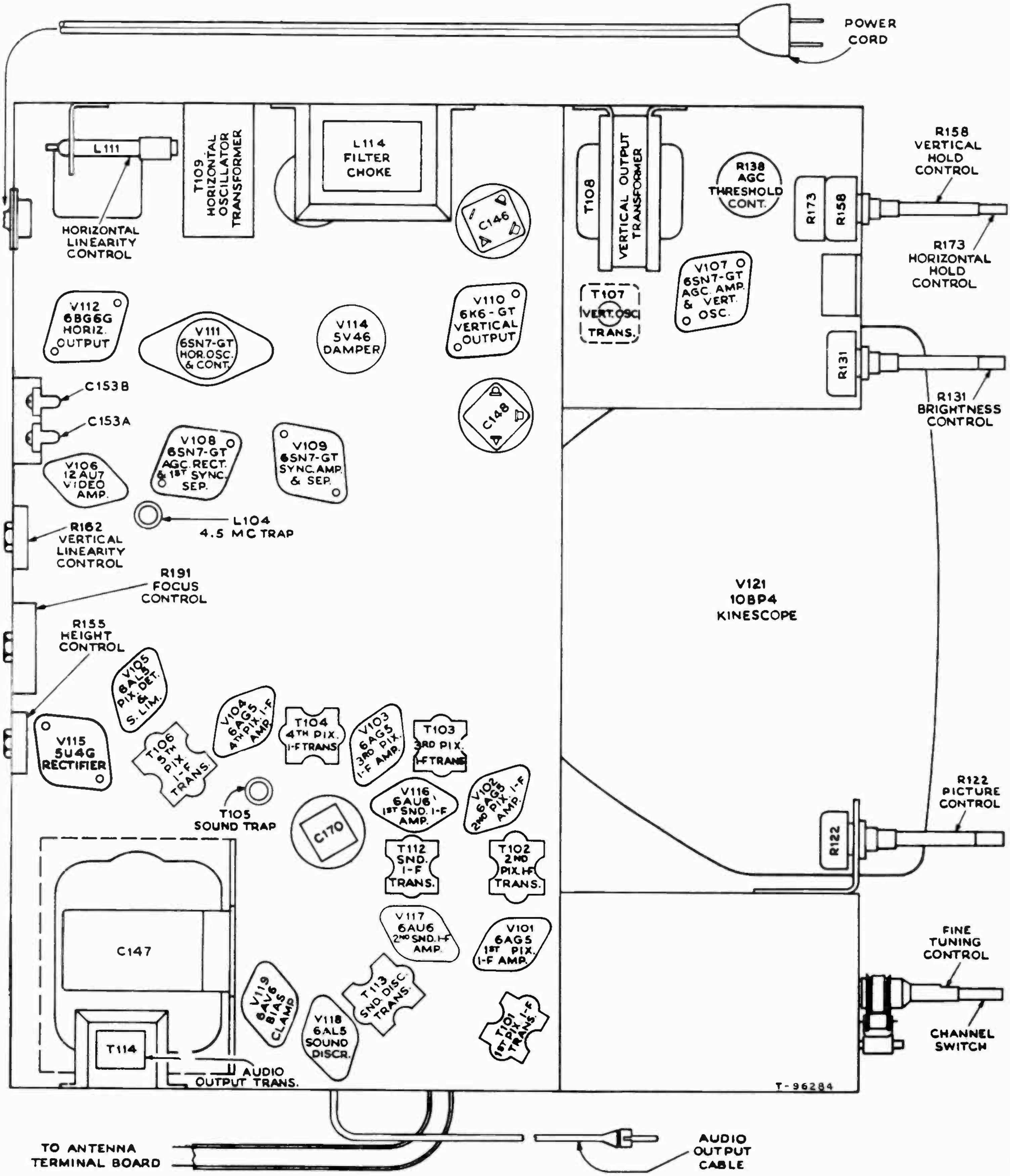


Figure 11—Television Chassis Bottom View

It is advisable that the reader be familiar with a recent standard textbook of television principles in order to understand the receiver circuits and their functions. Such a knowledge is assumed for the purpose of this publication.

The discussions which follow will not dwell on the operation of conventional circuits used which have been used in previous receivers and which should be well known. The circuits discussed will be only those that are new to the field.

R-F UNIT.—A new design of r-f unit is employed in the Model 8TV321, 8TV323 receivers. This unit employs several novel features which require explanation.

For ease of analysis the input circuit to the r-f amplifier can be broken down into three sections as shown in the simplified schematic of Figure 12.

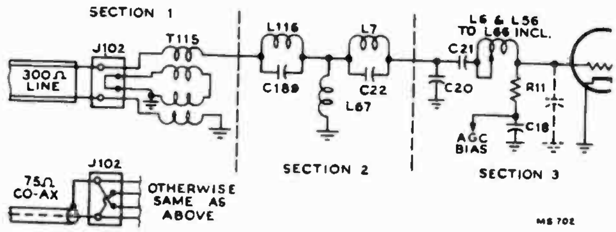


Figure 12—Simplified Schematic of R-F Amplifier Input

The function of the first section is to match the input to either a 300 balanced transmission line or to a 72 ohm co-ax line.

This is accomplished by using the equivalent of two 150 ohm transmission lines coiled up on separate coil forms. The act of coiling these transmission lines causes them to have high impedance for any unbalanced current in the lines so that opposite ends of the lines may have different connections in reference to ground. The use of two of these 150 ohm elements allows either a series or series-parallel connection to provide a match for either a 300 balanced or a 72 ohm co-ax antenna transmission line.

Section 2 of Figure 12 is simply an M-derived high pass filter section matching 300 ohms, cutting off just below channel 2 and has maximum attenuation in the picture i-f frequency range. This filter provides rejection for signals of i-f frequency which otherwise might be passed by the r-f amplifier and cause interference in the picture.

Section 3 of Figure 12 has the dual function of providing some selectivity in the input circuit and of stepping up the voltage at the r-f amplifier grid. The selectivity is approximately equivalent to that of a single tuned circuit with the exception that the skirt selectivity is better on the high frequency side of resonance than on the low frequency side due to the circuit's low pass filter configuration. Tuning is accomplished by switching small increments of inductance in or out of the circuit in order to resonate the network to the desired channel.

Voltage step up is accomplished by feeding the antenna voltage across a portion of the tank capacitance that is lower in impedance than that portion of the tank capacitance which comprises the input to the tube. Figure 13 shows a further simplification of this type of tuned circuit.

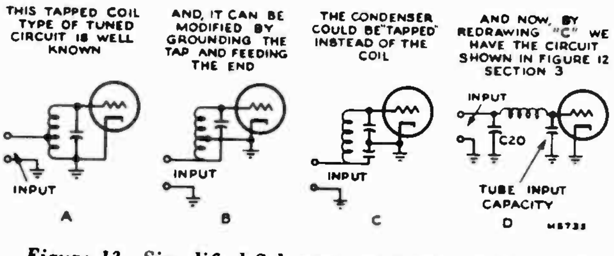


Figure 13—Simplified Schematic of Section 3, Figure 12

R11 is the resistance loading for the tuned circuit. This resistance is chosen to provide the proper bandwidth of response and at the same time provide a termination such that the input impedance to the circuit is 300 ohms. The ratio of capacitance of C20 and the tube input capacitance is such that the impedance is stepped up to 1,000 ohms at the r-f amplifier grid and the voltage is stepped up approximately 1.8 times.

The r-f amplifier tube is a 6AG5 pentode for good isolation between grid and plate circuits.

Figure 14 shows the simplified schematic of the tuned circuits coupling the plate of the r-f amplifier to the grid of the converter.

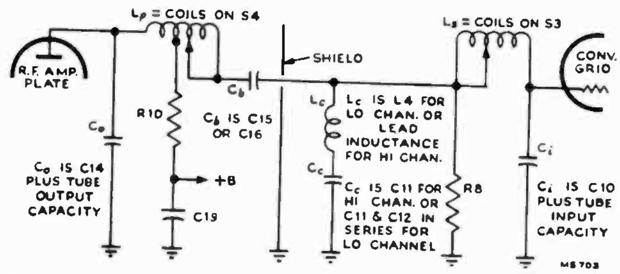


Figure 14—Simplified Schematic of R-F and Converter Lines

The primary of this tuned coupled circuit consists of the output capacitance of the r-f amplifier Co shunted by Lp, Cb, Lc and Cc in series.

The secondary consists of the input capacitance Ci of the converter grid shunted by Ls, Lc and Cc in series.

It will be noted that Lc and Cc are common to both primary and secondary circuits and consequently provide coupling between the two.

Tuning of the primary and secondary is accomplished as in the antenna circuit by switching inductance in Lp and Ls in order to obtain resonance on the desired channel.

The coupling circuit Lc and Cc is switched in going from low to high channels. One combination of Lc and Cc is provided for the low channels and another for the high channels. This thus provides an adjustment for optimum coupling for both groups of channels.

The combination of Lc and Cc is series resonant above the highest frequency channel of the group for which it is used so that the coefficient of coupling is extremely low in the neighborhood of the oscillator frequencies and the image frequencies. This is an important factor in realizing high image attenuation ratios and low oscillator radiation characteristics. For these reasons all other forms of stray coupling are reduced to a minimum and to this end, a grounded shield is placed between the primary and secondary coils.

Correlation of elements between the simplified schematics of Figures 12 and 14 and the actual schematic of Figure 95 should be obvious by inspection. R-F unit adjustments L1, L2, L3, and L5 are not intended for alignment but for factory control purposes.

VIDEO AMPLIFIER.—A d-c coupled video amplifier is employed. The picture control varies the contrast of the picture by varying the a-c gain of the second video amplifier by cathode degeneration. The gain variation is approximately 5 to 1 which is sufficient for a wide range of lighting conditions and viewer preferences. The d-c gain and hence blanking are held substantially constant by the resistor R124 feeding a bucking current at the cathode from −120 volts.

The kinescope screen must be approximately 300 volts positive with respect to the grid. Since this voltage is obtained from the receiver low voltage supply, a novel circuit is employed to permit operating the kinescope grid near ground potential yet permitting d-c coupling to the video amplifier plate which is at a considerably higher potential.

R128 is the normal load resistor for the second video amplifier and the a-c voltage is capacitively coupled through C130 to the kinescope grid.

The d-c component of the signal voltage developed on the plate side of R127 is approximately double that across R128 alone. This d-c is divided in half by R130 and R132 and directly coupled to the kinescope grid. The change in d-c potential representing picture background change appearing at the kinescope grid will be the same as that appearing across R128.

The lower end of R132 is connected to –120 volts so the static or reference d-c voltage at the kinescope grid will be one-half of the d-c voltage between the plate end of R127 and –120 volts. The kinescope grid is thereby permitted to operate at near ground reference potential but at the same time operate at normal d-c and a-c video component voltages.

A 4.5 mc trap L104 and C128 in series with the plate circuit is employed to reduce by a factor of 10 the 4.5 mc beat between sound and picture carriers. Consequently the fine tuning adjustment is less critical.

SYNC SEPARATION AND AGC. — One section of V108 is employed to substantially separate vertical sync from the video and the other section performs a dual function of pre-separating horizontal sync and developing a d-c voltage proportional to the tips of sync for automatic gain control purposes.

The complete video waveform from the first video amplifier is fed through R141 and R142 to the grid (pin 1) of V108. This resistance, in conjunction with the input capacity of the tube, attenuates horizontal sync at the grid without attenuating vertical sync.

The other section of V108 is fed the complete video waveform through R141 (5,600 ohms). This value of resistance bypassed by the tube input capacity does not materially affect the horizontal sync waveform but does isolate the tube input capacity from the video amplifier. The cathode time constant of this section is designed for the horizontal sync rate. The cathode voltage rises to tips of sync and discharges to blanking in a line interval, consequently most of the video waveform is beyond cutoff on the tubes grid characteristic. This time constant provides good noise immunity at the horizontal rate and permits the best possible horizontal sync under conditions of interference.

Separated horizontal sync pulses appear across the plate resistor R144. The horizontal and vertical sync pulses are then combined in a suitable network and fed to the grid of the sync amplifier.

For the AGC system, the peak voltage appearing on the AGC rectifier cathode is filtered by R139 and C133 and conductively coupled to the grid of the AGC amplifier V107A. A negative voltage for biasing the r-f and i-f amplifiers must be developed by the AGC amplifier. Therefore, the plate of the amplifier must be operated near ground potential, the cathode at a negative voltage and the grid at a slightly more negative voltage. The voltage appearing at the cathode pin 6 of V108 is approximately –8 volts with respect to ground so a divider arrangement consisting of R139, R137 and R138 is employed to obtain the proper reference voltage to operate the AGC amplifier. The AGC threshold control R138 is provided to set the operating characteristic so that the tips of sync are just below limiting at the first video amplifier. The AGC action will then maintain this level of signal to the video amplifier over the operating range of input signals.

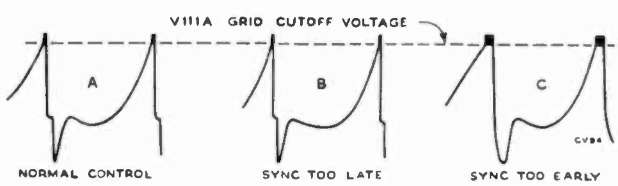
HORIZONTAL OSCILLATOR AND CONTROL. —Fundamentally the horizontal oscillator is a free running blocking oscillator and discharge circuit. The frequency of oscillation of this circuit can be controlled, however, by the adjustment of the operating bias. A control tube is provided which compares the frequency of the oscillator with the frequency of the incoming sync and produces an output voltage which is proportional to the phase displacement between the two signals. This voltage is applied as bias to the oscillator tube and causes it to oscillate at the frequency of the incoming sync and in the proper phase relation.

One section of the dual triode V111 operates as the oscillator and the other section functions as the control tube.

The details of the operation of the circuit are as follows: The right half of V111 (Figure 26) together with the coils between terminals A and C and C and F of T109, R179 and C161 operate as a normal blocking oscillator and discharge circuit to produce a saw-tooth voltage.

The stabilizing tuned circuit between terminals C and D of T109 is shock excited into oscillation by the pulses of plate current. The sine wave so generated is added to the saw-tooth wave in such a phase that the slope of the wave at the point just prior to discharge is increased by about 3 times. This increase in slope is desired in order to get greater sensitivity of control. This voltage is fed through R180 to the grid of the control tube. A partially integrated pulse from the kickback of the output stage is also fed to the control tube grid in order to increase the discharge slope of the waveform. The sync pulse is also fed into the control tube grid.

A portion of the bias from the blocking oscillator is applied to the grid of the control tube and is sufficient to keep the control tube cut off except when the sync pulse is high on the slope of the grid waveform as shown in Figure 15-A. If the oscillator changes phase so that the pulse slides down the slope, the control tube plate conduction time decreases as shown in Figure 15-B. If the pulse slides up the slope, then the plate conduction time increases as shown in Figure 15-C. When the control tube conducts capacitors C155 and C157 in its cathode circuit charge to a d-c potential proportional to the plate conduction time. This potential is applied as a bias to the oscillator grid thus shifting the oscillator frequency and pulling it into phase with the sync pulses.



PULSE ABOVE GRID CUTOFF LEVEL IS PORTION OF WAVEFORM EFFECTIVE IN PRODUCING OSCILLATOR CONTROL VOLTAGE.

Figure 15—Horizontal Control Waveforms

The effect of the various controls associated with the circuit are as follows: C153-A is a variable portion of a capacity voltage divider and is provided to set the amplitude of the waveform on the grid of the control tube so that conduction occurs only on the positive peaks of the waveform. T109 is provided with a slug to effect adjustments in oscillator frequency. The tuned circuit of T109 is also provided with a slug to permit accurate control of slope of the oscillator waveform. R173 the horizontal hold control is provided on the front panel to permit a 5% variation of frequency by varying the control tube plate voltage. The horizontal drive control C153-B is part of a capacity voltage divider and is provided to vary the amount of sawtooth voltage on the V112 grid and hence is a control for picture linearity.

The resistors employed in the oscillator and control circuits have special coefficients or characteristics and in case of failure, should be replaced only by exact replacement. Strains or excessive heat should not be applied to the leads or bodies of the resistors. Such conditions may cause excessive changes of resistance with age. See "Critical Lead Dress" on page 18

TELEVISION VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition a 2200 microvolt test pattern signal was fed into the receiver, the picture synced and the AGC threshold control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are as read with "Jr. VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts 60 cycles a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6AG5	R-F Amplifier	2200 Mu.V. Signal	5	146	6	148	2 & 7	0	1	−4.9	.72	.33	
			No Signal	5	85	6	120	2 & 7	0	1	−0.[illegible]	12.0	4.0	
V2	6AG5	Converter	2200 Mu.V. Signal	5	*130 to 140	6	*130 to 140	2 & 7	0	1	*−3.0 to −7.0	*7.1 to 7.7	*2.3 to 2.7	*Depending upon channel
			No Signal	5	*104 to 109	6	*104 to 109	2 & 7	0	1	*−2.0 to −6.0	*5.3 to 5.9	*.8 to 1.0	
V3	6J6	R-F Oscillator	2200 Mu.V. Signal	1 & 2	*88 to 95	—	—	7	.19	5 & 6	*−5.1 to −7.3	*1.9 to 2.7	—	*Depending upon channel
			No Signal	1 & 2	*68 to 81	—	—	7	.16	5 & 6	*−4.5 to −6.6	*1.8 to 2.1	—	
V101	6AG5	1st Pix. I-F Amplifier	2200 Mu.V. Signal	5	141	6	141	2 & 7	.07	1	−3.9	.8	.22	
			No Signal	5	108	6	108	2 & 7	.11	1	−.09	4.97	1.73	
V102	6AG5	2d Pix. I-F Amplifier	2200 Mu.V. Signal	5	130	6	130	2 & 7	.86	1	0	9.48	3.12	
			No Signal	5	106	6	106	2 & 7	.6	1	0	7.6	2.6	
V103	6AG5	3d Pix. I-F Amplifier	2200 Mu.V. Signal	5	130	6	140	2 & 7	.03	1	−3.9	.51	.09	
			No Signal	5	94	6	109	2 & 7	.11	1	−.03	3.92	1.5	
V104	6AG5	4th Pix. I-F Amplifier	2200 Mu.V. Signal	5	175	6	145	2 & 7	1.38	1	0	7.0	2.0	
			No Signal	5	167	6	109	2 & 7	.95	1	0	5.7	1.5	
V105 A	6AL5	Picture 2d Det.	2200 Mu.V. Signal	7	−113	—	—	1	−112	—	—	.48	—	
			No Signal	7	−120	—	—	1	−120	—	—	—	—	
V105 B	6AL5	Sync Limiter	2200 Mu.V. Signal	2	−107	—	—	5	−56	—	—	—	—	
			No Signal	2	−80	—	—	5	−60	—	—	—	—	
V106	12AU7	1st Video Amplifier	2200 Mu.V. Signal	1	−23.2	—	—	3	−111	2	−113	4.38	—	
			No Signal	1	−19.2	—	—	3	−117	2	−120	3.82	—	
V106	12AU7	2d Video Amplifier	2200 Mu.V. Signal	6	*166	—	—	8	*−5.3	7	*−12.2	6.2	—	*At average contrast
			No Signal	6	*134	—	—	8	*−5.6	7	*−10.3	6.9	—	
V107 A	6SN7 GT	AGC Amplifier	2200 Mu.V. Signal	5	−17.9	—	—	6	−55.5	4	−56.5	.9	—	
			No Signal	5	−5.2	—	—	6	−60	4	−64	.3	—	
V107 B	6SN7 GT	Vertical Oscillator	2200 Mu.V. Signal	2	76	—	—	3	−111	1	−158	.2	—	
			No Signal	2	62	—	—	3	−120	1	−169	.2	—	
V108	6SN7 GT	AGC Rectifier	2200 Mu.V. Signal	5	97	—	—	6	−3.4	4	−19.3	.3	—	
			No Signal	5	81	—	—	6	−8.7	4	−19.3	.28	—	
V108	6SN7 GT	1st Sync Separator	2200 Mu.V. Signal	2	96	—	—	3	−1.8	1	−19.5	.1	—	
			No Signal	2	81	—	—	3	−9.7	1	−19.3	.1	—	

Tube No.	Tube Type	Function	Operating Condition	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V109	6SN7 GT	Sync Amplifier	2200 Mu.V. Signal	2	158	—	—	3	0	1	−4.7	5.25	—	
			No Signal	2	154	—	—	3	0	1	−5.2	3.75	—	
V109	6SN7 GT	Sync Separator	2200 Mu.V. Signal	5	230	—	—	6	−51	4	−106	.4	—	
			No Signal	5	215	—	—	6	−59	4	−80	.35	—	
V110	6K6-GT	Vertical Output	2200 Mu.V. Signal	3	223	4	223	8	−67	5	−91		*7.85	*Screen connected to plate
			No Signal	3	208	4	208	8	−79	5	−101		*7.7	
V111	6SN7 GT	Horizontal Osc. Control	2200 Mu.V. Signal	2	*48	—	—	3	−110	1	−92	.2	—	*Variation of hold gives −21.9 to +56 volts on plate
			No Signal	2	*33	—	—	3	−120	1	−108	.2	—	
V111	6SN7 GT	Horizontal Oscillator	2200 Mu.V. Signal	5	70	—	—	6	−111	4	−185	2.4	—	
			No Signal	5	54	—	—	6	−120	4	−192	2.4	—	
V112	6BG6G	Horizontal Output	2200 Mu.V. Signal	Cap	*	8	160	3	−104	5	−101	93.5	11.5	*5200 volt pulse present
			No Signal	Cap	Do Not Meas.	8	142	3	−113	5	−112	90.8	11.2	
V113	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	8500	—	—	0	—	*8500 volt pulse present
			Brightness Average	Cap	Do Not Meas.	—	—	2 & 7	8400	—	—	.1	—	
V114	5V4G	Damper	2200 Mu.V. Signal	4 & 6	*	—	—	2 & 8	339	—	—	94.5	—	*1200 volt pulse present
			No Signal	4 & 6	Do Not Meas.	—	—	2 & 8	322	—	—	92	—	
V115	5U4G	Rectifier	2200 Mu.V. Signal	4 & 6	390	—	—	2 & 8	291	—	—	225	—	*A-C measured from plate to trans. center tap
			No Signal	4 & 6	390	—	—	2 & 8	272	—	—	230	—	
V116	6AU6	1st Sound I-F Amplifier	2200 Mu.V. Signal	5	134	6	134	7	.9	1	0	8.2	3.3	
			No Signal	5	110	6	110	7	.7	1	0	5.7	2.6	
V117	6AU6	2d Sound I-F Amplifier	2200 Mu.V. Signal	5	148	6	90	7	0	1	−9	1.6	.8	
			No Signal	5	115	6	60	7	0	1	−.65	3.35	1.15	
V118	6AL5	Sound Discrim.	2200 Mu.V. Signal	2	−8.4	—	—	5	5.8	—	—	—	—	
			No Signal	2	−2.0	—	—	5	.41	—	—	—	—	
			2200 Mu.V. Signal	7	−3.7	—	—	1	0	—	—	—	—	
			No Signal	7	−1.08	—	—	1	0	—	—	—	—	
V119	6AV6	Bias Clamp	2200 Mu.V. Signal	7	0	—	—	2	0	1	0	—	—	
			No Signal	7	0	—	—	2	0	1	0	—	—	
V121	10BP4	Kinescope	2200 Mu.V. Signal	Cap	*8400	10	339	11	51	2	20	.1	—	*Average Brightness
			No Signal	Cap	—	10	322	11	42	2	14	—	—	Average Brightness
			2200 Mu.V. Signal	Cap	—	10	339	11		2		.4	—	Maximum Brightness
			2200 Mu.V. Signal	Cap	*8500	10	339	11		2		0	—	Minimum Brightness

RADIO ALIGNMENT PROCEDURE

If any lead dressing is necessary, it should be done before aligning the receiver. See Critical Lead Dress on page 15

Before aligning set, completely mesh the gang and set the dial pointer to the mechanical max. calibration point at extreme left end of dial.

When making a complete alignment follow the tabulated form below in sequence.

If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the chart.

Any adjustments made on the AM 455 kc. I-F's make it necessary to adjust the FM 10.7 mc. I-F's.

AM I-F, OSC, R-F AND ANT ALIGNMENT

Test-Oscillator.—For all alignment operations, connect the low side of the test-oscillator to the receiver chassis, and keep the oscillator output as low as possible to avoid a-v-c action. Set the oscillator to 30% 400 cycle modulation.

Output Meter.—Connect the meter across the speaker voice coil, and turn the receiver volume control to maximum.

Steps	Connect the High Side of the Test Osc. to—	Tune Test Osc. to—	Function Switch	Turn Radio Dial to—	Adjust the following for peak output on the meter
1	C3 in series with .01 mfd.	455 kc	"A" Band	Quiet point at low freq. end of dial	AM windings* T3 bottom core (sec.) T3 top core (pri.)
2	"	"	"	"	AM windings* T2 top core (sec.) T2 bottom core (pri.)
3	Terminal 1 of antenna board in series with 220 mmf.	1400 kc	"	1400 kc	C13 Oscillator C4 Antenna
4	"	600 kc	"	600 kc	L4 Oscillator & L9 Antenna (Rock gang)
5	Repeat steps 3 and 4.				

*Use alternate loading. This method involves the use of a 47,000-ohm resistor to load the primary winding while the secondary winding of the same transformer is being peaked. Then the secondary winding is loaded with the 47,000-ohm resistor while the primary winding is being peaked. Remove the 47,000-ohm resistor after T2 and T3 have been aligned.

FM RATIO DETECTOR I-F, OSC, R-F AND ANT ALIGNMENT

Steps	Connect the High Side of the Test Osc. to—	Tune Test Osc. to—	Function Switch	Turn Radio Dial to—	Adjust the following
1	Connect "VoltOhmyst" d-c probe to negative lead of C33, and the meter common lead to chassis ground.				
2	Pin 1 of V3 (6AU6) in series with .01 mfd.	10.7 mc 30% 400 cycle AM modulated .05 V. output	FM	Low freq. end of dial	T4 top core for max. d-c voltage across C33 T4 bottom core for min. audio output**
3	Terminal 1 of antenna board in series with 300 ohms	10.7 mc output adjusted to give 2 to 3 volts on "VoltOhmyst"	"	"	FM windings for max. d-c voltage across C33*** T3 top core (sec.) T3 bottom core (pri.)
4	"	"	"	"	FM windings for max. d-c*** T2 top core (sec.) T2 bottom core (pri.)
5	"	106 mc	"	106 mc	L2 Oscillator**** C2 Antenna (set C2 at max. capacity while adjusting L2)
6	"	90 mc	"	90 mc	L1 Antenna**** (Rock gang)
7	Repeat steps 5 and 6 until further adjustment provides no improvement in calibration.				

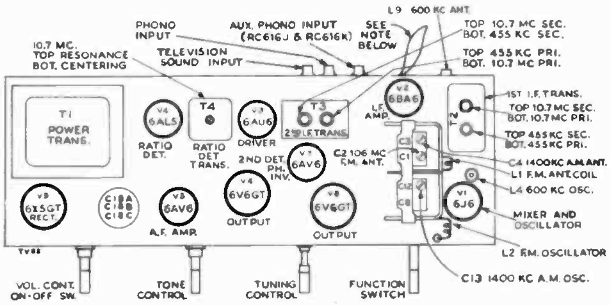
**Two or more points may be found which give reductions in the audio output. At the correct tuning point, the minimum audio output is approached rapidly and the output is much less than at any incorrect point.

***Align T2 and T3 by the use of alternate loading. Use a 680-ohm resistor to load the primary winding while the secondary winding of the same transformer is being peaked. Then load the secondary winding with the 680-ohm resistor while the primary winding is being peaked.

****L1 and L2 are adjusted by increasing or decreasing the spacing between turns of the coils.

NOTE.—The FM alignment may be checked by means of an FM sweep generator and cathode ray oscilloscope. Set the sweep generator to 10.7 mc center frequency and connect the output lead to the mixer grid Pin 5 of V1 (6J6). Set the signal generator to 10.7 mc and loosely couple it to the mixer grid to provide a marker. To observe the I-F response, disconnect the 2 mfd capacitors C33 from the ratio detector circuit. Connect the oscilloscope to the junction of R25 and R26.

To observe the Ratio Detector response, reconnect C33 and connect the oscilloscope across the volume control R14.



Note: If it is desired to use a separate "A" band antenna, cut the green loop of wire extending from the chassis as shown above and connect the antenna to the wire which permits greatest sensitivity.

Figure 16—Chassis, Top View, Showing Adjustments

RADIO VOLTAGE CHART

All voltages measured to ground, using a "VoltOhmyst"

Tube	Type		Pin No.	"A"	"FM"	TV or Phono
V1	6J6	Plate Grid Plate Grid	1 6 2 5	102 −6.8 96 −2.7	98 −6.0 110 −2.5	— — −0.4 −0.8
V2	6BA6	Plate Screen Cathode Grid	5 6 7 1	196 100 0.7 −1.3	192 83 0.84 −0.2	— — — −0.9
V3	6AU6	Plate Screen Cathode	5 6 7	190 145 1.25	185 141 1.21	— — —
V4	6AL5	—	—	—	—	—
V5	6AV6	Plate Grid	7 1	85 −0.6	84 −0.6	125 −0.6
V6	6V6GT	Plate Screen Cathode	3 4 8	282 220 15.5	280 217 15.4	299 295 21.4
V7	6AV6	Plate Grid	7 1	125 −0.5	125 −0.5	168 −0.5
V8	6V6GT	Plate Screen Cathode	3 4 8	282 220 15.5	280 217 15.4	299 295 21.4
V9	6X5GT	Cathode	8	300	299	313

RADIO CRITICAL LEAD DRESS

1. Keep leads of C7 short.
2. Dress R27 away from range switch and pin No. 5 of V1.
3. The ground lead of pin No. 2 of V2 and V3 should be down against chassis. Its length is critical.
4. The AVC lead from R26 to range switch should be dressed against chassis.
5. C43 should have short leads and the color code of the capacitor should go to the coil L4. The capacitor should be cemented down with polystyrene cement at the same time L2 is cemented.
6. Lead from pin No. 2 of V1 to terminal "A" of 1st I. F. transformer should be dressed against the chassis.
7. Connect C40 directly between the gang condenser and pin No. 1 of V1.
8. Make all FM leads as short as possible.
9. Dress lead from pin No. 5 of V2 to terminal "A" of 2nd I. F. transformer down against chassis.
10. Dress resistor R15 near chassis base.
11. Dress all A. C. leads away from volume control.
12. The lead from "FM" terminal of antenna terminal board to L1 tap should be dressed away from V2.
13. The taps on L1 and L2 are critical. L1 tap should be ¾ turn from the ground end. L2 tap should be 2½ turns from the gang condenser C8.
14. Dress C25 and C26 against the chassis with the shortest lead length possible.
15. The position of L1 and L2 is critical. L1 should be midway between V1 and the 1st I. F. transformer. The end of L2 should be approximately 3/16" from V1.
16. Coupling between pins 5 and 6 of V1 and the components attached should be kept to a minimum.

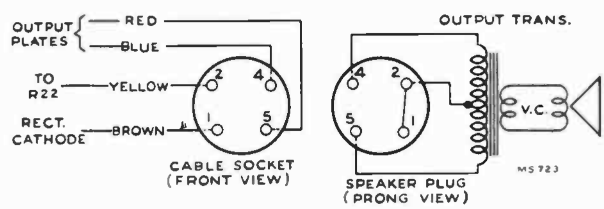


Figure 17—Speaker Connections

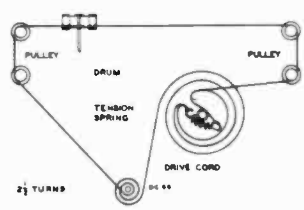


Figure 18—Dial and Drive Cord Assembly (8TV321)

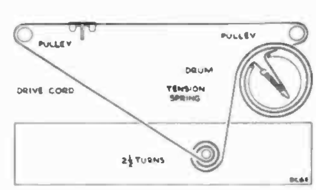
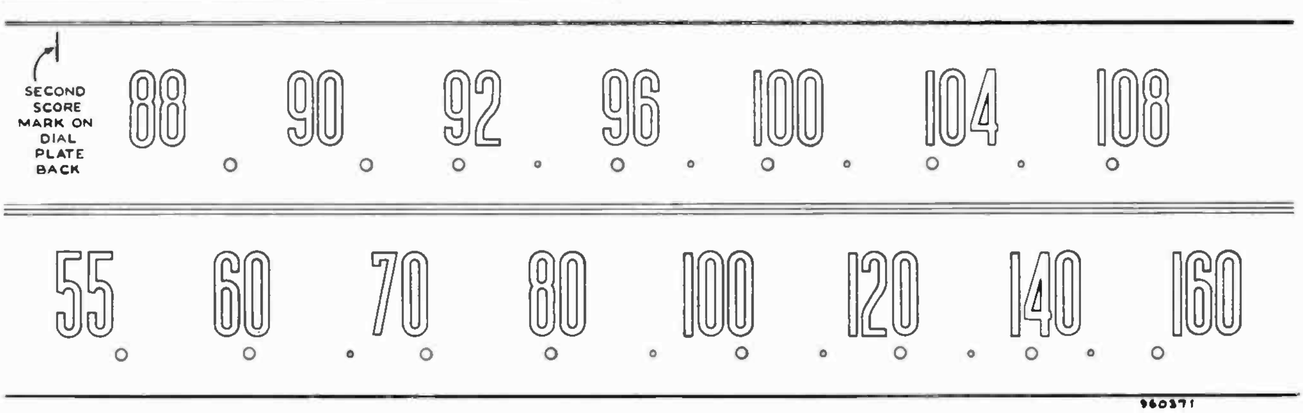


Figure 19—Dial and Drive Cord Assembly (8TV323)



The dial scale drawing shown is a full size reproduction. It can be used as a reference during alignment.

Figure 20—Radio Dial Scale

RADIO SCHEMATIC DIAGRAM (RC616J, RC616K)

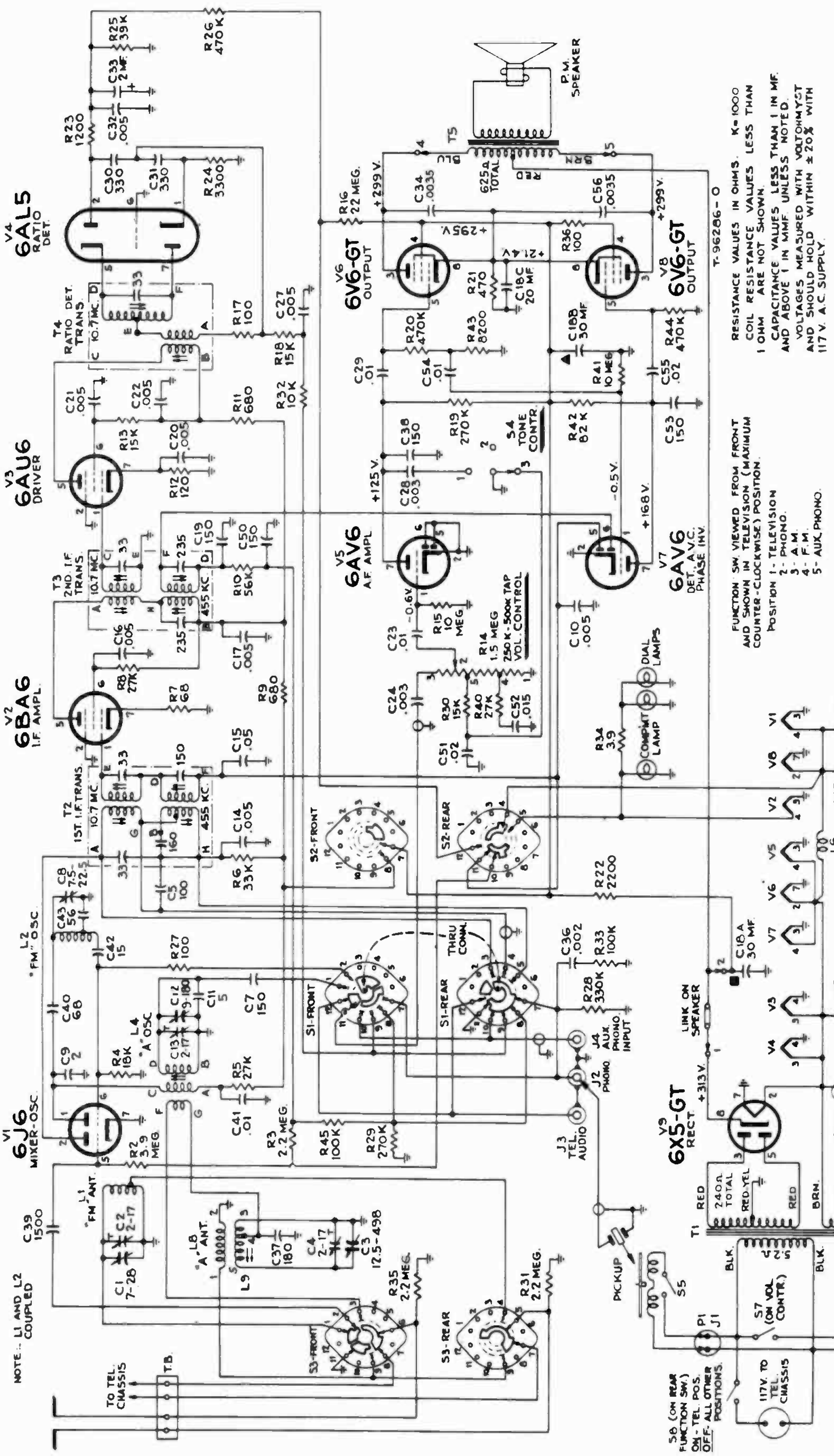
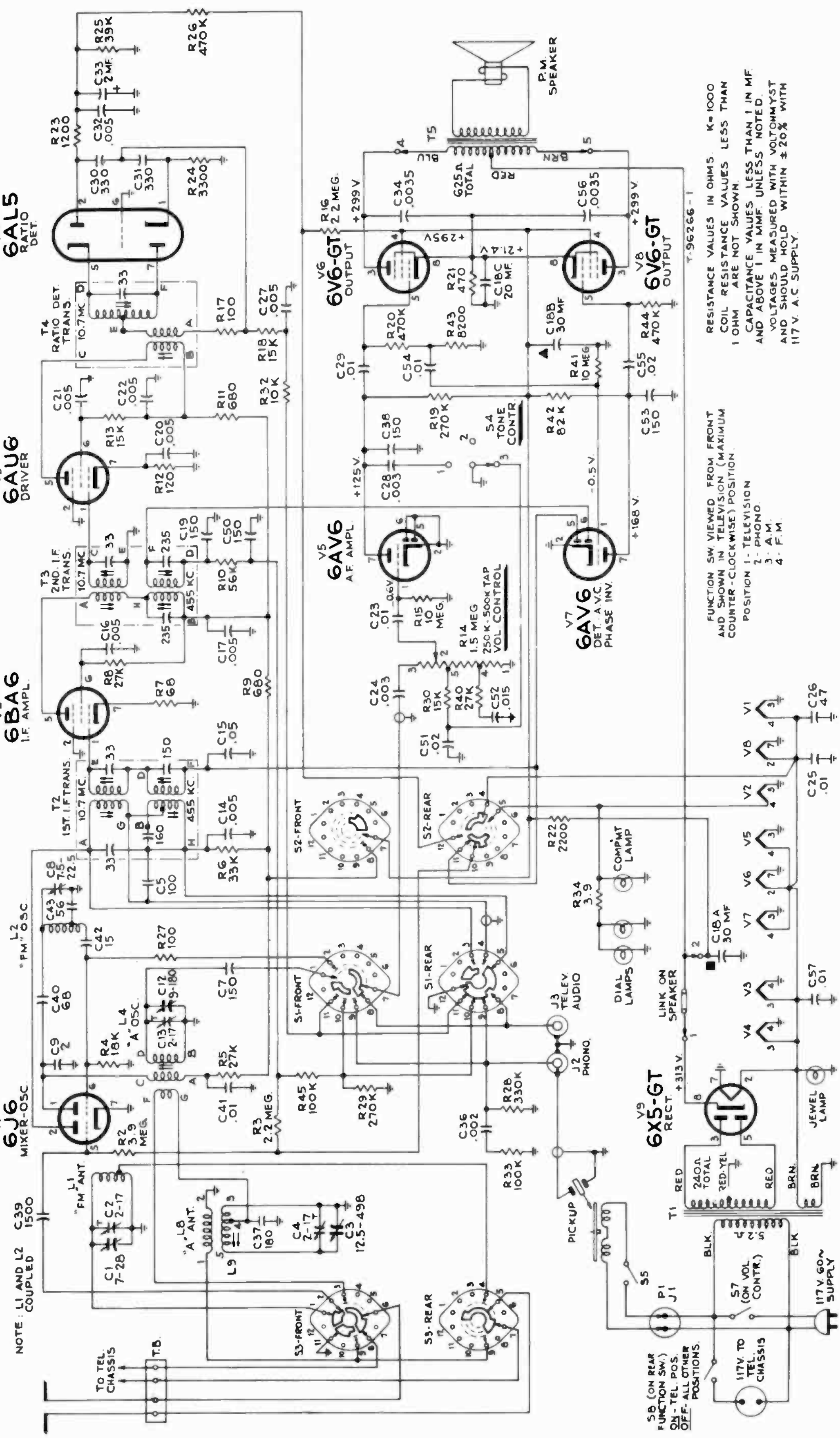


Figure 21 —Radio Schematic Diagram (RC616J, RC616K)



NOTE.—Some sets employ T2 second I.F transformer drawing number 970435-2, stock number 73363. The 455 kc windings have a d-c resistance of 8.2 ohms each and employ 235 mmf fixed capacitors across each coil. The transformer employed in later sets and shown in the above schematic is drawing number 970435-5, stock number 74019

Figure 22 —Radio Schematic Diagram (Chassis RC616B, RC616C)

TELEVISION R-F UNIT WIRING DIAGRAM

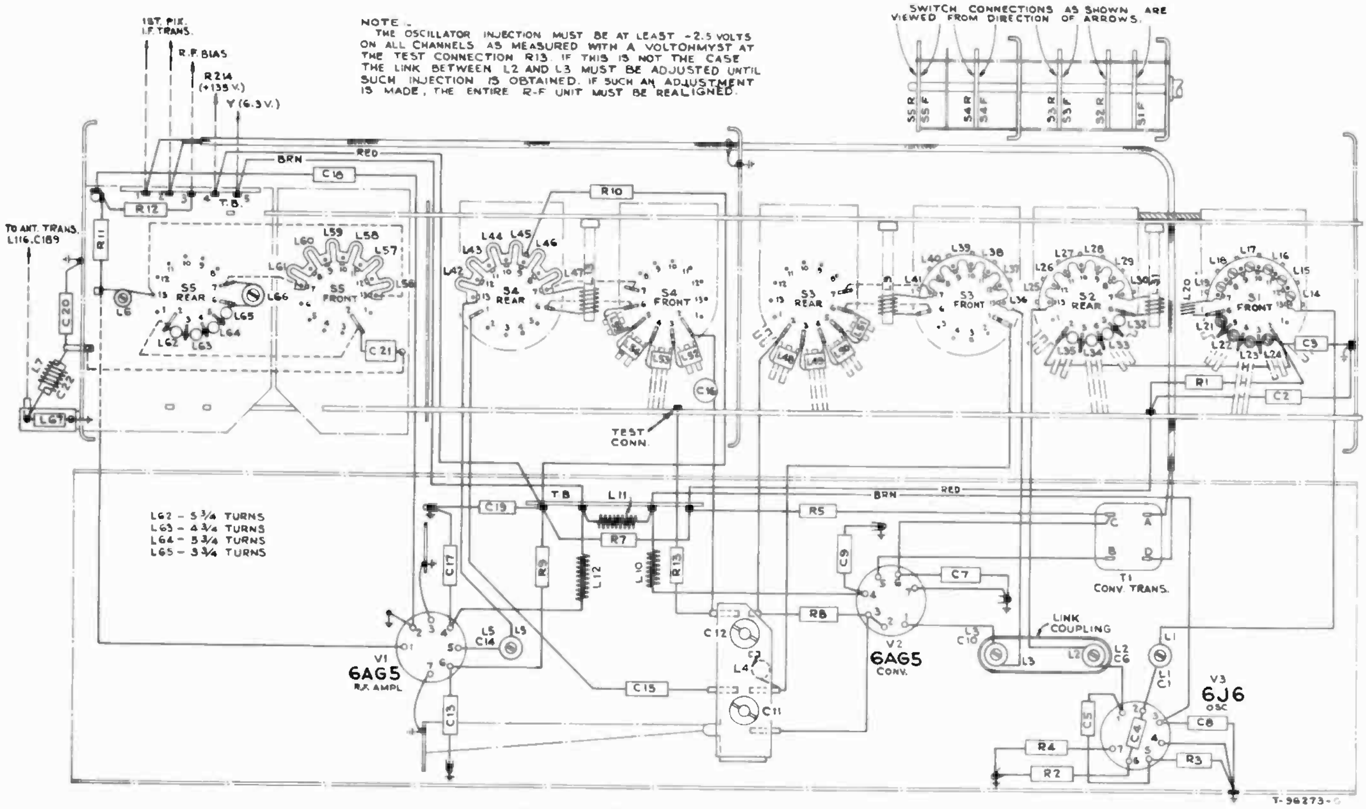


Figure 23—R-F Unit Wiring Diagram

TELEVISION CRITICAL LEAD DRESS

1. The ground bus from pin 2 and the center shield of V117 socket should not be shortened or rerouted.
2. Do not change the dress of the filament leads or the by-pass capacitors in the picture or sound i-f circuits. The filament leads between V117 and V118 should be down against the chassis and away from grid or plate leads.
3. If it is necessary to replace any of the 1500 mmf capacitors in the picture i-f circuits the lead length must be kept as short as possible.
4. The picture i-f coupling capacitors C106, C111, C115 and C121 should be up and away from the chassis and should be clear of the pix i-f transformer adjustments by at least 1/4 inch. If the dress of any of these capacitors is changed, the i-f alignment should be rechecked.
5. Leads to L102 and L103 must be as short as possible.
6. Dress peaking coils L105, L106 and L107 up and away from the chassis.
7. Dress C183 across tube pins 5 and 6 with leads not exceeding 3/8 inch.
8. Dress the blue leads from pin 5 of V119 down against the chassis.
9. Dress C129 and C130 up and away from the chassis.
10. Dress the yellow lead from the picture control away from the chassis. Dress the yellow lead from pin 8 of V106 away from the chassis.
11. Dress the green lead from pin 2 of V106 away from the chassis.
12. Dress R168, R169, R170, R176 and R178 up and away from the chassis. In the event that it is necessary to replace one of these resistors, the resistor leads should not be clipped but should be bent and soldered into place in the same manner as the original unit. Strains or excessive heat should not be applied to the leads or bodies of the resistors associated with the horizontal oscillator and control circuits. Such conditions may cause excessive changes of resistance with age.
13. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.
14. Dress leads from L110 (width control coil) away from the transformer frame.
15. Dress T110 winding leads as shown in Figure 24

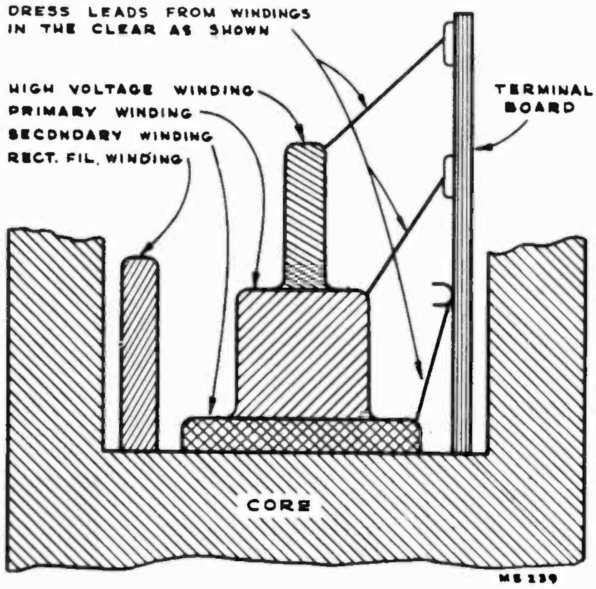


Figure 24—T 110 Lead Dress

Stock No.	DESCRIPTION
74305	Spring—Drive cord spring
74202	Support—Polystyrene coil support complete with mounting bracket
73603	Support—Dial plate mounting support complete with pulley—R.H.—for 8TV323
73604	Support—Dial plate mounting support complete with pulley—L.H.—for 8TV323
73665	Support—Dial plate mounting support complete with pulleys—R.H.—for 8TV321
73666	Support—Dial plate mounting support complete with pulleys—L.H.—for 8TV321
73669	Switch—Function switch (S1, S2, S3, S8) (8TV321, 8TV323)
74174	Switch—Function switch (S1, S2, S3, S8) (8TV321B, 8TV323B)
73601	Transformer—Power transformer, 115 volts 60 cycle (T1)
73745	Transformer—First I-F transformer—dual (T2)
74019	Transformer—Second I-F transformer—dual (T3)
73743	Transformer—Ratio detector transformer (T4)
33726	Washer—"C" washer for tuning knob shaft
	SPEAKER ASSEMBLIES 92569-5W RL 103B5
13867	Cap—Dust cap
73934	Cone—Cone complete with voice coil (3.2 ohms)
5039	Plug—4 prong male plug for speaker
73635	Speaker—12" P.M. speaker complete with cone and voice coil less output transformer and plug
71145	Suspension—Metal cone suspension
73636	Transformer—Output transformer (T5)
	SPEAKER ASSEMBLIES 92569-1KX
70574	Cone—Cone and voice coil assembly (2.2 ohms)
5039	Plug—4 prong male plug for speaker
37899	Transformer—Output transformer (T5)
	NOTE: When replacing complete speaker, order RCA 73635 (92569-5W)
	MISCELLANEOUS
73739	Back—Bottom back cover for Model 8TV323
73641	Back—Television chassis back cover
73736	Bezel—Dial scale bezel less dial for Model 8TV321
73627	Bezel—Dial scale bezel less dial for Model 8TV323
72857	Board—"Antenna" terminal board
71599	Bracket—Pilot lamp bracket
72437	Cable—Shielded pickup cable complete with pin plug
13103	Cap—Pilot lamp jewel
71892	Catch—Bullet catch and strike for television & record storage compartment's doors for Model 8TV323 or bullet catch and strike for television & radio compartment's doors for Model 8TV321
71820	Check—Radio compartment door check for Model 8TV323
72337	Clamp—Bottom clamp for dial scale for Model 8TV321 (2 required)
73738	Clamp—Upper clamp for dial scale for Model 8TV321 (2 required)
73643	Clip—Spring clip for channel marker escutcheon
X1624	Cloth—Grille cloth for Model 8TV321 toasted mahogany instruments
X1623	Cloth—Grille cloth for Model 8TV321 mahogany or walnut instruments
X1649	Cloth—Grille cloth for Model 8TV323 toasted mahogany instruments
X1639	Cloth—Grille cloth for Model 8TV323 mahogany instruments
X1632	Cloth—Grille cloth for Model 8TV323 walnut instruments
73773	Decal—Radio control panel function decal for mahogany or walnut instruments (RC616B, RC616C)
73774	Decal—Radio control panel function decal for toasted mahogany instruments (RC616B, RC616C)
74177	Decal—Radio control panel function decal for mahogany or walnut instruments (RC616J, RC616K)
74178	Decal—Radio control panel function decal for toasted mahogany instruments (RC616J, RC616K)
73775	Decal—Television control panel function decal for mahogany or walnut instruments
71966	Decal—Trade mark decal (Victrola)
73776	Decal—Television control panel function decal for toasted mahogany instruments
71768	Decal—Trade mark decal (RCA-Victor)
73737	Dial—Glass dial scale—Model 8TV321
73628	Dial—Glass dial scale—Model 8TV323
73180	Emblem—"RCA-Victor" emblem
73740	Escutcheon—Channel marker escutcheon for toasted mahogany instruments
73642	Escutcheon—Channel marker escutcheon for mahogany or walnut instruments
73779	Glass—Safety glass—Model 8TV321
73772	Glass—Safety glass—Model 8TV323
73777	Grille—Metal grille—Model 8TV321
72856	Grommet — Rubber grommet for mounting record changer (3 required)
11889	Grommet—Rubber grommet for front apron of chassis (2 required)
30698	Hinge—Cabinet lid hinge
73735	Hinge—Radio compartment drop door hinge Model 8TV323 (2 required)
36817	Hinge—Record storage compartment door hinge — Model 8TV323 (1 set)
73903	Hinge—Television compartment door hinge (1 set)—Model 8TV321 & 8TV323 or radio compartment door hinge (1 set) Model 8TV321
71822	Knob—Radio tone control or selector switch knob—maroon—for mahogany or walnut instruments
72824	Knob—Radio tone control or selector switch knob—brown—for toasted mahogany instruments
71821	Knob—Radio tuning or volume control knob—maroon—for mahogany or walnut instruments
72800	Knob—Radio tuning or volume control knob—brown—for toasted mahogany instruments
73224	Knob—Television channel selector knob—burgundy—for mahogany or walnut instruments
73225	Knob—Television channel selector knob — tan — for toasted mahogany instruments
73222	Knob—Television fine tuning knob — burgundy — for mahogany or walnut instruments
73223	Knob—Television fine tuning knob—tan—for toasted mahogany instruments
73228	Knob—Television horizontal hold control knob—burgundy—for mahogany or walnut instruments
73229	Knob—Television horizontal hold control knob—tan—for toasted mahogany instruments
73226	Knob—Television picture control, brightness control or vertical hold control knob—burgundy—for mahogany or walnut instruments
73227	Knob—Television picture control, brightness control or vertical hold control knob—tan—for toasted mahogany instruments
73230	Knob—Television picture control or brightness control knob—burgundy—for mahogany or walnut instruments
73231	Knob—Television picture control or brightness control knob—tan—for toasted mahogany instruments
11765	Lamp—Dial lamp
73109	Nut—Tee nut for mounting record changer (3 required)
71819	Plate — Radio compartment door check mounting plate for Model 8TV323
72817	Plate—Retaining plate complete with wing nut and spring for television front panel (2 required)—Model 8TV323
72850	Plug—2 prong male plug for antenna cable
73770	Pull—Door pull for television and radio compartments (6 required) for Model 8TV323
73771	Pull—Door pull for speaker and record storage compartments for Model 8TV323
73778	Pull—Door pull for Model 8TV321
73741	Screw—# 1/4-20 x 2" fillister head screw for mounting record changer (3 required)
72324	Shade—Lamp shade
71539	Slide—Kinescope centering slide (4 required)
73026	Spring—Cabinet lid support spring
72581	Spring—Radio compartment door check spring for Model 8TV323
72845	Spring—Retaining spring for knobs #73222 & 73223
14270	Spring—Retaining spring for knobs #73224, 73225, 73226, 73227, 73230 & 73231
30330	Spring—Retaining spring for knobs #73228 & 73229
30900	Spring—Retaining spring for radio control knobs
72936	Stop—Door stop for Model 8TV321
70158	Support—Cabinet lid support—L.H.
71814	Washer — Radio compartment door check rubber washer for Model 8TV323

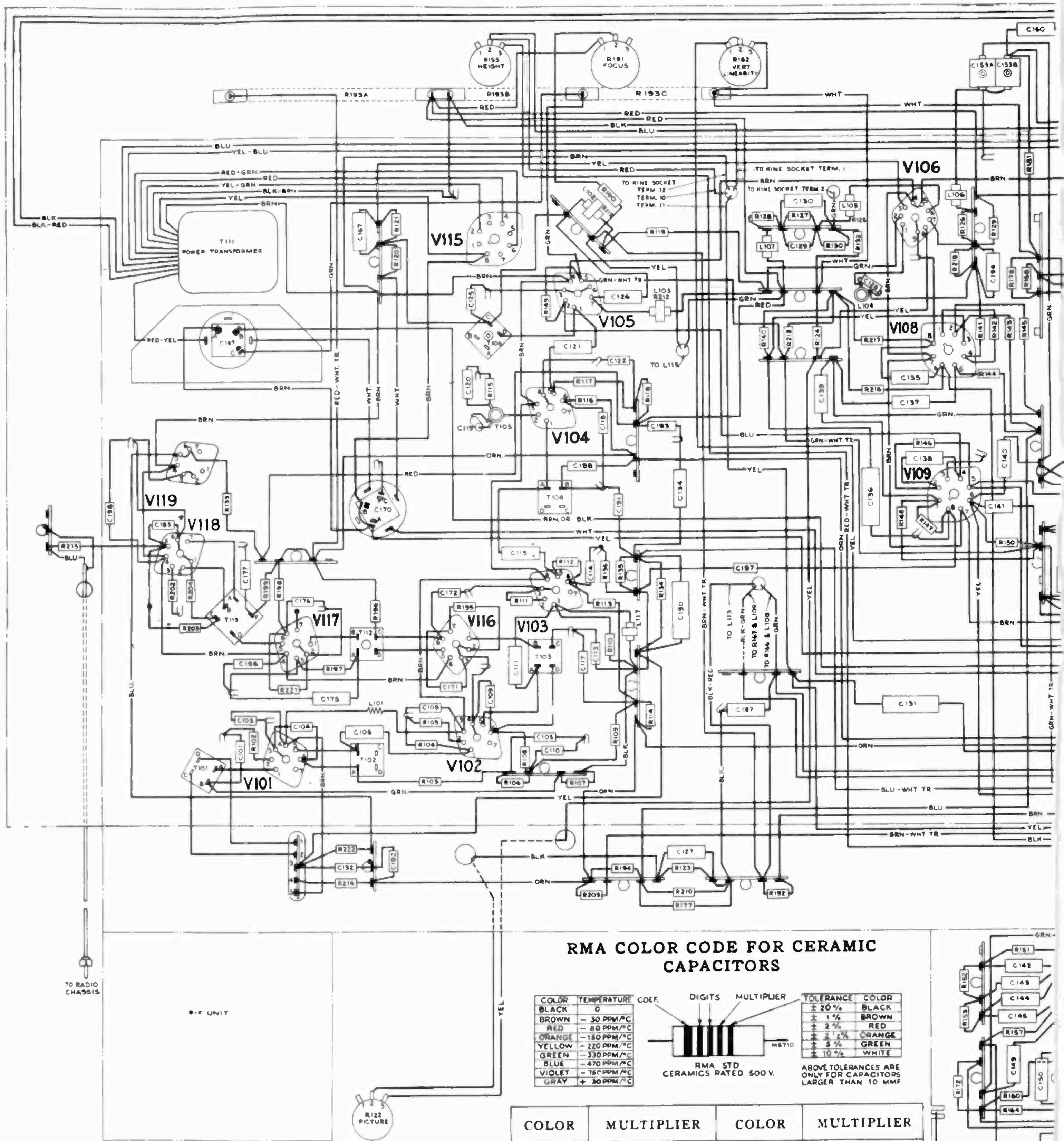
To obtain resistors for which no stock number is given, order by stating type, value of resistance, tolerance and wattage.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

Addition to Parts List.

MISCELLANEOUS

74409 Cushion—Lid Cushion



RMA COLOR CODE FOR CERAMIC CAPACITORS

COLOR	TEMPERATURE COEF.
BLACK	0
BROWN	− 30 PPM/°C
RED	− 80 PPM/°C
ORANGE	− 150 PPM/°C
YELLOW	− 220 PPM/°C
GREEN	− 330 PPM/°C
BLUE	− 470 PPM/°C
VIOLET	− 750 PPM/°C
GRAY	+ 30 PPM/°C

COEF. DIGITS MULTIPLIER

RMA STD
CERAMICS RATED 500 V.

TOLERANCE	COLOR
± 20 %	BLACK
± 1 %	BROWN
± 2 %	RED
± 2 ½ %	ORANGE
± 5 %	GREEN
± 10 %	WHITE

ABOVE TOLERANCES ARE ONLY FOR CAPACITORS LARGER THAN 10 MMF

COLOR	MULTIPLIER	COLOR	MULTIPLIER
GRAY	.01	BROWN	10
WHITE	0.1	RED	100
BLACK	1.0	ORANGE	1,000

FOR DIGITS, USE DIGITS COLUMN PAGE 20

Stock No.	DESCRIPTION
	R-F UNIT ASSEMBLIES
	KRK5
73465	Belt—Drive belt
73478	Cable—I-F transmission cable (4⅞") (W1)
73441	Cam—Fine tuning adjustment cam
74035	Capacitor—Ceramic, 5 mmf. (C4, C5)
53511	Capacitor—Ceramic, 10 mmf. (C3)
54207	Capacitor—Ceramic, 18 mmf. (C20)
73449	Capacitor—Ceramic trimmer, comprising 1 section of 150-190 mmf. and 1 section of 65-95 mmf. (C11, C12)
73091	Capacitor—Ceramic, 270 mmf. (C21)
53494	Capacitor—Ceramic, 1500 mmf. (C2, C7, C8, C9, C13, C15, C17, C18, C19)
73473	Capacitor—Ceramic, 5000 mmf. (C16)
73475	Coil—Antenna filter shunt coil (L67)
73477	Coil—Choke coil (L10, L11, L12)
73874	Coil—Oscillator plate coil or converter grid coil for channel No. 6 (L9, L31)
73462	Coil—Coupling inductance coil (L4)
73443	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with plunger adjustment) (L1, C1)
74108	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with plunger adjustment) (L1, C1)
73476	Coil—I-F trap (L7, C22)
73461	Coil—Oscillator plate coil (4 turns) for channel #6 (L20)
73460	Coil—R-F plate coil for channel #6 (L13)
73444	Coil—Trimmer coil (1½ turns with adjustable inductance core and capacitor stud smooth bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
74109	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
73446	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for r-f amplifier section (L5, C14)
74110	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for r-f amplifier section (L5, C14)
71493	Connector—Oscillator segment connector
73455	Core—Sliding core for fine tuning control trimmer
74187	Core—Adjustable core for L31
73440	Detent—R-F unit detent mechanism and fibre shaft
73453	Form—Coil form assembly for L9, L13
71487	Form—Coil form for oscillator plate coil for channel No. 6 (L31)
73442	Link—Link assembly for fine tuning
71462	Loop—Oscillator to converter trimmer loop connector
73634	Nut—Speed nut for drive belt shield
73467	Nut—Speed nut to mount trimmer coils 73443, 73444 and 73446
73436	Plate—Front plate and bushing
73464	Pulley—Idler pulley
	Resistor—Fixed, composition, 47 ohms ± 20%, ½ watt (R4)
	Resistor—Fixed, composition, 150 ohms ± 20%, ½ watt (R5, R9, R12)
	Resistor—Fixed, composition, 1000 ohms ± 20%, ½ watt (R7)
	Resistor—Fixed, composition, 1000 ohms ± 10%, ½ watt (R11)
	Resistor—Fixed, composition, 2700 ohms ± 10%, ½ watt (R10)
	Resistor—Fixed, composition, 10,000 ohms ± 20%, ½ watt (R1)
	Resistor—Fixed, composition, 100,000 ohms ± 20%, ½ watt (R2, R3, R8, R13)
14343	Retainer—Channel selector shaft retaining ring
30340	Retainer—Retainer for fine tuning link stud
71476	Screw—#4-40 x ¼" binder head screw for adjusting coils L14, L15, L16, L17, L18, L19
71475	Screw—#4-40 x .296 adjusting screw for coils L6, L21, L22, L23, L24
73640	Screw—#4-40 x ⅜" adjusting screw for L66
73439	Shaft—Actuating shaft for fine tuning control
73437	Shaft—Channel selector shaft complete with pawl and stud
73438	Shaft—Fine tuning control shaft and pulley
72951	Shield—Metal tube shield for V3
73454	Shield—Metal shield for drive belt

Stock No.	DESCRIPTION
73632	Shield—Metal tube shield for V1
71494	Socket—Tube socket
73450	Socket — Tube socket, ceramic, 7 prong bottom mounted
74188	Spring—Retaining spring for adjustable core No. 74187
73457	Spring—Return spring for fine tuning control core
73456	Spring—Tension spring for drive belt shield
73633	Stator—Antenna stator complete with rotor and coils (S5, L6, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, C21)
73470	Stator — Converter stator complete with rotor and coils (S3, L36, L37, L38, L39, L40, L41, L48, L49, L50, L51)
73468	Stator—Front oscillator section stator complete with rotor, segment, coils and adjusting screws (S1, L14, L15, L16, L17, L18, L19, L21, L22, L23, L24)
73469	Stator—Rear oscillator section stator complete with rotor, segment and coils (S2, L25, L26, L27, L28, L29, L30, L32, L33, L34, L35)
73471	Stator—R-F amplifier stator complete with rotor and coils (S4, L42, L43, L44, L45, L46, L47, L52, L53, L54, L55)
73448	Transformer—Converter transformer (T1, R6)
2917	Washer—"C" washer for channel selector shaft
73466	Washer—Insulating washers for front shield (1 set)
	R-F, I-F CHASSIS ASSEMBLIES
	KCS 30
72437	Cable—Shielded audio cable complete with pin plug
72809	Capacitor—Mica, 5 mmf. (C146)
72615	Capacitor—Mica, 10 mmf. (C126)
74105	Capacitor—Mica 33 mmf. (C111)
64062	Capacitor—Ceramic, 82 mmf. (C120)
39396	Capacitor—Ceramic, 100 mmf. (C175)
75060	Capacitor—Mica, 100 mmf., 1000 v. (C138)
73921	Capacitor—Ceramic, 120 mmf. (C129)
51416	Capacitor—Mica, 180 mmf. (C140)
73102	Capacitor—Mica, 180 mmf. (C156)
73922	Capacitor—Ceramic, 270 mmf. (C183, C194, C198)
73091	Capacitor—Mica, 270 mmf. (C106, C115, C121)
39642	Capacitor—Mica, 390 mmf. (C141, C160)
71450	Capacitor—Mica, 500 mmf., 15,000 volts (C168)
39646	Capacitor—Mica, 560 mmf. (C127, C167)
73580	Capacitor—Mica trimmer, consisting of 1 section of 10-160 mmf. and 1 section of 40-370 mmf. (C153A, C153B)
53494	Capacitor—Ceramic, 1500 mmf. (C101, C103, C104, C105, C108, C109, C110, C113, C114, C117, C118, C122, C125, C132, C171, C172, C176, C177, C188, C191, C192, C193, C196)
73801	Capacitor—Tubular, moulded paper, .001 mfd., 600 volts (C137)
73595	Capacitor—Tubular, moulded paper, oil filled, .0022 mfd., 600 volts (C142, C154, C161)
73550	Capacitor—Tubular, moulded paper, .0047 mfd., 600 volts (C143, C144)
73920	Capacitor—Tubular, moulded paper, oil filled, .0047 mfd., 600 volts (C145)
73561	Capacitor—Tubular, moulded paper, .01 mfd., 400 volts (C135, C151, C152)
73594	Capacitor — Tubular, moulded paper, oil filled, .01 mfd., 600 volts (C159)
73562	Capacitor—Tubular, moulded paper, .022 mfd., 400 volts (C155)
73596	Capacitor—Tubular, moulded paper, oil filled, .033 mfd., 1000 volts (C164)
73558	Capacitor—Tubular, moulded paper, .047 mfd., 200 volts (C133, C187)
73553	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C130, C139)
73592	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 600 volts (C150, C156)
73564	Capacitor—Tubular, moulded paper, .047 mfd., 1000 volts (C163)
73597	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 1000 volts (C165)
73551	Capacitor—Tubular, moulded paper, 0.1 mfd., 400 volts (C149)
73557	Capacitor—Tubular, moulded paper, 0.1 mfd., 600 volts (C131)
73560	Capacitor—Tubular, moulded paper, 0.22 mfd., 200 volts (C136)
73593	Capacitor—Tubular, moulded paper, 0.22 mfd., 400 volts (C157, C162)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd., 200 volts (C190)

Stock No.	DESCRIPTION
74106	Capacitor—Electrolytic, 5 mfd., 50 volts (C197)
53147	Capacitor—Electrolytic, 25 mfd., 50 volts (C134)
73581	Capacitor—Electrolytic, comprising 1 section of 60 mfd., 450 volts, 2 sections of 10 mfd., 450 volts and 1 section of 20 mfd., 150 volts (C146A, C146B, C146C, C146D)
73583	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 90 mfd., 150 volts and 1 section of 50 mfd., 150 volts (C147A, C147B, C147C)
71432	Capacitor—Electrolytic, comprising 2 sections of 40 mfd., 450 volts and 1 section of 10 mfd., 450 volts (C148A, C148B, C148C)
73582	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts and 1 section of 80 mfd., 200 volts (C170A, C170B, C170C)
73154	Choke—Filter choke (L114)
73591	Coil—Antenna matching coil less mounting bracket and socket (2 required)
73578	Coil—Antenna matching coil complete with bracket and socket (T115)
73477	Coil—Choke coil (L101)
73566	Coil—Focus coil (L115)
71449	Coil—Horizontal linearity, control coil (L111)
73476	Coil—I-F trap (L116, C189)
74170	Coil—Peaking coil (36 muh) (L117, R110)
72619	Coil—Peaking coil (93 muh) (L103, R212)
71528	Coil—Peaking coil (180 muh) (L102, L105, R213, R125)
71526	Coil—Peaking coil (250 muh) (L106, L107)
71429	Coil—Width control coil (L110)
71521	Connector—Hi-voltage capacitor connector
71789	Connector—Kinescope anode connector
73579	Control—AGC threshold control (R138)
73156	Control—Brightness control (R131)
72735	Control—Focus control (R191)
71440	Control—Height control (R155)
72734	Control—Horizontal hold and vertical hold control (R158, R173)
73663	Control—Picture control (R122)
71441	Control—Vertical linearity control (R162)
71457	Cord—Power cord and plug
71437	Cover — Insulating cover for electrolytics #71432, 73581 and 73582
73590	Cushion—Cushion for deflection yoke hood (2 required)
73600	Fuse—0.25 amp., 250 volts (F1)
71799	Grommet—Rubber grommet for horizontal yoke lead exit
37396	Grommet — Rubber grommet for mounting ceramic tube socket
73301	Magnet—Ion trap magnet (PM type)
73587	Nut—Speed nut to mount hi-voltage capacitor
18469	Plate—Mounting plate—bakelite—for electrolytics
71448	Plug—2 prong male plug for power cable
71513	Resistor—Wire wound, 3.3 ohms, 1/3 watt (R187)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R202)
	Resistor—Fixed, composition, 10 ohms ± 20%, ½ watt (R120, R192)
	Resistor—Fixed, composition, 39 ohms ± 10%, ½ watt (R102, R111)
	Resistor—Fixed, composition, 39 ohms ± 10%, 1 watt (R185)
	Resistor—Fixed, composition, 47 ohms ± 20%, ½ watt (R183)
	Resistor—Fixed, composition, 47 ohms, ±10%, 1 watt (R184)
	Resistor—Fixed, composition, 68 ohms ± 10%, ½ watt (R105)
	Resistor—Fixed, composition, 82 ohms ± 10%, ½ watt (R195)
	Resistor—Fixed, composition, 100 ohms ± 10%, ½ watt (R121)
	Resistor—Fixed, composition, 150 ohms ± 20%, ½ watt (R106, R109, R114, R214)
	Resistor—Fixed, composition, 150 ohms ± 10%, ½ watt (R115)
	Resistor—Fixed, composition, 220 ohms ± 10%, ½ watt (R123)
37502	Resistor—Wire wound, 330 ohms, 2 watt (R190)
73588	Resistor—Voltage divider, comprising 1 section of 850 ohms, 12 watt and 2 sections of 650 ohms, 6 watt (R193A, R193B, R193C)
	Resistor—Fixed, composition, 1000 ohms ± 20%, ½ watt (R103, R107, R108, R113, R116, R118, R165, R199)

Stock No.	DESCRIPTION
	Resistor—Fixed, composition, 1200 ohms ± 10%, ½ watt (R196)
	Resistor—Fixed, composition, 1800 ohms ± 10%, 2 watt (R194)
	Resistor—Fixed, composition, 2200 ohms ± 10%, ½ watt (R219)
	Resistor—Fixed, composition, 2700 ohms ± 10%, ½ watt (R161, R217)
	Resistor—Fixed, composition, 3300 ohms ± 5%, ½ watt (R126)
	Resistor—Fixed, composition, 4700 ohms ± 10%, ½ watt (R144)
	Resistor—Fixed, composition, 5600 ohms ± 10%, ½ watt (R141, R218)
	Resistor—Fixed, composition, 5600 ohms ± 5%, ½ watt (R112, R119, R136)
	Resistor—Fixed, composition, 5600 ohms ± 10%, 1 watt (R127)
	Resistor—Fixed, composition, 6800 ohms ± 10%, ½ watt (R150)
	Resistor—Fixed, composition, 6800 ohms ± 10%, 1 watt (R186)
	Resistor—Fixed, composition, 6800 ohms ± 5%, 1 watt (R117)
	Resistor—Fixed, composition, 6800 ohms ± 10%, 2 watts (R177, R210)
	Resistor—Fixed, composition, 8200 ohms ± 10%, ½ watt (R152, R153, R171)
	Resistor—Fixed, composition, 8200 ohms ± 5%, ½ watt (R164, R175, R222)
	Resistor—Fixed, composition, 8200 ohms ± 5%, 1 watt (R128)
	Resistor—Fixed, composition, 10,000 ohms ± 10%, ½ watt (R182)
	Resistor—Fixed, composition, 10,000 ohms ± 5%, ½ watt (R104)
51869	Resistor—Wire wound, 10,000 ohms, 10 watts (R225)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, ½ watt (R209)
	Resistor—Fixed, composition, 12,000 ohms ±10%, 2 watts (R124)
	Resistor—Fixed, composition, 15,000 ohms ± 10%, 1 watt (R146)
	Resistor—Fixed, composition, 18,000 ohms ± 5%, ½ watt (R135)
	Resistor—Fixed, composition, 22,000 ohms ± 20%, ½ watt (R198, R215)
	Resistor—Fixed, composition, 22,000 ohms ± 10%, ½ watt (R151, R197, R220)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, ½ watt (R143)
	Resistor—Fixed, composition, 47,000 ohms ± 20%, ½ watt (R221)
	Resistor—Fixed, composition, 47,000 ohms ± 10%, ½ watt (R145)
	Resistor—Fixed, composition, 56,000 ohms ± 10%, ½ watt (R156)
	Resistor—Fixed, composition, 68,000 ohms ±10%, ½ watt (R172)
	Resistor—Fixed, composition, 100,000 ohms ± 10%, ½ watt (R160, R216)
	Resistor—Fixed, composition, 100,000 ohms ± 5%, ½ watt (R203, R204)
	Resistor—Fixed, composition, 100,000 ohms ± 5%, 1 watt (R176)
	Resistor—Fixed, composition, 120,000 ohms ±5%, ½ watt (R134)
	Resistor—Fixed, composition, 120,000 ohms ± 10%, 1 watt (R174, R179)
	Resistor—Fixed, composition, 150,000 ohms ± 10%, ½ watt (R168, R180)
	Resistor—Fixed, composition, 150,000 ohms ±20%, ½ watt (R142)
	Resistor—Fixed, composition, 150,000 ohms ± 5%, 1 watt (R178)
	Resistor—Fixed, composition, 220,000 ohms ± 10%, ½ watt (R129, R154)
	Resistor—Fixed, composition, 330,000 ohms ± 20%, ½ watt (R140)
	Resistor—Fixed, composition, 470,000 ohms ±10%, ½ watt (R137, R139)
	Resistor—Fixed, composition, 560,000 ohms ±10%, ½ watt (R188)
	Resistor—Fixed, composition, 820,000 ohms ± 5%, ½ watt (R169)
	Resistor—Fixed, composition, 1 megohm ± 10%, ½ watt (R147, R181)
	Resistor—Fixed, composition, 1 megohm ± 20%, 1 watt (R189)

Stock No.	DESCRIPTION
	Resistor—Fixed, composition, 1.5 megohm ± 5%, ½ watt (R157)
	Resistor—Fixed, composition, 1.8 megohm ± 5%, ½ watt (R133)
	Resistor—Fixed, composition, 2.2 megohm ± 10%, ½ watt (R130, R132, R159, R163)
	Resistor—Fixed, composition, 2.7 megohm ± 5%, 1 watt (R170)
	Resistor—Fixed, composition, 3.9 megohm ± 10%, ½ watt (R149)
	Resistor—Fixed, composition, 10 megohms ± 10%, ½ watt (R148)
71456	Screw—#8-32 wing screw to mount yoke and hood (3 required)
73584	Shield—Tube shield for V117 and V118
72741	Socket—Kinescope socket
38853	Socket—Four pin wafer socket (J102)
71508	Socket—Tube socket for 8016
73117	Socket—Tube socket, 7 pin, miniature
72927	Socket—Tube socket, 9 pin, miniature
73249	Socket—Tube socket, octal, ceramic, plate mounted
31251	Socket—Tube socket, octal, wafer
73586	Spring—Hood and yoke pressure spring (3 required)
73571	Transformer—First pix i-f transformer (T101, C102, R101)
73572	Transformer—Second pix i-f transformer (T102, C107)
73573	Transformer—Third pix i-f transformer (T103, C112)
73574	Transformer—Fourth pix i-f transformer (T104, C116)
73575	Transformer—Fifth pix i-f transformer (T106, C123, C124)
73569	Transformer—Vertical oscillator transformer (T107)
73568	Transformer—Vertical output transformer (T108)
73576	Transformer—Horizontal oscillator (T109)
73570	Transformer—Horizontal output and hi-voltage transformer (T110)
73567	Transformer—Power transformer, 115 volt 60 cycle (T111)
71424	Transformer—Sound I-F transformer (T112, C173, C174))
71427	Transformer—Sound discriminator transformer (T113, C178, C179, C180)
73577	Trap—4.5 megacycle trap (L104, C128)
71778	Trap—Sound trap (T105, C119)
71420	Yoke—Deflection yoke (L108, L109, L112, L113, C169, R166, R167)
	RADIO CHASSIS ASSEMBLIES
	RC 616B—8TV323 RC 616J—8TV323
	RC 616C—8TV321 RC 616K—8TV321
72853	Board—Terminal board (Antenna-Television)
73607	Capacitor—Variable tuning capacitor (C1, C2, C3, C4, C8, C12, C13)
73866	Capacitor—Ceramic, 2 mmf. (C9)
31353	Capacitor—Ceramic, 15 mmf. (C42)
39042	Capacitor—Ceramic, 47 mmf. (C26)
73867	Capacitor—Ceramic, 56 mmf. (C43)
33103	Capacitor—Ceramic, 68 mmf. (C40)
39396	Capacitor—Ceramic, 100 mmf. (C5)
48125	Capacitor—Ceramic, 150 mmf. (C7, C19, C38, C50, C53)
71922	Capacitor—Ceramic, 180 mmf. (C37)
39640	Capacitor—Mica, 330 mmf. (C30, C31)
73748	Capacitor—Ceramic, 1500 mmf. (C39)
73750	Capacitor—Tubular, .002 mfd., 200 volts (C36)
73659	Capacitor—Tubular, .003 mfd., 100 volts (C24)
72573	Capacitor—Tubular, .003 mfd., 400 volts (C28)
70646	Capacitor—Tubular, .0035 mfd., 1000 volts (C34, C56)
71926	Capacitor—Tubular, .005 mfd., 200 volts (C20, C27, C32)
72791	Capacitor—Tubular, .005 mfd., 400 volts (C14, C16, C17, C21, C22)
71923	Capacitor—Tubular, .01 mfd., 200 volts (C23, C25, C57)
72827	Capacitor—Tubular, .01 mfd., 400 volts (C29, C41, C54)
72120	Capacitor—Tubular, .015 mfd., 200 volts (C52)
71928	Capacitor—Tubular, .02 mfd., 200 volts (C51)
73638	Capacitor—Tubular, .02 mfd., 400 volts (C55)
72596	Capacitor—Tubular, .05 mfd., 200 volts (C15)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C33)
73372	Capacitor—Electrolytic, comprising 1 section of 30 mfd., 350 volts, 1 section of 30 mfd., 300 volts and 1 section of 20 mfd., 25 volts (C18A, C18B, C18C)

Stock No.	DESCRIPTION
73661	Coil—Antenna coil—"A" band (L8, L9)
73744	Coil—Oscillator coil—"A" band (L4)
73918	Coil—F.M. antenna coil (#16 buss tinned, 8 turns per inch 1¾ turns L.H. .469 I.D.) (L1)
73916	Coil—F.M. oscillator coil (#16 buss tinned, 7 turns per inch 4¾ turns R.H. .469 I.D.) (L2)
73602	Control—Tone control (S4)
73662	Control—Volume control and power switch (R14, S7)
72953	Cord—Drive cord (approx. 38" overall length) for 8TV323
72953	Cord—Drive cord (approx. 45" overall length) for 8TV321
70392	Cord—Power cord and plug
16058	Grommet—Rubber grommet to mount R-F shelf (4 required)
72069	Grommet—Rubber grommet for rear mounting feet (2 required)
73710	Indicator—Station selector indicator for 8TV323
73668	Indicator—Station selector indicator for 8TV321
73044	Plate—Dial back plate for 8TV323
73667	Plate—Dial back plate for 8TV321
30868	Plug—2 contact female plug for motor cable
5040	Plug—4 contact female plug for speaker cable
52131	Receptacle—AC receptacle
33514	Receptacle—Television-phono receptacle
70250	Resistor—Wire wound, 3.9 ohms, 1 watt (R34)
	Resistor—Fixed, composition, 68 ohms ± 10%, ½ watt (R7)
	Resistor—Fixed, composition, 100 ohms ± 10%, ½ watt (R17, R27)
	Resistor—Fixed, composition, 120 ohms ± 10%, ½ watt (R12)
	Resistor—Fixed, composition, 470 ohms ± 10%, 2 watts (R21)
	Resistor—Fixed, composition, 680 ohms ± 20%, ½ watt (R9, R11)
	Resistor—Fixed, composition, 1200 ohms ± 5%, ½ watt (R23)
73637	Resistor—Wire wound, 2200 ohms, 5 watts (R22)
	Resistor—Fixed, composition, 3300 ohms ± 5%, ½ watt (R24)
	Resistor—Fixed, composition, 8200 ohms ± 10%, ½ watt (R43)
	Resistor—Fixed, composition, 10,000 ohms ± 10%, ½ watt (R32)
	Resistor—Fixed, composition, 15,000 ohms ± 10%, ½ watt (R13, R18, R30)
	Resistor—Fixed, composition, 18,000 ohms ±10%, ½ watt (R4)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, ½ watt (R8, R40)
	Resistor—Fixed, composition, 27,000 ohms ± 10%, 1 watt (R5)
	Resistor—Fixed, composition, 33,000 ohms ± 10%, ½ watt (R6)
	Resistor—Fixed, composition, 39,000 ohms ± 10%, ½ watt (R25)
	Resistor—Fixed, composition, 56,000 ohms ± 10%, 1 watt (R10)
	Resistor—Fixed, composition, 82,000 ohms ± 10%, ½ watt (R42)
	Resistor—Fixed, composition, 100,000 ohms ± 10%, ½ watt (R33, R45)
	Resistor—Fixed, composition, 270,000 ohms ± 10%, ½ watt (R19, R29)
	Resistor—Fixed, composition, 330,000 ohms ± 10%, ½ watt (R28)
	Resistor—Fixed, composition, 470,000 ohms ± 10%, ½ watt (R20, R26, R44)
	Resistor—Fixed, composition, 2.2 megohm ± 20%, ½ watt (R3)
	Resistor—Fixed, composition, 3.9 megohm ± 10%, ½ watt (R2)
	Resistor—Fixed, composition, 10 megohms ± 20%, ½ watt (R15, R41)
	Resistor—Fixed, composition, 22 megohms ± 20%, ½ watt (R16)
73605	Shaft—Tuning knob shaft
35787	Socket—Auxiliary phono input socket (RC 616J RC 616K)
31364	Socket—Pilot or dial lamp socket
72516	Socket—Tube socket, 7 prong, miniature
73606	Socket—Tube socket, 7 prong, miniature, mica filled rubber
31251	Socket—Tube socket, octal

WIRING DIAGRAM

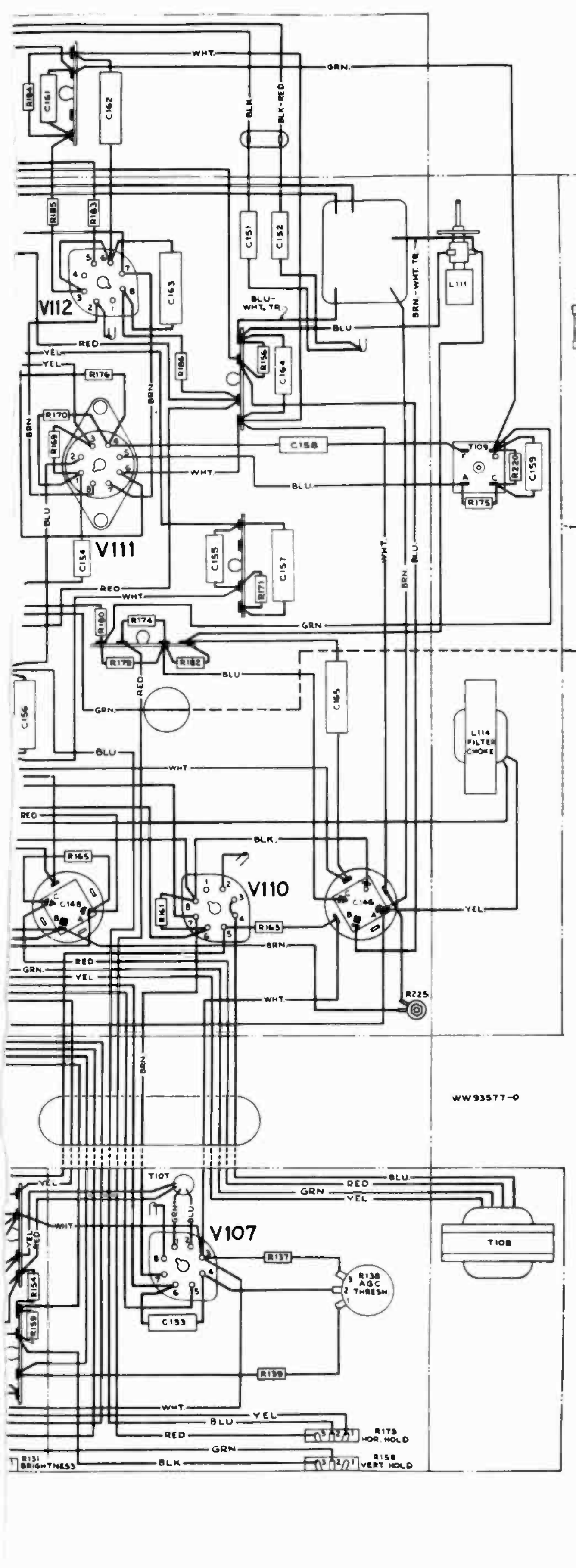
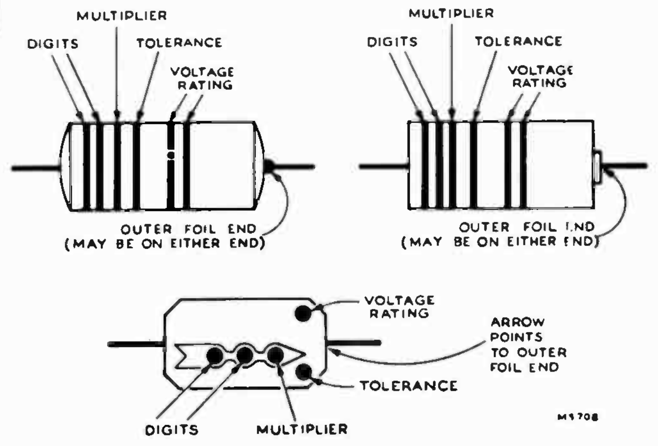


Figure 25—Television Chassis Wiring Diagram

REFER TO PAGES 442 TO 455 INC. FOR TELEVISION ALIGNMENT, SERVICE SUGGESTIONS, TEST PATTERN PHOTOGRAPHS AND WAVEFORM PHOTOGRAPHS.

COLOR CODE FOR MOULDED PAPER CAPACITORS



CAPACITY VALUE IN MMF

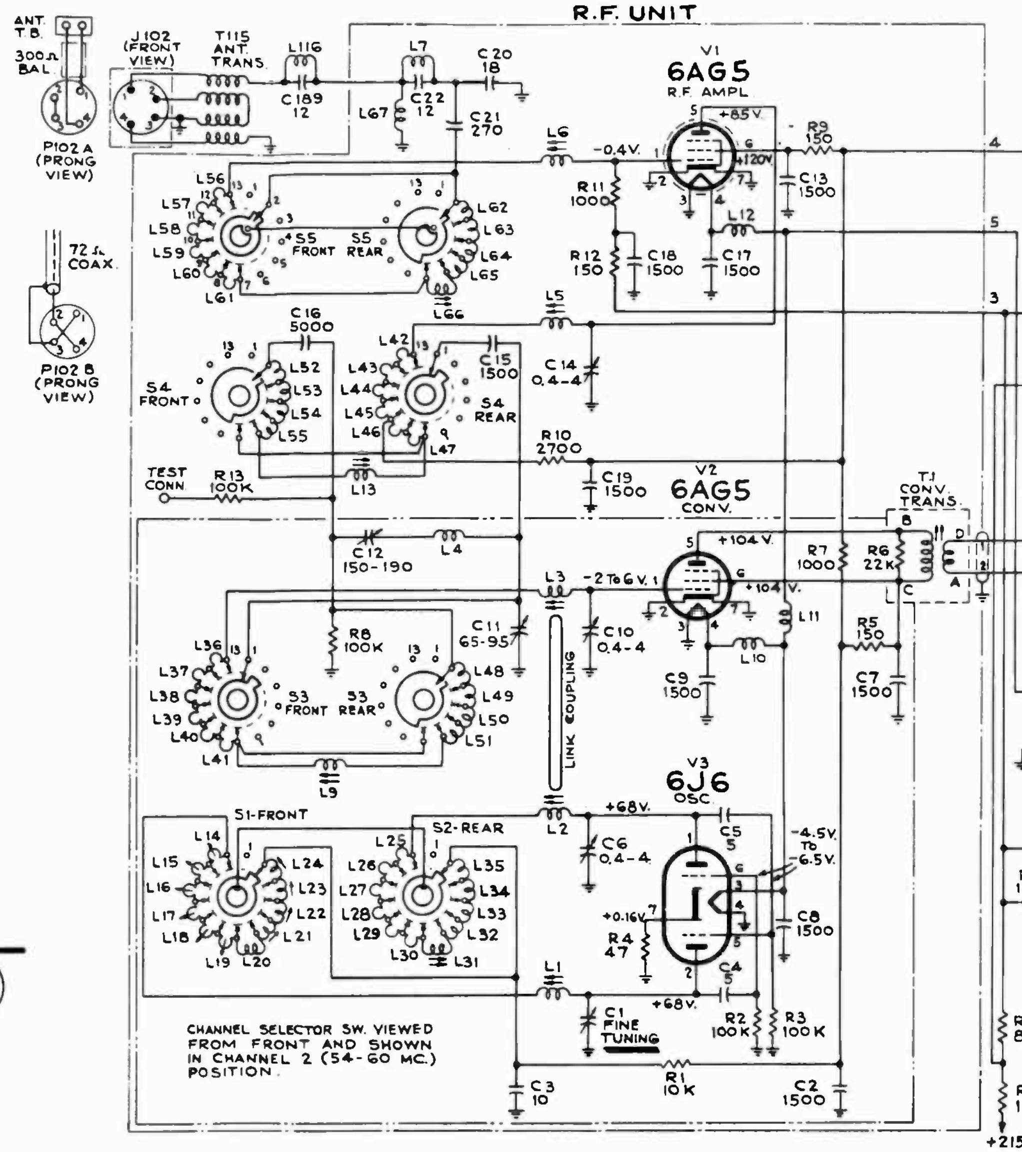
COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

TOLERANCE

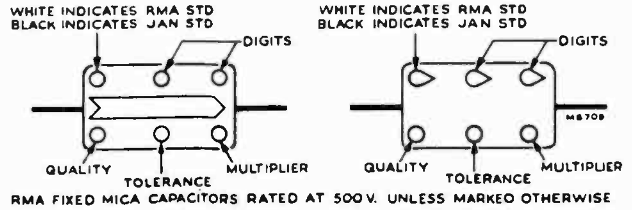
COLOR	TOLERANCE
BLACK BAND OR NONE	±20%
WHITE OR SILVER	±10%
YELLOW OR GOLD	± 5%

The voltage rating is given in hundreds of volts. Only one band is employed for ratings under 1,000 volts. Two bands are employed for ratings over 1,000 volts. Use digits column to read voltage ratings.

TELEVISION CIRCUIT SCHEMATIC DIAGRAM



RMA COLOR CODE FOR FIXED MICA CAPACITORS



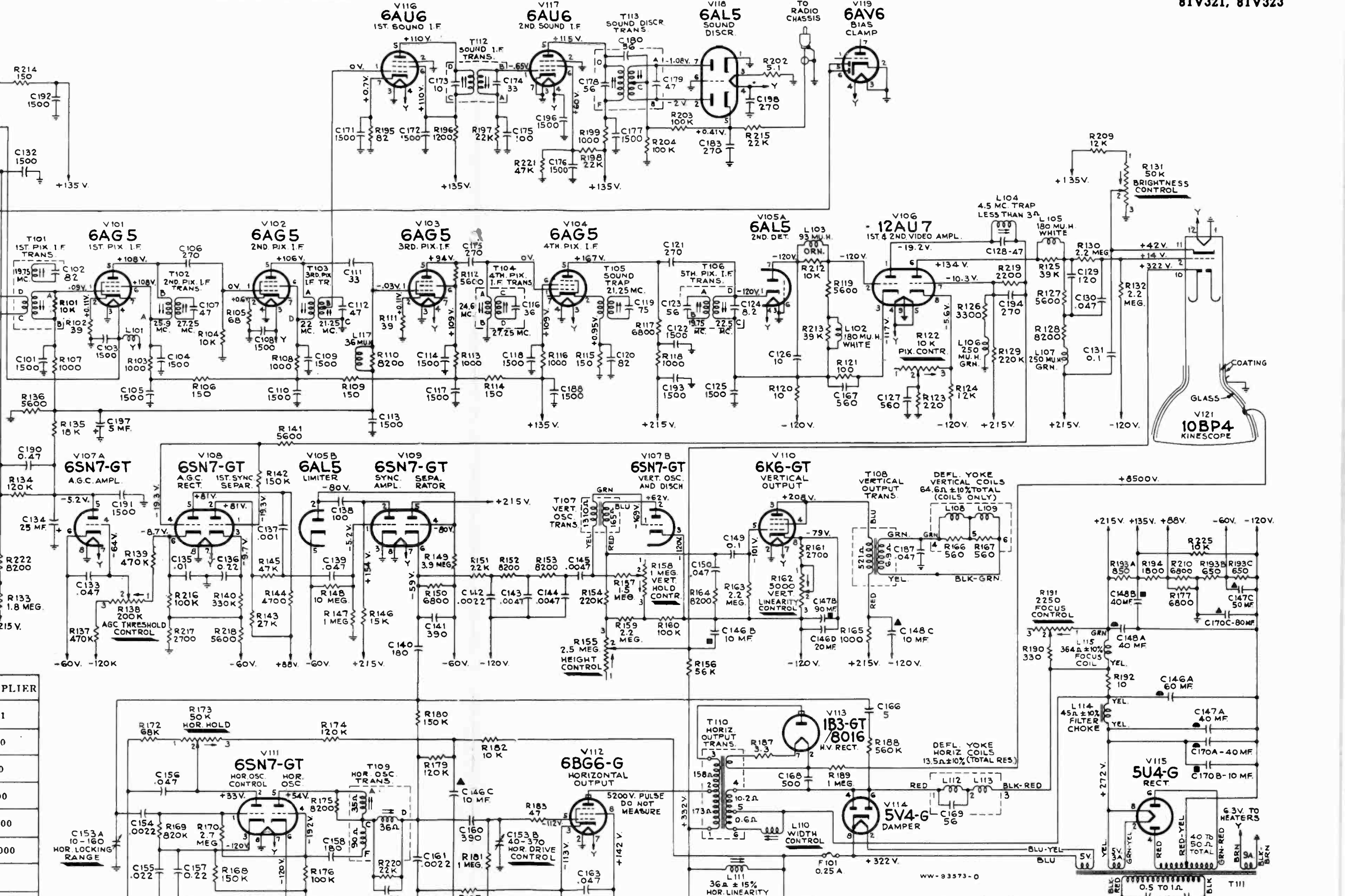
RMA FIXED MICA CAPACITORS RATED AT 500V. UNLESS MARKED OTHERWISE

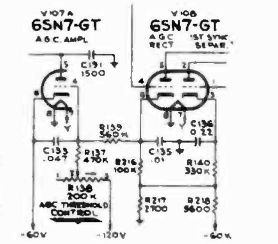
TOLERANCE			QUALITY			
COLOR	TOLERANCE		COLOR	CLASS	COLOR	CLASS
RED	± 2%		BLACK	A	YELLOW	D
GREEN	± 5%		BROWN	B	GRAY	I
SILVER	±10%		RED	C	WHITE	J
BLACK	±20%		ORANGE	D		

COLOR	DIGITS	MULTIPLIER
GOLD	–	0.1
BLACK	0	1.0
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

Coil resistance values less than 1 ohm are not shown.
Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.





All resistance values in ohms. K = 1000.
All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.

All voltages measured with "VoltOhmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.
In some receivers, C198 was omitted.

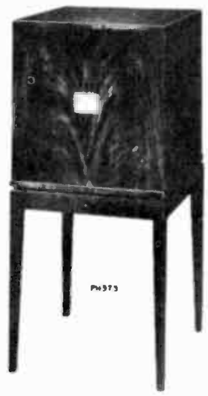
In some receivers, R222 was omitted.
In some receivers, R124 was 18K.
In some receivers, two .47 mfd capacitors in parallel were used for C197.
In some receivers, R117 was 8.2K.
In some receivers, R172 was 82K and R174 was 150K.

In some receivers, R139 is connected between pin 6 of V108 and pin 4 of V107. R137 is connected between pin 4 of V107 and the arm of R138. Lug 3 of R138 is connected to −120 volts.

In some receivers, R134 was 100K and R142 was 47K.

Figure 26—Television Circuit Schematic Diagram

Model 8T270 Walnut, Mahogany or Toasted Mahogany



Model 8TC270 Walnut, Mahogany or Toasted Mahogany

Model 8TC271 Walnut or Mahogany

RCA VICTOR

TELEVISION RECEIVERS

MODELS 8T270, 8TC270, 8TC271

Chassis Nos. KCS29, KCS29A

Mfr. No. 274

SERVICE DATA

—1949 No. T1—

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

GENERAL DESCRIPTION

Models 8T270. 8TC270 and 8TC271 are sixteen inch television receivers. These receivers employ twenty-two tubes plus four rectifiers and a 16AP4 kinescope. The receivers are identical except for cabinets.

Features of the television unit are full twelve channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; improved sync separator and clipper; four mc band width for picture channel and reduced hazard high voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE .... 10 7/32" x 13 5/8" — 3 3/16" radius at corner

R-F FREQUENCY RANGES

Channel Number	Channel Freq. Mc.	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.	Receiver R-F Osc. Freq. Mc.
2	54-60	55.25	59.75	81
3	60-66	61.25	65.75	87
4	66-72	67.25	71.75	93
5	76-82	77.25	81.75	103
6	82-88	83.25	87.75	109
7	174-180	175.25	179.75	201
8	180-186	181.25	185.75	207
9	186-192	187.25	191.75	213
10	192-198	193.25	197.75	219
11	198-204	199.25	203.75	225
12	204-210	205.25	209.75	231
13	210-216	211.25	215.75	237

FINE TUNING RANGE

Plus and minus approximately 250 kc on channel 2 and plus and minus approximately 650 kc on channel 13.

POWER SUPPLY RATING ...... 115 volts, 60 cycles, 285 watts

AUDIO POWER OUTPUT RATING .... 2.4 watts max.

LOUDSPEAKER 92580-2 .... 8 inch PM Dynamic
Voice Coil Impedance .... 3.2 ohms at 400 cycles

DIMENSIONS (inches)	Length	Height	Depth
Cabinet (outside) 8T270	22½	22½	23
Cabinet (outside) 8TC270	22½	48	24½
Cabinet (outside) 8TC271	24½	43¼	25
Chassis Assembly (outside)	19⅜	14¼	18¼
Chassis (Overall)	19⅜	14¼	22¾

RECEIVER ANTENNA INPUT IMPEDANCE

Choice: 300 ohms balanced or 72 ohms unbalanced.

WEIGHT

Chassis with Tubes in Cabinet—8T270 .... 88 lbs.
8TC270 .... 107 lbs. 8TC271 .... 114 lbs.

Shipping Weight—8T270 .... 109 lbs.
8TC270 .... 143 lbs. 8TC271 .... 145 lbs.

RCA TUBE COMPLEMENT

	Tube Used	Function
(1)	RCA 6AG5	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6AG5	Converter
(4)	RCA 6AU6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AV6	1st Audio Amplifier
(8)	RCA 6K6GT	Audio Output
(9)	RCA 6AG5	1st Picture I-F Amplifier
(10)	RCA 6AG5	2nd Picture I-F Amplifier
(11)	RCA 6AG5	3rd Picture I-F Amplifier
(12)	RCA 6AG5	4th Picture I-F Amplifier
(13)	RCA 6AL5	Picture 2nd Detector and Sync Limiter
(14)	RCA 6AU6	1st Video Amplifier
(15)	RCA 6K6GT	2nd Video Amplifier
(16)	RCA 6SN7GT	AGC Amplifier and Vertical Sweep Oscillator
(17)	RCA 6SN7GT	AGC Rectifier and 1st Sync Separator
(18)	RCA 6SN7GT	Sync Amplifier and 2nd Sync Separator
(19)	RCA 6K6GT	Vertical Sweep Output
(20)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(21)	RCA 6BG6G	Horizontal Sweep Output
(22)	RCA 5V4G	Damper
(23)	RCA 1B3-GT/8016	H. V. Rectifier (2 tubes)
(24)	RCA 5U4G	Power Supply Rectifier (2 tubes)
(25)	RCA 16AP4	Kinescope

Specifications continued on page 2

8T270, 8TC270, 8TC271 ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE I-F FREQUENCIES

Picture Carrier Frequency .... 25.75 Mc.
Adjacent Channel Sound Trap .... 27.25 Mc.
Accompanying Sound Traps .... 21.25 Mc.
Adjacent Channel Picture Carrier Trap .... 19.75 Mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency .... 21.25 Mc.
Sound Discriminator Band Width between peaks .... 350 kc

VIDEO RESPONSE .... To 4 Mc.

FOCUS .... Magnetic

SWEEP DEFLECTION .... Magnetic

SCANNING .... Interlaced, 525 line

HORIZONTAL SCANNING FREQUENCY .... 15,750 cps

VERTICAL SCANNING FREQUENCY .... 60 cps

FRAME FREQUENCY (Picture Repetition Rate) .... 30 cps

OPERATING CONTROLS (front panel)

Channel Selector, Fine Tuning .... Dual Control Knobs
Tone Control, Sound Volume and On-Off Switch .... Dual Control Knobs
Picture Horizontal Hold, Picture Vertical Hold .... Dual Control Knobs
Brightness, Picture .... Dual Control Knobs

NON-OPERATING CONTROLS (not including r-f and i-f adjustments)

Horizontal Centering .... rear chassis adjustment
Vertical Centering .... rear chassis adjustment
Width .... rear chassis screwdriver adjustments
Height .... rear chassis adjustment
Horizontal Linearity .... rear chassis screwdriver adjustment
Vertical Linearity .... rear chassis adjustment
Horizontal Drive .... rear chassis screwdriver adjustment
Horizontal Oscillator Frequency .... bottom chassis adjustment
Horizontal Oscillator Waveform .... side chassis adjustment
Focus .... rear chassis adjustment
Ion Trap Magnet .... top chassis adjustment
Deflection Coil .... top chassis wing nut adjustment
Focus Coil .... top chassis screwdriver adjustment
Video Bias .... rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NECESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE TELEVISION RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the receiver Installation Instructions section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

OPERATING INSTRUCTIONS

The following adjustments are necessary when tuning the receiver on for the first time.

1. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

2. Set the STATION SELECTOR to the desired channel.

3. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

4. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a light pattern appears on the screen.

5. Adjust the VERTICAL hold control until the pattern stops vertical movement.

6. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

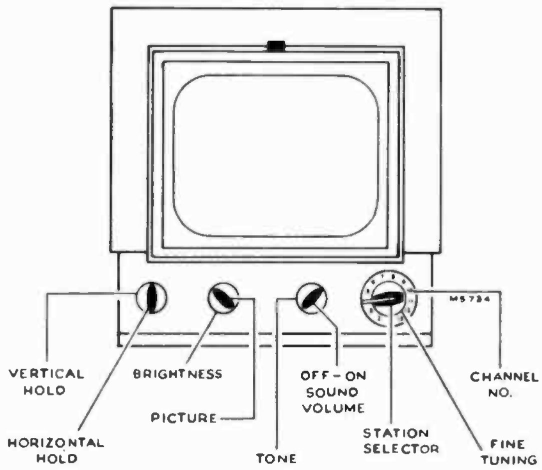


Figure 1—Receiver Operating Controls

7. Turn the BRIGHTNESS control counterclockwise until the retrace lines just disappear.

8. Adjust the PICTURE control for suitable picture contrast.

9. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

10. In switching from one station to another, it may be necessary to repeat steps numbers 3 and 8.

11. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 3 is generally sufficient.

12. If the positions of the controls have been changed, it may be necessary to repeat steps numbers 1 through 8.

INSTALLATION INSTRUCTIONS

The Model 8T270, 8TC270 and 8TC271 television receivers are shipped complete in one carton except for the 16AP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING. — Model 8T270 is shipped in a cardboard carton. To open the carton tear open the carton top flaps, remove the cardboard side packing material and with a man on two sides of the cabinet, lift it out of the carton.

Models 8TC270 and 8TC271 are also shipped in cardboard cartons. To unpack, turn the shipping carton on its side and tear open the carton bottom flaps. Fold the flaps up along the side of the carton and turn the carton back up. Lift the carton up and off the cabinet.

Remove the cabinet back grille. Remove all shipping material. Remove the envelope containing the control knobs and ion trap magnet. Make sure all tubes are in place and are firmly seated in their sockets.

Remove the cabinet front panel by loosening two wingnuts inside the cabinet and turning the two locking plates to the vertical position as shown in Figure 2. In Models 8TC270 and 8TC271, the panel may then be removed by hingeing the panel at the bottom and pulling out on the top edge. In Model 8T270, it will be necessary to remove two screws under the bottom of the cabinet.

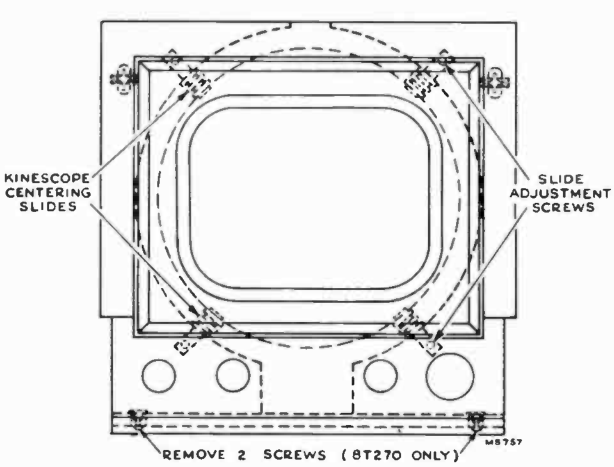


Figure 2—Cabinet, Front View

REMOVE THE TWO SELF-TAPPING SCREWS FROM THE KINESCOPE CUSHION SLIDE AS SHOWN IN FIGURE 3.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.

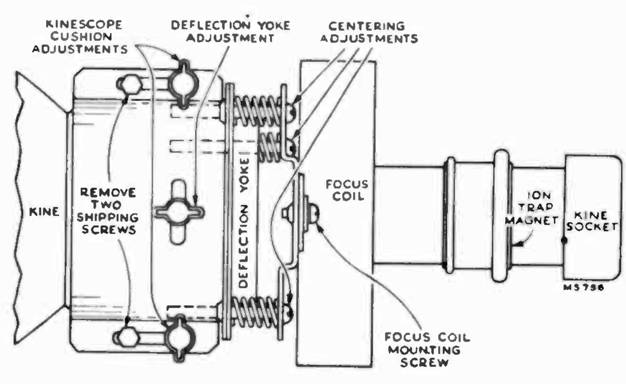


Figure 3—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the two focus coil mounting screws and move the coil until alignment is obtained. Tighten the mounting screws with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid-position. See Figure 2 for location of the slides and their adjustment screws. Loosen the two upper slides (from inside the cabinet), slip them up as far as possible and tighten.

Check the centering slides. There should be a small wire clip on the inner surface of each. The clip in the lower left corner should be connected to the high voltage lead.

KINESCOPE HANDLING PRECAUTION. — Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatter-proof goggles and heavy gloves are worn. Persons not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with fingermarks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a soft cloth moistened with "dry" carbon tetrachloride.

KINESCOPE INSTALLATION. — Slip the Vinylite boot over the metal cone of the kinescope, turn the tube so that the key on the base of the tube will be down and insert the neck of the kinescope through the deflection and focus coils as shown in Figure 4. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

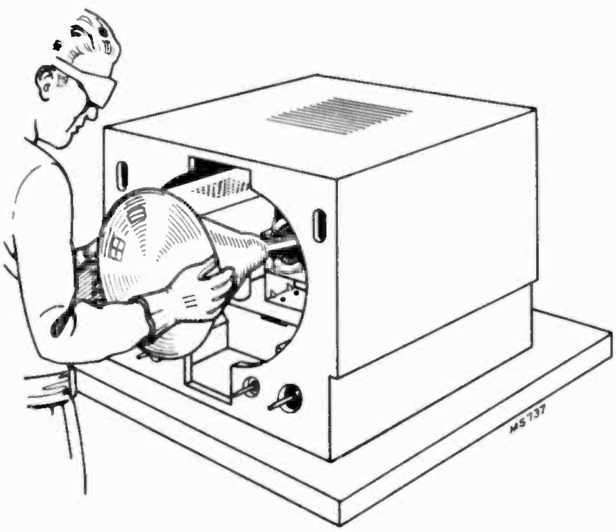


Figure 4—Kinescope Insertion

Slip the ion trap magnet assembly over the neck of the kinescope with the large magnet towards the base of the tube.

Connect the kinescope socket to the tube base.

Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.s "Windex" or similar cleaning agent.

Install the cabinet front panel by reversal of the procedure indicated in Figure 2.

For Models 8TC270 and 8TC271 to install the front panel, place the lip on the bottom of the panel in the recess below the kinescope opening and push the top in. Fasten the two bars in back of the panel and tighten the wingnuts.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap magnet and focus coil because of shadows on the corner of the raster.

The antenna and power connections should now be made. Install the front panel control knobs.

WARNING. — The high voltage supply in this receiver delivers 12,000 volts! If it is necessary to remove the kinescope after the receiver has been operating, short the kinescope cone to the chassis before attempting removal of or adjustments to the kinescope. A.C. interlocks are provided at the back of the set so that when the back is removed — so is the power.

Turn the power switch to the "on" position, the brightness control fully clockwise, and picture control counterclockwise.

ION TRAP MAGNET ADJUSTMENT. — Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags, as shown in Figure 5.

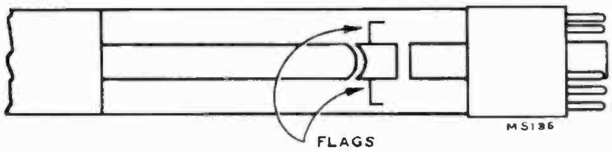


Figure 5—Ion Trap Flags

The ion trap rear magnet poles should be approximately over the ion trap flags. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R201 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

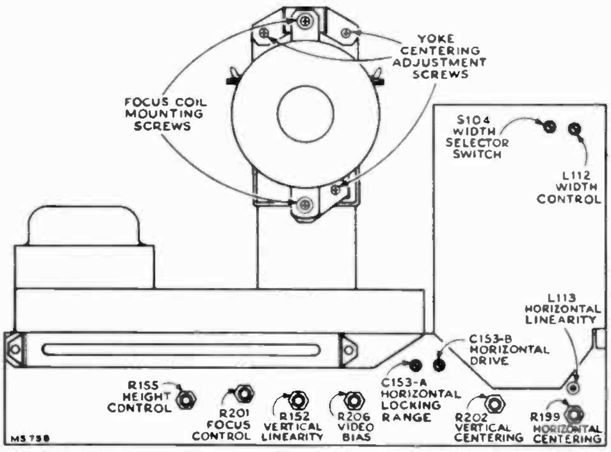


Figure 6—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT. — If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS. — It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 2 through 8 of the receiver operating instructions on page 3.

If the Horizontal Oscillator is operating properly, it should be possible to sync the picture at this point.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT. — Turn the horizontal hold control to the extreme counterclockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull in should occur when the control is approximately 90 degrees from the extreme counterclockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Centering Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR. — If in the above check the receiver failed to hold sync with the hold control at the extreme counterclockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment. — Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T109 horizontal frequency adjustment (under the chassis) until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Lock in Range Adjustment. — Set the horizontal hold control to the full counterclockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the picture control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat this procedure until 3 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is operating properly it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure on page 11. For field purposes paragraph "A" under Oscillator Waveform Adjustment may be omitted.

CENTERING ADJUSTMENTS. — Centering is obtained by adjustment of the centering controls and by mechanically orienting the focus coil with three adjustment screws shown in Figure 3. The focus coil should be concentric around the neck of the kinescope to prevent curvature of the raster.

Adjust the focus coil until it is at right angles to the neck of the kinescope. Center the picture with the electrical centering controls. If a shadow appears on a corner of the picture, adjust the focus coil centering screws to eliminate the shadow and re-center the picture with the electrical centering controls.

FOCUS COIL ADJUSTMENTS. — If, after making the centering adjustments in the above paragraph, a corner of the picture is shadowed, it will be necessary to loosen the focus coil mounting screws (shown in Figure 3) and change the position of the coil to eliminate the shadow. Re-center the picture by adjustment of the electrical centering controls and the focus coil centering adjustments.

Recheck the position of the ion trap magnet to insure that maximum brilliance is obtained.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS. — Adjust the height control (R155 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R162 on rear apron) until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS. — Adjust the horizontal drive control C153B to give a picture of maximum width within the limits of good linearity. Adjust the horizontal linearity control L113 to provide best linearity.

A width control coil and a width selector switch are provided. With the switch in position 1 (fully counterclockwise), adjust the width coil until the picture fills the mask. On low line voltages it may not be possible to get sufficient width by adjustment of the width coil. In this case turn the width selector switch clockwise to position 2. In this position the width coil is disconnected, and adjustment of the width coil will have no effect. For still greater width, turn the width selector switch fully clockwise to position 3. In this position, the 6BG6G screen voltage is increased as well as disconnecting the width control coil.

Adjustments of the horizontal drive control affect horizontal oscillator hold and locking range. If the drive control was adjusted, recheck the oscillator alignment.

FOCUS. — Adjust the focus control (R201 on chassis rear apron) for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

CHECK TO SEE THAT THE CUSHION AND YOKE THUMBSCREWS AND THE FOCUS COIL MOUNTING SCREWS ARE TIGHT.

VIDEO BIAS CONTROL. — Normally the video bias control (R206) should be in the fully clockwise position. To check to see if this is the correct position, turn the picture control clockwise and adjust the brightness control until the retrace lines just disappear. If the whites are compressed as indicated by a "washed out" appearance in light areas, turn the video bias control counterclockwise until the picture appears normal.

Replace the cabinet back and make sure that the screws holding it are up tight, otherwise it may rattle or buzz when the receiver is operated at high volume.

CHECK OF R-F OSCILLATOR ADJUSTMENTS. — Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure on page 10. The adjustments for channels 2 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 7. Adjustment for channel 13 is on top of the chassis and channel 6 adjustment is in the kinescope well. See Figures 11 and 12 for their location.

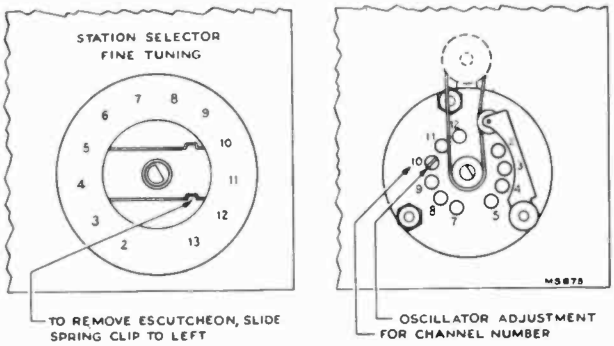


Figure 7—R-F Oscillator Adjustments

CAUTION. — The ion trap magnet employed for 16AP4 kinescopes is not the same as that used on 10BP4 tubes. Care should be taken to insure that the proper magnet supplied with the instrument is used. The type magnet shown in Figure 3 measures three fourths of an inch between magnet center lines and carries the number 986432-1 stamped on it.

CHASSIS TOP VIEW

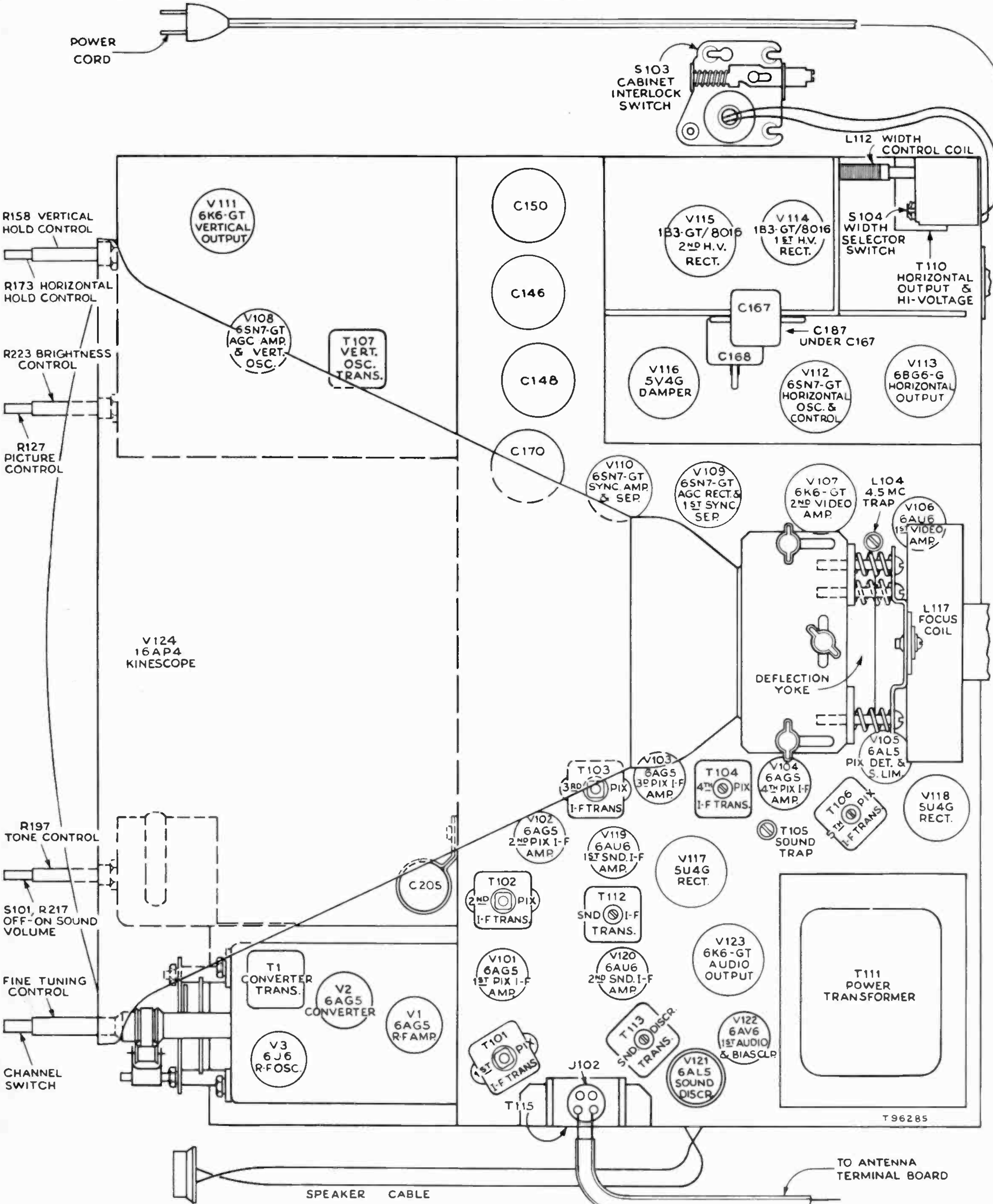


Figure 8—Chassis Top View

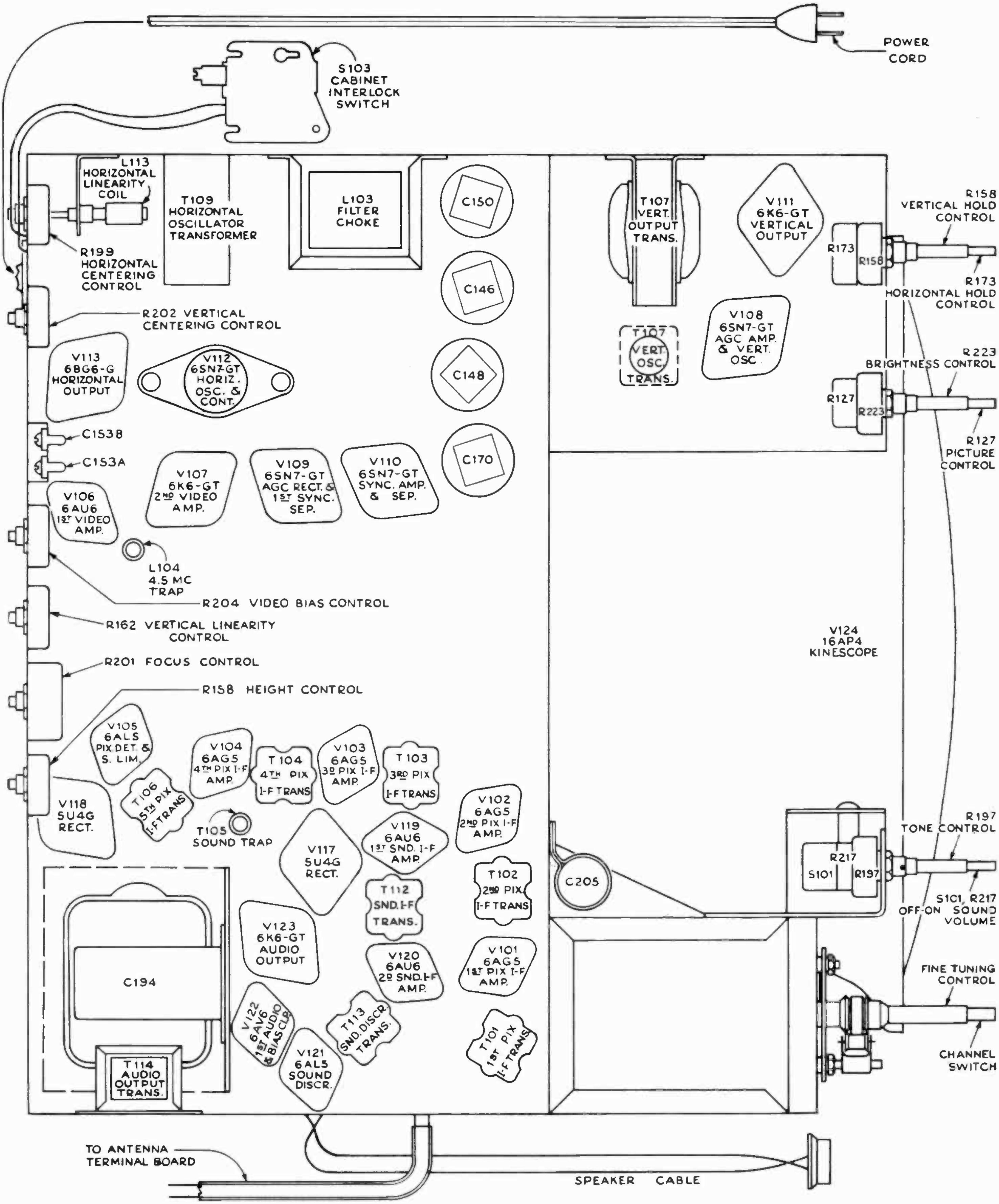


Figure 9—Chassis Bottom View

8T270, 8TC270, 8TC271 — VOLTAGE CHART

The following measurements represent two sets of conditions. In the first condition a 2200 microvolt test pattern signal was fed into the receiver. the picture synced and the AGC threshold control properly adjusted. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. Voltages shown are as read with "Jr. VoltOhymst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts 60 cycles a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V1	6AG5	R-F Amplifier	2200 Mu. V. Signal	5	140	6	142	2 & 7	0	1	−4.9	7	3	
			No Signal	5	67	6	111	2 & 7	0	1	−0.3	14.0	5.0	
V2	6AG5	Converter	2200 Mu. V. Signal	5	137	6	137	2 & 7	0	1	*−5.4	—	—	*Depending upon channel
			No Signal	5	108	6	108	2 & 7	0	1	*−2.0 to −7.0	*6.0 to 10	*1.5 to 3.0	
V3	6J6	R-F Oscillator	2200 Mu. V. Signal	1 & 2	90.5	—	—	7	19	5 & 6	*−7.0	—	—	*Depending upon channel
			No Signal	1 & 2	*68 to 81	—	—	7	16	5 & 6	*−4.5 to −6.6	*1.8 to 2.1	—	
V101	6AG5	1st Pix. I-F Amplifier	2200 Mu. V. Signal	5	136	6	136	2 & 7	<0.1	1	−4.2	0.5	0.1	
			No Signal	5	110	6	103	2 & 7	0.17	1	−1.5	3.8	0.6	
V102	6AG5	2d Pix. I-F Amplifier	2200 Mu. V. Signal	5	122	6	122	2 & 7	0.9	1	0	10.3	2.9	
			No Signal	5	96	6	100	2 & 7	0.6	1	0	6.8	2.0	
V103	6AG5	3d Pix. I-F Amplifier	2200 Mu. V. Signal	5	130	6	137	2 & 7	<0.1	1	−4.2	1.0	3	
			No Signal	5	95	6	106	2 & 7	0.17	1	−1.5	3.6	8	
V104	6AG5	4th Pix. I-F Amplifier	2200 Mu. V. Signal	5	194	6	137	2 & 7	1.6	1	0	8.3	2.7	
			No Signal	5	200	6	113	2 & 7	1.2	1	0	7.1	1.4	
V105 A	6AL5	Picture 2d Det.	2200 Mu. V. Signal	7	−117	—	—	1	−115	—	—	0.2	—	
			No Signal	7	−130	—	—	1	−125	—	—	0.3	—	
V105 B	6AL5	Sync Limiter	2200 Mu. V. Signal	2	−131	—	—	5	−46	—	—	<0.1	—	
			No Signal	2	−100	—	—	5	−52	—	—	<0.1	—	
V106	6AU6	1st Video Amplifier	2200 Mu. V. Signal	5	−68	6	27	7	−114.5	1	−117	3.9	1.8	
			No Signal	5	−72	6	25	7	−124	1	−130	3.7	1.6	
V107	6K6 GT	2d Video Amplifier	2200 Mu. V. Signal	3	*68	4	140	8	−47	5	−68	10.0	2.5	Maximum contrast
			No Signal	3	*34	4	120	8	−52	5	−72	11.0	2.3	
V108 A	6SN7 GT	AGC Amplifier	2200 Mu. V. Signal	5	−24	—	—	6	−50	4	−51	0.4	—	
			No Signal	5	−7	—	—	6	−56	4	−60	<0.1	—	
V108 B	6SN7 GT	Vertical Oscillator	2200 Mu. V. Signal	2	54	—	—	3	−110	1	−157	0.32	—	
			No Signal	2	39	—	—	3	−125	1	−171	0.32	—	
V109	6SN7 GT	AGC Rectifier	2200 Mu. V. Signal	5	27	—	—	6	−51	4	−68	0.25	—	
			No Signal	5	19	—	—	6	−59	4	−72	0.25	—	
V109	6SN7 GT	1st Sync Separator	2200 Mu. V. Signal	2	23	—	—	3	−52	1	−68	0.13	—	
			No Signal	2	18	—	—	3	−63	1	−70	0.18	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V110	6SN7 GT	Sync Amplifier	2200 Mu. V. Signal	2	81	—	—	3	−46	1	−48	10.8	—	
			No Signal	2	71	—	—	3	−50	1	−54	10.8	—	
V110	6SN7 GT	Sync Separator	2200 Mu. V. Signal	5	210	—	—	6	−44	4	−131	0.34	—	
			No Signal	5	200	—	—	6	−51	4	−100	0.15	—	
V111	6K6-GT	Vertical Output	2200 Mu. V. Signal	3	197	4	*197	8	−76	5	−96	7.7	1.3	*Screen connected to plate
			No Signal	3	185	4	*185	8	−93	5	−110	7.6	1.3	
V112	6SN7 GT	Horizontal Osc. Control	2200 Mu. V. Signal	2	25	—	—	3	−120	1	−110	0.24	—	Horizontal hold control completely clockwise
			No Signal	2	−8	—	—	3	−146	1	−128	0.1	—	
			No Signal	2	+60	—	—	3	−130	1	−114	0.13	—	Hold control counterclockwise
V112	6SN7 GT	Horizontal Oscillator	2200 Mu. V. Signal	5	75	—	—	6	−115	4	−190	2.3	—	
			No Signal	5	60	—	—	6	−125	4	−204	1.5	—	
V113	6BG6G	Horizontal Output	2200 Mu. V. Signal	Cap	*	8	180	3	−100	5	−120	90.0	10.0	*5200 volt pulse present
			No Signal	Cap	Do Not Meas.	8	160	3	−112	5	−126	92.6	10.4	
V114	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	6400	—	—	—	—	*6000 volt pulse present
			Brightness Max.	Cap	Do Not Meas.	—	—	2 & 7	6100	—	—	—	—	
V115	1B3GT /8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	11700	—	—	—	—	*6000 volt pulse present
			Brightness Max.	Cap	Do Not Meas.	—	—	2 & 7	11600	—	—	—	—	
V116	5V4G	Damper	2200 Mu. V. Signal	4 & 6	*	—	—	2 & 8	350	—	—	93.0	—	*1200 volt pulse present
			No Signal	4 & 6	Do Not Meas.	—	—	2 & 8	340	—	—	92.0	—	
V117 V118	5U4G	Rectifier	2200 Mu. V. Signal	4 & 6	*365	—	—	2 & 8	277	—	—	†125	—	†Per tube *A-C measured from plate to trans. center tap
			No Signal	4 & 6	*365	—	—	2 & 8	264	—	—	†130	—	
V119	6AU6	1st Sound I-F Amplifier	2200 Mu. V. Signal	5	131	6	131	7	0.65	1	0	6.0		
			No Signal	5	106	6	106	7	0.55	1	0	4.9		
V120	6AU6	2d Sound I-F Amplifier	2200 Mu. V. Signal	5	136	6	80	7	0	1	−0.6	3.5		
			No Signal	5	111	6	62	7	0	1	−0.7	3.0		
V121	6AL5	Sound Discrim.	2200 Mu. V. Signal	2	−1.4	—	—	5	0	—	—	—	—	
			No Signal	2	−0.7	—	—	5	0	—	—	—	—	
V122	6AV6	1st Audio Amplifier	2200 Mu. V. Signal	7	88	—	—	2	0	1	−0.7	0.5	—	
			No Signal	7	91	—	—	2	0	1	−0.7	0.5	—	
V123	6K6-GT	Audio Output	2200 Mu. V. Signal	3	152	4	165	8	−94	5	−115	24.0	3.4	
			No Signal	3	139	4	152	8	−107	5	−125	24.0	3.4	
V124	16AP4	Kinescope	2200 Mu. V. Signal	Cap	11700	10	320	11	26	2	−29	0.08	—	Average Brightness
			No Signal	Cap	11600	10	305	11	11	2	−47	0.08	—	Average Brightness

TEST EQUIPMENT. — To properly service the television chassis of this receiver, it is recommended that the following test equipment be available:

R-F Sweep Generator meeting the following requirements:

(a) Frequency Ranges
20 to 30 mc., 1 mc. and 10 mc. sweep width
50 to 90 mc., 10 mc. sweep width
170 to 225 mc., 10 mc. sweep width
(b) Output adjustable with at least .1 volt maximum.
(c) Output constant on all ranges.
(d) "Flat" output on all attenuator positions.

Cathode-Ray Oscilloscope, preferably one with a wide band vertical deflection, an input calibrating source, and a low capacity probe.

Signal Generator to provide the following frequencies.

(a) I-F frequencies
19.75 mc. adjacent channel picture trap
21.25 mc. sound i-f and sound traps
22.05 and 24.75 mc. converter and first pix i-f transformer
25.9 mc. second picture i-f transformer
24.6 mc. fourth picture i-f transformer
22.0 mc. third picture i-f transformer
22.5 mc. fifth picture i-f transformer
25.75 mc. picture carrier
27.25 mc. adjacent channel sound trap

(b) R-F frequencies

Channel Number	Picture Carrier Freq. Mc.	Sound Carrier Freq. Mc.
2	55.25	59.75
3	61.25	65.75
4	67.25	71.75
5	77.25	81.75
6	83.25	87.75
7	175.25	179.75
8	181.25	185.75
9	187.25	191.75
10	193.25	197.75
11	199.25	203.75
12	205.25	209.75
13	211.25	215.75

(c) Output on these ranges should be adjustable and at least .1 volt maximum.

Heterodyne Frequency Meter with crystal calibrator if the signal generator is not crystal controlled.

Electronic Voltmeter of Junior "VoltOhmyst" type and a high voltage multiplier probe for use with this meter to permit measurements up to 10 kv.

Service Precautions. — If necessary to remove the chassis from cabinet, the kinescope must first be removed. See Figures 2 and 4. If possible, the chassis should then be serviced without the kinescope. However, if it is necessary to view the raster during servicing, the kinescope should be inserted only after the chassis is turned on end. The kinescope should never be allowed to support its weight by resting in the deflecting yoke. A bracket should be used to support the tube at its viewing screen.

By turning the chassis on end with the power transformer down, all adjustments will be made conveniently available. Since this is the only safe position in which the chassis will rest and still leave all adjustments accessible, the trimmer location drawings are oriented similarly for ease of use.

CAUTION: Do not short the kinescope second anode lead.

Adjustments Required. — Normally, only the r-f oscillator line will require the attention of the service technician. All other circuits are either broad or very stable and hence will seldom require re-adjustment.

The oscillator line is relatively non critical. When oscillator tubes are changed, in all probability it will be necessary to adjust only C6 in order to bring the entire line into adjustment.

ORDER OF ALIGNMENT. — When a complete receiver alignment is necessary, it can be most conveniently performed in the following order:

(1) Sound discriminator	(5) R-F and converter lines
(2) Sound i-f transformers	(6) R-F oscillator line
(3) Picture i-f traps	(7) 4.5 mc. video trap
(4) Picture i-f transformers	(8) Sensitivity check

SOUND DISCRIMINATOR ALIGNMENT. — Set the signal generator for approximately .1 volt output at 21.25 mc. and connect it to the second sound i-f grid.

Detune T113 secondary (bottom).

Set the "VoltOhmyst" on the 10 volt scale.

Connect the meter in series with a one megohm resistor to the junction of diode resistors R215 and R216.

Adjust the primary of T113 (top) for maximum output on the meter.

Connect the "VoltOhmyst" to the junction of C183 and R215. Adjust T113 secondary (bottom). It will be found that it is possible to produce a positive or negative voltage on the meter dependent upon this adjustment. Obviously to pass from a positive to a negative voltage, the voltage must go through zero. T113 (bottom) should be adjusted so that the meter indicates zero output as the voltage swings from positive to negative. This point will be called discriminator zero output.

Connect the sweep oscillator to the grid of the second sound i-f amplifier.

Adjust the sweep band width to approximately 1 mc. with the center frequency at approximately 21.25 mc. and with an output of approximately .1 volt.

Connect the oscilloscope to the junction of C183 and R215. The pattern obtained should be similar to that shown in Figure 15. If it is not, adjust the T113 (top) until the wave form is symmetrical.

The peak to peak band width of the discriminator should be approximately 350 kc. and it should be linear from 21.175 mc. to 21.325 mc.

SOUND I-F ALIGNMENT. — Connect the sweep oscillator to the first sound i-f amplifier grid.

Connect the oscilloscope to the second sound i-f grid return (terminal "A" of T112) in series with a 33,000 ohm isolating resistor.

Insert a 21.25 mc. marker signal from the signal generator into the first sound i-f grid.

Adjust T112 (top and bottom) for maximum gain and symmetry about the 21.25 mc. marker. The pattern obtained should be similar to that shown in Figure 16.

The output level from the sweep should be set to produce approximately .3 volt peak-to-peak at the second sound i-f grid return when the final touches on the above adjustment are made. It is necessary that the sweep output voltage should not exceed the specified values otherwise the response curve will be broadened, permitting slight misadjustment to pass unnoticed and possibly causing distortion on weak signals.

The band width at 70% response from the first sound i-f grid to the second i-f grid should be approximately 200 kc.

PICTURE I-F TRAP ADJUSTMENT. — Connect the "VoltOhmyst" to the junction of R135 and R136.

Remove the 6SN7GT AGC Amplifier tube V108. Connect a 250,000 ohm potentiometer between pins 5 and 6 of the V108 socket. Adjust the potentiometer until the "VoltOhmyst" reads approximately −4.5 volts.

Set the channel switch to the blank position between channel numbers 2 and 13.

Connect the "VoltOhmyst" across the picture detector load resistor R120. Under this condition, both leads of the meter are at approximately −125 volts. In making this measurement, care should be taken not to touch the case of the meter or to permit the meter case to become grounded.

Connect the output of the signal generator to the grid of the converter tube V2. To do this, remove the tube from the socket and fashion a clip by twisting one end of a small piece of wire around pin number 1. Replace the tube in the socket leaving the end of the wire protruding from under the tube. Connect the signal generator to this wire through a 1,500 mmf capacitor keeping the leads as short as possible.

Set the generator to each of the following frequencies and with a thin fiber screwdriver tune the specified adjustment for minimum indication on the "VoltOhmyst." In each instance the generator should be checked against a crystal calibrator to insure that the generator is exactly on frequency.

(1) 21.25 mc.—T103 (top)
(2) 21.25 mc.—T105 (top)
(3) 27.25 mc.—T102 (top)
(4) 27.25 mc.—T104 (top)
(5) 19.75 mc.—T106 (top)
(6) 19.75 mc.—T101 (top)

In the above transformers using threaded cores, it is possible to run the cores completely through the coils and secure two peaks or nulls. The correct position is with the cores in the outside ends of the coils. If the cores are not in the correct position, the coupling will be incorrect and it will be impossible to secure the correct response.

PICTURE I-F TRANSFORMER ADJUSTMENTS. — Set the signal generator to each of the following frequencies and peak the specified adjustment for maximum indication on the "VoltOhmyst." During alignment, reduce the input signal if necessary to prevent overloading.

22.5 mc.—T106 (bottom)
24.6 mc.—T104 (bottom)
22.0 mc.—T103 (bottom)
25.9 mc.—T102 (bottom)

T1 and T101 are coupled by a link and in combination constitute an overcoupled transformer. The characteristics of such a transformer are such that it is impossible to adjust it to a single frequency.

To sweep align T1 and T101, connect a 330 ohm composition resistor across the primary coils of T102, T103, T104 and T106.

Connect the "VoltOhmyst" to the junction of R135 and R136. Adjust the 250,000 ohm potentiometer for −2.0 volts on the meter.

Connect the oscilloscope to the plate of the first video amplifier pin 5 of V106.

Connect a sweep generator to the converter grid through a 1,500 mmf capacitor. Set the generator to sweep from 20.0 mc. to 30.0 mc. and adjust the output to provide a 4 volt peak-to-peak signal on the scope.

Connect the signal generator loosely to the converter grid and adjust to provide markers at 22.05 mc. and 24.75 mc.

Adjust T1 (top) and T101 (bottom) to obtain the response shown in Figure 17. The T1 core must penetrate to the terminal board end of the coil in order to obtain the correct response.

Remove the 330 ohm resistors from across T102, T103, T104 and T106.

Adjust the 250,000 ohm potentiometer for a 15 volt peak-to-peak signal at the plate of the first video amplifier. The bias as measured by the "VoltOhmyst" should be −4.5 volts or less.

Observe and analyze the response curve obtained. The response will not be ideal and the i-f adjustments must be retouched in order to obtain the desired curve. See Figure 18.

On final adjustment the picture carrier marker must be at approximately 45% response. The curve must be approximately flat topped, with the 22.1 mc. marker at approximately 95% response, the 25.0 mc. marker below 90% and the 26.5 mc. marker between 5% and 10% on the response curve.

The most important consideration in making the i-f adjustments is to get the picture carrier at the 45% response point. If the picture carrier operates too low on the response curve, loss of low frequency video response, of picture brilliance, of blanking, and of sync may occur. If the picture carrier operates too high on the response curve, the picture becomes smeared. In making these adjustments, care should be taken that no two transformers are tuned to the same frequency as i-f oscillation may result.

Remove the converter tube and take off the clip to pin number 1. Replace the tube in the socket.

Picture I-F Oscillation. — If the receiver will operate without oscillating with the test equipment disconnected but breaks into oscillation or becomes unstable with the equipment connected, it may become necessary to establish a ground plane. Cover the test bench with a sheet of copper and set the chassis on the sheet. Set all the test equipment except the "VoltOhmyst" on the sheet and bond or bypass them to it. A Junior "VoltOhmyst" should not be bonded to the sheet since the negative test probe is not always connected to ground during alignment.

If the receiver is badly misaligned and two or more of the i-f transformers are tuned to the same frequency, the receiver may fall into i-f oscillation. I-F oscillation shows up as a voltage across the picture detector load resistor that is unaffected by r-f signal input. If such a condition is encountered, it is sometimes possible to stop oscillation by adjusting the transformers approximately to frequency by setting the adjustment cores of T101, T102, T103, T104, T105 and T106 to be approximately equal to those of another receiver known to be in proper alignment. If this does not have the desired effect, it may now be possible to stop oscillation by increasing the grid bias. If so, it should then be possible to align the transformers by the usual method. Once aligned in this manner, the i-f should be stable with reduced bias.

If the oscillation cannot be stopped in the above manner, shunt the grids of the first three pix i-f amplifiers to ground with 1,000 mmf. capacitors. Connect the signal generator to the fourth pix i-f grid and align T106 to frequency. Progressively remove the shunt from each grid and align the plate coil of that stage to frequency.

If this does not stop the oscillation, the difficulty is not due to i-f misalignment as the i-f section is stable when properly aligned. Check all i-f by-pass condensers, transformer shunting resistors, tubes, socket voltages, etc.

ANTENNA, R-F AND CONVERTER LINE ADJUSTMENT. — In order to align the r-f tuner, it will first be necessary to set the channel 13 oscillator to frequency. The shield over the bottom of the r-f unit must be in place when making any adjustments.

The channel 13 oscillator may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available. Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated.

If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, couple the meter probe loosely to the receiver oscillator.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier signal, connect the signal generator to the receiver antenna terminals. Connect the "VoltOhmyst" to the sound discriminator output (junction of C183 and R215).

Set the receiver channel switch to 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust C6 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator.

Now that the channel 13 oscillator is set to frequency we may procede with the r-f alignment.

Connect the oscilloscope to the test connection at R13 in the r-f tuning unit.

Connect the "VoltOhmyst" to the junction of R133 and R134. Adjust the bias potentiometer for −3.5 volts on the meter.

Remove the first picture i-f amplifier tube V101.

Connect the r-f sweep oscillator to the receiver antenna terminals. The method of connection depends upon the output impedance of the sweep. The P102 connection for 300 ohm balanced or 72 ohm single-ended input are shown in the circuit diagram in Figure 80. If the sweep oscillator has a 50-ohm single-ended output, 300 ohm balanced output can be obtained by connecting as shown in Figure 10.

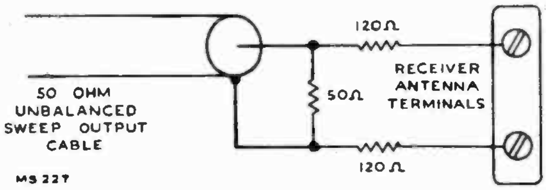


Figure 10—Unbalanced Sweep Cable Termination

Connect the signal generator loosely to the receiver antenna terminals.

Since channel 7 has the narrowest response of any of the high frequency channels, it should be adjusted first.

Set the receiver channel switch to channel 7.

Set the sweep oscillator to cover channel 7.

Insert markers of channel 7 picture carrier and sound carrier 175.25 mc. and 179.75 mc.

Adjust C10 and C14 until the curve falls symmetrically with the sound and picture carrier markers. Adjust C11 to give the proper bandwidth. Roughly peak L6 in conjunction with slight adjustments of C10 and C14 for a flat-topped, response curve with the sound and picture carriers at 90% to 95% response points on this curve. See Figure 19, channel 7.

Switch to channel 12 and adjust L6 for maximum response and minimum top slope of the curve.

Check the response of channels 7 through '3 by switching the receiver channel switch, sweep oscillator and marker oscillator to each of these channels and observe the response obtained. See Figure 19 for typical response curves. It should be found that all these channels have the proper shaped response with the markers above 80% response. If the markers do not fall within this requirement on one or more high frequency channels, since there are no individual channel adjustments, it will be necessary to readjust L6, C10, C11 and C14, and possibly compromise some channels slightly in order to get the markers up on other channels. Normally, however, no difficulty of this type should be experienced since the higher frequency channels become comparatively broad and the markers easily fall within the required range.

Channel 6 is next aligned in the same manner.

Set the receiver to channel 6.

Set the sweep oscillator to cover channel 6.

Set the marker oscillator to channel 6 picture and sound carrier frequencies.

Adjust L9, L13, L66 and C12 for an approximately flat-topped response curve located symmetrically between the markers. L9, L13 and L66 are the center frequency adjustments. C12 is the band width adjustment.

Check channels 5 down through channel 2 by switching the receiver, sweep oscillator and marker oscillator to each channel and observing the response obtained. In all cases, the markers should be above the 80% response point. If this is not the case, L9, L13, L66 and C12 should be retouched. On final adjustment, all channels must be within the 80% specification.

Disconnect the bias potentiometer and replace V108. Replace V101.

Following an r-f alignment, the oscillator alignment must be checked.

R-F OSCILLATOR LINE ADJUSTMENT.—The r-f oscillator line may be aligned by adjusting it to beat with a crystal calibrated heterodyne frequency meter, or by feeding a signal into the receiver at the r-f sound carrier frequency and adjusting the oscillator for zero output from the sound discriminator. In this latter case the sound discriminator must first have been aligned to exact frequency. Either method of adjustment will produce the same results. The method used will depend upon the type of test equipment available.

Regardless of which method of oscillator alignment is used, the frequency standard must be crystal controlled or calibrated. If the receiver oscillator is to be adjusted by the heterodyne frequency meter method, the calibration frequency listed under R-F Osc. Freq. must be available.

If the receiver oscillator is adjusted by feeding in the r-f sound carrier frequency, the frequencies listed under Sound Carrier Freq. must be available.

Channel Number	Receiver R-F Osc. Freq. Mc.	R-F Sound Carrier Freq. Mc.	Channel Oscillator Adjustment
2	81	59.75	L24
3	87	65.75	L23
4	93	71.75	L22
5	103	81.75	L21
6	109	87.75	L31
7	201	179.75	L19
8	207	185.75	L18
9	213	191.75	L17
10	219	197.75	L16
11	225	203.75	L15
12	231	209.75	L14
13	237	215.75	C6

If the heterodyne frequency meter method is used, couple the meter probe loosely to the receiver oscillator.

If the r-f sound carrier method is used, connect the "VoltOhmyst" to the sound discriminator output (junction of C183 and R215).

Connect the signal generator to the receiver antenna terminals. The order of alignment remains the same regardless of which method is used.

The shield over the bottom of the r-f unit must be in place when making adjustments.

Since lower frequencies are obtained by adding steps of inductance, it is necessary to align channel 13 first and continue in reverse numerical order.

Set the receiver channel switch to 13.

Adjust the frequency standard to the correct frequency (237 mc. for heterodyne frequency meter or 215.75 mc. for the signal generator).

Set the fine tuning control to the middle of its range while making the adjustment.

Adjust C6 for an audible beat on the heterodyne frequency meter or zero voltage from sound discriminator. Oscillator adjustments L1 and L2 shown on the schematic are factory control adjustments and should not be touched in the field.

Switch the receiver to channel 12.

Set the frequency standard to the proper frequency as listed in the alignment table.

Adjust L14 for indications as above.

Adjust the oscillator to frequency on all channels by switching the receiver and the frequency standard to each channel and adjusting the appropriate oscillator trimmer for the specified indication. It should be possible to adjust the oscillator to the correct frequency on all channels with the fine tuning control in the middle third of its range.

After the oscillator has been set on all channels, start back at channel 13 and recheck to make sure that all adjustments are correct.

HORIZONTAL OSCILLATOR ADJUSTMENT. — Normally the adjustment of the horizontal oscillator is not considered to be a part of the alignment procedure, but since the oscillator waveform adjustment requires the use of an oscilloscope, it can not be done conveniently in the field. The waveform adjustment is made at the factory and normally should not require readjustment in the field. However, the waveform adjustment should be checked whenever the receiver is aligned or whenever the horizontal oscillator operation is improper.

Horizontal Frequency Adjustment. — With a clip lead, short circuit the coil between terminals C and D of the horizontal oscillator transformer T109. Tune in a television station and sync the picture if possible.

A.—Turn the horizontal hold control R173 to the extreme clockwise position. Adjust the T109 Frequency Adjustment (under the chassis) so that the picture is just out of sync and the horizontal blanking appears in the picture as a vertical bar. The position of the bar is unimportant.

B.—Turn the hold control approximately one quarter of a turn from the extreme clockwise position and examine the width and linearity of the picture. If picture width or linearity is incorrect, adjust the horizontal drive control C153B, the width control L112 and the linearity control L113 until the picture is correct. If C153B, L112 or L113 was adjusted, repeat step A above.

Horizontal Locking Range Adjustment. — Turn the horizontal hold control fully counterclockwise. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 9 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 7 bars are present, adjust C153A slightly counterclockwise. Turn the horizontal hold control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 7 to 9 bars are present.

Horizontal Oscillator Waveform Adjustment. — Remove the shorting clip from terminals C and D of T109. Turn the horizontal hold control to the extreme clockwise position. With a thin fibre screwdriver, adjust the Oscillator Waveform Adjustment Core of T109 (on the outside of the chassis) until the horizontal blanking bar appears in the raster.

A.—Connect the low capacity probe of an oscilloscope to terminal C of T109. Turn the horizontal hold control one quarter turn from the clockwise position so that the picture is in sync. The pattern on the oscilloscope should be as shown in Figure 20. Adjust the Oscillator Waveform Adjustment Core of T109 until the two peaks are at the same height. During this adjustment, the picture must be kept in sync by readjusting the hold control if necessary.

This adjustment is very important for correct operation of the circuit. If the broad peak of the wave on the oscilloscope is lower than the sharp peak, the noise immunity becomes poorer, the stabilizing effect of the tuned circuit is reduced and drift of the oscillator becomes more serious. On the other hand, if the broad peak is higher than the sharp peak, the oscillator is overstabilized, the pull-in range becomes inadequate and the broad peak can cause double triggering of the oscillator when the hold control approaches the clockwise position.

Remove the oscilloscope upon completion of this adjustment.

Check of Horizontal Oscillator Adjustments. — Set the horizontal hold control to the full counterclockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the horizontal hold control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull-in point. Repeat this procedure until 3 bars are present.

Turn the horizontal hold control to the maximum clockwise position. The picture should be just out of sync to the extent that the horizontal blanking bar appears as a single vertical or diagonal bar in the picture. Adjust the T109 Frequency Adjustment until this condition is fulfilled.

4.5 MC. VIDEO TRAP. — Tune in a strong station. With a very short clip lead, short circuit the trap winding of T103. Observe the picture for the appearance of a 4.5 mc. beat. If the beat appears in the picture, adjust L104 until the beat is eliminated. Remove the clip lead.

SENSITIVITY CHECK. — A comparative sensitivity check can be made by operating the receiver on a weak signal from a television station and comparing the picture and sound obtained to that obtained on other receivers under the same conditions.

This weak signal can be obtained by connecting the shop antenna to the receiver through a ladder type attenuator pad. The number of stages in the pad depends upon the signal strength available at the antenna. A sufficient number of stages should be inserted so that a somewhat less than normal contrast picture is obtained when the picture control is at the maximum clockwise position. Only carbon type resistors should be used to construct the pad.

RESPONSE CURVES. — The response curves shown on page 16 and referred to throughout the alignment procedure were taken from a production set. Although these curves are typical, some variations can be expected.

The response curves are shown in the classical manner of presentation, that is with "response up" and low frequency to the left. The manner in which they will be seen in a given test set-up will depend upon the characteristics of the oscilloscope and the sweep generator. The curves may be seen inverted and/or switched from left to right depending on the deflection polarity of the oscilloscope and the phasing of the sweep generator.

ALIGNMENT TABLE. — Both methods of oscillator alignment are presented in the alignment table. The service technician may thereby choose the method to suit his test equipment.

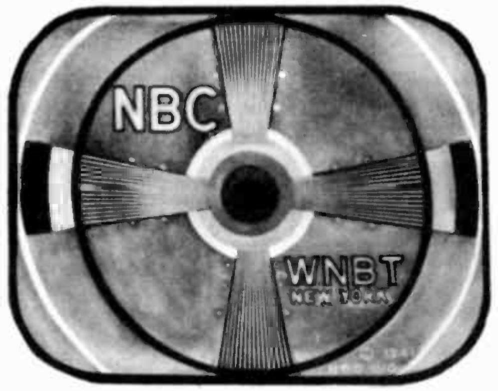
8T270, 8TC270, 8TC271

ALIGNMENT TABLE

THE DETAILED ALIGNMENT PROCEDURE BEGINNING ON PAGE 10 SHOULD BE READ BEFORE ALIGNMENT BY USE OF THE TABLE IS ATTEMPTED.

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
				DISCRIMINATOR AND SOUND I-F ALIGNMENT					
1	2nd sound i-f grid (pin 1, V120)	21.25 .1 volt output	Not used		Not used	In series with 1 meg. to junction of R215 & R216		Detune T113 (bot.) Adjust T113 (top) for max. on meter	Fig. 13 Fig. 12 Fig. 11
2	"	"	"		"	Junct. of C183 & R215	Meter on 3 volt scale	T113 (bottom) for zero on meter	Fig. 13 Fig. 12
3	"	"	2nd sound i-f grid (pin 1, V120)	21.25 center 1 mc. wide .1 v. out	Junction of C183 & R215	Not used	Check for symmetrical response waveform (positive & negative). If not equal adjust T113 (top) until they are equal		Fig. 13 Fig. 15
4	1st sound i-f grid (pin 1, V119)	21.25 re-duced output	1st sound i-f grid (pin 1, V119)	21.25 reduced output	Terminal A, T112 in series with a 33,000 ohm resistor.	"	Sweep output re-duced to provide .3 volt p-to-p on scope	T112 (top & bot.) for max. gain and symmetry at 21.25 mc.	Fig. 13 Fig. 11 Fig. 12 Fig. 16
				PICTURE I-F AND TRAP ADJUSTMENT					
5	Not Used		Not used		Not used	Junction of R135 & R136	Remove V108. Connect potenti-ometer between pins 5 & 6 of V108 socket	Adjust potentio-meter for -4.5 volts on meter	Fig. 13 Fig. 11
6	Converter grid (pin 1, V2)	21.25	"		"	Across R120	Meter on 3 volt scale. Receiver be-tween 2 & 13	T103 (top) for min. on meter	Fig. 11 Fig. 13
7	"	21.25	"		"	"	"	T105 (top) for min.	Fig. 13 Fig. 11
8	"	27.25	"		"	"	"	T102 (top) for min.	"
9	"	27.25	"		"	"	"	T104 (top) for min.	"
10	"	19.75	"		"	"	"	T106 (top) for min.	"
11	"	19.75	"		"	"	"	T101 (top) for min.	"
12	"	22.5	"		"	"	"	T106 (bottom) for max. on meter	Fig. 12
13	"	24.6	"		"	"	"	T104 (bottom) for max.	"
14	"	22.0	"		"	"	"	T103 (bottom) for max.	"
15	"	25.9	"		"	"	"	T102 (bottom) for max.	"
16	"	22.05 24.75	Converter grid (Pin 1, V2)	Sweep-ing 20 to 30 mc.	Pin 5, V106	Junction of R135 & R136	Shunt 300 ohms across pri. T102, T103, T104, T106. Set bias -2 V. Set swp. gen. for 4 V. P-P on scope.	Adjust T1 (top) and T101 (bot-tom) for proper response	Fig. 12 Fig. 17
17	"		"	"	"	"	Remove shunt re-sistors. Set bias to give 15 volts P to P on scope.	Adjust T1 (top), T101, T102, T103, T104, T106 (bot.) for proper resp.	Fig. 11 Fig. 12 Fig. 13 Fig. 18
				ANTENNA, R-F AND CONVERTER LINE ALIGNMENT					
18	Antenna terminals	215.75	Not used		Not used	Junction of C183 & R215 for signal gen. method only	Fine tuning cen-tered. Receiver on channel 13. Het-erodyne meter coupled to oscil-lator if used.	C6 for zero on meter or beat on het. feq. meter	Fig. 13 Fig. 11
19						Junction of R133 & R134	Remove V101	Potentiometer for -3.5 volts on meter	Fig. 13 Fig. 11
20	Antenna terminal (loosely)	175.25 & 179.75	Antenna terminals (see text for precaution)	Sweep-ing channel 7	Test Connection R13	Not used	Receiver on chan-nel 7	L6, C10, C11 & C14 for flat top response between markers. Markers above 90%.	Fig. 13 Fig. 12 Fig. 11 Fig. 19 (7)
21	"	205.25 209.75	"	channel 12	"	"	Receiver on chan-nel 12	L6 for max. re-sponse and min. slope of top of curve	Fig. 11 Fig. 19 (12)
22	"	175.25 179.75	"	channel 7	"	"	Receiver on chan-nel 7.	Check to see that response is as above	Fig. 19 (7)
23	"	181.25 185.75	"	channel 8	"	"	Receiver on chan-nel 8	"	Fig. 19 (8)
24	"	187.25 191.75	"	channel 9	"	"	Receiver on chan-nel 9	"	Fig. 19 (9)

TEST PATTERN PHOTOGRAPHS

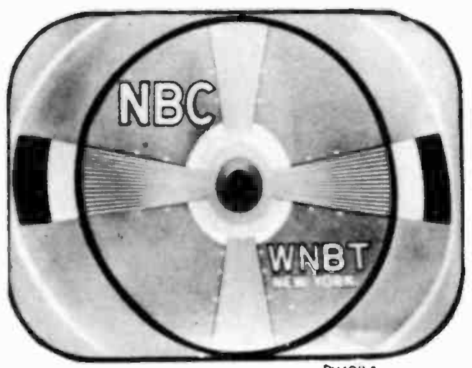


PH2M

Figure 21—Normal Picture

PH106 B

Figure 22—Focus Coil and Ion Trap Magnet Misadjusted

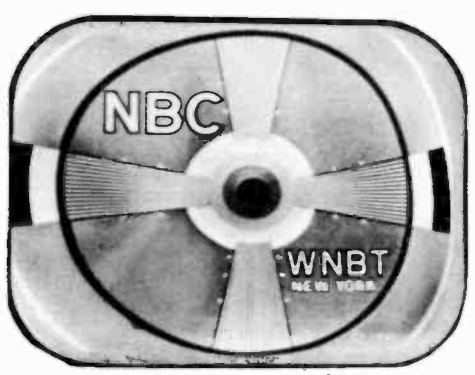


PH108 A

Figure 23—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)

PH108B

Figure 24—Width Control Misadjusted

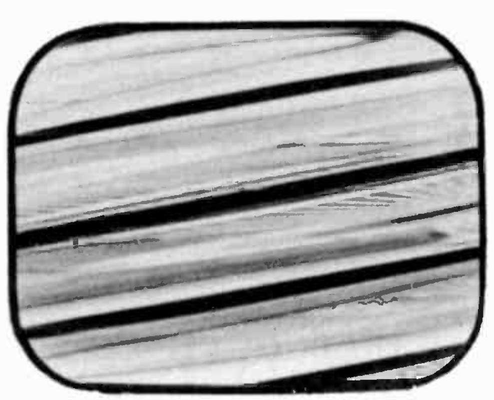


PH108C

Figure 25—Horizontal Drive Control Misadjusted

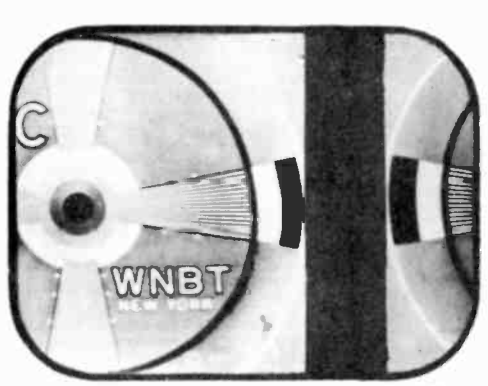
PH10

Figure 26—Transients



PH227-2

Figure 27—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is in a Counterclockwise Position—Just Before Pulling Into Sync



PH109D

Figure 28—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position

SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults.

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet—Magnets reversed either front to back or top to bottom, front magnet incorrectly oriented.

(2) V113, V114 or V115 inoperative—check voltage and waveform on grids and plates.

(3) No high voltage—If horizontal deflection is operating as evidenced by the correct waveform on terminal 4 of horizontal output transformer, the trouble can be isolated to the 8016 circuit. Either the T110 high voltage winding is open (points 2 to 3), an 8016 tube is defective, its filament circuit is open, C167, C168 or C187 is shorted or R189, R190, R191, R192 or R193 is open.

(4) V112 circuit inoperative—Refer to schematic and waveform chart.

(5) Damper tube (V116) inoperative.

(6) Defective kinescope.

(7) R223 open (terminal 3 to R224).

(8) No receiver plate voltage—filter capacitor or filter choke shorted—bleeder or filter choke open.

NO VERTICAL DEFLECTION:

(1) V108B or V111 inoperative—check voltage and waveforms on grids and plates.

(2) T107 or T108 open.

(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

(2) V113 defective.

POOR VERTICAL LINEARITY:

(1) If adjustment cannot correct, change V111.

(2) Vertical output transformer defective.

(3) V108B defective—check voltage and waveforms on grid and plate.

(4) C147, R164, C148B or C150C defective.

(5) Low bias or plate voltage—check rectifiers and capacitors in supply circuits.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V113 or V116.

(2) T110 or L113 defective.

(3) C164 or C165 defective.

WRINKLES ON LEFT SIDE OF RASTER:

(1) R166, R167 or C169 defective.

(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) T109 incorrectly tuned.

(2) R172, R173, R174, R176 or R178 defective.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER:

(1) Improper adjustment of focus coil or ion trap magnet.

(2) Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f, discriminator or audio amplifier inoperative—check V119, V120, V121, V122, V123 and their socket voltages.

(3) T114 or C186 defective.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) V105A, V106, V108A, V109 or V111 inoperative—check voltage and waveforms at their grids and plates.

(2) Check V104. Try another tube.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V108B and associated circuit—C145, T107, etc.

(2) Integrating network inoperative—check.

(3) R154, R155, R157, R158 or R159 defective.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T109 misadjusted—readjust as instructed on page **13.**

(2) V112 inoperative—cneck socket voltages and waveforms.

(3) T109 defective.

(4) C140, C153A, C154, C155, C157 or C166 defective.

(5) If horizontal speed is completely off and cannot be adjusted check C158, C159, R172, R173, R174, R179 and R182.

SOUND AND RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V103, V104, V105, V106 and V107—check socket voltages.

(2) Bad contact to kinescope grid.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V105A, V106 or V107 defective.

(2) Peaking coils defective—check for specified resistance.

(3) Make sure that the focus control operates on both sides of proper focus.

(4) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) R-F or I-F circuits misaligned.

(2) Open peaking coil.

(3) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) Check for proper operation of hold controls.

(2) If regular sections at the left picture are displaced change V113.

ALIGNMENT TABLE

STEP No.	CONNECT SIGNAL GENERATOR TO	SIGNAL GEN. FREQ. MC.	CONNECT SWEEP GENERATOR TO	SWEEP GEN. FREQ. MC.	CONNECT OSCILLOSCOPE TO	CONNECT "VOLTOHMYST" TO	MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS	ADJUST	REFER TO
	R-F AND CONVERTER LINE ALIGNMENT (Cont'd)								
25	Antenna terminal (loosely)	193.25 197.75	Ant. terminals (see text for precaution)	channel 10	Test Connection R13	Not used	Receiver on channel 10	Check to see that response is as above	Fig. 19 (10)
26	"	199.25 203.75	"	channel 11	"	"	Receiver on channel 11	"	Fig. 19 (11)
27	"	205.25 209.75	"	channel 12	"	"	Receiver on channel 12	"	Fig. 19 (12)
28	"	211.25 215.75	"	channel 13	"	"	Receiver on channel 13	"	Fig. 19 (13)
29	If the response on any channel (steps 22 through 28) is below 80% at either marker, switch to that channel and adjust L6, C10, C11 & C14 to pull response up on that channel. Then recheck steps 22 through 28.								
30	Antenna terminals (loosely)	83.25 87.75	Ant. terminals (see text for precaution)	Sweeping chan. 6	Test Connection R13	Not used	Receiver on channel 6	L9, L13, L66 & C12 for response as above	Fig. 19 (6)
31	"	77.25 81.75	"	channel 5	"	"	Receiver on channel 5	Check to see that response is as above	Fig. 19 (5)
32	"	67.25 71.75	"	channel 4	"	"	Receiver on channel 4	"	Fig. 19 (4)
33	"	61.25 65.75	"	channel 3	"	"	Receiver on channel 3	"	Fig. 19 (3)
34	"	55.25 59.75	"	channel 2	"	"	Receiver on channel 2	"	Fig. 19 (2)
35	If the response on any channel (steps 31 through 34) is below 80% at either marker, switch to that channel and adjust L9, L13, L66 & C12 to pull response up on that channel. Then recheck steps 30 through 34. Replace V101. Disconnect bias pot and replace V108.								
	R-F OSCILLATOR ALIGNMENT								
STEP No.	**CONNECT SIGNAL GENERATOR TO**	**SIGNAL GEN. FREQ. MC.**	**CONNECT HETERODYNE FREQ. METER TO**	**HET. METER FREQ. MC.**	**CONNECT OSCILLOSCOPE TO**	**CONNECT "VOLTOHMYST" TO**	**MISCELLANEOUS CONNECTIONS AND INSTRUCTIONS**	**ADJUST**	**REFER TO**
36	Antenna terminals	215.75	Loosely coupled to r-f osc.	237	Not used	Junction of C183 & R215 for sig. gen. method only	Fine tuning centered. Receiver on channel 13	C6 for zero on meter or beat on het. freq. meter	Fig. 13 Fig. 12 Fig. 11
37	"	209.75	"	231	"	"	Rec. on chan. 12	L14 as above	Fig. 14
38	"	203.75	"	225	"	"	Rec. on chan. 11	L15 as above	"
39	"	197.75	"	219	"	"	Rec. on chan. 10	L16 as above	"
40	"	191.75	"	213	"	"	Rec. on chan. 9	L17 as above	"
41	"	185.75	"	207	"	"	Rec. on chan. 8	L18 as above	"
42	"	179.75	"	201	"	"	Rec. on chan. 7	L19 as above	"
43	"	87.75	"	109	"	"	Rec. on chan. 6	L31 as above	Fig. 12
44	"	81.75	"	103	"	"	Rec. on chan. 5	L21 as above	Fig. 14
45	"	71.75	"	93	"	"	Rec. on chan. 4	L22 as above	"
46	"	65.75	"	87	"	"	Rec. on chan. 3	L23 as above	"
47	"	59.75	"	81	"	"	Rec. on chan. 2	L24 as above	"
48	Repeat steps 36 through 47 as a check.								
	HORIZONTAL OSCILLATOR ADJUSTMENT								
49	Short circuit terminals C and D of T109. Tune in a station.								
50	Turn hold control fully clockwise. Adjust T109 Frequency Adjustment until horizontal blanking bar appears in the picture.								
51	Turn hold control ¼ turn from clockwise to sync picture. Adjust width (L110), linearity (L111) and drive (C153B) controls until picture is correct. Repeat step 50.								
52	Turn hold control fully counterclockwise. Momentarily remove signal. Turn hold control slowly clockwise. Note least number of bars before pull-in. Adjust Locking Range Control (C153A) for 7 to 9 bar pull-in.								
53	Remove clip from terminals C and D of T109. Turn hold control fully clockwise. Adjust T109 Oscillator Waveform Adjustment until horizontal blanking bar appears in picture.								
54	Connect low capacity probe of oscilloscope to terminal C of T109. Turn hold control ¼ turn from clockwise. Adjust T109 Oscillator Waveform Adjustment until broad and sharp peaks of wave on oscilloscope are same height. Keep picture in sync with hold control during adjustment. Remove oscilloscope.								
55	Turn hold control fully counterclockwise. Momentarily remove signal. Turn hold control slowly clockwise. Note least number of bars before pull-in. Adjust Locking Range Control (C153A) for 3 bar pull-in.								
56	Turn hold control fully clockwise. Adjust T109 Freq. Adjustment until horizontal blanking appears as single vertical or diagonal bar in pix.								
	4.5 MC VIDEO TRAP ADJUSTMENT								
57	Tune in a strong station. Short trap winding of T103 with a clip lead. If 4.5 mc beat appears in picture adjust L104 until beat is eliminated.								
	SENSITIVITY CHECK								
58	Connect antenna to receiver through attenuator pad to provide weak signal. Compare the picture and sound obtained to that obtained on other receivers under the same conditions.								

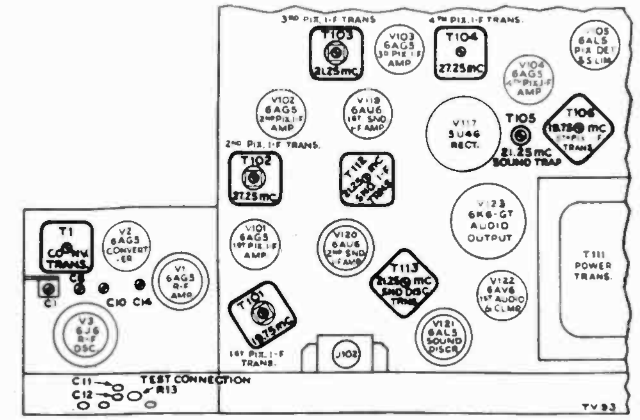


Figure 11—Top Chassis Adjustments

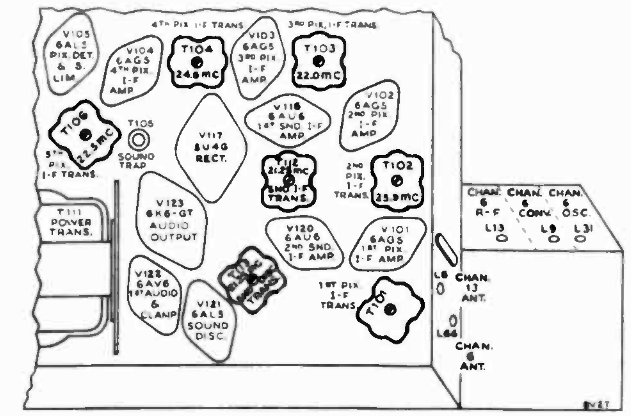


Figure 12—Bottom Chassis Adjustments

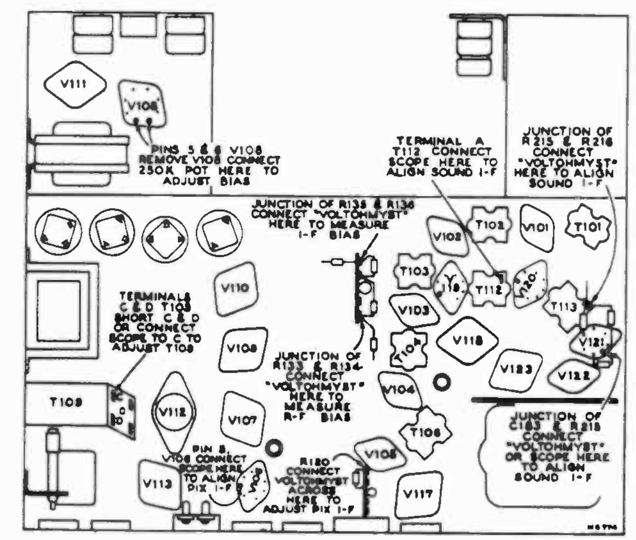
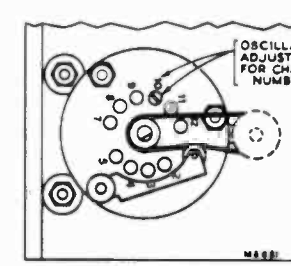


Figure 13—Test Connection Points



OSCILLATOR ADJUSTMENT FOR CHANNEL 13 IS ON TOP OF R-F UNIT AND CHANNEL 6 IS ON SIDE.

Figure 14—R-F Oscillator Adjustments

NOTE—FIGS. 11 AND 12: IN MODEL 8TK320 THE AUDIO OUTPUT TUBE (V123) IS TYPE 6V6GT.

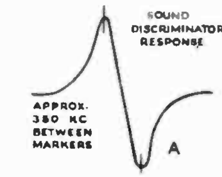


Figure 15 Discriminator Response

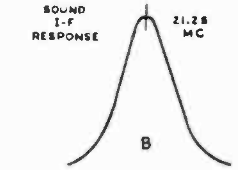


Figure 16 Sound I-F Response

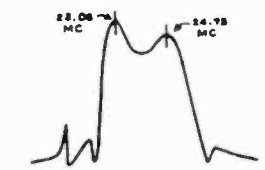


Figure 17 T1 and T101 Response

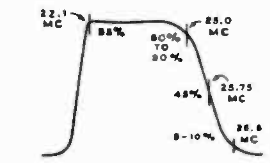


Figure 18 Overall I-F R-F Response

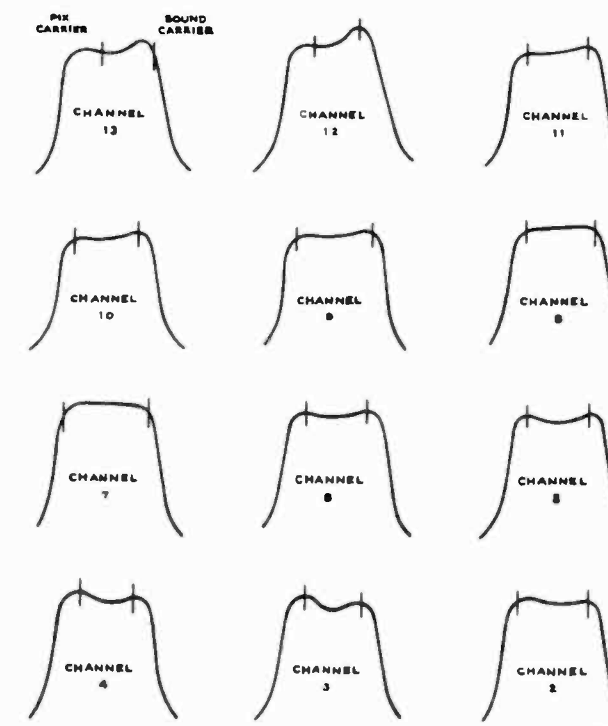


Figure 19—R-F Response

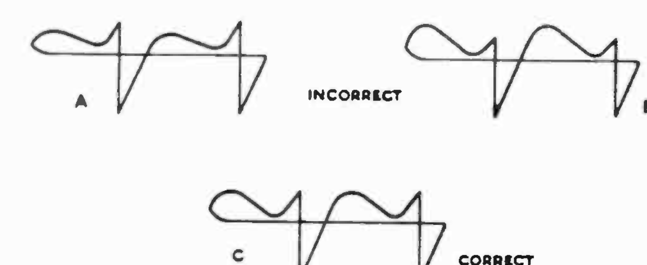


Figure 20—Horizontal Oscillator Waveforms

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync.

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—check V1, V2, V3.

PICTURE I-F RESPONSE. — At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method:

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect a wide band sweep generator to the converter grid and adjust it to sweep from 18 mc. to 30 mc.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V113.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C169 defective.

(2) V116 defective.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

Figures 29 through 33 show the response of the various stages obtained in the above manner. The curves shown are typical although some variation between receivers can be expected. Relative stage gain is not shown.

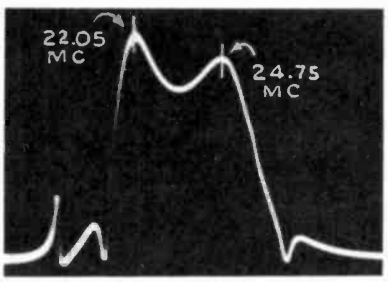


Figure 29—Response of Converter and First Pix I-F Transformer

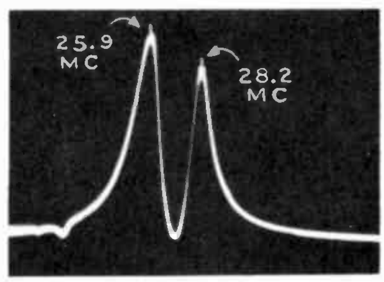


Figure 30—Response of Second Pix I-F Transformer

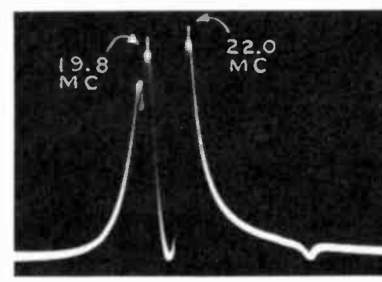


Figure 31—Response of Third Pix I-F Transformer

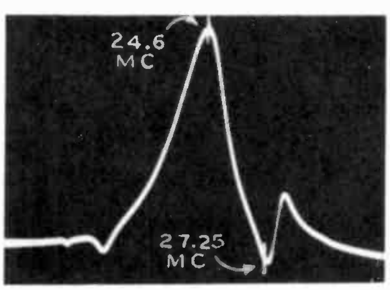


Figure 32—Response of Fourth Pix I-F Transformer

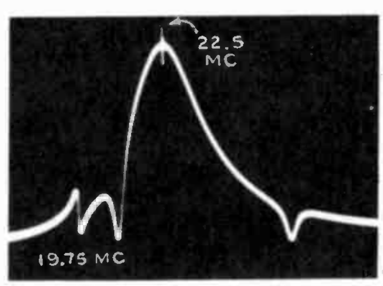


Figure 33—Response of Fifth Pix I-F Transformer

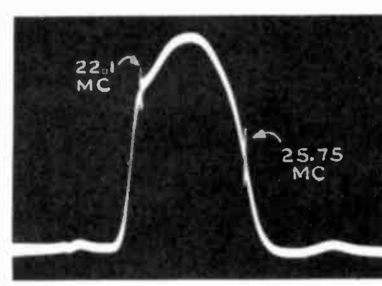


Figure 34—Response from First Pix I-F grid to Pix Det.

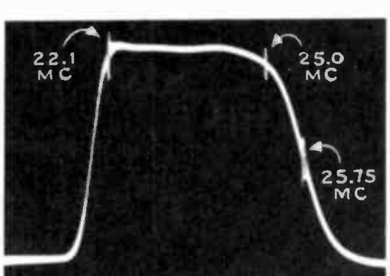


Figure 35—Overall Pix I-F Response

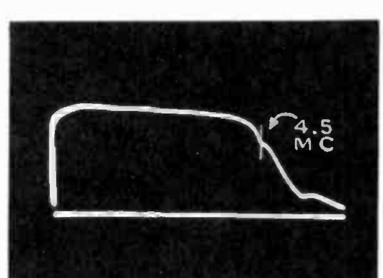


Figure 36—Video Response at Average Contrast

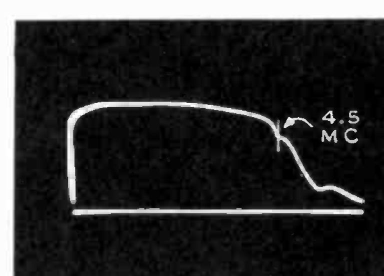
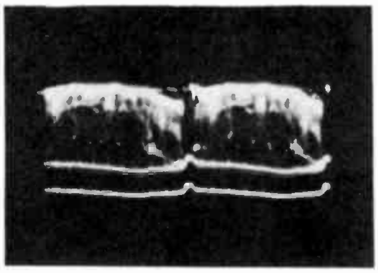


Figure 37—Video Response at Maximum Contrast

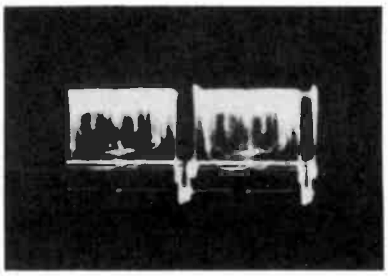
WAVEFORM PHOTOGRAPHS

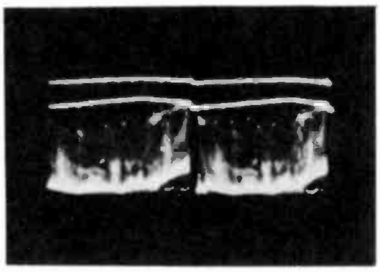


Video Signal Input to 1st Video Amplifier (Pin 1 of V106) (6AU6)

Figure 38—Vertical (Oscilloscope Synced to ½ of Vertical Sweep Rate) (2.1 Volts PP)

Figure 39—Horizontal (Oscilloscope Synced to ½ of Horizontal Sweep Rate) (2.1 Volts PP)

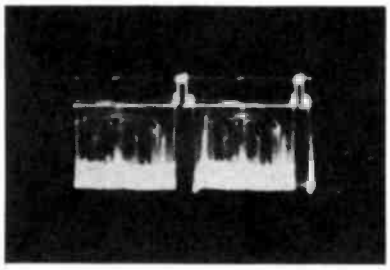


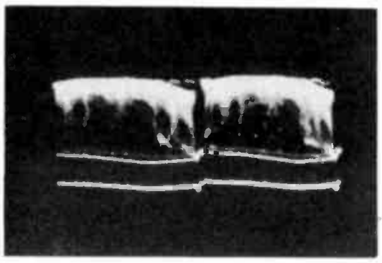


Input to 2nd Video Amplifier (Pin 5 of V107) (6K6GT)

Figure 40—Vertical (15 Volts PP)

Figure 41—Horizontal (15 Volts PP)

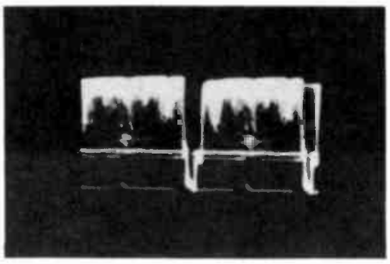


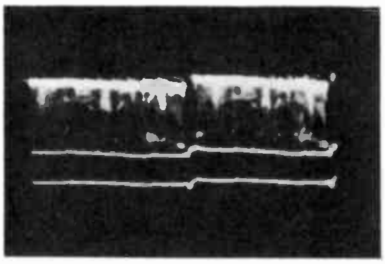


Output of 2nd Video Amplifier (Pin 3 of V107) (6K6GT) (Picture Max.)

Figure 42—Vertical (130 Volts PP)

Figure 43—Horizontal (130 Volts PP)

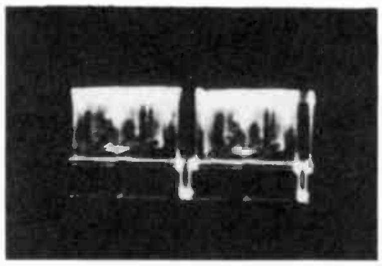


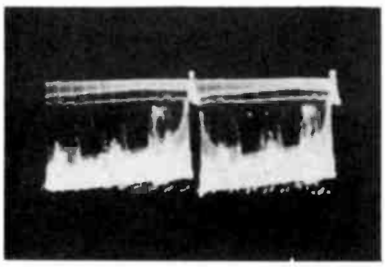


Input to Kinescope (Junction of R131 and R132) (Picture Max.)

Figure 44—Vertical (65 Volts PP)

Figure 45—Horizontal (65 Volts PP)

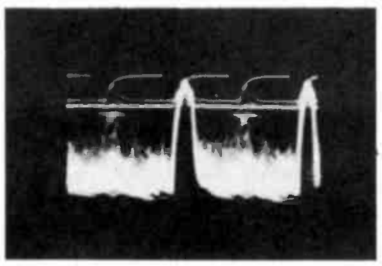


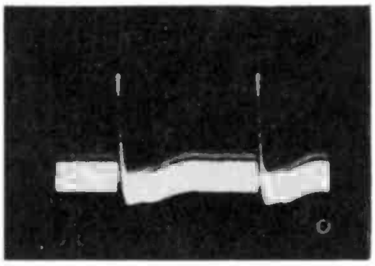


Input to 1st Sync Separator (Pin 1 of V109) (6SN7GT)

Figure 46—Vertical (24 Volts PP)

Figure 47—Horizontal (24 Volts PP)

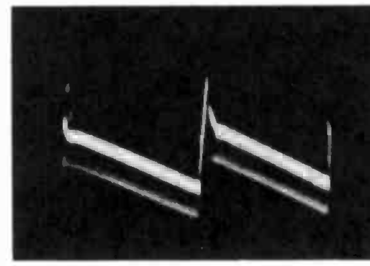


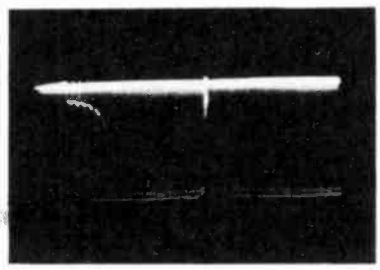


AGC Rectifier Cathode (Pin 6 of V109) (6SN7GT)

Figure 48—Vertical (4.3 Volts PP)

Figure 49—Horizontal (2.2 Volts PP)

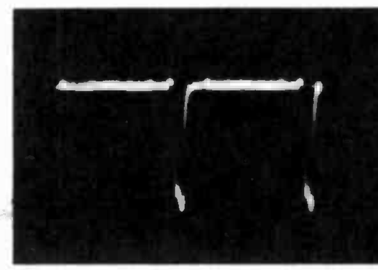


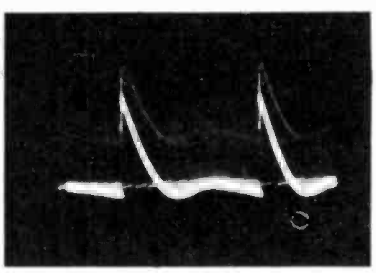


Output of AGC Rectifier (Pin 5 of V109) (6SN7GT)

Figure 50—Vertical (19 Volts PP)

Figure 51—Horizontal (19 Volts PP)

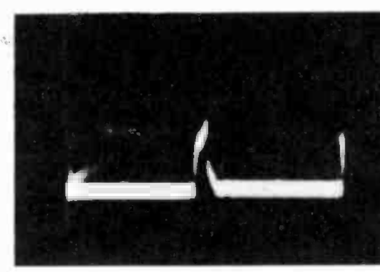


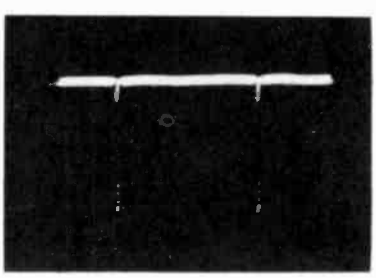


Cathode of 1st Sync Separator (Pin 3 of V109) (6SN7GT)

Figure 52—Vertical (1.3 Volts PP)

Figure 53—Horizontal (0.9 Volts PP)

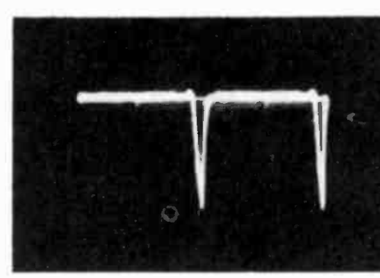


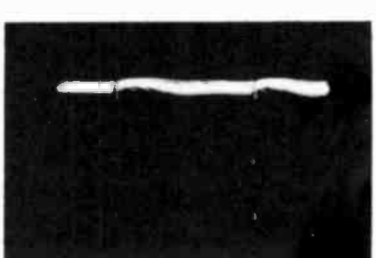


Output of 1st Sync Separator (Pin 2 of V109) (6SN7GT)

Figure 54—Vertical (48 Volts PP)

Figure 55—Horizontal (38 Volts PP)



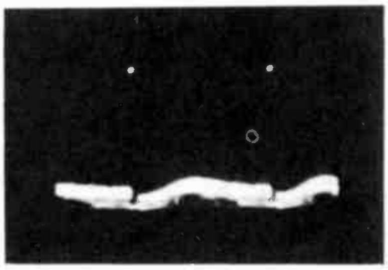


Input to Sync Amplifier (Junction of C137, C139 and R144)

Figure 56—Vertical (30 Volts PP)

Figure 57—Horizontal (17 Volts PP)

WAVEFORM PHOTOGRAPHS



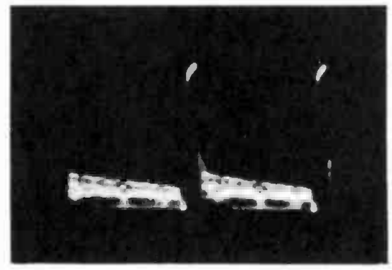
Output of Sync Amplifier (Pin 2 of V110) (6SN7GT)

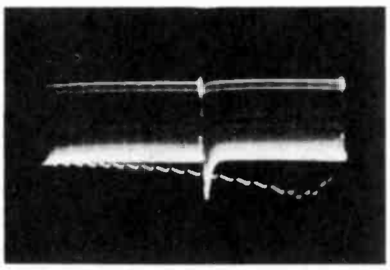
Figure 58—Vertical (150 Volts PP)

←

Figure 59—Horizontal (145 Volts PP)

→





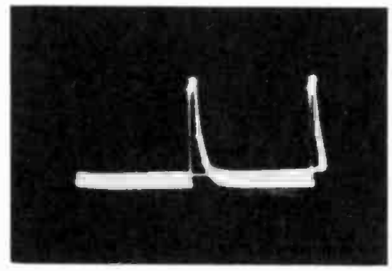
Cathode of 2nd Sync Separator (Pin 6 of V110) (6SN7GT)

Figure 60—Vertical (17 Volts PP)

←

Figure 61—Horizontal (11 Volts PP)

→



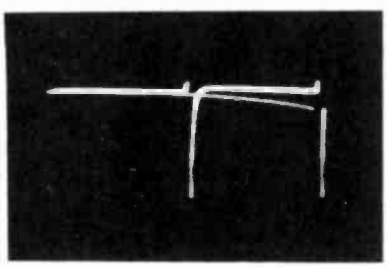
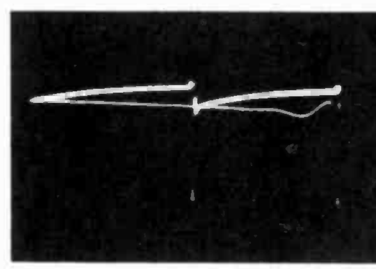


Figure 62—Output of Integrating Network (Junction of C144, C145 and R153) (38 Volts PP)

←

Figure 63—Grid of Vertical Oscillator (480 Volts PP) (Pin 1 of V108) (6SN7GT)

→



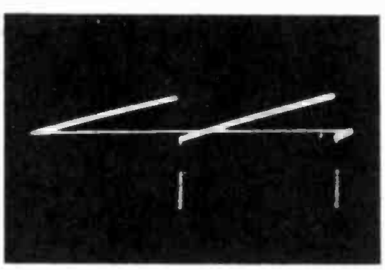
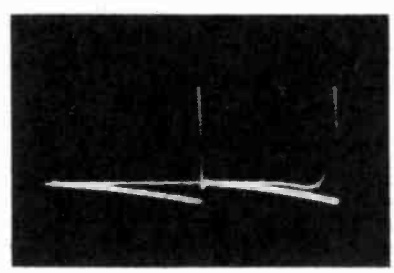


Figure 64—Grid of Vertical Output (140 Volts PP) (Pin 5 of V111) (6K6GT)

←

Figure 65—Plate of Vertical Output (925 Volts PP) (Pin 3 of V111) (6K6GT)

→



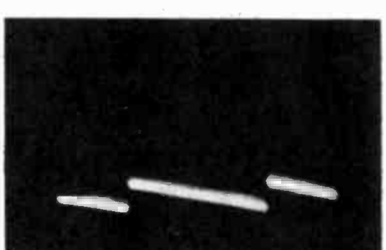
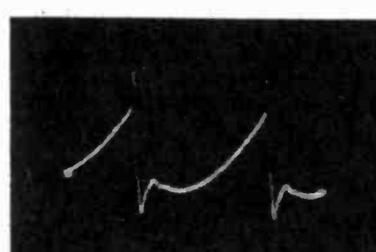


Figure 66—Input of Vertical Deflection Coils (75 Volts PP) (Junction of Green Lead of T108 and Green Lead of Yoke)

←

Figure 67—Input to Horizontal Oscillator (25 Volts PP) (Junction of C153A and C154)

→



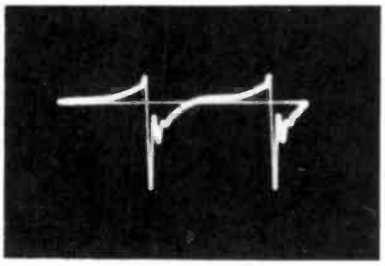
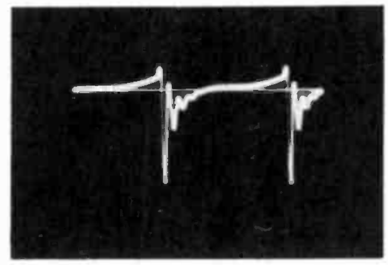


Figure 68—Junction of R168, R176 and R178 (140 Volts PP)

Figure 69—Grid of Horizontal Oscillator (500 Volts PP) (Pin 4 of V112) (6SN7GT)



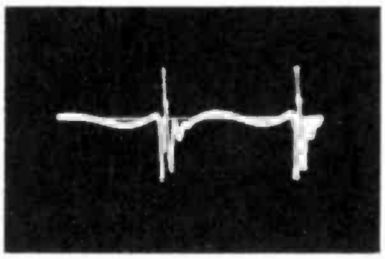
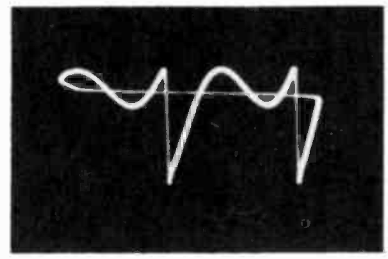


Figure 70—Plate of Horizontal Oscillator (280 Volts PP) (Pin 5 of V112) (6SN7GT)

Figure 71—Terminal "C" of T109 (85 Volts PP)



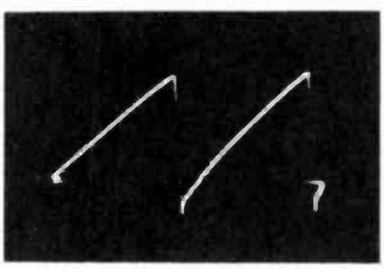
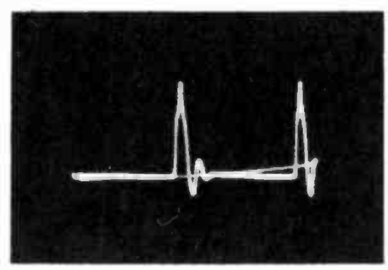


Figure 72—Input to Horizontal Output Tube (75 Volts PP) (Junction of C160, R181 and C153B)

Figure 73—Plate of Horizontal Output (Approx. 6,100 Volts PP) (Measured Through a Capacity Voltage Divider Connected from Top Cap of V113 to Ground)



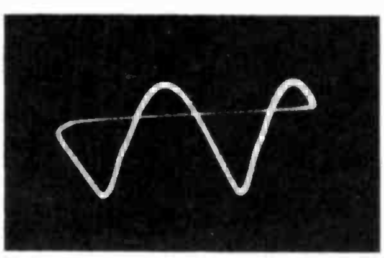
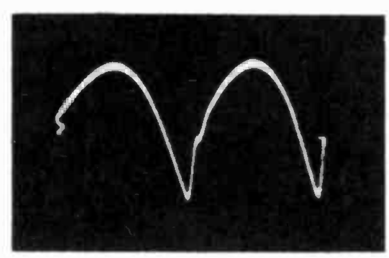


Figure 74—Junction of C164, L113 and Terminal 1 of T110 (80 Volts PP)

Figure 75—Cathode of Damper (50 Volts PP) (Pin 8 of V116) (5V4G)



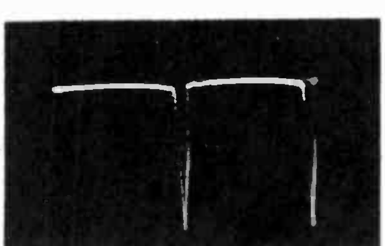
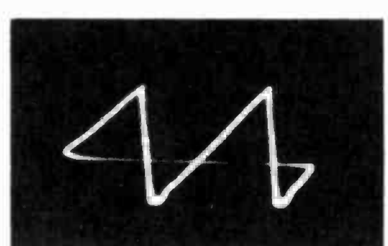


Figure 76—Input to Horizontal Deflection Coils (1,600 Volts PP) (Pin 4 of V116) (5V4G)

Figure 77—Horizontal Deflection Coil Current (800 ma PP) (Calculated Value from PP Voltage across R199)



8T270, 8TC270, 8TC271 — R-F UNIT WIRING DIAGRAM

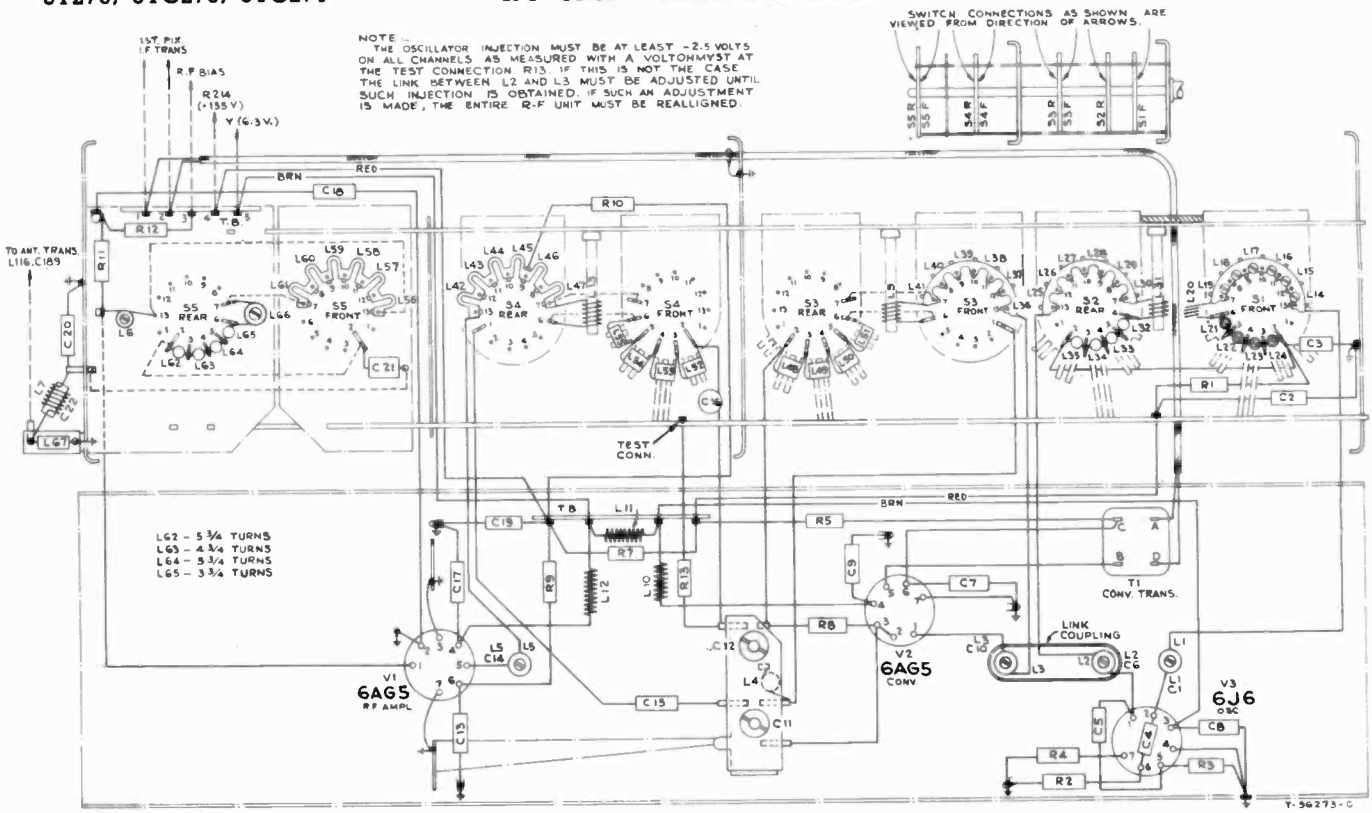


Figure 78—R-F Unit Wiring Diagram

CRITICAL LEAD DRESS:

1. The ground bus from pin 2 and the center shield of V120 socket should not be shortened or rerouted.
2. Dress the body of R195 as close to tube pin as possible.
3. Do not change the dress of the filament leads or the by-pass capacitors in the picture or sound i-f circuits. The filament leads between V120, V121 and V122 should be down against the chassis and away from grid or plate leads.
4. Dress all leads crossing the i-f circuits close to the chassis and held so they cannot move and change alignment.
5. If it is necessary to replace any of the 1500 mmf capacitors in the picture i-f circuit, the lead length must be kept as short as possible.
6. Picture i-f coupling capacitors C106, C111, C115 and C121 should be up and away from the chassis and should be clear of the pix i-f transformer adjustments by at least ¼ inch. If the dress of any of these capacitors is changed, the i-f alignment should be rechecked.
7. Leads to L102 and L103 must be as short as possible.
8. Dress peaking coils L105, L106, L107, L108 and L109 up and away from the chassis.
9. Dress R129 away from L109.
10. Dress C183 across V121 tube pins 5 and 6 with leads not exceeding ⅜ inch.
11. Dress the blue lead from pin 5 of V122 down against the chassis and under two shielded leads.
12. Dress C129 and C199 up and away from the chassis.
13. Dress the yellow lead from the picture control away from the chassis. Dress the yellow lead from pin 8 of V106 away from the chassis.
14. Dress the green lead from pin 8 of V107 away from the chassis.
15. Dress R168, R169, R170, R176 and R178 up and away from the chassis.
16. The leads to the volume control should be dressed down against the chassis and away from V119 and V120.
17. Dress the yoke red horizontal deflection lead under the clips of the fixed H. V. shield.
18. Dress the green lead from C166 close to the chassis and away from the red lead connected to T110-4.
19. Insert the red lead into T110-4 from the top of the terminal.
20. All soldered connections in the high voltage compartment should be free of sharp points.
21. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.

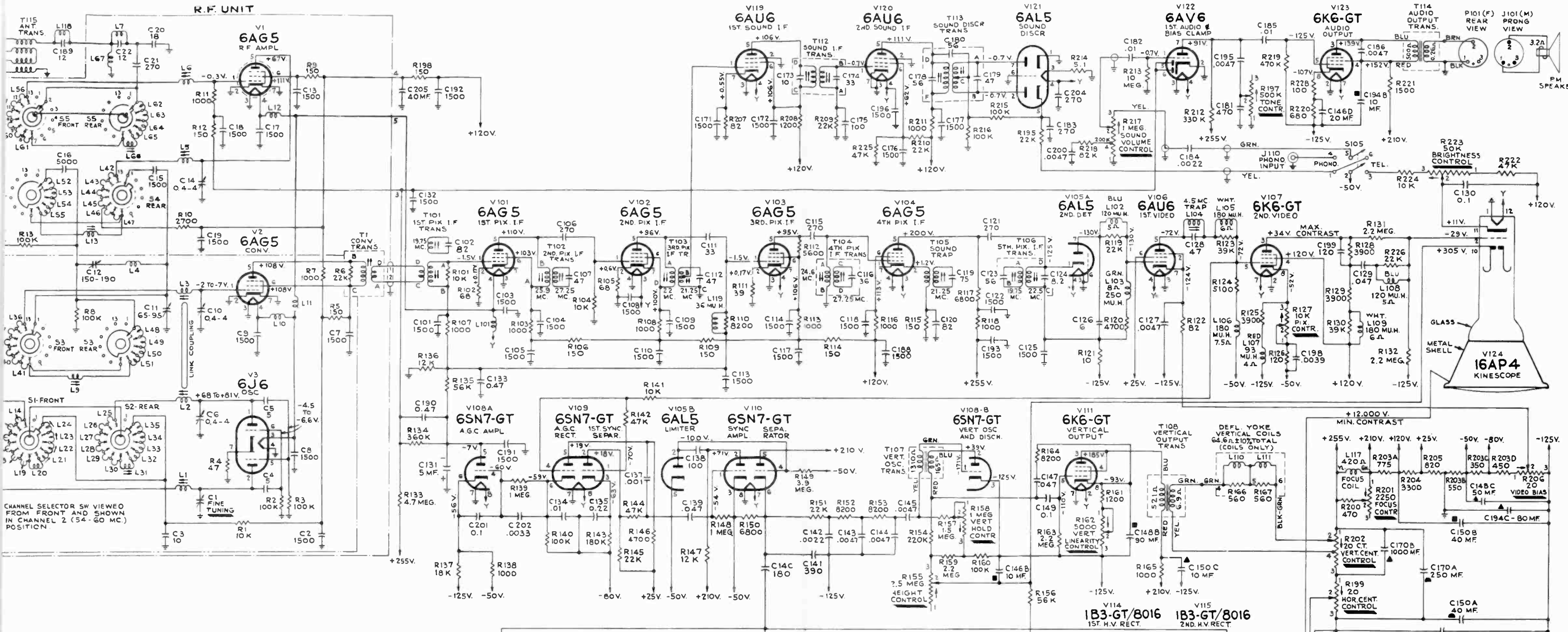
REPLACEMENT PARTS

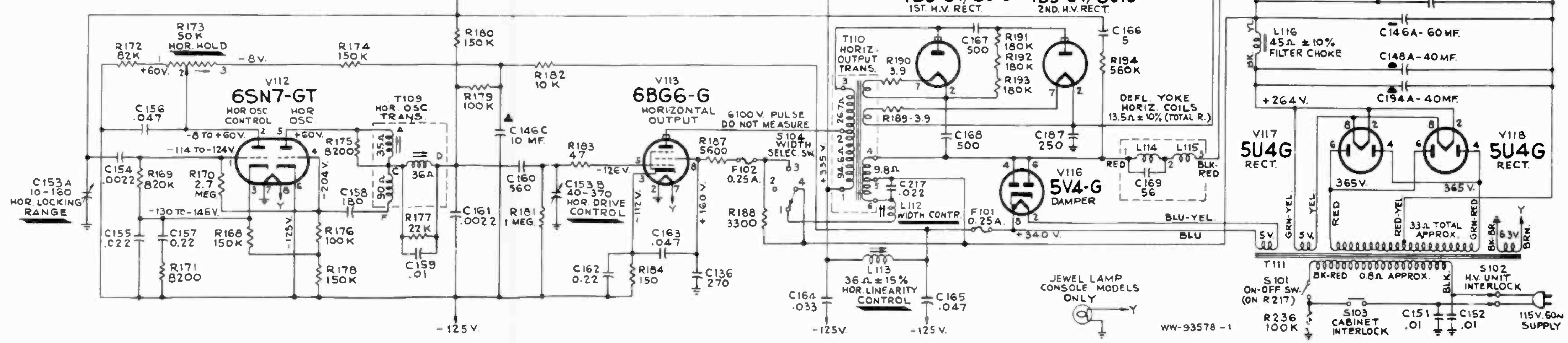
STOCK No.	DESCRIPTION
	R-F UNIT ASSEMBLY KRK5A
73465	Belt—Drive belt
73478	Cable—I-F transmission cable (4⅞") (W1)
73441	Cam—Fine tuning adjustment cam
74035	Capacitor—Ceramic, 5 mmf. (C4, C5)
53511	Capacitor—Ceramic, 10 mmf. (C3)
54207	Capacitor—Ceramic, 18 mmf. (C20)
73449	Capacitor—Ceramic trimmer, comprising 1 section of 150-190 mmf. and 1 section of 65-95 mmf. (C11, C12)
73091	Capacitor—Ceramic, 270 mmf. (C21)
71501	Capacitor—Ceramic, 1,500 mmf. (C2, C7, C8, C9, C13, C15, C17, C18, C19)
73473	Capacitor—Ceramic, 5,000 mmf. (C16)
73475	Coil—Antenna filter shunt coil (L67)
73477	Coil—Choke coil (L10, L11, L12)
73874	Coil—Converter grid coil for channel No. 6 (L9, L31)
73462	Coil—Coupling inductance coil (L4)
74108	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with plunger adjustment) (L1, C1)
73443	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with plunger adjustment) (L1, C1)
73476	Coil—I-F trap (L7, C22)
73461	Coil—Oscillator plate coil (4 turns) for channel No. 6 (L20)
73460	Coil—R-F plate coil for channel No. 6 (L13)
74109	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
73444	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
74110	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for r-f amplifier section (L5, C14)
73446	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for r-f amplifier section (L5, C14)
71493	Connector—Oscillator segment connector
74187	Core—Adjustable core for L31
73455	Core—Sliding core for fine tuning control trimmer
73440	Detent—R-F unit detent mechanism and fibre shaft
73453	Form—Coil form assembly for L9, L13
71487	Form—Coil form for oscillator plate coil L31
73442	Link—Link assembly for fine tuning
71462	Loop—Oscillator to converter trimmer loop connector
73634	Nut—Speed nut for drive belt shield
73467	Nut—Speed nut to mount trimmer coils 73443, 73444 and 73446
74166	Plate—Front plate and bushing
73464	Pulley—Idler pulley
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R5, R9, R12)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R7)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, ½ watt (R11)
	Resistor—Fixed, composition, 2,700 ohms, ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 10,000 ohms, ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, ½ watt (R2, R3, R8, R13)
14343	Retainer—Channel selector shaft retaining ring
30340	Retainer—Retainer for fine tuning link stud
71476	Screw—No. 4-40 x ¼" binder head screw for adjusting coils L14, L15, L16, L17, L18, L19
71475	Screw—No. 4-40 x .296 adjusting screw for coils L6, L21, L22, L23, L24
73640	Screw—No. 4-40 x ⅜" adjusting screw for L66
74167	Shaft—Actuating shaft for fine tuning control
74168	Shaft—Channel selector shaft complete with pawl and stud
73438	Shaft—Fine tuning control shaft and pulley
72951	Shield—Metal tube shield for V3
73454	Shield—Metal shield for drive belt
73632	Shield—Metal tube shield for V1
71494	Socket—Tube socket
73450	Socket—Tube socket, ceramic, 7 prong bottom mounted
74188	Spring—Retaining spring for adjustable core No. 74187
73457	Spring—Return spring for fine tuning control core
73456	Spring—Tension spring for drive belt shield
73633	Stator—Antenna stator complete with rotor and coils (S5, L6, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, C21)
73470	Stator—Converter stator complete with rotor and coils (S3, L36, L37, L38, L39, L40, L41, L48, L49, L50, L51)
73468	Stator—Front oscillator section stator complete with rotor, segment, coils and adjusting screws (S1, L14, L15, L16, L17, L18, L19, L21, L22, L23, L24)
73469	Stator—Rear oscillator section stator complete with rotor, segment and coils (S2, L25, L26, L27, L28, L29, L30, L32, L33, L34, L35)
73471	Stator—R-F amplifier stator complete with rotor and coils (S4, L42, L43, L44, L45, L46, L47, L52, L53, L54, L55)
2917	Washer—"C" washer for channel selector shaft
73466	Washer—Insulating washers for front shield (1 set)
73448	Transformer—Converter transformer (T1, R6)
	TELEVISION CHASSIS KCS29-8T270, KCS29A-8TC270 and 8TC271
73414	Cap—Hi-voltage rectifier and horizontal output plate cap
72809	Capacitor—Mica, 5 mmf. (C166)
74182	Capacitor—Ceramic, 6 mmf. (C126)
74105	Capacitor—Mica, 33 mmf. (C111)
64062	Capacitor—Ceramic, 82 mmf. (C120)
75060	Capacitor—Mica, 100 mmf., 1000 v. (C138)
39396	Capacitor—Ceramic, 100 mmf. (C175)
73921	Capacitor—Ceramic, 120 mmf. (C199)
51416	Capacitor—Mica, 180 mmf. (C140)
73102	Capacitor—Mica, 180 mmf. (C158)
74154	Capacitor—Ceramic, 250 mmf., 20,000 volts (C187)
73091	Capacitor—Mica, 270 mmf. (C106, C115, C121, C136)
73922	Capacitor—Ceramic, 270 mmf. (C183, C204)
39642	Capacitor—Mica, 390 mmf. (C141)
39644	Capacitor—Mica, 470 mmf. (C181)
74153	Capacitor—Ceramic, 500 mmf., 15,000 volts (C167, C168)
74250	Capacitor—Mica, 560 mmf. (C160)
73580	Capacitor—Mica trimmer, comprising 1 section of 10-160 mmf. and 1 section of 40-370 mmf. (C153A, C153B)
71501	Capacitor—Ceramic, 1,500 mmf. (C101, C103, C104, C105, C108, C109, C110, C113, C114, C117, C118,

REPLACEMENT PARTS (Continued)

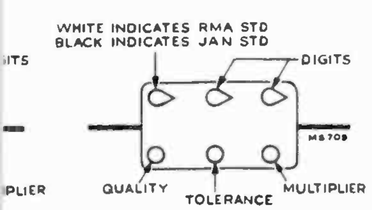
STOCK No.	DESCRIPTION
	C122, C125, C132, C171, C172, C176, C177, C188, C191, C192, C193, C196)
73801	Capacitor—Tubular, moulded paper, .001 mfd., 600 volts (C137)
73803	Capacitor—Tubular, moulded paper, .0022 mfd., 600 volts (C142, C154, C184)
73595	Capacitor—Tubular, moulded paper, oil treated, .0022 mfd., 600 volts (C161)
73795	Capacitor—Tubular, moulded paper, .0033 mfd., 600 volts (C202)
73796	Capacitor—Tubular, moulded paper, .0039 mfd., 600 volts (C198)
73920	Capacitor—Tubular, moulded paper, oil treated, .0047 mfd., 600 volts (C145)
73550	Capacitor—Tubular, moulded paper, .0047 mfd., 600 volts (C127, C143, C144, C186, C195, C200)
73561	Capacitor—Tubular, moulded paper, .01 mfd., 400 volts (C134, C151, C152, C182)
73594	Capacitor—Tubular, moulded paper, oil treated, .01 mfd., 600 volts (C159)
73565	Capacitor—Tubular, moulded paper, .01 mfd., 1,000 volts (C185)
73562	Capacitor—Tubular, moulded paper, .022 mfd., 400 volts (C155)
73596	Capacitor—Tubular, moulded paper, oil treated, .033 mfd., 1,000 volts (C164)
73553	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C129, C139)
73592	Capacitor—Tubular, moulded paper, .047 mfd., 600 volts (C147, C156)
73597	Capacitor—Tubular, moulded paper, oil treated, .047 mfd., 1,000 volts (C165)
73564	Capacitor—Tubular, moulded paper, .047 mfd., 1,000 volts (C163)
73784	Capacitor—Tubular, moulded paper, 0.1 mfd., 200 volts (C201)
73551	Capacitor—Tubular, moulded paper, 0.1 mfd., 400 volts (C130, C149)
73560	Capacitor—Tubular, moulded paper, 0.22 mfd., 200 volts (C135)
73794	Capacitor—Tubular, moulded paper, 0.22 mfd., 400 volts (C157, C162)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd., 200 volts (C133, C190)
74106	Capacitor—Electrolytic, 5 mfd., 50 volts (C131)
74266	Capacitor—Electrolytic, 40 mfd., 400 volts (C205)
71432	Capacitor—Electrolytic, comprising 2 sections of 40 mfd., 450 volts, and 1 section of 10 mfd., 450 volts (C150A, C150B, C150C)
73581	Capacitor—Electrolytic, comprising 1 section of 60 mfd., 450 volts, 2 sections of 10 mfd., 450 volts, and 1 section of 20 mfd., 150 volts (C146A, C146B, C146C, C146D)
73582	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts, and 1 section of 80 mfd., 200 volts (C194A, C194B, C194C)
73583	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 90 mfd., 450 volts, and 1 section of 50 mfd., 150 volts (C148A, C148B, C148C)
71436	Capacitor—Electrolytic, comprising 1 section of 250 mfd., 10 volts, and 1 section of 1,000 mfd., 6 volts (C170A, C170B)
73154	Choke—Filter choke (L116)
73578	Coil—Antenna matching coils complete with socket and bracket (T115)
73477	Coil—Choke coil (L101)
74142	Coil—Focus coil (L117)
71449	Coil—Horizontal linearity control coil (L113)
74170	Coil—Peaking coil (36 mh) (L119, R110)
71527	Coil—Peaking coil (93 mh) (L107)
71529	Coil—Peaking coil (120 mh) (L102, R119, L108, R226)
74214	Coil—Peaking coil (180 mh) (L106)
71528	Coil—Peaking coil (180 mh) (L105, R123, L109, R130)
71526	Coil—Peaking coil (250 mh) (L103)
71429	Coil—Width control coil (L112)
74160	Connector—Anode connector
35787	Connector—Phono input connector (J110)
71521	Contact—Hi-voltage capacitor contact
74047	Control—Brightness and picture control (R127, R223)
72735	Control—Focus control (R201)
71440	Control—Height control (R155)
74146	Control—Horizontal centering or video bias control (R199, R206)
72734	Control—Horizontal and vertical hold control (R158, R173)
74048	Control—Tone control, volume control and power switch (R197, R217, S101)
71441	Control—Vertical linearity control (R182)
71443	Control—Vertical centering control (R202)
71457	Cord—Power cord and plug
71437	Cover—Insulating cover for electrolytics Nos. 71432, 73581 and 73583
72772	Cover—Insulating cover for electrolytics No. 71436
73590	Cushion—Deflection yoke hood cushion (2 required)
73600	Fuse—0.25 ampere, 250 volts (F101, F102)
37396	Grommet—Rubber grommet to mount ceramic tube socket (2 required)
71799	Grommet—Rubber grommet for 2nd anode lead
74148	Magnet—Ion trap magnet (PM type)
18469	Plate—Bakelite mounting plate for electrolytics
5119	Plug—3 contact female plug for speaker cable
71448	Plug—Male plug for power cable
74156	Resistor—Wire wound, 3.9 ohms, 1/3 watt (R189, R190)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R214)
	Resistor—Fixed, composition, 10 ohms, ±20%, ½ watt (R121)
	Resistor—Fixed, composition, 39 ohms, ±10%, ½ watt (R102, R111)
	Resistor—Fixed, composition, 47 ohms, ±20%, ½ watt (R183)
	Resistor—Fixed, composition, 68 ohms, ±10%, ½ watt (R105)
	Resistor—Fixed, composition, 82 ohms, ±10%, ½ watt (R207)
	Resistor—Fixed, composition, 82 ohms, ±5%, ½ watt (R122)
	Resistor—Fixed, composition, 100 ohms, ±10%, ½ watt (R228)
	Resistor—Fixed, composition, 120 ohms, ±10%, ½ watt (R126)
	Resistor—Fixed, composition, 150 ohms, ±20%, ½ watt (R106, R109, R114, R198)
	Resistor—Fixed, composition, 150 ohms, ±10%, ½ watt (R115)
	Resistor—Fixed, composition, 150 ohms, ±10%, 2 watts (R184)
74197	Resistor—Wire wound, 470 ohms, 4 watts (R200)
	Resistor—Fixed, composition, 680 ohms, ±10%, 1 watt (R220)
74213	Resistor—Wire wound, 820 ohms, 4 watts (R205)

CIRCUIT SCHEMATIC DIAGRAM





E. FIXED MICA CAPACITORS



TED AT 500V. UNLESS MARKED OTHERWISE

QUALITY

COLOR	CLASS	COLOR	CLASS
BLACK	A	YELLOW	D
BROWN	B	GRAY	I
RED	C	WHITE	J
ORANGE	D		

COLOR	DIGITS	MULTIPLIER
GOLD	—	.1
BLACK	0	1.
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

All resistance values in ohms. K = 1000.
All capacitance values less than 1 in MF and above 1 in MMF unless otherwise noted.
Coil resistance values less than 1 ohm are not shown.

Direction of arrows at controls indicates clockwise rotation.
In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

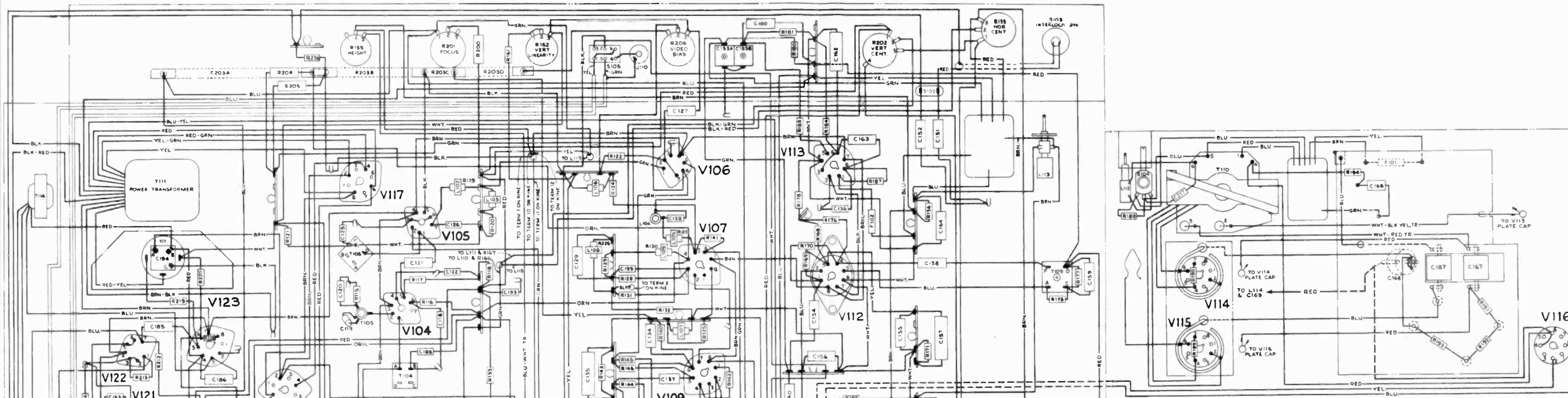
All voltages measured with "VoltOhmyst" and with no signal input. Voltages should hold within ±20% with 117 v. a-c supply.
In some receivers C148B was 10 MF and a 60 MF tubular condenser was connected in parallel with it.

In some receivers, R228 was omitted.
In some receivers, R236 was omitted.
In some receivers, F102 was omitted.
In some receivers, R236 was 220 K.
In some receivers, R102 was 39 ohms.
In some receivers, C127 was omitted.

In some receivers, the phono switch S105 and jack J110 were omitted. R195 was connected directly to C184. R224 was connected to -50 V.

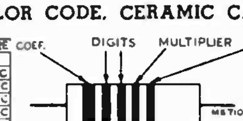
Figure 80—Circuit Schematic Diagram

CHASSIS WIRING DIAGRAM



RMA COLOR CODE, CERAMIC CAPACITORS

COLOR	TEMPERATURE COEF.
BLACK	0
BROWN	− 30 PPM/°C
RED	− 80 PPM/°C
ORANGE	−150 PPM/°C
YELLOW	− 220 PPM/°C
GREEN	− 330 PPM/°C
BLUE	− 470 PPM/°C
VIOLET	− 750 PPM/°C
GRAY	+ 30 PPM/°C



TOLERANCE	COLOR
± 20%	BLACK
± 1%	BROWN
± 2%	RED
± 2 1/2%	ORANGE
± 5%	GREEN
± 10%	WHITE

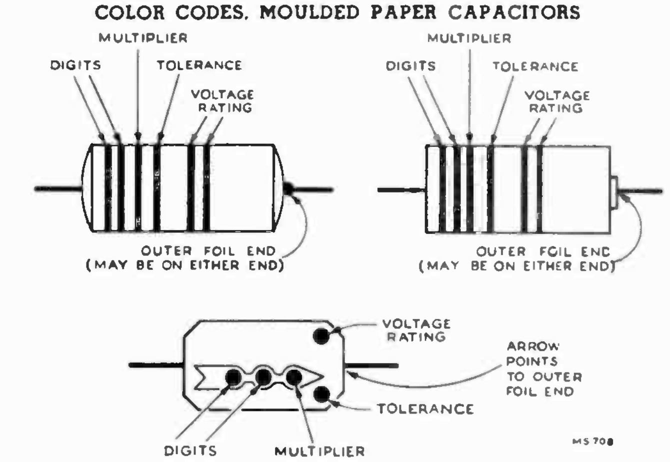
ABOVE TOLERANCES ARE ONLY FOR CAPACITORS LARGER THAN 10 MMF

COLOR	MULTIPLIER	COLOR	MULTIPLIER
GRAY	.01	BROWN	10
WHITE	.1	RED	100
BLACK	1.	ORANGE	1,000

For digits, use digit column, page 26.

Figure 79—Chassis Wiring Diagram

COLOR CODES, MOULDED PAPER CAPACITORS



CAPACITY VALUE IN MMF

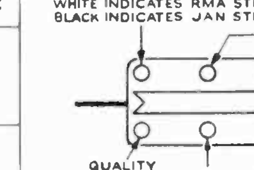
COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

TOLERANCE

COLOR	TOLERANCE
BLACK BAND OR NONE	±20%
WHITE OR SILVER	±10%
YELLOW OR GOLD	±5%

The Voltage Rating is given in hundreds of volts. Only one band is employed for ratings under 1,000 volts. Two bands are employed for ratings over 1,000 volts. Use digit column to read voltage rating.

RMA COLOR C



TOLERANCE

COLOR	TOLERANC
RED	±2%
GREEN	±5%
SILVER	±10%
BLACK	±20%

REPLACEMENT PARTS (Continued)

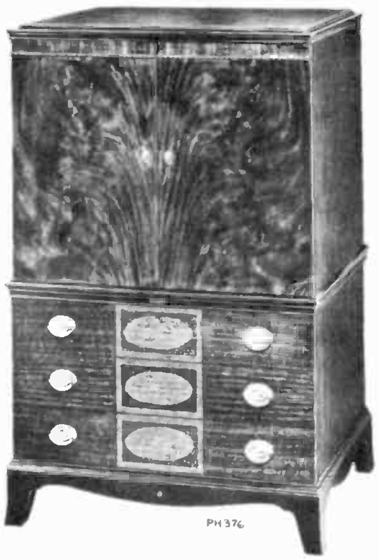
STOCK No.	DESCRIPTION
74155	Resistor—Voltage divider, comprising 1 section of 775 ohms, 9.5 watts, 1 section of 550 ohms, 5 watts, 1 section of 350 ohms, 3 watts, and 1 section of 450 ohms, 5 watts (R203A, R203B, R203C, R203D)
	Resistor—Fixed, composition, 1,000 ohms, ±20%, ½ watt (R103, R107, R108, R113, R116, R118, R165, R211)
	Resistor—Fixed, composition, 1,000 ohms, ±10%, ½ watt (R138)
	Resistor—Fixed, composition, 1,200 ohms, ±10%, ½ watt (R161, R208)
	Resistor—Fixed, composition, 1,500 ohms, ±10%, 2 watts (R221)
	Resistor—Fixed, composition, 3,300 ohms, ±10%, ½ watt (R188)
48207	Resistor—Wire wound, 3,300 ohms, 10 watts (R204)
	Resistor—Fixed, composition, 3,900 ohms, ±5%, 2 watts (R125, R128, R129)
	Resistor—Fixed, composition, 4,700 ohms, ±10%, ½ watt (R146)
	Resistor—Fixed, composition, 4,700 ohms, ±5%, ½ watt (R120)
	Resistor—Fixed, composition, 5,100 ohms, ±5%, ½ watt (R124)
	Resistor—Fixed, composition, 5,600 ohms, ±5%, ½ watt (R112)
	Resistor—Fixed, composition, 5,600 ohms, ±10%, 1 watt (R187)
	Resistor—Fixed, composition, 6,800 ohms, ±10%, ½ watt (R150)
	Resistor—Fixed, composition, 6,800 ohms, ±5%, 1 watt (R117)
	Resistor—Fixed, composition, 8,200 ohms, ±10%, ½ watt (R152, R153, R171)
	Resistor—Fixed, composition, 8,200 ohms, ±5%, ½ watt (R164, R175)
	Resistor—Fixed, composition, 10,000 ohms, ±10%, ½ watt (R141, R182, R224)
	Resistor—Fixed, composition, 10,000 ohms, ±5%, ½ watt (R104)
	Resistor—Fixed, composition, 12,000 ohms, ±5%, ½ watt (R136)
	Resistor—Fixed, composition, 12,000 ohms, ±10%, 2 watts (R147)
	Resistor—Fixed, composition, 18,000 ohms, ±10%, ½ watt (R137)
	Resistor—Fixed, composition, 22,000 ohms, ±20%, ½ watt (R195, R209, R210)
	Resistor—Fixed, composition, 22,000 ohms, ±10%, ½ watt (R145, R151, R177)
	Resistor—Fixed, composition, 47,000 ohms, ±20%, ½ watt (R225)
	Resistor—Fixed, composition, 47,000 ohms, ±10%, ½ watt (R142, R144, R222)
	Resistor—Fixed, composition, 56,000 ohms, ±10%, ½ watt (R156)
	Resistor—Fixed, composition, 56,000 ohms, ±5%, ½ watt (R135)
	Resistor—Fixed, composition, 82,000 ohms, ±10%, ½ watt (R172, R218)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, ½ watt (R140, R160)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, ½ watt (R215, R216)
	Resistor—Fixed, composition, 100,000 ohms, ±10%, 1 watt (R179)
	Resistor—Fixed, composition, 100,000 ohms, ±5%, 1 watt (R176)
	Resistor—Fixed, composition, 100,000 ohms, ±20%, 2 watt (R236)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, ½ watt (R168, R180)
	Resistor—Fixed, composition, 150,000 ohms, ±10%, 1 watt (R174)
	Resistor—Fixed, composition, 150,000 ohms, ±5%, 1 watt (R178)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, ½ watt (R143)
	Resistor—Fixed, composition, 180,000 ohms, ±10%, 2 watts (R191, R192, R193)
	Resistor—Fixed, composition, 220,000 ohms, ±10%, ½ watt (R154)
	Resistor—Fixed, composition, 330,000 ohms, ±10%, ½ watt (R212)
	Resistor—Fixed, composition, 360,000 ohms, ±5%, ½ watt (R134)
	Resistor—Fixed, composition, 470,000 ohms, ±20%, ½ watt (R219)
	Resistor—Fixed, composition, 560,000 ohms, ±10%, ½ watt (R194)
	Resistor—Fixed, composition, 820,000 ohms, ±5%, ½ watt (R169)
	Resistor—Fixed, composition, 1 megohm, ±20%, ½ watt (R139, R148)
	Resistor—Fixed, composition, 1 megohm, ±10%, ½ watt (R181)
	Resistor—Fixed, composition, 1.5 megohm, ±5%, ½ watt (R157)
	Resistor—Fixed, composition, 2.2 megohms, ±10%, ½ watt (R131, R132, R159, R163)
	Resistor—Fixed, composition, 2.7 megohms, ±5%, 1 watt (R170)
	Resistor—Fixed, composition, 3.9 megohms, ±10%, ½ watt (R149)
	Resistor—Fixed, composition, 4.7 megohms, ±5%, 1 watt (R133)
	Resistor—Fixed, composition, 10 megohms, ±20%, ½ watt (R213)
71456	Screw—No. 8-32 wing screw to mount hood and yoke (3 required)
73584	Shield—Tube shield for V120 and V121
73117	Socket—Tube socket, 7 pin, miniature
74251	Socket—Kinescope socket
31364	Socket—Pilot lamp socket for Models 8TC270 and 8TC271
31251	Socket—Tube socket, octal, wafer
31319	Socket—Tube socket, octal, moulded, saddle mounted
71508	Socket—Tube socket for 8016
73249	Socket—Tube socket, octal, ceramic, plate mounted
74151	Spacer—Bakelite spacer to mount moulded tube socket (2 required)
74152	Spring—Anode spring
72190	Spring—Hood and yoke pressure spring (3 required)
74149	Supports—Set of bakelite supports for horizontal plate assembly
74425	Support—Bakelite support for 2nd anode lead
74150	Support—Vertical plate support (bakelite)
74157	Switch—Interlock switch (S103)
74147	Switch—Width selector switch (S104)
46760	Switch—"TV Phono" switch (S105)
73571	Transformer—First pix I-F trans. (T101, C102, R101)
73572	Transformer—Second pix I-F transformer (T102, C107)

REPLACEMENT PARTS (Continued)

STOCK No.	DESCRIPTION
73573	Transformer—Third pix I-F transformer (T103, C112)
73574	Transformer—Fourth pix I-F transformer (T104, C116)
73575	Transformer—Fifth pix I-F transformer (T106, C123, C124)
74144	Transformer—Vertical oscillator transformer (T107)
73568	Transformer—Vertical output transformer (T108)
73576	Transformer—Horizontal oscillator transformer (T109)
74145	Transformer—Horizontal output and hi-voltage transformer (T110)
74143	Transformer—Power transformer, 115 volt, 60 cycles (T111)
71424	Transformer—Sound I-F transformer (T112, C173, C174)
71427	Transformer—Sound discriminator transformer (T113, C178, C179, C180)
71419	Transformer—Audio output transformer (T114)
73577	Trap—4.5 mc video trap (L104, C128)
71778	Trap—Sound trap (T105, C119)
73476	Trap—I-F trap (L118, C189)
74141	Yoke—Deflection yoke (L110, L111, L114, L115, C169, R166, R167)
	SPEAKER ASSEMBLY 92580-2W RL 105A3
31825	Cap—Dust cap
73912	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug for speaker
74169	Speaker—8" P.M. speaker complete with cone and voice coil, less plug
	MISCELLANEOUS
74158	Back—Cabinet back
72857	Board—"Antenna" board
71599	Bracket—Pilot lamp bracket for Models 8TC270 and 8TC271
13103	Cap—Pilot lamp jewel
73754	Catch—Bullet catch and strike (2 required) for Models 8TC270 and 8TC271
X1917	Cloth—Grille cloth for mahogany or walnut instruments for Model 8T270
X1918	Cloth—Grille cloth for toasted mahogany instruments for Model 8T270
74160	Connector—Anode connector (3 required)
74127	Cushion—Cushion strip for back of safety glass (4 required)
74116	Decal—Control panel decal for mahogany or walnut instruments
74117	Decal—Control panel decal for toasted mahogany instruments
71768	Decal—Trade mark decal (RCA Victor) for Model 8TC271
71984	Decal—Trade mark decal (RCA Victor) for Model 8TC270
73180	Emblem—"RCA Victor" emblem
73642	Escutcheon—Channel marker escutcheon for walnut or mahogany instruments
73740	Escutcheon—Channel marker escutcheon for toasted mahogany instruments
72113	Foot—Rubber foot (4 required) for Model 8T270
74306	Glass—Safety glass for Model 8TC271
74125	Glass—Safety glass for Model 8T270
74252	Glass—Safety glass for Model 8TC270
74308	Hinge—Door hinge (1 set) for Model 8TC271 (2 required)
73903	Hinge—Door hinge (1 set for 1 door) for Model 8T270
73224	Knob—Channel selector knob—dark—for walnut or mahogany instruments
73225	Knob—Channel selector knob — tan — for toasted mahogany instruments
73222	Knob—Fine tuning knob — dark — for walnut or mahogany instruments
73223	Knob—Fine tuning knob — tan — for toasted mahogany instruments
73228	Knob—Horizontal hold, picture control or volume control knob—dark—for walnut or mahogany instruments
73229	Knob—Horizontal hold, picture control or volume control knob—tan for toasted mahogany instruments
73226	Knob—Vertical hold, brightness control or tone control knob—dark—for walnut or mahogany instruments
73227	Knob—Vertical hold, brightness control or tone control knob—tan—for toasted mahogany instruments
11765	Lamp—Pilot lamp
74126	Mask—Kinescope mask
74123	Ornament—Front panel metal ornament for Model 8T270
74313	Ornament—Wood fibre ornament for front of cabinet for Model 8TC271
74111	Plate—Door pull back plate — R.H. — for Model 8TC271
74112	Plate—Door pull back plate — L.H. — for Model 8TC271
74115	Plate—Stud and plate including wing nut and spring for front panel (2 required) for 8TC270 and 8TC271
74162	Plate—Mounting plate for interlock switch
74124	Plate—Stud and plate including wing nut and spring for front panel (2 required) for Model 8T270
39153	Plug—4 prong male plug for antenna cable
74253	Pull—Door pull for R.H. door for Model 8TC270
74254	Pull—Door pull for L.H. door for Model 8TC270
73771	Pull—Door pull (2 required) for Model 8TC271
74307	Screw—No. 8-32 x 1/8 tremit head screw for door pulls for Model 8TC271
74171	Shield—Cellulose shield for kinescope
30330	Spring—Retaining spring for knobs
14270	Spring—Retaining spring for knobs
72845	Spring—Retaining spring for knobs
73643	Spring—Spring clip for channel marker escutcheon
72936	Stop—Door stop for Models 8TC270 and 8TC271
74161	Stud—Locating stud for cabinet back (2 required)
74159	Support—Moulded insulator supports for kinescope (4 required)

To obtain resistors for which no stock number is given, order by stating type, value of resistance, tolerance and wattage.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS



Model 8TK320 Walnut, Mahogany or Toasted Mahogany

RCA VICTOR

TELEVISION, AM-FM RADIO RECEIVER MODEL 8TK320

Chassis Nos. KCS33A-1, RK135A-1
Mfr. No. 274

SERVICE DATA

— 1949 No. T5 —

RADIO CORPORATION OF AMERICA
RCA VICTOR DIVISION
CAMDEN, N. J., U. S. A.

REFER TO PAGES 522 TO 535 INC. FOR TELEVISION ALIGN MENT AND WAVEFORM PHOTOGRAPHS

GENERAL DESCRIPTION

The Model 8TK320 is a "16 inch" television, AF-FM radio combination. The receiver employs twenty-seven tubes plus four rectifiers and a 16AP4 kinescope. A phono input jack is provided to permit the use of an external record player.

Features of the television unit are full twelve channel coverage; FM sound system; improved picture brilliance; picture A-G-C; A-F-C horizontal hold; stabilized vertical hold; two stages of video amplification; noise saturation circuits; improved sync separator and clipper; four mc band width for picture channel and reduced hazard high voltage supply.

ELECTRICAL AND MECHANICAL SPECIFICATIONS

PICTURE SIZE ...... 146 square inches on a 16 inch kinescope

TELEVISION R-F FREQUENCY RANGE

All 12 television channels, 54 mc. to 88 mc., 174 mc. to 216 mc.
Fine Tuning Range . . ±250 kc. on chan. 2, ±650 kc. on chan. 13
Picture Carrier Frequency .... 25.75 mc.
Sound Carrier Frequency .... 21.25 mc.

RADIO TUNING RANGE

Broadcast .... 540-1,600 kc.
Frequency Modulation .... 88-108 mc.
Intermediate Frequency—AM .... 455 kc.
Intermediate Frequency—FM .... 10.7 mc.

POWER SUPPLY RATING ...... 115 volts, 60 cycles, 285 watts

AUDIO POWER OUTPUT RATING .... 2.4 watts max.

CHASSIS DESIGNATIONS

Television Chassis KCS33A-1
Radio Chassis RK135A-1

LOUDSPEAKER 92582-3 (RL 103C21) ..... 12 inch PM Dynamic
Voice Coil Impedance .... 3.2 ohms at 400 cycles

WEIGHT

Chassis with Tubes in Cabinet .... 150 lbs.
Shipping Weight .... 193 lbs.

DIMENSIONS (inches)	Width	Height	Depth
Cabinet (outside)	30¼	46½	24¾
Chassis (Overall)	19⅜	12¼	20¼

RECEIVER ANTENNA INPUT IMPEDANCE 300 ohms balanced

If necessary, the television chassis may be fed separately from either a 300 ohm balanced line or a 72 ohm co-ax.

RCA TUBE COMPLEMENT

	Tube Used (Television Chassis)	Function
(1)	RCA 6AG5	R-F Amplifier
(2)	RCA 6J6	R-F Oscillator
(3)	RCA 6AG5	Converter
(4)	RCA 6AU6	1st Sound I-F Amplifier
(5)	RCA 6AU6	2nd Sound I-F Amplifier
(6)	RCA 6AL5	Sound Discriminator
(7)	RCA 6AV6	1st Audio Amplifier
(8)	RCA 6V6GT	Audio Output
(9)	RCA 6AG5	1st Picture I-F Amplifier
(10)	RCA 6AG5	2nd Picture I-F Amplifier
(11)	RCA 6AG5	3rd Picture I-F Amplifier
(12)	RCA 6AG5	4th Picture I-F Amplifier
(13)	RCA 6AL5	Picture 2nd Detector and Sync Limiter
(14)	RCA 6AU6	1st Video Amplifier
(15)	RCA 6K6GT	2nd Video Amplifier
(16)	RCA 6SN7GT	AGC Amplifier and Vertical Sweep Oscillator
(17)	RCA 6SN7GT	AGC Rectifier and 1st Sync Separator
(18)	RCA 6SN7GT	Sync Amplifier and 2nd Sync Separator
(19)	RCA 6K6GT	Vertical Sweep Output
(20)	RCA 6SN7GT	Horizontal Sweep Oscillator and Control
(21)	RCA 6BG6G	Horizontal Sweep Output
(22)	RCA 5V4G	Damper
(23)	RCA 1B3-GT/8016	H. V. Rectifier (2 tubes)
(24)	RCA 5U4G	Power Supply Rectifier (2 tubes)
(25)	RCA 16AP4	Kinescope

(Radio Tuner Chassis)

	Tube Used	Function
(1)	RCA 6J6	Mixer and Oscillator
(2)	RCA 6BA6	I-F Amplifier
(3)	RCA 6AU6	F-M Driver
(4)	RCA 6AL5	Ratio Detector
(5)	RCA 6AV6	AM Detector AVC

Specifications continued on page 2

8TK320

ELECTRICAL AND MECHANICAL SPECIFICATIONS (Continued)

PICTURE I-F FREQUENCIES

Picture Carrier Frequency	25.75 mc.
Adjacent Channel Sound Trap	27.25 mc.
Accompanying Sound Traps	21.25 mc.
Adjacent Channel Picture Carrier Trap	19.75 mc.

SOUND I-F FREQUENCIES

Sound Carrier Frequency	21.25 mc.
Sound Discriminator Band Width between peaks	350 kc.

VIDEO RESPONSE	To 4 mc.
FOCUS	Magnetic
SWEEP DEFLECTION	Magnetic
SCANNING	Interlaced, 525 line
HORIZONTAL SCANNING FREQUENCY	15,750 cps
VERTICAL SCANNING FREQUENCY	60 cps
FRAME FREQUENCY (Picture Repetition Rate)	30 cps

OPERATING CONTROLS (front panel)

Channel Selector Fine Tuning	Dual Control Knobs
Tone Sound Volume and On-Off Switch	Dual Control Knobs
Picture Horizontal Hold Picture Vertical Hold	Dual Control Knobs
Picture Brightness	Dual Control Knobs
Function Switch	Single Control Knob
Radio Tuning	Single Control Knob

NON-OPERATING CONTROLS

Horizontal Centering	rear chassis adjustment
Vertical Centering	rear chassis adjustment
Width	rear chassis screwdriver adjustments
Height	rear chassis adjustment
Horizontal Linearity	rear chassis screwdriver adjustment
Vertical Linearity	rear chassis adjustment
Horizontal Drive	rear chassis screwdriver adjustment
Horizontal Oscillator Frequency	bottom chassis adjustment
Horizontal Oscillator Waveform	side chassis adjustment
Focus	rear chassis adjustment
Ion Trap Magnet	top chassis adjustment
Deflection Coil	top chassis wing nut adjustment
Focus Coil	top chassis screwdriver adjustment
Video Bias	rear chassis adjustment

HIGH VOLTAGE WARNING

OPERATION OF THIS RECEIVER OUTSIDE THE CABINET OR WITH THE COVERS REMOVED, INVOLVES A SHOCK HAZARD FROM THE RECEIVER POWER SUPPLIES. WORK ON THE RECEIVER SHOULD NOT BE ATTEMPTED BY ANYONE WHO IS NOT THOROUGHLY FAMILIAR WITH THE PRECAUTIONS NESESSARY WHEN WORKING ON HIGH VOLTAGE EQUIPMENT. DO NOT OPERATE THE RECEIVER WITH THE HIGH VOLTAGE COMPARTMENT SHIELD REMOVED.

KINESCOPE HANDLING PRECAUTIONS

DO NOT OPEN THE KINESCOPE SHIPPING CARTON, INSTALL, REMOVE OR HANDLE THE KINESCOPE IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PEOPLE NOT SO EQUIPPED SHOULD BE KEPT AWAY WHILE HANDLING KINESCOPES. KEEP THE KINESCOPE AWAY FROM THE BODY WHILE HANDLING.

The kinescope bulb encloses a high vacuum and, due to its large surface area, is subjected to considerable air pressure. For these reasons, kinescopes must be handled with more care than ordinary receiving tubes.

The large end of the kinescope bulb—particularly that part at the rim of the viewing surface—must not be struck, scratched or subjected to more than moderate pressure at any time. In installation, if the tube sticks or fails to slip smoothly into its socket, or deflecting yoke, investigate and remove the cause of the trouble. Do not force the tube. Refer to the Receiver Installation section for detailed instructions on kinescope installation. All RCA kinescopes are shipped in special cartons and should be left in the cartons until ready for installation in the receiver. Keep the carton for possible future use.

OPERATING INSTRUCTIONS

The following adjustments are necessary when turning the receiver on for the first time.

1. Turn the radio FUNCTION switch to Tel.

2. Turn the receiver "ON" and advance the SOUND VOLUME control to approximately mid-position.

3. Set the STATION SELECTOR to the desired channel.

4. Adjust the FINE TUNING control for best sound fidelity and SOUND VOLUME for suitable volume.

5. Turn the BRIGHTNESS control fully counterclockwise, then clockwise until a light pattern appears on the screen.

6. Adjust the VERTICAL hold control until the pattern stops vertical movement.

7. Adjust the HORIZONTAL hold control until a picture is obtained and centered.

8. Turn the BRIGHTNESS control counterclockwise until the retrace lines just disappear.

9. Adjust the PICTURE control for suitable picture contrast.

10. After the receiver has been on for some time, it may be necessary to readjust the FINE TUNING control slightly for improved sound fidelity.

11. In switching from one station to another, it may be necessary to repeat steps numbers 4 and 9.

12. When the set is turned on again after an idle period, it should not be necessary to repeat the adjustments if the positions of the controls have not been changed. If any adjustment is necessary, step number 4 is generally sufficient.

13. If the positions of the controls have been changed, it may be necessary to repeat steps numbers 1 through 9.

14. For radio operation turn the FUNCTION switch to AM or FM and tune in station with the radio TUNING control.

15. For phono operation, connect phono attachment to receiver and turn the FUNCTION switch to AUX.

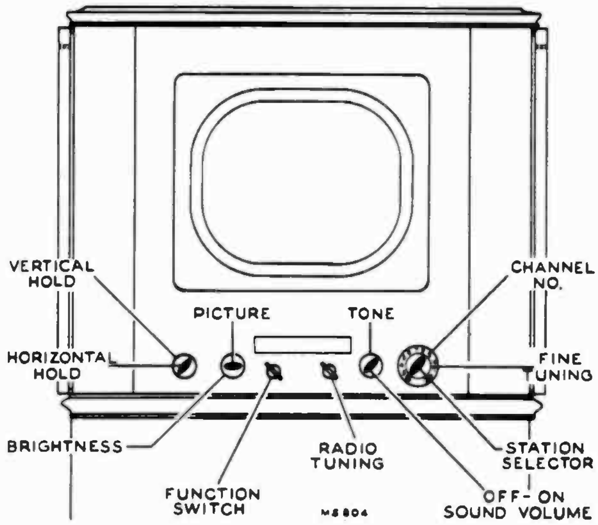


Figure 1—Receiver Operating Controls

INSTALLATION INSTRUCTIONS

The Model 8TK320 television receiver is shipped complete in one carton except for the 16AP4 kinescope. The kinescope is shipped in a special carton and should not be unpacked until ready for installation.

UNPACKING. — The 8TK320 receiver is packed in a cardboard carton. To unpack, turn the shipping carton on its side and tear open the carton bottom flaps. Fold the flaps up along the side of the carton and turn the carton back up. Lift the carton up and off the cabinet.

Remove the cabinet back grille. Remove all shipping material. Remove the envelope containing the control knobs and ion trap magnet.

To remove the front panel, loosen the two wingnuts inside the cabinet and turn the two locking plates to vertical as shown in Figure 2. Tilt the panel out at the top, reach in and remove the radio dial light sockets from the bracket on the front panel.

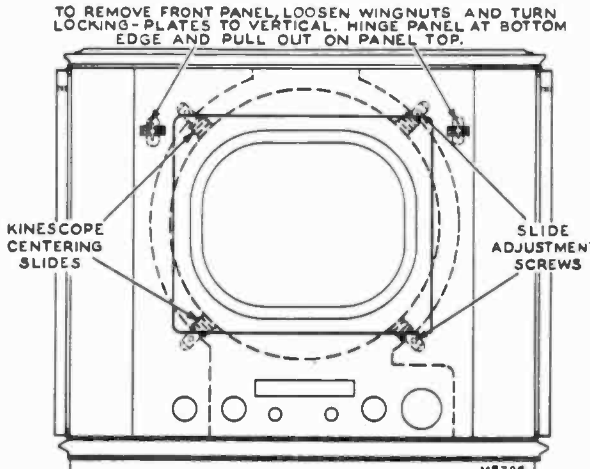


Figure 2—Cabinet, Front View

Remove the protective cardboard shield from the 5U4G rectifier. Make sure all tubes are in place and are firmly seated in their sockets.

Remove the two self-tapping screws from the kinescope cushion slide as shown in Figure 3.

Loosen the two kinescope cushion adjustment wing screws and slide the cushion toward the rear of the chassis. Loosen the deflection yoke adjustment, slide the yoke toward the rear of the chassis and tighten.

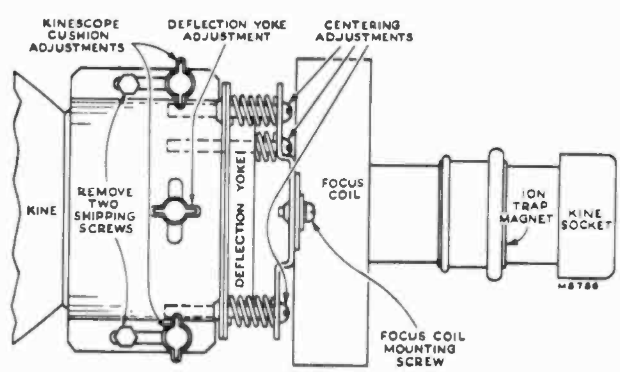


Figure 3—Yoke and Focus Coil Adjustments

From the front of the cabinet, look through the deflection yoke and check the alignment of the focus coil with the yoke. If the focus coil is not in line, loosen the two focus coil mounting screws and move the coil until alignment is obtained. Tighten the mounting screws with the coil in this position.

Loosen the two lower kinescope face centering slides, and set them at approximately mid-position. See Figure 2 for location of the slides and their adjustment screws. Loosen the two upper slides, slip them up as far as possible and tighten.

Check the centering slides. There should be a small wire clip on the inner surface of each. The clip in the lower left corner should be connected to the high voltage lead.

KINESCOPE HANDLING PRECAUTION. — Do not open the kinescope shipping carton, install, remove, or handle the kinescope in any manner, unless shatter-proof goggles and heavy gloves are worn. People not so equipped should be kept away while handling the kinescope. Keep the kinescope away from the body while handling. The shipping carton should be kept for use in case of future moves.

Handle this tube by the metal rim at the edge of the screen. Do not cover the glass bell of the tube with finger marks as it will produce leakage paths which may interfere with reception. If this portion of the tube has inadvertently been handled, wipe it clean with a cloth moistened with carbon tetrachloride.

KINESCOPE INSTALLATION. — Slip the cellulose boot over the metal cone of the kinescope, turn the tube so that the key on the tube base will be down and insert the kinescope neck through the deflection and focus coils as shown in Figure 4. If the tube sticks, or fails to slip into place smoothly, investigate and remove the cause of the trouble. Do not force the tube.

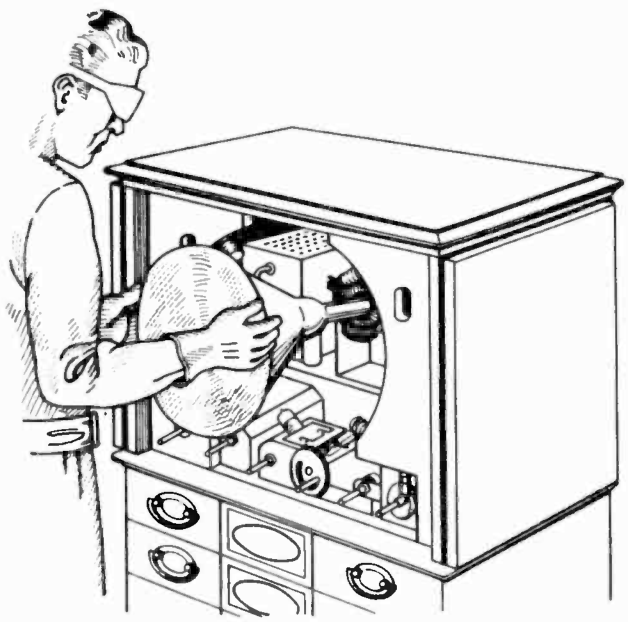


Figure 4—Kinescope Insertion

Slip the ion trap magnet assembly over the neck of the kinescope with the large magnet towards the base of the tube.

Connect the kinescope socket to the tube base.

Adjust the four centering slides until the face of the kinescope is in the center of the cabinet opening. Tighten the four slides securely.

Wipe the kinescope screen surface and front panel safety glass clean of all dust and finger marks with a soft cloth moistened with the Drackett Co.'s "Windex" or similar cleaning agent.

As may be seen by inspection, the radio dial lights and dial pointer are attached to the cabinet front panel. The dial cord is attached to the receiver chassis. The method of attachment may be seen in Figure 5.

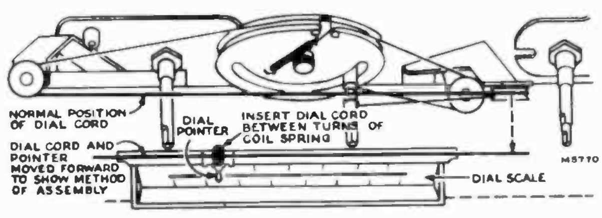


Figure 5—Dial Cord and Pointer Assembly

Before replacing the front panel, inspect the slit shields on the pilot light brackets to see that they are properly seated and that the slits line up with the dial light plate. Inspect the dial pointer, associated carriage and dial cord to see the method of assembly. Slip the radio pilot lights on the brackets and use the attached piece of scotch tape to tape the pilot light leads to the front panel between the lights. Turn the set on and to radio position to see that the dial lighting is correct. If it is not, adjust the dial lights and shields. Install the panel.

To hook up the dial pointer, turn the tuning shaft until the gang is fully meshed. Reach over the television chassis to the radio, slip the dial pointer to the low frequency end of the dial and press the dial cord well into the coil spring.

Slip the kinescope as far forward as possible. Slide the kinescope cushion firmly up against the flare of the tube and tighten the adjustment wing screws. Slide the deflection yoke as far forward as possible. If this is not done, difficulty will be encountered in adjusting the ion trap magnet and focus coil because of shadows on the corner of the raster.

The antenna connection should now be made. The link on the antenna terminal board on the back of the cabinet is for use in case it is desirable to connect a separate "A" band antenna.

Install the front panel control knobs.

WARNING. — The high voltage supply in this receiver delivers 12,000 volts! If it is necessary to remove the kinescope after the receiver has been operating, short the kinescope cone to the chassis before attempting removal of or adjustments to the kinescope. A.C. interlocks are provided at the back of the set so that when the back is removed — so is the power.

Turn the power switch to the "on" position, the function switch to Tel, the brightness control fully clockwise, and picture control counterclockwise.

ION TRAP MAGNET ADJUSTMENT. — Looking at the kinescope gun structure, it will be observed that the second cylinder from the base inside the glass neck is provided with two small metal flags. The ion trap rear magnet poles should be approximately over the ion trap flags. Starting from this position adjust the magnet by moving it forward or backward at the same time rotating it slightly around the neck of the kinescope for the brightest raster on the screen. Reduce the brightness control setting until the raster is slightly above average brilliance. Adjust the focus control (R201 on the chassis rear apron) until the line structure of the raster is clearly visible. Readjust the ion trap magnet for maximum raster brilliance. The final touches on this adjustment should be made with the brightness control at the maximum position with which good line focus can be maintained.

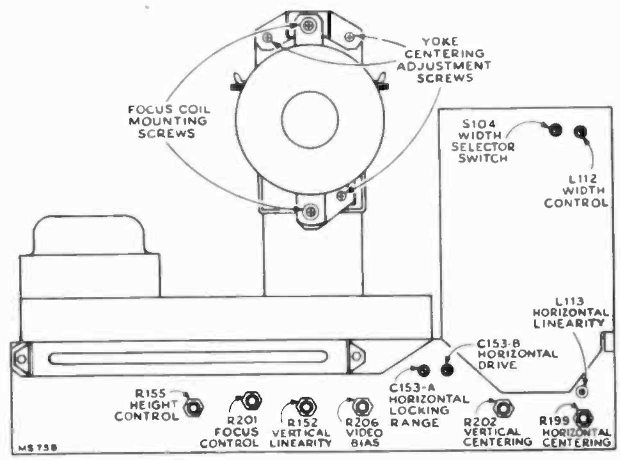


Figure 6—Rear Chassis Adjustments

DEFLECTION YOKE ADJUSTMENT.—If the lines of the raster are not horizontal or squared with the picture mask, rotate the deflection yoke until this condition is obtained. Tighten the yoke adjustment wing screw.

PICTURE ADJUSTMENTS. — It will now be necessary to obtain a test pattern picture in order to make further adjustments. See steps 3 through 9 of the receiver operating instructions on page 3.

If the Horizontal Oscillator is operating properly, it should be possible to sync the picture at this point.

CHECK OF HORIZONTAL OSCILLATOR ALIGNMENT. — Turn the horizontal hold control to the extreme counterclockwise position. The picture should remain in horizontal sync. Momentarily remove the signal by switching off channel then back. Normally the picture will be out of sync. Turn the control clockwise slowly. The number of diagonal black bars will be gradually reduced and when only 3 bars sloping downward to the left are obtained, the picture will pull into sync upon slight additional clockwise rotation of the control. Pull in should occur when the control is approximately 90 degrees from the extreme counterclockwise position. The picture should remain in sync for approximately 90 degrees of additional clockwise rotation of the control. At the extreme clockwise position, the picture should be out of sync and should show 1 vertical or diagonal black bar in the raster.

If the receiver passes the above checks and the picture is normal and stable, the horizontal oscillator is properly aligned. Skip "Alignment of Horizontal Oscillator" and proceed with "Centering Adjustment."

ALIGNMENT OF HORIZONTAL OSCILLATOR. — If in the above check the receiver failed to hold sync with the hold control at the extreme counterclockwise position or failed to hold sync over 90 degrees of clockwise rotation of the control from the pull in point, it will be necessary to make the following adjustments.

Horizontal Frequency Adjustment. — Turn the horizontal hold control to the extreme clockwise position. Tune in a television station and adjust the T109 horizontal frequency adjustment (under the chassis) until the picture is just out of sync and the horizontal blanking appears as a vertical or diagonal black bar in the raster.

Horizontal Locking Range Adjustment. — Set the horizontal hold control to the full counterclockwise position. Momentarily remove the signal by switching off channel then back. Slowly turn the horizontal hold control clockwise and note the least number of diagonal bars obtained just before the picture pulls into sync.

If more than 3 bars are present just before the picture pulls into sync, adjust the horizontal locking range trimmer C153A slightly clockwise. If less than 3 bars are present, adjust C153A slightly counterclockwise. Turn the picture control counterclockwise, momentarily remove the signal and recheck the number of bars present at the pull in point. Repeat this procedure until 3 bars are present.

Repeat the adjustments under "Horizontal Frequency Adjustment" and "Horizontal Locking Range Adjustment" until the conditions specified under each are fulfilled. When the horizontal hold operates as outlined under "Check of Horizontal Oscillator Alignment" the oscillator is properly adjusted.

If it is impossible to sync the picture at this point and the AGC system is operating properly it will be necessary to adjust the Horizontal Oscillator by the method outlined in the alignment procedure. For field purposes paragraph "A" under Horizontal Oscillator Waveform Adjustment may be omitted.

CENTERING ADJUSTMENTS. — Centering is obtained by adjustment of the centering controls and by mechanically orienting the focus coil with three adjustment screws shown in Figure 3. The focus coil should be concentric around the neck of the kinescope to prevent curvature of the raster.

Adjust the focus coil until it is at right angles to the neck of the kinescope. Center the picture with the electrical centering controls. If a shadow appears on a corner of the picture, adjust the focus coil centering screws to eliminate the shadow and re-center the picture with the electrical centering controls.

FOCUS COIL ADJUSTMENTS. — If, after making the centering adjustments in the above paragraph, a corner of the picture is shadowed, it will be necessary to loosen the focus coil mounting screws (shown in Figure 3) and change the position of the coil to eliminate the shadow. Re-center the picture by adjustment of the electrical centering controls and the focus coil centering adjustments.

Recheck the position of the ion trap magnet to insure that maximum brilliance is obtained.

HEIGHT AND VERTICAL LINEARITY ADJUSTMENTS. — Adjust the height control (R155 on chassis rear apron) until the picture fills the mask vertically. Adjust vertical linearity (R162 on rear apron) until the test pattern is symmetrical from top to bottom. Adjustment of either control will require a readjustment of the other. Adjust vertical centering to align the picture with the mask.

WIDTH, DRIVE AND HORIZONTAL LINEARITY ADJUSTMENTS. — Adjust the horizontal drive control C153B to give a picture of maximum width within the limits of good linearity. Adjust the horizontal linearity control L113 to provide best linearity.

A width control coil and a width selector switch are provided. With the switch in position 1 (fully counterclockwise), adjust the width coil until the picture fills the mask. On low line voltages it may not be possible to get sufficient width by adjustment of the width coil. In this case turn the width selector switch clockwise to position 2. In this position the width coil is disconnected, and adjustment of the width coil will have no effect. For still greater width, turn the width selector switch fully clockwise to position 3. In this position, the 6BG6G screen voltage is increased as well as disconnecting the width control coil.

Adjustments of the horizontal drive control affect horizontal oscillator hold and locking range. If the drive control was adjusted, recheck the oscillator alignment.

FOCUS. — Adjust the focus control (R201 on chassis rear apron) for maximum definition in the test pattern vertical "wedge" and best focus in the white areas of the pattern.

Check to see that the cushion and yoke thumbscrews and the focus coil mounting screws are tight.

VIDEO BIAS CONTROL. — Normally the video bias control (R206) should be in the fully clockwise position. To check to see if this is the correct position, turn the picture control clockwise and adjust the brightness control until the retrace lines just disappear. If the whites are compressed as indicated by a "washed out" appearance in light areas, turn the video bias control counterclockwise until the picture appears normal.

Replace the cabinet back and make sure that the screws holding it are up tight, otherwise it may rattle or buzz when the receiver is operated at high volume.

CHECK OF R-F OSCILLATOR ADJUSTMENTS. — Tune in all available stations to see if the receiver r-f oscillator is adjusted to the proper frequency on all channels. If adjustments are required, these should be made by the method outlined in the alignment procedure. The adjustments for channels 2 through 5 and 7 through 12 are available from the front of the cabinet by removing the station selector escutcheon as shown in Figure 7. Adjustment for channel 13 is on top of the chassis and channel 6 adjustment is in the kinescope well.

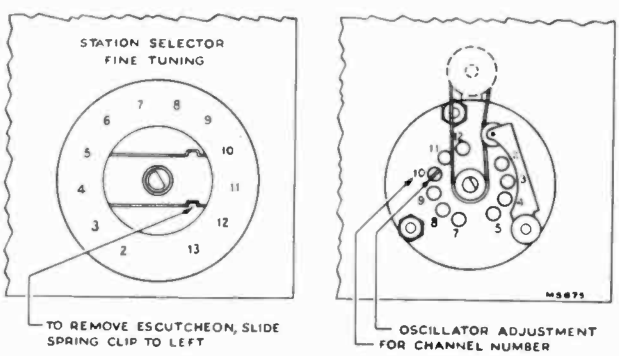


Figure 7—R-F Oscillator Adjustments

CAUTION. — The ion trap magnet employed for 16AP4 kinescopes is not the same as that used on 10BP4 tubes. Care should be taken to insure that the proper magnet supplied with the instrument is used. The type magnet shown in Figure 3 carries the number 986432-1 stamped on it.

RADIO OPERATION. — Turn the receiver function switch to AM and FM positions and check the radio for proper operation. Tune in a station of known frequency. If the dial pointer does not point to the correct spot on the dial, slip the dial pointer on the dial cord until the proper indication is obtained.

CHASSIS TOP VIEW

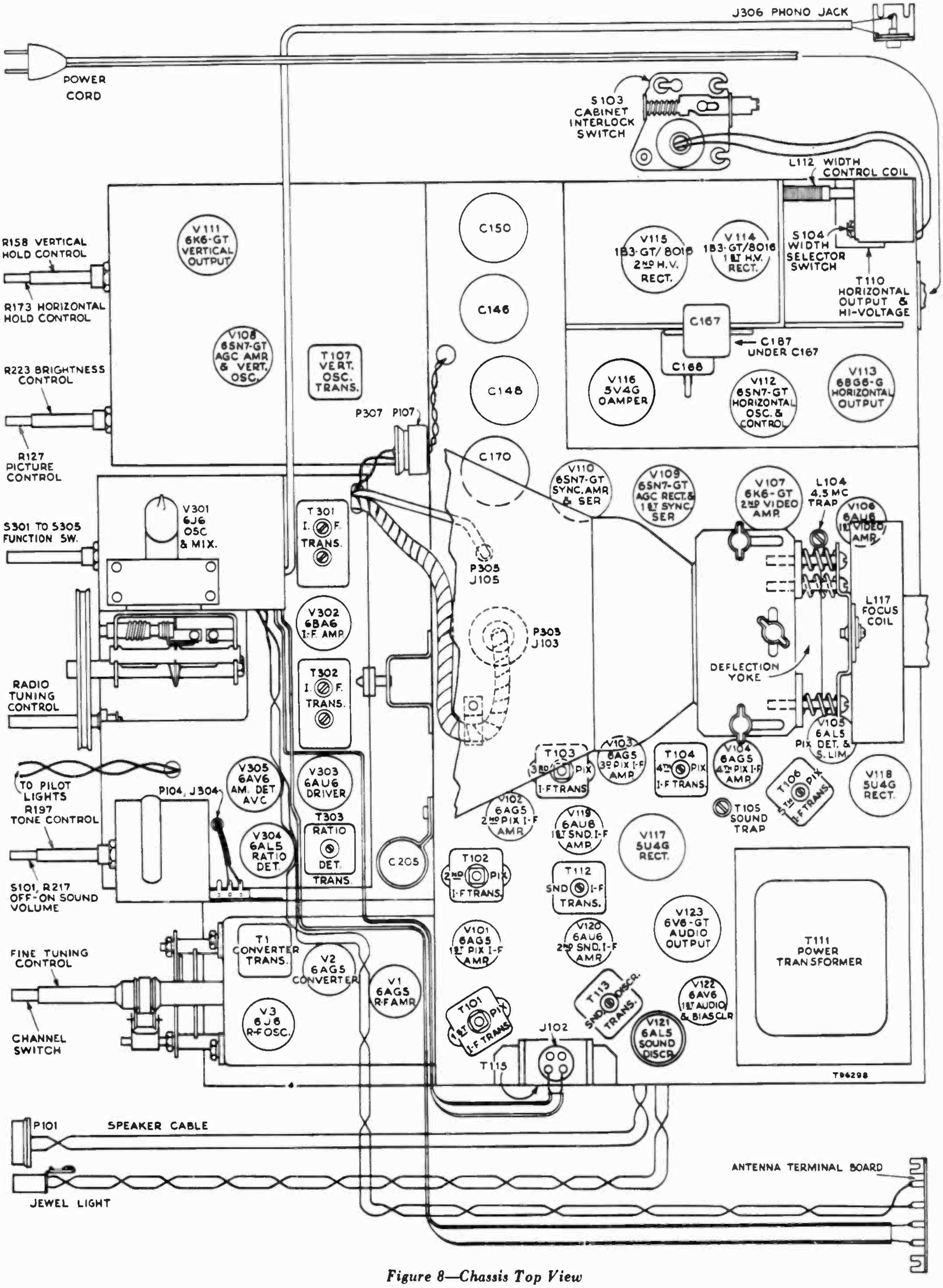


Figure 8—Chassis Top View

CHASSIS BOTTOM VIEW 8TK320

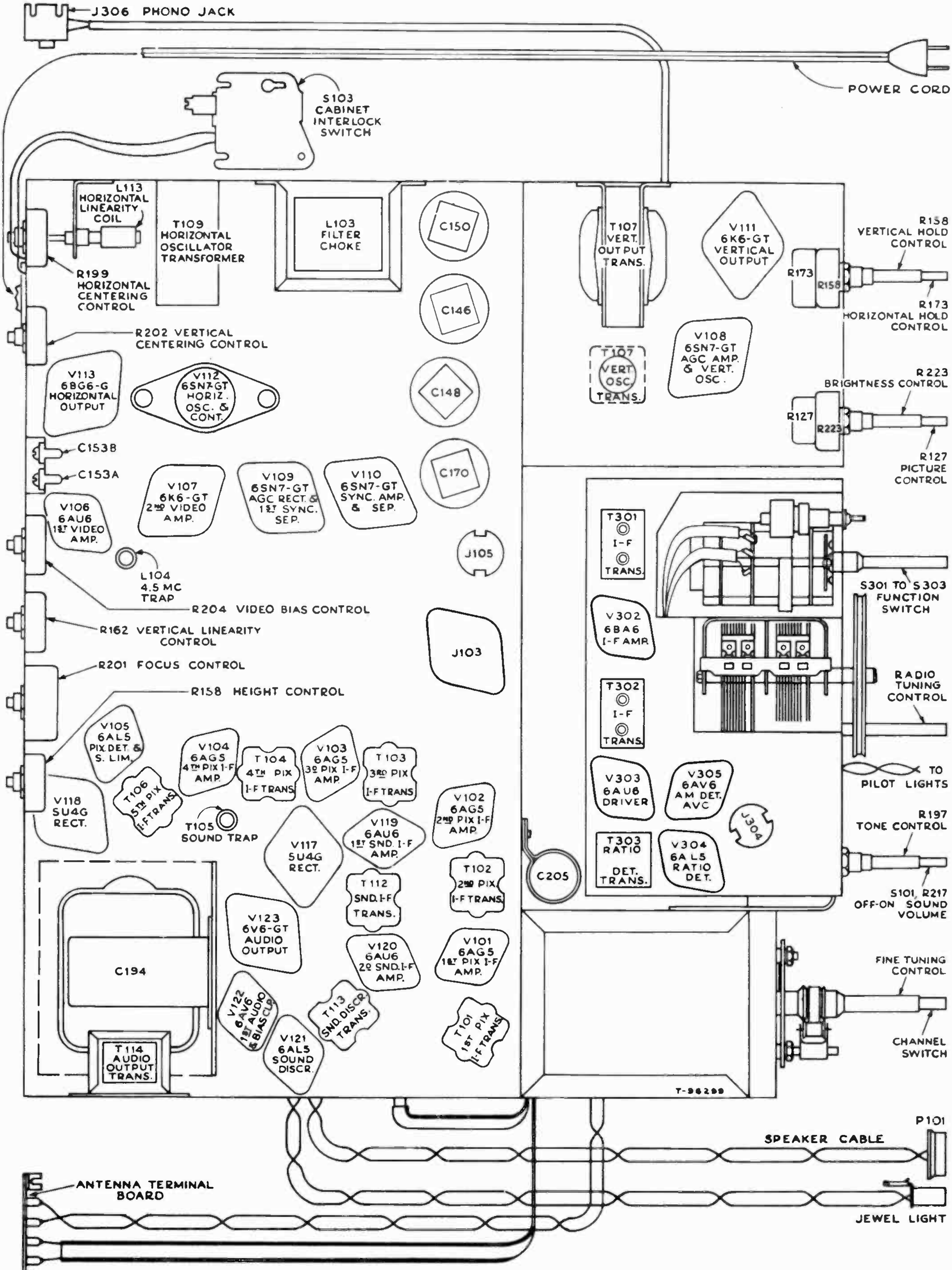


Figure 9—Chassis Bottom View

VOLTAGE CHART

The following measurements represent three sets of conditions. In the first condition, the function switch is in the television position and a 2200 microvolt test pattern signal was fed into the receiver and the picture synced. The second condition was obtained by removing the antenna leads and short circuiting the receiver antenna terminals. In the third condition, in order to get radio operating voltages, the function switch was placed in the F-M position. Voltages shown are read with "Jr. VoltOhmyst" between the indicated terminal and chassis ground and with the receiver operating on 117 volts, 60 cycles, a-c.

Tube No.	Tube Type	Function	Operating Condition	E. Plate Pin No.	E. Plate Volts	E. Screen Pin No.	E. Screen Volts	E. Cathode Pin No.	E. Cathode Volts	E. Grid Pin No.	E. Grid Volts	I Plate (ma.)	I Screen (ma.)	Notes on Measurements
V1	6AG5	R-F Amplifier	2200 Mu. V. Signal	5	140	6	142	2 & 7	0	1	−4.9	.7	.3	
			No Signal	5	67	6	111	2 & 7	0	1	−0.3	14.0	5.0	
V2	6AG5	Converter	2200 Mu. V. Signal	5	137	6	137	2 & 7	0	1	*−5.4	—	—	*Depending upon channel
			No Signal	5	108	6	108	2 & 7	0	1	*−2.0 to −7.0	*6.0 to 10	*1.5 to 3.0	
V3	6J6	R-F Oscillator	2200 Mu. V. Signal	1 & 2	90.5	—	—	7	19	5 & 6	*−7.0	—	—	*Depending upon channel
			No Signal	1 & 2	*68 to 81	—	—	7	16	5 & 6	*−4.5 to −6.6	*1.8 to 2.1	—	
V101	6AG5	1st Pix. I-F Amplifier	2200 Mu. V. Signal	5	136	6	136	2 & 7	<0.1	1	−4.2	0.5	0.1	
			No Signal	5	110	6	103	2 & 7	0.17	1	−1.5	3.8	0.6	
V102	6AG5	2d Pix. I-F Amplifier	2200 Mu. V. Signal	5	122	6	122	2 & 7	0.9	1	0	10.3	2.9	
			No Signal	5	96	6	100	2 & 7	0.6	1	0	6.8	2.0	
V103	6AG5	3d Pix. I-F Amplifier	2200 Mu. V. Signal	5	130	6	137	2 & 7	<0.1	1	−4.2	1.0	.3	
			No Signal	5	95	6	106	2 & 7	0.17	1	−1.5	3.6	.8	
V104	6AG5	4th Pix. I-F Amplifier	2200 Mu. V. Signal	5	194	6	137	2 & 7	1.6	1	0	8.3	2.7	
			No Signal	5	200	6	113	2 & 7	1.2	1	0	7.1	1.4	
V105 A	6AL5	Picture 2d Det.	2200 Mu. V. Signal	7	−117	—	—	1	−115	—	—	0.2	—	
			No Signal	7	−130	—	—	1	−125	—	—	0.3	—	
V105 B	6AL5	Sync Limiter	2200 Mu. V. Signal	2	−131	—	—	5	−46	—	—	<0.1	—	
			No Signal	2	−100	—	—	5	−52	—	—	<0.1	—	
V106	6AU6	1st Video Amplifier	2200 Mu. V. Signal	5	−68	6	27	7	−114.5	1	−117	3.9	1.8	
			No Signal	5	−72	6	25	7	−124	1	−130	3.7	1.6	
V107	6K6 GT	2d Video Amplifier	2200 Mu. V. Signal	3	*68	4	140	8	−47	5	−68	10.0	2.5	*Maximum contrast
			No Signal	3	*34	4	120	8	−52	5	−72	11.0	2.3	
V108 A	6SN7 GT	AGC Amplifier	2200 Mu. V. Signal	5	−24	—	—	6	−50	4	−51	0.4	—	
			No Signal	5	−7	—	—	6	−56	4	−60	<0.1	—	
V108 B	6SN7 GT	Vertical Oscillator	2200 Mu. V. Signal	2	54	—	—	3	−110	1	−157	0.32	—	
			No Signal	2	39	—	—	3	−125	1	−171	0.32	—	
V109	6SN7 GT	AGC Rectifier	2200 Mu. V. Signal	5	27	—	—	6	−51	4	−68	0.25	—	
			No Signal	5	19	—	—	6	−59	4	−70	0.25	—	
V109	6SN7 GT	1st Sync Separator	2200 Mu. V. Signal	2	23	—	—	3	−52	1	−68	0.13	—	
			No Signal	2	18	—	—	3	−63	1	−70	0.18	—	
V110	6SN7 GT	Sync Amplifier	2200 Mu. V. Signal	2	81	—	—	3	−46	1	−48	10.8	—	
			No Signal	2	71	—	—	3	−50	1	−54	10.8	—	
V110	6SN7 GT	Sync Separator	2200 Mu. V. Signal	5	210	—	—	6	−44	4	−131	0.34	—	
			No Signal	5	200	—	—	6	−51	4	−100	0.15	—	

VOLTAGE CHART

Tube No.	Tube Type	Function	Operating Condition	E. Plate		E. Screen		E. Cathode		E. Grid		I Plate (ma.)	I Screen (ma.)	Notes on Measurements
				Pin No.	Volts	Pin No.	Volts	Pin No.	Volts	Pin No.	Volts			
V111	6K6-GT	Vertical Output	2200 Mu. V. Signal	3	197	4	*197	8	−76	5	−96	7.7	1.3	*Screen connected to plate
			No Signal	3	185	4	*185	8	−93	5	−110	7.6	1.3	
V112	6SN7 GT	Horizontal Osc. Control	2200 Mu. V. Signal	2	25	—	—	3	−120	1	−110	0.24	—	Horizontal hold control completely clockwise
			No Signal	2	−8	—	—	3	−146	1	−128	0.1	—	
			No Signal	2	+60	—	—	3	−130	1	−114	0.13	—	Hold control counterclockwise
V112	6SN7 GT	Horizontal Oscillator	2200 Mu. V. Signal	5	75	—	—	6	−115	4	−190	2.3	—	
			No Signal	5	60	—	—	6	−125	4	−204	1.5	—	
V113	6BG6G	Horizontal Output	2200 Mu. V. Signal	Cap	*	8	180	3	−100	5	−120	90.0	10.0	*5200 volt pulse present
			No Signal	Cap	Do Not Meas.	8	160	3	−112	5	−126	92.6	10.4	
V114	1B3GT/8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	6400	—	—	—	—	*6000 volt pulse present
			Brightness Max.	Cap	Do Not Meas.	—	—	2 & 7	6100	—	—	—	—	
V115	1B3GT/8016	H. V. Rectifier	Brightness Min.	Cap	*	—	—	2 & 7	11700	—	—	—	—	*6000 volt pulse present
			Brightness Max.	Cap	Do Not Meas.	—	—	2 & 7	11600	—	—	—	—	
V116	5V4G	Damper	2200 Mu. V. Signal	4 & 6	*	—	—	2 & 8	350	—	—	93.0	—	*1200 volt pulse present
			No Signal	4 & 6	Do Not Meas.	—	—	2 & 8	340	—	—	92.0	—	
V117 V118	5U4G	Rectifier	2200 Mu. V. Signal	4 & 6	*365	—	—	2 & 8	277	—	—	†125	—	†Per tube *A-C measured from plate to trans. center tap
			No Signal	4 & 6	*365	—	—	2 & 8	264	—	—	†130	—	
V119	6AU6	1st Sound I-F Amplifier	2200 Mu. V. Signal	5	131	6	131	7	0.65	1	0	6.0		
			No Signal	5	106	6	106	7	0.55	1	0	4.9		
V120	6AU6	2d Sound I-F Amplifier	2200 Mu. V. Signal	5	136	6	80	7	0	1	−0.6	3.5		
			No Signal	5	111	6	62	7	0	1	−0.7	3.0		
V121	6AL5	Sound Discrim.	2200 Mu. V. Signal	2	−1.4	—	—	5	0	—	—	—	—	
			No Signal	2	−0.7	—	—	5	0	—	—	—	—	
V122	6AV6	1st Audio Amplifier	2200 Mu. V. Signal	7	88	—	—	2	0	1	−0.7	0.5	—	
			No Signal	7	91	—	—	2	0	1	−0.7	0.5	—	
V123	6V6-GT	Audio Output	2200 Mu. V. Signal	3	152	4	165	8	−94	5	−115	24.0	3.4	
			No Signal	3	139	4	152	8	−107	5	−125	24.0	3.4	
V124	16AP4	Kinescope	2200 Mu. V. Signal	Cap	11700	10	320	11	26	2	−29	0.08	—	Average Brightness
			No Signal	Cap	11600	10	305	11	11	2	−47	0.08	—	Average Brightness
V301	6J6	Mixer and Oscillator	No Signal	1 2	110 95	— —	— —	7	0	6 5	−2.0 −5.0	— —	— —	
V302	6BA6	Radio I-F Amplifier	No Signal	5	210	6	105	7	8	1	−0.2	—	—	Function switch in F-M position
V303	6AV6	Radio F-M Driver	No Signal	5	205	6	135	7	1.5	1	0	—	—	
V304	6AL5	Radio Ratio Det.	No Signal	2 7	−0.2 −0.2	—	—	5 1	−0.2 −0.1	— —	— —	— —	— —	
V305	6AV6	Radio A-M Det.	No Signal	6 Diode	−0.2	—	—	2	0	—	—	—	—	

8TK320

RADIO ALIGNMENT PROCEDURE

If any lead dressing is necessary, it should be done before aligning the receiver. When making a complete alignment follow the table below in sequence. If only a portion of the circuit is to be aligned select the portion required and follow with the remaining steps in the section. Any adjustments made on the 455 kc. I-F's make it necessary to adjust the 10.7 mc. I-F's.

"AM" R-F—I-F ALIGNMENT

Test-Oscillator. — For all alignment operations, connect low side of the test-osc. to the receiver chassis, and keep the osc. output as low as possible to avoid a-v-c action. **Output Meter.** — Connect the meter across the speaker voice coil, and turn the receiver volume control to max.

Steps	Connect the High Side of the Test. Osc. to—	Tune Test Osc. to—	Function Switch	Turn Radio Dial to—	Adjust the following
1	Antenna terminal in series with .01 mfd.	455 kc. Modulated	AM	Low Freq. end of Dial	†Top and bot. cores of T301 and T302. (For max. voltage across voice coil.)
2	Ant. terminal through dummy ant. of 200 mmfs.	1,620 kc.	AM	Min. capacity	Osc. C308 for maximum output.
3		1,400 kc.	AM	Tune to signal	Ant. C304 for maximum output.
4		600 kc.	AM	600 kc.	Osc. L306 and Ant. L303.
5	Repeat steps 2, 3 and 4 for maximum output.				

† Use alternate loading. Connect an 18,000-ohm resistor across the primary to load the plate winding while the grid winding of the same transformer is being peaked. Then load the grid winding with the 18,000-ohm resistor while the plate winding is being peaked.

RATIO DETECTOR ALIGNMENT

Connect probe of "VoltOhmyst" to negative side of C328 and low side to chassis. Connect output meter across speaker voice coil.

Steps	Connect the High Side of the Test. Osc. to—	Tune Test Osc. to—	Function Switch	Radio Dial Tuned to—	Adjust
6	Pin No. 1 of 6AU6 (V303) in series with .01 mfd.	10.7 mc. 30% AM Modulated	FM	———	Top of T303 for maximum DC on "VoltOhmyst."
7	Pin No. 1 of 6AU6 (V303) in series with .01 mfd.		FM	———	Bottom of T303 for minimum audio output on meter.
8	Repeat steps 6 and 7 as necessary making final adjustment with r-f input level set to give approximately –3.0 volts d-c on "VoltOhmyst."				

"FM" R-F—I-F ALIGNMENT

Steps	Connect the High Side of the Test. Osc. to—	Tune Test Osc. to—	Function Switch	Radio Dial Tuned to—	Adjust
9	Terminal 3 of S302 rear through 270 ohms.	10.7 mc.	FM	88 mc.	*T301 and T302 with r-f input set to give –3 volts on "VoltOhmyst."
10	Terminal 3 of S302 rear through 270 ohms.	106 mc.	FM	106 mc.	Set C302 to max. capacity. Squeeze L307 and adjust C302 for maximum.
11	Terminal 3 of S302 rear through 270 ohms.	90 mc.	FM	Tune to signal	Squeeze L301 and rock gang for maximum output.
12	Repeat steps 10 and 11 as required.				

* Use a 680-ohm resistor to load the plate winding while the grid winding of the same transformer is being peaked. Then the grid winding is loaded with 680-ohm resistor while the plate winding is being peaked.

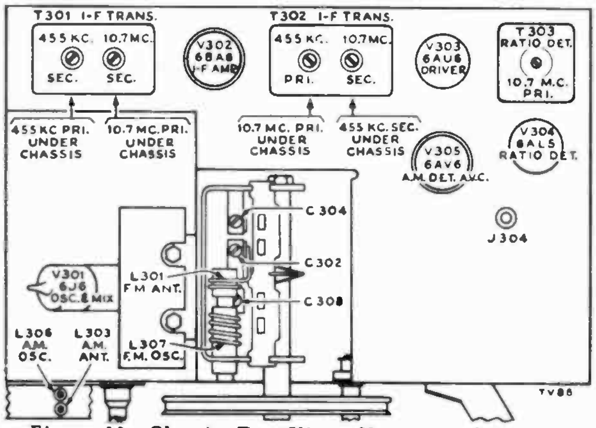


Figure 10—Chassis, Top View, Showing Adjustments

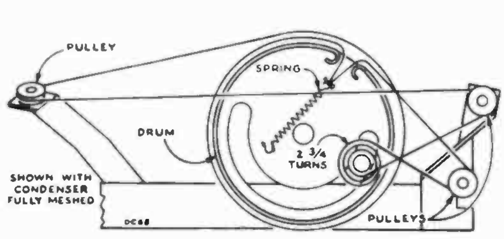


Figure 11—Dial and Drive Cord Assembly

CRITICAL LEAD DRESS:

1. Ground lead on pin 2 of V302 and V303 should be dressed down flat on chassis.
2. Dual .005 mfd. capacitors and diode filter should be dressed to clear the bottom of the cabinet.
3. Dress C329 across V302 sockets with short and direct leads.
4. Dress V302 plate lead from pin 5 down to the chassis.
5. Dress AVC lead from R321 to switch down to chassis and against back of gang mounting plate.
6. Dress lead from pin 6 of V305 down to chassis and against back of gang mounting plate.
7. Dress AVC lead from 1st I-F to switch against chassis and against gang mounting plate.
8. Dress lead from switch to pin 1 of V301 against plate supporting gang.
9. Dress all insulated F-M leads down to chassis.
10. Connect C309 with short lead to pin 6 of V301 keeping body of cap away from plate lead and switch terminals.
11. The coupling between L301 and L307 should be adjusted to give proper injection voltage to the mixer grid. This has been found to be correct when the distance between adjacent end turns is 3/8" to 7/16" measured at top of the form.
12. Dress cabled leads away from antenna transmission lines.
13. Dress all uninsulated bus wire so as to avoid short circuits.

SERVICE SUGGESTIONS

Following is a list of symptoms of possible failures and an indication of some of the possible faults.

NO RASTER ON KINESCOPE:

(1) Incorrect adjustment of ion trap magnet—Magnets reversed either front to back or top to bottom, front magnet incorrectly oriented.

(2) V113, V114 or V115 inoperative—check voltage and waveform on grids and plates.

(3) No high voltage—If horizontal deflection is operating as evidenced by the correct waveform on terminal 4 of horizontal output transformer, the trouble can be isolated to the 8016 circuit. Either the T110 high voltage winding is open (points 2 to 3), an 8016 tube is defective, its filament circuit is open, C167, C168 or C187 is shorted or R189, R190, R191, R192 or R193 is open.

(4) V112 circuit inoperative—Refer to schematic and waveform chart.

(5) Damper tube (V116) inoperative.

(6) Defective kinescope.

(7) R223 open (terminal 3 to R224).

(8) No receiver plate voltage—filter capacitor or filter choke shorted—bleeder or filter choke open.

NO VERTICAL DEFLECTION:

(1) V108B or V111 inoperative—check voltage and waveforms on grids and plates.

(2) T107 or T108 open.

(3) Vertical deflection coils open.

SMALL RASTER:

(1) Low Plus B or low line voltage.

(2) V113 defective.

POOR VERTICAL LINEARITY:

(1) If adjustment cannot correct, change V111.

(2) Vertical output transformer defective.

(3) V108B defective—check voltage and waveforms on grid and plate.

(4) C147, R164, C148B or C150C defective.

(5) Low bias or plate voltage—check rectifiers and capacitors in supply circuits.

POOR HORIZONTAL LINEARITY:

(1) If adjustments do not correct, change V113 or V116.

(2) T110 or L113 defective.

(3) C164 or C165 defective.

WRINKLES ON LEFT SIDE OF RASTER:

(1) R166, R167 or C169 defective.

(2) Defective yoke.

PICTURE OUT OF SYNC HORIZONTALLY:

(1) T109 incorrectly tuned.

(2) R172, R173, R174, R176 or R178 defective.

TRAPEZOIDAL OR NON-SYMMETRICAL RASTER:

(1) Improper adjustment of focus coil or ion trap magnet.

(2) Defective yoke.

RASTER AND SIGNAL ON KINESCOPE BUT NO SOUND:

(1) R-F oscillator off frequency.

(2) Sound i-f, discriminator or audio amplifier inoperative—check V119, V120, V121, V122, V123 and their socket voltages.

(3) T114 or C186 defective.

(4) Speaker defective.

SIGNAL AT KINESCOPE GRID BUT NO SYNC:

(1) V105A, V106, V108A, V109 or V111 inoperative—check voltage and waveforms at their grids and plates.

(2) Check V104. Try another tube.

SIGNAL ON KINESCOPE GRID BUT NO VERTICAL SYNC:

(1) Check V108B and associated circuit—C145, T107, etc.

(2) Integrating network inoperative—check.

(3) R154, R155, R157, R158 or R159 defective.

SIGNAL ON KINESCOPE GRID BUT NO HORIZONTAL SYNC:

(1) T109 misadjusted—readjust as instructed.

(2) V112 inoperative—check socket voltages and waveforms.

(3) T109 defective.

(4) C140, C153A, C154, C155, C157 or C166 defective.

(5) If horizontal speed is completely off and cannot be adjusted check C158, C159, R172, R173, R174, R179 and R182.

SOUND AND RASTER BUT NO PICTURE OR SYNC:

(1) Picture i-f, detector or video amplifier inoperative—check V103, V104, V105, V106 and V107—check socket voltages.

(2) Bad contact to kinescope grid.

PICTURE STABLE BUT POOR RESOLUTION:

(1) V105A, V106 or V107 defective.

(2) Peaking coils defective—check for specified resistance.

(3) Make sure that the focus control operates on both sides of proper focus.

(4) R-F and I-F circuits misaligned.

PICTURE SMEAR:

(1) R-F or I-F circuits misaligned.

(2) Open peaking coil.

(3) This trouble can originate at the transmitter—check on another station.

PICTURE JITTER:

(1) Check for proper operation of hold controls.

(2) If regular sections at the left picture are displaced change V113.

SERVICE SUGGESTIONS

(3) Vertical instability may be due to loose connections or noise.

(4) Horizontal instability may be due to unstable transmitted sync.

RASTER BUT NO SOUND, PICTURE OR SYNC:

(1) Defective antenna or transmission line.

(2) R-F oscillator off frequency.

(3) R-F unit inoperative—check V1, V2, V3.

PICTURE I-F RESPONSE. — At times it may be desirable to observe the individual i-f stage response. This can be achieved by the following method:

Shunt all i-f transformers and coils with a 330 ohm carbon resistor except the one whose response is to be observed.

Connect a wide band sweep generator to the converter grid and adjust it to sweep from 18 mc. to 30 mc.

DARK VERTICAL LINE ON LEFT OF PICTURE:

(1) Reduce horizontal drive and readjust width and horizontal linearity.

(2) Replace V113.

LIGHT VERTICAL LINE ON LEFT OF PICTURE:

(1) C169 defective.

(2) V116 defective.

Connect the oscilloscope across the picture detector load resistor and observe the overall response. The response obtained will be essentially that of the unshunted stage. The effects of the various traps are also visible on the stage response.

TELEVISION CRITICAL LEAD DRESS

1. The ground bus from pin 2 and the center shield of V120 socket should not be shortened or rerouted.
2. Dress the body of R195 as close to tube pin as possible.
3. Do not change the dress of the filament leads or the bypass capacitors in the picture or sound i-f circuits. The filament leads between V120, V121 and V122 should be down against the chassis and away from grid or plate leads.
4. Dress all leads crossing the i-f circuits close to the chassis and held so they cannot move and change alignment.
5. If it is necessary to replace any of the 1500 mmf. capacitors in the picture i-f circuit, the lead length must be kept as short as possible.
6. Picture i-f coupling capacitors C106, C111, C115 and C121 should be up and away from the chassis and should be clear of the pix i-f transformer adjustments by at least ¼ inch. If the dress of any of these capacitors is changed, the i-f alignment should be rechecked.
7. Leads to L102 and L103 must be as short as possible.
8. Dress peaking coils L1C5, L106, L107, L108 and L109 up and away from the chassis.
9. Dress R129 away from L109.
10. Dress C183 across V121 tube pins 5 and 6 with leads not exceeding ⅜ inch.
11. Dress C129 and C199 up and away from the chassis.
12. Dress the blue lead from pin 5 of V122 down against the chassis and under two shielded leads.
13. Dress the yellow lead from the picture control away from the chassis. Dress the yellow lead from pin 8 of V106 away from the chassis.
14. Dress the green lead from pin 8 of V107 away from the chassis.
15. Dress R168, R169, R170, R176 and R178 up and away from the chassis.
16. The leads to the volume control should be dressed down against the chassis and away from V119 and V120.
17. Dress the red and yellow lead from the power transformer away from the two terminal boards on the end apron of the chassis and away from all audio circuits.
18. Dress the yoke red horizontal deflection lead under the clips of the fixed H. V. shield.
19. Dress the green lead from C166 close to the chassis and away from the red lead connected to T110-4.
20. Insert the red lead into T110-4 from the top of the terminal.
21. All soldered connections in the high voltage compartment should be free of sharp points.
22. Contact between the r-f oscillator frequency adjustment screws and the oscillator coils or channel switch eyelets must be avoided.

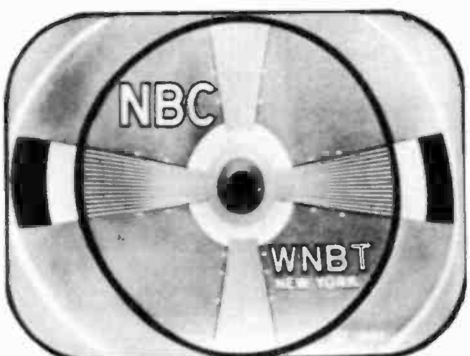
REFER TO PAGES 522 TO 535 INC. FOR TELEVISION ALIGNMENT AND WAVEFORM PHOTOGRAPHS

TEST PATTERN PHOTOGRAPHS

Figure 12—Normal Picture

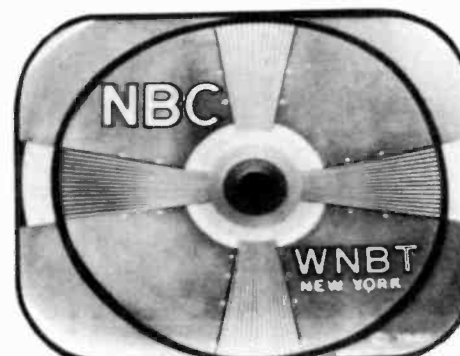
PH106B

Figure 13—Focus Coil and Ion Trap Magnet Misadjusted



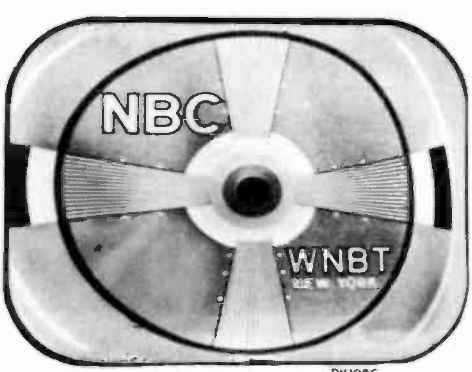
PH108A

Figure 14—Horizontal Linearity Control Misadjusted (Picture Cramped in Middle)



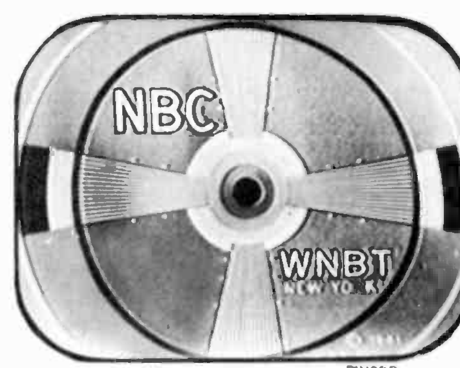
PH108B

Figure 15—Width Control Misadjusted



PH108C

Figure 16—Horizontal Drive Control Misadjusted

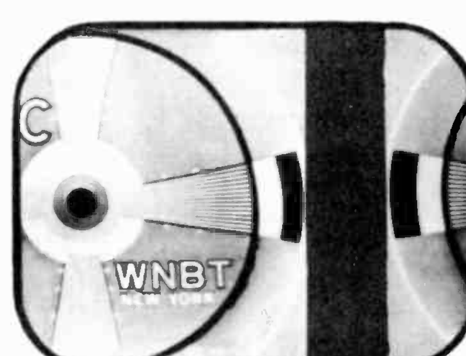


PH109B

Figure 17—Transients

PH227-2

Figure 18—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is in a Counterclockwise Position—Just Before Pulling Into Sync



PH109D

Figure 19—Test Pattern Showing Out of Sync Condition When Horizontal Hold Control Is at the Maximum Clockwise Position

RADIO CHASSIS WIRING DIAGRAM

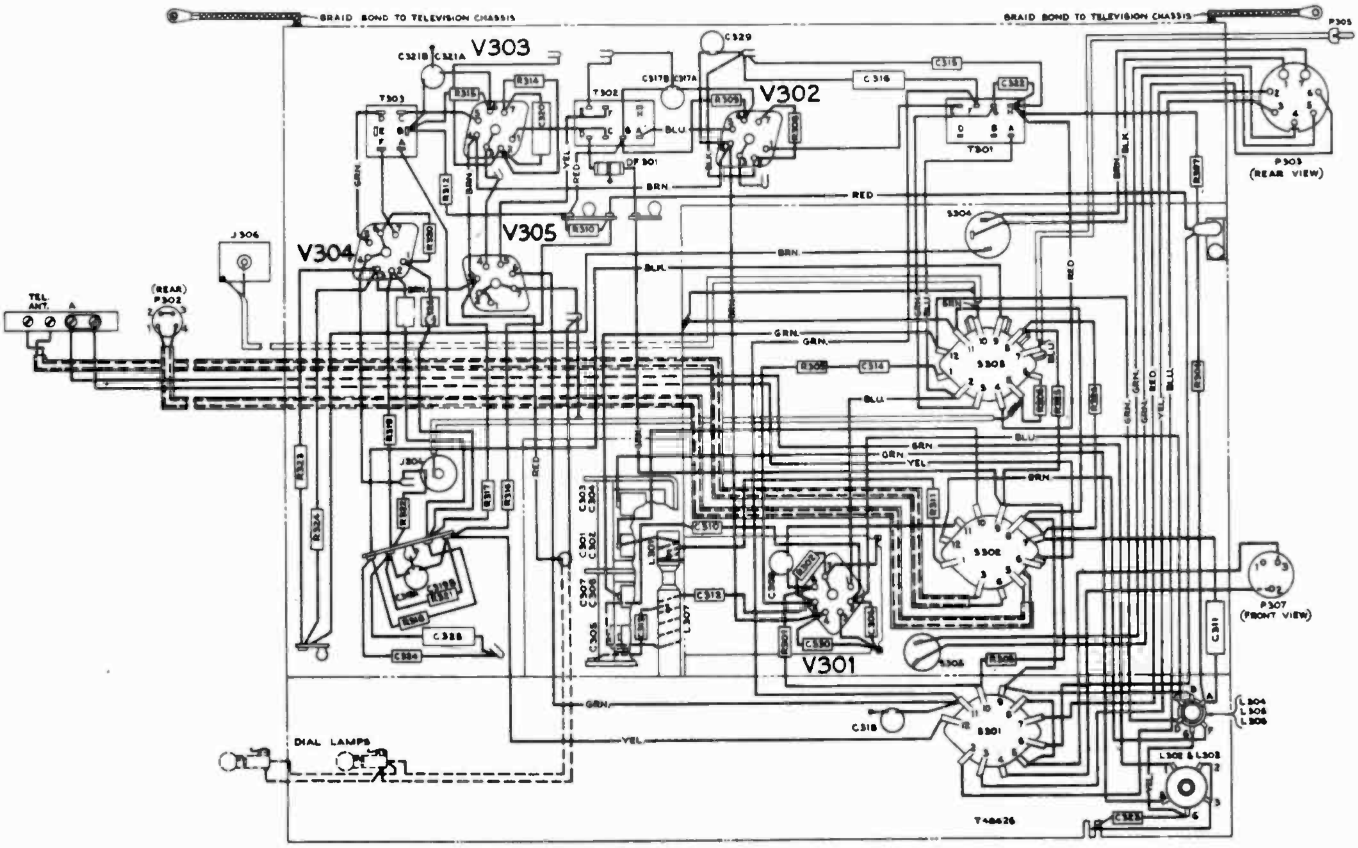


Figure 20—Radio Chassis Wiring Diagram (RK135A)

R-F UNIT WIRING DIAGRAM

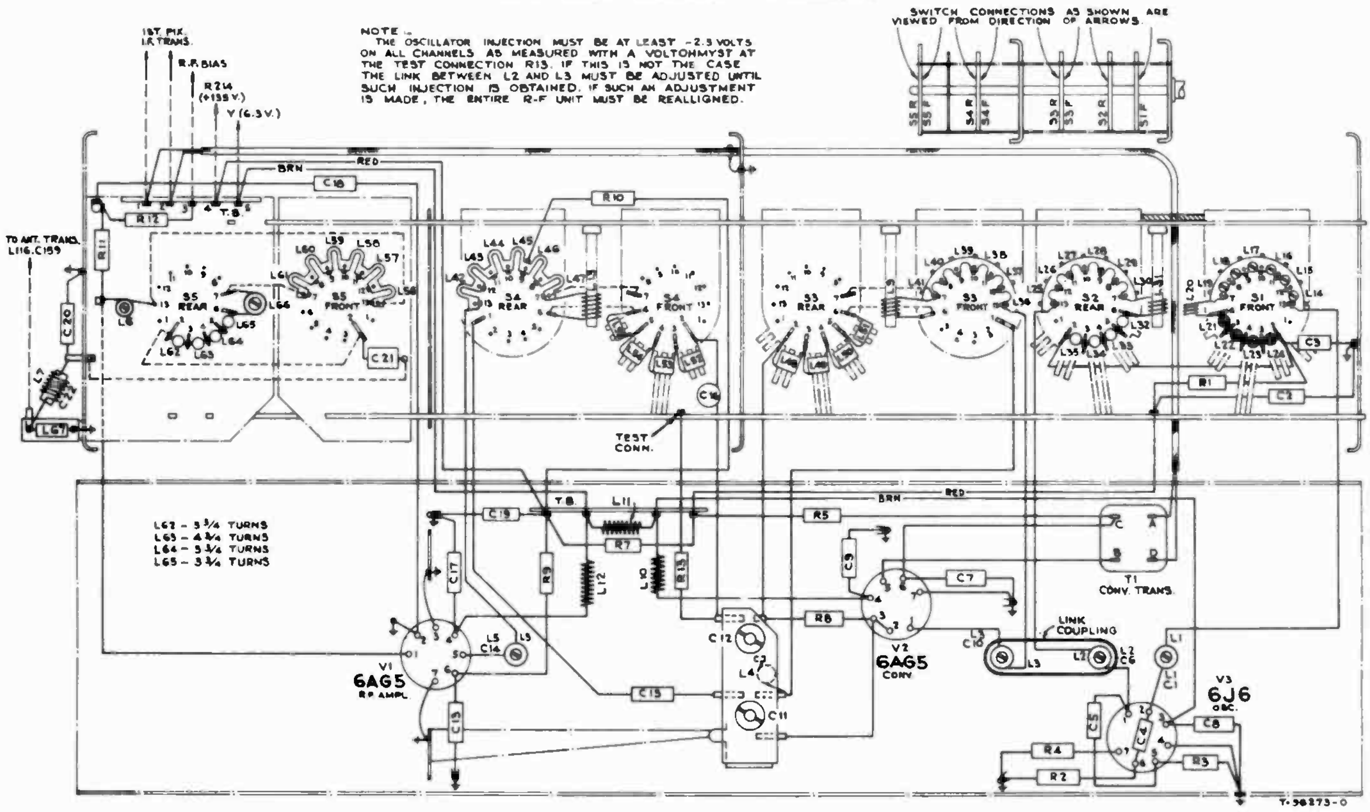


Figure 21—R-F Unit Wiring Diagram

R-F UNIT ASSEMBLIES
KRK5A

STOCK No.	DESCRIPTION
73465	Belt—Drive belt
73478	Cable—I-F transmission cable (4⅞") (W1)
73441	Cam—Fine tuning adjustment cam
74035	Capacitor—Ceramic, 5 mmf. (C4, C5)
53511	Capacitor—Ceramic, 10 mmf. (C3)
54207	Capacitor—Ceramic, 18 mmf. (C20)
73449	Capacitor—Ceramic trimmer, comprising 1 section of 150-190 mmf. and 1 section of 65-95 mmf. (C11, C12)
73091	Capacitor—Ceramic, 270 mmf. (C21)
71501	Capacitor—Ceramic, 1,500 mmf. (C2, C7, C8, C9, C13, C15, C17, C18, C19)
73473	Capacitor—Ceramic, 5,000 mmf. (C16)
73475	Coil—Antenna filter shunt coil (L67)
73477	Coil—Choke coil (L10, L11, L12)
73874	Coil—Oscillator plate coil or converter grid coil for channel No. 6 (L9, L31)
73462	Coil—Coupling inductance coil (L4)
73443	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with plunger adjustment) (L1, C1)
74108	Coil—Fine tuning coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with plunger adjustment) (L1, C1)
73476	Coil—I-F trap coil (L7, C22)
73461	Coil—Oscillator plate coil (4 turns) (L20)
73460	Coil—R-F plate coil for channel No. 6 (L13)
73444	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
74109	Coil—Trimmer coil (1½ turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for oscillator section or converter section (L2, C6, L3, C10)
73446	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (smooth bushing type with screw adjustment) for r-f amplifier section (L5, C14)
74110	Coil—Trimmer coil (3 turns) with adjustable inductance core and capacitor stud (threaded bushing type with screw adjustment) for r-f amplifier section (L5, C14)
71493	Connector—Oscillator segment connector
73455	Core—Sliding core for fine tuning control trimmer
74187	Core—Adjustable core for L31
73440	Detent—R-F unit detent mechanism and fibre shaft
71487	Form—Coil form for oscillator plate coil for channel No. 6 (L31)
73453	Form—Coil form assembly for L9, L13
73442	Link—Link assembly fine tuning
71462	Loop—Oscillator to converter trimmer loop connector
73634	Nut—Speed nut for drive belt shield
73467	Nut—Speed nut to mount trimmer coils 73444, 73443 and 73446
74166	Plate—Front plate and bushing
73464	Pulley—Idler pulley
	Resistor—Fixed, composition, 47 ohms ±20%, ½ watt (R4)
	Resistor—Fixed, composition, 150 ohms ±20%, ½ watt (R5, R9, R12)
	Resistor—Fixed, composition, 1,000 ohms ±20%, ½ watt (R7)
	Resistor—Fixed, composition, 1,000 ohms ±10%, ½ watt (R11)
	Resistor—Fixed, composition, 2,700 ohms ±10%, ½ watt (R10)
	Resistor—Fixed, composition, 10,000 ohms ±20%, ½ watt (R1)
	Resistor—Fixed, composition, 100,000 ohms ±20%, ½ watt (R2, R3, R8, R13)
14343	Retainer—Channel selector shaft retaining ring
30340	Retainer—Retainer for fine tuning link stud
71476	Screw—No. 4-40 x ¼" binder head screw for adjusting coils L14, L15, L16, L17, L18, L19
71475	Screw—No. 4-40 x .296 adjusting screw for coils L6, L21, L22, L23, L24
73640	Screw—No. 4-40 x ⅜" adjusting screw for L66
74167	Shaft—Actuating shaft for fine tuning control
74168	Shaft—Channel selector shaft complete with pawl and stud
73438	Shaft—Fine tuning control shaft pulley
72951	Shield—Metal tube shield for V3
73454	Shield—Metal shield for drive belt
73632	Shield—Metal tube shield for V1
71494	Socket—Tube socket
73450	Socket—Tube socket, ceramic, 7 prong bottom mounting
73457	Spring—Return spring for fine tuning control core
74188	Spring—Retaining spring for adjustable core 74187
73456	Spring—Tension spring for drive belt shield
73633	Stator—Antenna stator complete with rotor and coils (S5, L6, L56, L57, L58, L59, L60, L61, L62, L63, L64, L65, L66, C21)
73470	Stator—Converter stator complete with rotor and coils (S3, L9, L36, L37, L38, L39, L40, L41, L48, L49, L50, L51)
73468	Stator—Front oscillator section stator complete with rotor, segment, coils and adjusting screws (S1, L14, L15, L16, L17, L18, L19, L21, L22, L23, L24)
73469	Stator—Rear oscillator section stator complete with rotor, segment and coils (S2, L25, L26, L27, L28, L29, L30, L32, L33, L34, L35)
73471	Stator—R-F amplifier stator complete with rotor and coils (S4, L13, L42, L43, L44, L45, L46, L47, L52, L53, L54, L55, C15, C16, R10)
73448	Transformer—Converter transformer (T1, R6)
2917	Washer—"C" washer for channel selector shaft
73466	Washer—Insulating washers for front shield (1 set)

TELEVISION CHASSSIS
KCS 33A-1

STOCK No.	DESCRIPTION
71105	Cable—Shielded audio cable complete with pin plug (to radio chassis)
73414	Cap—Hi-voltage rectifier and horizontal output plate cap
72809	Capacitor—Mica, 5 mmf. (C166)
74182	Capacitor—Ceramic, 6 mmf. (C126)
74105	Capacitor—Mica, 33 mmf. (C111)
64062	Capacitor—Ceramic, 82 mmf. (C120)
39396	Capacitor—Ceramic, 100 mmf. (C175)
75060	Capacitor—Mica, 100 mmf., 1000 v. (C138)
73921	Capacitor—Ceramic, 120 mmf. (C199)
39630	Capacitor—Mica, 120 mmf. (C207)
73102	Capacitor—Mica, 180 mmf. (C158)
51416	Capacitor—Mica, 180 mmf. (C140)
74154	Capacitor—Ceramic, 250 mmf., 20,000 volts (C187)
73091	Capacitor—Mica, 270 mmf. (C106, C115, C121, C136)
73922	Capacitor—Ceramic, 270 mmf. (C183, C204)
39642	Capacitor—Mica, 390 mmf. (C141)
74153	Capacitor—Ceramic, 500 mmf., 15,000 volts (C167, C168)
74250	Capacitor—Mica, 560 mmf. (C160)
71501	Capacitor—Ceramic, 1,500 mmf. (C101, C103, C104, C105, C108, C109, C110, C113, C114, C117, C118, C122, C125, C132, C171, C172, C176, C177, C188, C191, C192, C193, C196)
73580	Capacitor—Mica trimmer, comprising 1 section of 10-160 mmf. and 1 section of 40-370 mmf. (C153A, C153B)
73801	Capacitor—Tubular, moulded paper, .001 mfd., 600 volts (C137, C203)
73595	Capacitor—Tubular, moulded paper, oil filled, .0022 mfd., 600 volts (C161)
73803	Capacitor—Tubular, moulded paper, .0022 mfd., 600 volts (C142, C154)
73795	Capacitor—Tubular, moulded paper, .0033 mfd., 600 volts (C202, C209)
73796	Capacitor—Tubular, moulded paper, .0039 mfd., 600 volts (C198)
73920	Capacitor—Tubular, moulded paper, oil filled, .0047 mfd., 600 volts (C145)
73550	Capacitor—Tubular, moulded paper, .0047 mfd., 600 volts (C127, C143, C144, C195, C208)
73789	Capacitor—Tubular, moulded paper, .0068 mfd., 400 volts (C210)
73561	Capacitor—Tubular, moulded paper, .01 mfd., 400 volts (C134, C151, C152, C102)
73594	Capacitor—Tubular, moulded paper, oil filled, .01 mfd., 600 volts (C159)
73565	Capacitor—Tubular, moulded paper, .01 mfd., 1,000 volts (C185)
73797	Capacitor—Tubular, moulded paper, .015 mfd., 600 volts (C206)
73562	Capacitor—Tubular, moulded paper, .022 mfd., 400 volts (C155)

STOCK No.	DESCRIPTION
73596	Capacitor—Tubular, moulded paper, oil filled, .033 mfd., 1,000 volts (C164)
73553	Capacitor—Tubular, moulded paper, .047 mfd., 400 volts (C129, C139, C197)
73592	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 600 volts (C147, C156)
73597	Capacitor—Tubular, moulded paper, oil filled, .047 mfd., 1,000 volts (C165)
73564	Capacitor—Tubular, moulded paper, .047 mfd., 1,000 volts (C163)
73784	Capacitor—Tubular, moulded paper, 0.1 mfd., 200 volts (C201)
73551	Capacitor—Tubular, moulded paper, 0.1 mfd., 400 volts (C130, C149)
73560	Capacitor—Tubular, moulded paper, 0.22 mfd., 200 volts (C135)
73794	Capacitor—Tubular, moulded paper, 0.22 mfd., 400 volts (C157, C162)
73787	Capacitor—Tubular, moulded paper, 0.47 mfd., 200 volts (C133, C190)
74106	Capacitor—Electrolytic, 5 mfd., 50 volts (C131)
74266	Capacitor—Electrolytic, 40 mfd., 400 volts (C205)
71432	Capacitor—Electrolytic, comprising 2 sections of 40 mfd., 450 volts and 1 section of 10 mfd., 450 volts (C150A, C150B, C150C)
73582	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 10 mfd., 450 volts and 1 section of 80 mfd., 200 volts (C194A, C194B, C194C)
73583	Capacitor—Electrolytic, comprising 1 section of 40 mfd., 450 volts, 1 section of 90 mfd., 450 volts and 1 section of 50 mfd., 150 volts (C148A, C148B, C148C)
73581	Capacitor—Electrolytic, comprising 1 section of 60 mfd., 450 volts, 2 sections of 10 mfd., 450 volts and 1 section of 20 mfd., 150 volts (C146A, C146B, C146C, C146D)
71436	Capacitor—Electrolytic, comprising 1 section of 250 mfd., 10 volts, and 1 section of 1,000 mfd., 6 volts (C170A, C170B)
73154	Choke—Filter choke (L116)
73477	Coil—Choke coil (L101)
74263	Coil—Focus coil (L117)
71449	Coil—Horizontal linearity control coil (L113)
74170	Coil—Peaking coil (36 muh) (L119, R110)
71527	Coil—Peaking coil (93 muh) (L107)
71529	Coil—Peaking coil (120 muh) (L102, R119, L108, R226)
71528	Coil—Peaking coil (180 muh) (L109, R130, L105, R123)
74214	Coil—Peaking coil (180 muh) (L106)
71526	Coil—Peaking coil (250 muh) (L103)
71429	Coil—Width control coil (L112)
74160	Connector—Anode connector
71521	Connector—Hi-voltage capacitor connector
5119	Connector—3 contact female plug for speaker
74316	Connector—3 contact male plug for audio "+B" switching cable
72108	Connector—7 contact connector for power supply cable (mounted on chassis)
71448	Connector—Male connector for power cord
74047	Control—Brightness and picture control (R127, R223)
72735	Control—Focus control (R201)
71440	Control—Height control (R155)
72734	Control—Horizontal and vertical hold control (R158, R173)
74146	Control—Horizontal centering or video bias control (R199, R206)
71443	Control—Vertical centering control (R202)
71441	Control—Vertical linearity control (R162)
74359	Control—Tone control, volume control and power switch (R231, R232, S101)
71457	Cord—Power cord and plug
72772	Cover—Insulating cover for electrolytic No. 71436
71437	Cover—Insulating cover for electrolytic No. 71432, No. 73581 and No. 73583
73590	Cushion—Deflection yoke hood cushion (2 required)
73600	Fuse—0.25 amp., 250 volts (F101, F102)
74030	Grommet—Rubber grommet to mount radio chassis (3 required)
37396	Grommet—Rubber grommet to mount ceramic tube socket (2 required)
71799	Grommet—Rubber grommet for 2nd anode lead
74148	Magnet—Ion trap magnet (P.M. type)
18469	Plate—Bakelite mounting plate for electrolytics Nos. 71432, 71436, 73581, 73582 and 73583
74156	Resistor—Wire wound, 3.9 ohms, 1/3 watt (R189, R190)
72067	Resistor—Wire wound, 5.1 ohms, ½ watt (R214)
	Resistor—Fixed, composition, 10 ohms ±20%, ½ watt (R121)
	Resistor—Fixed, composition, 39 ohms ±10%, ½ watt (R211)
	Resistor—Fixed, composition, 47 ohms ±20%, ½ watt (R183)
	Resistor—Fixed, composition, 68 ohms ±10%, ½ watt (R102, R105)
	Resistor—Fixed, composition, 82 ohms ±10%, ½ watt (R207)
	Resistor—Fixed, composition, 82 ohms ±5%, ½ watt (R122)
	Resistor—Fixed, composition, 100 ohms ±10%, ½ watt (R228)
	Resistor—Fixed, composition, 120 ohms ±10%, ½ watt (R126)
	Resistor—Fixed, composition, 150 ohms ±20%, ½ watt (R106, R109, R114, R198)
	Resistor—Fixed, composition, 150 ohms ±10%, ½ watt (R115)
	Resistor—Fixed, composition, 150 ohms ±10%, 2 watts (R184)
74265	Resistor—Wire wound, 330 ohms, 20 watts (R227)
	Resistor—Fixed, composition, 360 ohms ±5%, ½ watt (R134)
74197	Resistor—Wire wound, 470 ohms, 4 watts (R200)
	Resistor—Fixed, composition, 680 ohms ±10%, 1 watt (R220)
74213	Resistor—Wire wound, 820 ohms, 4 watts (R205)
	Resistor—Fixed, composition, 1,000 ohms ±20%, ½ watt (R103, R107, R108, R113, R116, R118, R165, R211)
	Resistor—Fixed, composition, 1,000 ohms ±10%, ½ watt (R138)
	Resistor—Fixed, composition, 1,200 ohms ±10%, ½ watt (R161, R208)
	Resistor—Fixed, composition, 1,500 ohms ±10%, 2 watts (R221)
	Resistor—Fixed, composition, 3,300 ohms ±10%, ½ watt (R188)
48207	Resistor—Wire wound, 3,300 ohms, 10 watts (R204)
	Resistor—Fixed, composition, 3,900 ohms ±5%, 2 watts (R125, R128, R129)
	Resistor—Fixed, composition, 4,700 ohms ±10%, ½ watt (R146)
	Resistor—Fixed, composition, 4,700 ohms ±5%, ½ watt (R120)
	Resistor—Fixed, composition, 5,100 ohms ±5%, ½ watt (R124)
	Resistor—Fixed, composition, 5,600 ohms ±5%, ½ watt (R112)
	Resistor—Fixed, composition, 5,600 ohms ±10%, 1 watt (R187)
	Resistor—Fixed, composition, 6,800 ohms ±10%, ½ watt (R150)
	Resistor—Fixed, composition, 6,800 ohms ±5%, 1 watt (R117)
	Resistor—Fixed, composition, 8,200 ohms ±10%, ½ watt (R152, R153, R171)
	Resistor—Fixed, composition, 8,200 ohms ±5%, ½ watt (R164, R175)
	Resistor—Fixed, composition, 10,000 ohms ±10%, ½ watt (R141, R182, R224)
	Resistor—Fixed, composition, 10,000 ohms ±5%, ½ watt (R104)
	Resistor—Fixed, composition, 12,000 ohms ±5%, ½ watt (R136)
	Resistor—Fixed, composition, 12,000 ohms ±10%, 2 watts (R147)
	Resistor—Fixed, composition, 18,000 ohms ±10%, ½ watt (R137)
	Resistor—Fixed, composition, 22,000 ohms ±20%, ½ watt (R195, R209, R210)
	Resistor—Fixed, composition, 22,000 ohms ±10%, ½ watt (R145, R151, R177)
	Resistor—Fixed, composition, 27,000 ohms ±10%, ½ watt (R229, R230)
	Resistor—Fixed, composition, 47,000 ohms ±20%, ½ watt (R225)
	Resistor—Fixed, composition, 47,000 ohms ±10%, ½ watt (R142, R144, R222)
	Resistor—Fixed, composition, 56,000 ohms ±10%, ½ watt (R156)

STOCK No.	DESCRIPTION
	Resistor—Fixed, composition, 56,000 ohms ±5%, ½ watt (R135)
	Resistor—Fixed, composition, 82,000 ohms ±10%, ½ watt (R172)
	Resistor—Fixed, composition, 100,000 ohms ±10%, ½ watt (R140, R160)
	Resistor—Fixed, composition, 100,000 ohms ±5%, ½ watt (R215, R216)
	Resistor—Fixed, composition, 100,000 ohms ±10%, 1 watt (R179)
	Resistor—Fixed, composition, 100,000 ohms ±5%, 1 watt (R176)
	Resistor—Fixed, composition, 100,000 ohms ±20%, 2 watts (R236)
	Resistor—Fixed, composition, 150,000 ohms ±10%, ½ watt (R168, R180)
	Resistor—Fixed, composition, 150,000 ohms ±10%, 1 watt (R174)
	Resistor—Fixed, composition, 150,000 ohms ±5%, 1 watt (R178)
	Resistor—Fixed, composition, 180,000 ohms ±10%, ½ watt (R143, R186)
	Resistor—Fixed, composition, 180,000 ohms ±10%, 2 watts (R191, R192, R193)
	Resistor—Fixed, composition, 220,000 ohms ±10%, ½ watt (R154)
	Resistor—Fixed, composition, 330,000 ohms ±10%, ½ watt (R212)
	Resistor—Fixed, composition, 470,000 ohms ±20%, ½ watt (R219)
	Resistor—Fixed, composition, 560,000 ohms ±10%, ½ watt (R194)
	Resistor—Fixed, composition, 820,000 ohms ±5%, ½ watt (R189)
	Resistor—Fixed, composition, 820,000 ohms ±10%, ½ watt (R185)
74155	Resistor—Voltage divider, comprising 1 section of 775 ohms, 9.5 watts, 1 section of 550 ohms, 5 watts, 1 section of 350 ohms, 3 watts and 1 section of 450 ohms, 5 watts (R203A, R203B, R203C)
	Resistor—Fixed, composition, 1 megohm ±20%, ½ watt (R139, R148)
	Resistor—Fixed, composition, 1.5 megohm ±5%, ½ watt (R157)
	Resistor—Fixed, composition, 2.2 megohms ±10%, ½ watt (R131, R132, R159, R163)
	Resistor—Fixed, composition, 2.7 megohms ±5%, 1 watt (R170)
	Resistor—Fixed, composition, 3.9 megohms ±10%, ½ watt (R149)
	Resistor—Fixed, composition, 4.7 megohms ±5%, 1 watt (R133)
	Resistor—Fixed, composition, 10 megohms ±20%, ½ watt (R213)
71456	Screw—No. 8-32 wing screw to mount hood and yoke (3 required)
73584	Shield—Tube shield for V120 and V121
74267	Socket—Kinescope socket
35787	Socket—Phono input socket
31364	Socket—Pilot lamp locket
71508	Socket—Tube socket for 1B3GT/8016
73117	Socket—Tube socket, 7 pin, miniature
31251	Socket—Tube socket, octal, wafer
73249	Socket—Tube socket, octal, ceramic, plate mounted
31319	Socket—Tube socket, octal, moulded, saddle mounted
74151	Spacer—Bakelite spacer to mount moulded tube socket (2 required)
74360	Spring—Anode spring
72190	Spring—Hood and yoke pressure spring (3 required)
74425	Support—Bakelite support for 2nd anode lead
74150	Support—Vertical plate support (bakelite)
74157	Switch—Interlock switch (S103)
74147	Switch—Width selector switch (S104)
73571	Transformer—First pix I-F transformer (T101, C102, R101)
73572	Transformer—Second pix I-F transformer (T102, C107)
73573	Transformer—Third pix I-F transformer (T103, C112)
73574	Transformer—Fourth pix I-F transformer (T104, C118)
73575	Transformer—Fifth pix I-F transformer (T106, C123, C124)
74144	Transformer—Vertical oscillator transformer (T107)
73568	Transformer—Vertical output transformer (T108)
73576	Transformer—Horizontal oscillator transformer (T109)
74145	Transformer—Horizontal output and hi-voltage transformer (T110)
71424	Transformer—Sound i-f transformer (T112, C173, C174)
71427	Transformer—Sound discriminator transformer (T113, C178, C179, C180)
73578	Transformer—Antenna matching transformer complete with socket and bracket (T115, J102)
74264	Transformer—Power transformer, 117 volt, 60 cycle (T118)
74358	Transformer—Audio transformer (T119)
73577	Trap—4.5 mc. trap (L104, C128)
73476	Trap—I-F trap (L118, C189)
71778	Trap—Sound trap (T105, C119)
74262	Yoke—Deflection yoke (L110, L111, L114, L115, C169, R166, R167)

RADIO CHASSIS
RK 135A-1

STOCK No.	DESCRIPTION
74039	Board—"Tel-Ant" terminal board (4 contacts with link)
74027	Bracket—Drive cord bracket complete with pulley—L. H.
74026	Bracket—Drive cord bracket complete with two pulleys—R. H.
71105	Cable—Shielded cable complete with pin plug (to television chassis) (W301)
74017	Capacitor—Variable tuning capacitor (C301, C302, C303, C304, C305, C307, C308)
73866	Capacitor—Ceramic, 2 mmf. (C306)
31353	Capacitor—Ceramic, 15 mmf. (C312)
39042	Capacitor—Ceramic, 47 mmf. (C330)
73867	Capacitor—Ceramic, 56 mmf. (C313)
33103	Capacitor—Ceramic, 68 mmf. (C310)
39396	Capacitor—Ceramic, 100 mmf. (C322, C323)
48125	Capacitor—Ceramic, 150 mmf. (C314)
39640	Capacitor—Mica, 330 mmf. (C325, C326)
73748	Capacitor—Ceramic, 1,500 mmf. (C309)
74009	Capacitor—Ceramic, dual, 4,000 mmf. (C317, C319, C321)
73473	Capacitor—Ceramic, 5,000 mmf. (C318, C329)
71553	Capacitor—Tubular, .005 mfd., 400 volts (C315, C320, C324)
71925	Capacitor—Tubular, .01 mfd., 400 volts (C311)
54859	Capacitor—Tubular, .05 mfd., 400 volts (C316)
73747	Capacitor—Electrolytic, 2 mfd., 50 volts (C328)
74024	Coil—Antenna coil—F. M. (No. 16 buss tinned, 8 turns per inch, 2½ turns L. H., .430 I. D.) (L301)
74020	Coil—Antenna coil—A. M. (L302, L303)
73744	Coil—Oscillator coil—A. M. (L304, L305, L306)
74025	Coil—Oscillator coil—F. M. (No. 16 buss tinned, 9 turns per inch, 4⅞ turns L. H., .430 I. D.) (L307)
5119	Connector—3 contact female connector for audio power supply cable
39153	Connector—4 contact male connector for antenna cable (P302)
36395	Connector—7 contact male connector for power supply cable
72953	Cord—Drive cord (approx. 42" overall length)
74011	Filter—Diode filter, dual 200 mmf. and 47,000 ohms (DF301)
74023	Resistor—Wire wound, 0.51 ohms, 1 watt (R323, R324)
	Resistor—Fixed, composition, 3.9 ohms ±10%, ½ watt (R301)
	Resistor—Fixed, composition, 10 ohms ±20%, ½ watt (R311)
	Resistor—Fixed, composition, 68 ohms ±20%, ½ watt (R308)
	Resistor—Fixed, composition, 100 ohms ±20%, ½ watt (R305, R317)
	Resistor—Fixed, composition, 120 ohms ±10%, ½ watt (R314)
	Resistor—Fixed, composition, 680 ohms ±20%, ½ watt (R310, R312)
	Resistor—Fixed, composition, 1,200 ohms ±5%, ½ watt (R319)
	Resistor—Fixed, composition, 3,300 ohms ±5%, ½ watt (R320)
	Resistor—Fixed, composition, 10,000 ohms ±20%, ½ watt (R306)
	Resistor—Fixed, composition, 15,000 ohms ±10%, ½ watt (R304)

STOCK No.	DESCRIPTION
	Resistor—Fixed, composition, 15,000 ohms ±20%, ½ watt (R315, R318)
	Resistor—Fixed, composition, 18,000 ohms ±10%, ½ watt (R302)
	Resistor—Fixed, composition, 27,000 ohms ±10%, ½ watt (R307, R309)
	Resistor—Fixed, composition, 39,000 ohms ±10%, ½ watt (R322)
	Resistor—Fixed, composition, 150,000 ohms ±10%, ½ watt (R325, R326)
	Resistor—Fixed, composition, 470,000 ohms ±20%, ½ watt (R321)
	Resistor—Fixed, composition, 2.2 megohms ±20%, ½ watt (R303)
	Resistor—Fixed, composition, 22 megohms ±20%, ½ watt (R316)
74028	Shaft—Tuning knob shaft
73632	Shield—Tube shield
35787	Socket—Audio cable input socket
31364	Socket—Lamp socket
74128	Socket—Phono input socket and bracket assembly
74179	Socket—Tube socket for V302 and V303
73117	Socket—Tube socket
74038	Spring—Drive cord spring
74031	Switch—Heater switch (S304)
74260	Switch—Selector switch complete with heater switch and shorting switch (S301, S302, S303, S304, S305)
74032	Switch—Shorting switch (S305)
73745	Transformer—First i-f transformer, dual (T301)
74019	Transformer—Second i-f transformer, dual (T302)
73743	Transformer—Ratio detector transformer (T303)
33726	Washer—"C" washer for tuning shaft (rear)
74172	Washer—Fibre washer to prevent dial cord slippage
34457	Washer—Spring washer for tuning shaft (front)

SPEAKER ASSEMBLY
92582-3
RL103C21

STOCK No.	DESCRIPTION
13867	Cap—Dust cap
73934	Cone—Cone and voice coil assembly
5118	Plug—3 prong male plug
74355	Speaker—12" P. M. speaker complete with cone and voice coil
71145	Suspension—Metal cone suspension

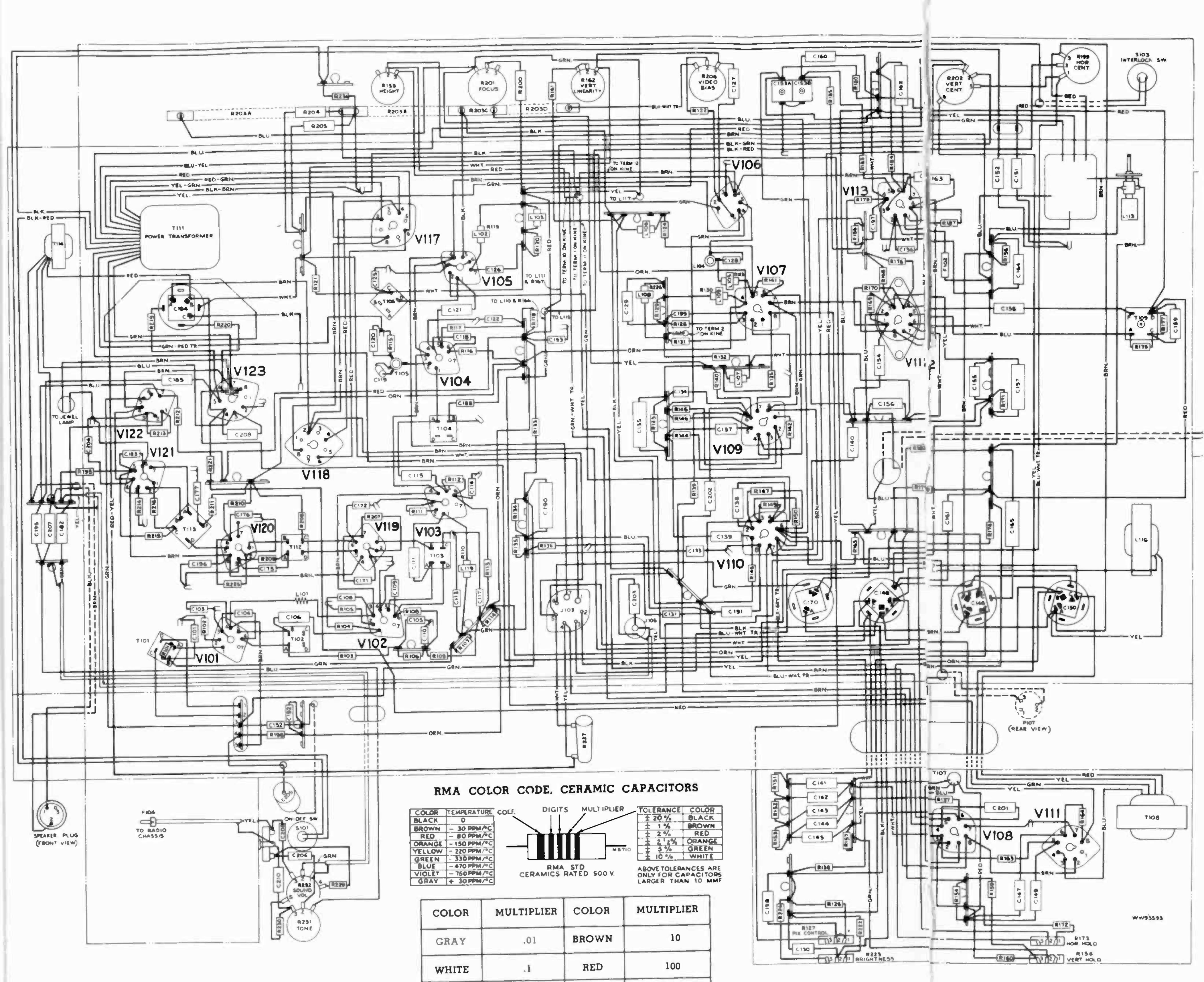
MISCELLANEOUS

STOCK No.	DESCRIPTION
74281	Back—Cabinet back
74052	Bezel—Lucite bezel and dial scale
74054	Bracket—Lamp bracket
71599	Bracket—Pilot lamp bracket
13103	Cap—Pilot lamp jewel
71892	Catch—Bullet catch and strike for doors (3 required)
74055	Clip—Spring clip for bezel and dial (2 required)
X1984	Cloth—Grille cloth for toasted mahogany instruments
X1983	Cloth—Grille cloth for mahogany or walnut instruments
74160	Connector—Anode connector (3 required)
74127	Cushion—Rubber cushion strip for back of safety glass (4 required)
74357	Decal—Control panel function decal for toasted mahogany instruments
74356	Decal—Control panel function decal for mahogany or walnut instruments.
71904	Decal—Trade mark decal
73180	Emblem—"RCA Victor" emblem
73740	Escutcheon—Channel marker escutcheon for toasted mahogany instruments
73642	Escutcheon—Channel marker escutcheon for mahogany or walnut instruments
74252	Glass—Safety glass
37396	Grommet—Rubber grommet to mount speaker (4 required)
74050	Guide—Station selector indicator guide
70167	Hinge—Bottom hinge for lower L. H. door
73200	Hinge—Top hinge for lower L. H. door
73903	Hinge—Upper door hinge (1 set) (2 required)
74051	Indicator—Station selector indicator
74057	Knob—Radio tuning or selector switch knob—tan—for toasted mahogany instruments
74056	Knob—Radio tuning or selector switch knob—dark—for mahogany or walnut instruments
73225	Knob—Television channel selector knob—tan—for toasted mahogany instruments
73224	Knob—Television channel selector knob—dark—for mahogany or walnut instruments
73223	Knob—Television fine tuning knob—tan—for toasted mahogany instruments
73222	Knob—Television fine tuning knob—dark—for mahogany or walnut instruments
74362	Knob—Tone control knob—tan—for toasted mahogany instruments
74361	Knob—Tone control knob—dark—for mahogany or walnut instruments
73226	Knob—Vertical hold control or brightness control knob—dark—for mahogany or walnut instruments
73227	Knob—Vertical hold control or brightness control knob—tan—for toasted mahogany instruments
73229	Knob—Volume control and power switch, horizontal hold control or picture control knob—tan—for toasted mahogany instruments
73228	Knob—Volume control and power switch, horizontal hold control or picture control knob—dark—for mahogany or walnut instruments
11765	Lamp—Dial lamp—Mazda 51
74126	Mask—Kinescope mask
74111	Plate—Door pull back plate for upper R. H. door
74112	Plate—Door pull back plate for upper L. H. door
74162	Plate—Mounting plate for interlock switch
72817	Plate—Stud and plate including wing nut and spring for front panel (2 required)
74309	Pull—Door pull for speaker compartment door and dummy door (6 required)
73771	Pull—Door pull for upper doors (2 required)
74279	Screw—No. 8-32 x ⅞" trimit head screw for door pulls for lower doors (2 required)
74113	Screw—No. 8-32 x 1" trimit head screw for door pull back plate
74171	Shield—Cellulose shield for kinescope
30330	Spring—Retaining spring for knobs, RCA Nos. 73228 and 73229
14270	Spring—Retaining spring for knobs, RCA Nos. 73224, 73225, 73226, 73227, 74056 and 74057
72845	Spring—Retaining spring for knobs, RCA Nos. 73222 and 73223
73643	Spring—Spring clip for channel marker escutcheon
72936	Stop—Door stop for upper doors
74161	Stud—Locating stud for cabinet back (2 required)
74159	Support—Moulded support for kinescope (4 required)

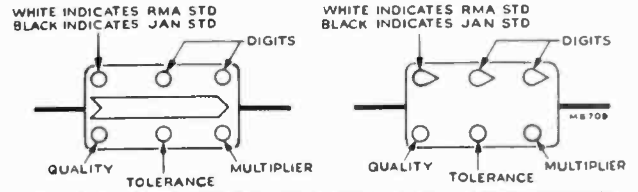
To obtain resistors for which no stock number is given, order by stating type, value of resistance, tolerance and wattage.

APPLY TO YOUR RCA DISTRIBUTOR FOR PRICES OF REPLACEMENT PARTS

CHASSIS WIRING DIAGRAM



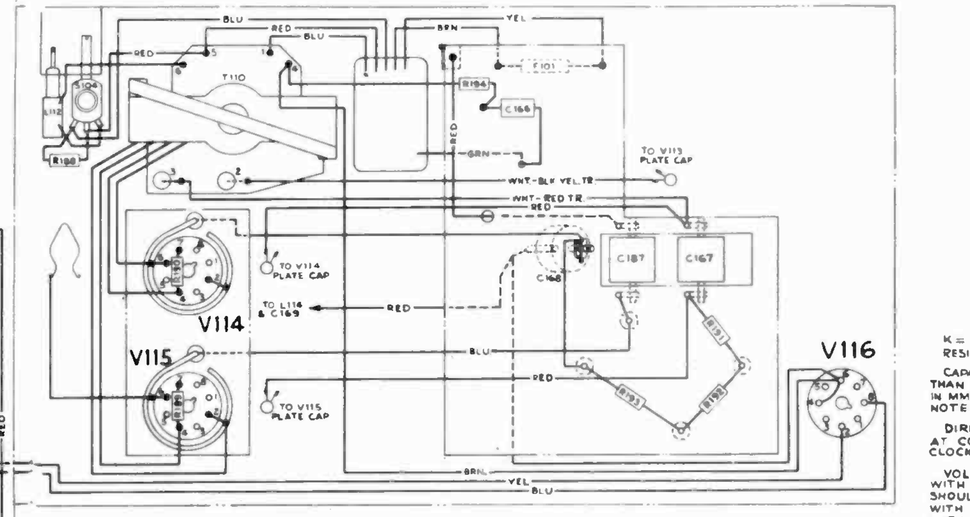
RMA COLOR CODE, FIXED MICA CAPACITORS



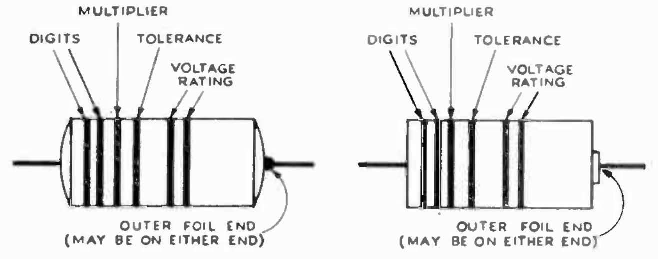
RMA FIXED MICA CAPACITORS RATED AT 500 V. UNLESS MARKED OTHERWISE

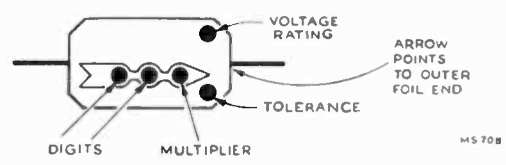
TOLERANCE

COLOR	TOLERANCE
RED	±2%
GREEN	±5%
SILVER	±10%
BLACK	±20%



COLOR CODES, MOULDED PAPER CAPACITORS





CAPACITY VALUE IN MMF

COLOR	DIGITS	MULTIPLIER
BLACK	0	1
BROWN	1	10
RED	2	100
ORANGE	3	1,000
YELLOW	4	10,000
GREEN	5	
BLUE	6	
VIOLET	7	
GRAY	8	
WHITE	9	

TOLERANCE

COLOR	TOLERANCE
BLACK BAND OR NONE	±20%
WHITE OR SILVER	±10%
YELLOW OR GOLD	±5%

The Voltage Rating is given in hundreds of volts. Only one band is employed for ratings under 1,000 volts. Two bands are employed for ratings over 1,000 volts. Use digit column to read voltage rating.

RMA COLOR CODE, CERAMIC CAPACITORS

COLOR	TEMPERATURE COEF.
BLACK	0
BROWN	− 30 PPM/°C
RED	− 80 PPM/°C
ORANGE	−150 PPM/°C
YELLOW	− 220 PPM/°C
GREEN	− 330 PPM/°C
BLUE	− 470 PPM/°C
VIOLET	− 750 PPM/°C
GRAY	+ 30 PPM/°C

RMA STD
CERAMICS RATED 500 V.

TOLERANCE	COLOR
± 20 %	BLACK
± 1 %	BROWN
± 2 %	RED
± 2½%	ORANGE
± 5 %	GREEN
± 10 %	WHITE

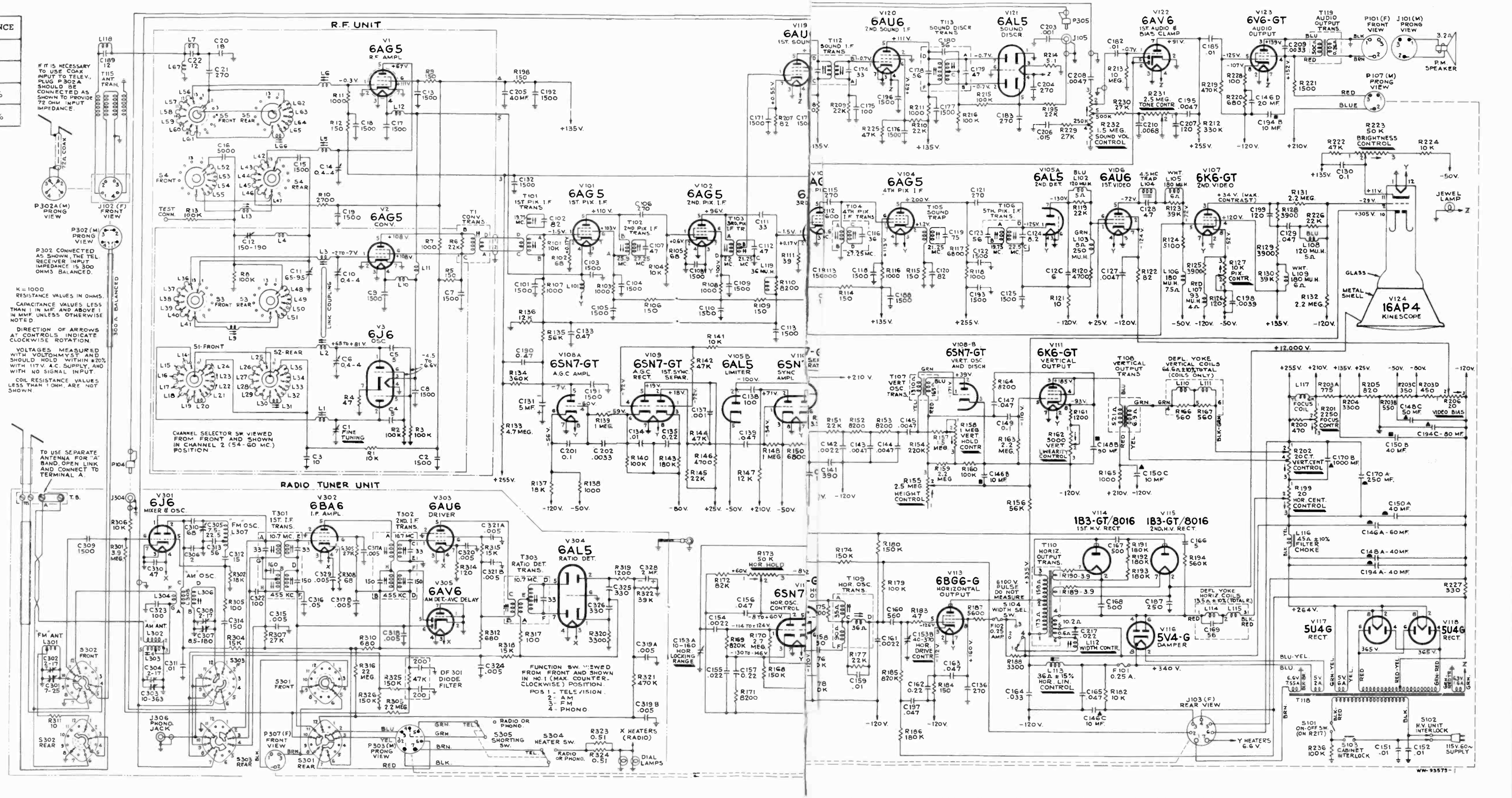
ABOVE TOLERANCES ARE ONLY FOR CAPACITORS LARGER THAN 10 MMF

COLOR	MULTIPLIER	COLOR	MULTIPLIER
GRAY	.01	BROWN	10
WHITE	.1	RED	100
BLACK	1.	ORANGE	1,000

For digits, use digit column, page 16

Figure 22—Chassis Wiring Diagram

CIRCUIT SCHEMATIC DIAGRAM



All resistance values in ohms. K = 1,000.
All capacitance values less than 1 in MF and above 1 in MMF unless noted.

Coil resistance values less than 1 ohm are not shown.
Direction of arrows at controls indicates clockwise rotation.

In some receivers, substitutions have caused changes in component lead color codes, in electrolytic capacitor values and their lug identification markings.

All voltages measured with "VoltOhm" no signal input with 117 v. a-c supply the pix control fully clockwise and the b ness control set for average brightness.

In some receivers, R101 consists of two 22k resistors in parallel. One 22k resistor is inside T101 and the other is on the bottom of the terminal board.

In some receivers, R102 was 39 ohms.
In some receivers, C217 was omitted.

Figure 23—Circuit Schematic Diagram

RCA

"HIS MASTER'S VOICE"