

**ELECTRONIC
TECHNICIAN**

TEK FAX

VOLUME 6

**TV-RADIO SCHEMATICS * OVER 30 MANUFACTURERS
COVERS HUNDREDS OF CHASSIS & MODEL NUMBERS**

PUBLISHED BY ELECTRONIC TECHNICIAN MAGAZINE, OJIBWAY BUILDING, DULUTH 2, MINNESOTA

ELECTRONIC TECHNICIAN

TV-RADIO-HI FI SCHEMATICS

TEKNOFAX

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Ojibway Building Duluth 2, Minnesota

VOLUME 6

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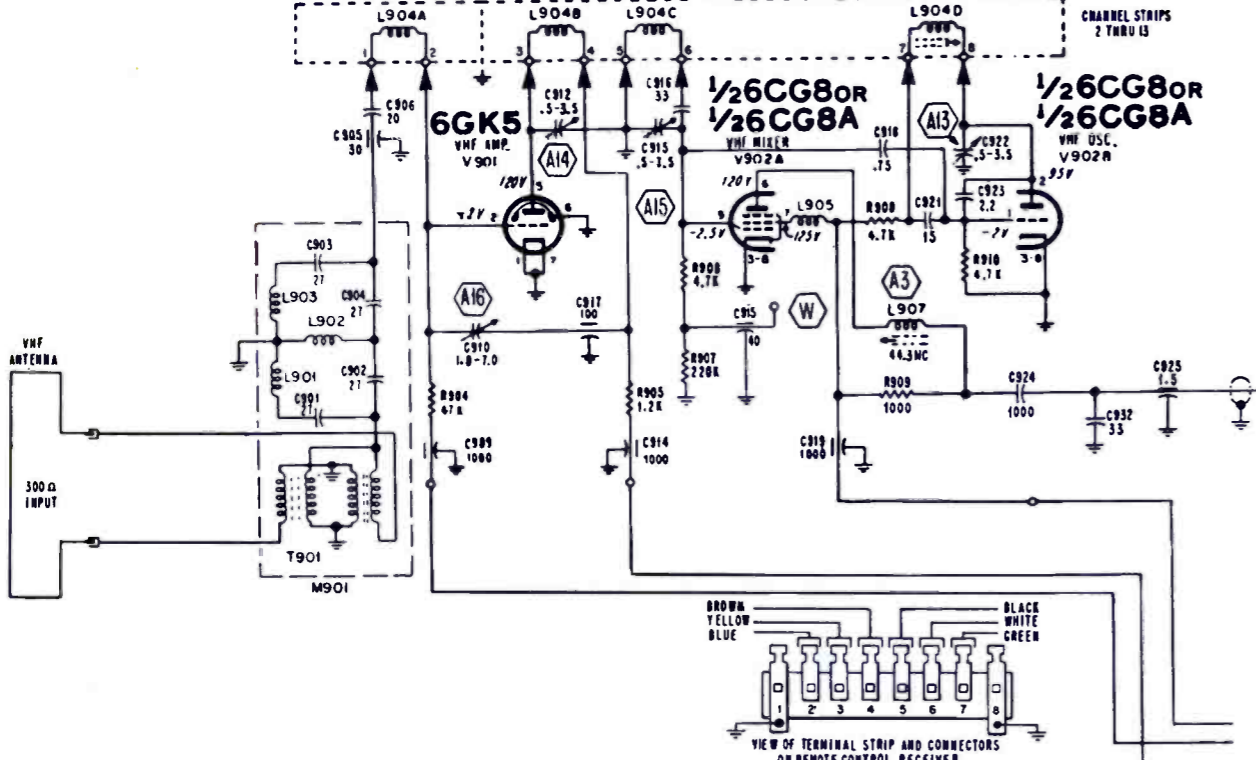
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ELECTRONIC TECHNICIAN TEKFAK

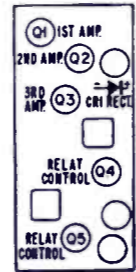
ADMIRAL

TV Chassis
Models 19K3U,
-M3U, -R3U,
-T3U, run 13

VHF TUNER 94E210-5

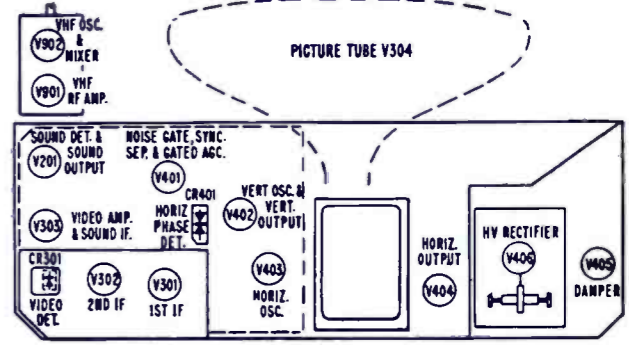


TUBE LOCATIONS



TUBE AND SEMI-CONDUCTOR COMPLEMENT

- V901—6GK5
- V902—6CG8 or 6CG8A
- V201—6AL11
- V301—6EH7
- V302—6EJ7
- V303—6JV8
- V304—19AVP4
- V401—6BU8
- V402—6EW7
- V403—6FQ7
- V404—6GE5
- V405—6AX3
- V406—1G3GT
- CR1—93B24-3
- CR301—1M87A
- CR401—93B5-6
- CR501—93B12-2
- CR502—93B12-2
- CR503—93B12-2
- Q1, Q2—57D1-88
- Q3—57D1-89
- Q4, Q5—57D1-70



SCHEMATIC NOTES

Numbers or letters inside hexagons indicate alignments points.
Fixed resistor values shown in ohms $\pm 10\%$ tolerance. $\frac{1}{2}$ watt; capacitor values shown in micro-microfarads $\pm 20\%$ unless otherwise specified.

VOLTAGES AND WAVEFORMS

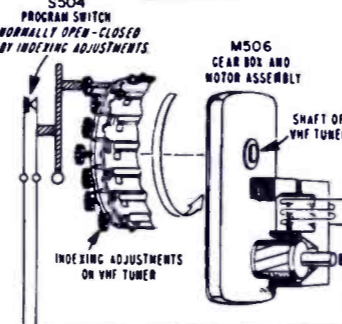
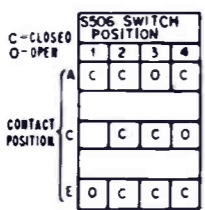
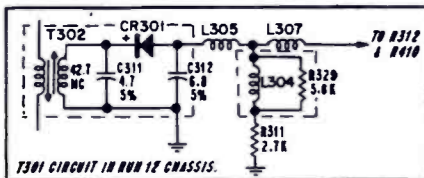
Line Voltage: 117.
Channel Selector on unused channel. Contrast control fully clockwise; all other controls counterclockwise. Do not disturb Horizontal Hold control. Antenna disconnected and terminals shorted. DC voltages measured with VTVM between tube socket and chassis, unless otherwise indicated. Voltages marked (*) will vary widely with control settings. Waveforms taken with transmitted signal input. For waveforms, controls set for normal picture. Peak-to-peak voltages may vary slightly.

VOLTAGE WARNING

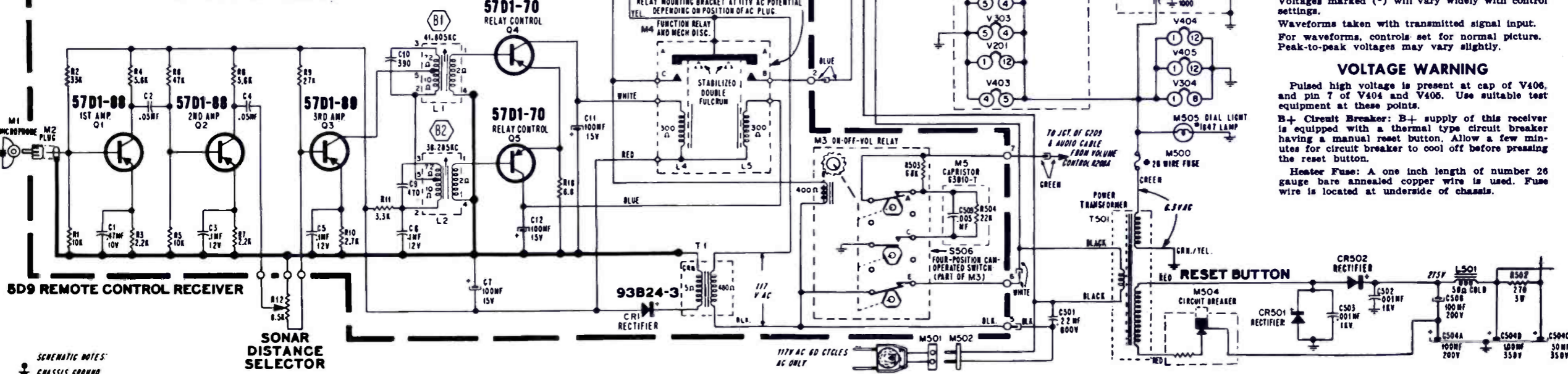
Pulsed high voltage is present at cap of V406, and pin 7 of V404 and V405. Use suitable test equipment at these points.
B+ Circuit Breaker: B+ supply of this receiver is equipped with a thermal type circuit breaker having a manual reset button. Allow a few minutes for circuit breaker to cool off before pressing the reset button.
Heater Fuse: A one inch length of number 26 gauge bare annealed copper wire is used. Fuse wire is located at underside of chassis.

RUN CHANGES

- (12) Start of production.
- (13) To improve interference rejection characteristics, L300 and C301 were added. T302 changed from part no. 72B207-6 to 72C261-3. Early circuit shown below.



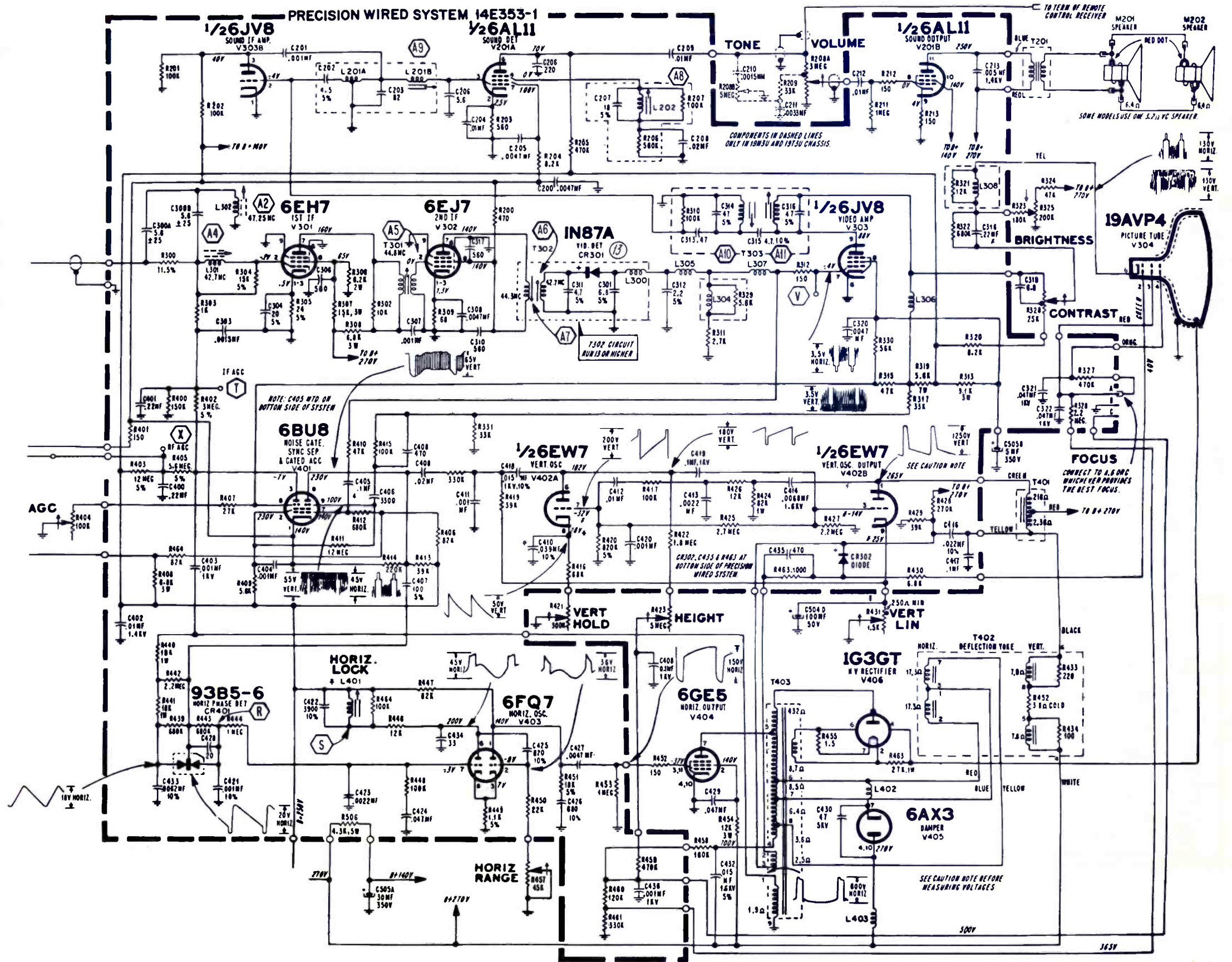
PRECISION WIRED SYSTEM 14E354-1



SCHEMATIC NOTES:
* CHASSIS GROUND
* PART NOT MOUNTED ON PRECISION WIRED SYSTEM.
* VOLTAGE WILL VARY WITH SETTING OF CONTROLS

ADMIRAL
 TV Chassis
 Models 19K3U -M3U
 -R3U -T3U run 13

ELECTRONIC TECHNICIAN
TEK FAX



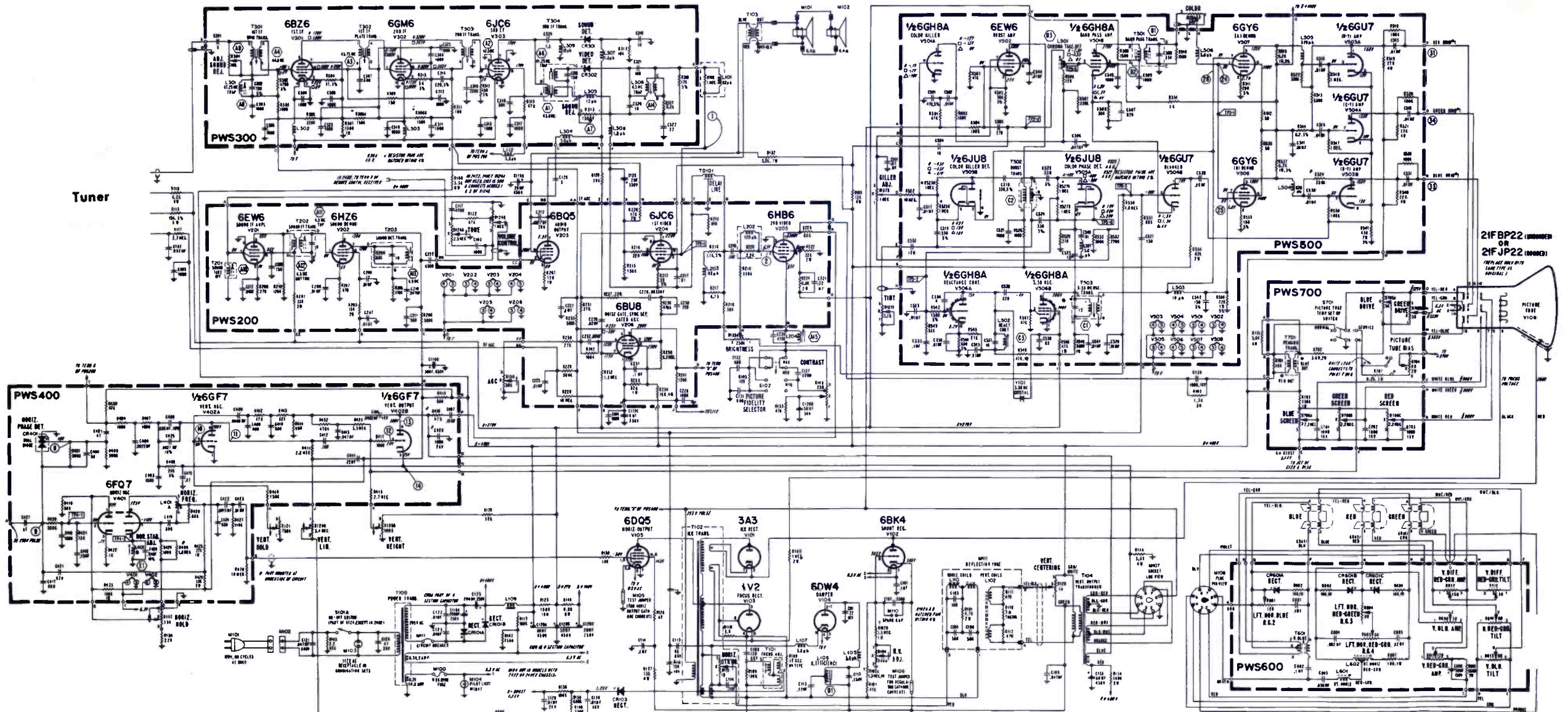
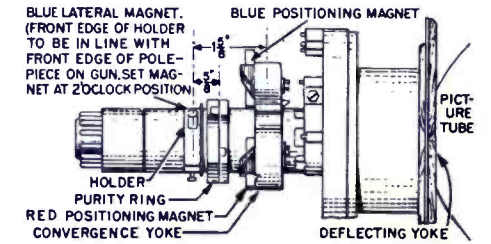
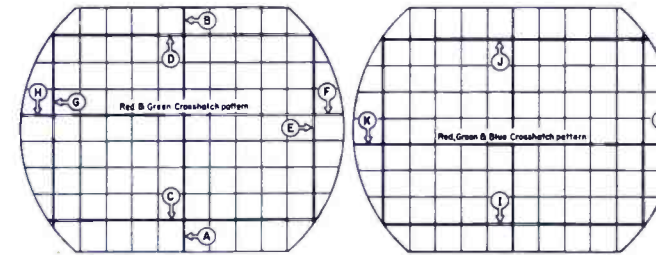
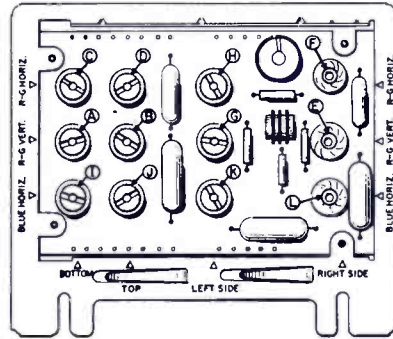
ELECTRONIC TECHNICIAN TEKFAX

ADMIRAL
Color TV Chassis
24A2, UA2, B2,
UB2, C2, UC2, D2,
UD2, UE2—Run 10

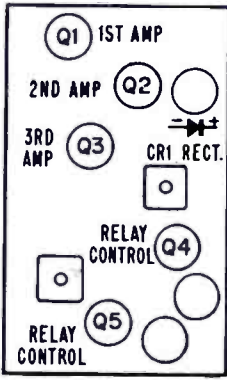
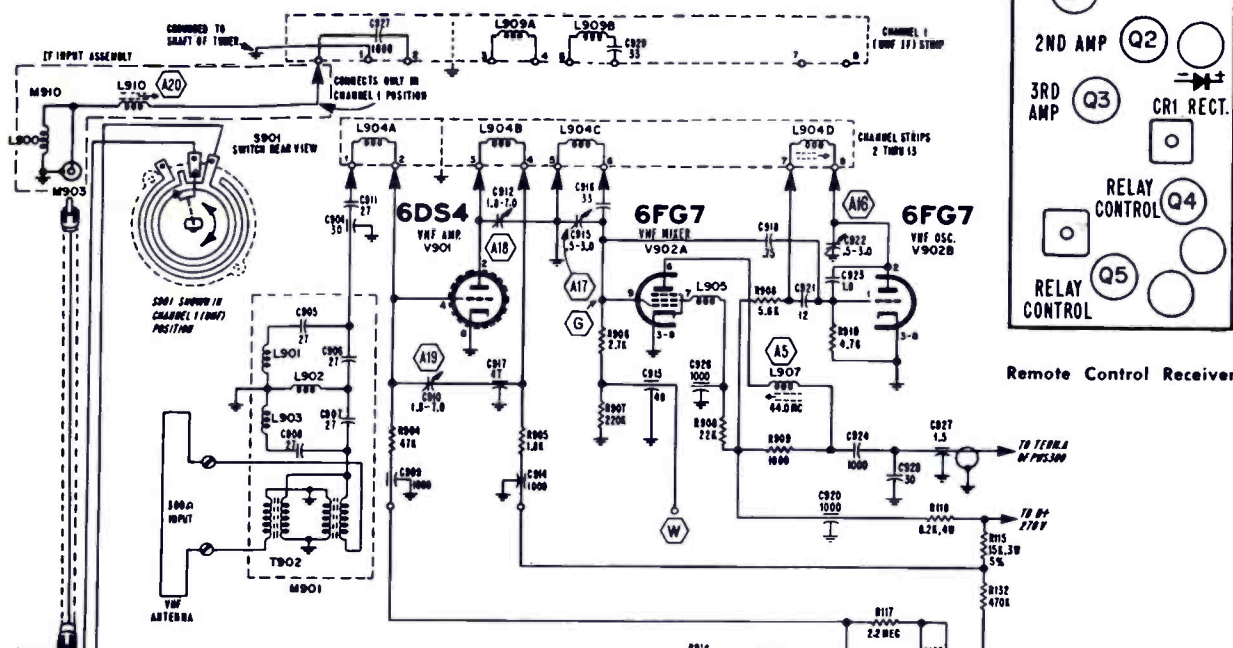
TUBE AND SEMI-CONDUCTOR COMPLEMENT

- | | | |
|--------------------------|--------------------|-----------------|
| V101—3A3 | V303—6JC6 | CR1—93B24-3 |
| V102—6BK4 | V401—6FQ7 | CR101A} 93C30-2 |
| V103—1V2 | V402—6GF7 | CR101B} |
| V104—6DW4 | V501—6GH8A | CR103—93C40-1 |
| V105—6DQ5 | V502—6EW6 | CR301—93C8-1 |
| +V108—21FJP22 or 21FBP22 | V503—6GU7 | CR302—93C8-1 |
| V201—6EW6 | V504—6GU7 | CR401—93B5-6 |
| V202—6HZ6 | V505—6JU8 | CR601A} |
| V203—6BQ5 | V506—6GH8A | CR601B} 93C1-20 |
| V204—6JC6 | V507—6GY6 | CR601C} |
| V205—6HB6 | V508—6GY6 | Q1, Q2—57D1-88 |
| V206—6BU8 | V801—6DZ4 or 6AF4B | Q3—57D1-89 |
| V301—6BZ6 | V901—6DS4 | Q4, Q5—57D1-70 |
| V302—6CM6 | V902—6FG7 | |

+ Replace only with exact same type as original.

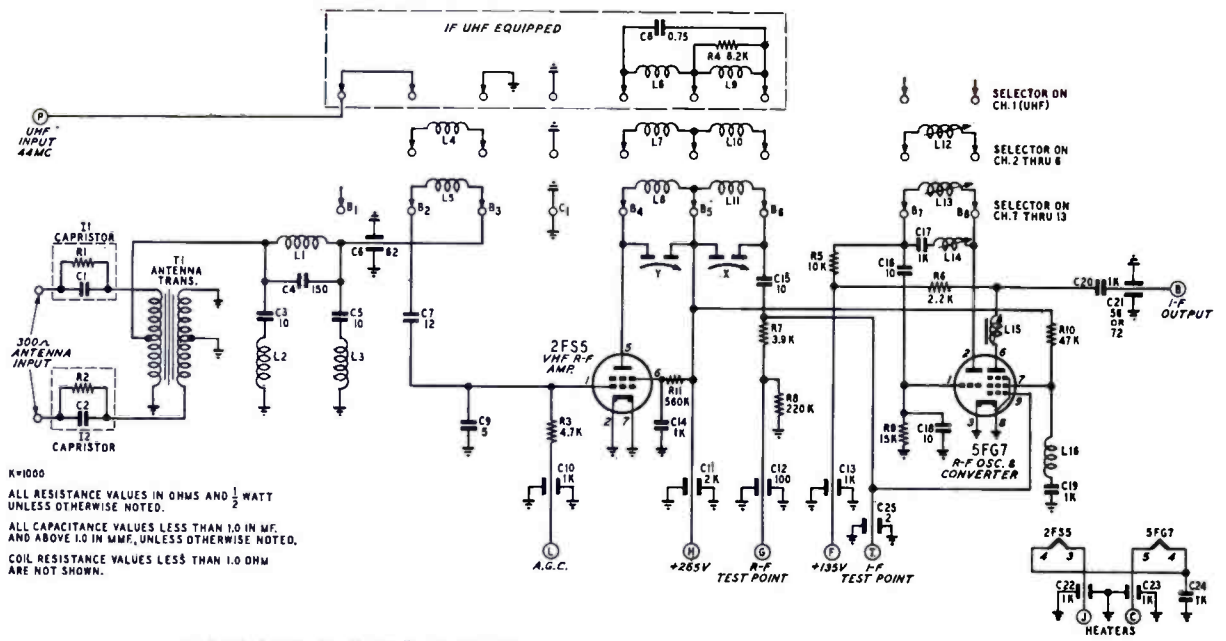


VHF TUNER 94E228-1,2 OR 3



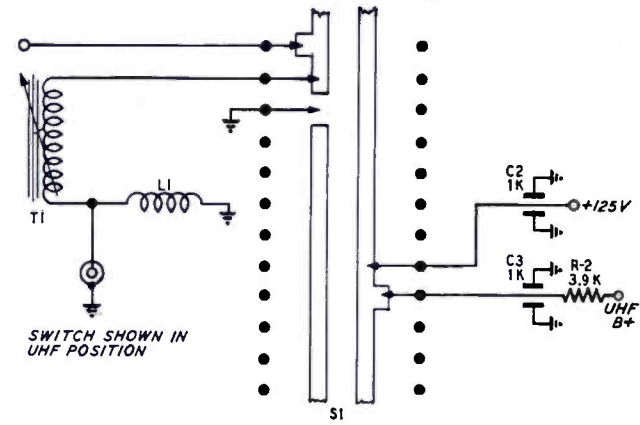
Remote Control Receiver

25A1230-13 VHF TUNER SCHEMATIC



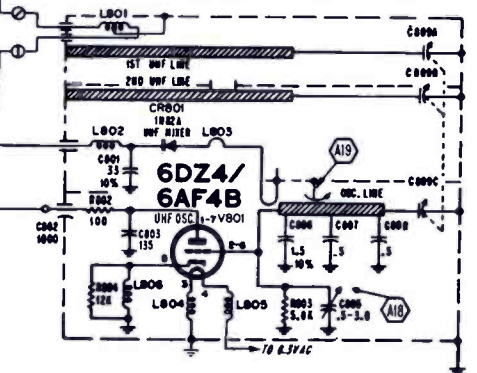
K=1000
 ALL RESISTANCE VALUES IN OHMS AND 1/2 WATT UNLESS OTHERWISE NOTED.
 ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF. AND ABOVE 1.0 IN MMF, UNLESS OTHERWISE NOTED.
 COIL RESISTANCE VALUES LESS THAN 1.0 OHM ARE NOT SHOWN.

2A553 UHF IF INPUT SWITCH (IF UHF EQUIPPED)



AIRLINE
 TV Chassis
 Models WG 1683A
 and WG2683A

UHF TUNER 94D247-1

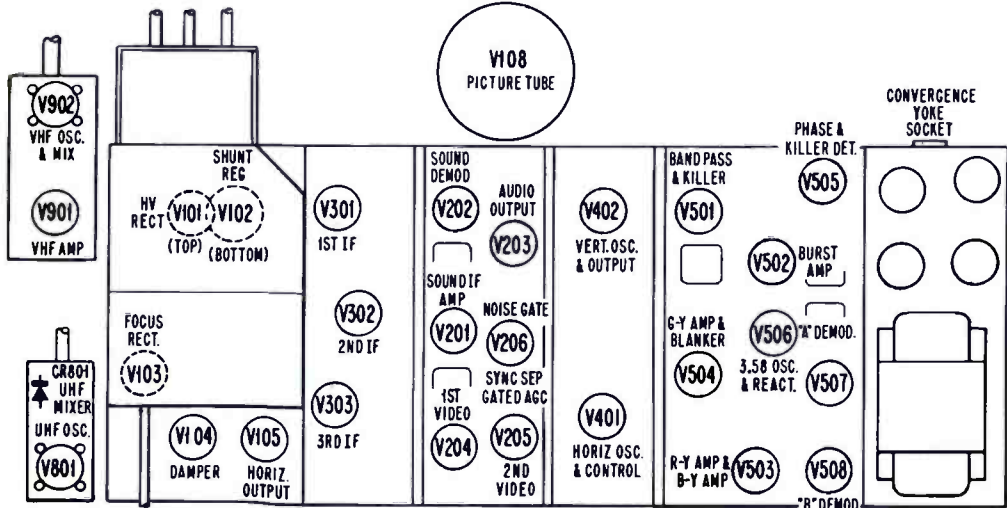


ADMIRAL
 Color TV Chassis
 24A2, UA2, B2, UB2, C2,
 UC2, D2, UD2, UE2
 - Run 10

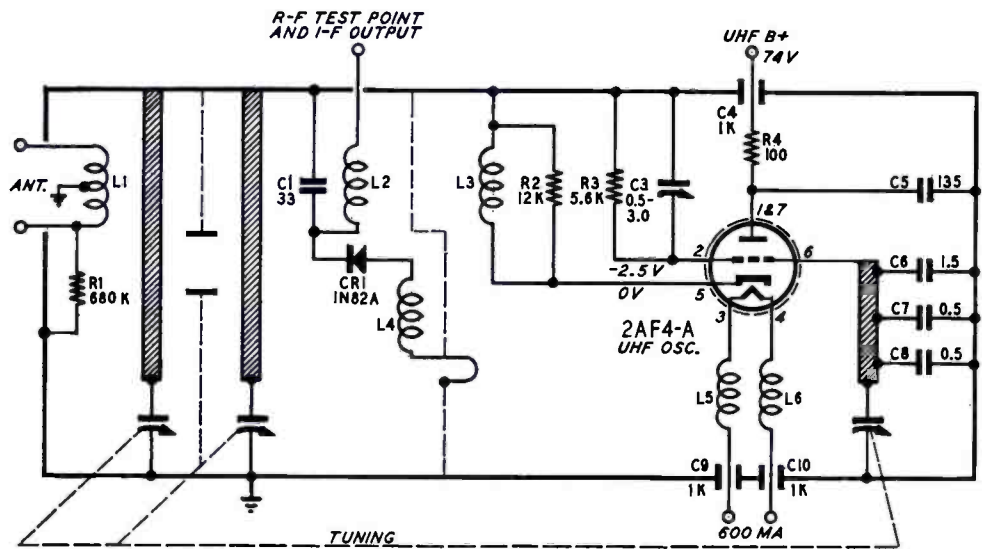
VOLTAGE WARNING

Exercise normal high voltage precautions when servicing receiver power supply and deflection circuits.
 Pulsed high voltage is present at various points of the power supply and deflection system. Use suitable test equipment at these points.

TUBE LOCATIONS



25A1193-5 UHF TUNER SCHEMATIC (IF UHF EQUIPPED)



ELECTRONIC TECHNICIAN TEKFAX

AIRLINE
TV Chassis
Models WG 1683A
and WG2683A

OSCILLOSCOPE WAVEFORM PATTERNS

The waveforms shown on the schematic diagram are as observed on a Tektronix type 524D wide band television oscilloscope with the receiver tuned to a reasonably strong signal and a normal picture. The voltages shown on each waveform are the approximate peak to peak amplitudes. The frequency accompanying each waveform indicates the repetition rate of the waveform not the sweep rate of the oscilloscope. If the waveforms are observed on the oscilloscope with a poor high frequency response, the corners of the pulses will tend to be more rounded than those shown on the schematic diagram and the amplitude of any high frequency pulse will tend to be less.

DC SOCKET VOLTAGES

All DC socket voltages shown on the schematic are measured with a high impedance VTVM and under zero signal conditions.

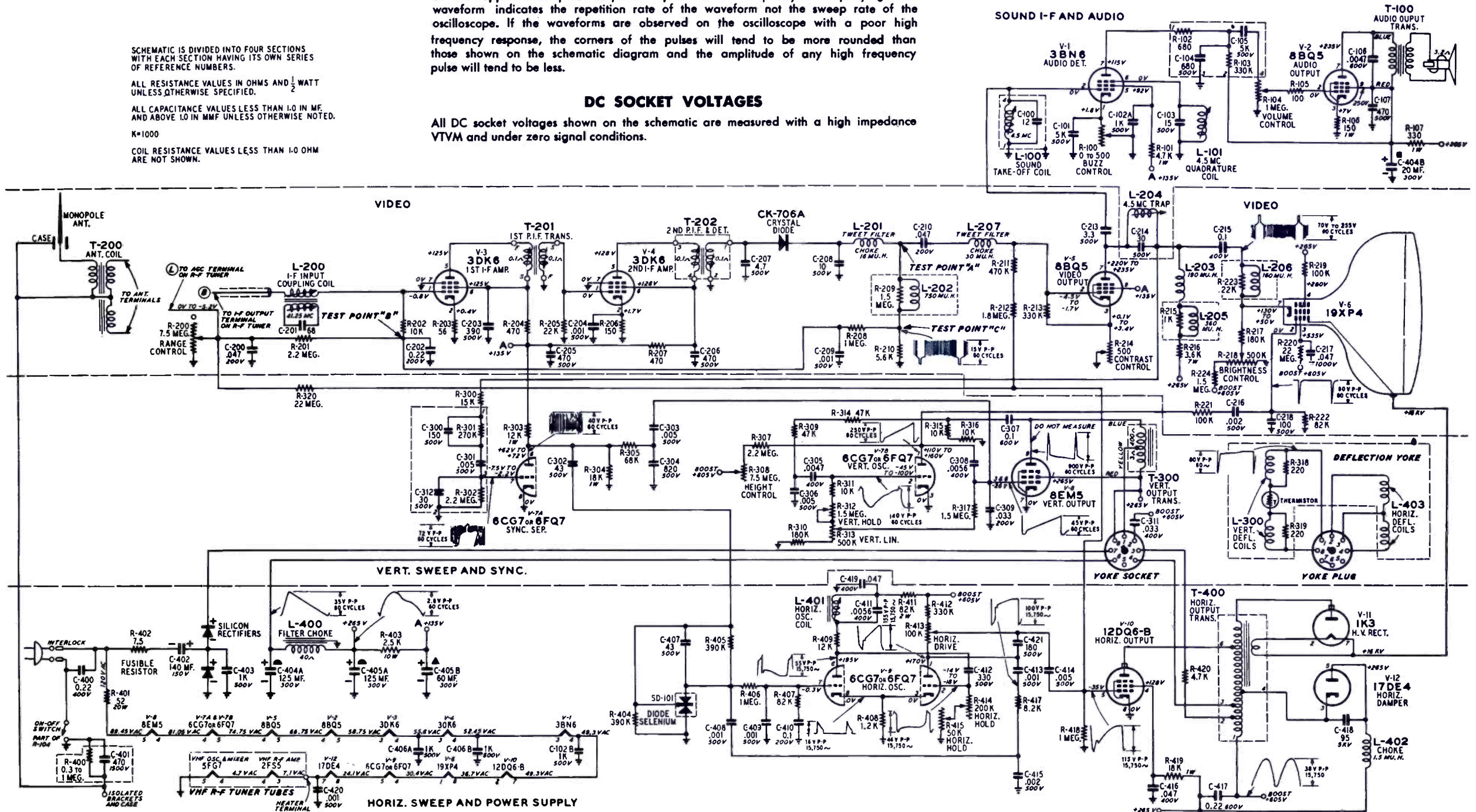
SCHEMATIC IS DIVIDED INTO FOUR SECTIONS WITH EACH SECTION HAVING ITS OWN SERIES OF REFERENCE NUMBERS.

ALL RESISTANCE VALUES IN OHMS AND $\frac{1}{2}$ WATT UNLESS OTHERWISE SPECIFIED.

ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF. AND ABOVE 1.0 IN MMF UNLESS OTHERWISE NOTED.

K=1000

COIL RESISTANCE VALUES LESS THAN 1.0 OHM ARE NOT SHOWN.

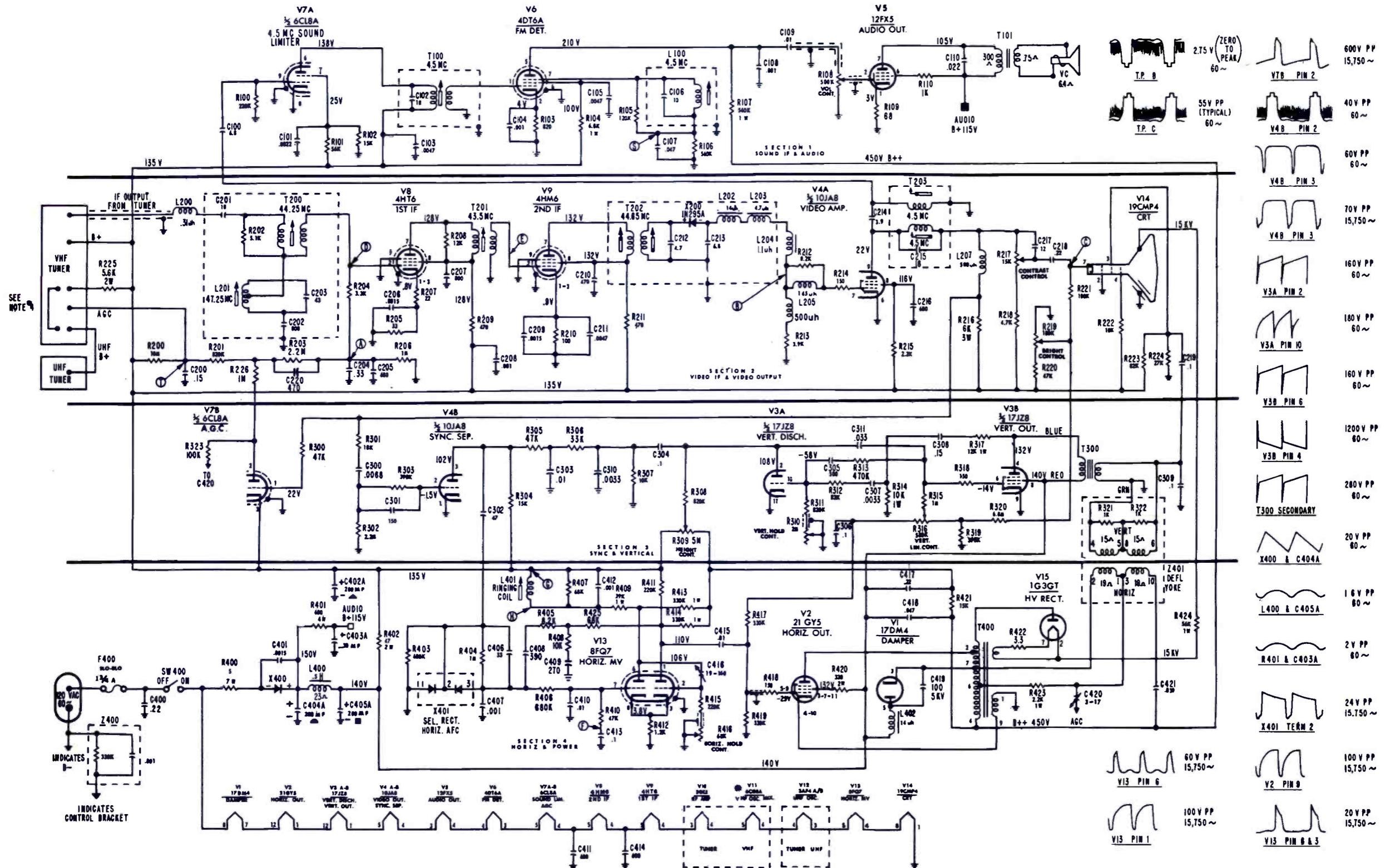


NOTE—In UHF receivers the filament voltages in the tuner and above the tuner in the heater string will be slightly greater because of the filament voltages of the tuner tubes.

AIRLINE
TV Chassis
Models
KCS 143 A & B

ELECTRONIC TECHNICIAN TEKFAK

- NOTES:
1. ALL CAPACITOR VALUES LESS THAN 1 ARE IN MFD, AND VALUES GREATER THAN 1 ARE IN PF.(MICROMICROFARADS) ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE INDICATED.
 2. DC VOLTAGES ARE MEASURED FROM POINT INDICATED TO CIRCUIT GROUND WITH A VTVM. LINE VOLTAGE AT 120 V.A.C., NO SIGNAL APPLIED.
 3. WAVEFORMS WERE TAKEN WITH CONTROLS SET FOR A NORMAL PICTURE. C-420 WAS SET FOR 2.75V (ZERO TO PEAK) AT T.P. ①.
 4. SWITCH MAKES CONTACT ON UHF POSITION ONLY.



ELECTRONIC TECHNICIAN TEKFAK

CORONADO
TV Chassis
Model TV2-9442A

OSCILLOSCOPE WAVEFORM PATTERNS

The waveforms shown on the schematic diagram are as observed on a Tektronix type 524D wide band television oscilloscope with the receiver tuned to a reasonably strong signal and a normal picture. The voltages shown on each waveform are the approximate peak to peak amplitudes. The frequency accompanying each waveform indicates the repetition rate of the waveform not the sweep rate of the oscilloscope. If the waveforms are observed on the oscilloscope with a poor high

frequency response, the corners of the pulses will tend to be more rounded than those shown on the schematic diagram and the amplitude of any high frequency pulse will tend to be less.

DC SOCKET VOLTAGES

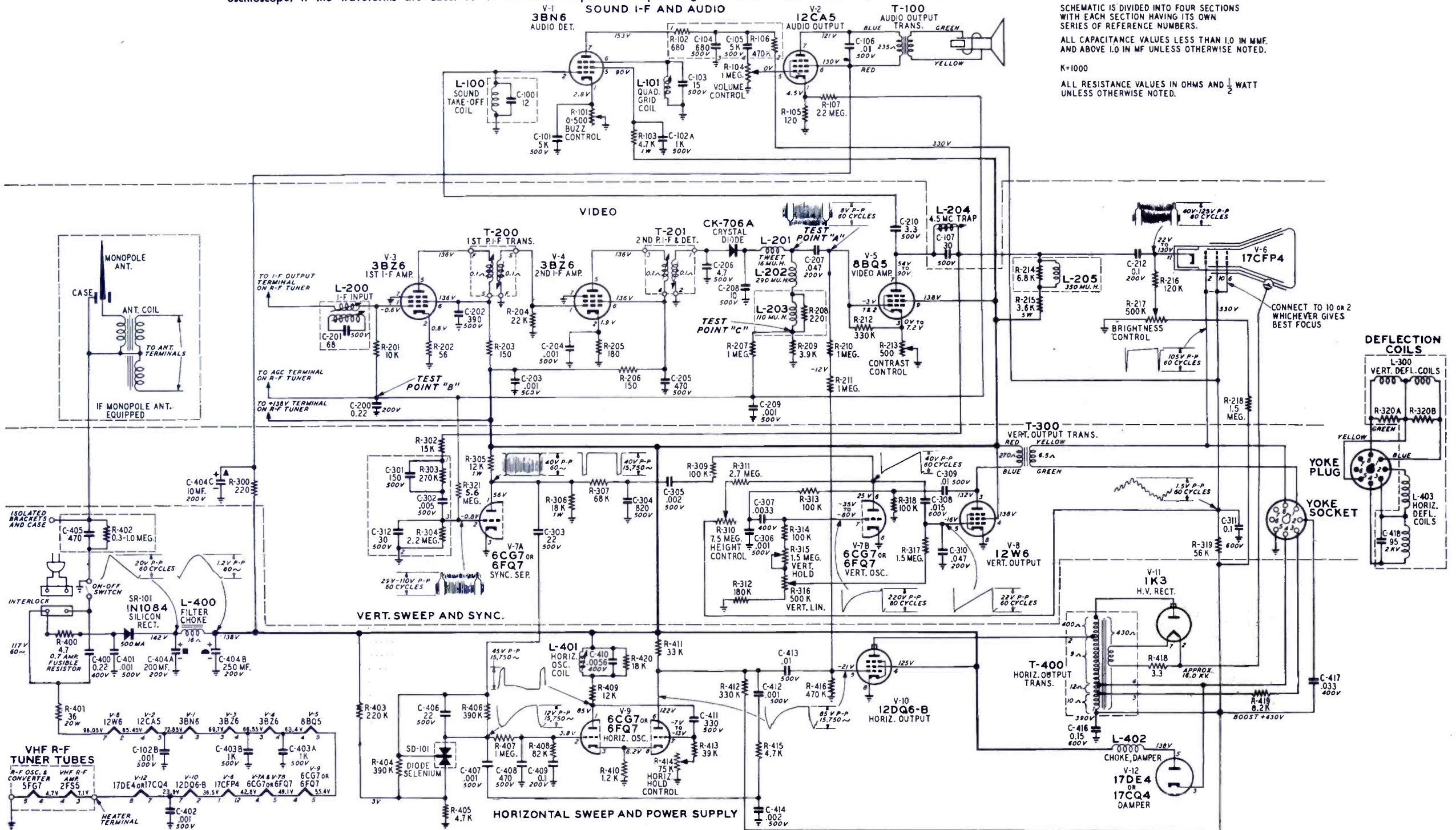
All DC socket voltages shown on the schematic are measured with a high impedance VTVM and under zero signal conditions.

SCHEMATIC IS DIVIDED INTO FOUR SECTIONS WITH EACH SECTION HAVING ITS OWN SERIES OF REFERENCE NUMBERS.

ALL CAPACITANCE VALUES LESS THAN 1.0 IN MMF. AND ABOVE 1.0 IN MF UNLESS OTHERWISE NOTED.

K=1000

ALL RESISTANCE VALUES IN OHMS AND $\frac{1}{2}$ WATT UNLESS OTHERWISE NOTED.



NOTE—In UHF receivers the filament voltages in the tuner and above the tuner in the heater string will be slightly greater because of the filament voltages of the tuner tubes.

CORONADO

TV Chassis
Model TV2-9442A

**ELECTRONIC
TECHNICIAN
TEKFAK**

SERVICE HINTS

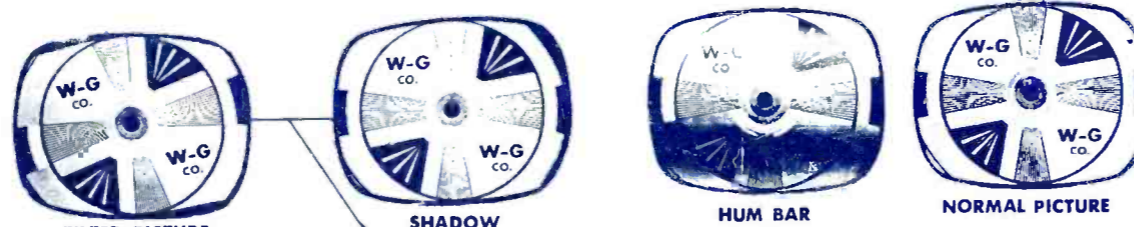
To provide a simple "Service Saver" procedure, the controls associated with a service condition that can be adjusted without removing the cabinet back are listed adjacent to each picture. To accomplish other control adjustments or to substitute tubes, the cabinet back must be removed. Removing the cabinet back disengages the safety interlock on the AC cord. The safety interlock is provided to remove any shock hazard when working inside the cabinet with the cabinet back removed. To adjust the various service controls located on the picture tube and chassis of the receiver, power must be applied with the cabinet back removed. A separate AC line cord (referred to as a "cheater" cord by servicemen) can be connected to the AC input terminals for this purpose. This, however, creates a severe shock hazard.

USE AN ISOLATION TRANSFORMER BETWEEN THE "CHEATER" CORD AND POWER RECEPTACLE. THIS REMOVES THE SHOCK HAZARD AND IS THE ONLY SAFE GUARD. SEVERE SHOCK MAY RESULT FROM CONTACT WITH THE CHASSIS IF AN ISOLATION TRANSFORMER IS NOT USED.

Also follow the simple cautions below:

1. Disconnect "cheater" cord each time a tube is substituted.
2. Touch only those service controls listed.

When a tube substitution is made, the tube location diagram on this chart or the diagram on the cabinet back or inside wall of the cabinet, should be consulted. Be sure to closely observe the diagram and replace the same type number tube in the position indicated. Do not rearrange tubes or remove a tube while the receiver is in operation. If a tube substitution does not correct the trouble, replace the original tube. If the receiver has been in operation for sometime, the tubes become hot and gloves or other protective means should be used when replacing tubes to prevent finger burns.



TILTED PICTURE

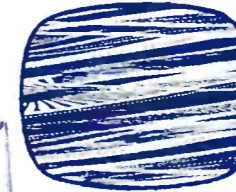
SHADOW

HUM BAR

NORMAL PICTURE

Loosen Locking Screw, Rotate Yoke Until Picture is Level and Push Yoke Forward as Far as it Will Go. Re-Tighten Locking Screw.

With Weak or Distorted Sound or No Sound.



DIAGONAL BARS
Check—Horizontal Hold Control Adjustment.



UNSTABLE PICTURE (ROLLING)
Check—Vertical Hold Control Adjustment.



INSUFFICIENT HORIZONTAL SIZE



PICTURE BLOOMING



NO LIGHT ON PICTURE TUBE

Check—Brightness Control, A.C. Line Cord Power Connections and Fusible Resistor.

SERVICE SAVER PROCEDURE

1. Carefully study face of picture tube.
2. Select one of the pictures on chart that is closest to the picture portrayed by the TV set.
3. Adjust controls indicated adjacent to picture. For the proper control adjustment procedure refer to Owner's Guide which accompanies receiver.
4. If necessary, remove back of set, adjust controls or substitute tubes indicated.

POOR PICTURE

Check—Fine Tuning Control Adjustment and Antenna Connections.

WEAK PICTURE

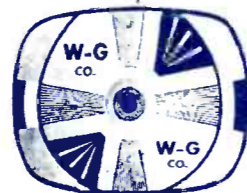
Check—Antenna and Antenna Connections.

NO PICTURE - NO SNOW

NO PICTURE - SNOW

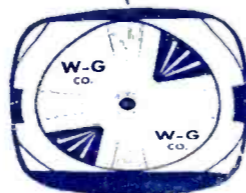
Check—Station selector position and antenna connections.

WHITE LINE



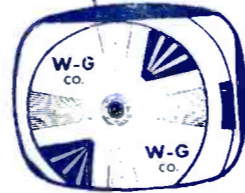
POOR LINEARITY

Check—Vertical Linearity Adjustment.



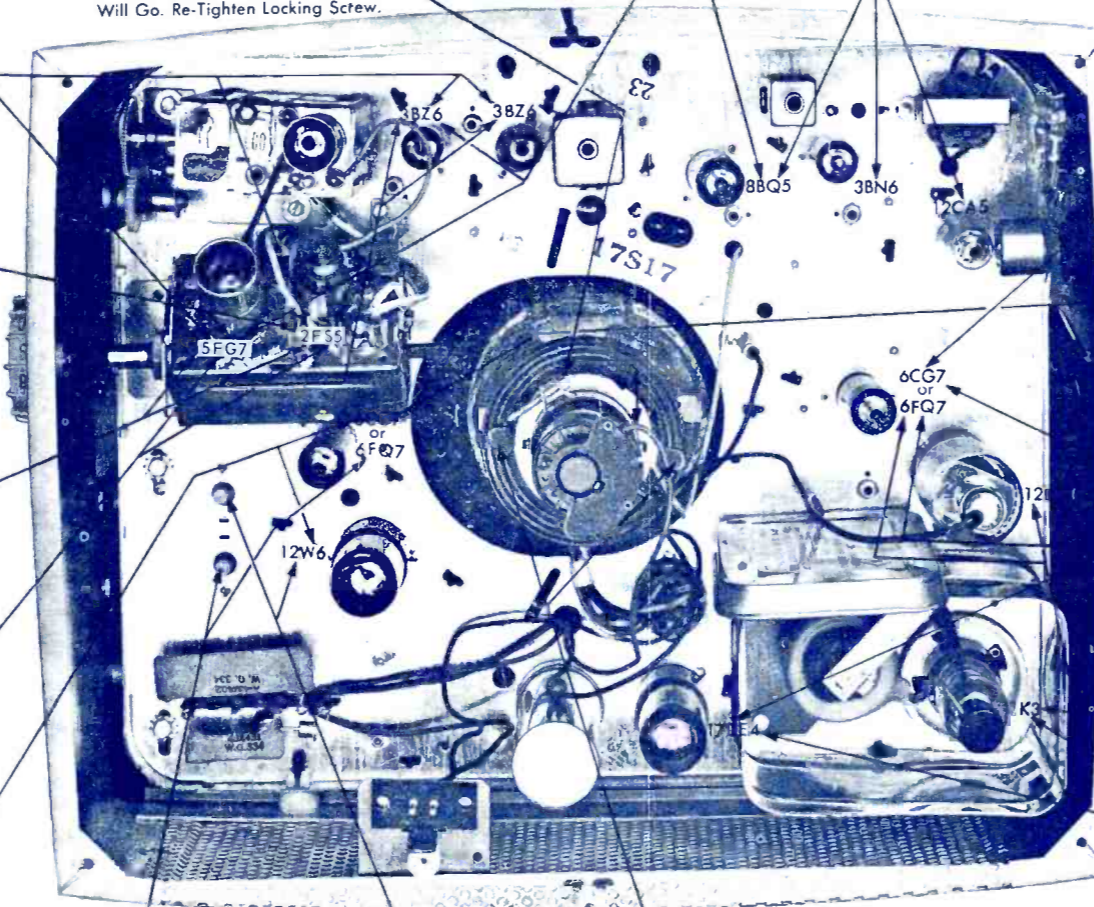
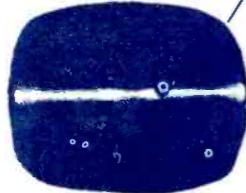
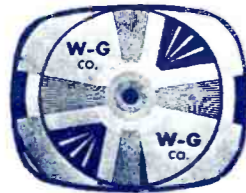
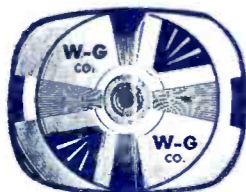
INSUFFICIENT VERTICAL HEIGHT

Check—Height Adjustment.



MIS-CENTERING

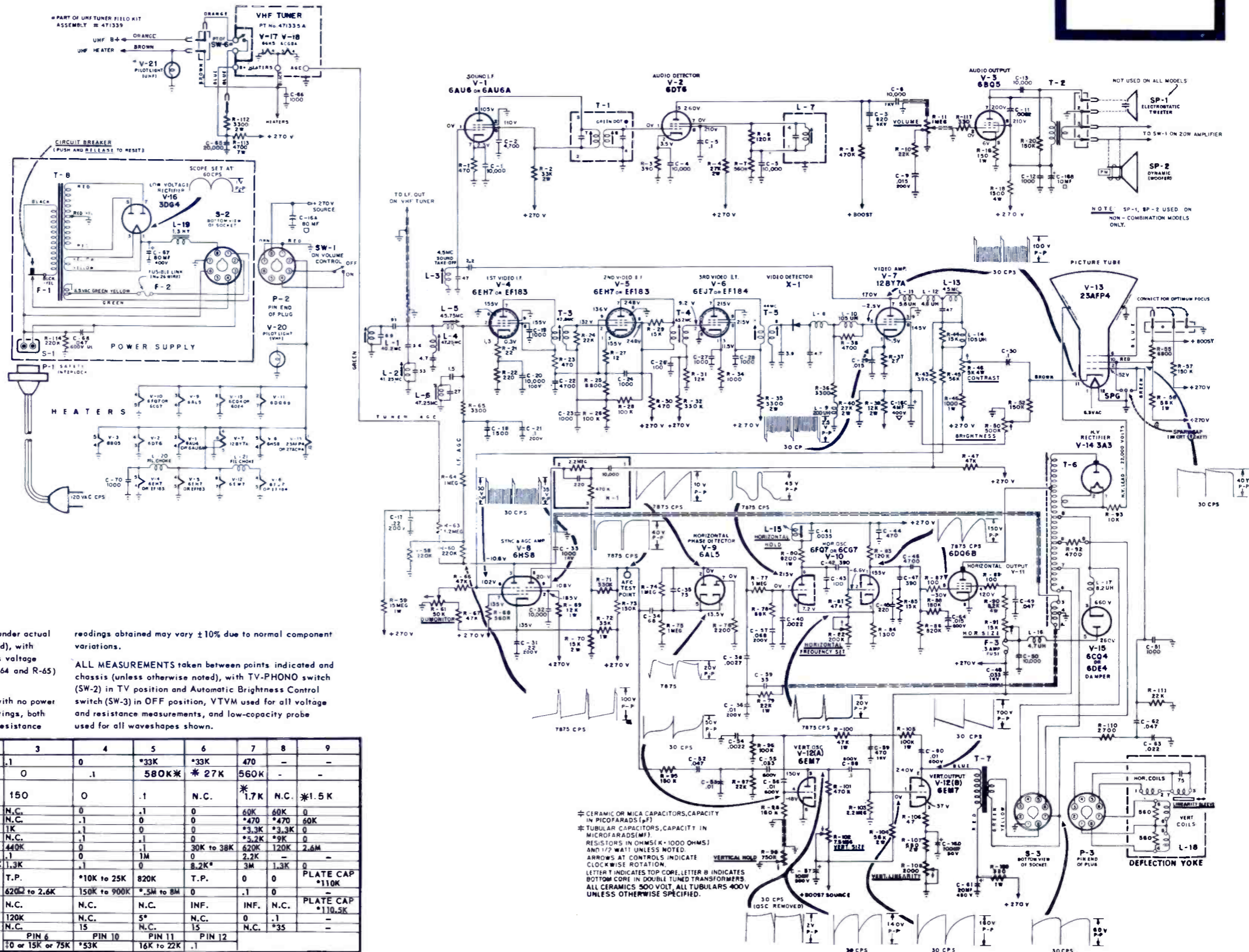
Rotate tabs individually or together until picture is centered.



ELECTRONIC TECHNICIAN

TEKFAX

DUMONT
Chassis 120633
Series 900



VOLTAGES AND WAVESHAPES were taken under actual operating conditions (normal picture and sound), with line voltage maintained at 120 volts AC. Bias voltage developed at the I-F AGC line (junction of R-64 and R-65) was minus ten volts.

RESISTANCE MEASUREMENTS were taken with no power applied. Where readings vary with control settings, both maximum and minimum values are given. All resistance

readings obtained may vary $\pm 10\%$ due to normal component variations.

ALL MEASUREMENTS taken between points indicated and chassis (unless otherwise noted), with TV-PHONO switch (SW-2) in TV position and Automatic Brightness Control switch (SW-3) in OFF position, VTVM used for all voltage and resistance measurements, and low-capacity probe used for all waveshapes shown.

SYMBOL	TUBE TYPE	1	2	3	4	5	6	7	8	9
V-1	6AU6	1.1	0	.1	0	*33K	*33K	470	-	-
V-2	6DT6	1.1	390	0	.1	580K*	*27K	560K	-	-
V-3	6BQ5	N.C.	330 Ω TO 1 MEG.	150	0	.1	N.C.	*1.7K	N.C.	*1.5 K
V-4	6EH7	200	1.5M	N.C.	0	.1	0	60K	60K	0
V-5	6EH7	50K	5.2K	N.C.	0	.1	0	*470	*470	60K
V-6	6EJ7	N.C.	12K	1K	0	0	0	*3.3K	*3.3K	0
V-7	12BY7A	27	300	N.C.	.1	.1	0	*5.2K	*9K	0
V-8	6HS8	10K	*12K	N.C.	0	0	0	30K TO 38K	620K	120K
V-9	6AL5	1M	2M	440K	0	0	1M	0	0	0
V-10	6CG7	*120K	50K TO 250K	1.3K	.1	0	0	2.2K	0	0
V-11	6DQ6B	T.P.	.1	T.P.	*10K TO 25K	820K	T.P.	0	0	PLATE CAP *110K
V-12	6EN7	2.2M	*600	620 Ω TO 2.6K	150K TO 900K	*.5M TO 8M	0	.1	0	PLATE CAP *110.5K
V-14	1K3	N.C.	INF.	N.C.	N.C.	N.C.	INF.	INF.	N.C.	-
V-15	6DA4/6DE4	N.C.	N.C.	120K	N.C.	5*	N.C.	0	.1	-
V-16	5U4/GB	N.C.	*35	N.C.	15	N.C.	15	N.C.	*35	-
V-13	23YP4 or 27YP4	0	26K		PIN 6 10 or 15K or 75K	*53K		PIN 11 16K TO 22K	.1	

K - Denotes Kilohms
M - Denotes Megohms
N.C. - Denotes no connection
TP - Denotes terminal used as the post

* - Indicates readings taken with common lead of meter connected to Pin 8 of S-2 on power supply (270 volt B-Plus line)
† - Indicates readings which may vary from chassis to chassis. Refer to Schematic Diagram for details.

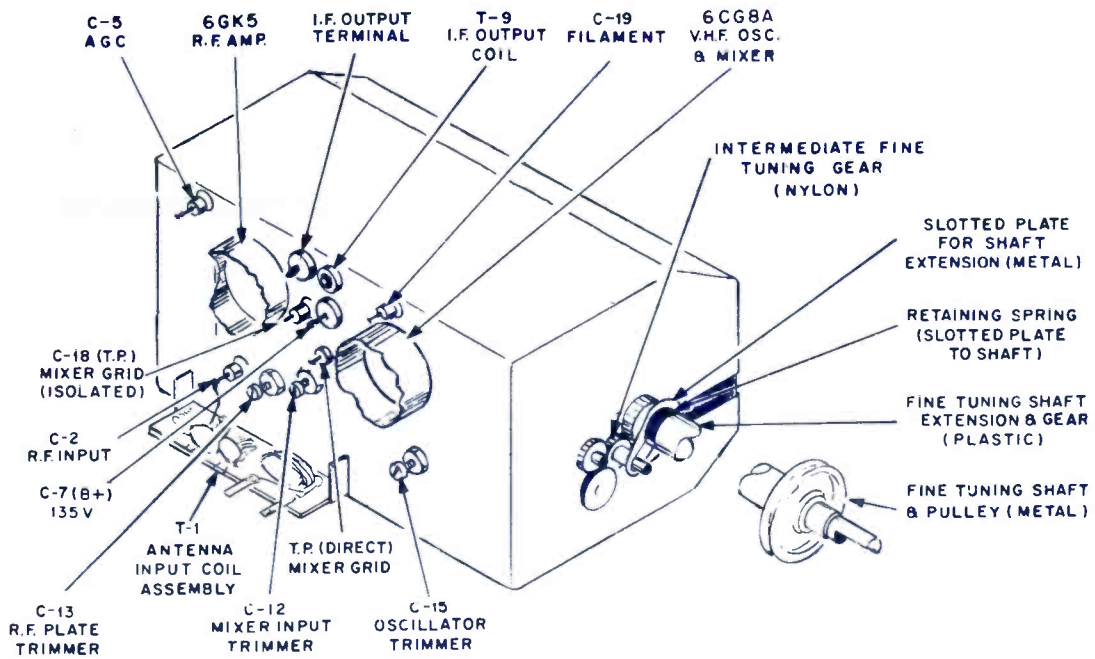
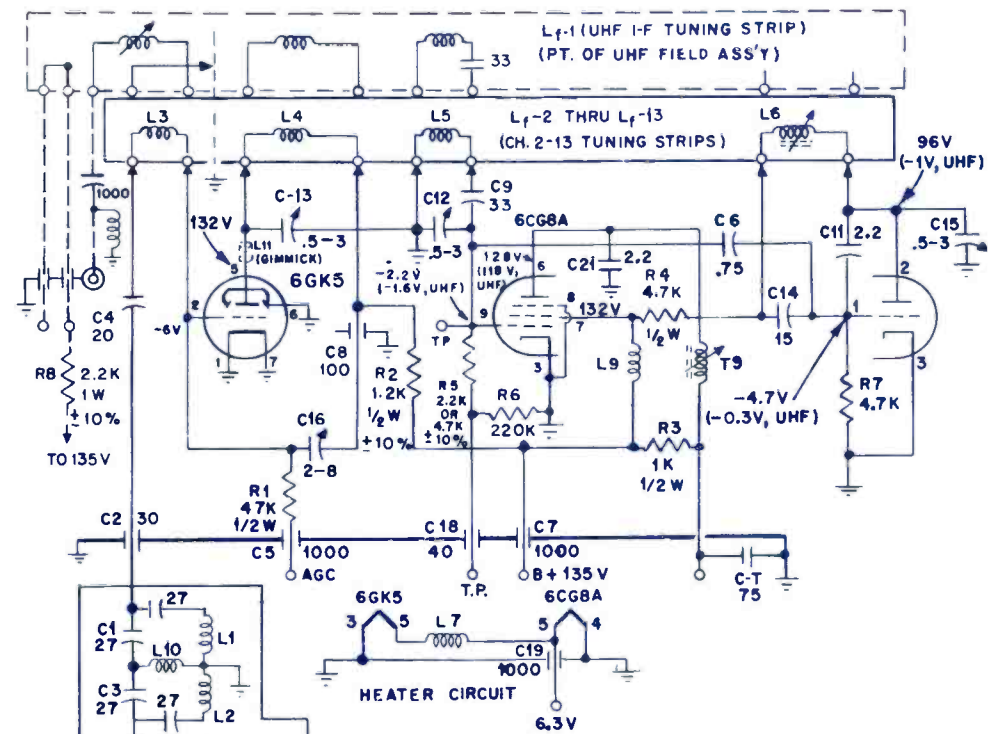


FIG. 6 - VHF TUNER 471332

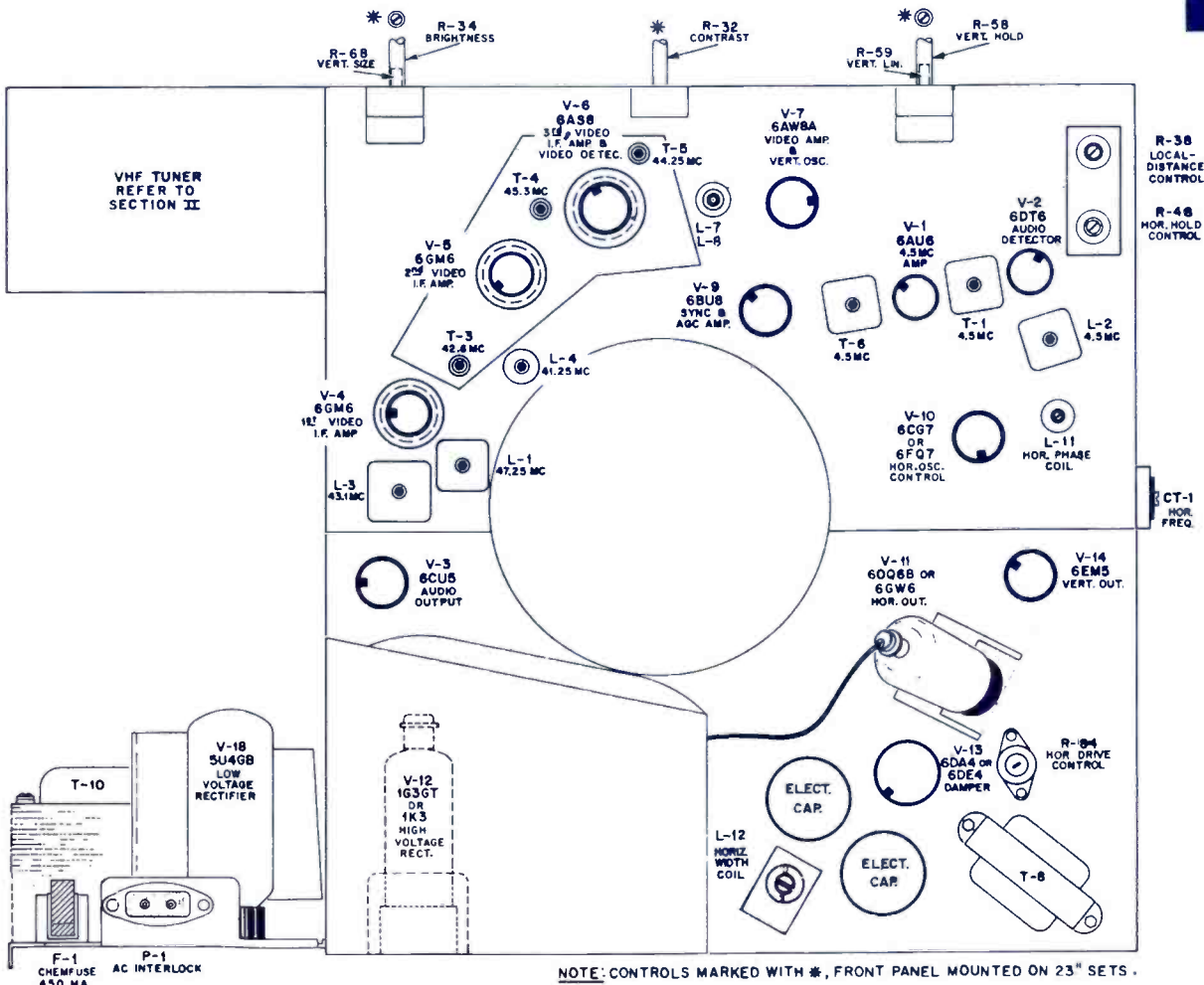
8

PIN	6GK5	6CG8A
1	0	4.7K
2	1.8M	*4.7K
3	0	0
4	.1	0
5	*1.2K	.1
6	0	*1K
7	0	*0
8	---	0
9	---	225K



NOTE
ALL RESISTORS ARE 1/4 WATT ±20% TOLERANCE UNLESS OTHERWISE NOTED.
ALL CAPACITOR VALUES SHOWN ARE IN MICRO-MICROFARADS (MMF).
CIRCUIT SHOWN IN DOTTED LINES IS PART OF UHF FIELD ASS'Y.

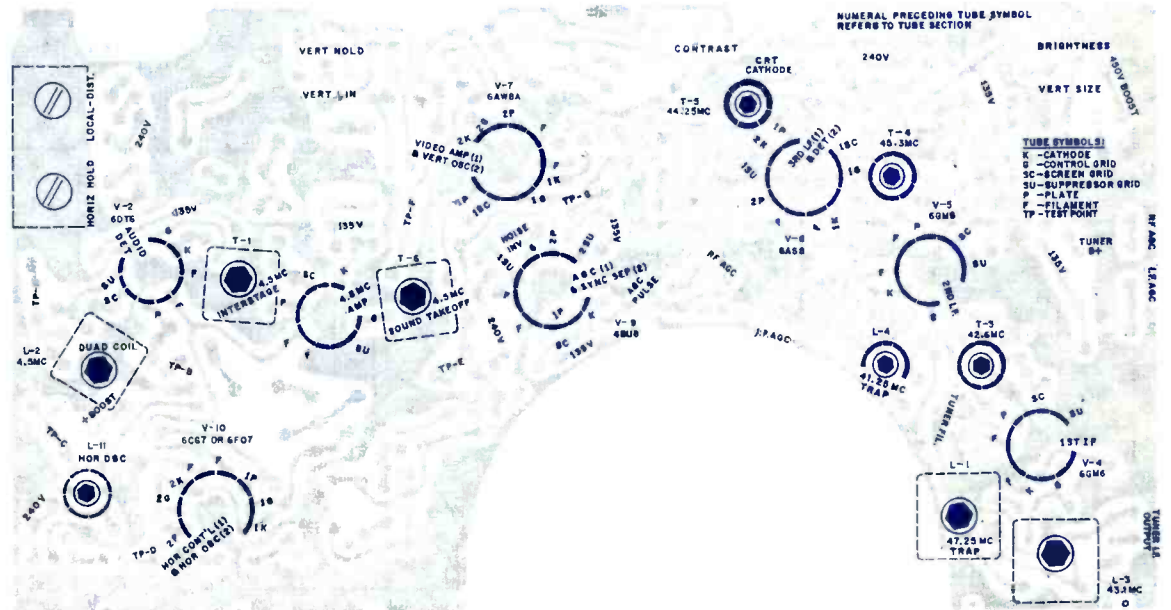
SCHEMATIC, VHF TUNER 471332



NOTE: CONTROLS MARKED WITH *, FRONT PANEL MOUNTED ON 23" SETS.

TUBE LOCATION AND ALIGNMENT POINTS

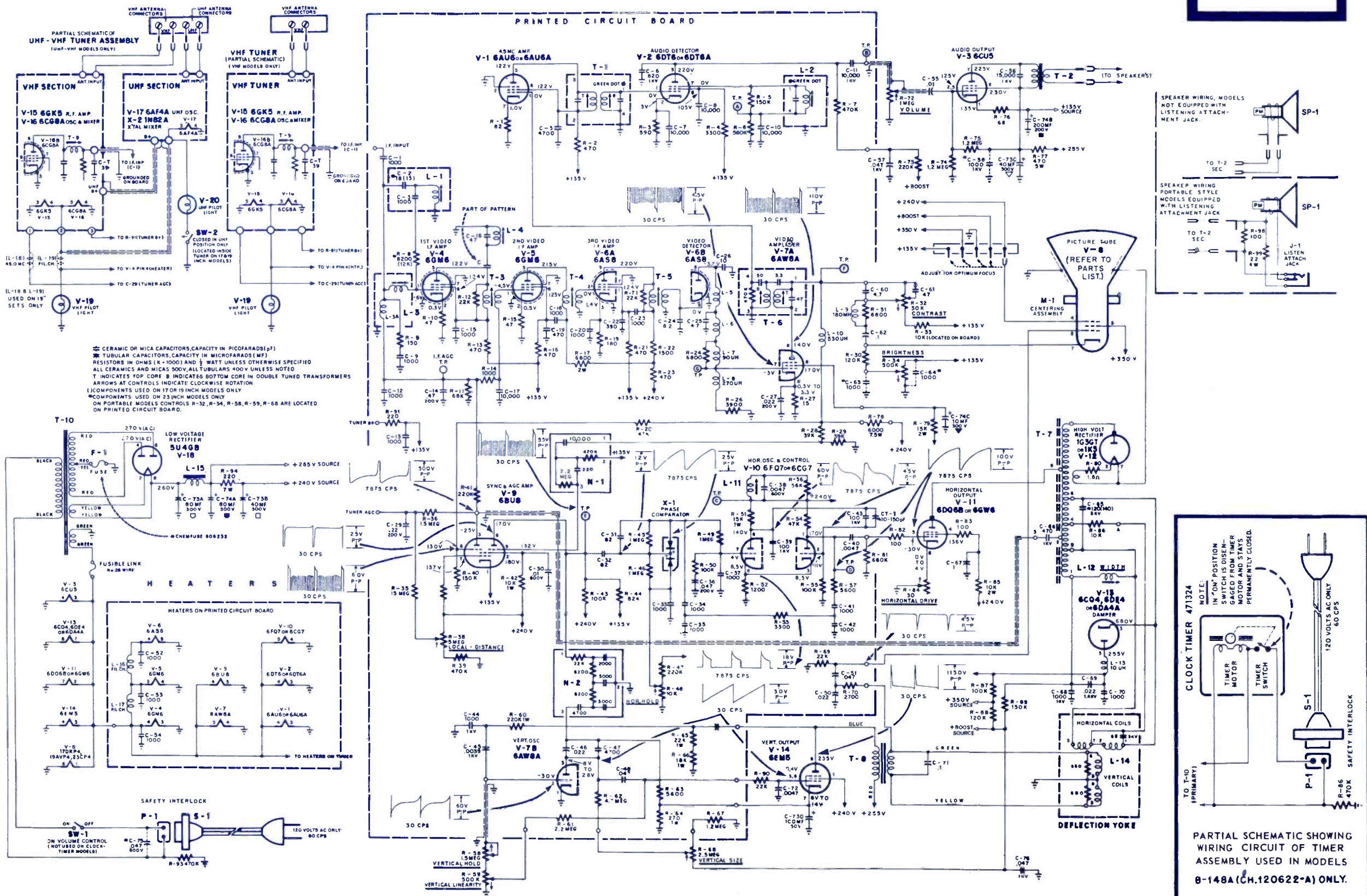
ETCHED PRINTED CIRCUIT BOARD, BOTTOM VIEW



ELECTRONIC TECHNICIAN

TEKFAX

DUMONT
TV Chassis
120622-A, 23-B,
44-A and 88-A

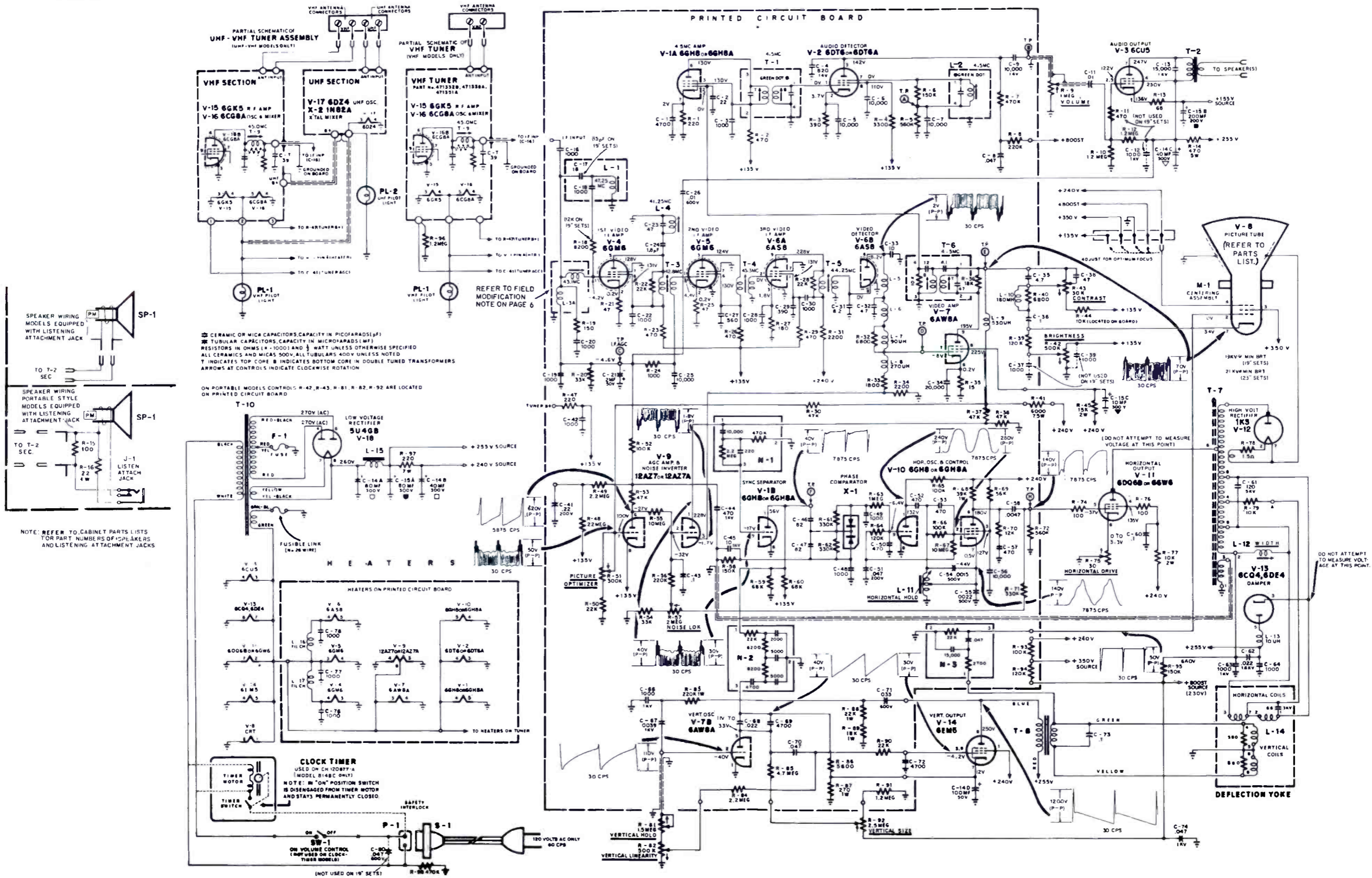


DUMONT

TV Chassis
120677-A, 78-B,
79-A, 84-A,
89-A

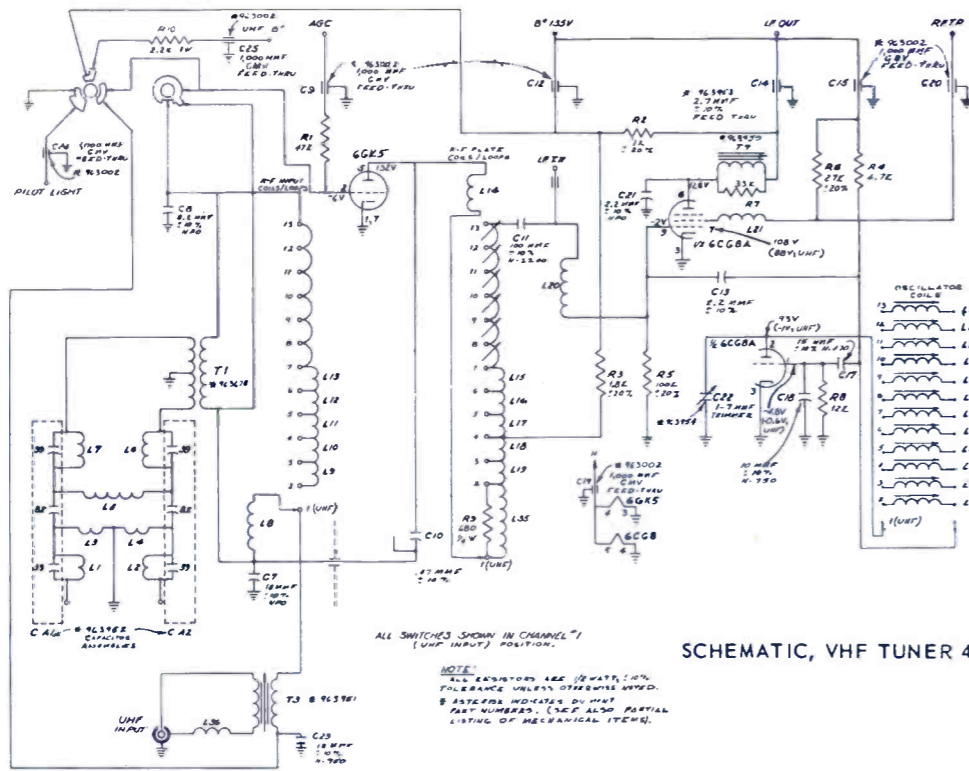
ELECTRONIC TECHNICIAN

TEKFAX

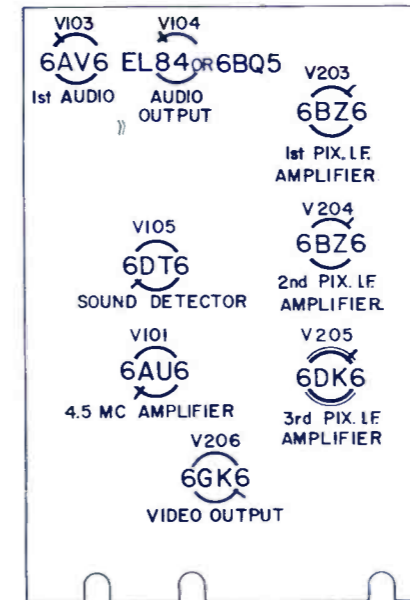


ELECTRONIC TECHNICIAN TEKFAQ

ELECTROHOME
TV Chassis
Models Kimberly
and Kalmar



SCHEMATIC, VHF TUNER 471341



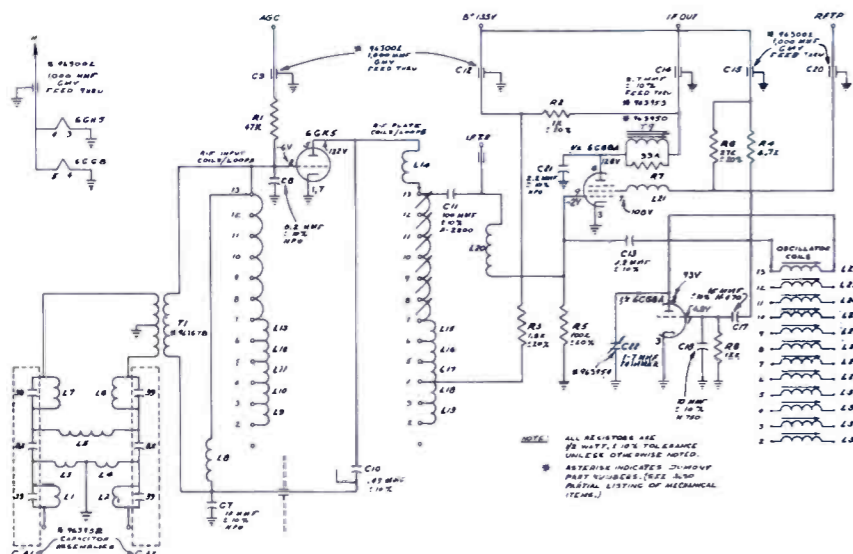
**CONDITIONS FOR VOLTAGE AND RESISTANCE MEASUREMENTS;
VHF TUNERS 471338 AND 471341**

VOLTAGE MEASUREMENTS were taken under actual operating conditions (normal picture and sound), with line voltage maintained at 120 volts AC.

RESISTANCE MEASUREMENTS were taken with no power applied. Readings obtained may vary ±10% due to normal component tolerances.

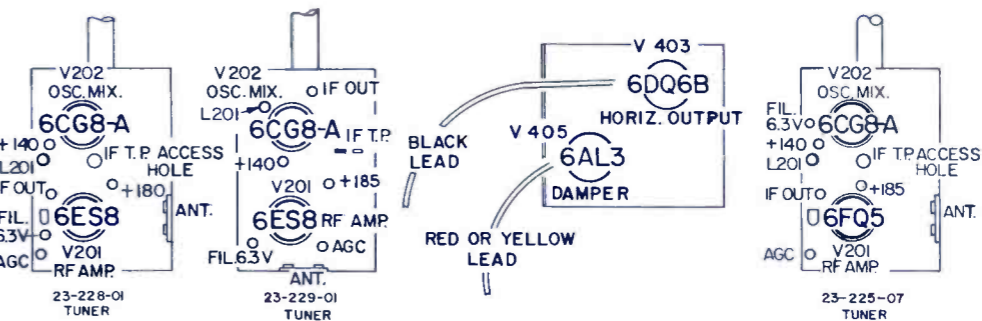
ALL MEASUREMENTS taken using VTVM, between points indicated and chassis, unless otherwise noted. Measurements marked with asterisk (*) taken with common lead of meter connected to B+ 135 volt point on tuner.

SCHEMATIC, VHF TUNER 471338



DUMONT
TV Chassis
120677-A 78-B 79-A
84-A 89-A

**ELECTRONIC TECHNICIAN
TEKFAQ**

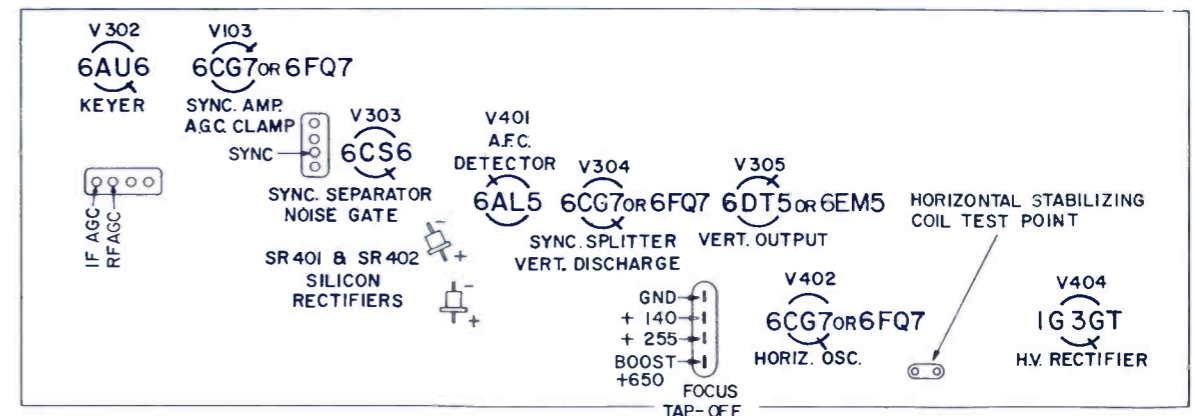


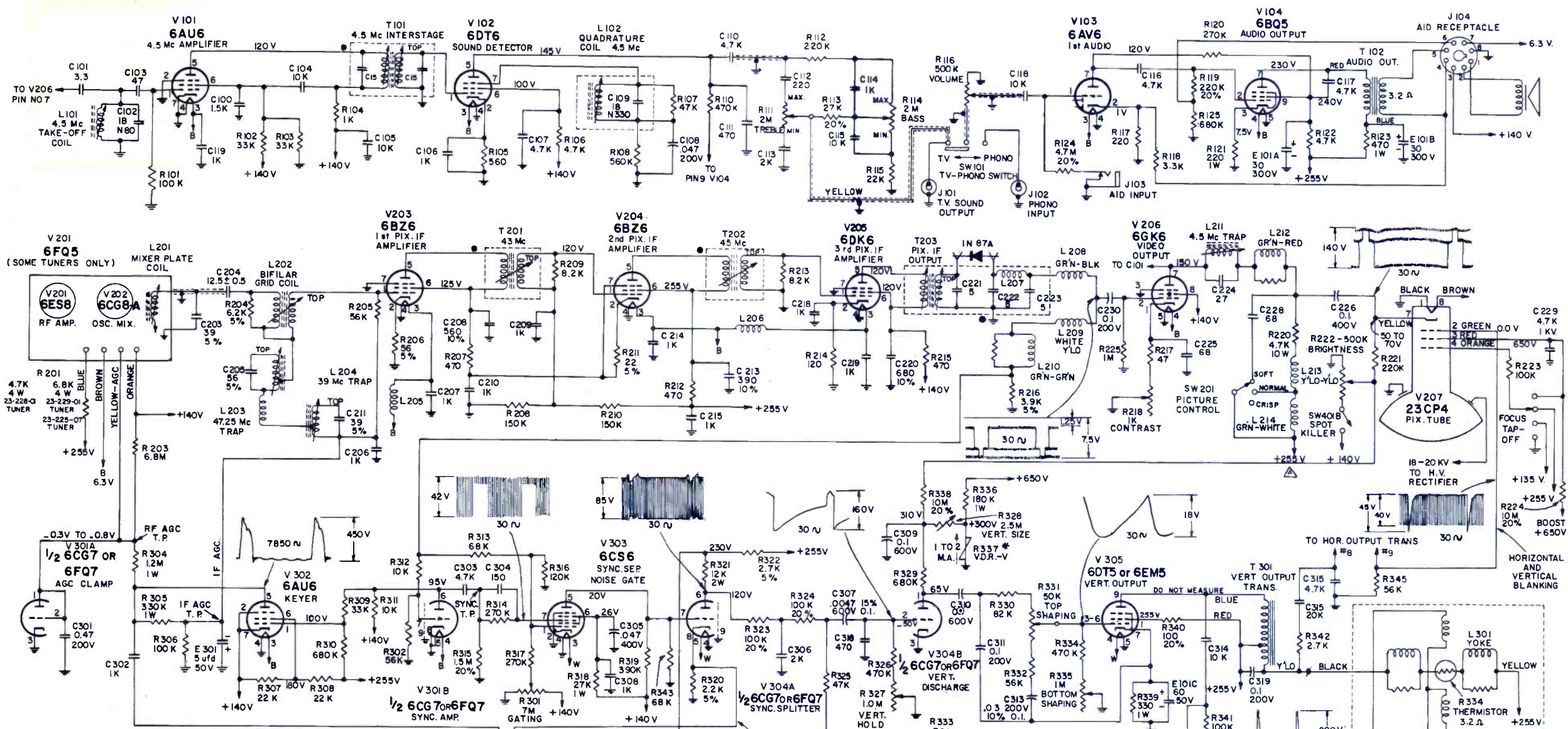
INDICATES SHIELDED TUBE
INDICATES MISSING PIN OR INDICATING TAB

October 1963

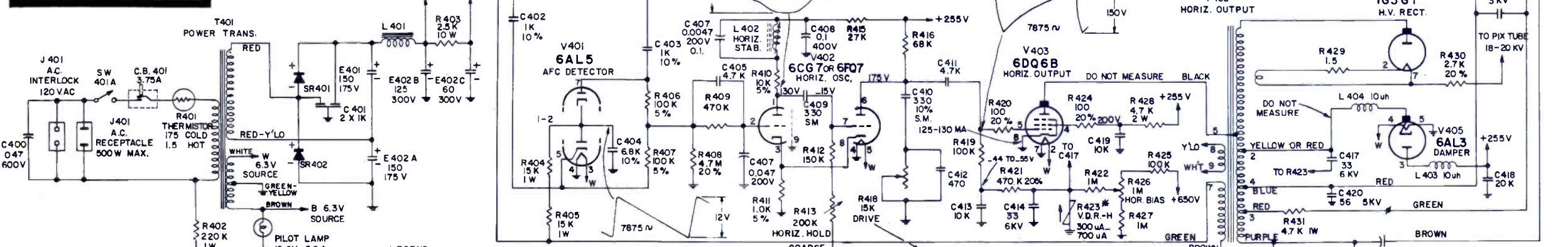
**RESISTANCE MEASUREMENTS
VHF TUNERS 471338, 471341**

PIN	6GK5	6CG8A
1	0	12K
2	1.8M	*4.7K
3	0	0
4	.1	0
5	*1.8K	.10
6	0	*1K
7	0	*27K
8	---	0
9	---	100K





ELECTROHOME
TV Chassis
Models Kimberly and Kalmar



RESISTORS
HALF WATT UNLESS OTHERWISE NOTED.
10% TOLERANCE

CAPACITORS
TUBULAR, CAPACITY IN μ F AND D.C.W.V
CURVED LINE, OUTSIDE FOIL
ELECTROLYTIC, CAPACITY IN μ F AND D.C.W.V
CERAMIC, MICA OR OTHER TYPES WITH NO OBVIOUS OUTSIDE OR GROUNDED SIDE.
CAPACITY IN μ F, TOLERANCE IF CRITICAL AND D.C.W.V.

LEGEND
K = 1000
M = 1000,000

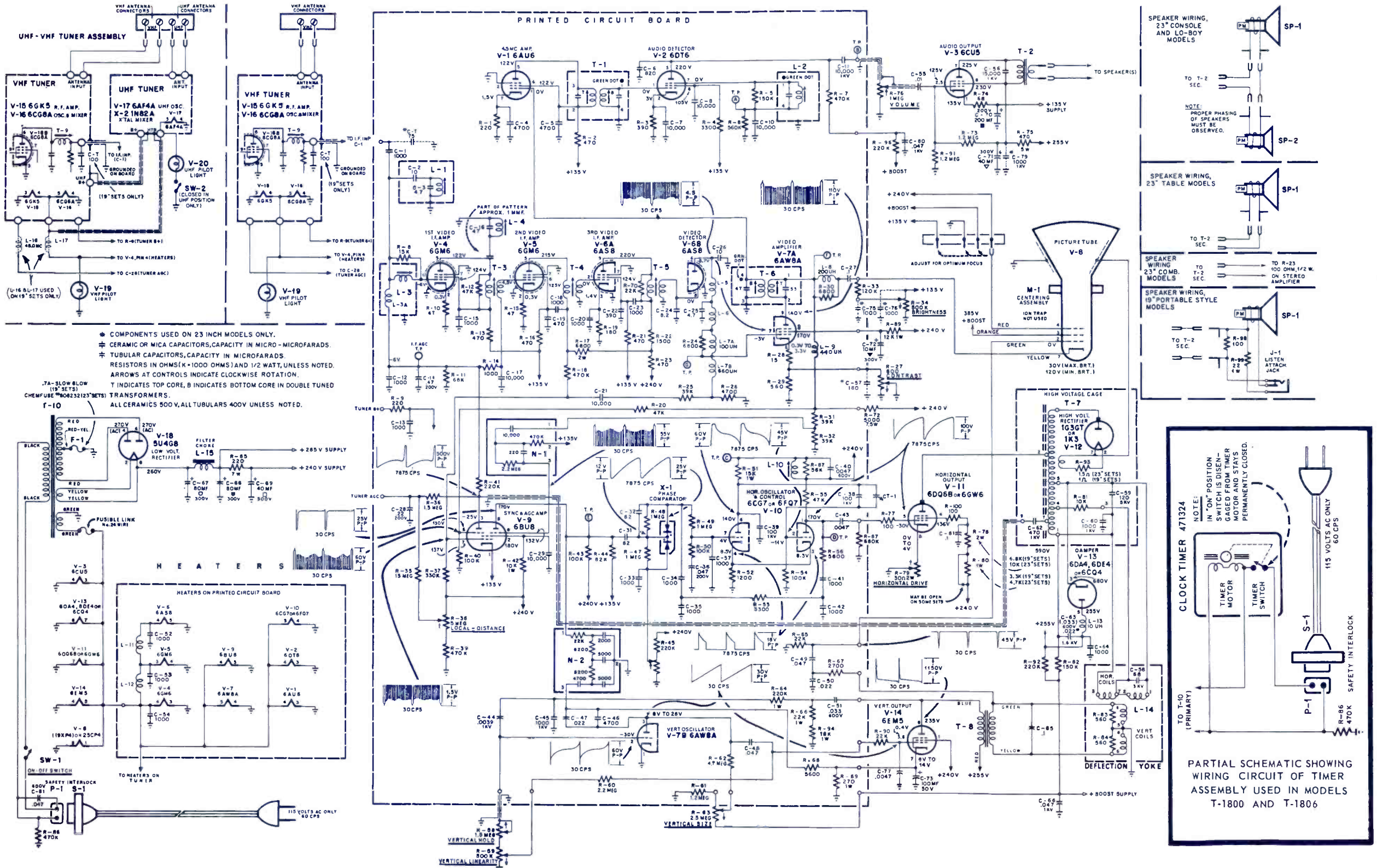
SPECIAL CAPACITORS SUCH AS TEMPERATURE COMPENSATING TYPES ARE IDENTIFIED BY A NOTE AT CAPACITOR LOCATION
e.g. - O.I. = OIL IMPREGNATED SM. = SILVER MICA

NOTE: DC VOLTAGES ARE SHOWN FOR A NORMAL SIGNAL, VOLUME CONTROL ZERO, BRIGHTNESS FULL, CONTRAST FULL, OTHERS NORMAL, MEASURED WITH A V.T.V.M. HAVING 10 M RESISTANCE.

WAVE FORMS MEASURED BY AN OSCILLOSCOPE WITH GOOD FREQUENCY RESPONSE, 10 M.Ω INPUT RESISTANCE

ELECTRONIC TECHNICIAN TEK FAX

EMERSON
TV Chassis
Models 1800
and 2000 series



EMERSON
TV Chassis
120572-C,
120573-D

ELECTRONIC TECHNICIAN TEKFAK

(Separate conditions apply to readings taken on AM, FM, or STEREO chassis. For details, refer to page 15 in section III of this service note.)

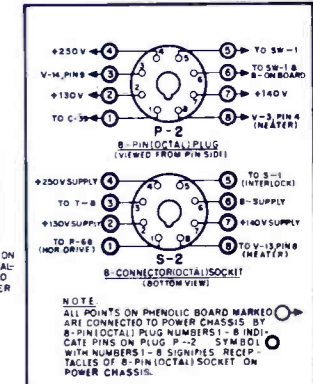
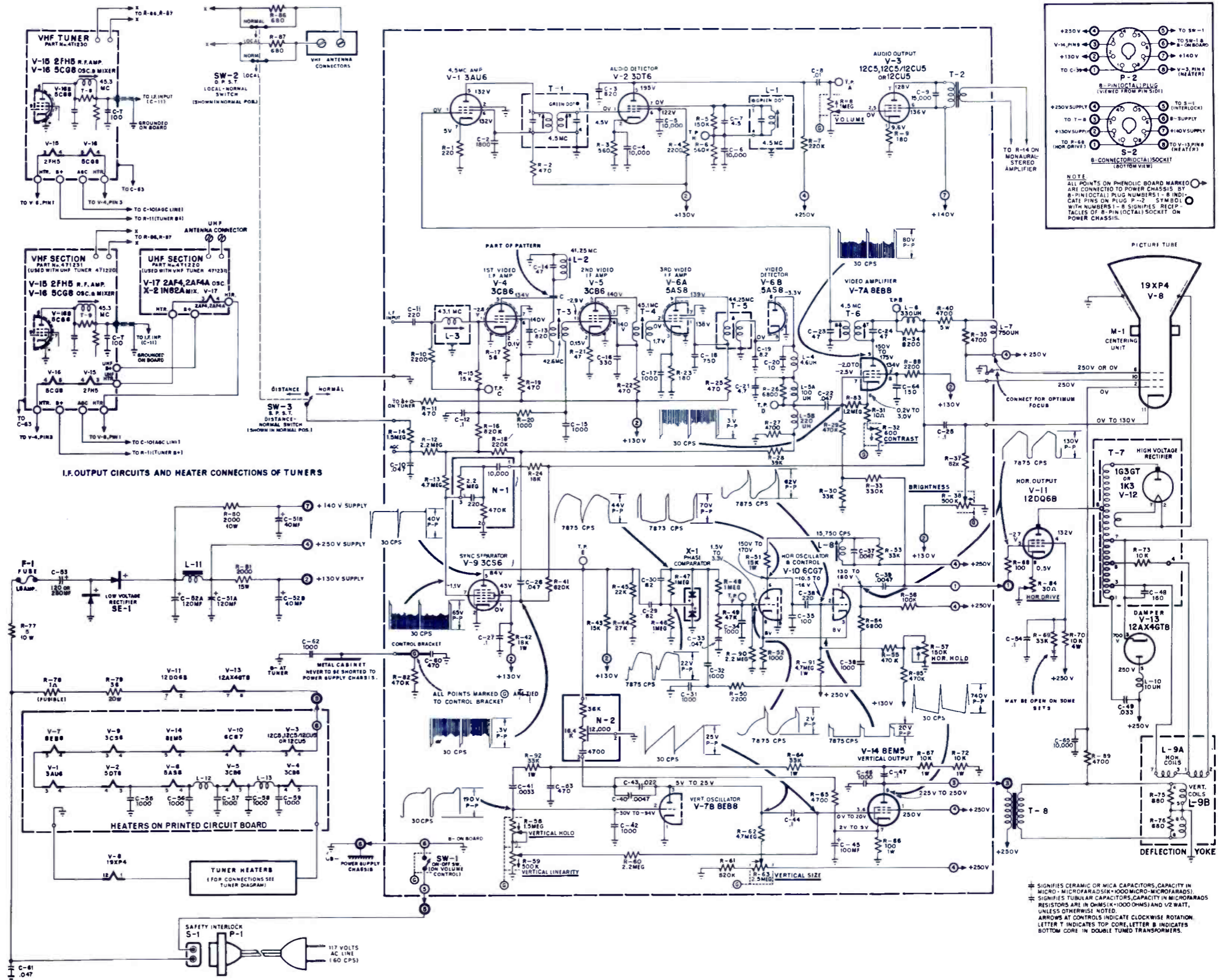
VOLTAGES AND WAVESHAPES were taken under actual operating conditions (normal picture and sound). AGC voltage developed at test point (junction of R-15, R-16) was minus four volts. Voltage and waveshape readings obtained may vary $\pm 20\%$ in value due to component tolerances and strength of input signal to chassis under test.

RESISTANCE READINGS were taken with no power applied. Where readings are affected by control settings, both maximum and minimum values are given. All resistance readings may vary $\pm 10\%$ due to normal component tolerances.

ALL MEASUREMENTS were taken between points indicated and tuner chassis (unless otherwise noted), with line voltage maintained at 115 volts AC. A VTVM was used for all voltage and resistance measurements and a low capacity probe was used for all waveshapes shown.

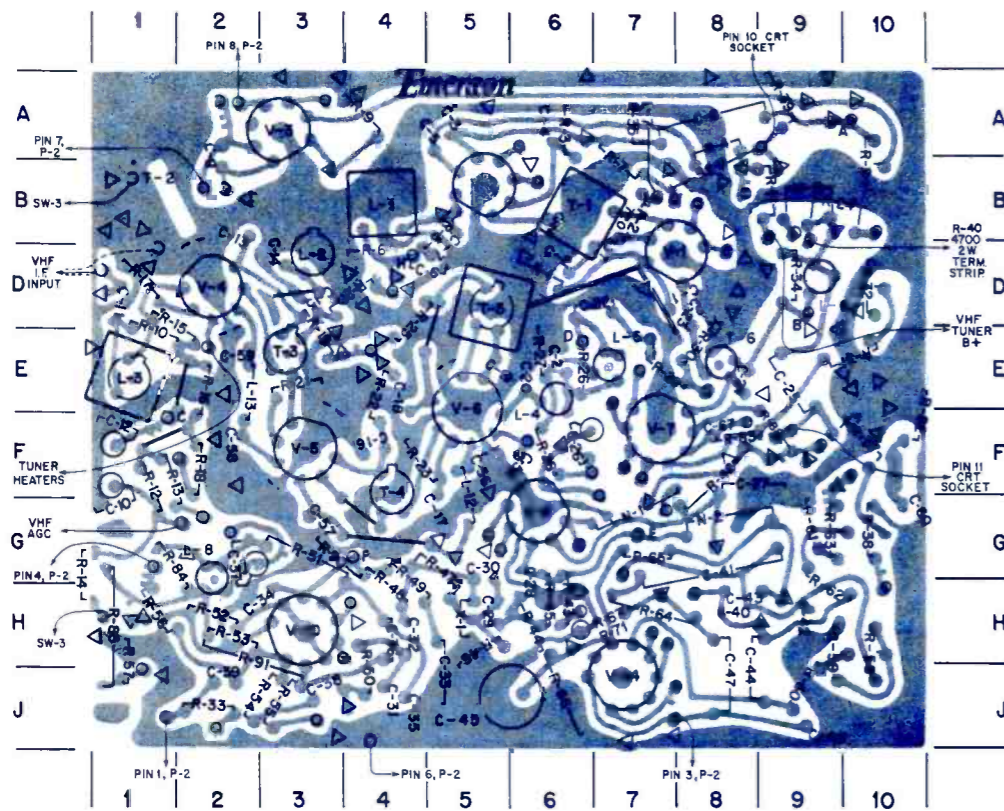
RESISTANCE READINGS CHART NOTES:

All resistance readings given are in ohms, "K" in Kilohms, "M" is Megohms. * Indicates varying resistance: allow 30 seconds for meter to settle. N.C. Denotes no connection at terminal indicated.



NOTE: ALL POINTS ON PHENOLIC BOARD MARKED ARE CONNECTED TO POWER CHASSIS BY 8-PIN OCTAL PLUG NUMBER 1-8 INDICATE PINS ON PLUG P-2. SYMBOL WITH NUMBERS 1-8 SIGNIFIES RECIPIENT OF 8-PIN OCTAL SOCKET ON POWER CHASSIS.

More Data on Reverse Side



ETCHED PRINTED CIRCUIT BOARD CHASSIS (TOP VIEW)

SYMBOL-COORDINATE CHART

Sym.	Coor.	Sym.	Coor.	Sym.	Coor.	Sym.	Coor.	Sym.	Coor.	Sym.	Coor.	Sym.	Coor.	Sym.	Coor.	Sym.	Coor.
R-1	D-6	R-16	E-2	R-31	E-10	R-47	G-5	R-62	H-9	C-2	D-6	C-18	E-4	C-34	H-2	C-57	G-3
R-2	B-7	R-17	D-1	R-32	D-10	R-48	H-4	R-63	G-9	C-3	A-5	C-19	E-5	C-35	J-4	C-58	F-2
R-3	A-6	R-18	F-2	R-33	J-2	R-49	H-4	R-64	H-7	C-4	A-6	C-20	E-6	C-36	H-4	C-59	E-2
R-4	A-8	R-19	D-3	R-34	D-9	R-50	H-4	R-65	G-7	C-5	A-5	C-21	E-6	C-37	G-2	C-60	G-10
R-5	B-5	R-20	D-4	R-35	A-7	R-51	G-3	R-66	J-6	C-6	D-4	C-22	D-6	C-38	J-3	*C64	F-7
R-6	D-4	R-21	E-3	R-36	B-8	R-52	H-2	R-67	H-7	C-7	D-5	C-23	D-8	C-39	J-2	C-67	F-8
R-7	B-7	R-22	E-4	R-37	F-10	R-53	H-2	R-71	H-7	C-8	A-8	C-24	E-8	C-40	H-8	L-1	B-4
R-8	B-10	R-23	F-4	R-38	G-10	R-54	J-2	R-82	E-10	C-9	A-2	C-25	E-9	C-41	G-8	L-2	D-3
R-9	A-4	R-24	E-9	R-39	A-9	R-55	J-3	R-83	F-8	C-10	G-1	C-26	F-6	C-42	H-9	L-3	E-1
R-10	D-1	R-25	D-4	R-41	B-9	R-56	H-1	R-84	G-1	C-11	D-1	C-27	F-8	C-43	H-8	L-4	E-6
R-11	B-9	R-26	E-6	R-42	F-8	R-57	H-1	R-85	H-1	C-12	F-1	C-28	G-6	C-44	H-8	L-5	E-7
R-12	F-1	R-27	E-6	R-43	H-6	R-58	H-10	R-88	F-9	C-13	B-2	C-29	H-5	C-45	J-5	L-6	D-9
R-13	F-1	R-28	F-6	R-44	H-6	R-59	H-9	R-90	G-3	C-14	B-3	C-30	G-5	C-46	J-9	L-7	A-7
R-14	G-1	R-29	E-7	R-45	H-6	R-60	J-9	R-91	H-2	C-15	D-3	C-31	J-4	C-47	H-8	L-8	G-2
R-15	D-1	R-30	E-8	R-46	H-5	R-61	G-9	R-92	H-2	C-16	F-4	C-32	H-4	C-55	F-6	L-12	F-5
										C-17	G-5	C-33	H-5	C-56	F-5	L-13	E-2

RESISTANCE READINGS, TV CHASSIS

SYMBOL	TUBE TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V-1	3AU6	1	0	7	6.5	25K*	25K*	220	-	-
V-2	3DT6	4	560	6	6.5	220K*	27K*	560	-	-
V-3	12C5/12CU5	1B0	15Ω TO 850K	14	16	15Ω TO 850K	25K*	25K*	-	-
V-4	3CB6	1M	56	3.5	4.2	25K*	25K*	0	-	-
V-5	3CB6	1M	47	4.2	5	25K*	25K*	0	-	-
V-6	5AS8	25K*	0	180	5	6	4.7K	0	0	25K*
V-7	8EB8	0	380K TO 1.8M	5M TO 5.5M	9	7	10Ω TO 600Ω	340K	25K*	27K*
V-9	3CS6	900K	0	9	10	26K*	40K*	1.5M	-	-
V-10	6CG7	*120K	400K TO 500K	1K	14	12	39K*	1.3M	1K	0
V-11	12DQ6	N.C.	1B	N.C.	18K*	360K	N.C.	22	0Ω TO 30Ω	PLATE CAP ∞
V-12	1G3/1K3									PLATE CAP ∞
V-13	12D4	N.C.	N.C.			23K	N.C.	18	16	-
V-14	8EM5	*23K	100	2.3M TO 2.6M	12	10	2.3M TO 2.6M	100	N.C.	24K
V-8	19XP4	0	4.7K							

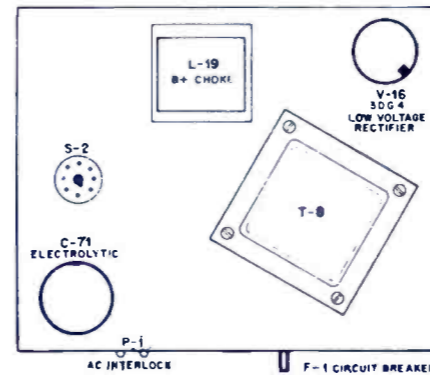


FIG. 1-TUBE LOCATION, ALIGNMENT POINTS

GENERAL ALIGNMENT NOTES

1. Set tuner to highest unused channel and remove the Horizontal Deflection and Damper tubes.
2. Allow chassis and equipment to warm up for 10 minutes or more.
3. Maintain signal generator output no higher than necessary to produce a usable reading.
4. Use insulated alignment tools only.
5. Video IF alignment requires the use of a shim for signal injection. This can be easily constructed by pasting a thin piece of metal foil (1/2x2") on a slightly larger piece of heavy paper. Insert this shim between tuner mixer tube and its shield in such a manner that the foil side faces the tube.

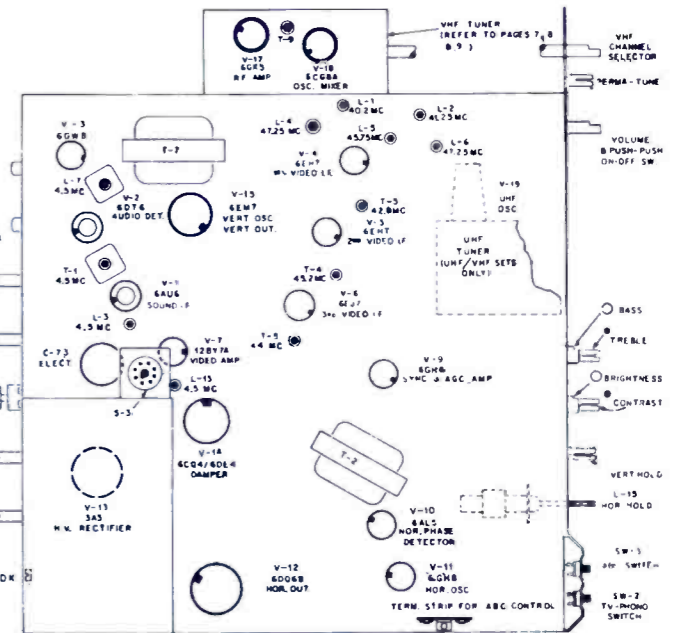


FIG. 2 (RIGHT)
FIRST VIDEO I-F
RESPONSE CURVE

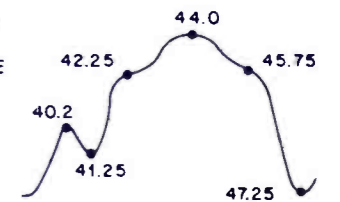
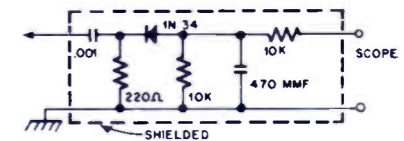


FIG. 3 (BELOW)
SHIELDED PROBE USED
FOR STEP 6 (SEE CHART)

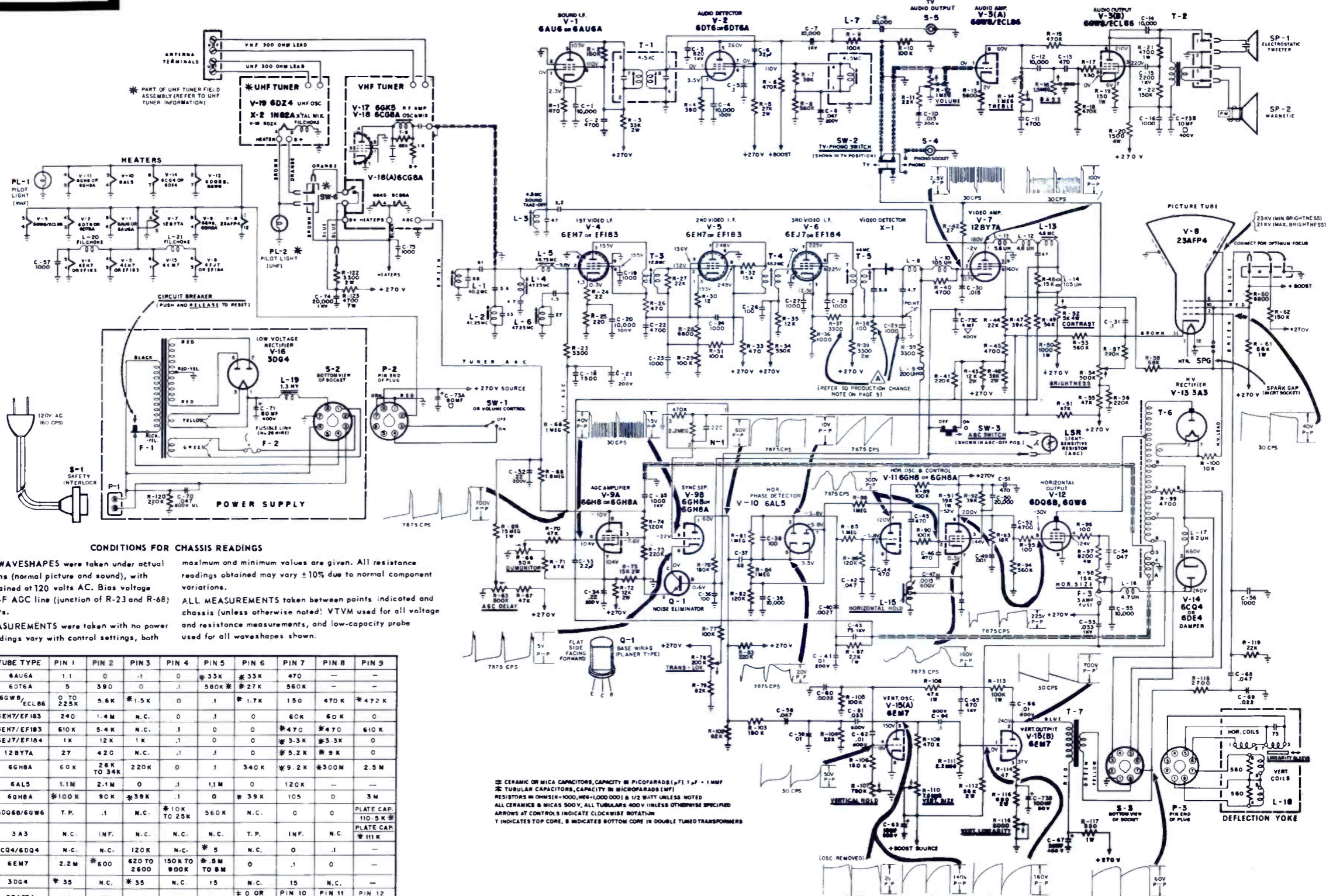


VIDEO ALIGNMENT PROCEDURE

STEP	SIGNAL GENERATOR		BIAS	OUTPUT INDICATOR	ADJUST	REMARKS
	COUPLING	FREQUENCY				
1	High side of signal generator to foil on shim (see general alignment notes), low side to chassis.	47.25 MC (Marker) (No Sweep)	-6 Volts to pin 6 of V-9A	VTVM to Pin 2 of V-7	L-4, L-6	Tune for minimum negative reading.
2	As above.	41.25 MC (Marker) (No Sweep)	As above.	As above.	L-2	As above.
3	As above.	44 MC (Marker) (No Sweep)	As above.	As above.	T-5 top, T-5 bottom	Turn top slug fully counter-clockwise and tune bottom slug for maximum negative reading. Re-tune top slug for maximum negative reading.
4	As above.	45.2 MC (Marker) (No Sweep)	As above.	As above.	T-4	Tune for maximum negative reading.
5	As above.	42.8 MC (Marker) (No Sweep)	As above.	As above.	T-3	As above.
6	As above.	43.5 MC Center Freq., 10 MC Sweep	-3 Volts to pin 6 of V-9A	Scope through crystal diode to pin 5 of V-4	L-1; L-5 and T-9	Tune L-1 for 40.2 MC sound kickback peak. Tune L-5 and T-9 simultaneously to position markers as shown in Fig. 2. Re-check L-1 for 40.2 MC peak.
7	High side to pin 2 of V-7, low side to chassis.	4.5 MC (Audio Mod.)	Non req'd.	Scope through crystal diode to pin 11 of V-8 (CRT)	L-13	Tune for minimum amplitude.

EMERSON
TV Chassis
120692A

ELECTRONIC TECHNICIAN TEKFAK



CONDITIONS FOR CHASSIS READINGS

VOLTAGES AND WAVESHAPES were taken under actual operating conditions (normal picture and sound), with line voltage maintained at 120 volts AC. Bias voltage developed at the I-F AGC line (junction of R-23 and R-68) was minus ten volts.

RESISTANCE MEASUREMENTS were taken with no power applied. Where readings vary with control settings, both

maximum and minimum values are given. All resistance readings obtained may vary $\pm 10\%$ due to normal component variations.

ALL MEASUREMENTS taken between points indicated and chassis (unless otherwise noted): VTVM used for all voltage and resistance measurements, and low-capacity probe used for all waveshapes shown.

SYM.	TUBE TYPE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V-1	6AU6A	1.1	0	.1	0	*33K	*33K	470	—	—
V-2	6DT6A	5	3.0	0	.1	580K*	*27K	560K	—	—
V-3	6GW6 ECL86	0 TO 223K	5.6K	*1.5K	0	.1	*1.7K	150	470K	*472K
V-4	6EH7/EF183	2.4	1.4M	N.C.	0	.1	0	60K	60K	0
V-5	6EH7/EF183	610K	5.4K	N.C.	.1	0	0	*470	*470	610K
V-6	6EJ7/EF184	1K	12K	1K	.1	0	0	*3.3K	*3.3K	0
V-7	12BY7A	27	4.2	N.C.	.1	.1	0	*5.2K	*9K	0
V-9	6GH8A	60K	24K TO 34K	220K	0	.1	340K	*9.2K	*300M	2.5M
V-10	6AL5	1.1M	2.1M	0	.1	1.1M	0	120K	—	3M
V-11	6GH8A	*100K	90K	*39K	.1	0	*39K	105	0	3M
V-12	60Q6/6QW6	T.P.	.1	N.C.	*10K TO 25K	560K	N.C.	0	0	PLATE CAP. 110.5K
V-13	3A3	N.C.	INF.	N.C.	N.C.	N.C.	T.P.	INF.	N.C.	PLATE CAP. *111K
V-14	6CQ4/6DQ4	N.C.	N.C.	120K	N.C.	*5	N.C.	0	.1	—
V-15	6EM7	2.2M	*600	620 TO 2600	150K TO 900K	*.5M TO .8M	0	.1	0	—
V-16	3DG4	*35	N.C.	*35	N.C.	15	N.C.	15	N.C.	—
V-8	23A4P4	.1	17K	N.C.	N.C.	N.C.	† 0 OR 7K OR 15K	PIN 10 6.2K	PIN 11 160K-220K	PIN 12 0

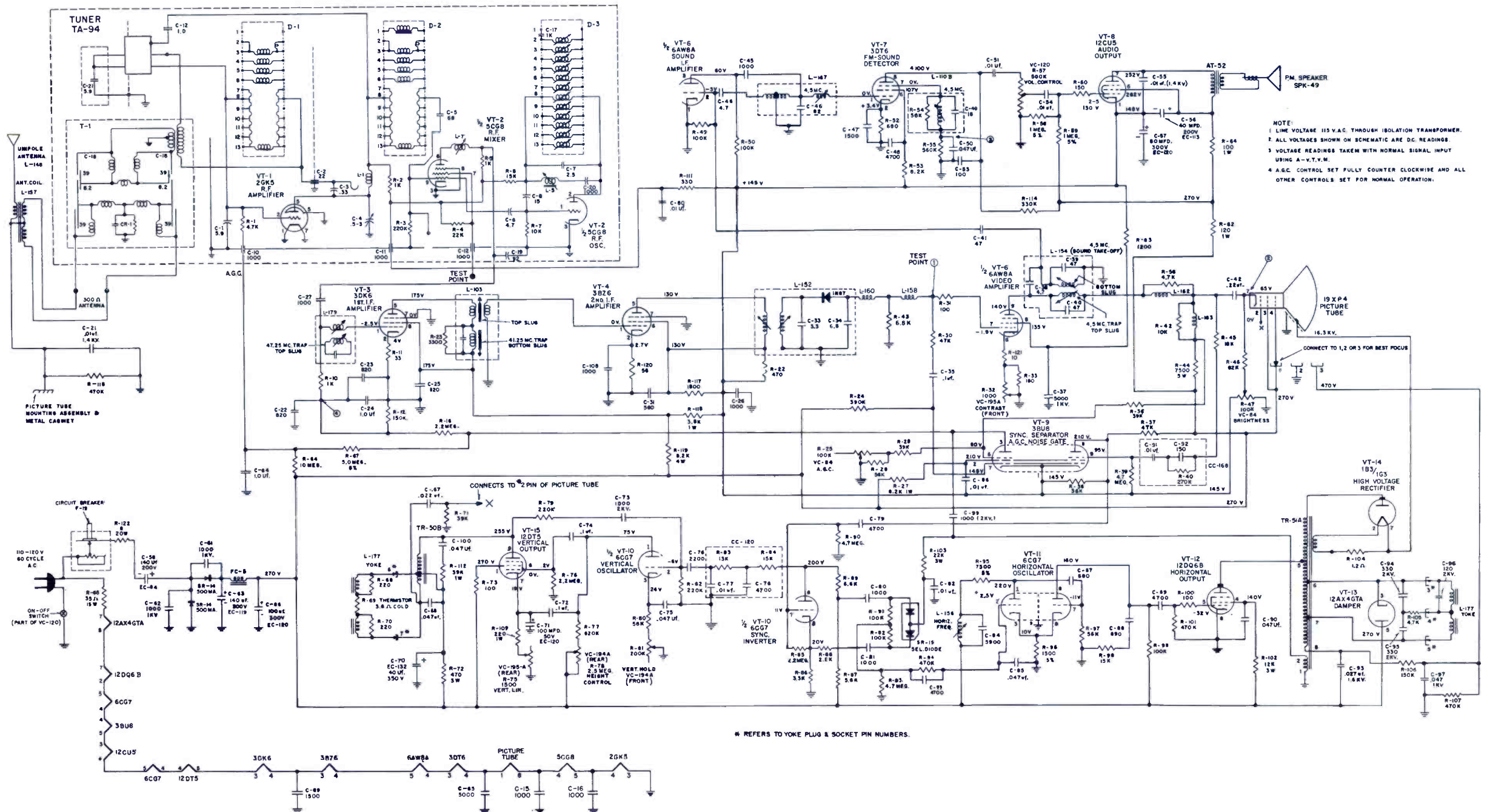
NOTES: "K" denotes kilohms, "M" denotes megohms;
"†" denotes terminal used as tie point;
"N.C." denotes no connection made to terminal indicated.
* Asterisk indicates measurements made with common lead of meter connected to pin 8 of S-2 on power supply (B+ 270 volt point).
† Symbol indicates reading which is dependent upon connection of clip-lead from pin 6 of V-8 (focusing electrode of CRT).

⊗ CERAMIC OR MICA CAPACITORS, CAPACITY IN PICOFARADS (PF), 1 μF = 1 MMF
* TUBULAR CAPACITORS, CAPACITY IN MICROFARADS (MF)
RESISTORS IN OHMS (K=1000, M=1,000,000) & 1/2 WATT UNLESS NOTED
ALL CERAMIC & MICA 500 V, ALL TUBULAR 400 V UNLESS OTHERWISE SPECIFIED
ARROWS AT CONTROLS INDICATE CLOCKWISE ROTATION
† INDICATES TOP CORE, † INDICATES BOTTOM CORE IN DOUBLE TUNED TRANSFORMERS

ELECTRONIC TECHNICIAN TEKFAX

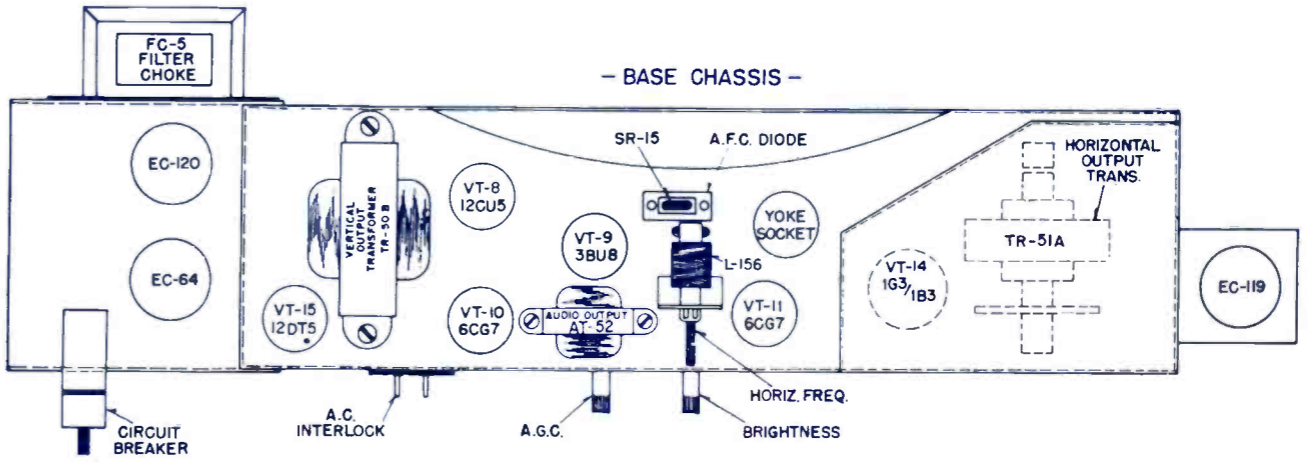
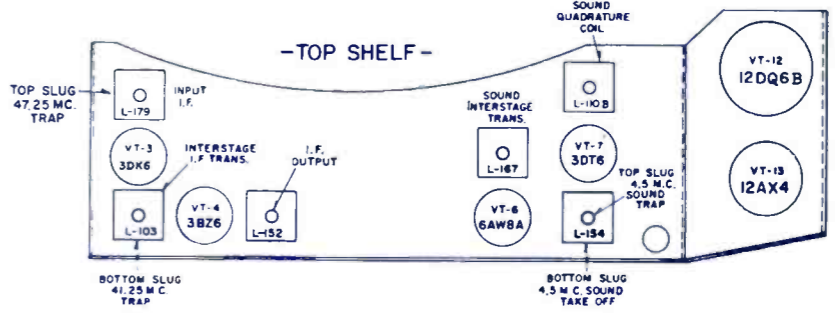
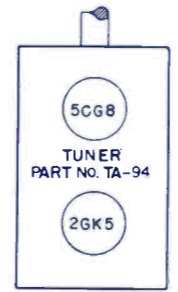
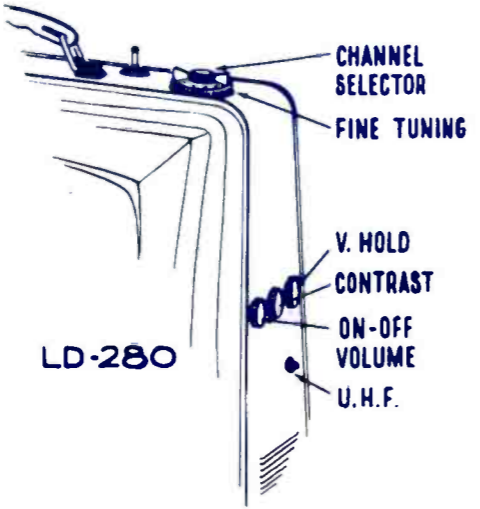
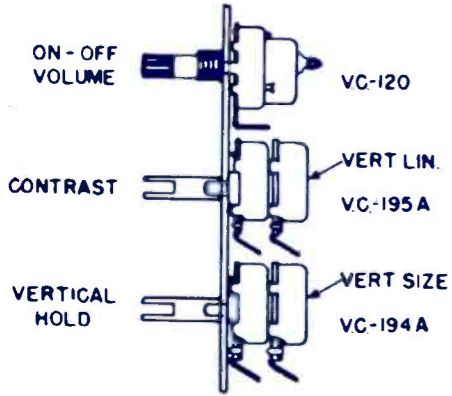
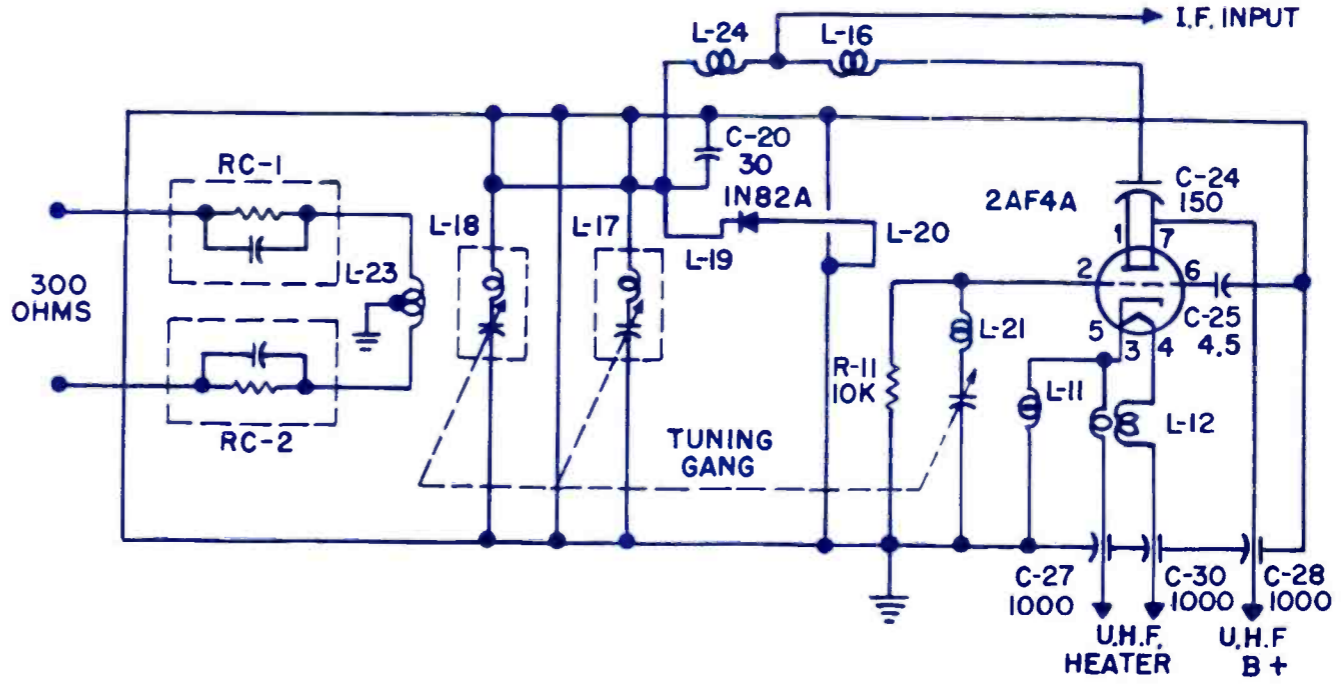
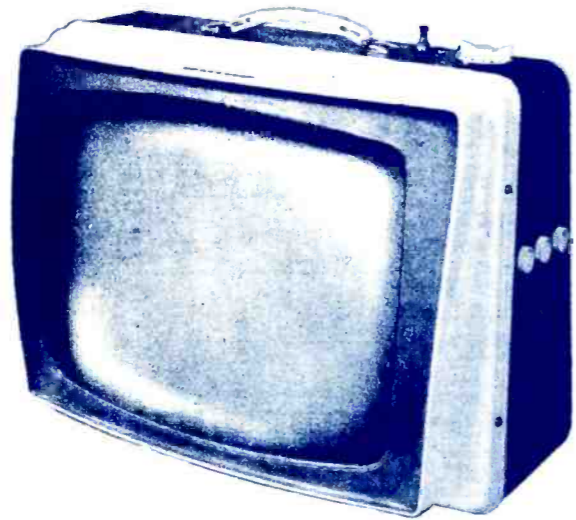
**GAMBLE-
SKOGMO**
TV Chassis
Model
TV17-9444A

More Data on Reverse Side



GAMBLE-SKOGMO
TV Chassis
Model TV17-9444A

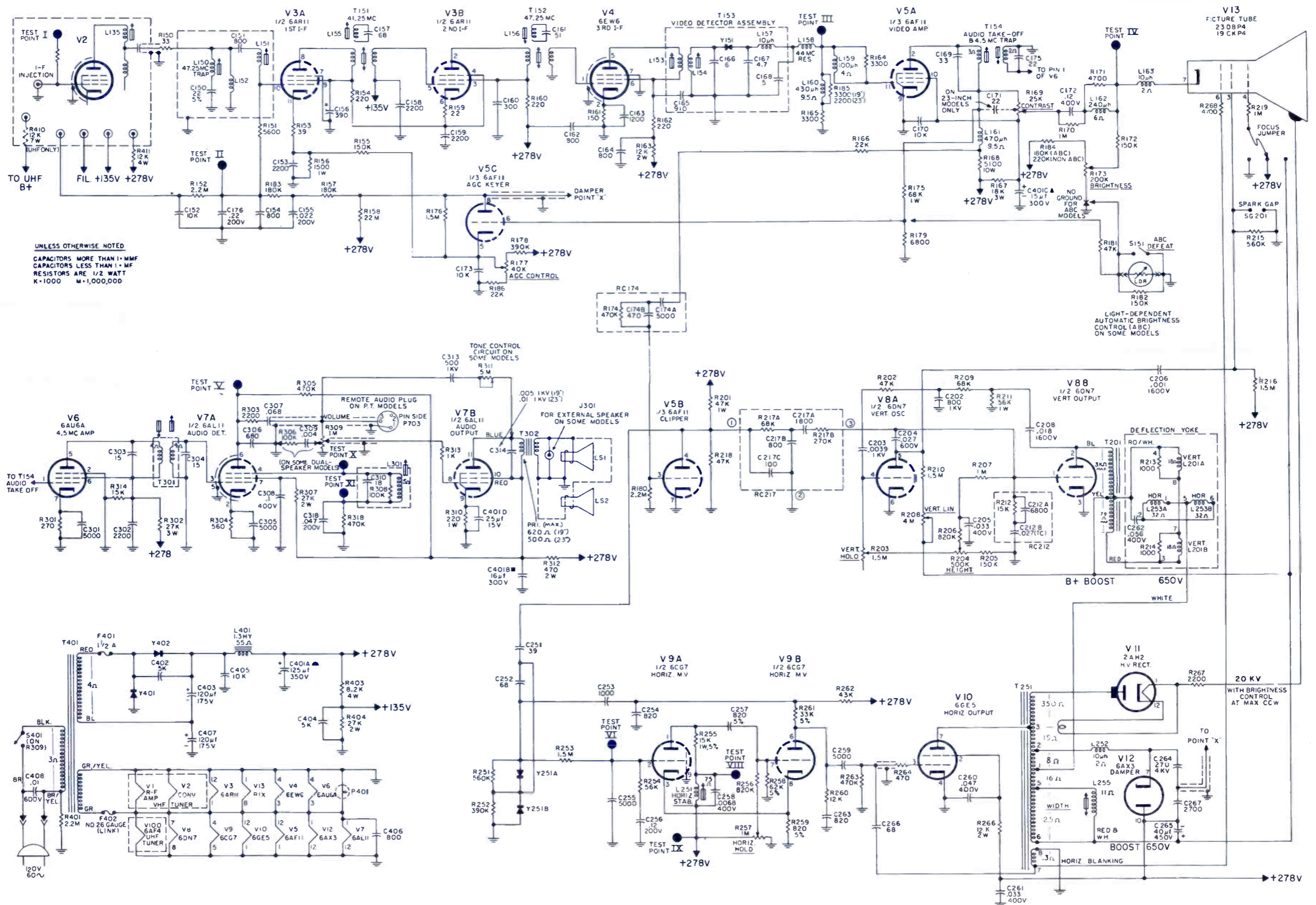
More Data on Reverse Side

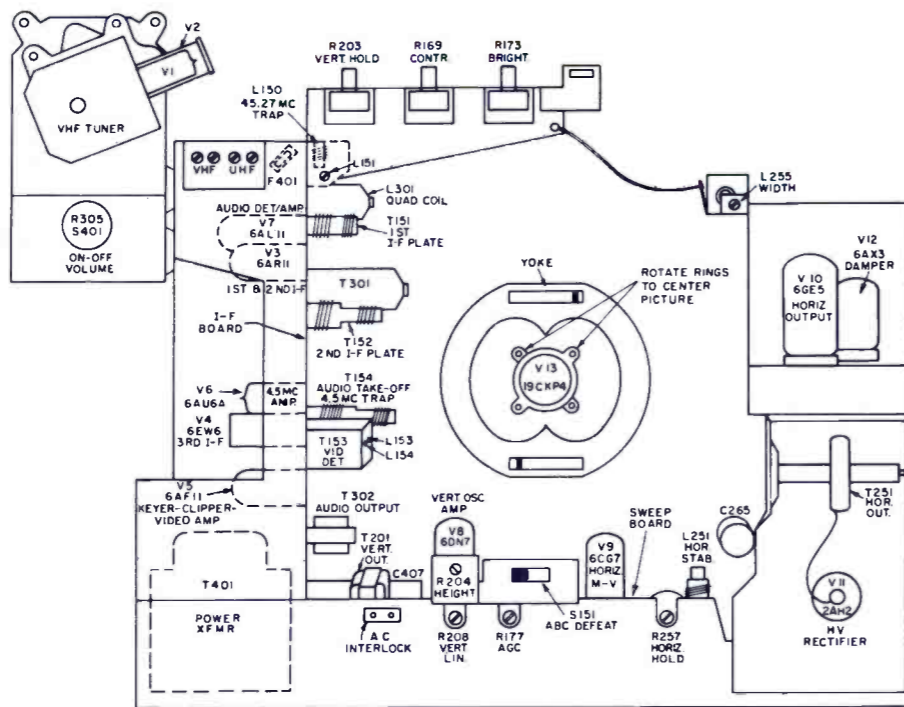


ELECTRONIC TECHNICIAN TEKFAX

**GENERAL
ELECTRIC**
TV Chassis MW

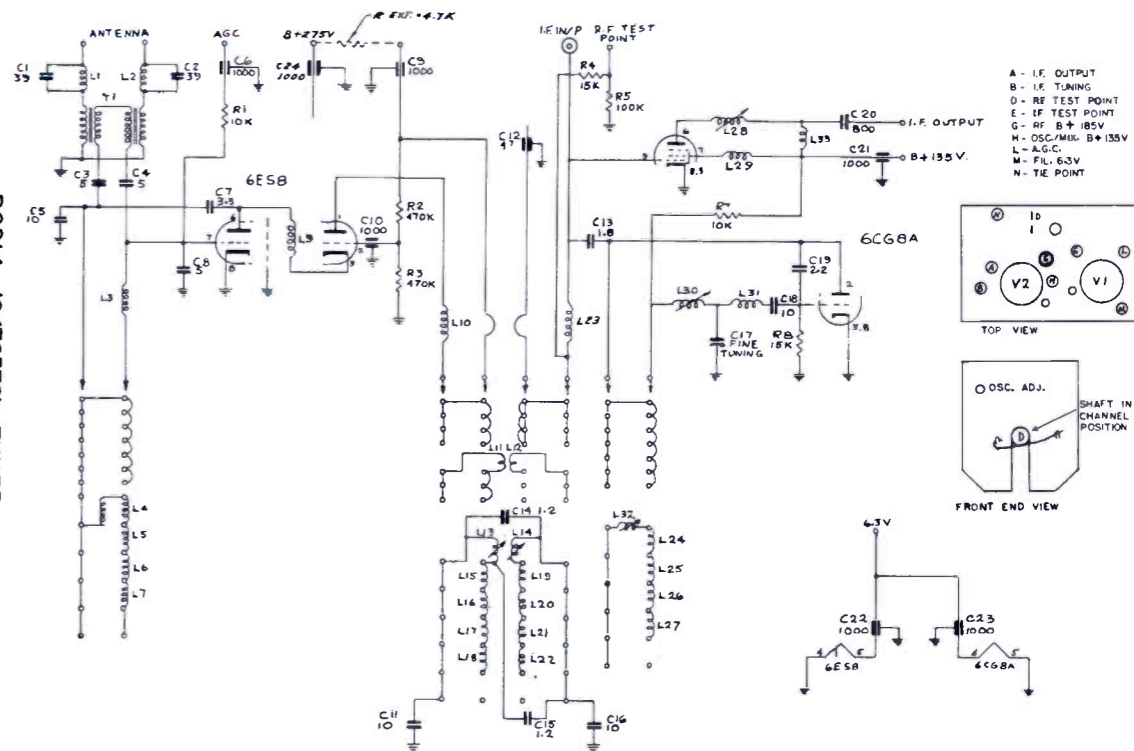
More Data on Reverse Side





19" MX CHASSIS COMPONENT & ADJUSTMENT LOCATIONS

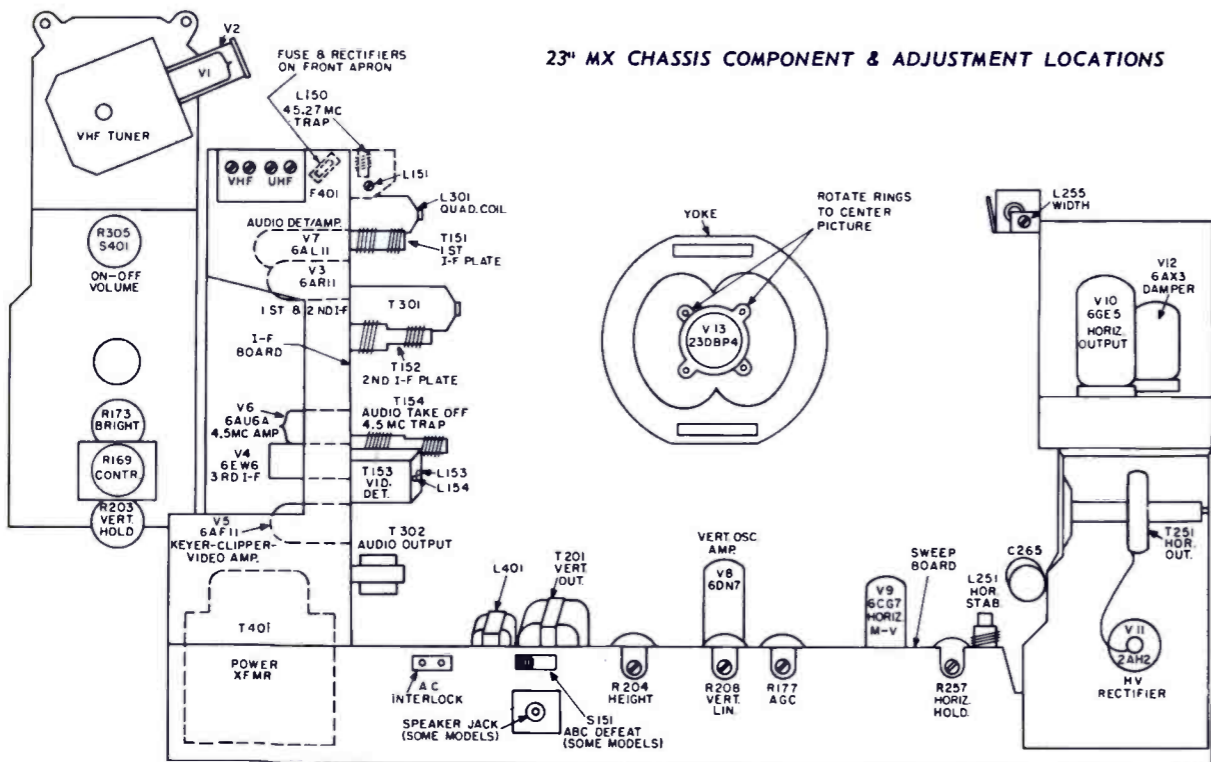
R6214 (947C376) TUNER
Manual Fine Tuning



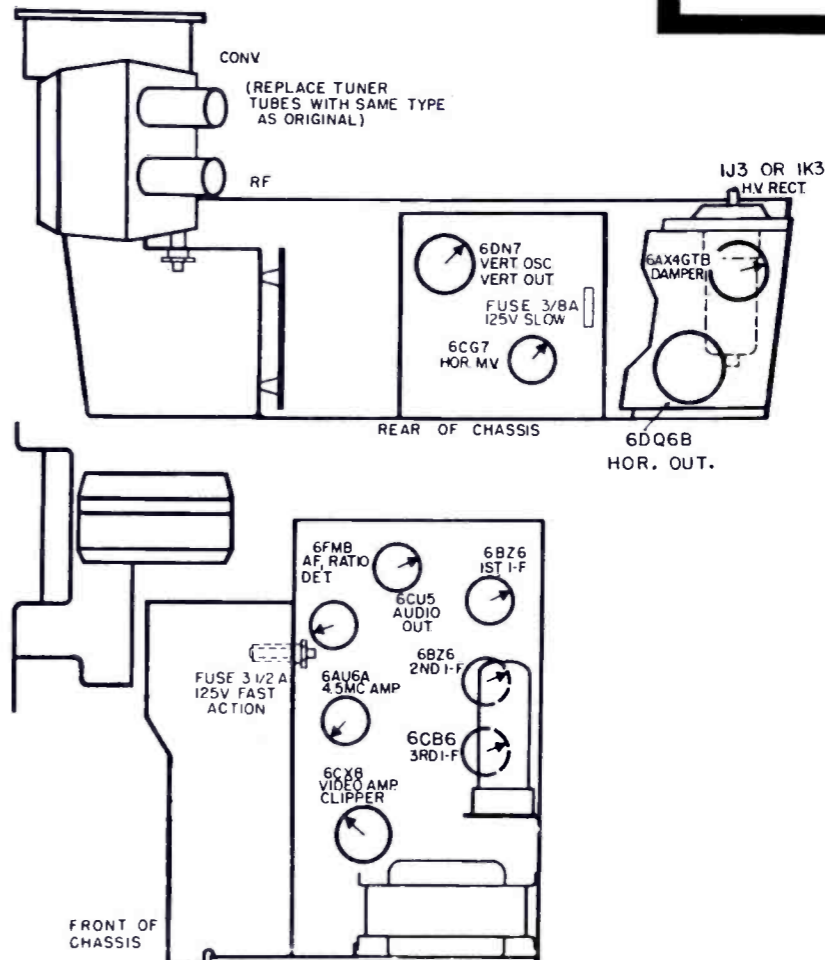
More Data on Reverse Side

G-E
TV Chassis MW

GENERAL ELECTRIC
TV Chassis
M 597 Series

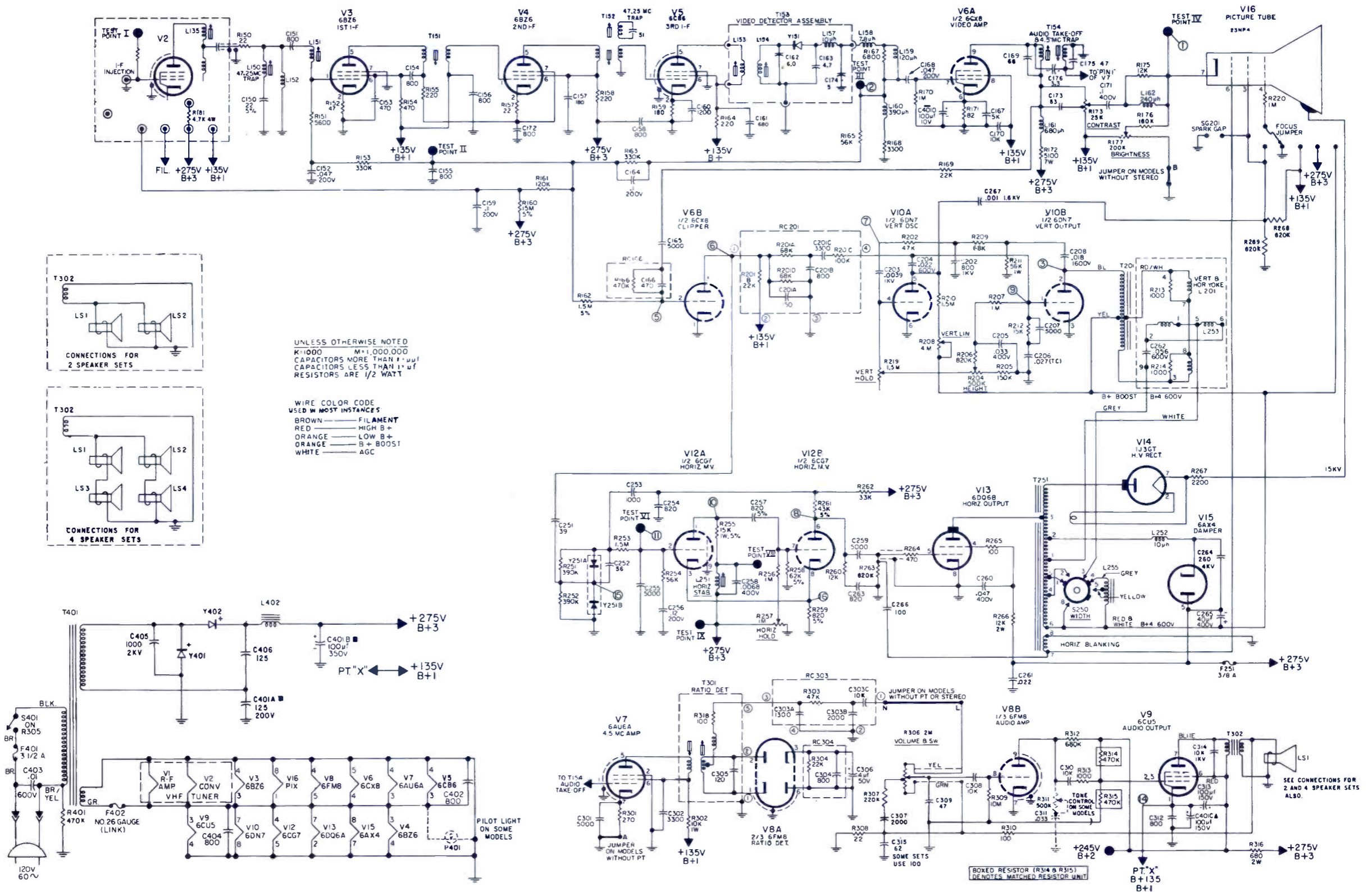


23" MX CHASSIS COMPONENT & ADJUSTMENT LOCATIONS



ELECTRONIC TECHNICIAN TEKFAX

GENERAL-ELECTRIC
TV Chassis
M 597 Series

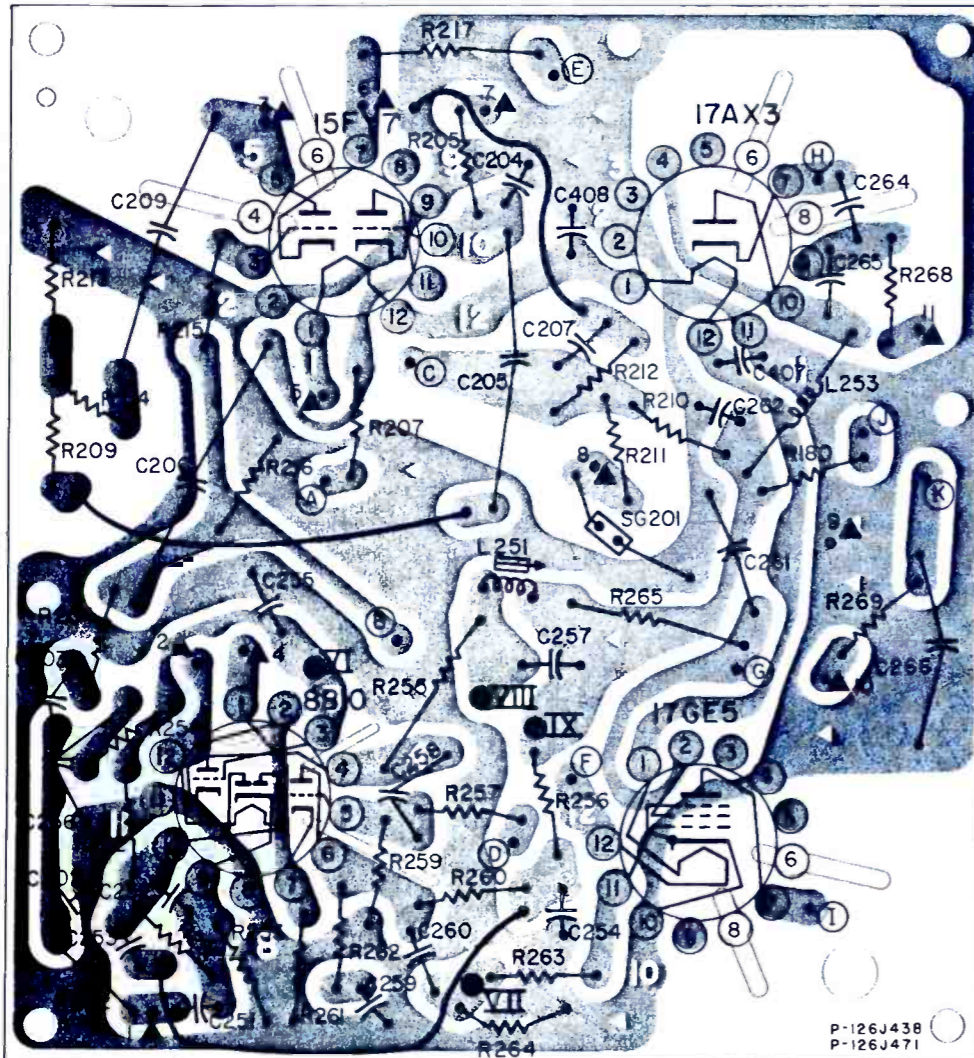
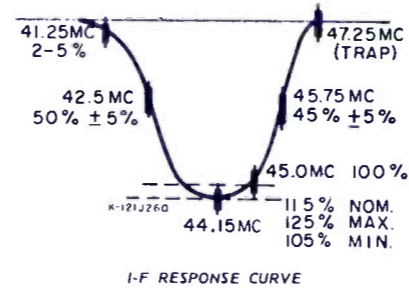


G-E

TV Chassis, QX
Models M502XBN,
EB, VY, 3XBN, EB
and VY

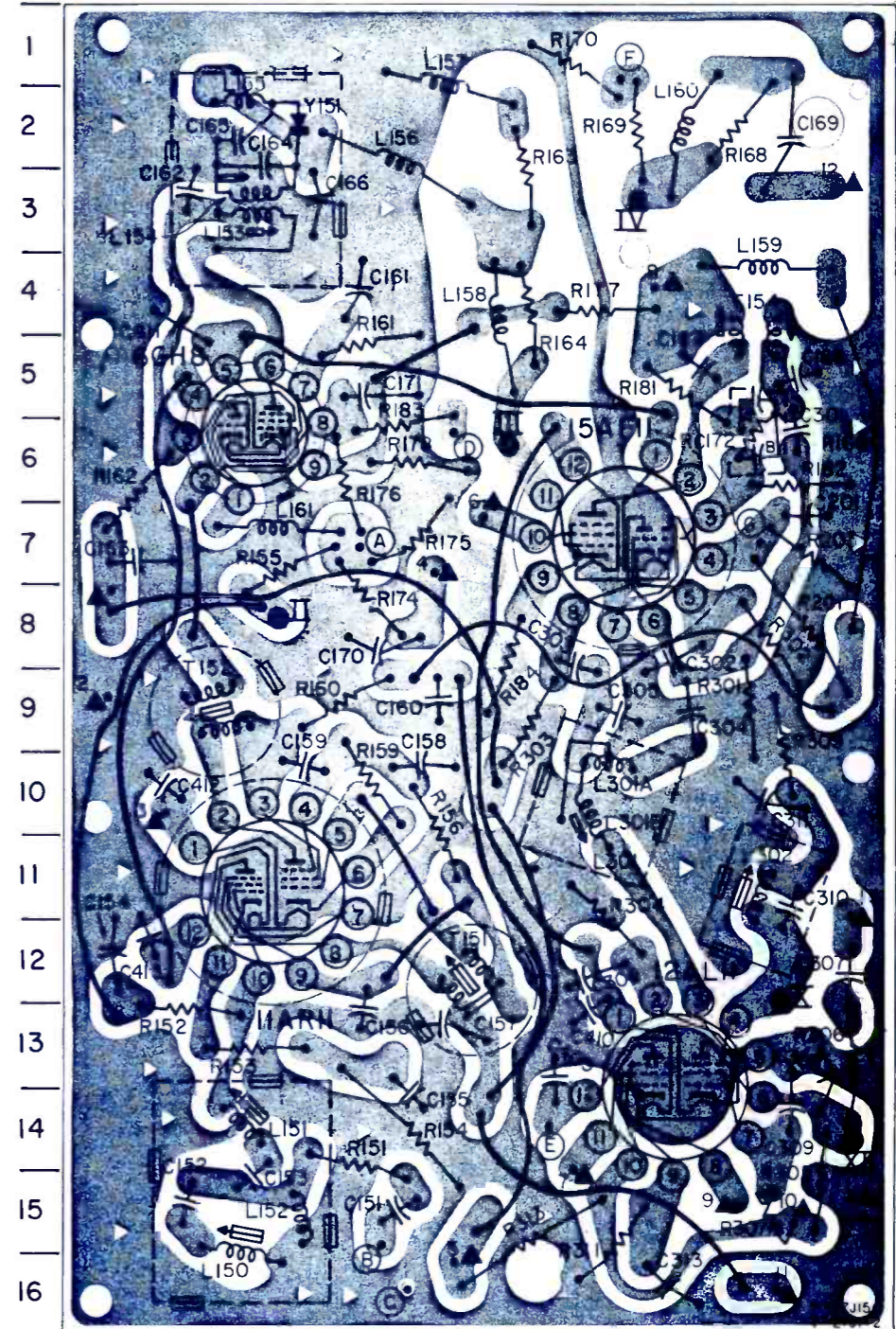
ELECTRONIC TECHNICIAN

TEKFAX



A | B | C | D | E | F | G | H | I | J | K
SWEEP BOARD COMPONENT LOCATIONS AS VIEWED FROM CONDUCTOR SIDE

CAPACITORS	RESISTORS (Cont'd)
C202-A11 C203-A8 C204-F2 C205-F5 C206-B6	R261-D12 R262-D11
C207-G4 C209-B3 C251-C12 C252-B11 C253-B11	R263-F11 R264-F12 R265-H7 R268-K4 R269-J7
C254-G11 C255-C7 C256-A9 C257-G8 C258-E9	WIRE CONNECTIONS
C259-E12 C260-E12 C261-I7 C262-I5 C264-J3	Ⓐ -D6 Ⓑ -E7 Ⓒ -E5 Ⓓ -F10 Ⓔ -G1 Ⓕ -G9 Ⓖ -I8 Ⓗ -I2 Ⓙ -J11 Ⓚ -J5 Ⓛ -K6
C265-J3 C266-K8 C407-I5 C408-G3	▲1-B12 ▲2-B8 ▲3-C2 ▲4-C8 ▲5-D5 ▲6-E2 ▲7-F2 ▲8-G6 ▲9-J6 ▲10-J8 ▲11-K4
RESISTORS	TUBES
R180-I6 R202-A12 R204-A7 R205-E2 R207-E5	V7-D2 V8-D8 V9-H8 V11-I2
R209-A6 R210-H5 R211-G6 R22-G5 R213-A4	SPARK GAP
R214-B5 R215-C4 R216-C6 R217-E1 R251-C11	SG201-H6
R252-B10 R253-C11 R254-B9 R255-E8 R256-G10	COILS
R257-F9 R259-D10 R260-F11	L251-F7 L253-J5
	TEST POINTS
	VI-D8 VII-F12 VIII-F8



A | B | C | D | E | F | G | H | I | J
I-F BOARD COMPONENT LOCATIONS AS VIEWED FROM CONDUCTOR SIDE

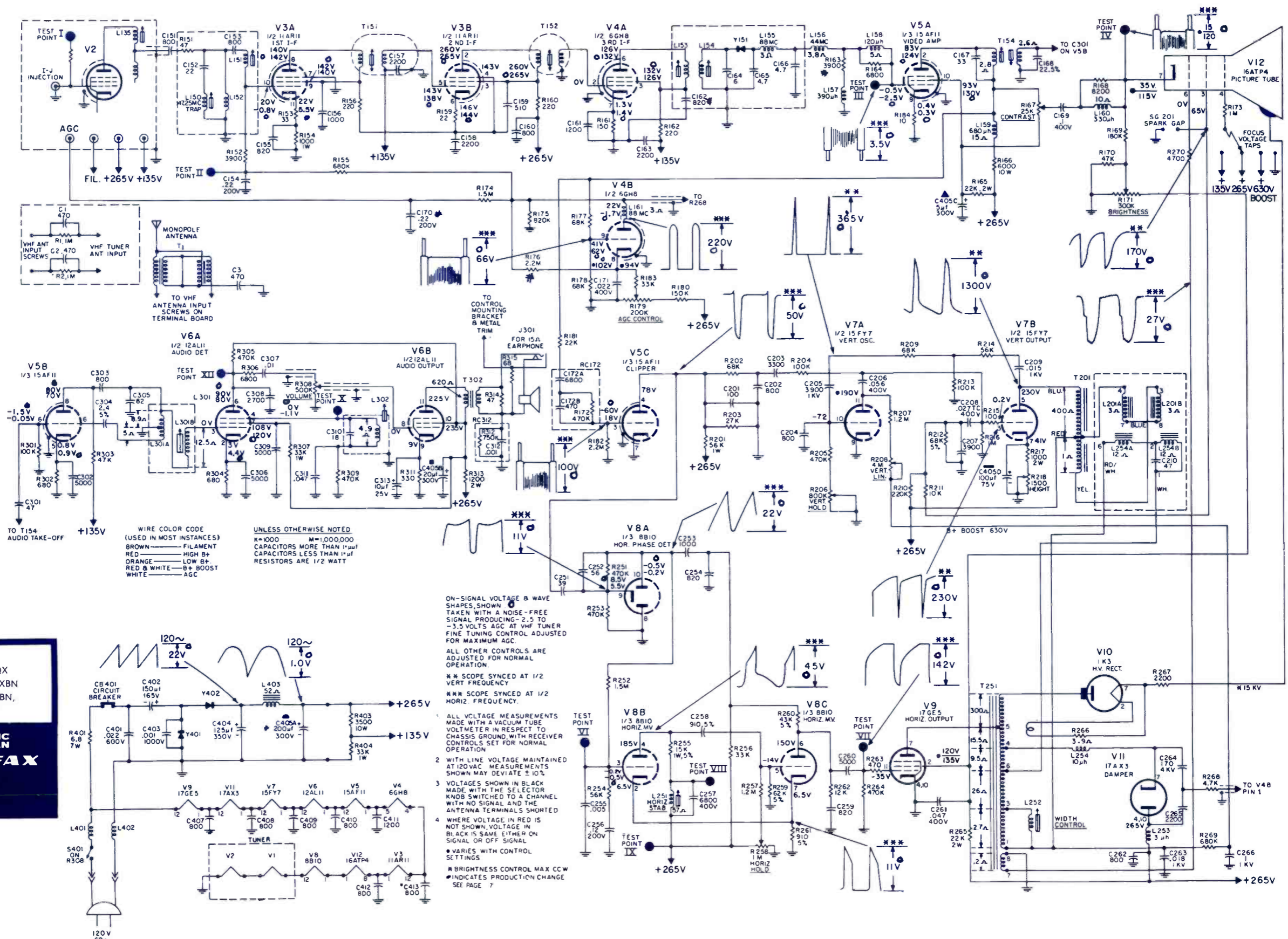
STEP	SIGNAL FREQUENCY	ADJUST	REMARKS
1	47.25 MC AM	Adjust L150 for minimum scope deflection	Use maximum scope sensitivity and smallest possible signal for the 47.25 MC AM adjustments.
2	44.15 MC AM	Adjust first L154, then L153 for maximum scope deflection	Position L154 core at end of coil nearer circuit board. Do not retouch these adjustments.
3		L135 (converter plate) for maximum deflection of the 45.75 MC marker	
4		L151 (1st I-F grid) for maximum deflection of the 42.5 MC marker and proper nose shaping	Symmetry of the nose is important. No portion of the nose should be out of symmetry by more than 3%
5	38-48 MC sweep generator, with scope calibrated 3 volts peak to peak for 2 inch deflection; markers at 41.25, 42.5, 44.15, 45.0 MC & 45.75 MC	T152 (2nd I-F Plate) to place 45.75 MC marker properly on the curve.	
6		T151 (1st I-F Plate) to place 42.5 MC marker properly on the curve.	Repeat 5, 6, and 7 if necessary.
7		L151 if necessary to shape the nose	

VIDEO I-F ALIGNMENT CHART

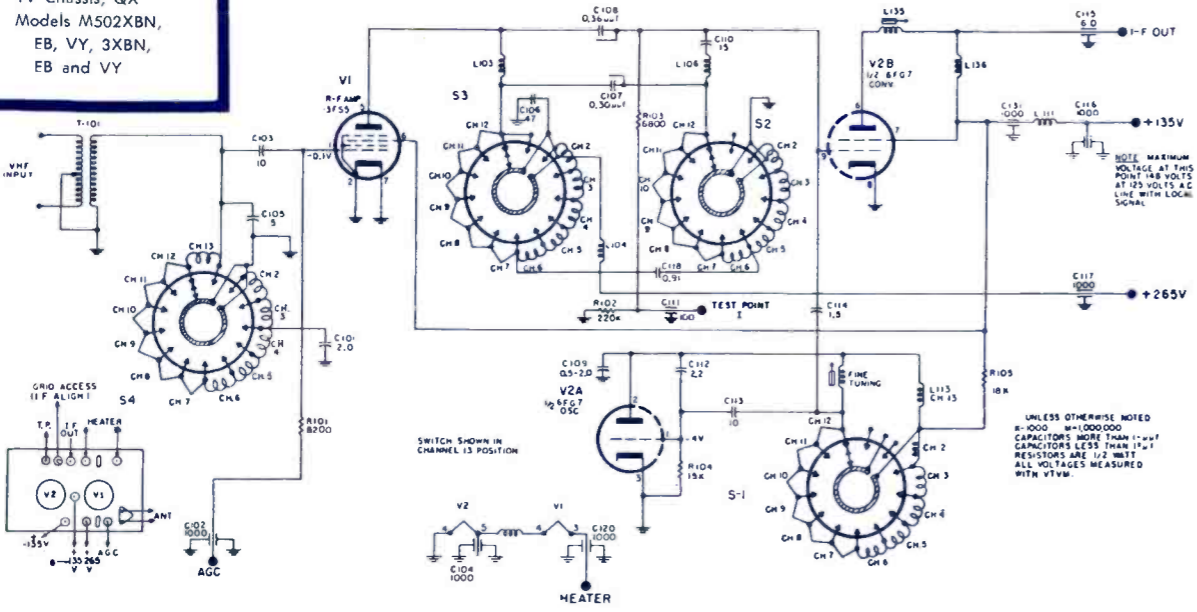
G-E
TV Chassis, QX
Models M502XBN
EB, VY, 3XBN,
EB and VY

**ELECTRONIC
TECHNICIAN**

TEKFAK

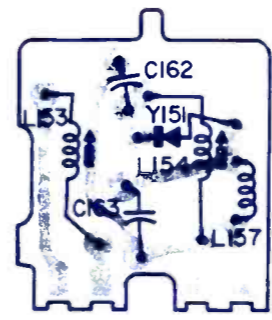


G-E
TV Chassis, QX
Models M502XBN,
EB, VY, 3XBN,
EB and VY

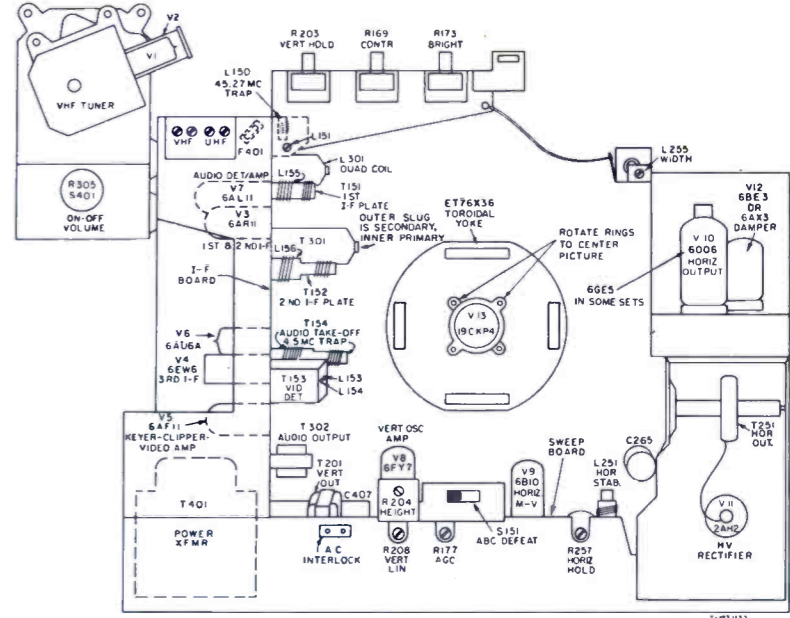


GENERAL ELECTRIC
TV Chassis
MXT

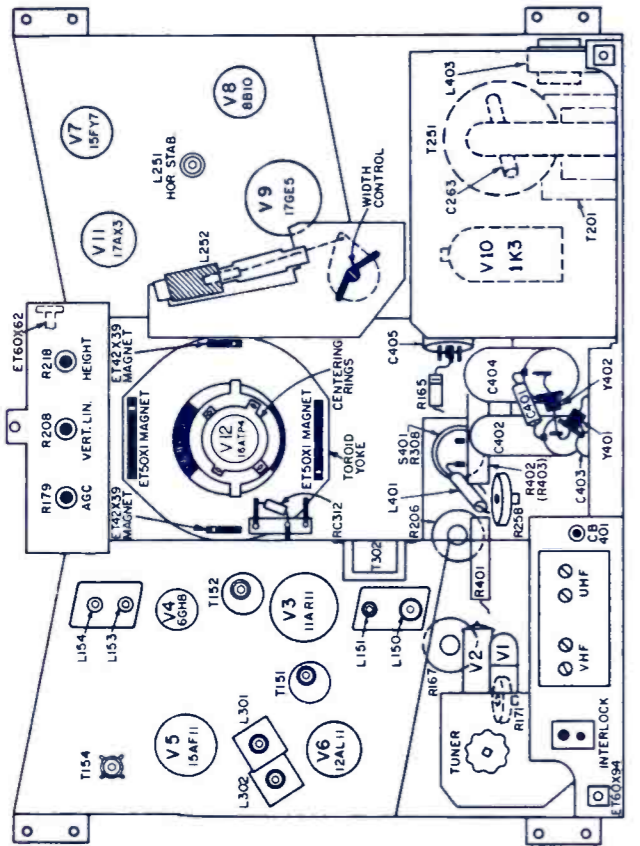
ELECTRONIC TECHNICIAN
TEKFAK



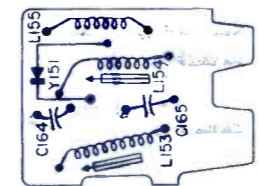
VIDEO DETECTOR BOARD
COMPONENT LOCATIONS AS
VIEWED FROM CONDUCTOR
SIDE OF BOARD.



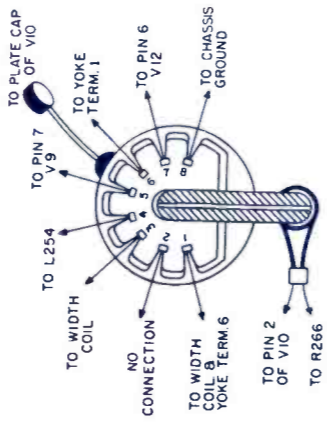
19" MXT CHASSIS COMPONENT & ADJUSTMENT LOCATIONS



23" MXT CHASSIS COMPONENT & ADJUSTMENT LOCATIONS



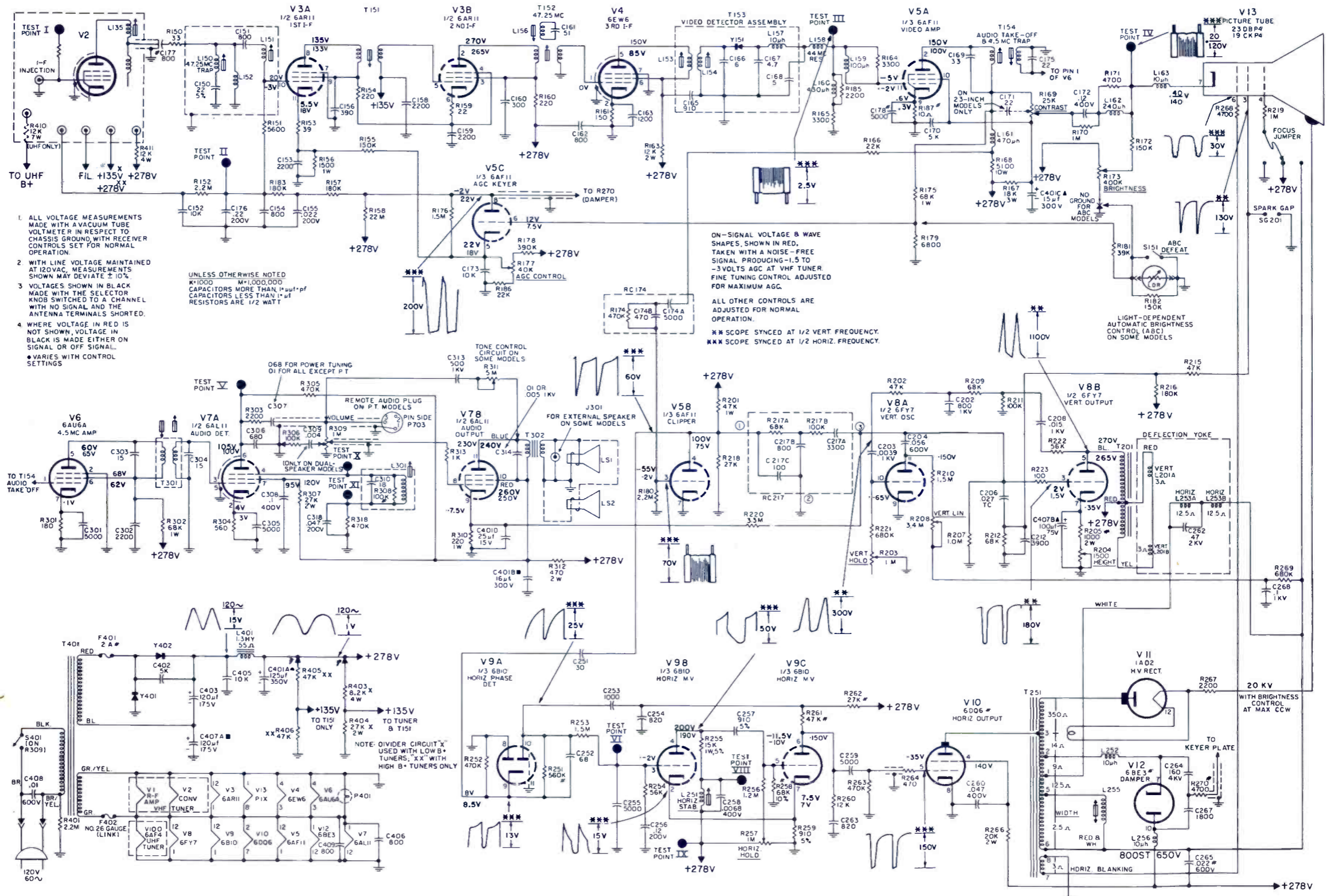
VIDEO DETECTOR BD
CONDUCTOR SIDE
PLUG INTO I-F BOARD
WITH COMPONENTS
FACING L156



HORIZONTAL OUTPUT
TRANSFORMER T251

ELECTRONIC TECHNICIAN TEKFAX

**GENERAL-
ELECTRIC**
TV Chassis
MXT



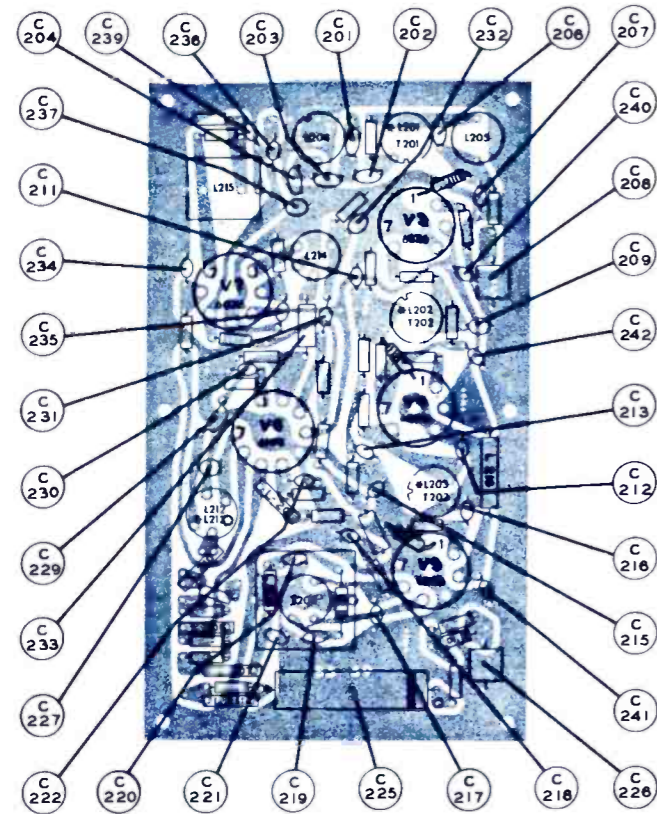
1. ALL VOLTAGE MEASUREMENTS MADE WITH A VACUUM TUBE VOLTMETER IN RESPECT TO CHASSIS GROUND, WITH RECEIVER CONTROLS SET FOR NORMAL OPERATION.
 2. WITH LINE VOLTAGE MAINTAINED AT 120VAC, MEASUREMENTS SHOWN MAY DEVIATE $\pm 10\%$.
 3. VOLTAGES SHOWN IN BLACK MADE WITH THE SELECTOR KNOB SWITCHED TO A CHANNEL WITH NO SIGNAL AND THE ANTENNA TERMINALS SHORTED.
 4. WHERE VOLTAGE IN RED IS NOT SHOWN, VOLTAGE IN BLACK IS MADE EITHER ON SIGNAL OR OFF SIGNAL.
- VARIES WITH CONTROL SETTINGS

UNLESS OTHERWISE NOTED
K=1000 M=1,000,000
CAPACITORS MORE THAN 1 μ F
RESISTORS ARE 1/2 WATT

ON-SIGNAL VOLTAGE B WAVE SHAPES, SHOWN IN RED, TAKEN WITH A NOISE-FREE SIGNAL PRODUCING -1.5 TO -3 VOLTS AGC AT VHF TUNER. FINE TUNING CONTROL ADJUSTED FOR MAXIMUM AGC.

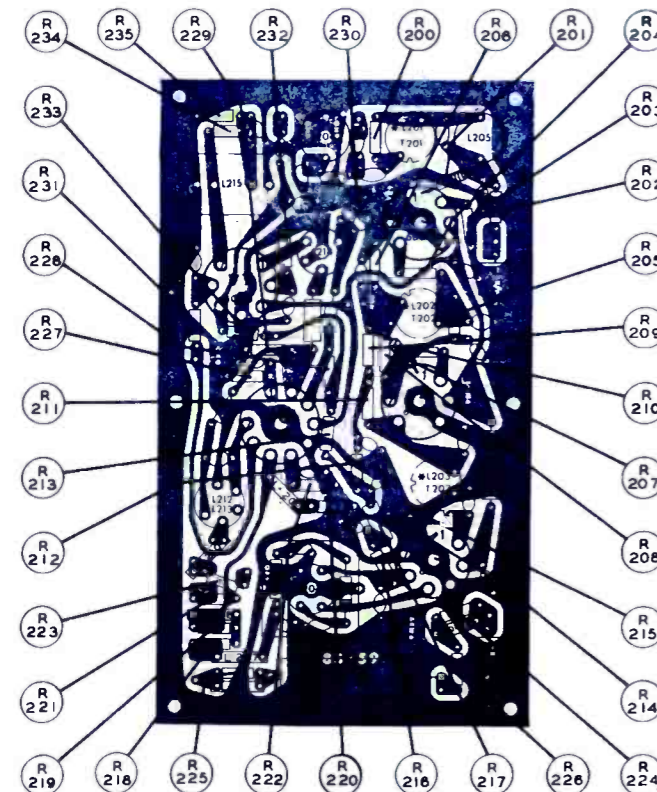
ALL OTHER CONTROLS ARE ADJUSTED FOR NORMAL OPERATION.
** SCOPE SYNCED AT 1/2 VERT. FREQUENCY.
*** SCOPE SYNCED AT 1/2 HORIZ. FREQUENCY.

ALIGNMENT CHART



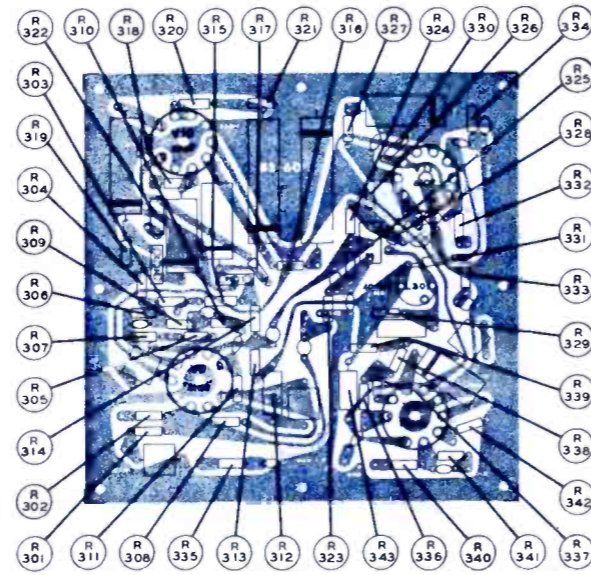
IF CIRCUIT BOARD CAPACITORS

*TOP SLUG

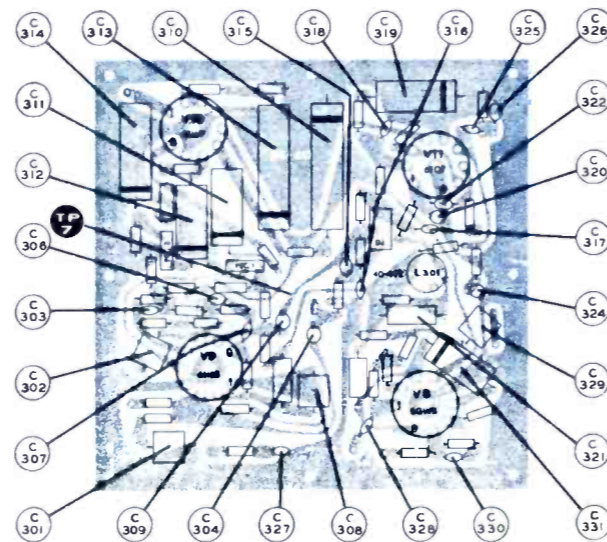


IF CIRCUIT BOARD RESISTORS

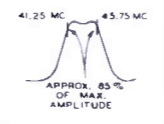
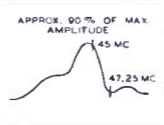
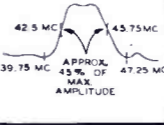
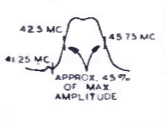
*TOP SLUG



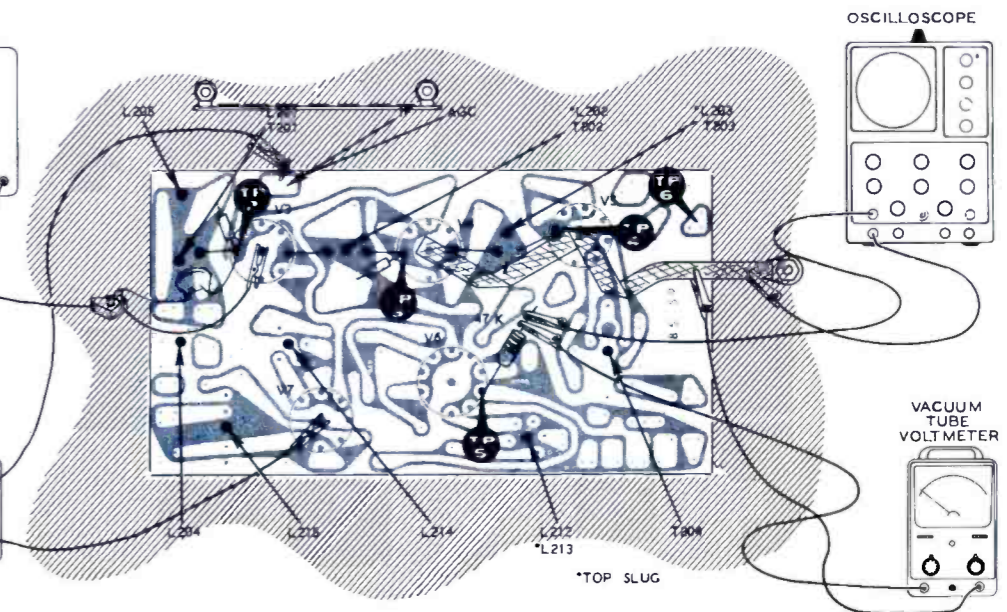
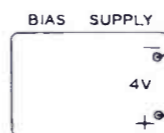
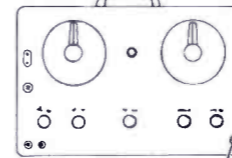
SWEEP CIRCUIT BOARD RESISTORS



SWEEP CIRCUIT BOARD CAPACITORS

STAGE	Connect the sweep and marker generator through a .001 μ f capacitor to test point	Sweep generator center frequency 43.5 mc. Sweep width approximately 8 mc.	Marker generator Frequency	Adjust for maximum gain and bandwidth	Adjust for minimum output	REMARKS
1 3rd IF T204	TP4 (pin 1 of V5)		41.25 mc 45.75 mc (both CW)	Top and bottom slugs of T204		Adjust output of sweep generator for approximately 3" of deflection. Keep marker output low enough so that it does not distort the waveform.
2 Adjacent channel sound trap L203	TP3 (pin 1 of V4)		47.25 with 400 ~ modulator		L203 (top slug)	
3 2nd IF T203	TP3 (pin 1 of V4)		45 mc (CW)	T203 (bottom slug)		Reduce output of sweep and marker generator.
4 Adjacent channel picture trap L202	TP2 (pin 1 of V3)		39.75 mc with 400 ~ modulation		L202 (top slug)	
5 1st IF T202	TP2 (pin 1 of V3)		42.5 mc 45.75 mc (both CW)	T202 (bottom slug)		Reduce output of sweep and marker generator.
6 Adjacent channel sound trap L205	TP1 (mixer grid)		47.25 mc with 400 ~ modulation		L205	
7 Adjacent channel picture trap L204	TP1 (mixer grid)		39.75 mc with 400 ~ modulation		L204	
8 Sound trap L201	TP1 (mixer grid)		41.25 mc with 400 ~ modulation		L201	
9 Overall IF response mixer plate coil IF input T201	TP1 (mixer grid)		42.5 mc 45.75 mc (both CW)	L108 Mixer plate coil T201 IF input coil		Reduce output of sweep and marker generator. If necessary, retouch preceding IF adjustments to obtain the correct overall response.

SWEEP AND MARKER GENERATOR



*TOP SLUG

ELECTRONIC TECHNICIAN TEKFAX

HEATH
TV Chassis
Model GR-22

PART NUMBERS FOR ALL RESISTORS, CAPACITORS, COILS, AND TRANSFORMERS HAVE BEEN PUT INTO THE FOLLOWING GROUPS:

0-99 PARTS MOUNTED ON THE CHASSIS AND ON TERMINAL STRIPS
100-199 PARTS ON THE VHF TUNER
200-299 PARTS ON THE IF CIRCUIT BOARD
300-399 PARTS ON THE SWEEP CIRCUIT BOARD
400-499 PARTS ON THE UHF TUNER

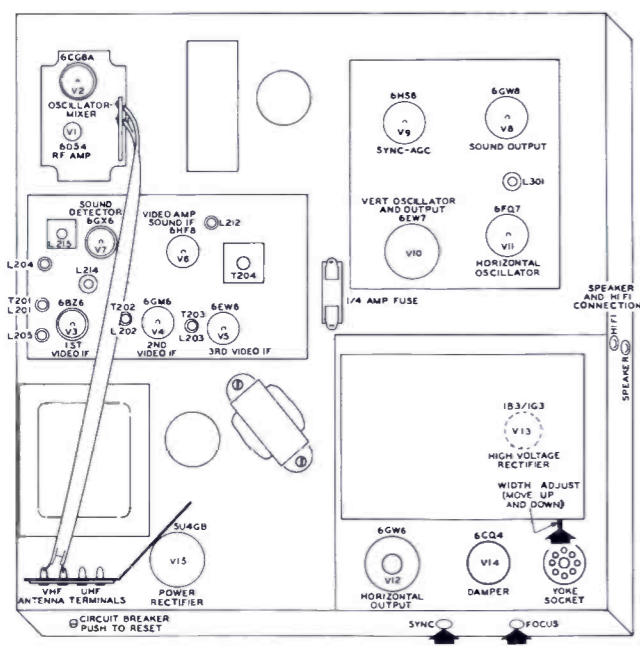
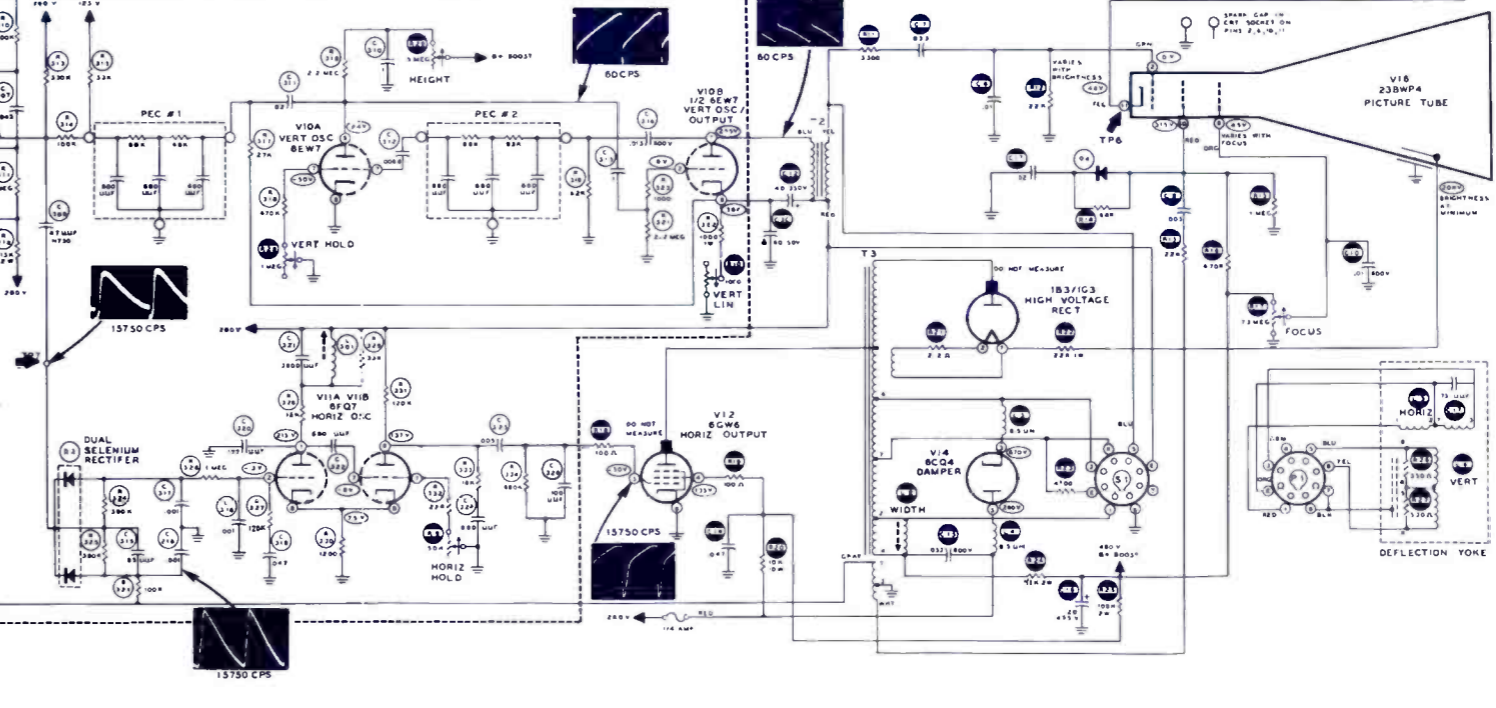
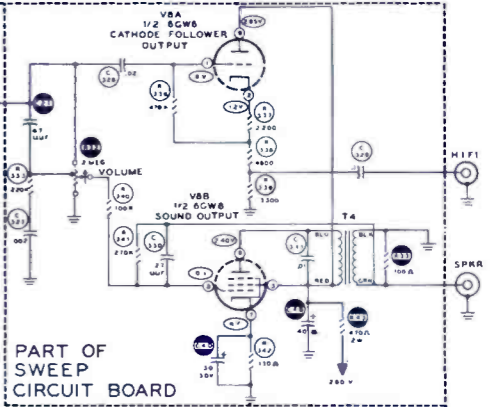
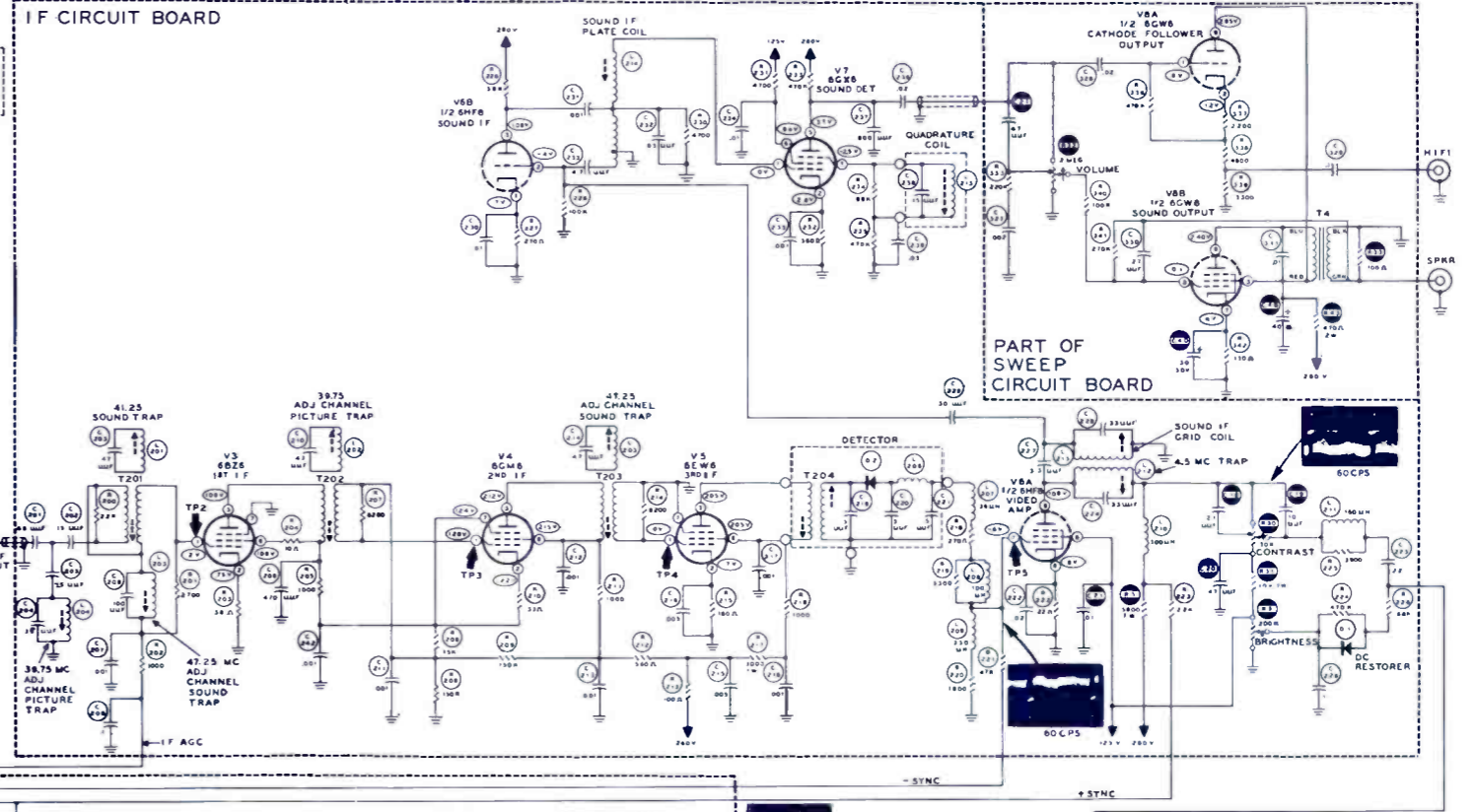
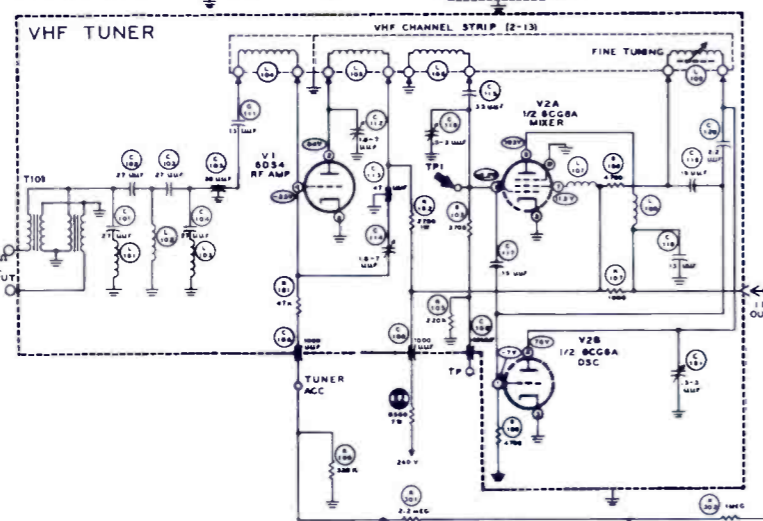
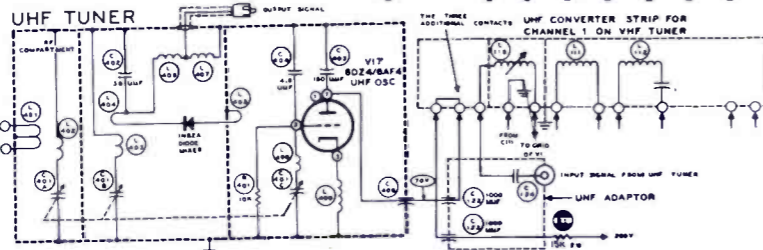
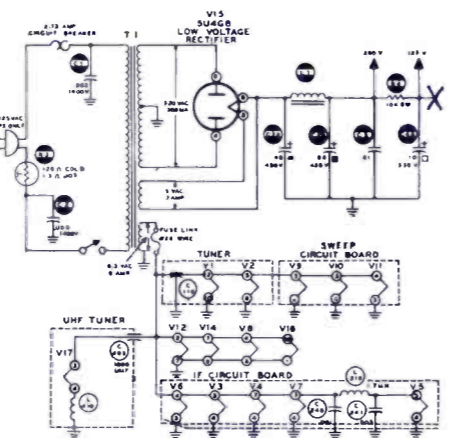
ALL RESISTOR VALUES ARE IN OHMS, UNLESS SPECIFIED OTHERWISE.
ALL CAPACITOR VALUES ARE IN MICROFARADS UNLESS SPECIFIED OTHERWISE.
INDICATES POSITIVE DC VOLTAGE MEASUREMENT, TAKEN WITH AN 11 MEGOHM TEST LEAD FROM POINT INDICATED TO CHASSIS GROUND.
VOLTAGE MEASUREMENTS WERE MADE WITH NO SIGNAL INPUT.

THIS SYMBOL AROUND A PART NUMBER MEANS THAT THIS PART IS MOUNTED ON THE CHASSIS, EVEN WHEN ITS POSITION ON THE SCHEMATIC SUGGESTS ANOTHER LOCATION.

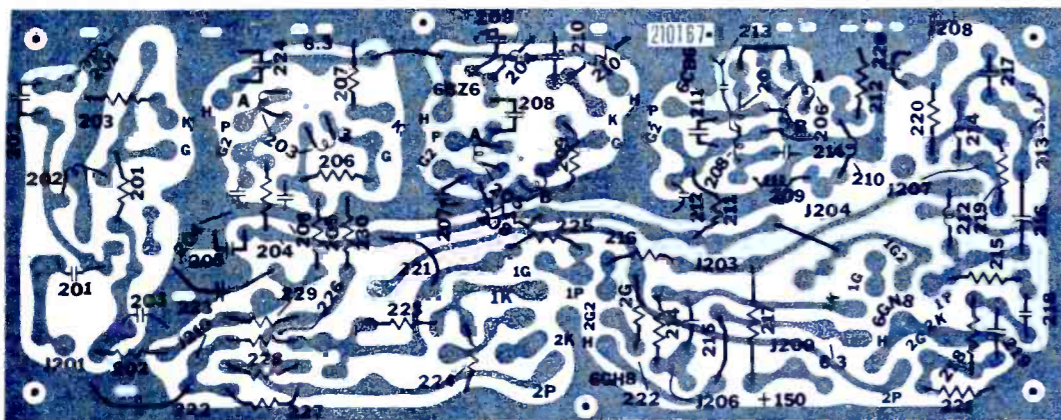
THIS SYMBOL INDICATES THE TOP COIL.

THIS SYMBOL INDICATES THE BOTTOM COIL.

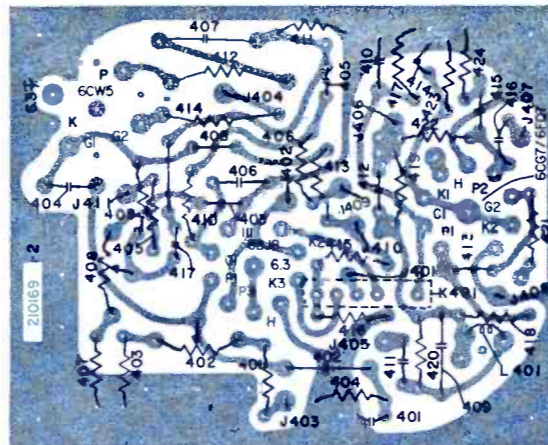
THIS SYMBOL INDICATES CLOCKWISE ROTATION OF CONTROL.



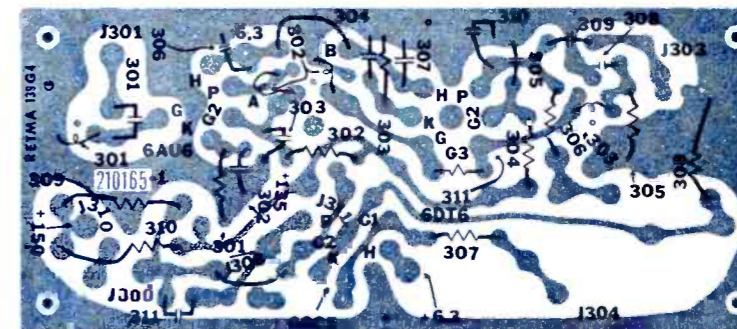
PRINTED CIRCUIT BOARDS
(VIEWED FROM COPPER PATTERN)
VIDEO IF BOARD



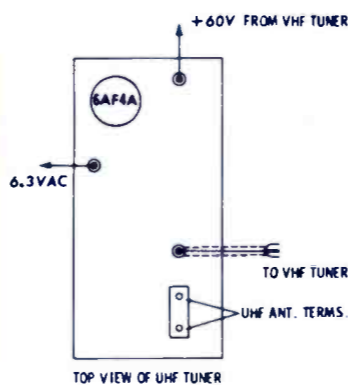
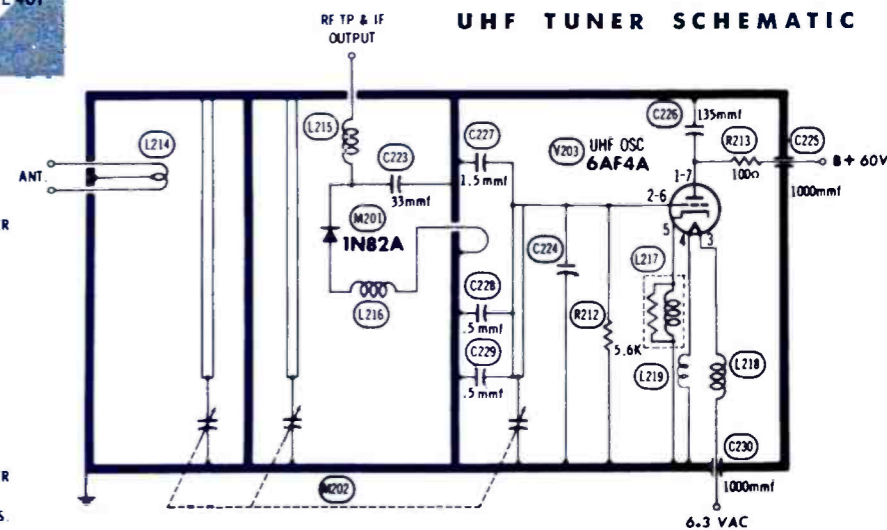
DEFLECTION BOARD



AUDIO BOARD

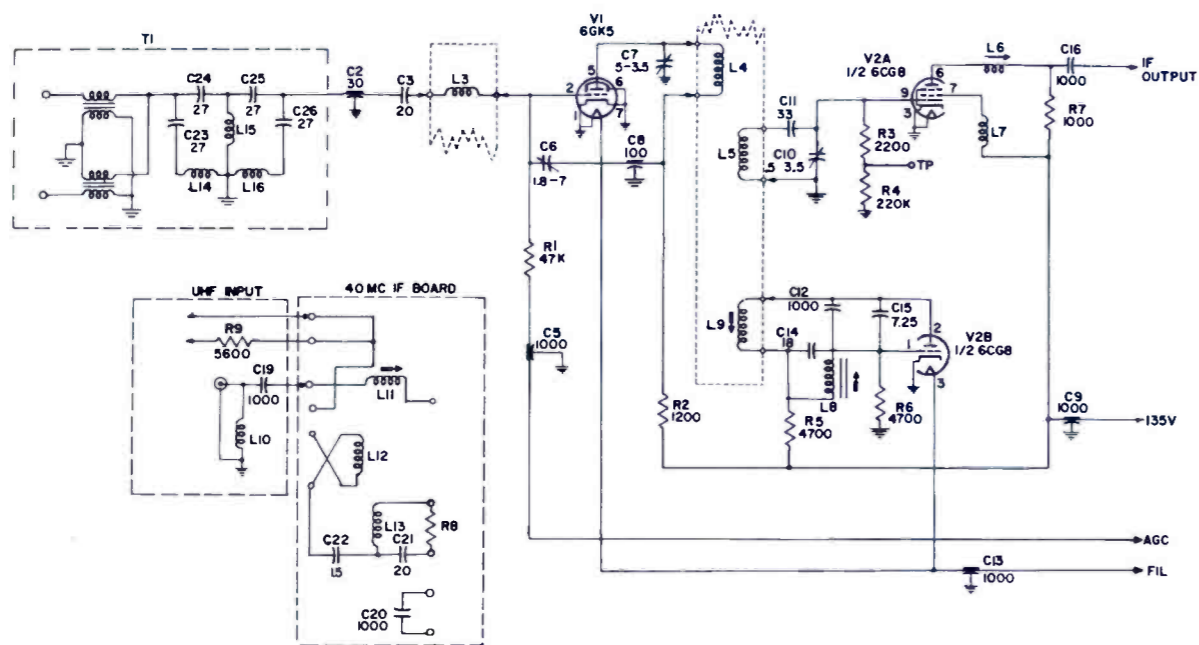


UHF TUNER SCHEMATIC

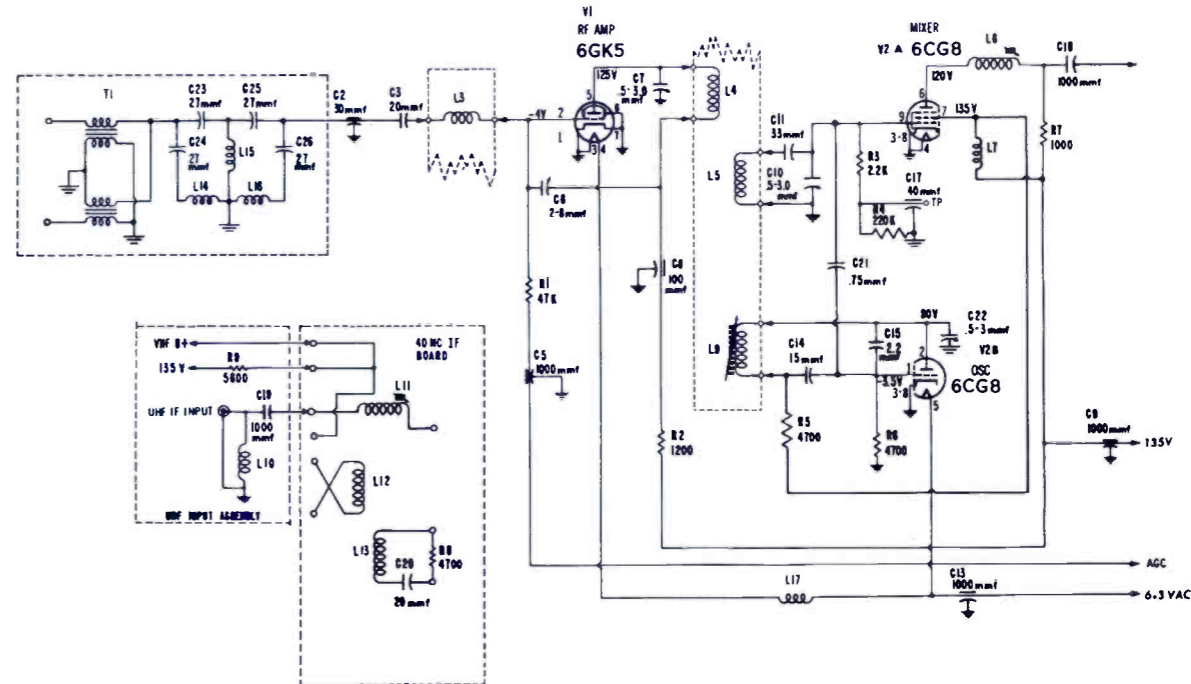


340027 & 28 SCHEMATIC DIAGRAM

MAGNAVOX
TV Chassis
44-01
**ELECTRONIC
TECHNICIAN**
TEKFAK

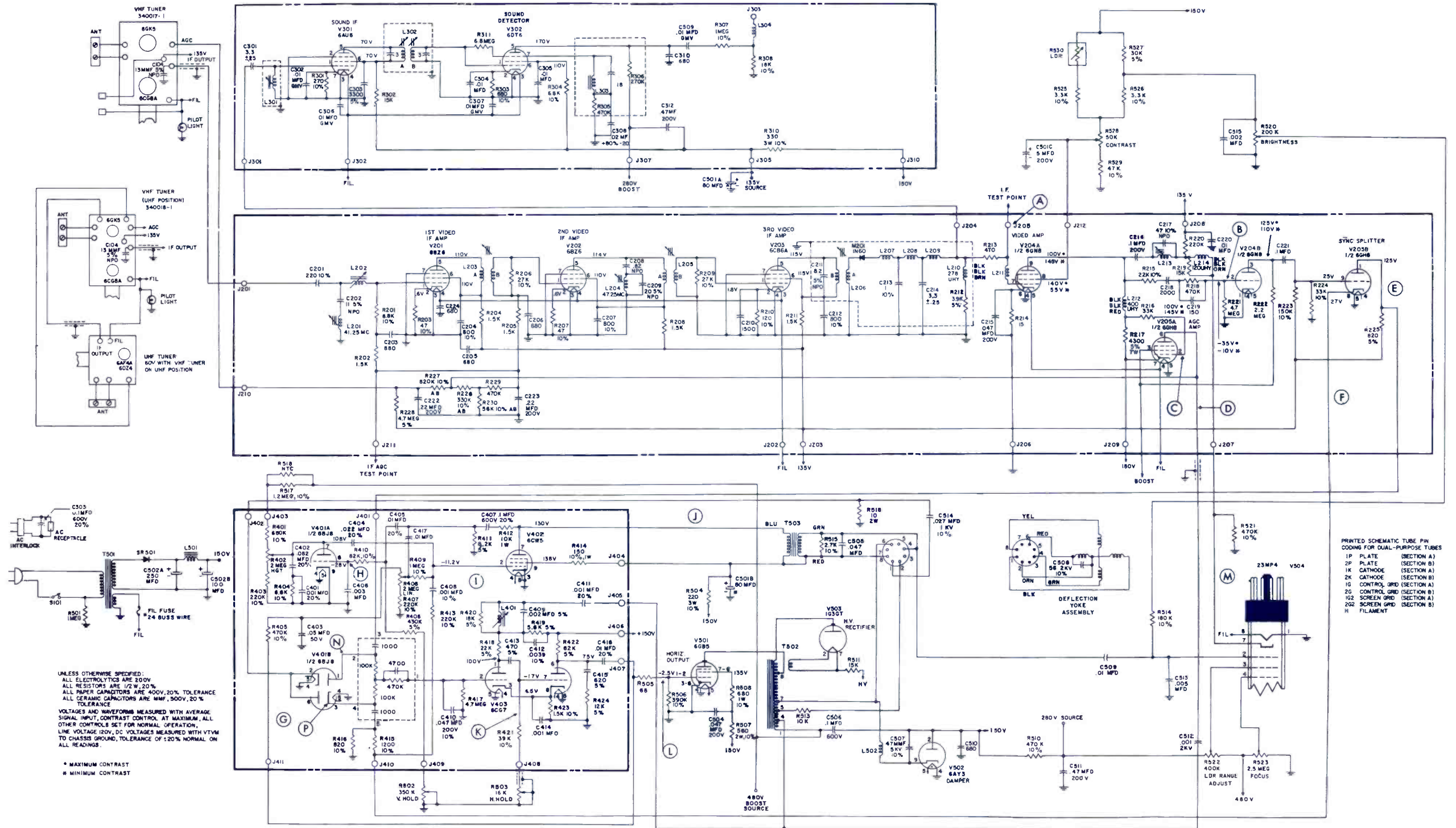
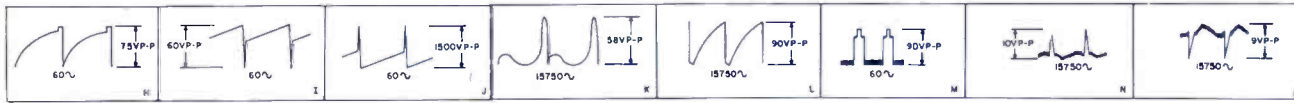
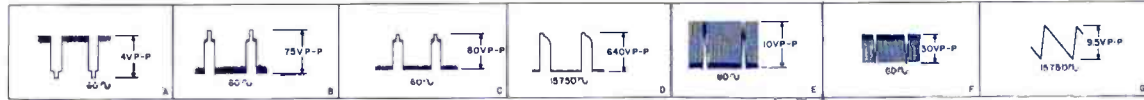


340017 & 18 SCHEMATIC DIAGRAM



ELECTRONIC TECHNICIAN TEKFAX

MAGNAVOX
TV Chassis
44-01



UNLESS OTHERWISE SPECIFIED:
ALL ELECTROLYTICS ARE 200V
ALL RESISTORS ARE 1/2 W, 20%
ALL PAPER CAPACITORS ARE 400V, 20% TOLERANCE
ALL CERAMIC CAPACITORS ARE MMF, 500V, 20% TOLERANCE

VOLTAGES AND WAVEFORMS MEASURED WITH AVERAGE SIGNAL INPUT, CONTRAST CONTROL AT MAXIMUM, ALL OTHER CONTROLS SET FOR NORMAL OPERATION.
LINE VOLTAGE 120V, DC VOLTAGES MEASURED WITH VTVM TO CHASSIS GROUND, TOLERANCE OF ±20% NORMAL ON ALL READINGS.

• MAXIMUM CONTRAST
MINIMUM CONTRAST

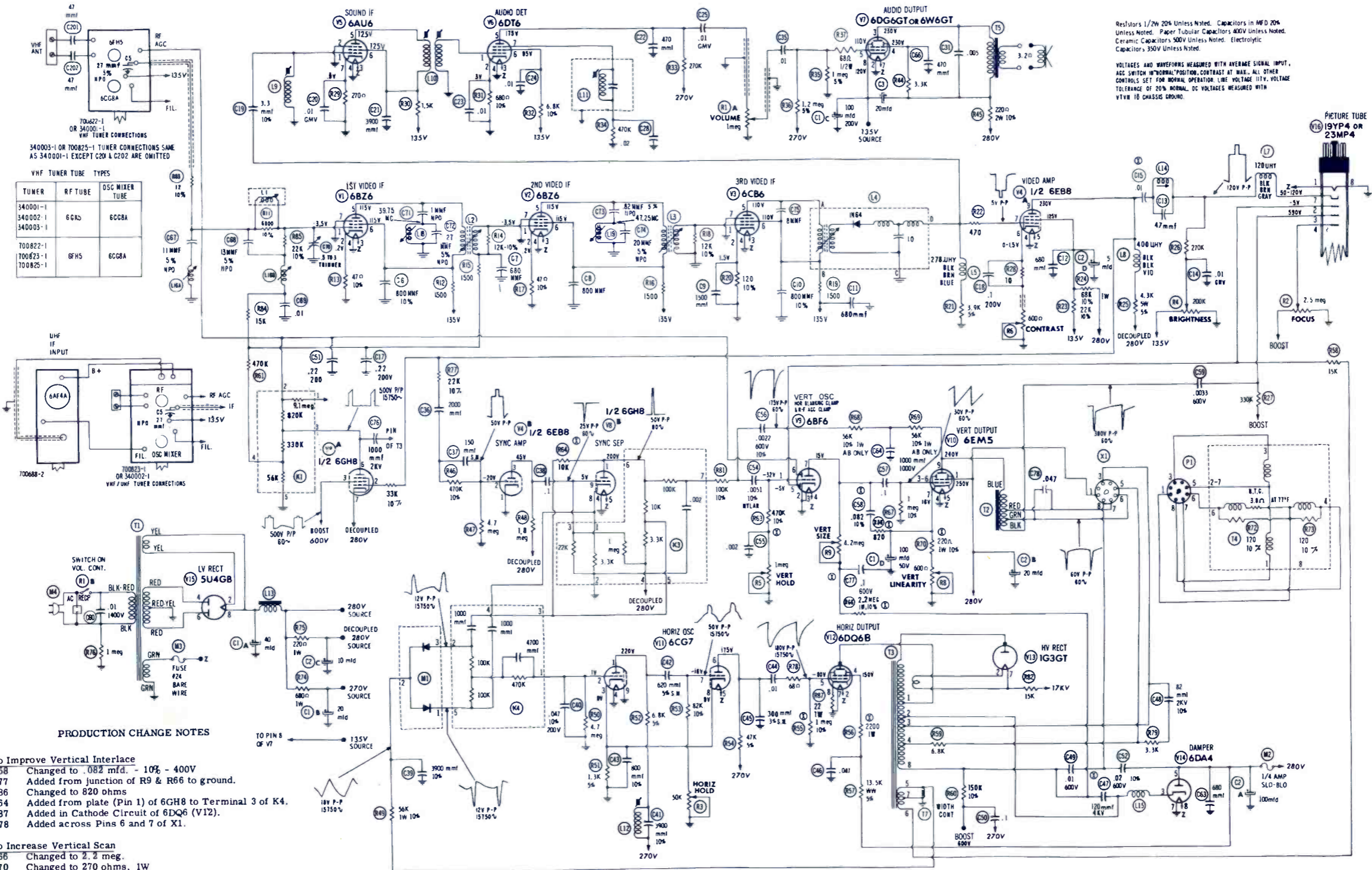
PRINTED SCHEMATIC TUBE PIN COILING FOR DUAL-PURPOSE TUBES

- 1P PLATE (SECTION A)
- 2P PLATE (SECTION B)
- 1K CATHODE (SECTION A)
- 2K CATHODE (SECTION B)
- 1G CONTROL GRID (SECTION A)
- 2G CONTROL GRID (SECTION B)
- 1G2 SCREEN GRID (SECTION A)
- 2G2 SCREEN GRID (SECTION B)
- H FILAMENT

ELECTRONIC TECHNICIAN

TEKFAX

MAGNAVOX
TV Chassis
34-01, -02, -03,
-04, -05, -07



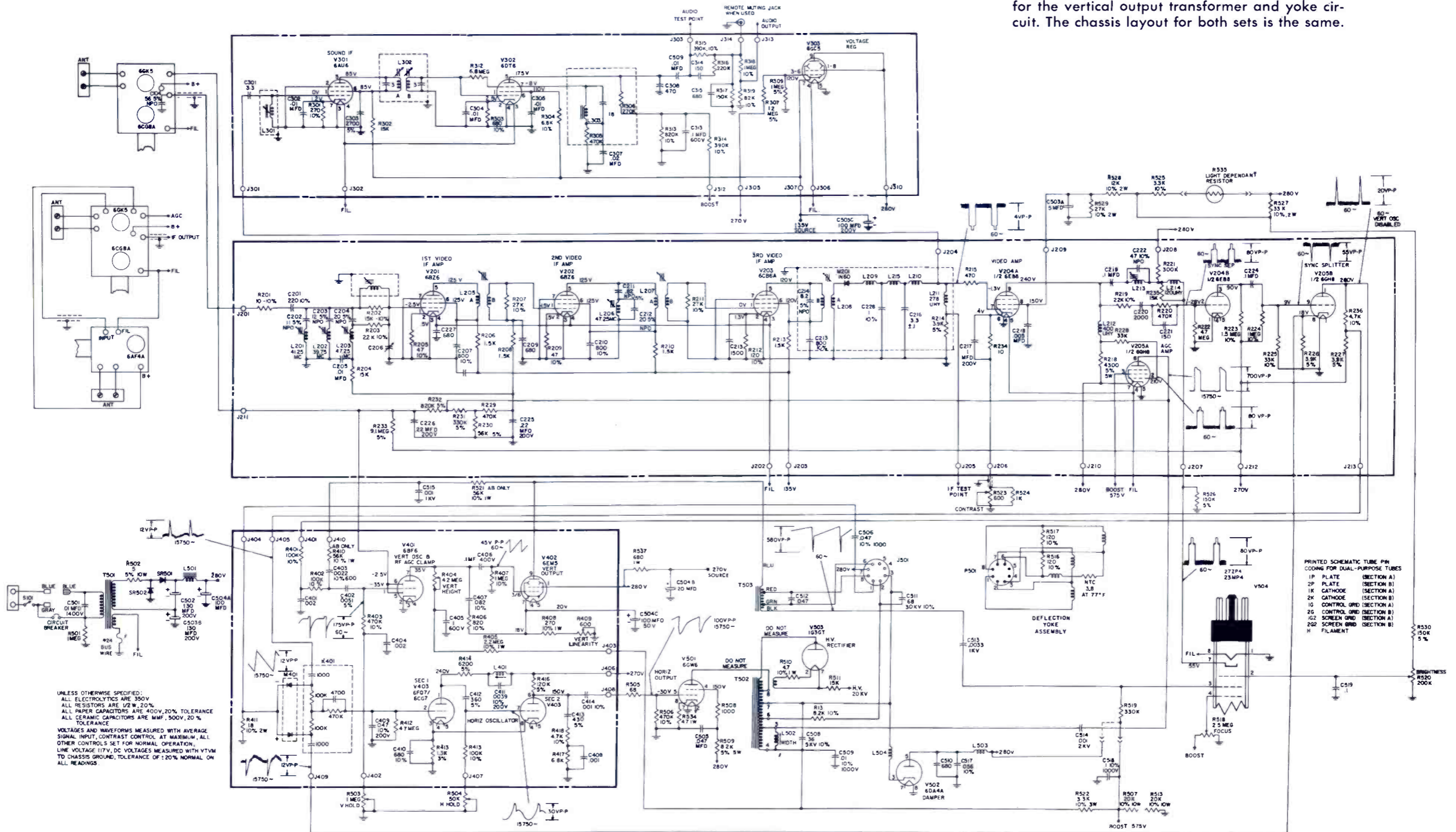
Resistors 1/2W 20% Unless Noted. Capacitors in MFD 20% Unless Noted. Paper Tubular Capacitors 400V Unless Noted. Ceramic Capacitors 500V Unless Noted. Electrolytic Capacitors 350V Unless Noted.

VOLTAGES AND WAVEFORMS MEASURED WITH AVERAGE SIGNAL INPUT. AGC SWITCH IN NORMAL POSITION. CONTRAST AT MAX. ALL OTHER CONTROLS SET FOR NORMAL OPERATION. LINE VOLTAGE 115V. VOLTAGE TOLERANCE OF 20% NORMAL. DC VOLTAGES MEASURED WITH VTVM TO CHASSIS GROUND.

MAGNAVOX
TV Chassis
36-08, 09

ELECTRONIC TECHNICIAN TEKFAX

The 36-07 chassis uses an additional electrolytic capacitor to provide a decoupled 280 v source for the vertical output transformer and yoke circuit. The chassis layout for both sets is the same.



OSCILLOSCOPE WAVEFORM PATTERNS

The waveforms shown on the schematic diagram are as observed on a Tektronix type 524D wide band television oscilloscope with the receiver tuned to a reasonably strong signal and a normal picture. The voltages shown on each waveform are the approximate peak to peak amplitudes. The frequency accompanying each waveform indicates the repetition rate of the waveform not the sweep rate of the oscilloscope. If the waveforms are observed on the oscilloscope with a poor high

frequency response, the corners of the pulses will tend to be more rounded than those shown on the schematic diagram and the amplitude of any high frequency pulse will tend to be less.

DC SOCKET VOLTAGES

All DC socket voltages shown on the schematic are measured with a high impedance VTVM and under zero signal conditions.

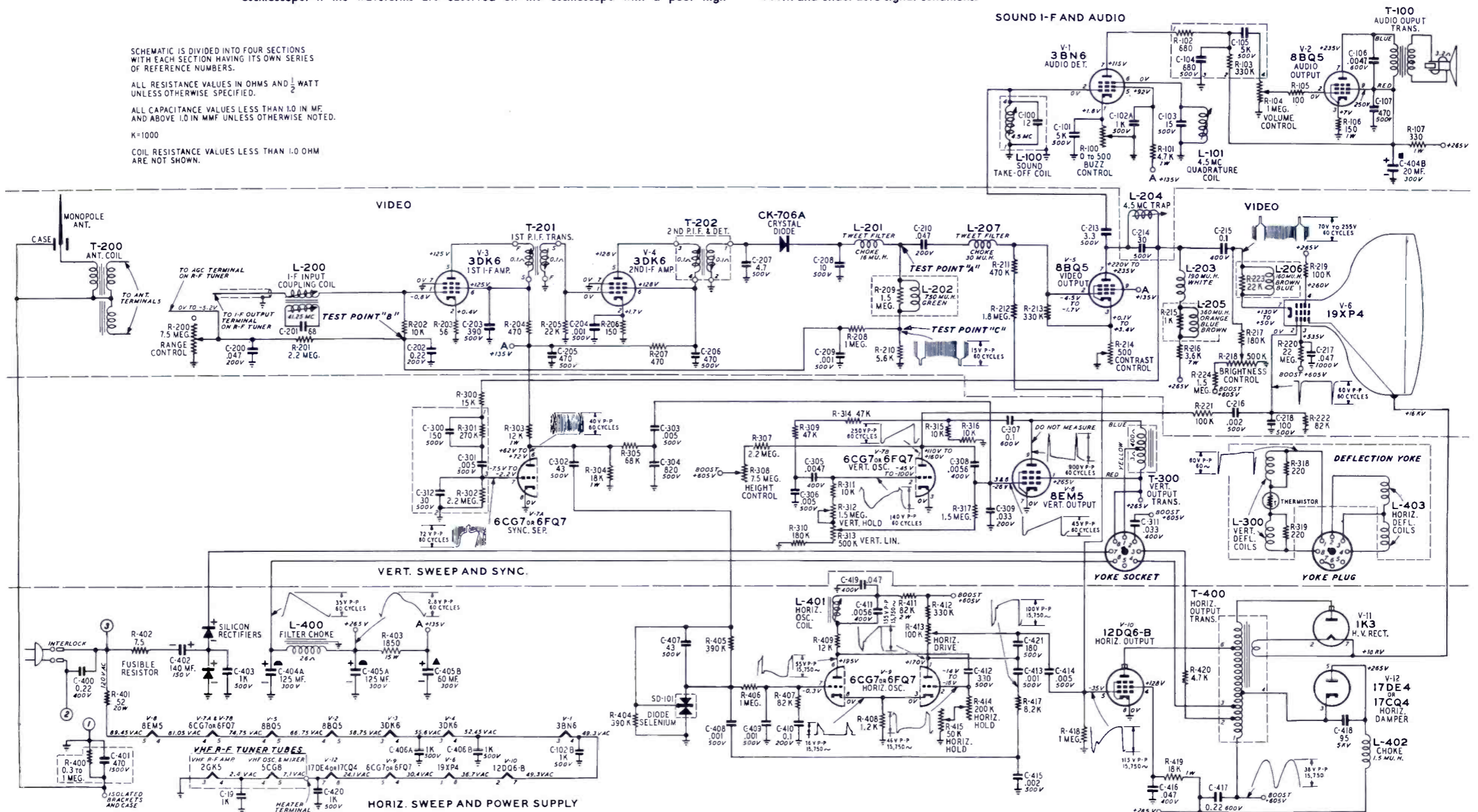
SCHEMATIC IS DIVIDED INTO FOUR SECTIONS WITH EACH SECTION HAVING ITS OWN SERIES OF REFERENCE NUMBERS.

ALL RESISTANCE VALUES IN OHMS AND $\frac{1}{2}$ WATT UNLESS OTHERWISE SPECIFIED.

ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF. AND ABOVE 1.0 IN MMF UNLESS OTHERWISE NOTED.

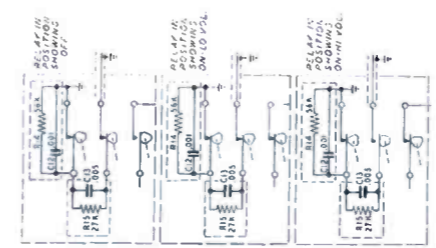
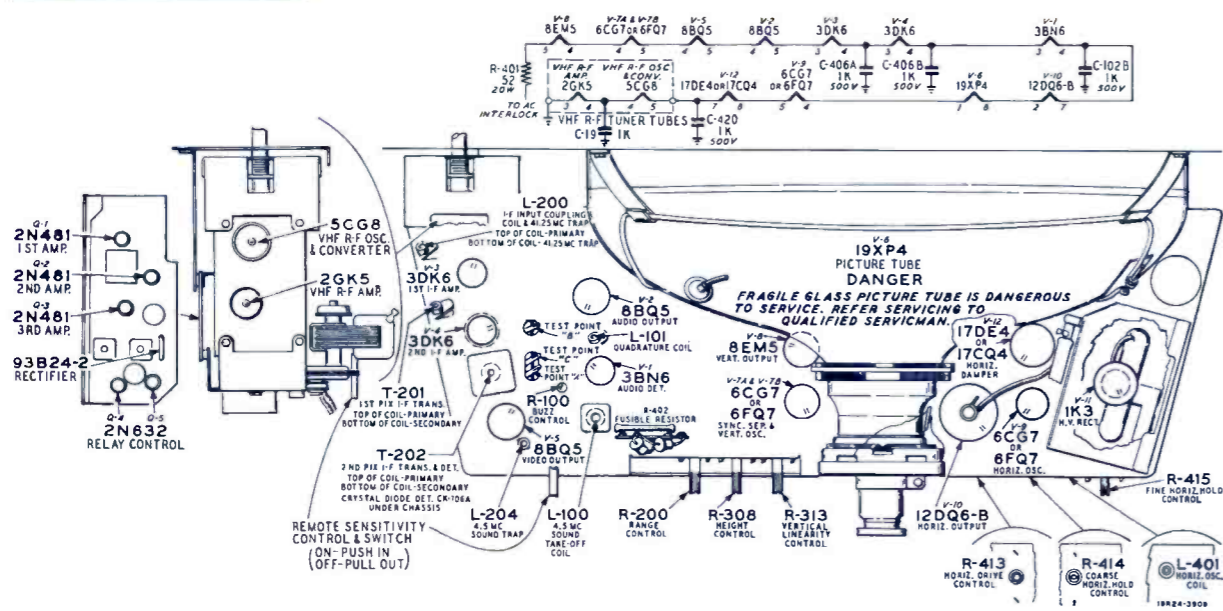
K=1000

COIL RESISTANCE VALUES LESS THAN 1.0 OHM ARE NOT SHOWN.

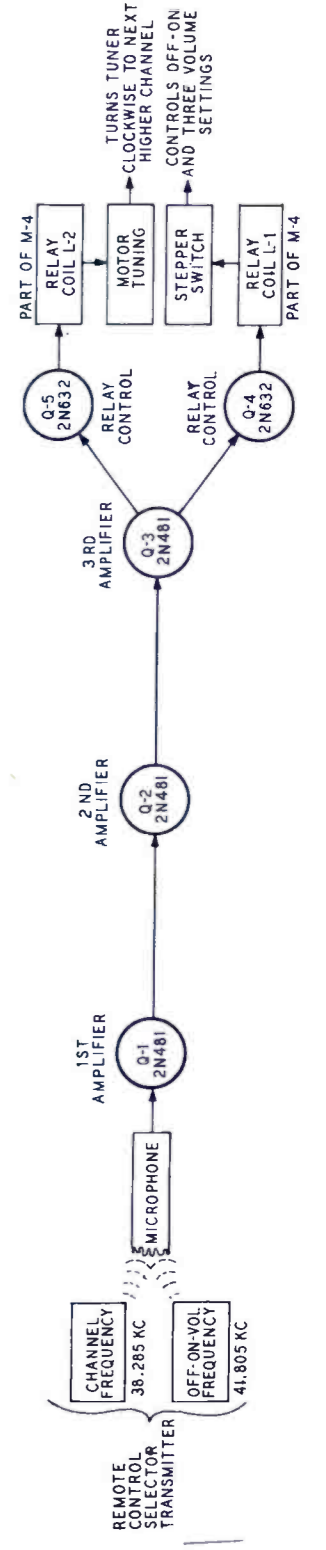
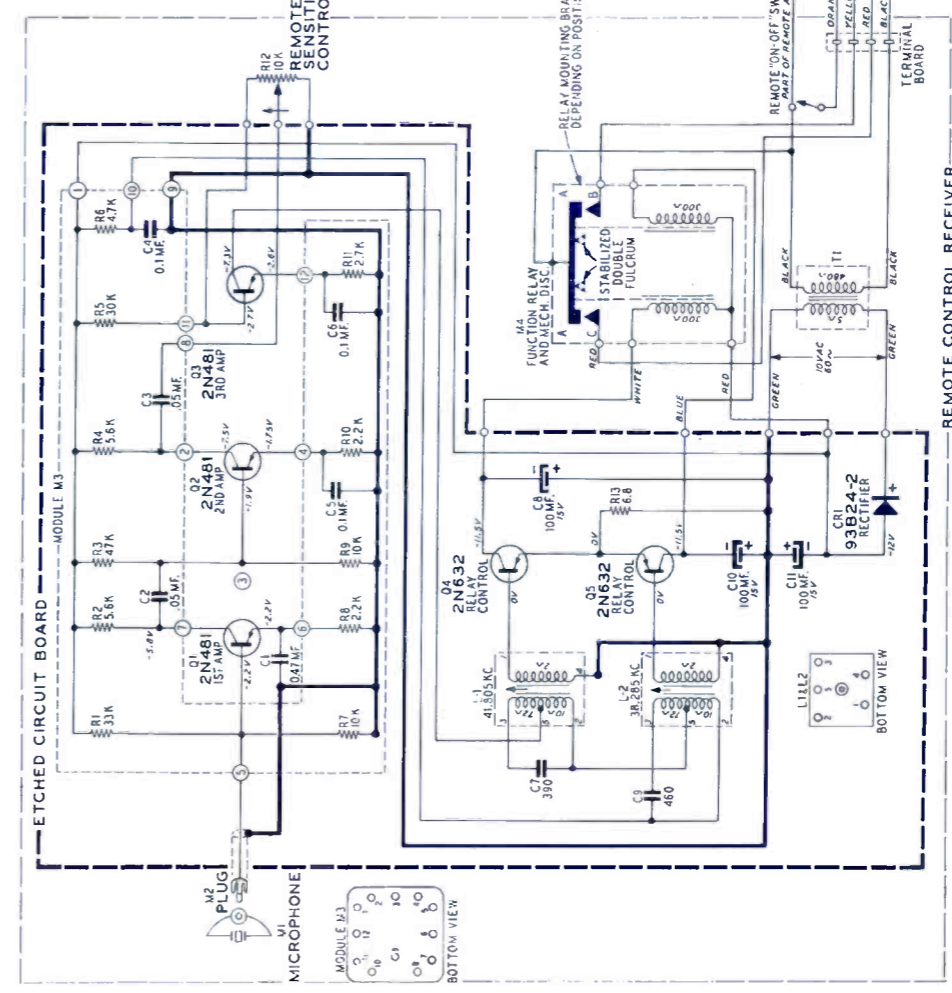
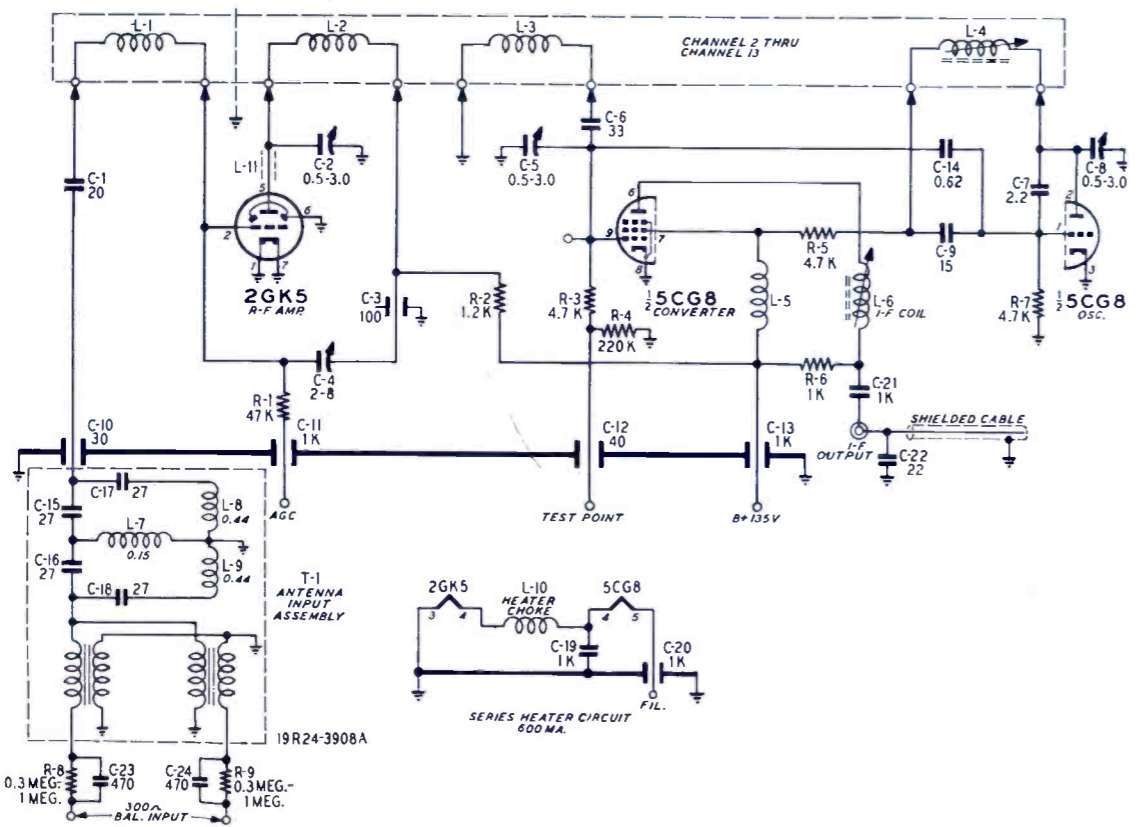


MONTGOMERY WARD

TV Chassis
WG-1883A

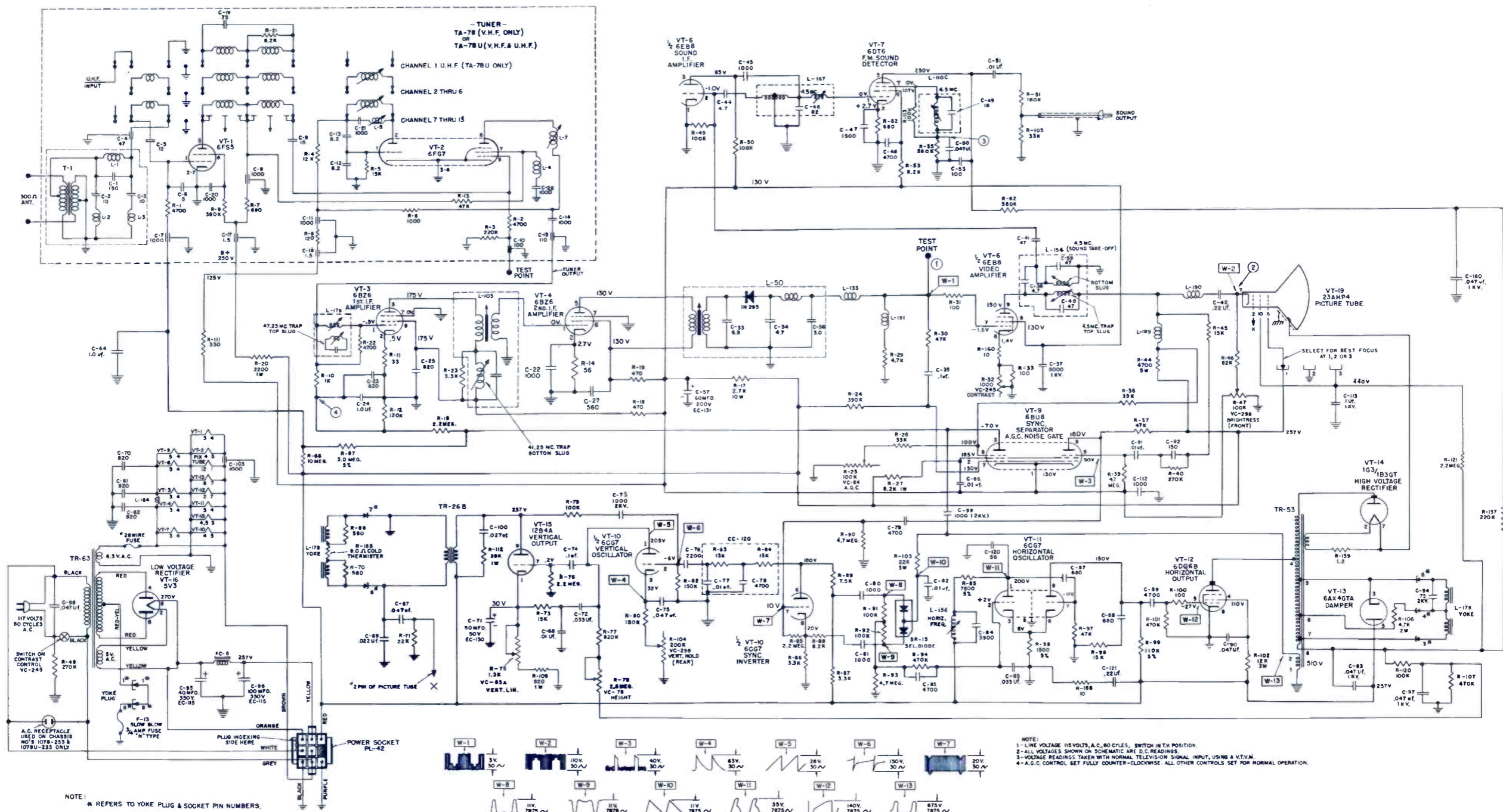


ALL D.C. VOLTAGES SHOWN ON SCHEMATIC ARE MEASURED WITH A HIGH IMPEDANCE VTVM TO REMOTE CHASSIS GROUND.



MONTGOMERY WARD

TV Chassis
1078-233, 243
1078U233,
and 243



ELECTRONIC TECHNICIAN TEKFAK

MOTOROLA
TV Chassis TS, QTS,
RTS, STS, & WTS-436
Models 19T5, 7, 11,
12, 13, 14, & A19T8

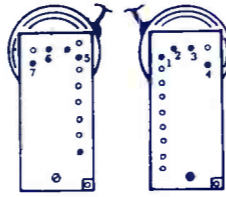
NOTES:

VOLTAGE MEASUREMENTS

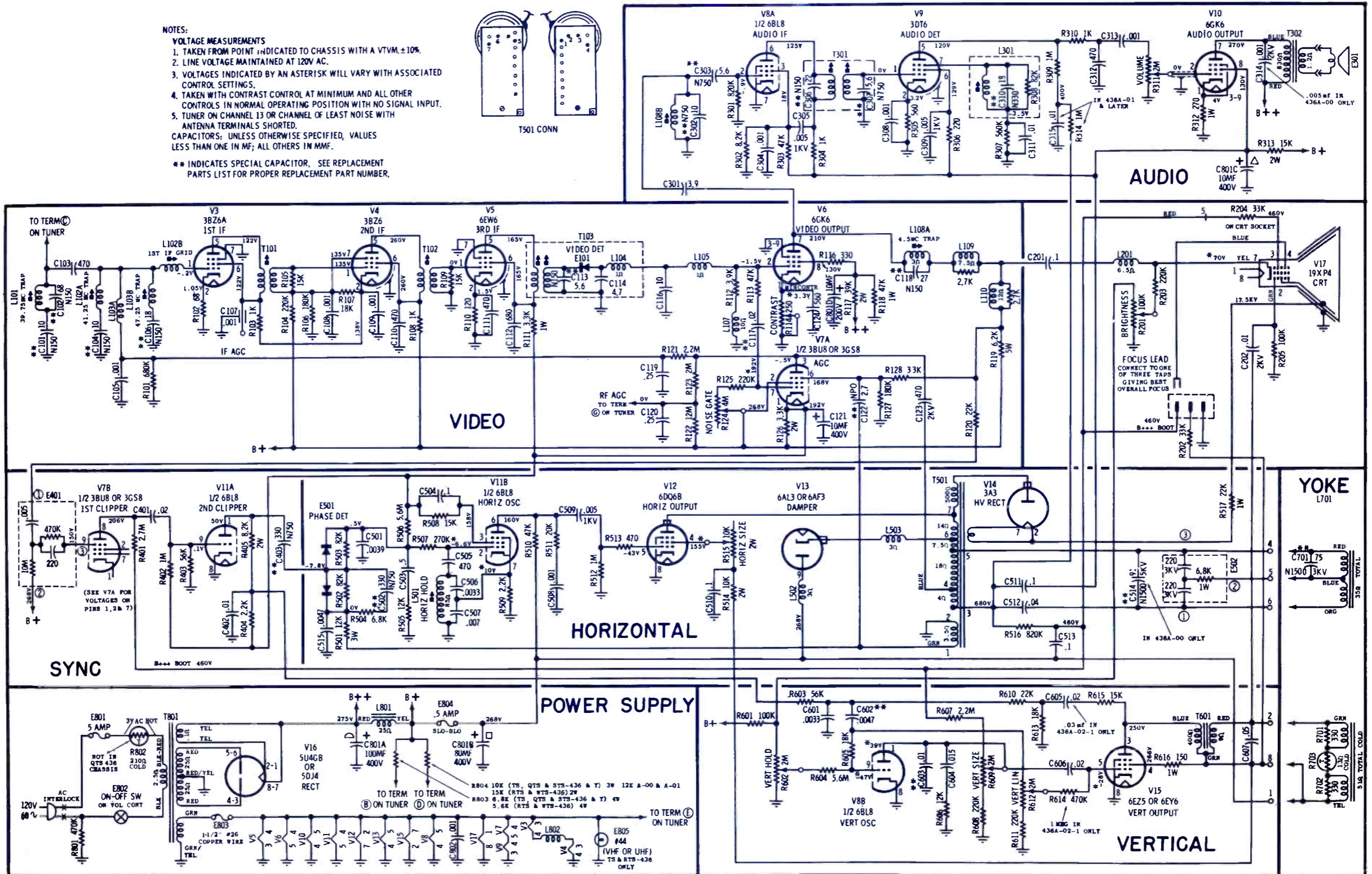
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM, ±10%.
2. LINE VOLTAGE MAINTAINED AT 120V AC.
3. VOLTAGES INDICATED BY AN ASTERISK WILL VARY WITH ASSOCIATED CONTROL SETTINGS.
4. TAKEN WITH CONTRAST CONTROL AT MINIMUM AND ALL OTHER CONTROLS IN NORMAL OPERATING POSITION WITH NO SIGNAL INPUT.
5. TUNER ON CHANNEL 13 OR CHANNEL OF LEAST NOISE WITH ANTENNA TERMINALS SHORTED.

CAPACITORS: UNLESS OTHERWISE SPECIFIED, VALUES LESS THAN ONE IN MF; ALL OTHERS IN MMF.

** INDICATES SPECIAL CAPACITOR. SEE REPLACEMENT PARTS LIST FOR PROPER REPLACEMENT PART NUMBER.

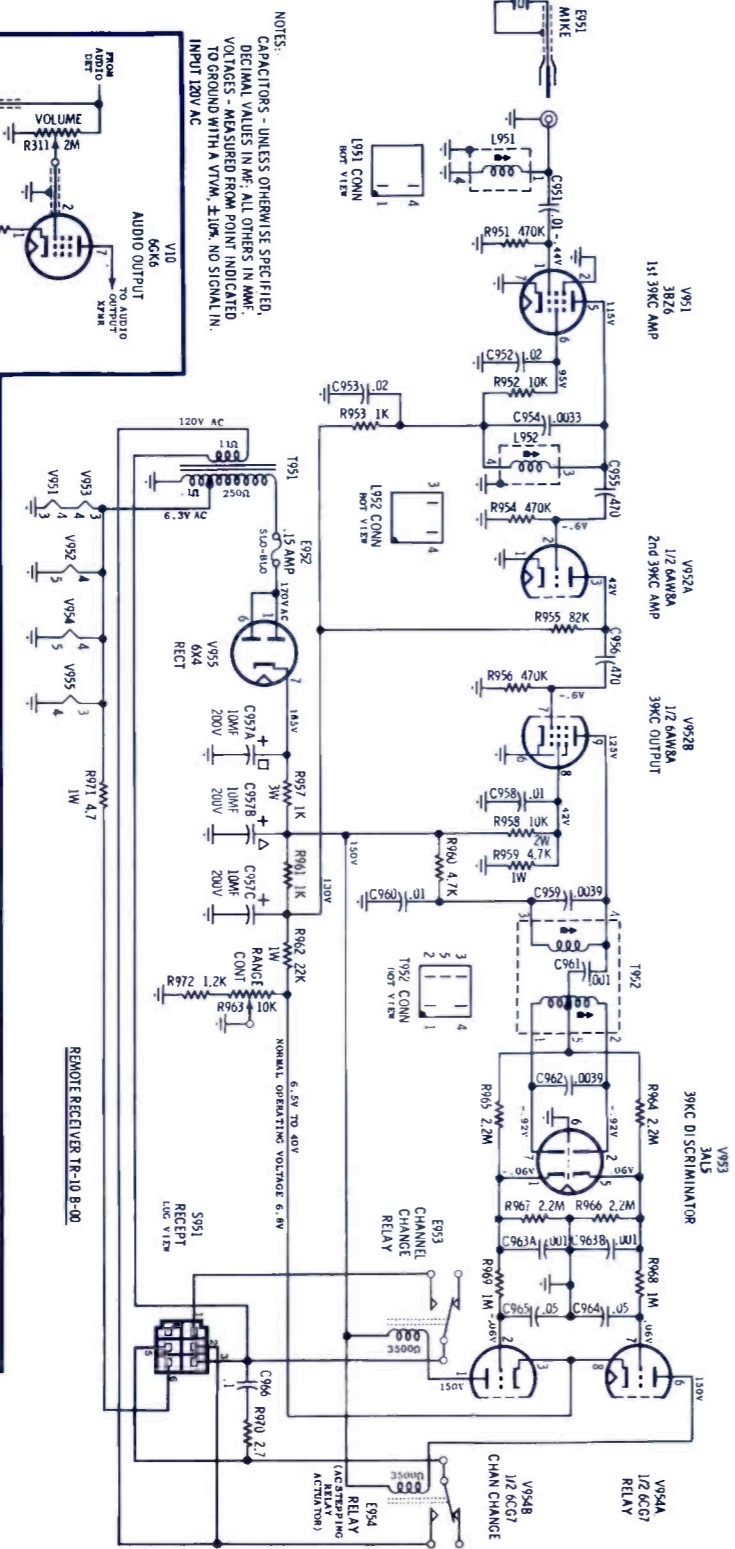
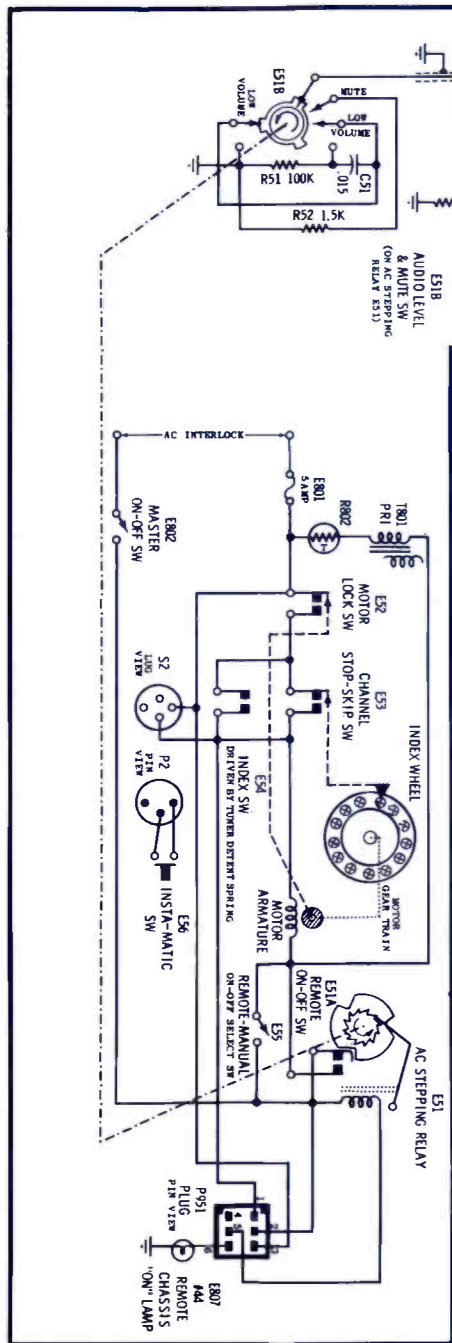


T501 CONN

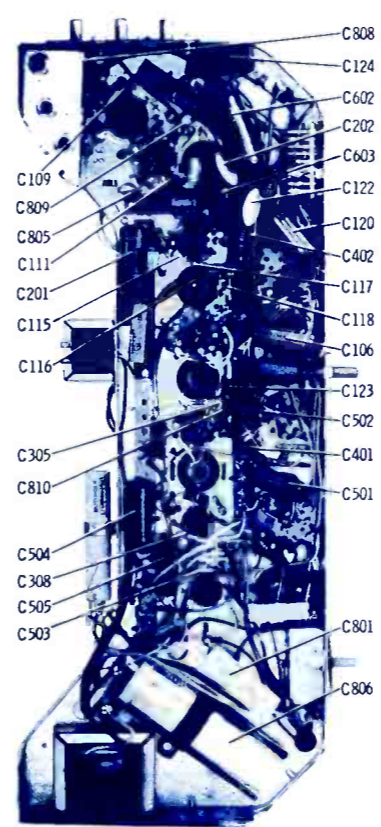


MOTOROLA

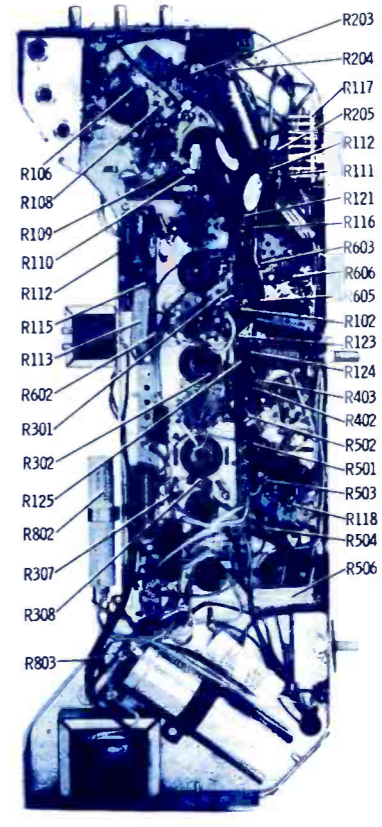
TV Chassis TS, QTS,
RTS, STS, & WTS-436
Models 19T5, 7, 11,
12, 13, 14, & A19T8



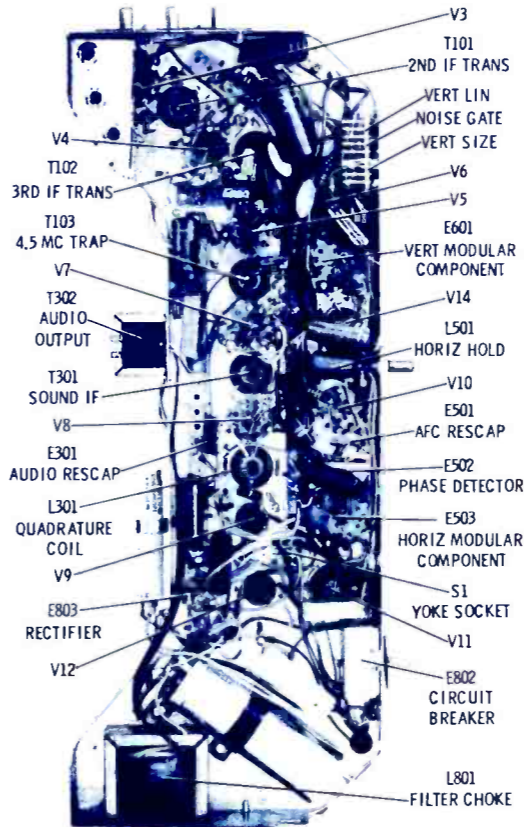
NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED,
DECIMAL VALUES IN MF. ALL OTHERS IN MMF.
VOLTAGES - MEASURED FROM A POINT INDICATED
TO GROUND WITH A VTVM. $\pm 10\%$ NO SIGNAL IN.
INPUT 120V AC



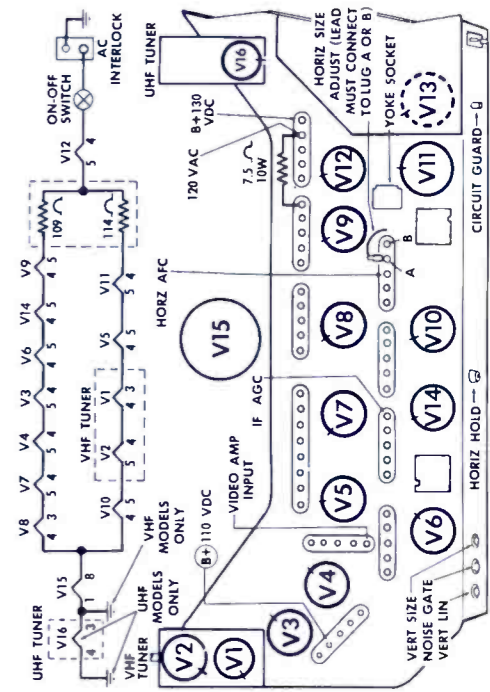
CAPACITORS



RESISTORS



MOTOROLA
TV Chassis
TS-449 Series



ELECTRONIC TECHNICIAN TEKFAX

MOTOROLA
TV Chassis
TS-449 Series

NOTES:

VOLTAGE MEASUREMENTS

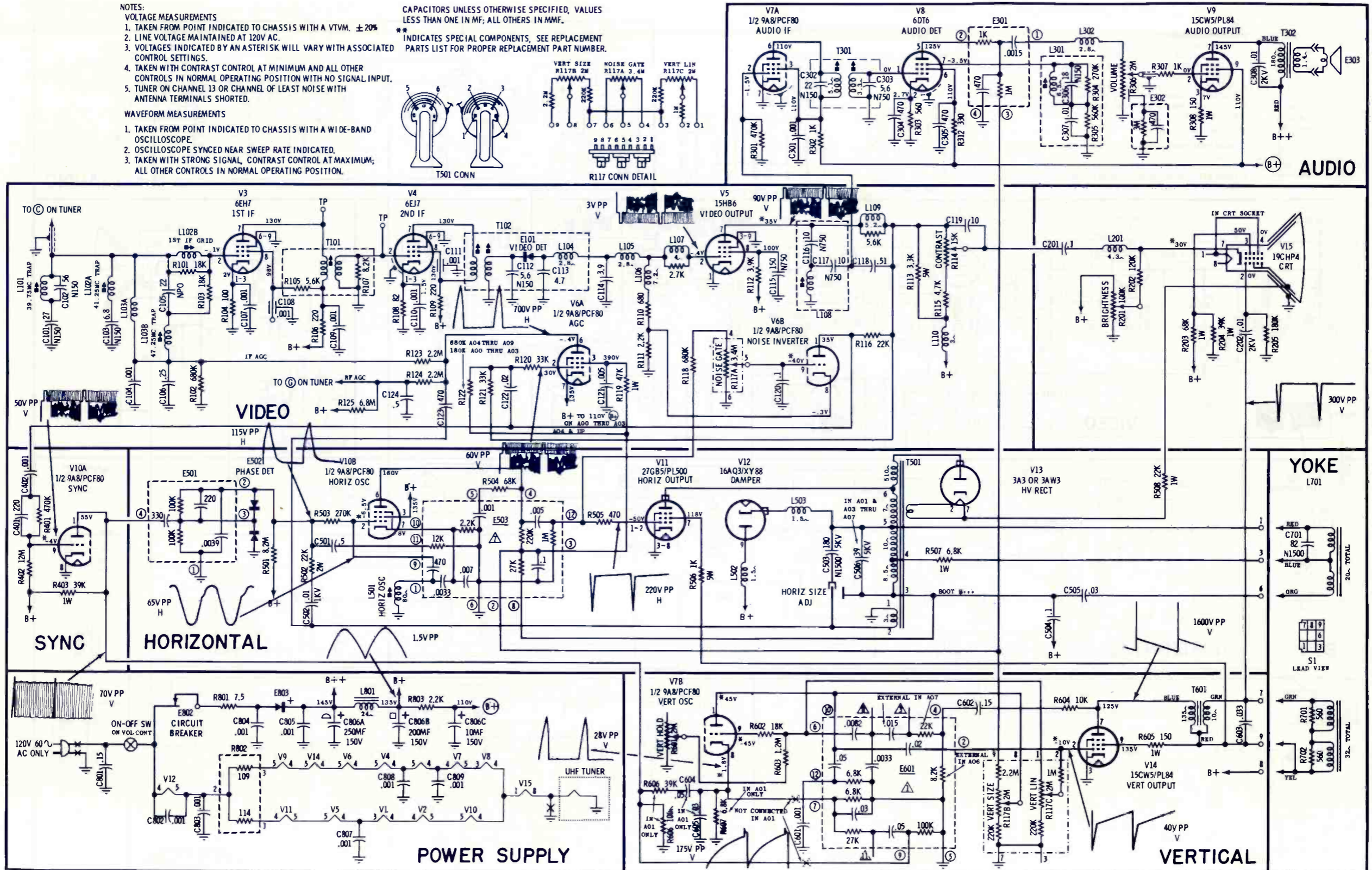
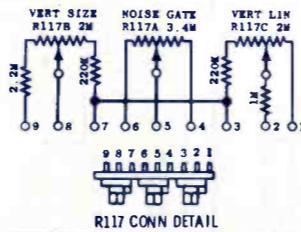
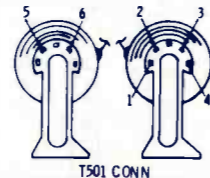
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM, $\pm 20\%$
2. LINE VOLTAGE MAINTAINED AT 120V AC.
3. VOLTAGES INDICATED BY AN ASTERISK WILL VARY WITH ASSOCIATED CONTROL SETTINGS.
4. TAKEN WITH CONTRAST CONTROL AT MINIMUM AND ALL OTHER CONTROLS IN NORMAL OPERATING POSITION WITH NO SIGNAL INPUT.
5. TUNER ON CHANNEL 13 OR CHANNEL OF LEAST NOISE WITH ANTENNA TERMINALS SHORTED.

WAVEFORM MEASUREMENTS

1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE.
2. OSCILLOSCOPE SYNCED NEAR SWEEP RATE INDICATED.
3. TAKEN WITH STRONG SIGNAL, CONTRAST CONTROL AT MAXIMUM; ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

CAPACITORS UNLESS OTHERWISE SPECIFIED, VALUES LESS THAN ONE IN MF; ALL OTHERS IN MMF.

** INDICATES SPECIAL COMPONENTS, SEE REPLACEMENT PARTS LIST FOR PROPER REPLACEMENT PART NUMBER.



MOTOROLA
TV Chassis
T8-578
Model
23T17 Series

ELECTRONIC TECHNICIAN TEKFAX

NOTES:

VOLTAGE MEASUREMENTS

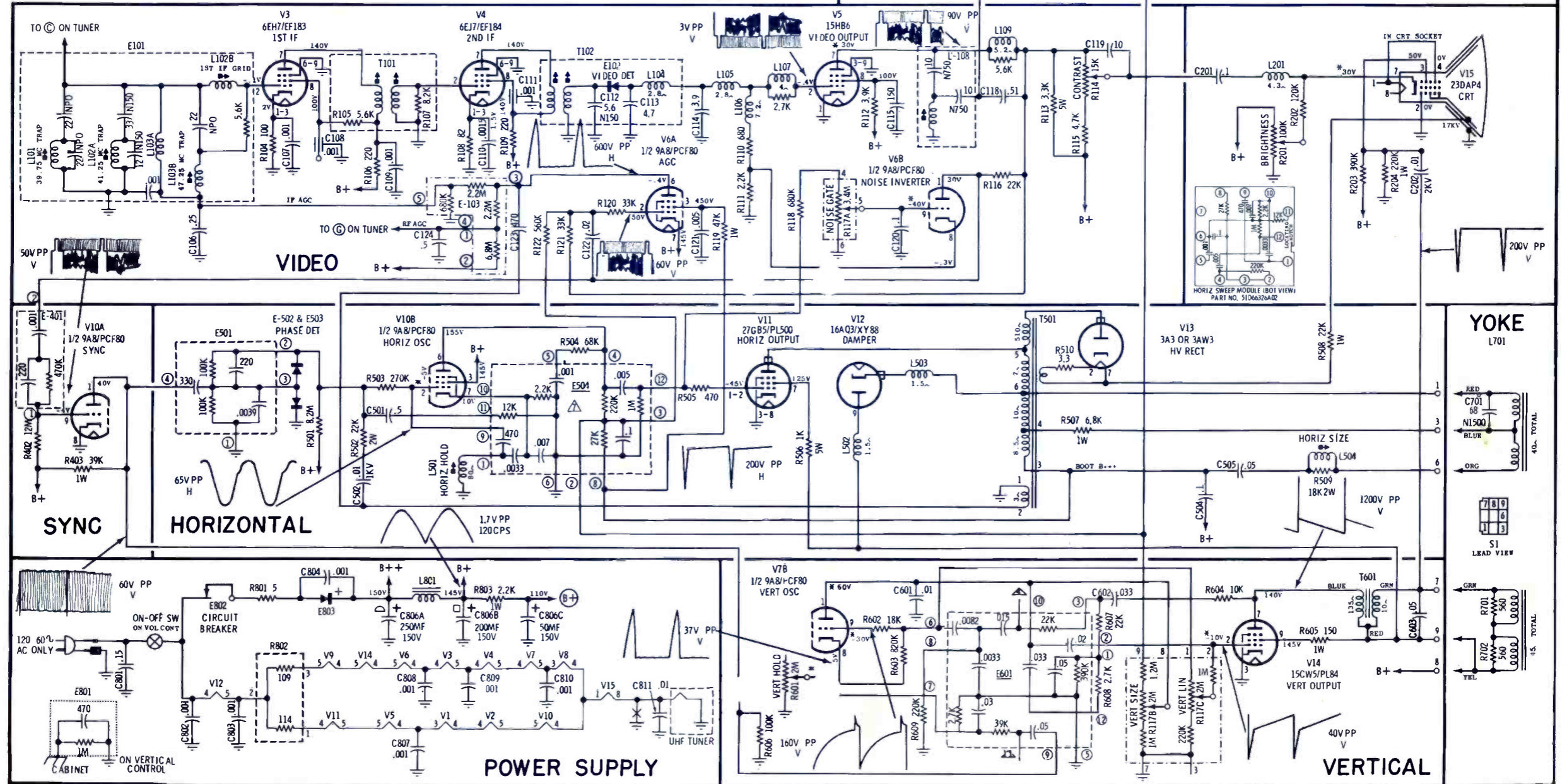
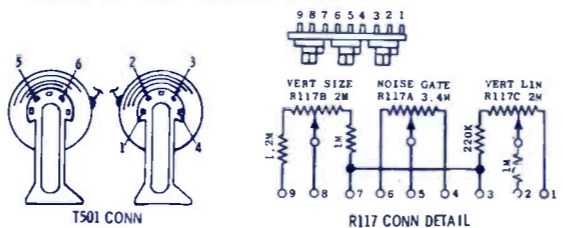
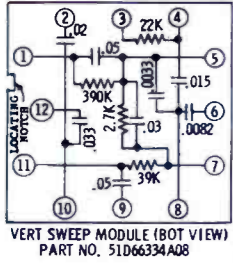
1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A VTVM. $\pm 20\%$
2. LINE VOLTAGE MAINTAINED AT 120V AC.
3. VOLTAGES INDICATED BY AN ASTERISK WILL VARY WITH ASSOCIATED CONTROL SETTINGS.
4. TAKEN WITH CONTRAST CONTROL AT MINIMUM AND ALL OTHER CONTROLS IN NORMAL OPERATING POSITION WITH NO SIGNAL INPUT.
5. TUNER ON CHANNEL 13 OR CHANNEL OF LEAST NOISE WITH ANTENNA TERMINALS SHORTED.

WAVEFORM MEASUREMENTS

1. TAKEN FROM POINT INDICATED TO CHASSIS WITH A WIDE-BAND OSCILLOSCOPE.
2. OSCILLOSCOPE SYNCED NEAR SWEEP RATE INDICATED.
3. TAKEN WITH STRONG SIGNAL, CONTRAST CONTROL AT MAXIMUM; ALL OTHER CONTROLS IN NORMAL OPERATING POSITION.

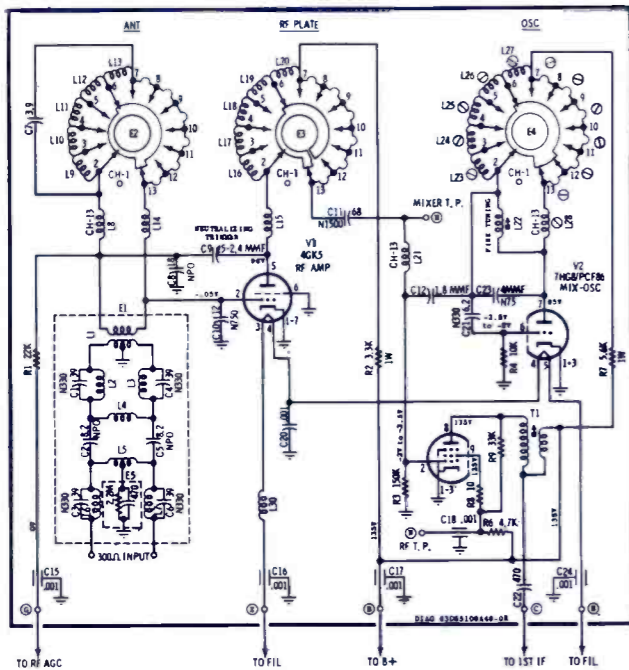
CAPACITORS UNLESS OTHERWISE SPECIFIED, VALUES LESS THAN ONE IN MF; ALL OTHERS IN MMF.

* INDICATES SPECIAL COMPONENTS, SEE REPLACEMENT PARTS LIST FOR PROPER REPLACEMENT PART NUMBER.

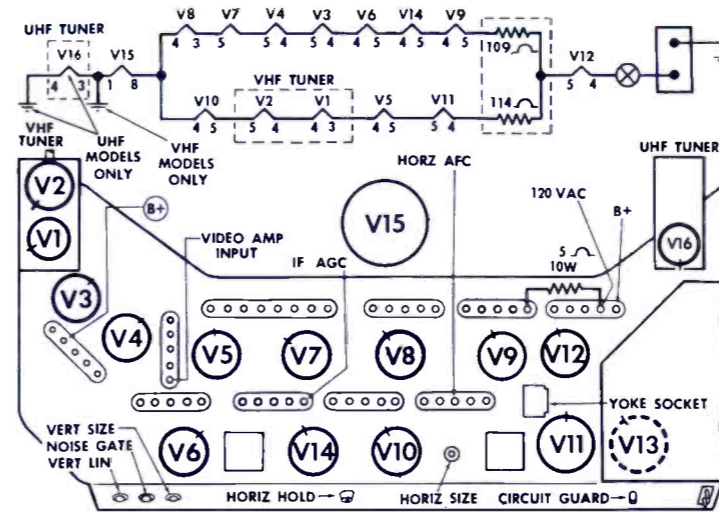
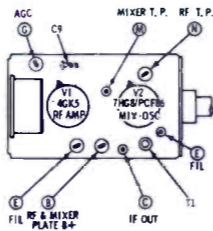


NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, VALUES
LESS THAN ONE IN MF; ALL OTHERS IN MMF.

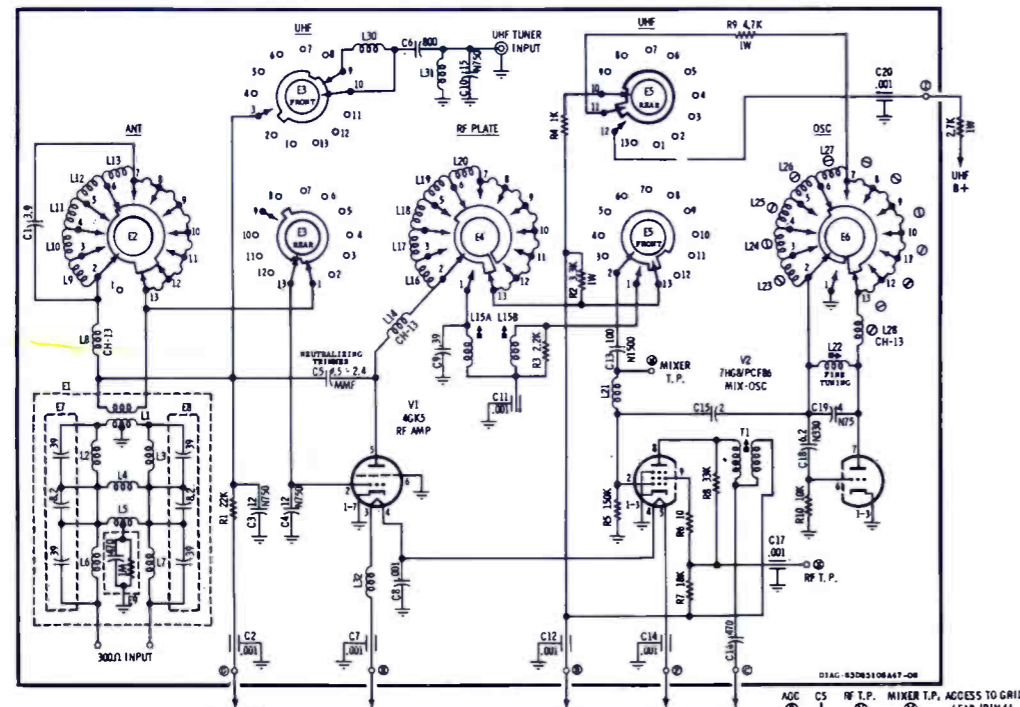
VOLTAGES - SEE CHASSIS SCHEMATIC DIAGRAM FOR
VOLTAGE NOTES.
T.P.=TEST POINT
CH = CHANNEL
CHANNEL SELECTOR SHOWN IN CHANNEL 13 POSITION



VHF TUNER TT-314 SCHEMATIC DIAGRAM

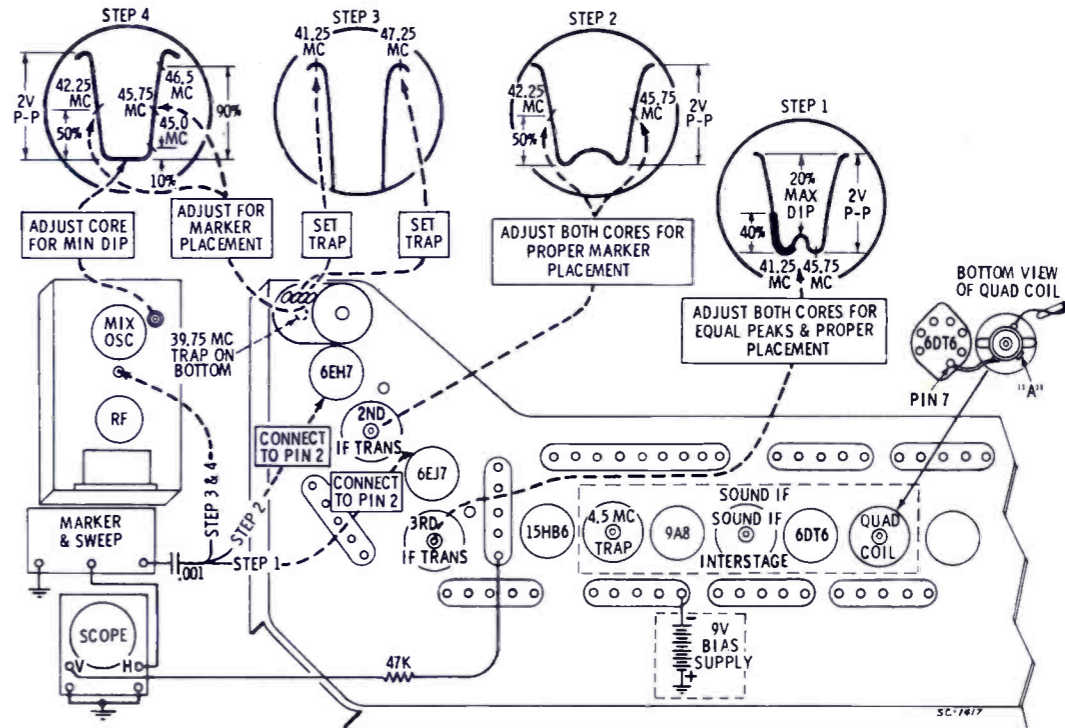
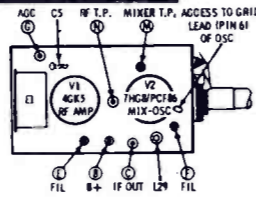


REF. No.	TUBE TYPE	FUNCTION	REF. No.	TUBE TYPE	FUNCTION
V1	4GK5	RF AMP	V12	16AQ3/XY88	DAMPER
V2	7HG8	MIXER OSC	V13	3A3 or 3AW3	HV RECT
V3	6EH7/EF183	1ST IF	V14	15CW5/PL84	VERT OUTPUT
V4	6EJ7/EF184	2ND IF			
V5	15HB6	VIDEO AMP	V15	23DAP4	CRT 23"
V6	9A8/PCF80	AGC	V16	2AF4B	UHF OSC (UHF ONLY)
V7	9A8/PCF80	VERT OSC & SOUND IF			
V8	6DT6	AUDIO DET			
V9	15CW5/PL84	AUDIO OUTPUT			
V10	9A8/PCF80	SYNC & HORZ OSC			
V11	27G85/PL500	HORZ OUTPUT			



NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, VALUES
LESS THAN ONE IN MF; ALL OTHERS IN MMF.
VOLTAGES - SEE CHASSIS SCHEMATIC DIAGRAM FOR
VOLTAGE NOTES.
CHANNEL SELECTOR SHOWN IN CHANNEL 13 POSITION.
T.P.=TEST POINT

VHF-UHF TUNER TT-315 SCHEMATIC DIAGRAM



VIDEO IF & SOUND ALIGNMENT DETAIL

GENERAL INFORMATION

CHASSIS DESCRIPTION

This manual contains the chassis schematic, alignment information and a complete parts list for the models shown in the chart.

The TS-578 chassis is electrically similar to the TS-449 used in models 19P15 and 19P16. Basic differences are in the deflection and high voltage circuits and the use of the 23DAP4 picture tube.

SERVICE NOTES

CHASSIS REMOVAL HINTS

Removing the cabinet bottom allows complete access to the under side of the chassis.

To completely remove chassis, remove the four chassis mounting screws. Remove tuner bracket, volume control bracket and brightness-contrast-vertical hold bracket from the bezel. The high voltage connection socket and yoke should then be removed from the picture tube. A substitute speaker and

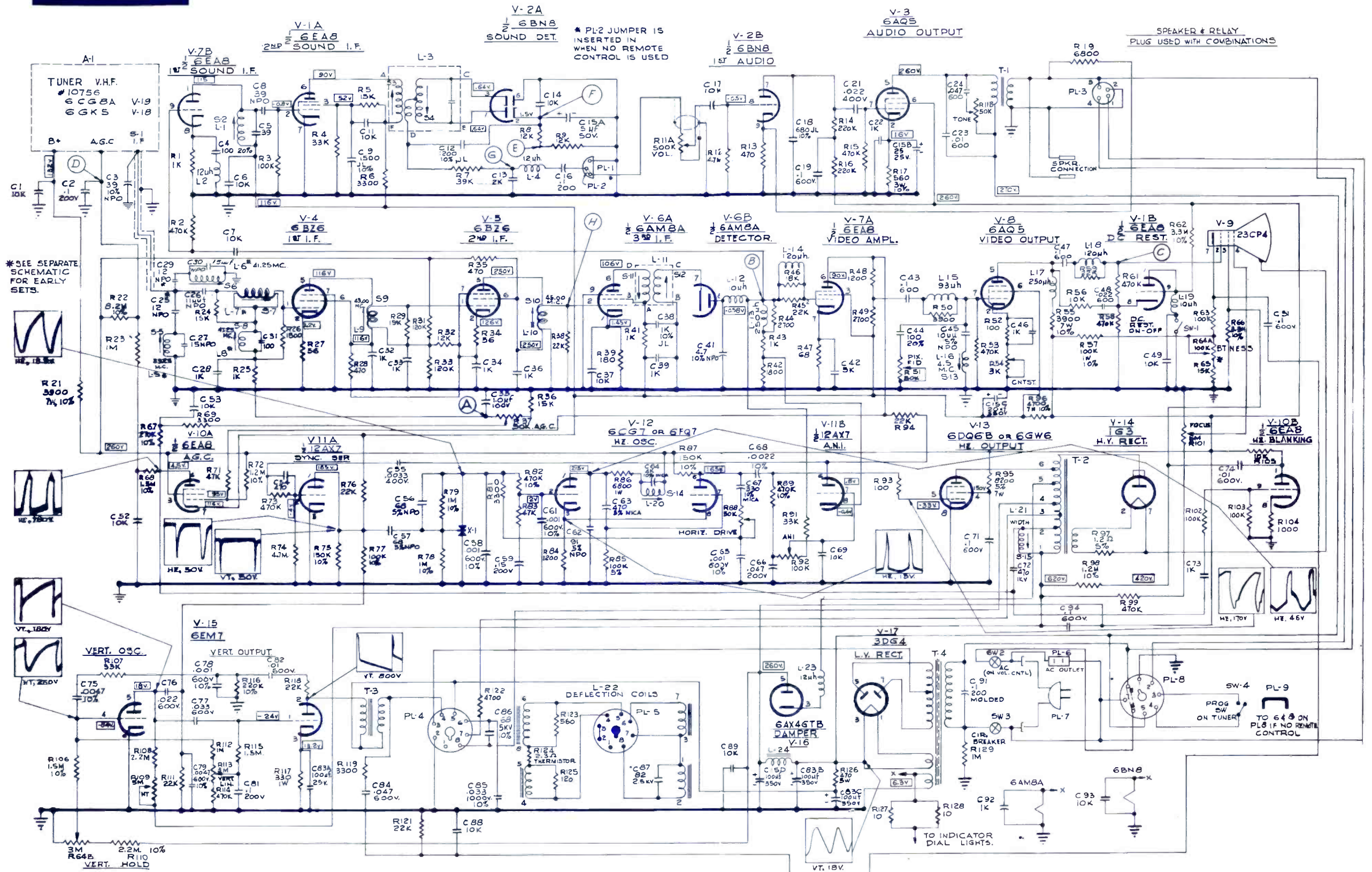
picture tube can be used for bench testing.

SERVICE ADJUSTMENTS

Horizontal size is adjusted by varying the position of the core in the size coil, L-504. It is located between the horizontal module, E-504, and the horizontal oscillator tube, V-10. For information on all other adjustments, refer to the TS-449 manual, Part No. 68P65110A55.

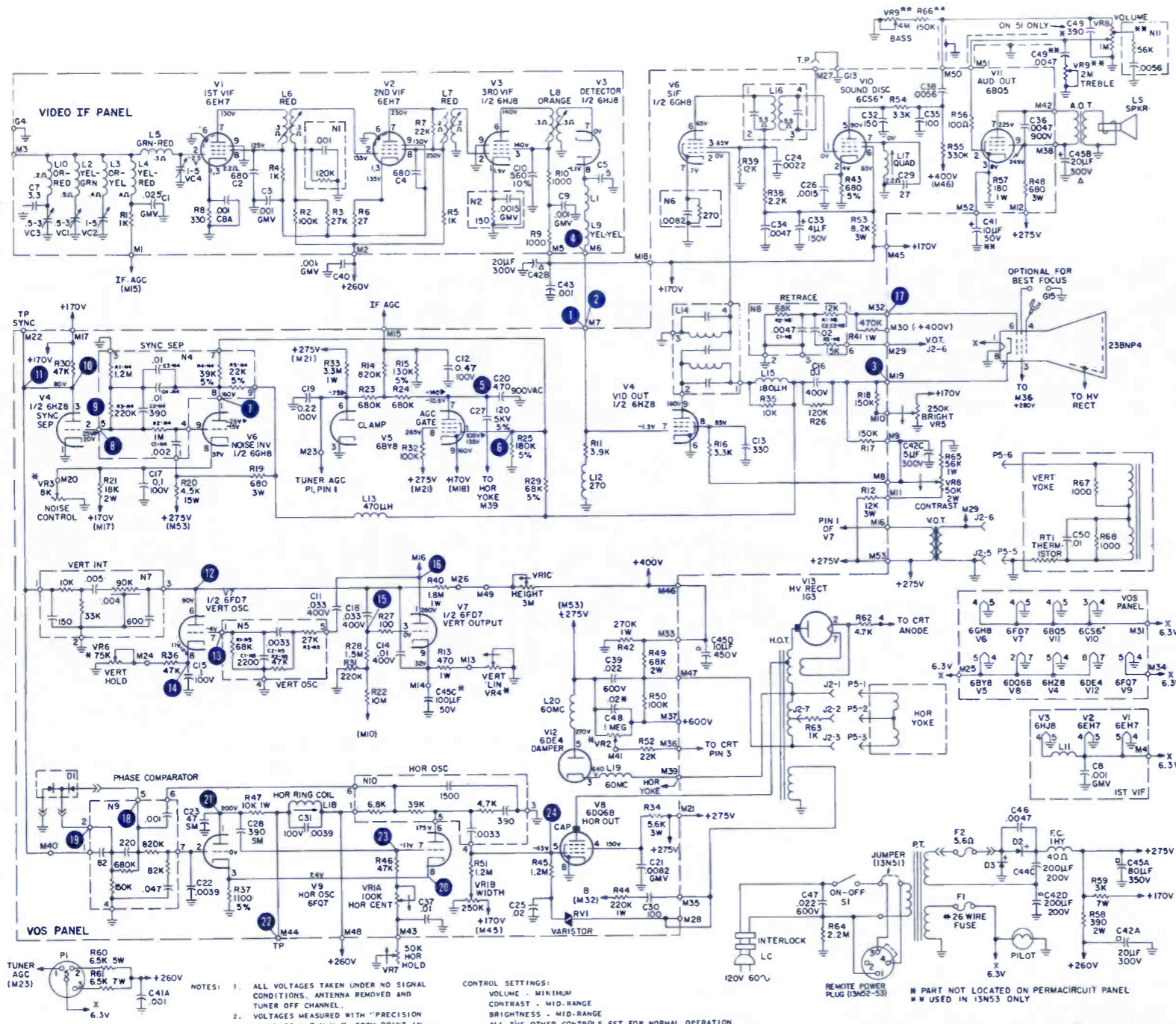
**PACKARD
BELL**
TV Chassis
Model 23DC16

ELECTRONIC TECHNICIAN TEKFAK



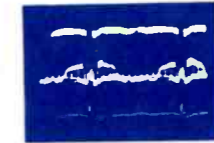
ELECTRONIC TECHNICIAN TEKFA~~X~~

PHILCO
TV Chassis
13N51, 52, 53



OSCILLOSCOPE WAVEFORM PATTERNS

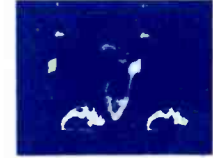
These waveforms were taken with the receiver adjusted for an approximate peak-to-peak output of 5 volts at the video detector. Voltage readings taken with raster just filling screen and all controls set for normal picture viewing. The voltages given are approximate peak-to-peak values. The frequencies shown are those of the waveforms—not the sweep rate of the oscilloscope. All readings were taken with a Model ES-550B Precision oscilloscope.



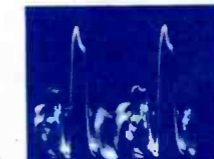
1 5 volts P/P, 60 C. P. S. - maximum contrast



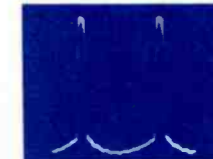
2 5 volts P/P, 15,750 C. P. S. - maximum contrast



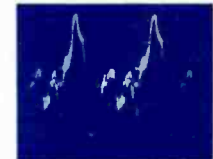
3 150 volts P/P, 60 C. P. S.



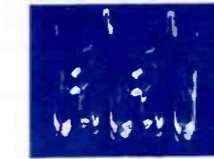
4 5 volts P/P, 15,750 C. P. S.



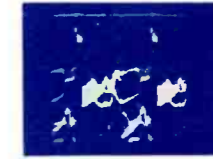
5 700 volts P/P, 15,750 C. P. S.



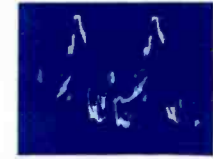
6 100 volts P/P, 15,750 C. P. S.



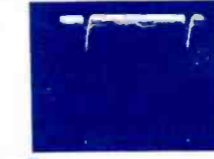
7 100 volts P/P, 15,750 C. P. S.



8 70 volts P/P, 60 C. P. S.



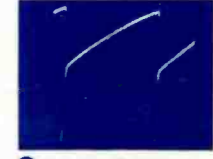
9 70 volts P/P, 15,750 C. P. S.



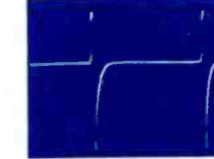
10 50 volts P/P, 60 C. P. S.



11 50 volts P/P, 15,750 C. P. S.



12 105 volts P/P, 60 C. P. S.



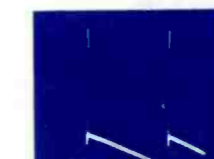
13 90 volts P/P, 60 C. P. S.



14 23 volts P/P, 60 C. P. S.



15 100 volts P/P, 60 C. P. S.



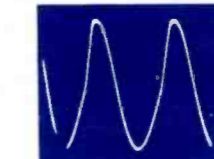
16 700 volts P/P total, 250 volts P/P sawtooth, 60 C. P. S.



17 60 volts P/P, 60 C. P. S.



18 7.5 volts P/P, 15,750 C. P. S.



19 12 volts P/P, 15,750 C. P. S.



20 17 volts P/P, 15,750 C. P. S.



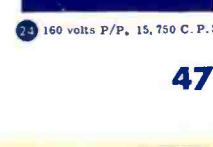
21 52 volts P/P, 15,750 C. P. S.



22 23 volts P/P, 15,750 C. P. S.



23 42 volts P/P, 15,750 C. P. S.



24 160 volts P/P, 15,750 C. P. S.

PHILCO
TV Chassis
13N51, 52, 53

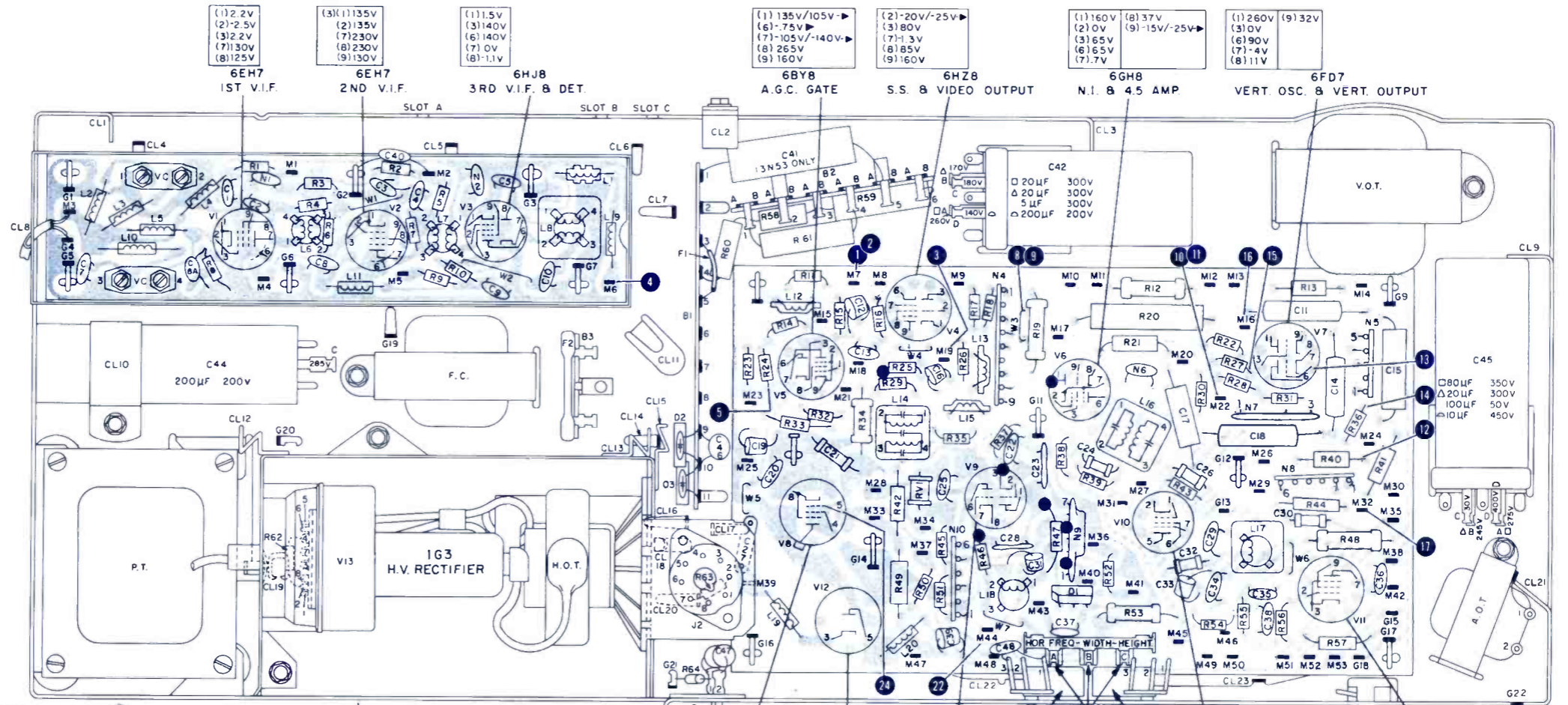
PANEL LUG CONNECTIONS
(13N51, 13N52 and 13N53)

VIF Panel

- M1 Lead to M51
- M2 Lead to B2-1B
- M3 IF Output
- M4 Lead to B1-3
- M5 Lead to B2-6A
- M6 Lead to M7

VOS Panel

- M7 Lead to M6
- M8 Lead to VR8, contrast cont.
- M9 Lead to filter C42-C
- M10 Lead to VR5, bright. cont.
- M11 Lead to VR8, contrast cont.
- M12 Lead to B2-3B
- M13 Lead to VR4, vert. lin. cont.
- M14 Lead to filter C45-C
- M15 Lead to M1
- M16 Lead to W. O. T.
- M17 Lead to M18
- M18 Lead to B2-6A
- M19 Lead to CRT, Pin 7
- M20 Lead to VR3, noise cont.
- M21 Lead to B2-3A
- M22 Lead to filter C45-D
- M23 Lead to tuner pwr. plug, Pin 1
- M24 Lead to VR6, vert. hold cont.
- M25 Lead to B1-3 and M34
- M26 Lead to M49
- M27 Lead to ground lug G13
- M28 Lead to M35 and H. O. T., Pin 1
- M29 Lead to vert. yoke plug, J2-6
- M30 Lead to filter C45-D and M46
- M31 Lead to B1-3
- M32 Lead to CRT, Pin 6
- M33 Lead to M46
- M34 Lead to M25
- M35 Lead to M28
- M36 Lead to CRT, Pin 3
- M37 Lead to VR2, G2 cont.
- M38 Lead to C45-B
- M39 Lead to H. O. T., Pin 5
- M40 Lead to M22
- M41 Lead to VR2, G2 cont.
- M42 Lead to filter C45-B
- M43 Lead to VR7, horz. hold cont.
- M44 Horz. ring coil TP
- M45 Lead to filter C42-A
- M46 Lead to M30
- M47 Lead to H. O. T., Pin 7
- M48 Lead to B2-1A
- M49 Lead to M46
- M50 Lead to VR9, tone cont. (13N53 only)
- M51 Lead to VR8, vol. cont.
- M52 TP, Pin 3, 6BQ5 (13N53 only)
- M53 Lead to filter C45-A and VR2-1



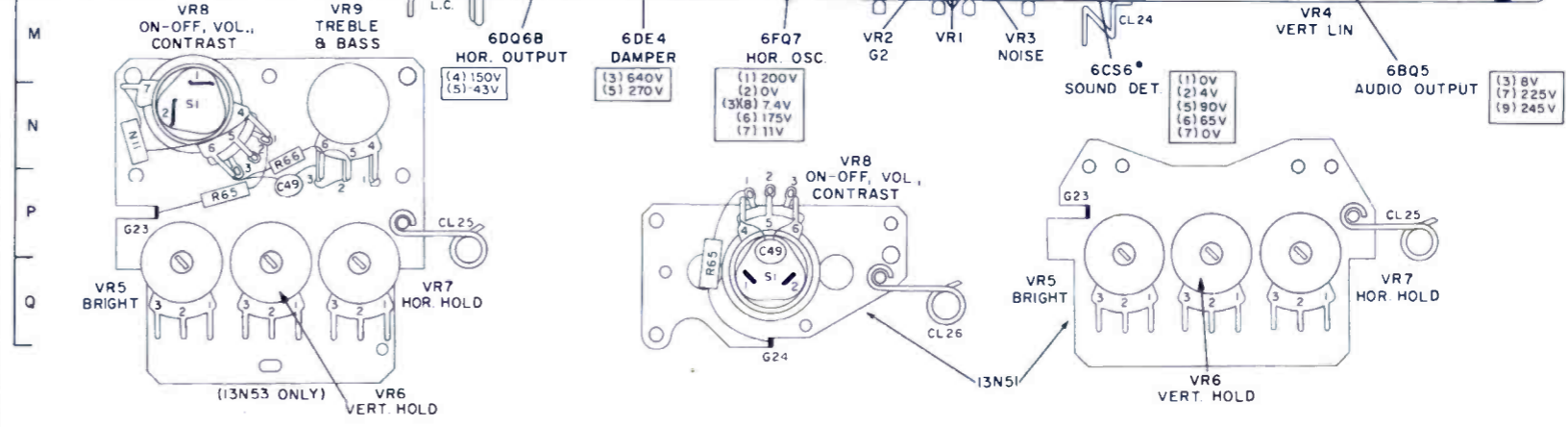
SCOPE WAVEFORM TEST POINTS ARE INDICATED BY ①, ②, ETC.
NOTE: THE SOLID BLACK DOTS INDICATE ADDITIONAL SCOPE WAVEFORM TEST POINTS. THE POINTS THUS INDICATED ARE: ④ - END OF R25, ⑦ - PIN 1-6GH8, ⑩ - PIN 3-6FQ7, ⑫ - END OF R47, ⑬ - END OF R46, ⑮ - PIN 5-N9, ⑰ - PIN 2-N9.

LEGEND FOR CODED VOS PERMACIRCUIT PANEL

- HORIZONTAL CIRCUITS
- SOUND IF DETECTOR AND AUDIO CIRCUITS
- VIDEO AND AGC CIRCUITS
- VERTICAL CIRCUITS
- SYNC SEPARATOR AND NOISE INVERTER CIRCUITS

RESISTANCE CHART

TUBE	USE	1	2	3	4	5	6	7	8	9
V1 6EH7	1st Video IF	230Ω	125KΩ	230KΩ	PH.	PH.	0Ω	8.3KΩ	8.3KΩ	0Ω
V2 6EH7	2nd Video IF	83KΩ	55KΩ	83KΩ	PH.	PH.	0Ω	10KΩ	10KΩ	8.3KΩ
V3 6HJ8	3rd Video IF and 2nd Det.	150Ω	0.2Ω	10KΩ	PH.	PH.	10KΩ	0.2Ω	3.9KΩ	0Ω
V4 6HJ8	Video Out. and Sync Sep.	0Ω	1.5 megΩ	25KΩ	PH.	PH.	0Ω	3.9KΩ	28KΩ	12KΩ
V5 6BY8	AGC gate and clamp	40KΩ	10KΩ	0Ω	PH.	PH.	1 megΩ	1.2 megΩ	100KΩ	10KΩ
V6 6GH8	Noise inverter and 4.5 MC amp.	30KΩ	6Ω	8KΩ	PH.	PH.	8KΩ	27Ω	4.5KΩ	2.2 megΩ
V7 6FD7	Vert. Osc. and Vert. Amp.	10KΩ		1.8 megΩ	PH.	PH.	3.9 megΩ	70KΩ	88KΩ	1KΩ
V8 6DQ6B	Horiz. Output			PH.			10KΩ	1.1 megΩ		0Ω
V9 6FQ7	Horiz. Osc.	20KΩ	1.4 megΩ	1.1KΩ	PH.	PH.	50KΩ	100KΩ	1.1KΩ	
V10 6CS6	Sound Disc	5Ω	680Ω	PH.	PH.	500KΩ	10KΩ	3Ω		
V11 6BQ5	Audio Output		110Ω	180Ω	PH.	PH.		10KΩ		10KΩ
V12 6DE4	Damper			60KΩ			14KΩ	PH.	PH.	

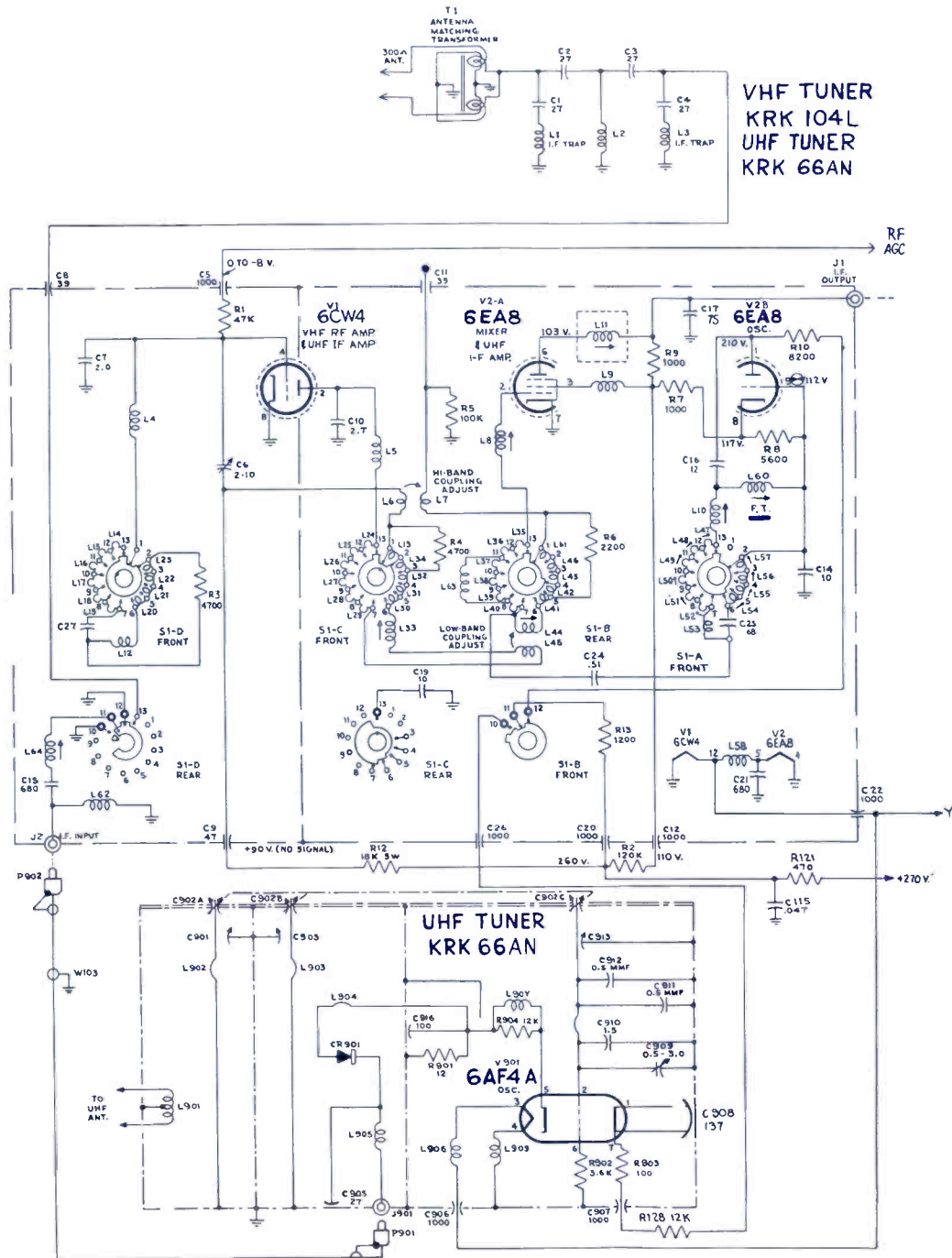


ELECTRONIC TECHNICIAN TEKFAX

RCA
TV Chassis
KCS147A & B

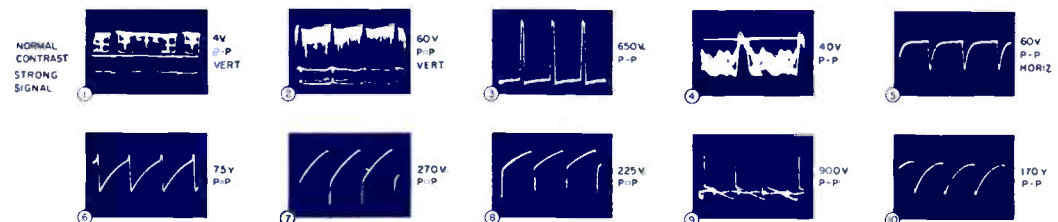
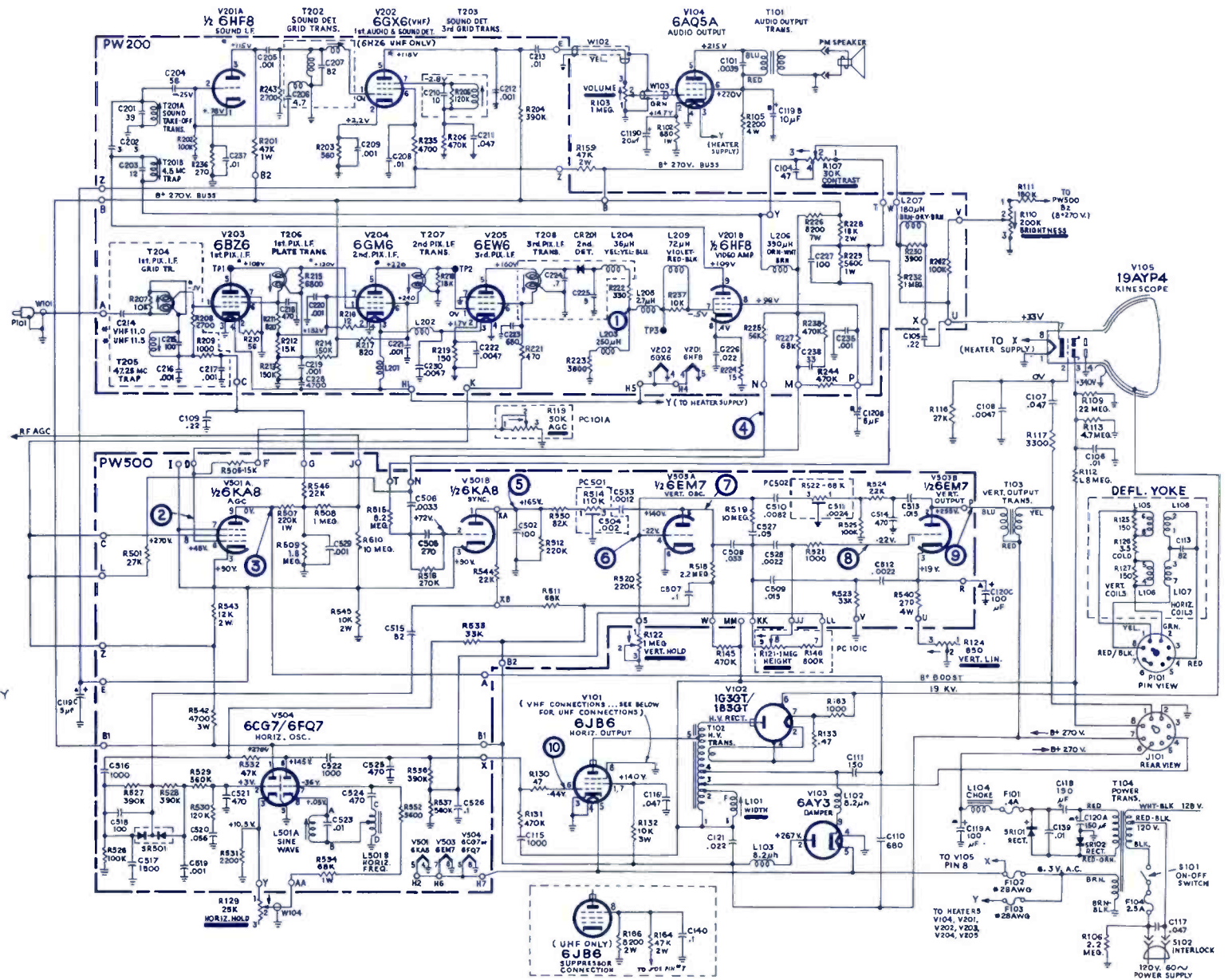
Balloons ①, ②, etc., shown on schematic indicate points of observation of the waveforms shown below the schematic.

RESISTANCE VALUES IN OHMS, K=1000.
CAPACITANCE VALUES LESS THAN 1 IN MF.
1 AND ABOVE IN MMF.
UNLESS OTHERWISE INDICATED.
DIRECTION OF ARROWS AT CONTROLS
INDICATES CLOCKWISE ROTATION.
VOLTAGES MEASURED WITH "VOLTOHMYST" B
WITH NO SIGNAL INPUT AND SHOULD HOLD
WITHIN 330% WITH 120V AC SUPPLY.

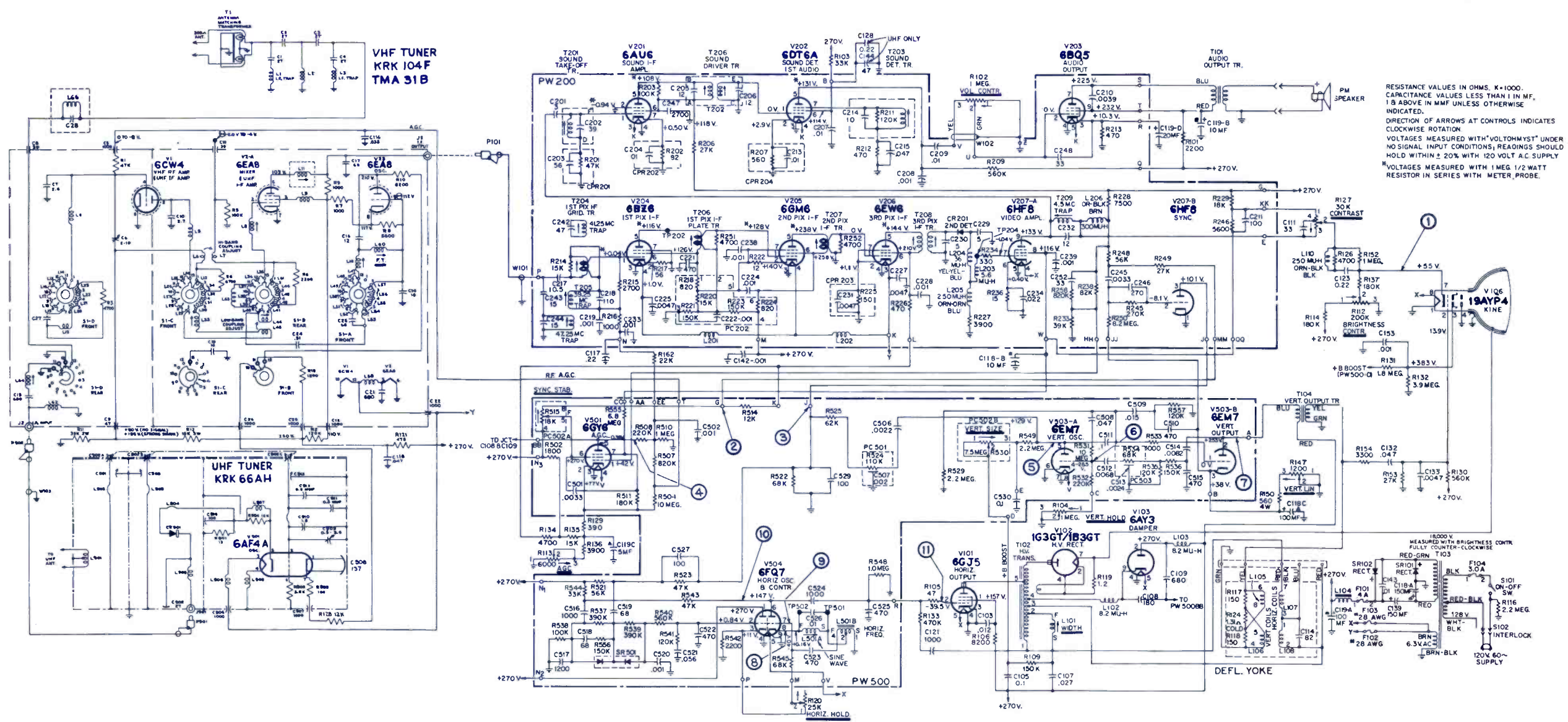


CHANNEL SELECTOR SWITCH NOTES:

- FRONT AND REAR SECTIONS OF SWITCH S1-A, -B, -C AND -D, ARE VIEWED FROM FRONT WITH THE CONTROL SHAFT IN CHANNEL 13 POSITION.
 - BLACK DOT IN SWITCH ROTOR SEGMENT INDICATES THRU CONNECTION.
 - INDICATES THRU CONNECTION FROM FRONT TO REAR OF SWITCH TERMINALS.
 - ⊙ INDICATES CONTACTS INSULATED - NOT CONNECTED FROM FRONT TO REAR OF SWITCH.
- ⊕ USE 100K ISOLATION RESISTOR IN SERIES WITH PROBE.



RCA
 TV Chassis KCS 140A, B
 Models 193-A-542-MV, MU,
 -546-VM, MU-549-MV, -MU



RESISTANCE VALUES IN OHMS. K=1000.
 CAPACITANCE VALUES LESS THAN 1 IN MF,
 1 μ ABOVE IN MMF UNLESS OTHERWISE
 INDICATED.
 DIRECTION OF ARROWS AT CONTROLS INDICATES
 CLOCKWISE ROTATION.
 VOLTAGES MEASURED WITH "VOLT OHM YST" UNDER
 NO SIGNAL INPUT CONDITIONS; READINGS SHOULD
 HOLD WITHIN ± 20% WITH 120 VOLT A.C. SUPPLY
 *VOLTAGES MEASURED WITH 1 MEG. 1/2 WATT
 RESISTOR IN SERIES WITH METER PROBE.

REFER TO PAGE TWO FOR
 CHASSIS/TUNER/MODEL
 CROSS-REFERENCE
 INFORMATION

All resistance values in ohms. K = 1000.
 All capacitance values less than 1 in F and
 above 1 in MF unless otherwise noted.
 Directions of arrows at controls indicates
 clockwise rotation.

All voltages measured with "VoltOhmyst"
 and with no signal input. Voltages should
 hold within ±20% with 120 volts a.c.
 supply.
 *Measured with 1 megohm, 1/2 watt res-
 istor in series with meter probe.
 Balloons ①, ②, etc., shown on schematics
 indicate points of observation of the wave-
 forms shown below the schematic.

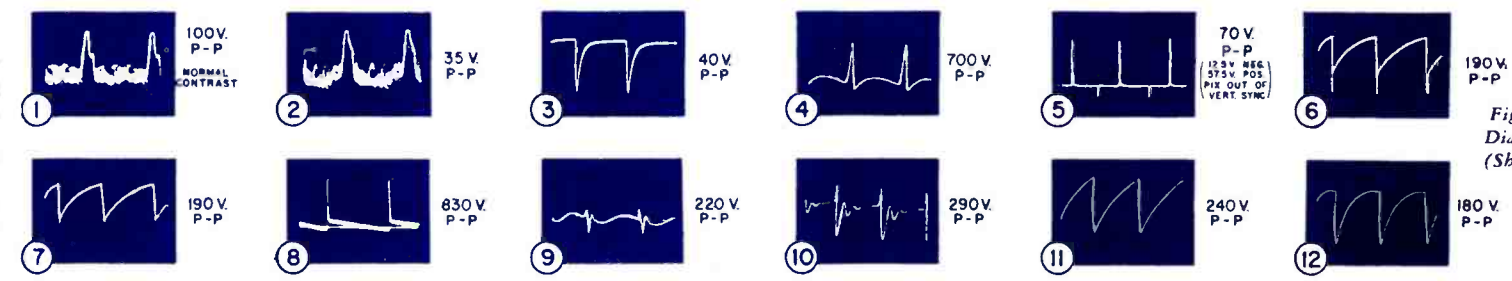
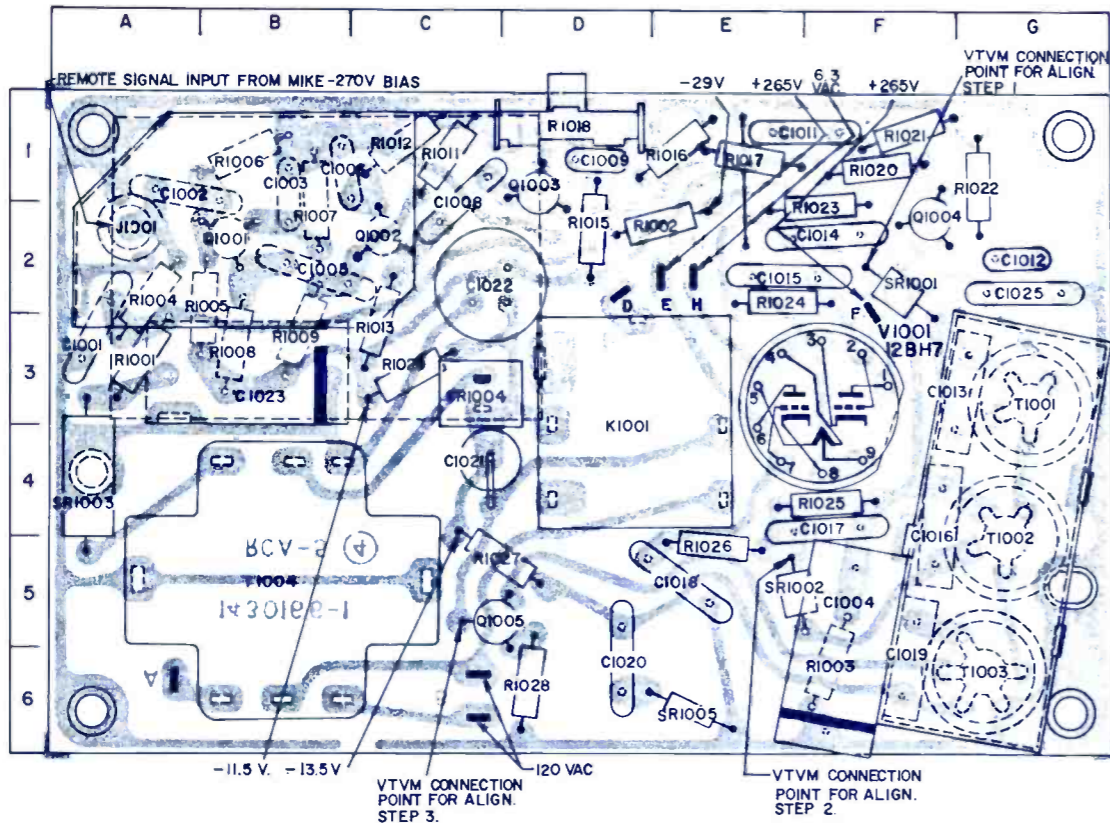


Figure 17—Circuit Schematic Diagram for Chassis 140A & B (Shown with KRK104F/66AH Tuners)

PW900 SECURITY SEALED CIRCUIT ASSEMBLY



PW900 COMPONENT LOCATION GUIDE

C1001 A3	C1013 F3	C1023 B3	Q1004 F2	R1008 B3	R1021 F1	SR1001 F2
C1002 A2	C1014 F2	C1025 G2	Q1005 C5	R1009 B3	R1022 G1	SR1002 E5
C1003 B1	C1015 E2	J1001 A2	R1001 A3	R1011 C1	R1023 F1	SR1003 A4
C1004 F5	C1016 F4	K1001 D4	R1002 D2	R1012 C1	R1024 E2	SR1004 C3
C1005 B2	C1017 F5		R1003 F5	R1013 C3	R1025 F4	SR1005 E6
C1006 B1	C1018 D5		R1004 A2	R1015 D2	R1026 E4	
C1008 C1	C1019 F5		R1005 A2	R1016 E1	R1027 C5	T1001 G3
C1009 D1	C1020 D6	Q1001 B2	R1006 B1	R1017 E1	R1028 D6	T1002 G4
C1011 E1	C1021 C4	Q1002 C2	R1007 B1	R1018 D1	R1029 C3	T1003 G6
C1012 G2	C1022 C2	Q1003 D1	R1007 B1	R1020 F1		T1004 B5

KRS26A REMOTE CONTROL AMPLIFIER ALIGNMENT

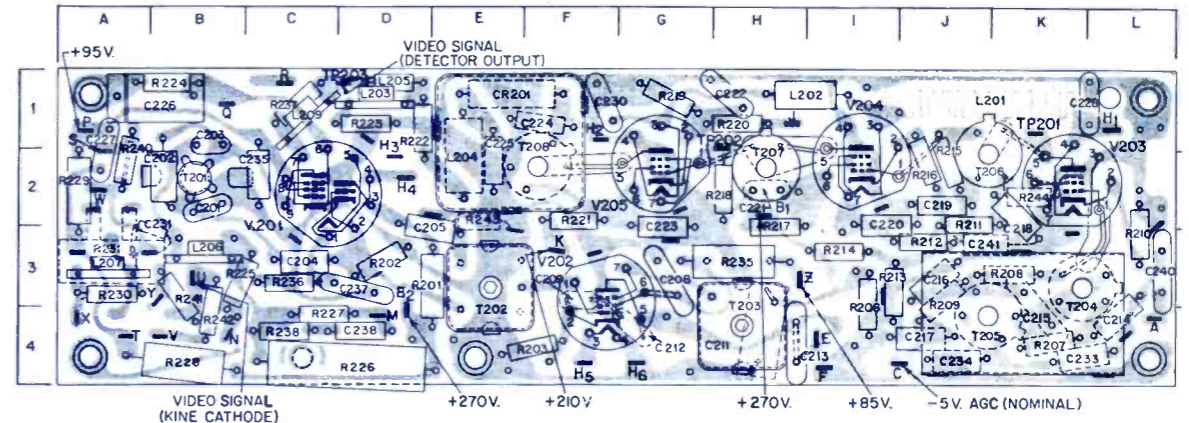
- SIGNAL SOURCE** A CRK1A transmitter, checked for accuracy and proper operation, is recommended as a signal standard to be used in aligning the amplifier. (Transmitters used as standards should be checked frequently against a crystal standard or several amplifiers known to be operating properly.)
- TRANSMITTER** The transmitter standard should be operated at a distance of approximately four feet from the amplifier to prevent excessive pick-up when the amplifier is finally peaked.
- VACUUM TUBE VOLTMETER** Connect meter to junction of SR1001 and R1023.
- MISCELLANEOUS** When depressing the function button on the transmitter, depress the button fully and hold depressed as amplifier adjustment is made. Refer to Fig. 15 below for adjustment locations.

STEP	TRANSMITTER FREQUENCY	TRANSMITTER FUNCTION	ADJUST
1	Adjust 43.25 kc. coil	43.25 kc.	Depress "OFF" button
			T1001 for maximum dip on meter.
	Move meter to junction of SR1002 and R1025.		
2	Adjust 39.50 kc. coil	39.50 kc.	Depress left side "Volume" button
			T1002 for maximum dip on meter.
	Move meter to junction of C1021 and Q1005 collector (black dot)		
3	Adjust 35.75 kc. coil	35.75 kc.	Depress left side "tint" button
			T1003 for maximum dip on meter.

Note: Sensitivity control R1018 is preset at the factory and should not be adjusted unless one of the transistor amplifiers (Q1001 through Q1005) is replaced. To perform this adjustment, when necessary, inject a weak signal from the transmitter (approximately 10 uv.) and adjust R1018 for 20 ma. plate current in the weakest section of the 12BH7A tube, V1001.

RCA
TV Chassis
KCS 136Y series

PW200 SECURITY SEALED CIRCUIT ASSEMBLY

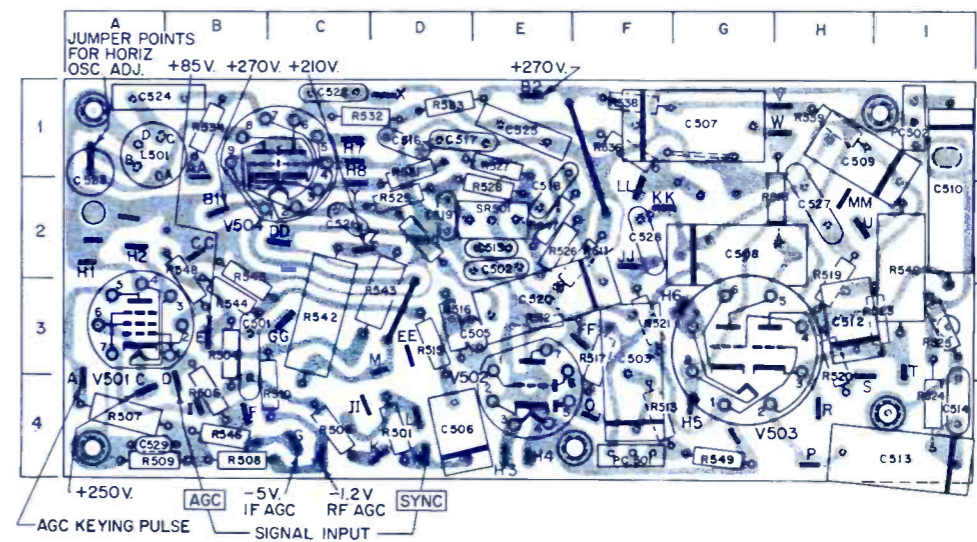


PW200 COMPONENT LOCATION GUIDE

C201 B2	C216 J3	C228 L1	L201 J1	R207 K4	R218 H2	R230 A3	T201 B2
C202 B2	C217 J4	C230 F1	L202 I1	R208 K3	R219 G1	R231 A3	T202 E3
C203 B1	C218 K2	C231 B3	L203 D1	R209 J3	R220 H1	R235 H3	T203 H4
C204 C3	C219 H2	C233 L4	L204 E2	R210 L3	R221 F2	R236 C3	T204 K3
C205 D2	C220 I2	C234 J4	L205 D1	R211 J2	R222 D1	R237 C1	T205 K4
C208 G3	C221 H2	C235 C2	L206 B3	R212 J3	R223 D1	R238 C4	T206 K2
C209 F3	C222 H1	C237 D3	L207 A3	R213 J3	R224 B1	R240 A2	T207 H2
C211 H4	C223 G2	C238 D4	L209 C1	R214 J3	R225 B3	R241 B3	T208 F2
C212 G4	C224 F1	C240 L3	L209 C1	R215 J2	R226 D4	R242 B4	
C213 H4	C225 E2	C241 J3	R201 E3	R216 J2	R227 C4	R243 E2	
C214 L4	C226 B1	CR201 E1	R202 D3	R217 H3	R228 B4	R244 K2	
C215 K4	C227 A1		R203 F4		R229 A2		

(In chassis with auto-brightness; omitted in chassis without auto-brightness.)

PW500 SECURITY SEALED CIRCUIT ASSEMBLY



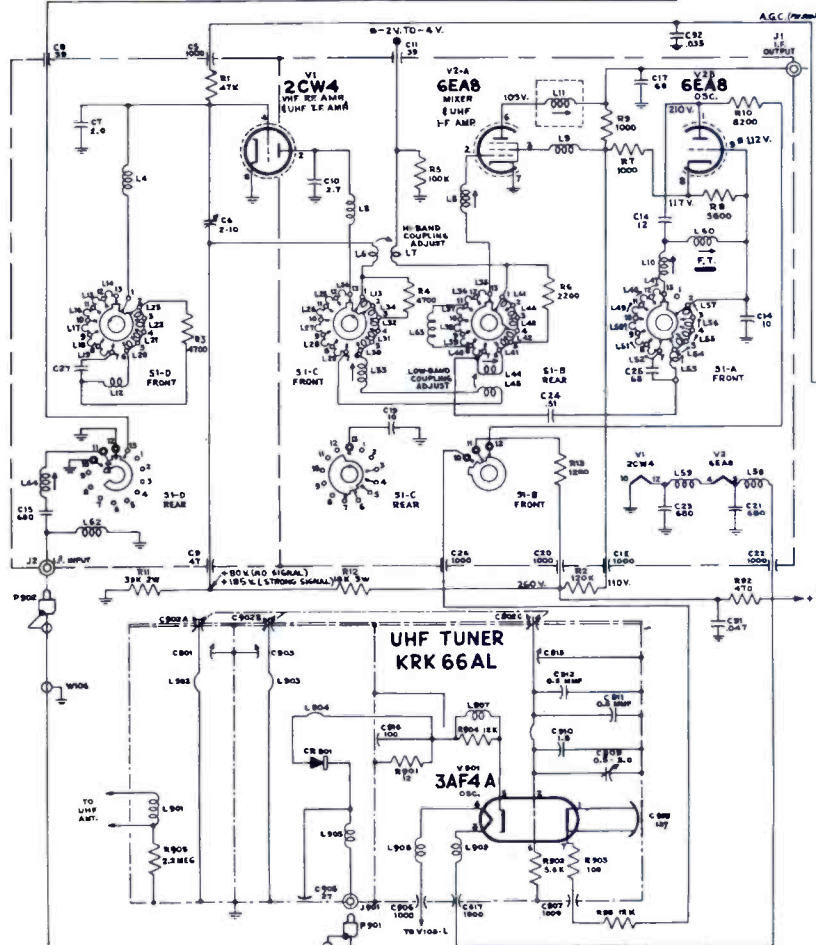
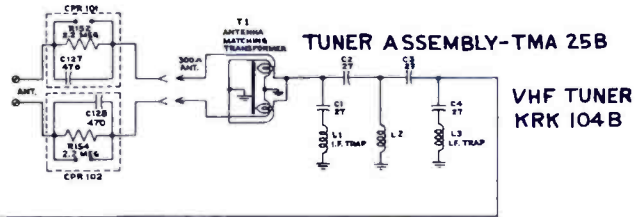
PW500 COMPONENT LOCATION GUIDE

C501 B3	C513 I4	C523 A1	PC502 I1	R511 F2	R523 I3	R533 D1	R546 B4
C502 E2	C514 I4	C524 A1	R501 D4	R512 E3	R524 I4	R534 B1	R547 E2
C503 F3	C515 E2	C525 E1	R505 C4	R513 F4	R525 I3	R536 F1	R548 B2
C505 D3	C516 D1	C527 H2	R506 B4	R515 D3	R526 E2	R538 F1	R549 G4
C506 D4	C517 D1	C528 F2	R507 A4	R516 D3	R527 E1	R539 H1	
C507 G1	C518 E2	C529 A4	R508 B4	R517 F3	R528 E2	R540 I2	SR501 E2
C508 G2	C519 D2		R509 A4	R518 H2	R529 D2	R542 C3	
C509 H1	C520 E3	L501 A1	R507 A4	R519 H2	R530 D2	R543 D3	
C510 I2	C521 C2	PC501 F4	R509 A4	R520 H3	R531 D1	R544 B3	
C512 H3	C522 C1		R510 C4	R521 F3	R532 C1	R545 B2	

(In chassis without auto-brightness; omitted in chassis with auto-brightness.)

RCA
TV Chassis
KCS 137
and 138

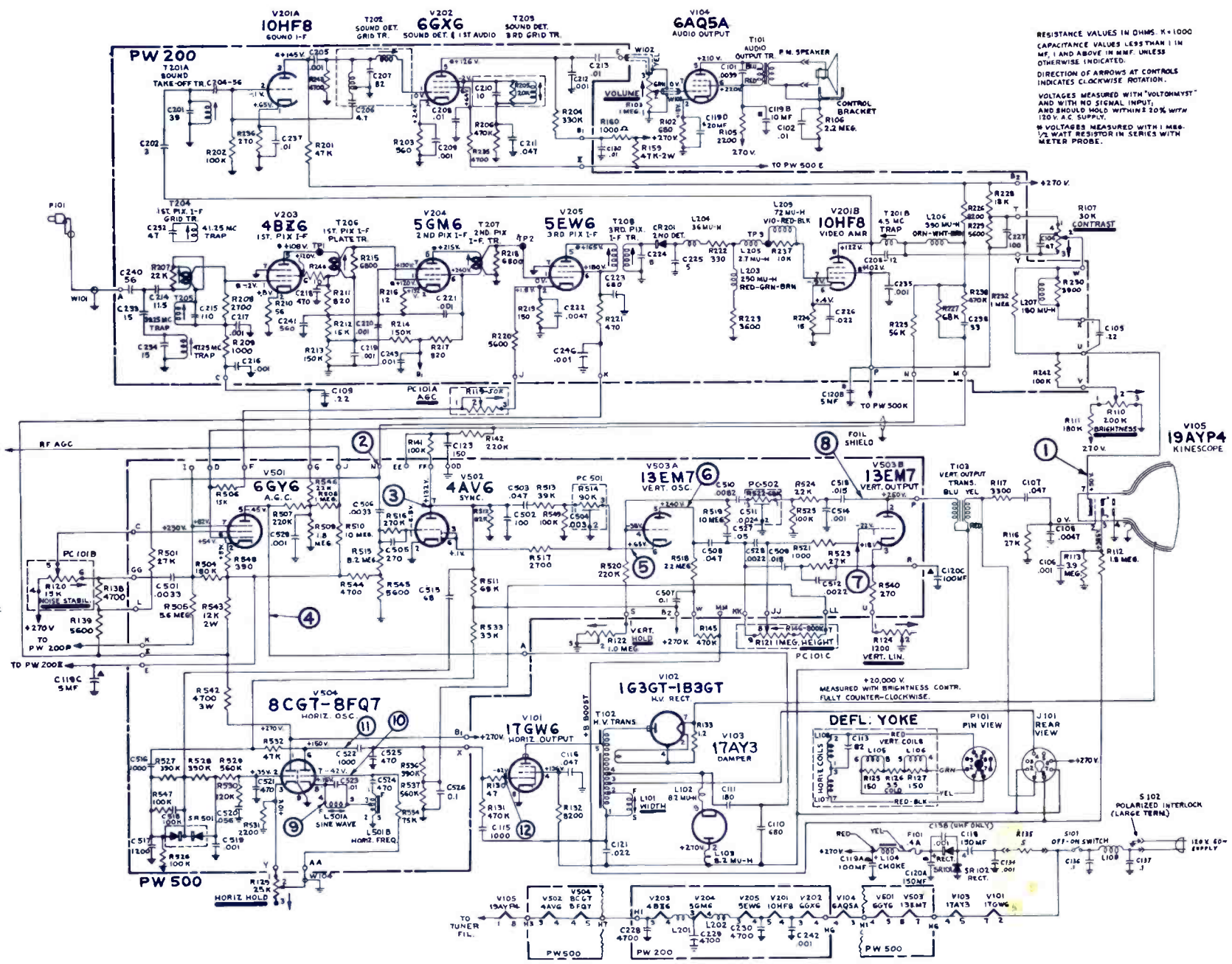
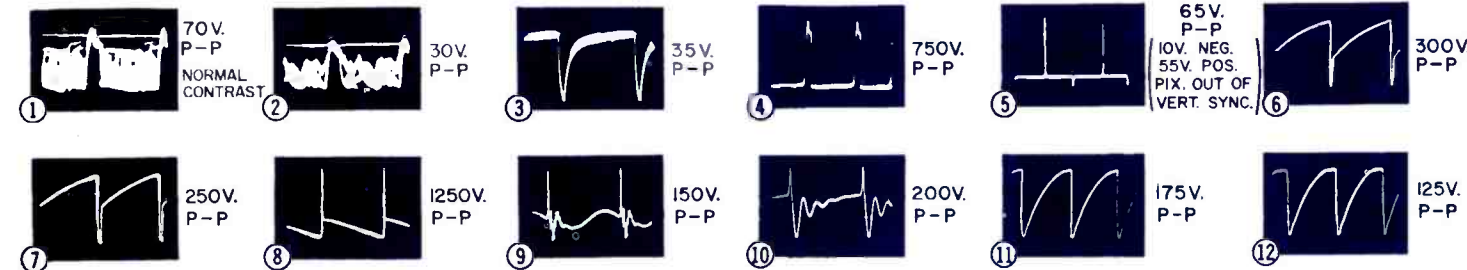
ELECTRONIC TECHNICIAN TEKFAK



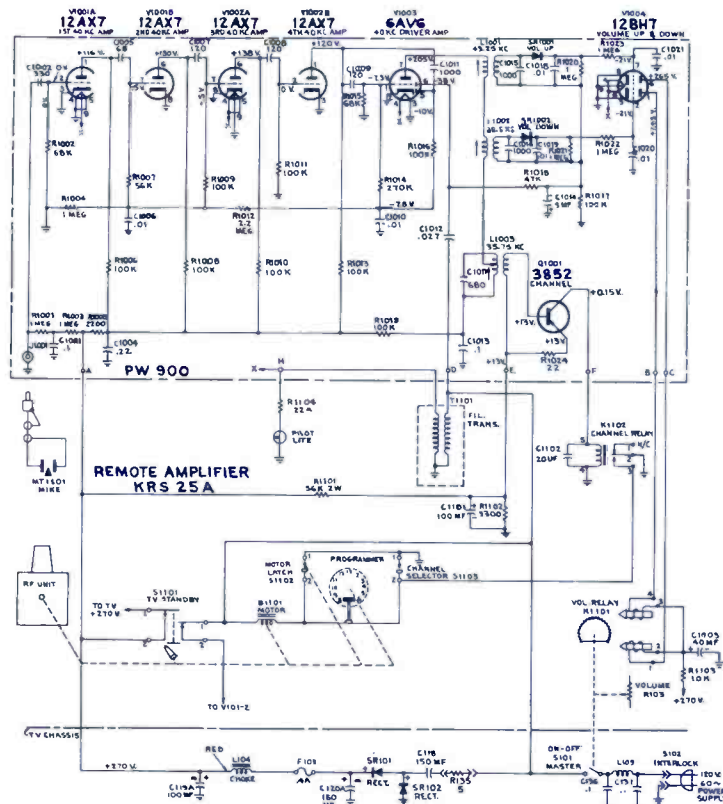
CHANNEL SELECTOR SWITCH NOTES:

- FRONT AND REAR SECTIONS OF SWITCH S1-A, B, C AND D, ARE VIEWED FROM FRONT WITH THE CONTROL SWAFT IN CHANNEL 13 POSITION.
- INDICATES THRU CONNECTION FROM FRONT TO REAR OF SWITCH.
- INDICATES CONTACTS INSULATED-NOT CONNECTED FROM FRONT TO REAR OF SWITCH.

USE 100 K OHM ISOLATION RESISTOR IN SERIES WITH PROBE.



RESISTANCE VALUES IN OHMS, K=1000
CAPACITANCE VALUES LESS THAN 1 IN MF, 1 AND ABOVE IN MMF, UNLESS OTHERWISE INDICATED.
DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.
VOLTAGES MEASURED WITH "VOLTMYST" AND WITH NO SIGNAL INPUT; AND SHOULD HOLD WITHIN ±20% WITH 120V. A.C. SUPPLY.
* VOLTAGES MEASURED WITH 1 MEG. 1/2 WATT RESISTOR IN SERIES WITH METER PROBE.



**RCA
TV Chassis
KCS 137 and 138**

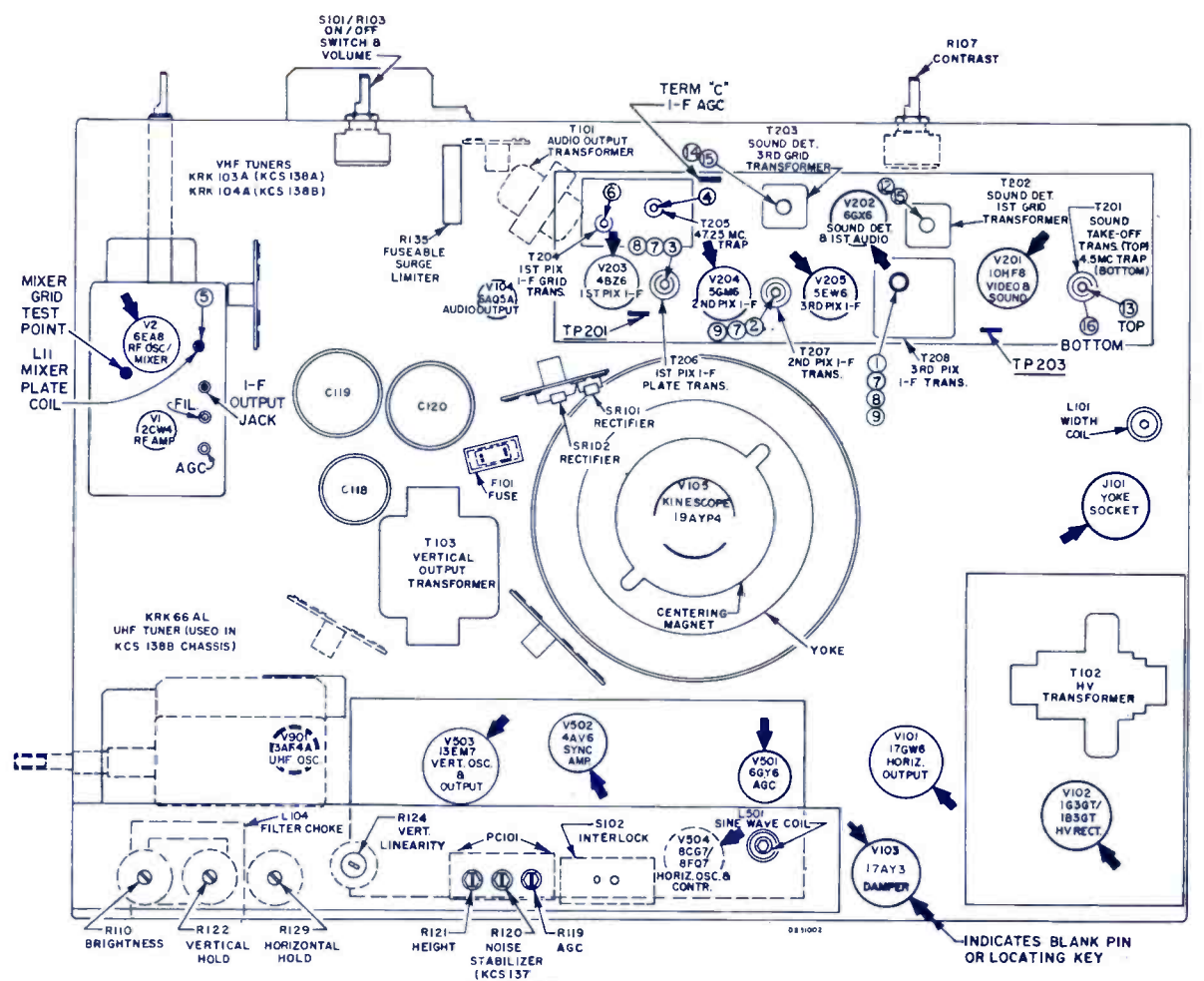
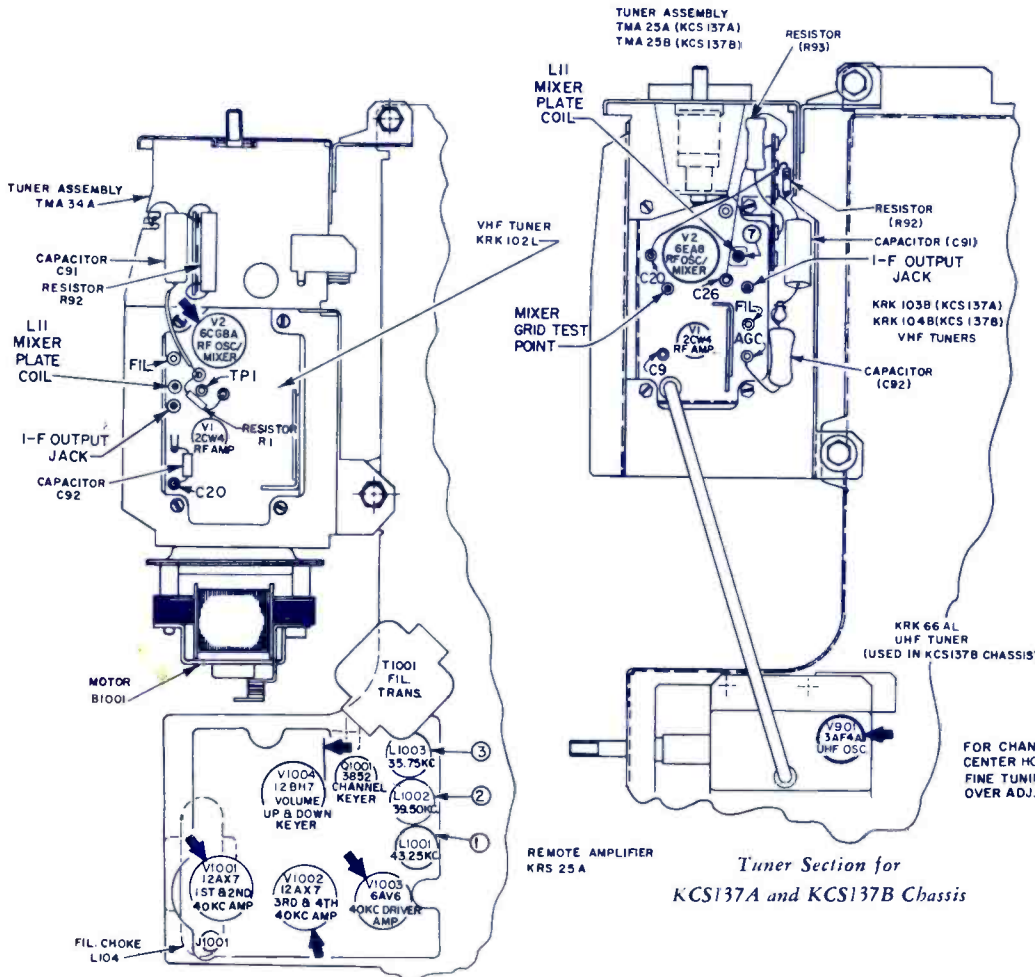
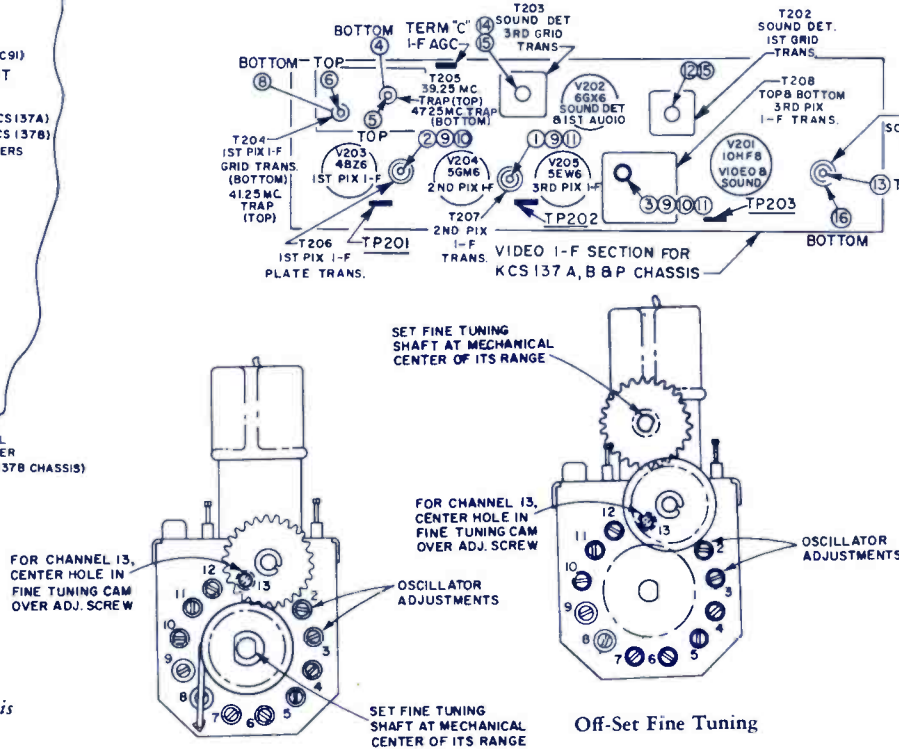


Figure 24—
Chassis Rear View
KCS137 & KCS138

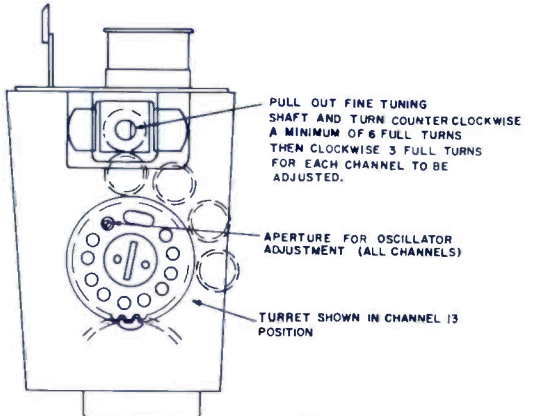


Tuner and Remote Amplifier Section
for KCS137P Chassis



Concentric Fine Tuning

Off-Set Fine Tuning



Oscillator Adjustments (One-Set Fine Tuning)

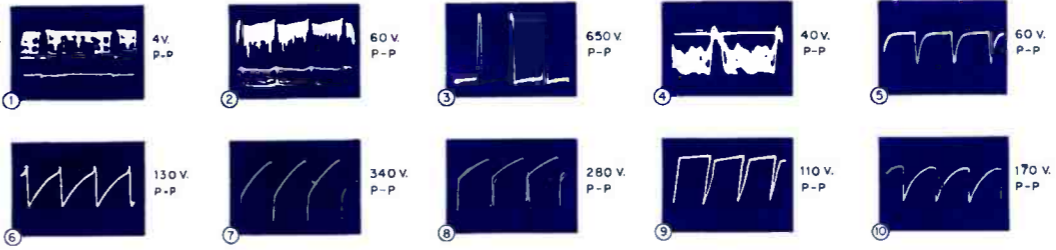
RCA

TV Chassis
Models
GTM1583A, 2583A

ELECTRONIC TECHNICIAN

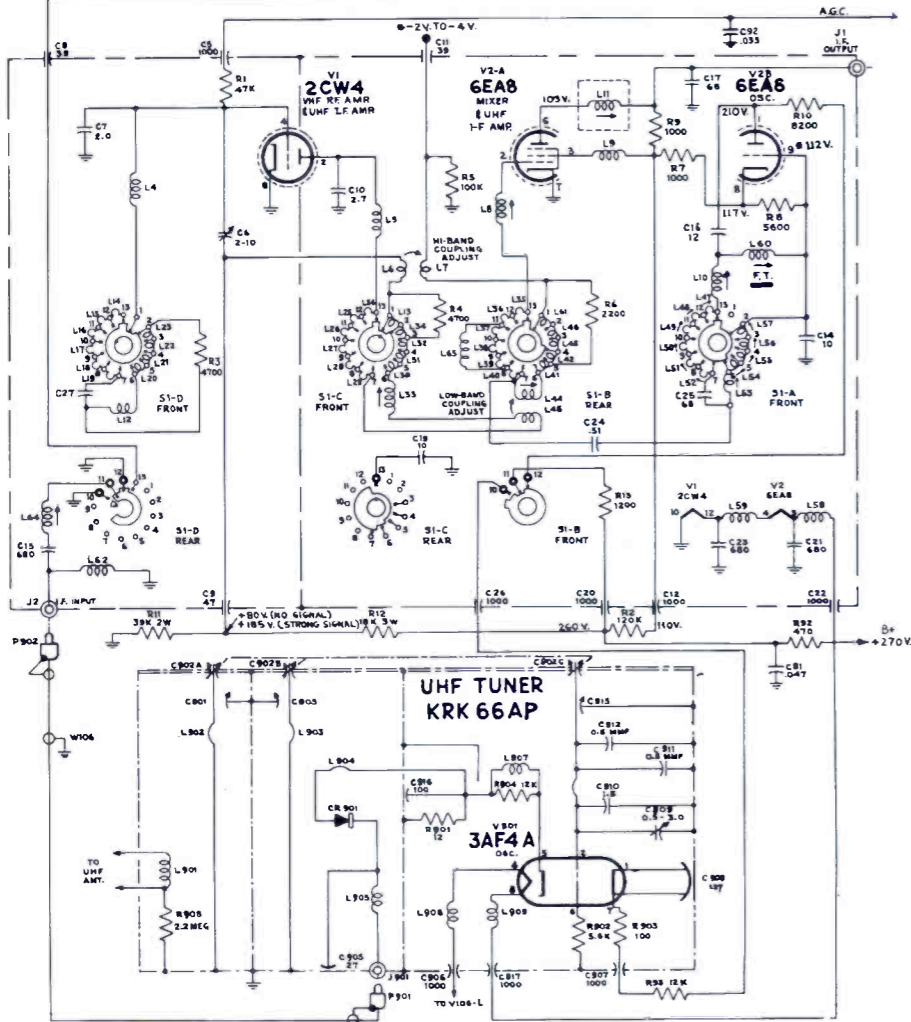
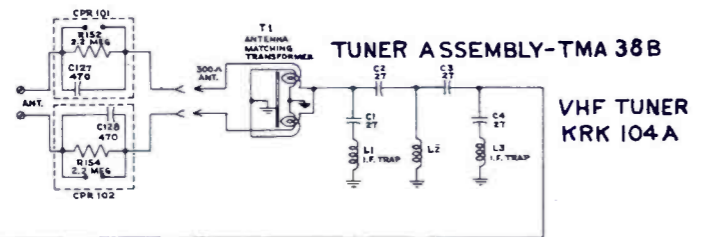
TEKFA~~X~~

NORMAL
CONTRAST
STRONG
SIGNAL



CIRCUIT SCHEMATIC DIAGRAM FOR KCS143A & B CHASSIS

CIRCUIT SCHEMATIC DIAGRAM FOR
KRK104A & KRK66AP UHF/VHF TUNER

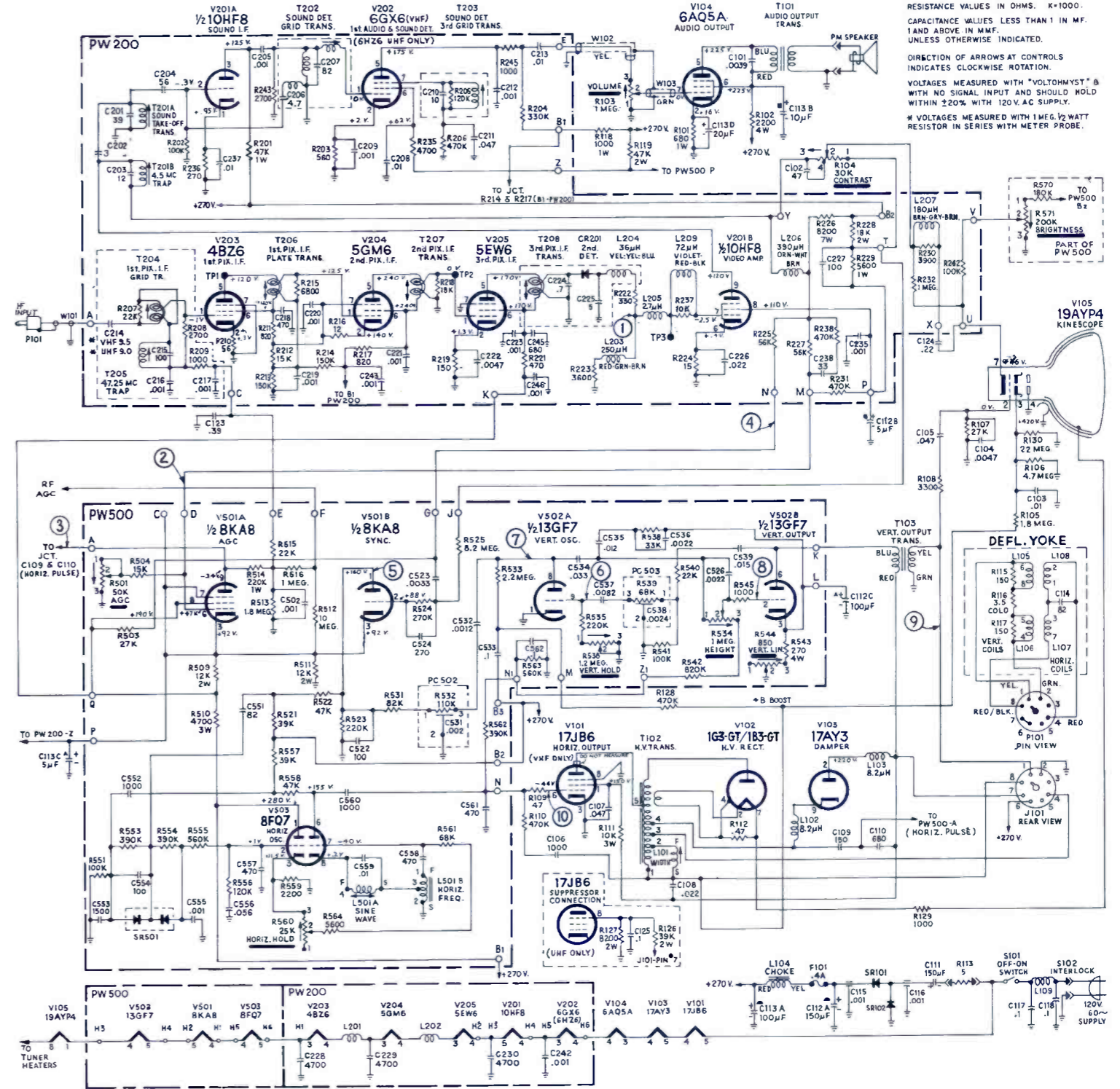


CHANNEL SELECTOR SWITCH NOTES:

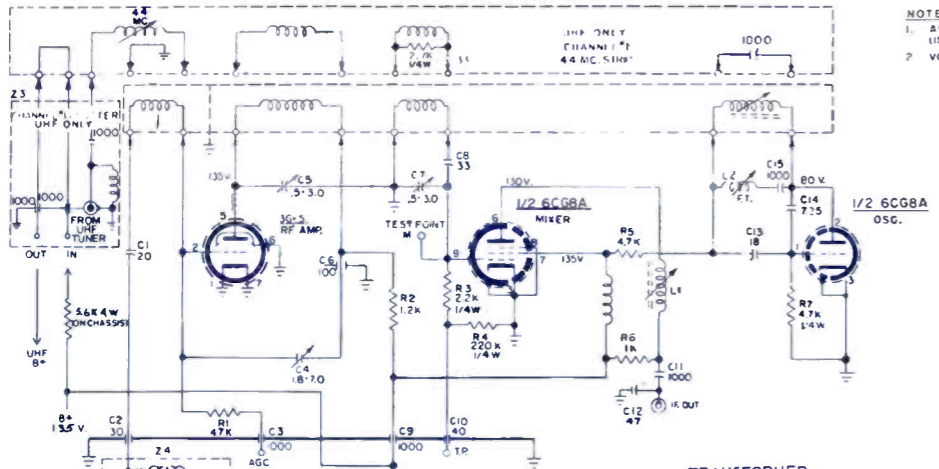
- FRONT AND REAR SECTIONS OF SWITCH S1-A, B, C AND D, ARE VIEWED FROM FRONT WITH THE CONTROL SHAFT IN CHANNEL 13 POSITION.
- INDICATES THRU CONNECTION FROM FRONT TO REAR OF SWITCH.
- INDICATES CONTACTS INSULATED-NOT CONNECTED FROM FRONT TO REAR OF SWITCH.

*USE 100 K ISOLATION RESISTOR IN SERIES WITH PROBE.

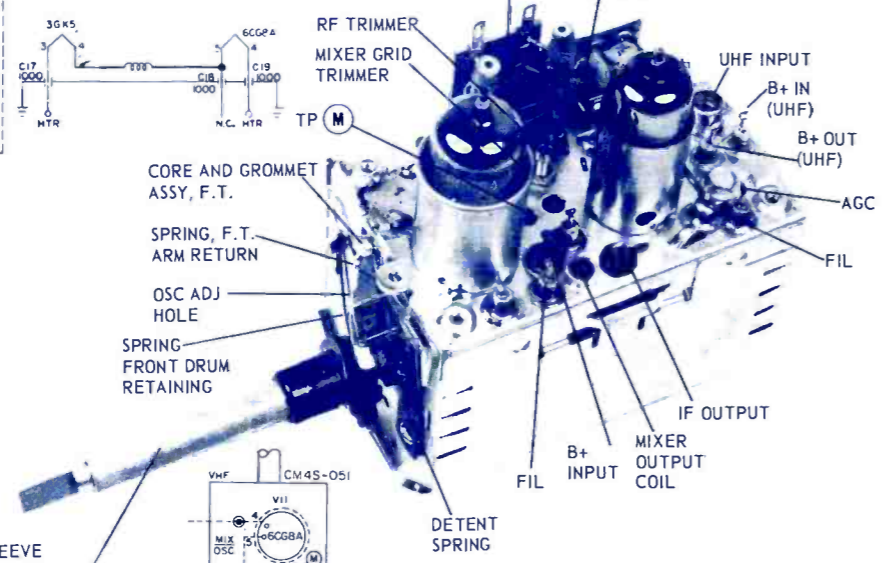
Balloons ①, ②, etc., shown on schematic indicate points of observation of the waveforms shown below the schematic.



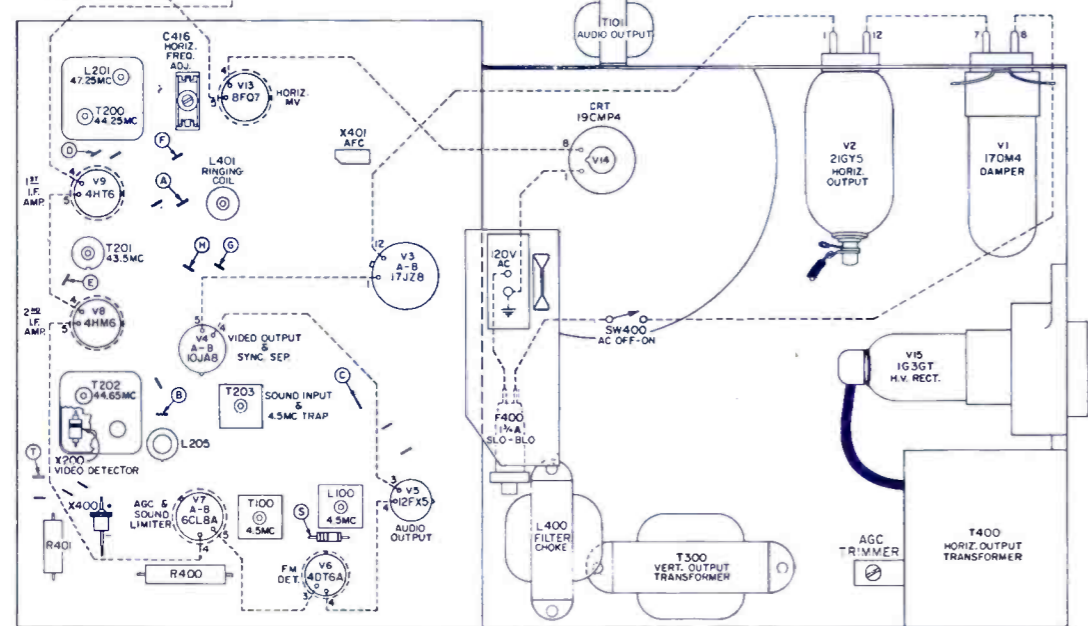
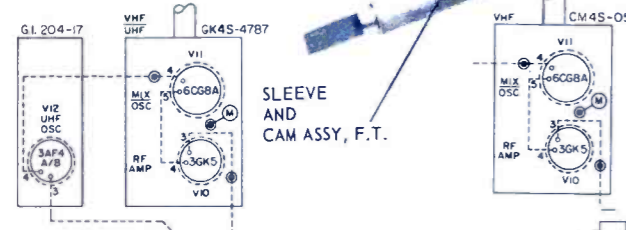
RESISTANCE VALUES IN OHMS. K=1000.
CAPACITANCE VALUES LESS THAN 1 IN MF. INDICATES CLOCKWISE ROTATION. UNLESS OTHERWISE INDICATED.
DIRECTION OF ARROWS AT CONTROLS INDICATES CLOCKWISE ROTATION.
VOLTAGES MEASURED WITH "VOLTOHMYST" WITH NO SIGNAL INPUT AND SHOULD HOLD WITHIN ±20% WITH 120V AC SUPPLY.
* VOLTAGES MEASURED WITH 1 MEG. 1/2 WATT RESISTOR IN SERIES WITH METER PROBE.



Tuner GK4S-4787 Schematic.



Tuner GK4S-4787.



Rear View.

NOTES:
 1. ALL CAPACITANCE VALUES IN μ F, ALL RESISTORS 1/2 WATT RATING UNLESS OTHERWISE SPECIFIED.
 2. VOLTAGES MEASURED WITH VTVM (ANT. TERMINALS SHORTED)

TUBE COMPLEMENT AND RESISTANCE CHART

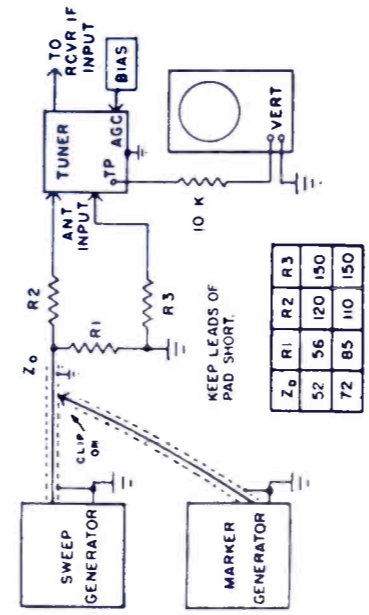
Part	Tube Type	Tube Function	Resistance Measurements											
			Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9	Pin 10	Pin 11	Pin 12
V1	17DM4	Damper	NC	NC	200K		*24		30	33				
V2	21GY5	Horiz Output	23	330K	NC	.5	NC	*24	NC	NC	330K	.5	354	30
V3	17JZ8	Vert Disch & Out	19	*2.5M	NC	*180	NC	1.3M	NC	*23	0	1.8M	0	23
V4	10JA8	Video Out & Sync Sep	0	2.5M	*15K	17	19	0	4K	2.2K	5K			
V5	12FX5	Audio Output	68	0-500K	17	13	NC	1680	980					
V6	4DT6A	FM Detector	0	820	12	13	*900K	*6.8K	560K					
V7	6CL8A	Sound Lim & AGC	*55K	4M	70	11	12	*70	13K					
V8	4HM6	2nd IF	100	.1	100	9	11	0	*540	*540	0			
V9	4HT6	1st IF	55	1.3M	55	7	9	0	*540	*540	0			
V10	3GK5	RF Amp	0	3.8M	7	6	*1.2K *2.2K	0	0					
V11	6CG8A	Mix-Osc	10K 4.7K	*5.7K *4.7K	0	5	6	*1K *70	*70 *1K	0	220K			
V12	3AF4A/B	UHF Osc	*5.6K	5.6K	4	5	.1	5.6K	5.6K					
V13	8FQ7	Horiz MV	*220K	220K-280K	1.2K	2	4	*39K	2.4M	1.2K				
V14	19CMP4	CRT	0	0	23K	*10K	NC	NC	220K	2				

Resistance measured from tube pin to B-- (except *)

*To junction of X400 & L400

NOTE: In V10 and V11, upper line indicates tuner CM4S-051 and lower line indicates tuner GK4S-4787

RCA
 TV Chassis
 Models
 GTM1583A, 2583A
ELECTRONIC TECHNICIAN
TEK FAX



Tuner Alignment Setup.

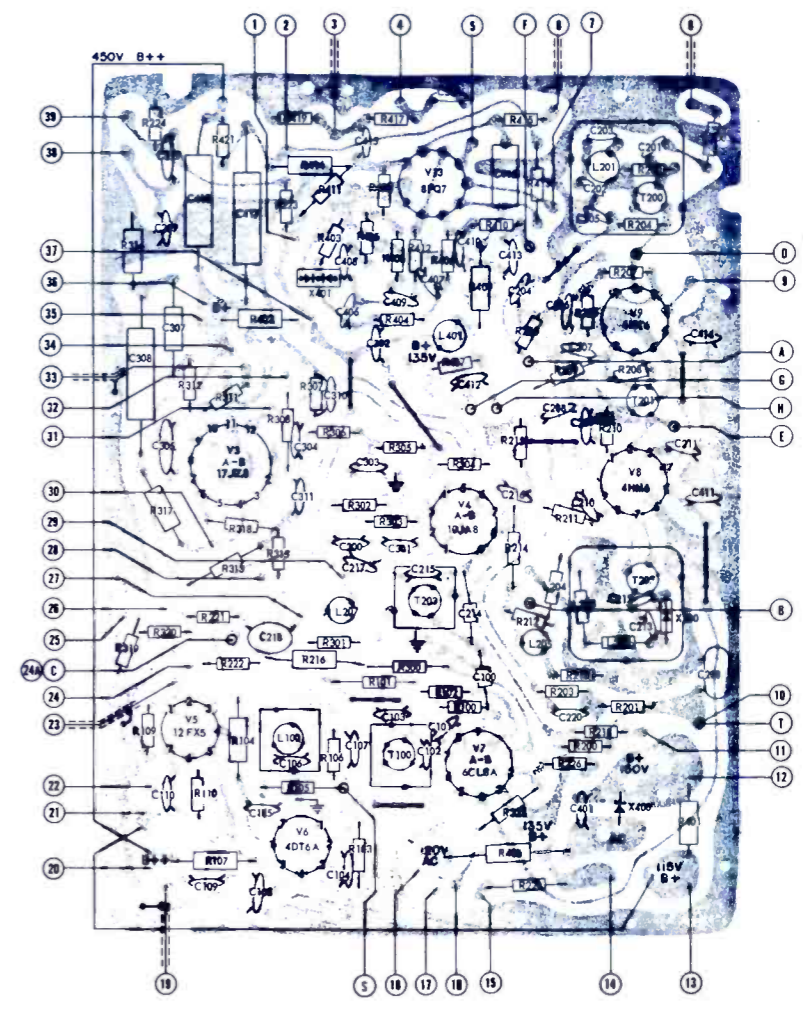
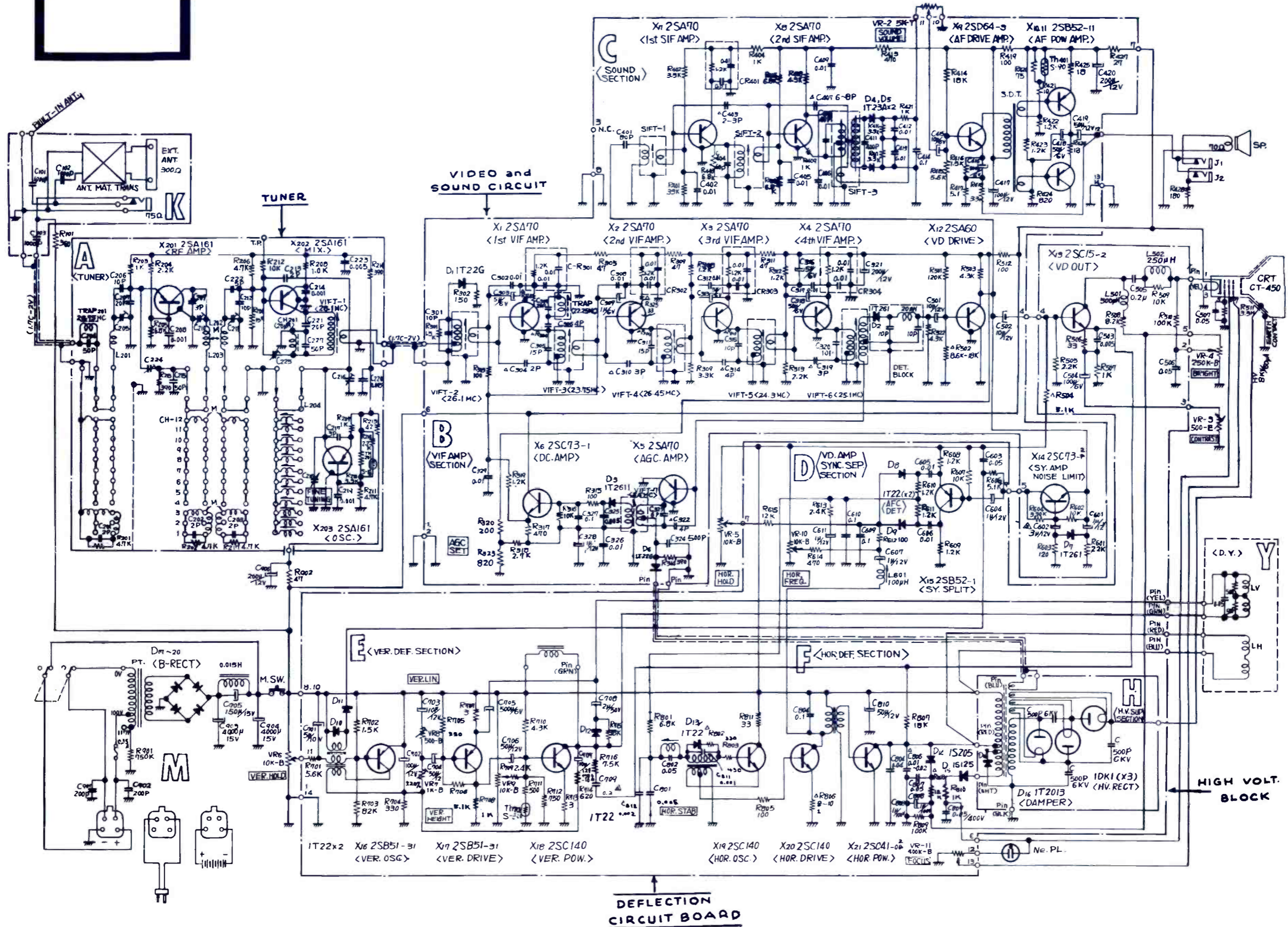


Figure 4 - Bottom view of PC board showing location of top components in solid outlines. Tube pin numbering is for bottom of socket.

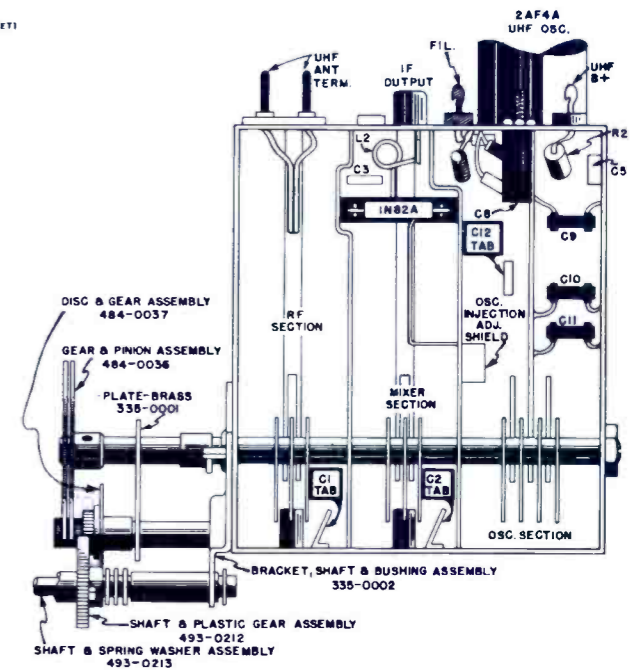
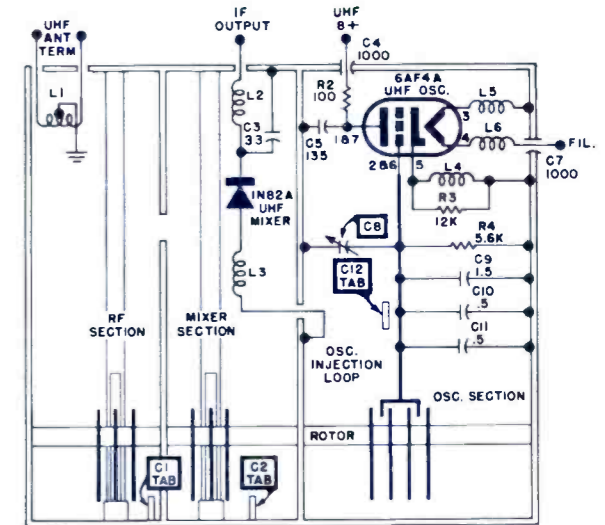
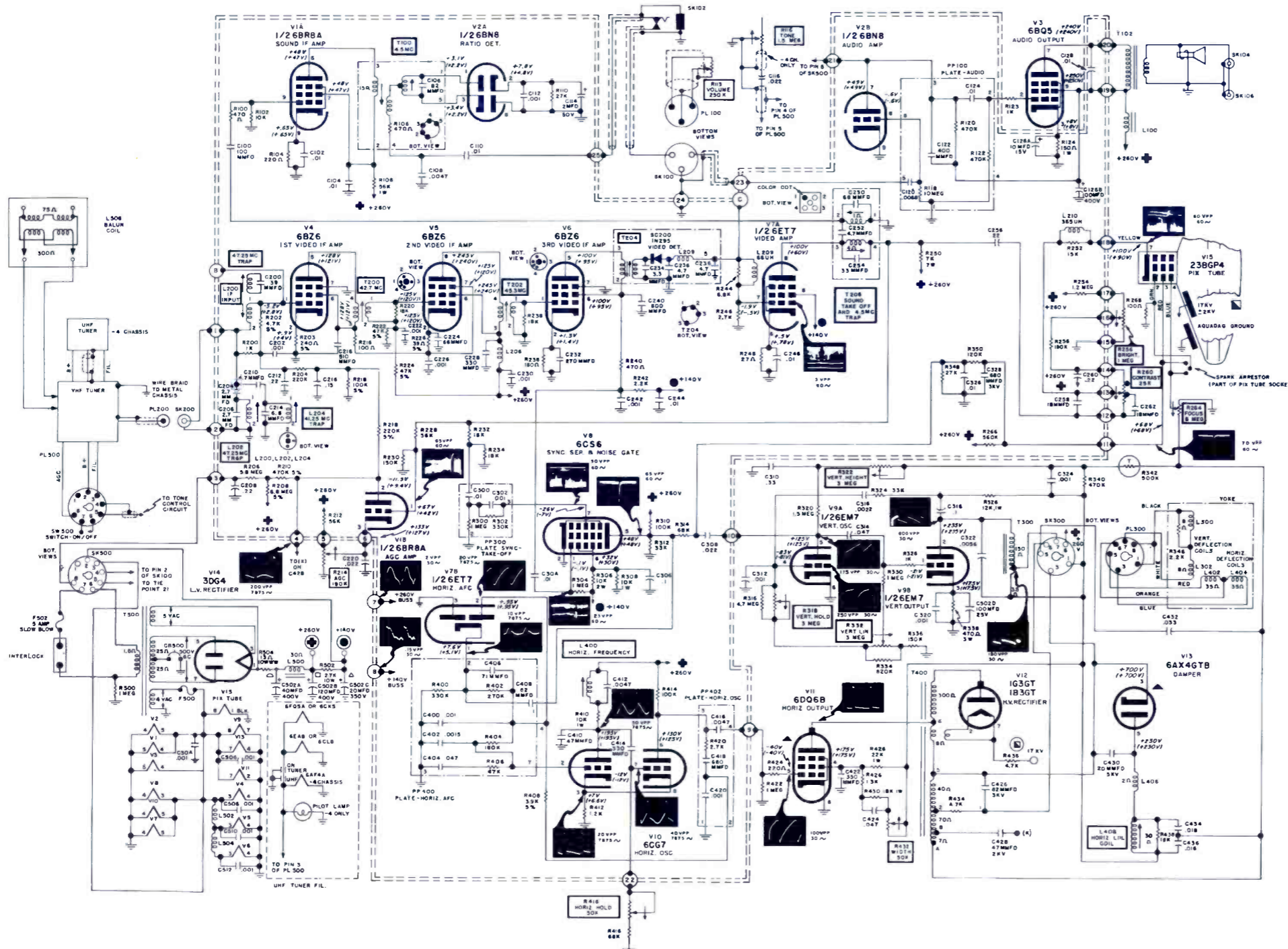
SONY
TV Chassis
TV 5-303W

ELECTRONIC TECHNICIAN TEKFAQ



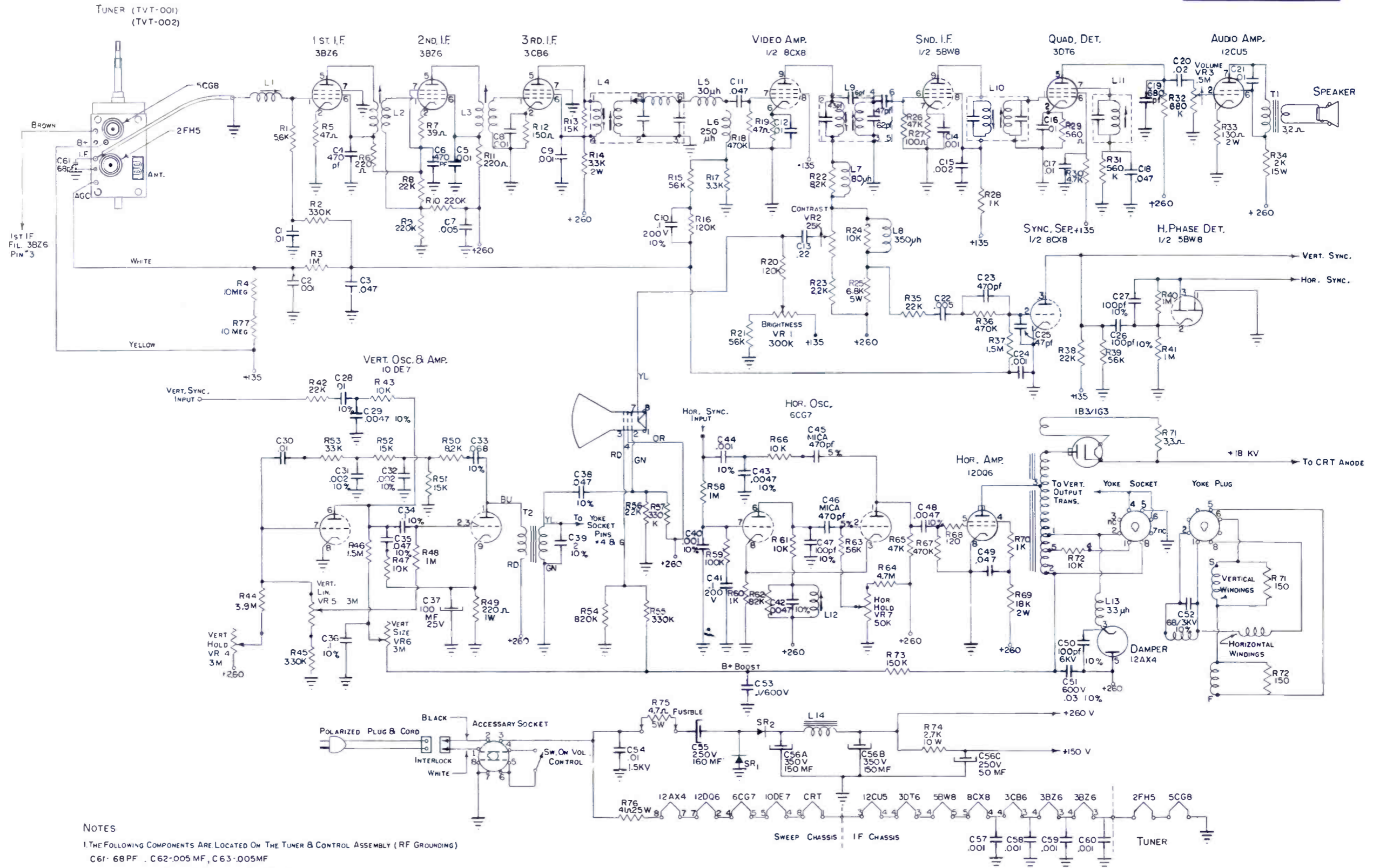
SYLVANIA
TV Chassis
562, -3, -4
Models 23E01

ELECTRONIC TECHNICIAN TEKFAX



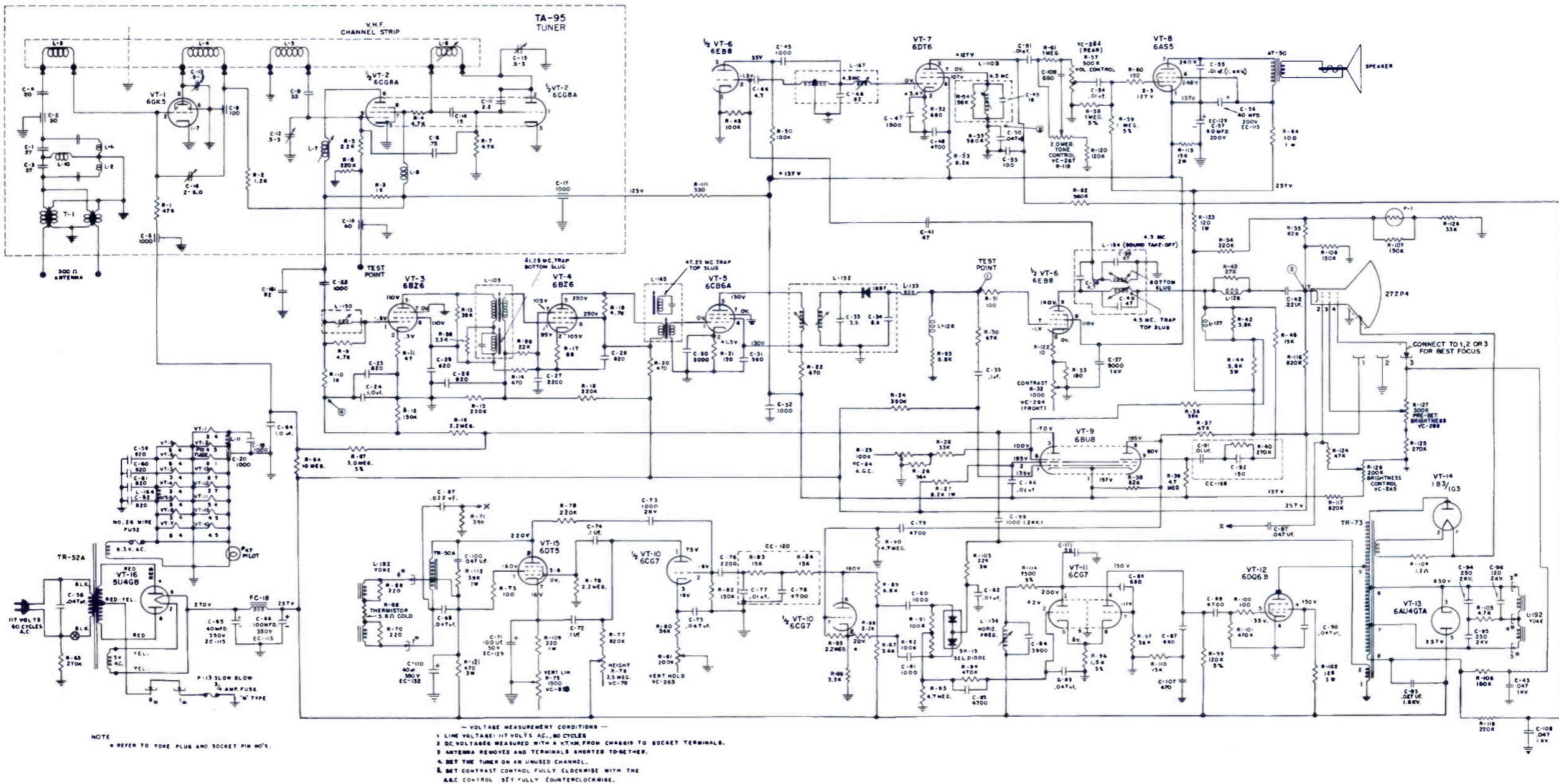
ELECTRONIC TECHNICIAN TEKFAK

SYMPHONIC
TV Chassis
TSL-001



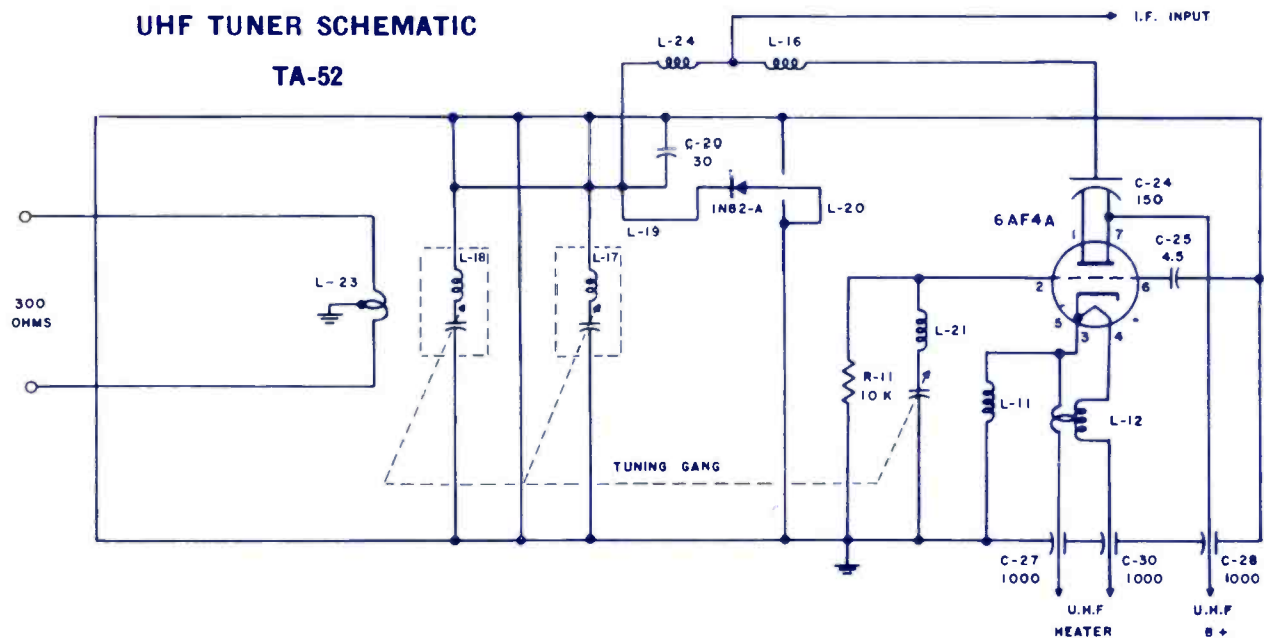
TRUETONE
TV Chassis
1095-232

ELECTRONIC TECHNICIAN TEKFAX

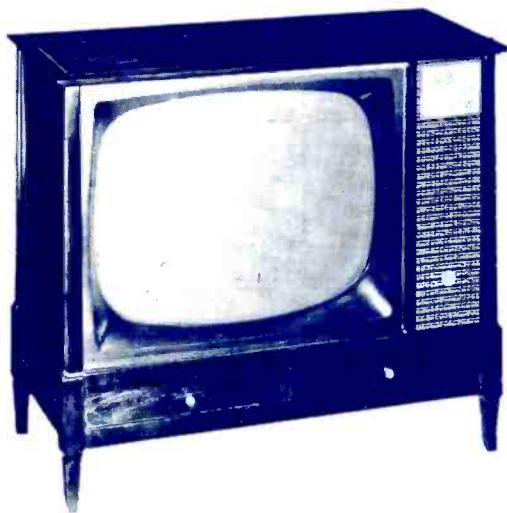
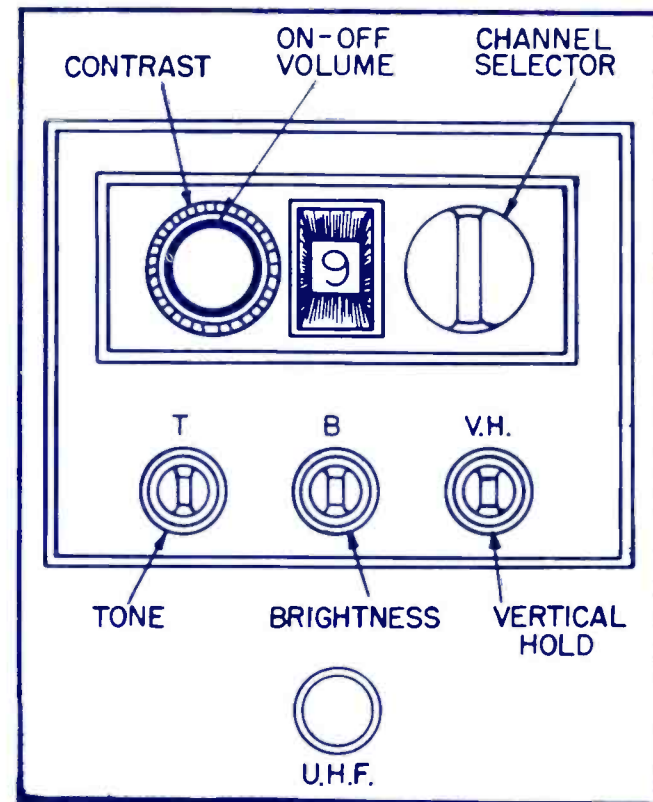


UHF TUNER SCHEMATIC

TA-52

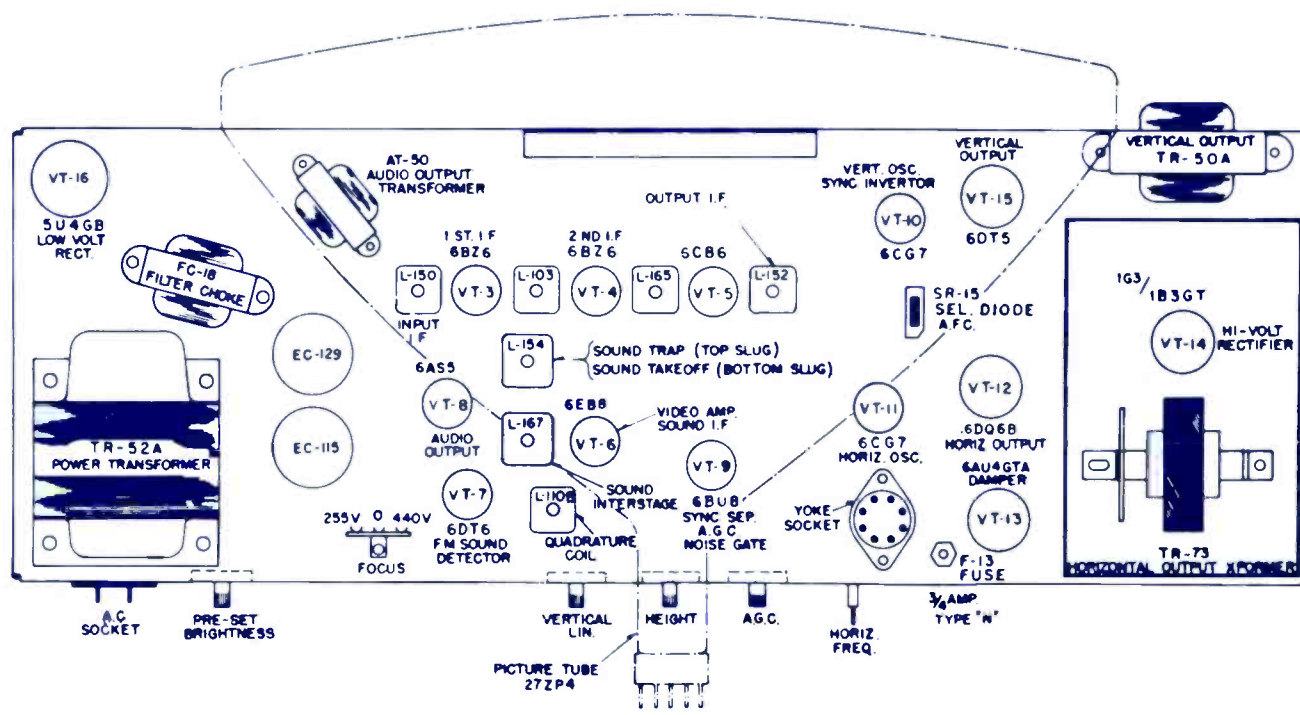
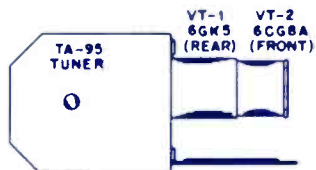
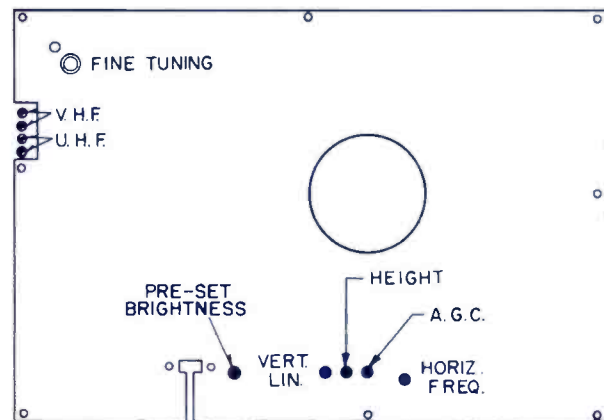


ON FRONT OF SET



TRUETONE
TV Chassis 1095-232

ON BACK OF SET

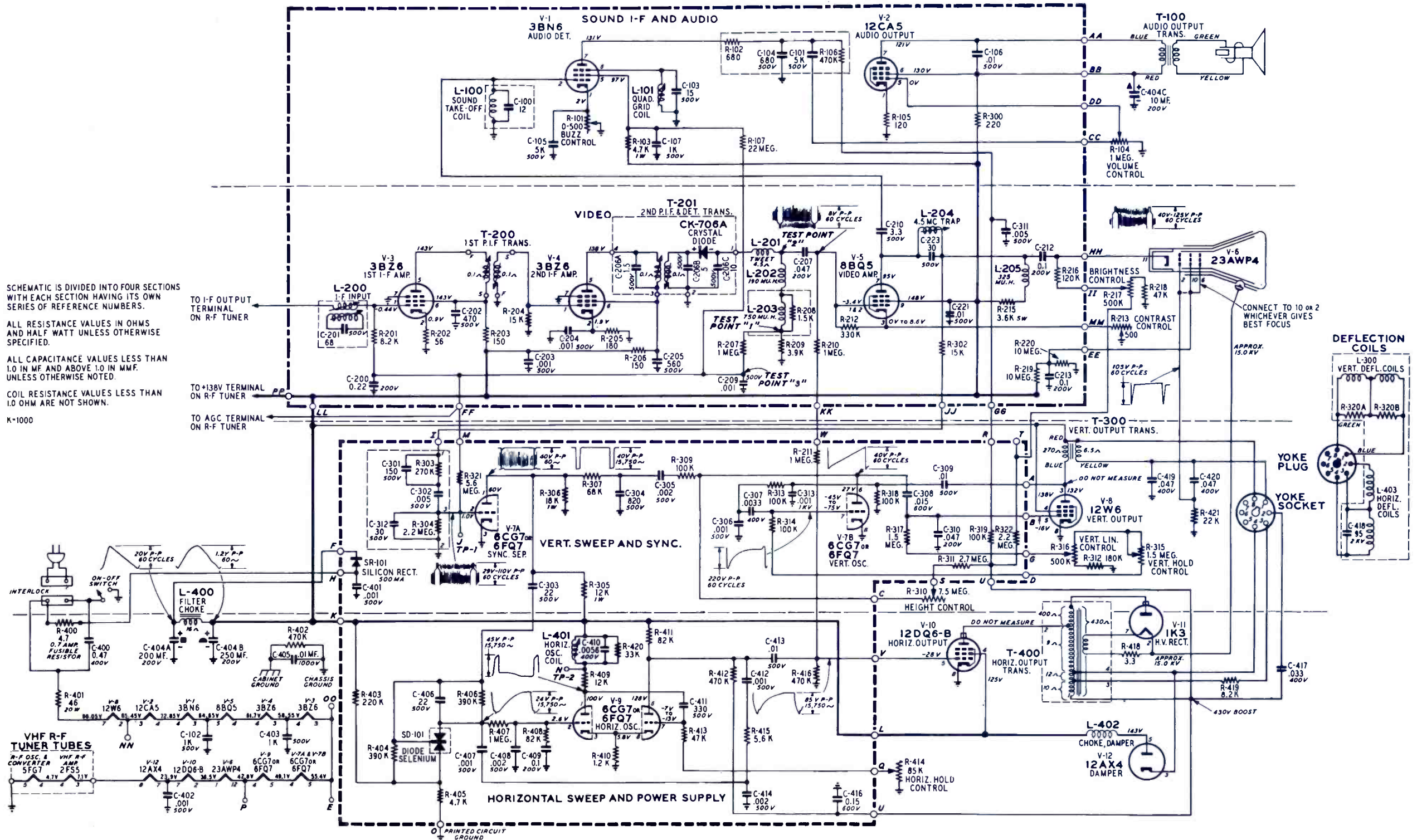


TRUETONE

TV Chassis
2DC1300C, -02C,
2DC1301C, -03C

ELECTRONIC TECHNICIAN

TEKFAX



SCHEMATIC IS DIVIDED INTO FOUR SECTIONS WITH EACH SECTION HAVING ITS OWN SERIES OF REFERENCE NUMBERS.

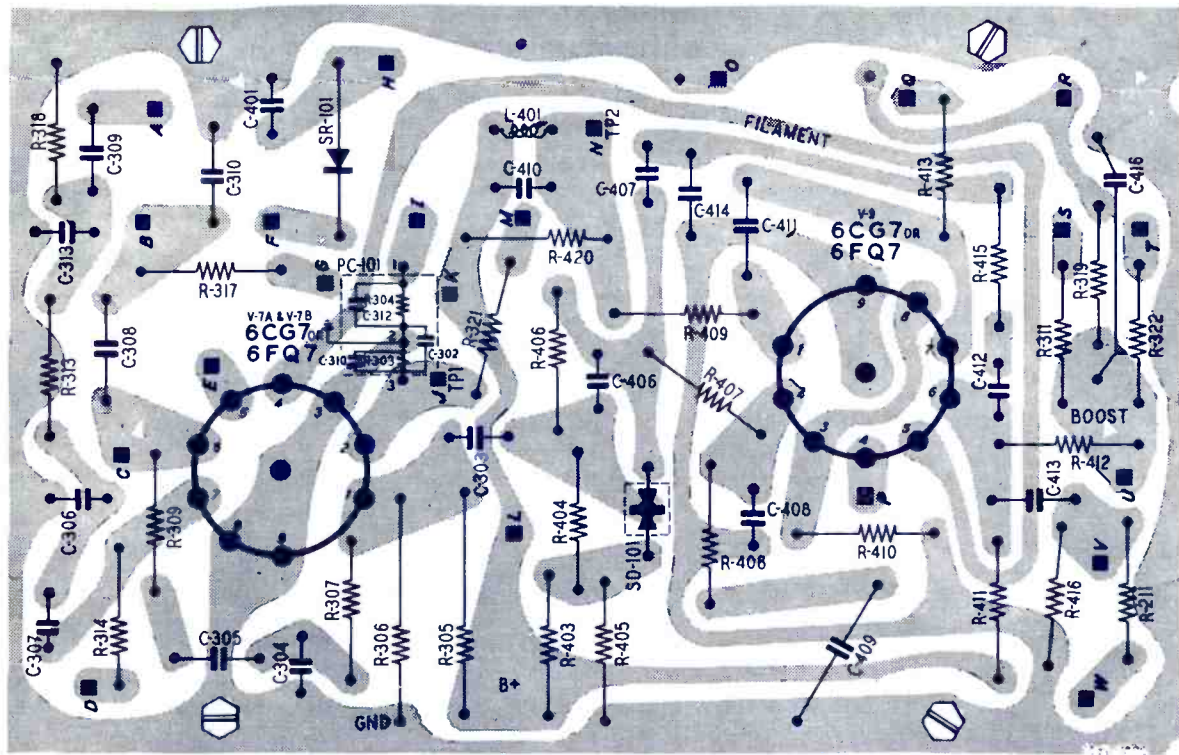
ALL RESISTANCE VALUES IN OHMS AND HALF WATT UNLESS OTHERWISE SPECIFIED.

ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF AND ABOVE 1.0 IN MMF. UNLESS OTHERWISE NOTED.

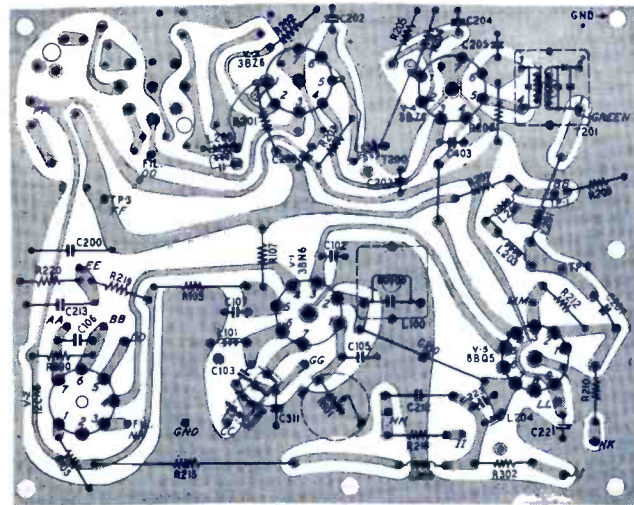
COIL RESISTANCE VALUES LESS THAN 1.0 OHM ARE NOT SHOWN.

K-1000

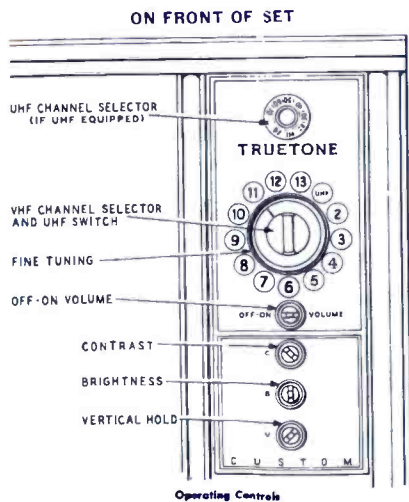
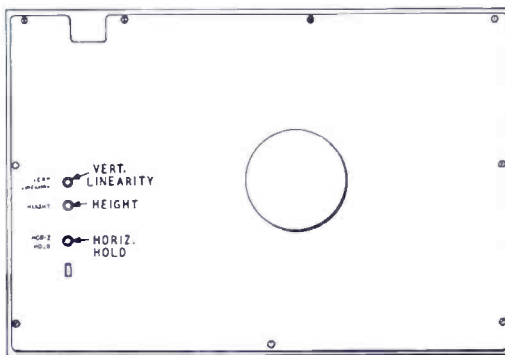
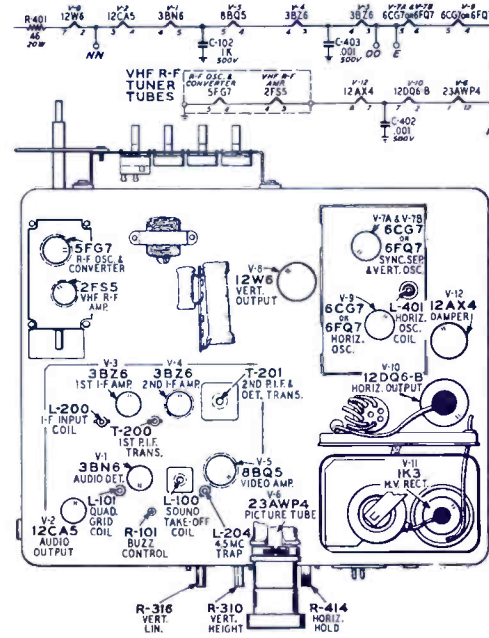
VHF R-F TUNER TUBES
R-F OSC. & CONVERTER 5C1
V-12 12AX4
V-11 12DQ6-B
V-10 12CA5
V-9 6CG7
V-8 6CG7
V-7 6CG7
V-6 6CG7
V-5 8BQ5
V-4 3BZ6
V-3 3BZ6
V-2 12CA5
V-1 38N6



S-38A2363 PRINTED CIRCUIT BOARD ASSEMBLY (SWEEP)

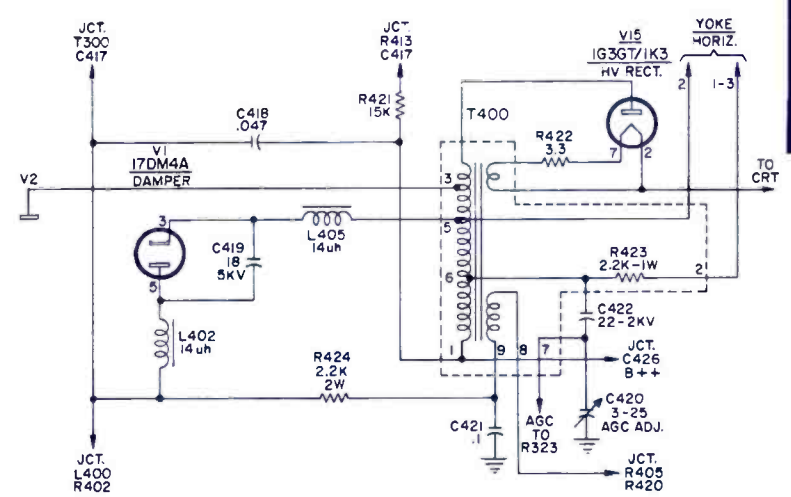


S-38A2524 PRINTED CIRCUIT BOARD ASSEMBLY (I-F)



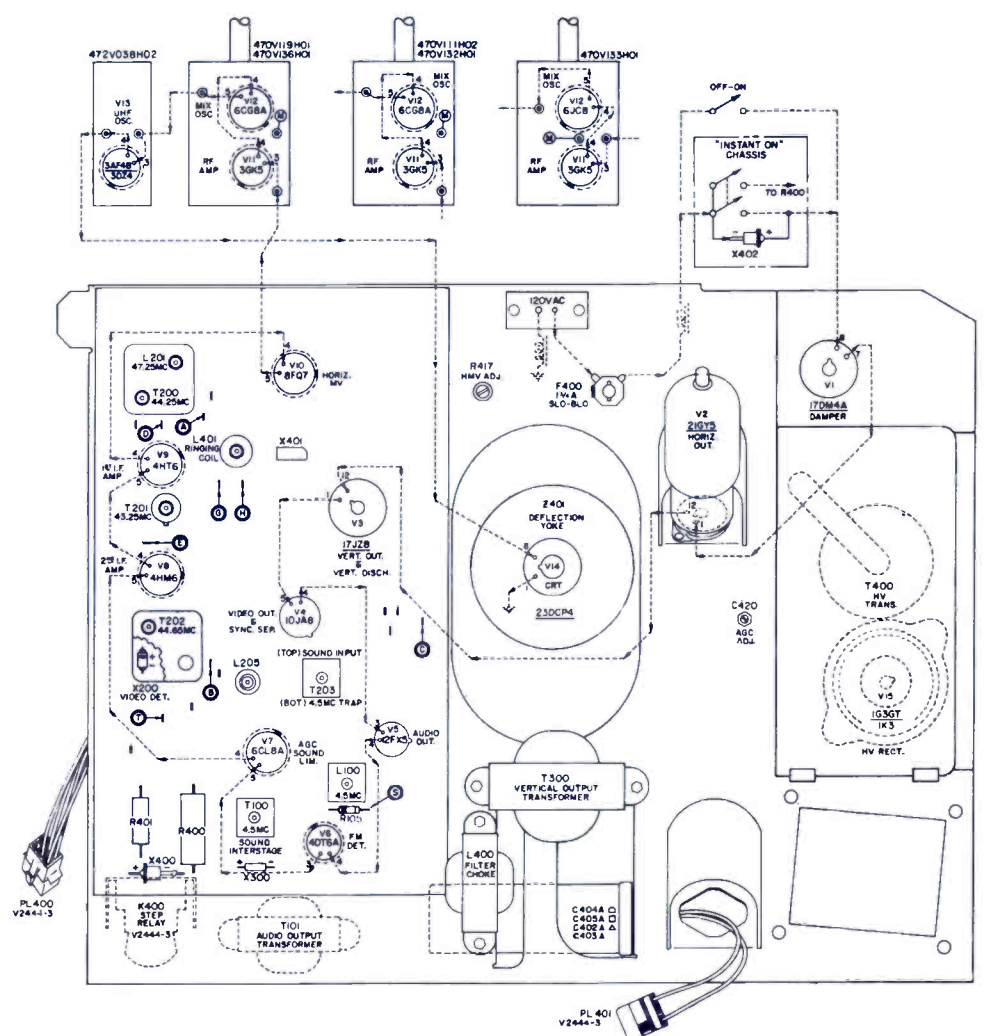
WESTERN AUTO
TV Chassis
Models 2DC1300B,
02B, 01B and 03B

WESTINGHOUSE
TV Chassis
V-2444-1, -2, -3, -5, -6,
-9, -10



If the later-production high-voltage transformer (493V012H02) is used to replace the early-production high-voltage transformer (493V012H01), the following parts also must be changed:

PART	EARLY PRODUCTION	LATE PRODUCTION	PART NO.
R422	3.3 ohm, to:	2.7 ohm	251V002A79
R424	2.2K, 2W, to:	3.3K, 2W	251V014H47

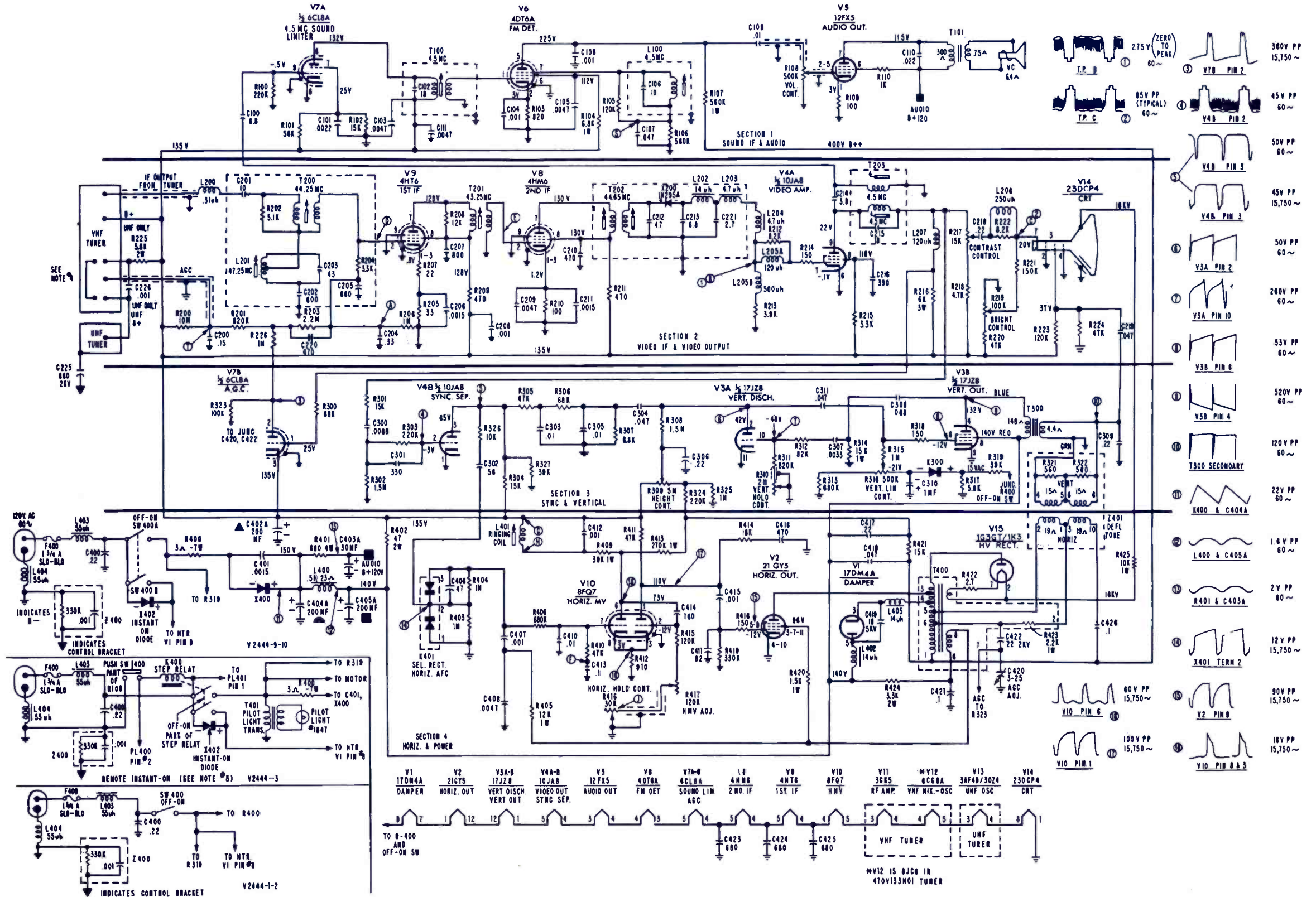


ELECTRONIC TECHNICIAN TEKFAX

**WESTING-
HOUSE**
TV Chassis
V-2444-1, -2, -3,
-5, -6, -9, -10

NOTES:

1. ALL CAPACITOR VALUES LESS THAN 1 ARE IN PFD, AND VALUES GREATER THAN 1 ARE IN PF(MICROMICROFARADS) ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE INDICATED.
2. DC VOLTAGES ARE MEASURED FROM POINT INDICATED TO CIRCUIT GROUND WITH A VTVM. LINE VOLTAGE AT 120 V.A.C., NO SIGNAL APPLIED.
3. WAVEFORMS WERE TAKEN WITH CONTROLS SET FOR A NORMAL PICTURE. C-420 WAS SET FOR 2.75V (ZERO TO PEAK) AT T.P. ①.
4. SWITCH MARKS CONTACT ON UNF POSITION ONLY.
5. FOR REMOTE OPERATION ON CHASSIS V2444-3, REFER TO THE REMOTE RECEIVER CHASSIS, V2418-4



WESTING
HOUSE

TV Chassis
U-2436

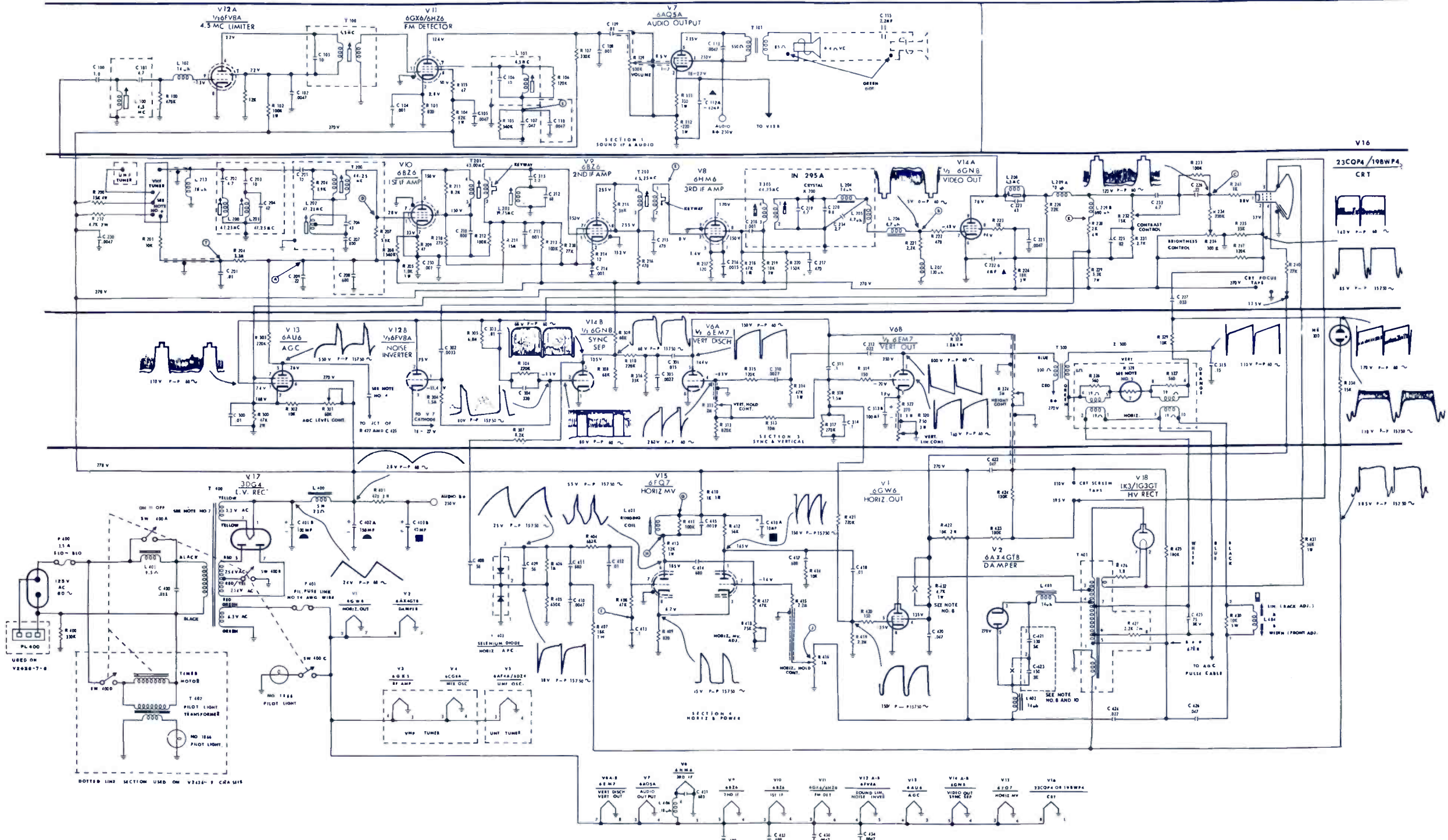
ELECTRONIC TECHNICIAN TEKFAK

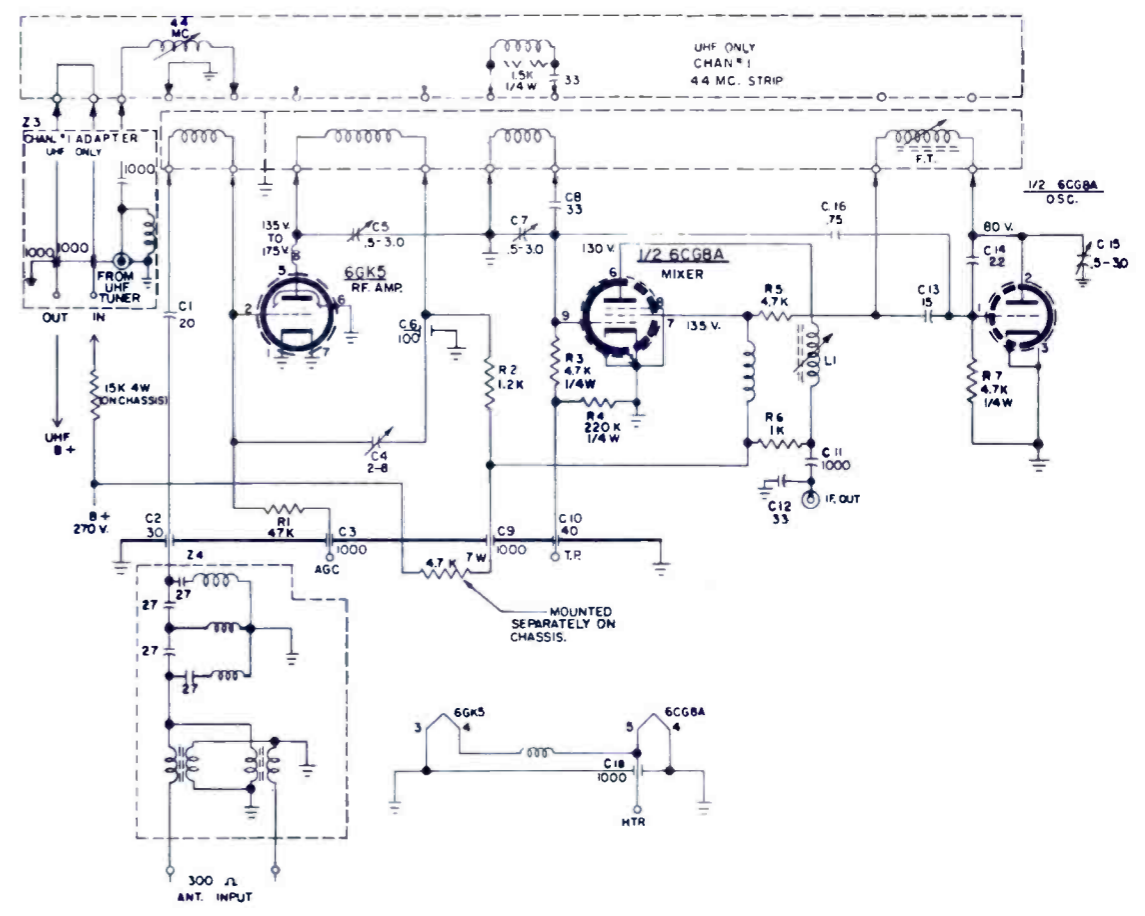
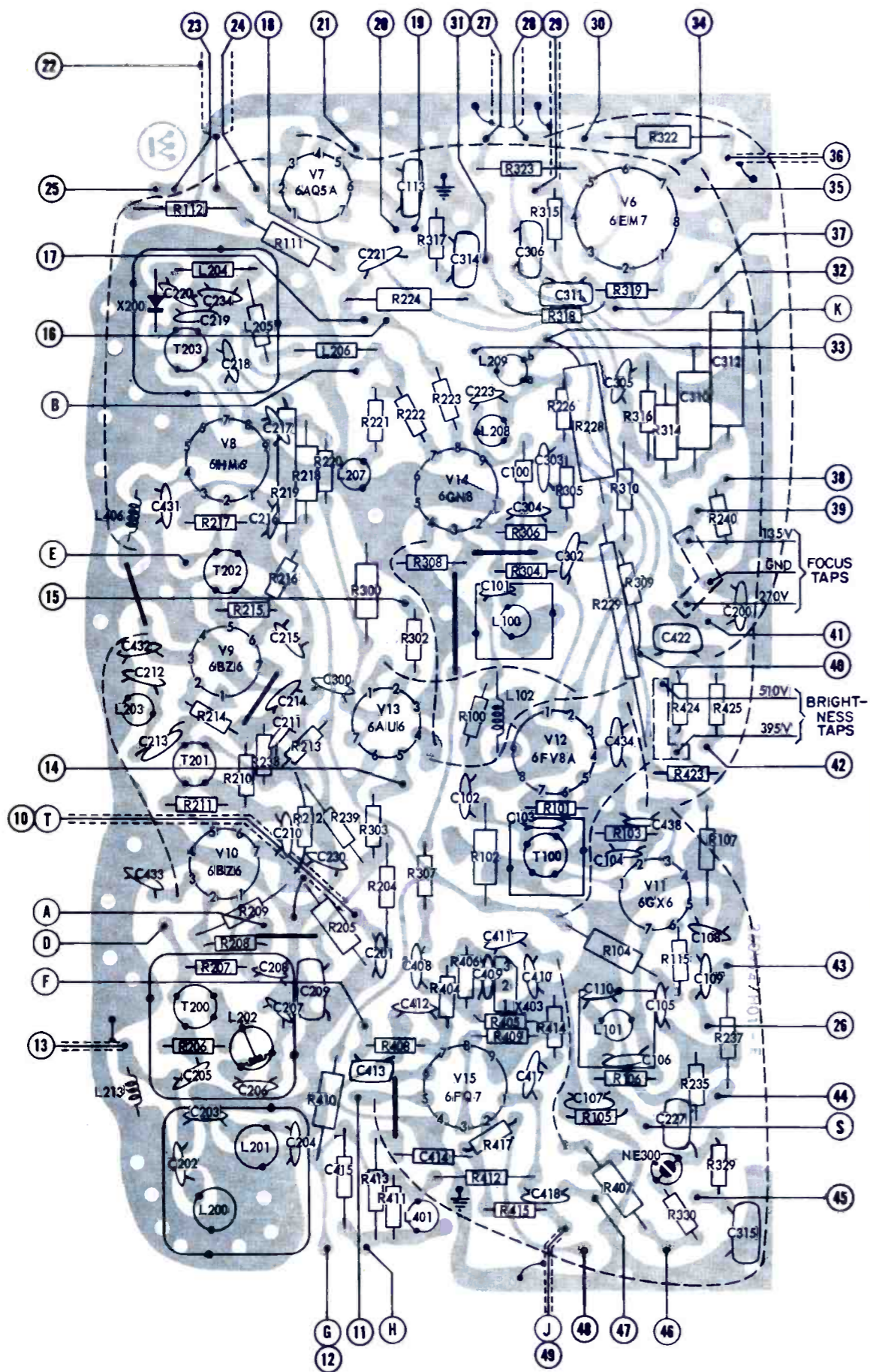
NOTES:

1. ALL CAPACITOR VALUES LESS THAN 1 ARE IN MF, AND VALUES GREATER THAN 1 ARE PF. ALL RESISTANCE VALUES ARE IN OHMS 1/2 WATT UNLESS OTHERWISE INDICATED.
2. DC VOLTAGES ARE MEASURED FROM POINT INDICATED TO CIRCUIT GROUND WITH A VTVM. LINE VOLTAGE AT 120V A.C., NO SIGNAL APPLIED.

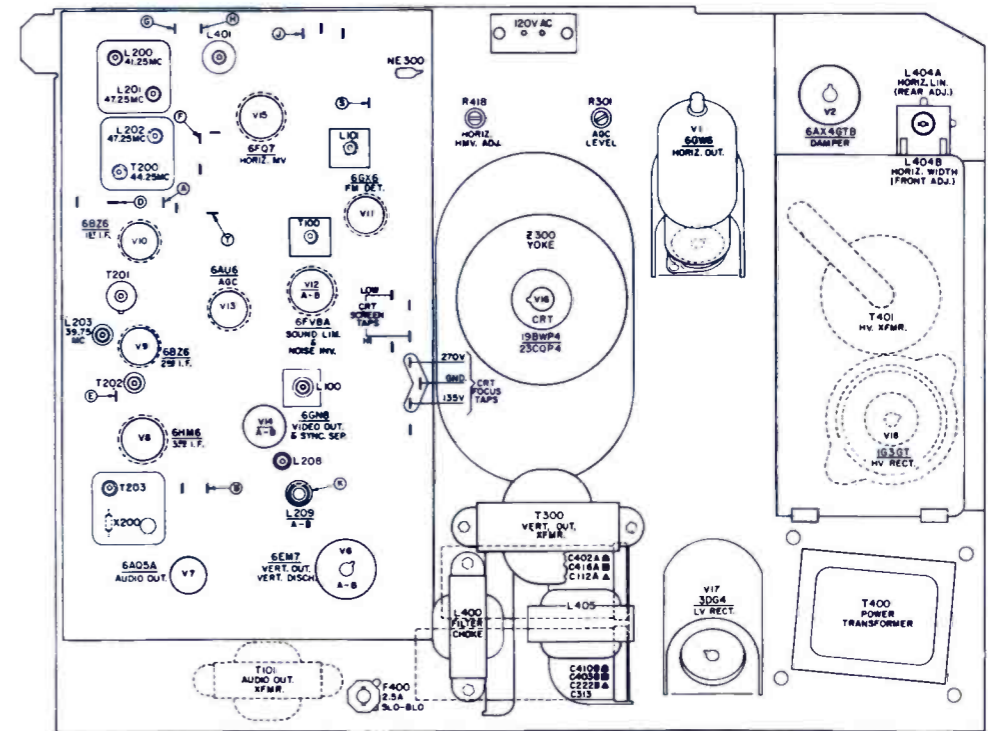
3. WAVEFORMS WERE TAKEN WITH CONTROLS SET FOR A NORMAL PICTURE WITH LEVEL CONTROL SET FOR VIDEO SYNC TIPS 80V BELOW B_f AT TP (K).
4. CAPACITOR MADE FROM 750V071H09 CABLE.
5. RESISTANCE MEASURES 8 OHMS COLD, 1 OHMS HOT.
6. SWITCH MAKES CONTACT ON UHF POSITION ONLY.

7. SWITCH 400A, 400B AND 400C IS PART OF VOLUME CONTROL ON CHASSIS V-2436-1-2.
8. SERVICE AND FACTORY ADJUSTMENT: JUMPER IN GIVES MAX. WIDTH.
9. SWITCH 400A, 400B AND 400C IS PART OF TIMER ON CHASSIS V-2436-9.
10. SEE PARTS LIST



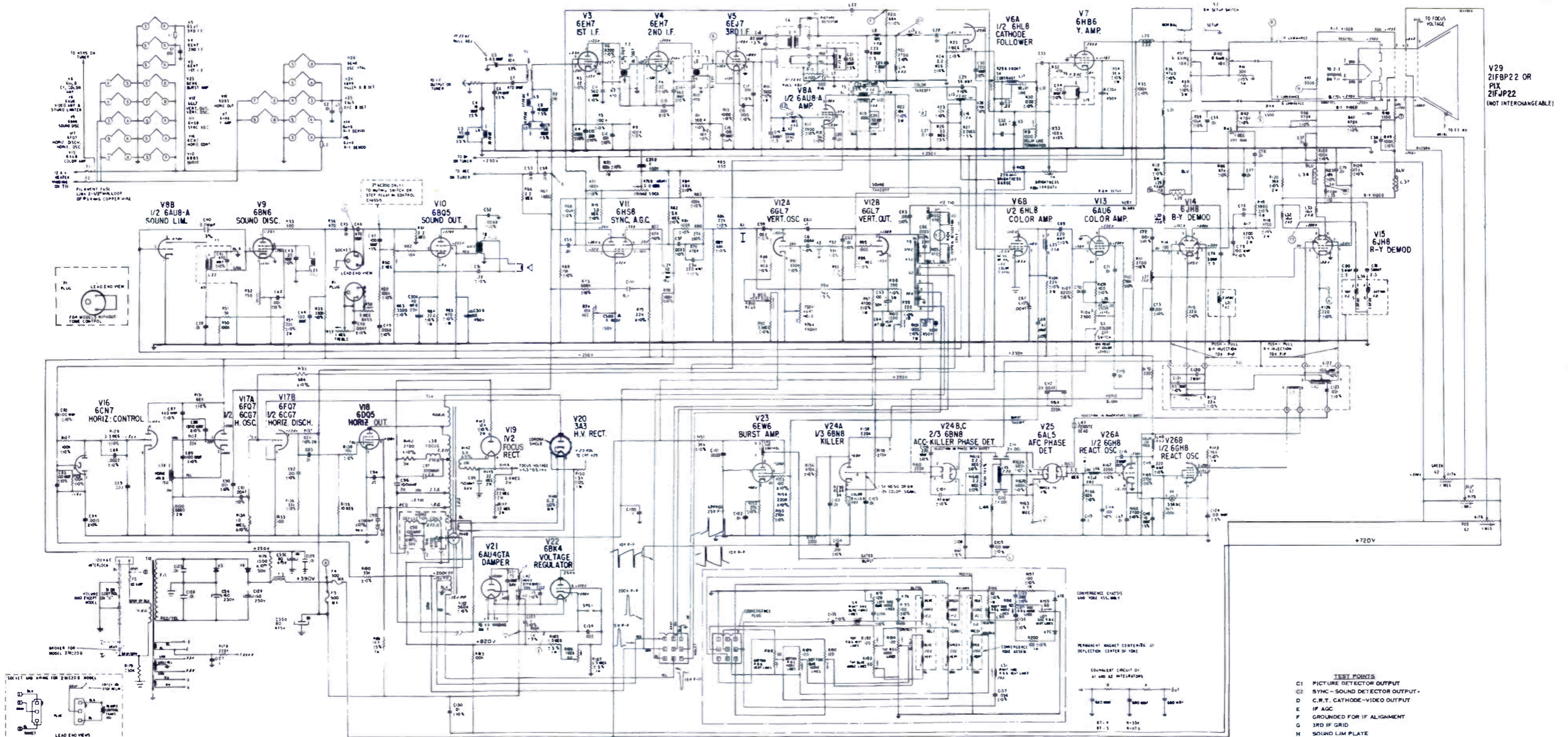


WESTINGHOUSE
TV Chassis
U-2436



ZENITH
Color TV Chassis
27KC20
and 27KC20Q

ELECTRONIC TECHNICIAN TEKFAX

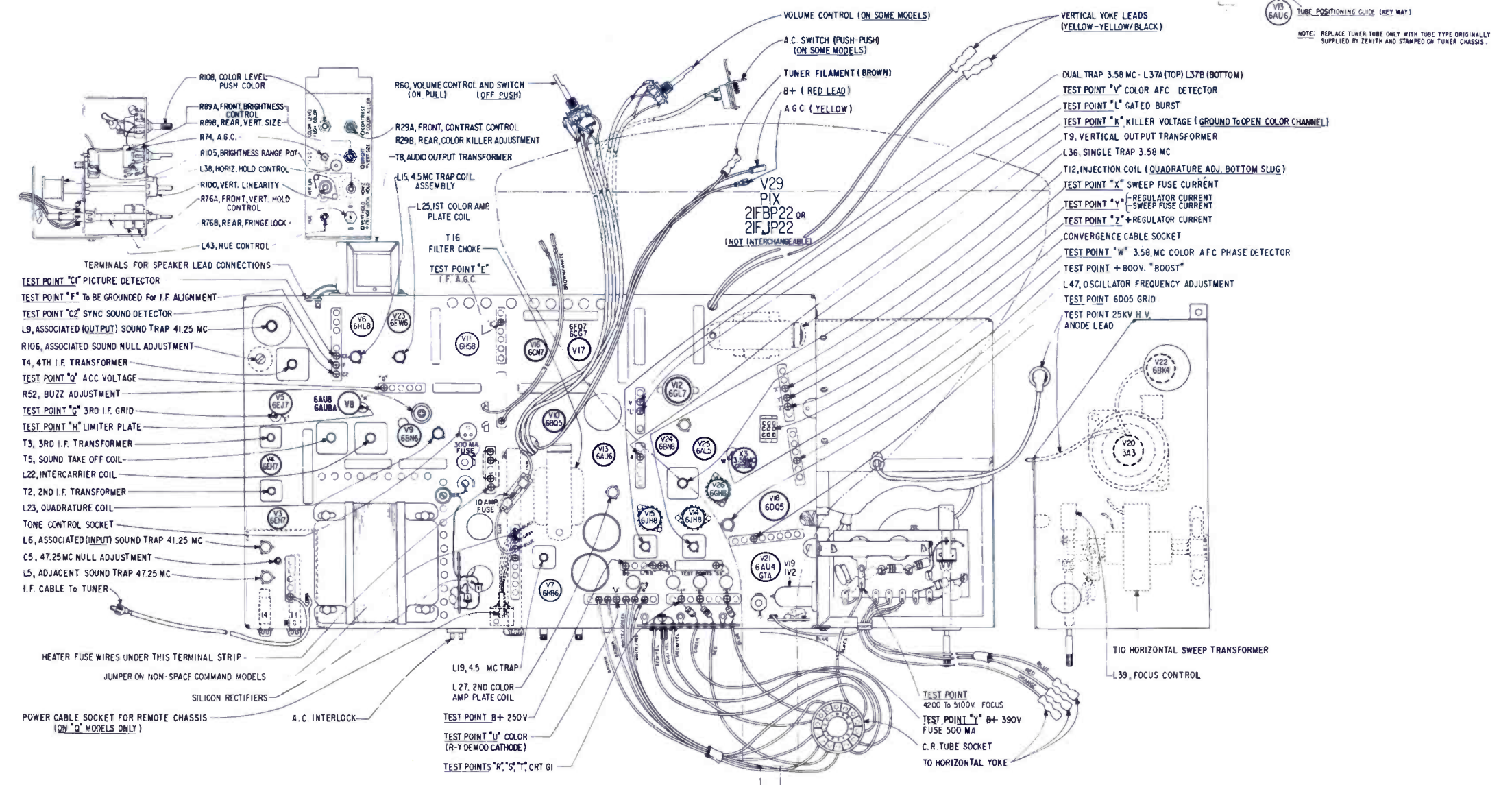
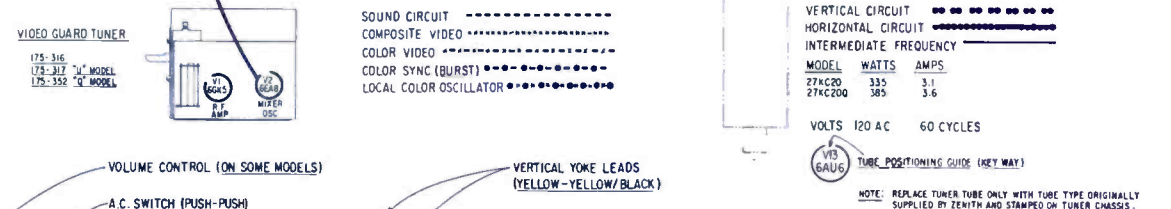
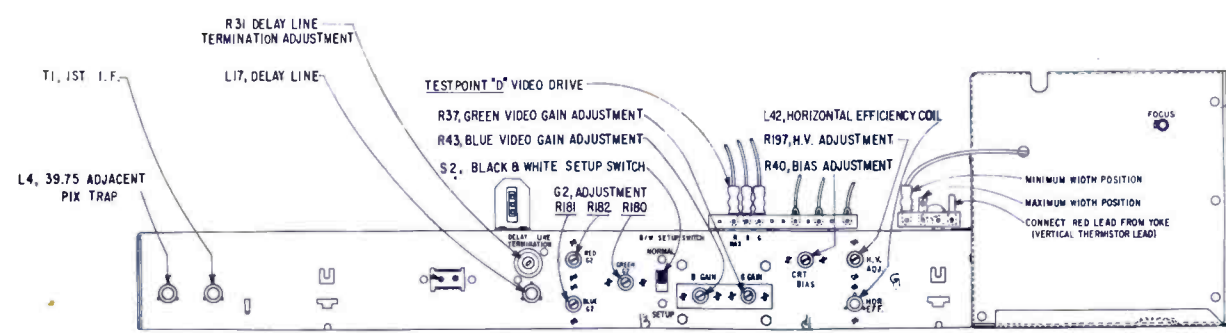
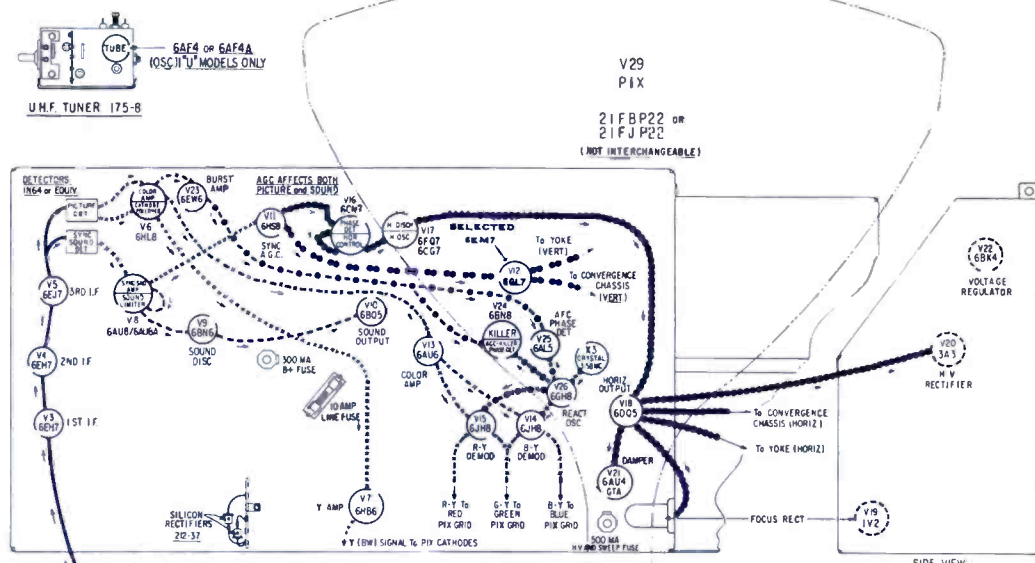


V29
21BP22 OR
21JP22
(NOT INTERCHANGEABLE)

NOTES:
ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED
ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE VOLTMETER HAVING 11 MEGOHM INPUT RESISTANCE
ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT AND NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED
ALL CONDENSER VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED
ALL CONDENSER CAPACITY TOLERANCE ± 20% UNLESS OTHERWISE SPECIFIED
ALL RESISTORS ARE ± 20% TOLERANCE, CARBON, 1/4 WATT UNLESS OTHERWISE SPECIFIED
RESISTANCE MEASUREMENTS SHOWN WITH COILS DISCONNECTED FROM CIRCUIT
COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM
CATHODE RAY TUBE 3RD ANODE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC OR 20K MIN OHM PER VOLT HIGH VOLTAGE METER
ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION
ALIGNMENT POINTS
CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS
CHASSIS

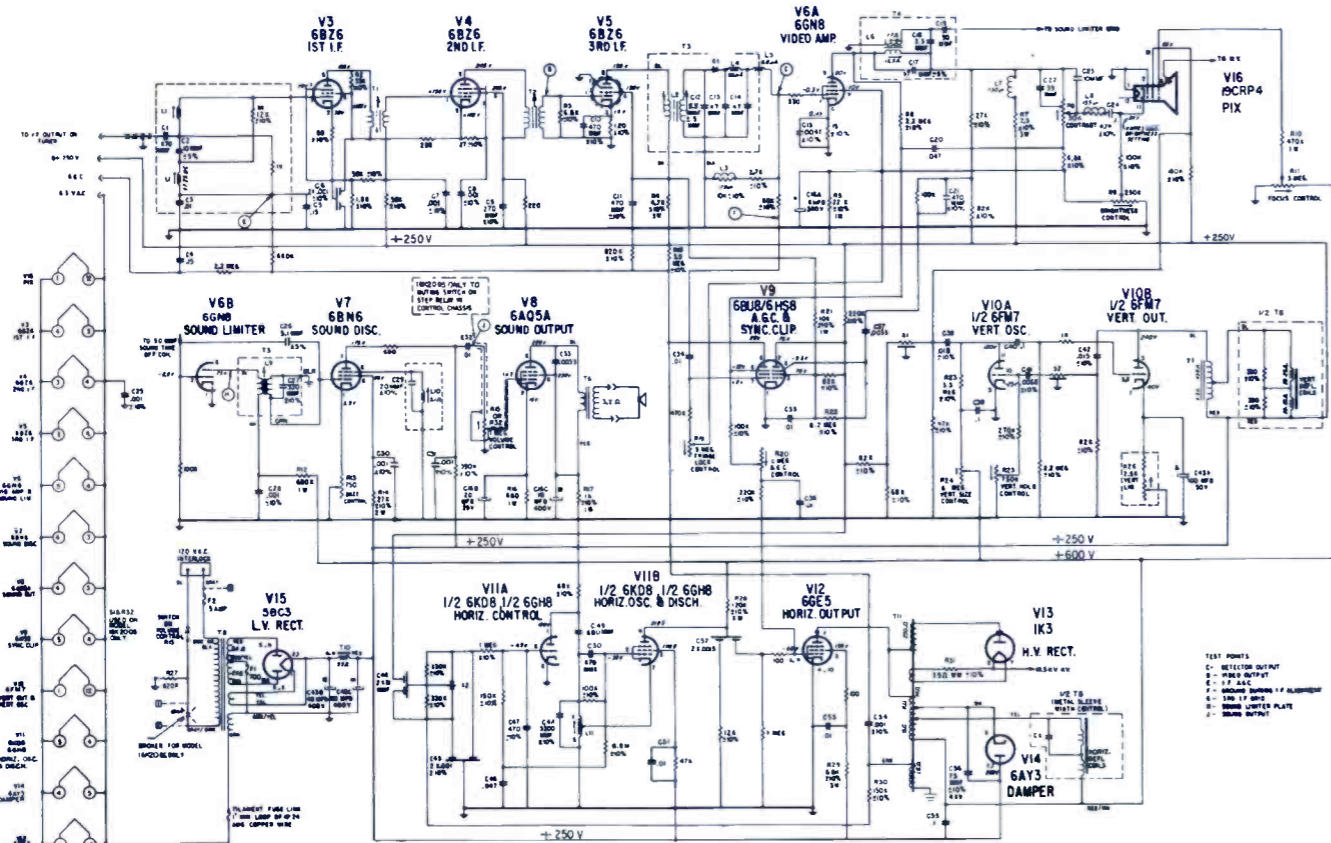
- TEST POINTS
- C1 PICTURE DETECTOR OUTPUT
 - C2 SYNC - SOUND DETECTOR OUTPUT
 - D C.R.T. CATHODE-VIDEO OUTPUT
 - E IF AGC
 - F GROUNDED FOR IF ALIGNMENT
 - G 3RD IF GRID
 - H SOUND LIM PLATE
 - J SOUND OUTPUT
 - K KILLER VOLTAGE (GROUND TO OPEN COLOR CHANNEL)
 - L GATED BURST
 - G ACC VOLTAGE
 - R R-Y GRID OF C.R.T.
 - S B-Y GRID OF C.R.T.
 - G-Y GRID OF C.R.T.
 - U R-Y DEMOD. CATHODE
 - V COLOR AFC DETECTOR
 - X SWEEP FUSE CURRENT
 - Y SWEEP FUSE CURRENT
 - Z REGULATOR CURRENT
 - REGULATOR CURRENT

ZENITH
Color TV Chassis
27KC20
and 27KC20Q



ZENITH
TV Chassis
16K20
and 16K20QS

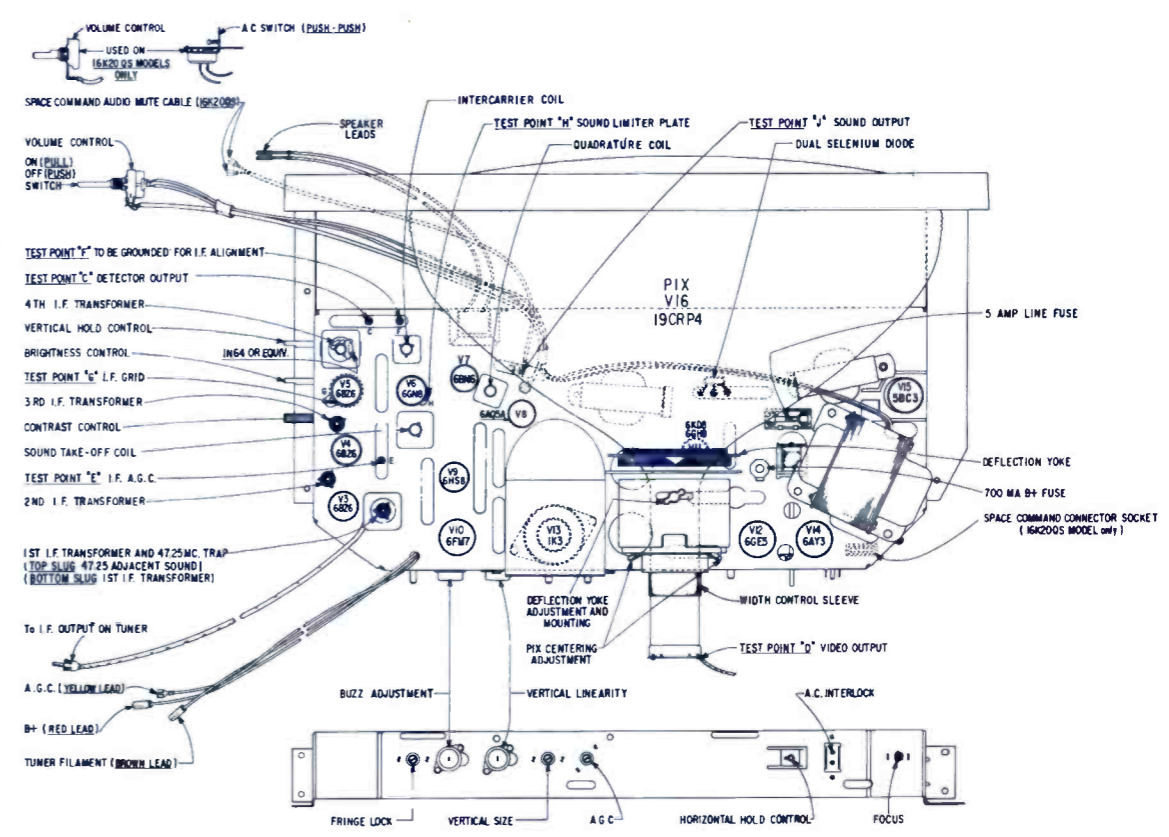
ELECTRONIC TECHNICIAN TEKFAX



NOTES:
 1. ALL PARTS SHOWN ARE STANDARD IN THIS CHASSIS.
 2. ALL PARTS ARE TO BE REPLACED BY THE MANUFACTURER'S ORIGINAL EQUIVALENTS.
 3. ALL PARTS ARE TO BE REPLACED BY THE MANUFACTURER'S ORIGINAL EQUIVALENTS.
 4. ALL PARTS ARE TO BE REPLACED BY THE MANUFACTURER'S ORIGINAL EQUIVALENTS.
 5. ALL PARTS ARE TO BE REPLACED BY THE MANUFACTURER'S ORIGINAL EQUIVALENTS.
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 8. ALL PARTS ARE TO BE REPLACED BY THE MANUFACTURER'S ORIGINAL EQUIVALENTS.
 9. ALL PARTS ARE TO BE REPLACED BY THE MANUFACTURER'S ORIGINAL EQUIVALENTS.
 10. ALL PARTS ARE TO BE REPLACED BY THE MANUFACTURER'S ORIGINAL EQUIVALENTS.



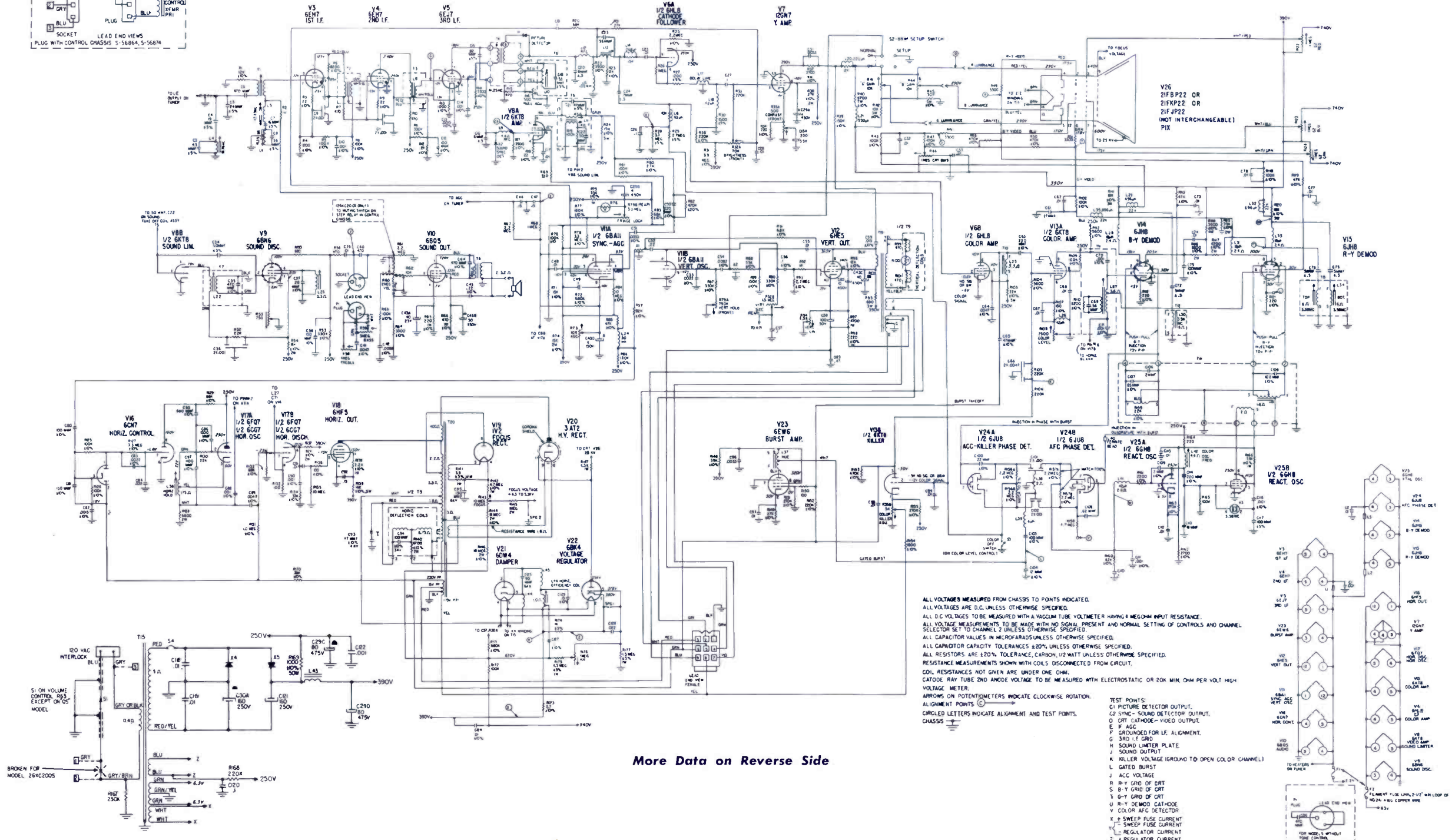
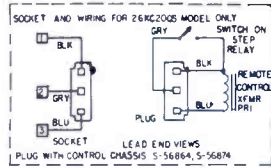
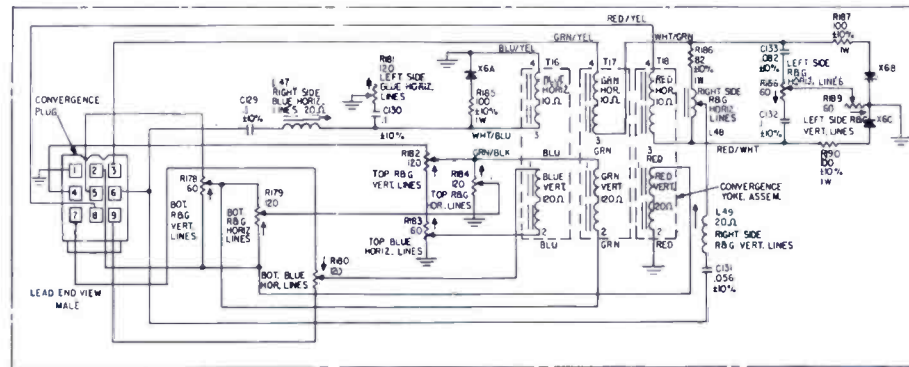
EQUIVALENT CIRCUIT
A-1 and A-2 INTEGRATORS



87-7 R 1s 68K
87-8 R 1s 82K

ELECTRONIC TECHNICIAN TEKFAX

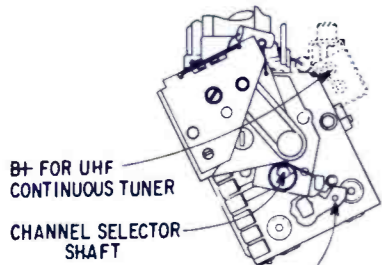
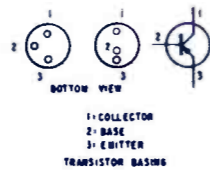
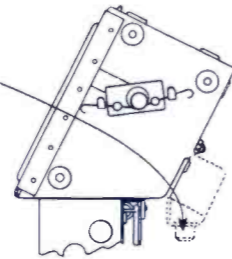
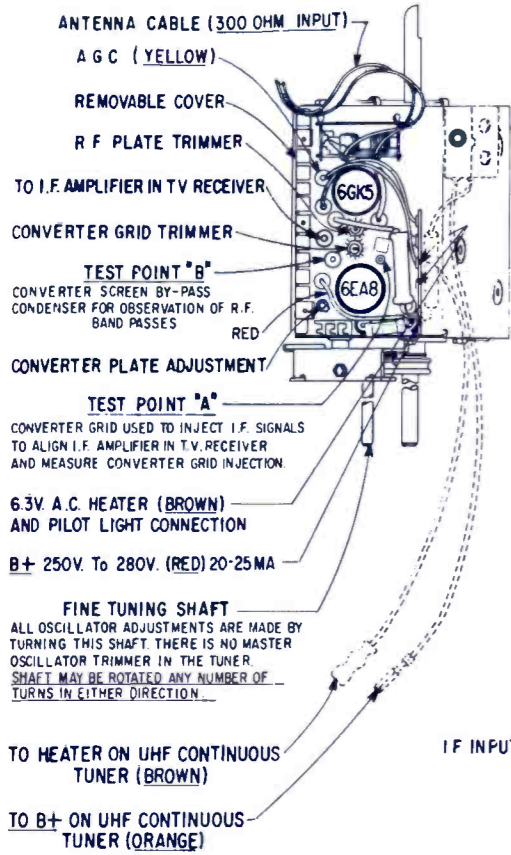
ZENITH
Color TV
Chassis 26KL20
and 20QS



ALL VOLTAGES MEASURED FROM CHASSIS TO POINTS INDICATED.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
ALL D.C. VOLTAGES TO BE MEASURED WITH A VACUUM TUBE VOLTMETER HAVING 1 MEGOHM INPUT RESISTANCE.
ALL VOLTAGE MEASUREMENTS TO BE MADE WITH NO SIGNAL PRESENT AND NORMAL SETTING OF CONTROLS AND CHANNEL SELECTOR SET TO CHANNEL 2 UNLESS OTHERWISE SPECIFIED.
ALL CAPACITOR VALUES IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
ALL CAPACITOR CAPACITY TOLERANCES ±20% UNLESS OTHERWISE SPECIFIED.
ALL RESISTORS ARE ±20% TOLERANCE, CARBON, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
RESISTANCE MEASUREMENTS TO BE MADE WITH COILS DISCONNECTED FROM CIRCUIT.
COIL RESISTANCES NOT GIVEN ARE UNDER ONE OHM.
CATHODE RAY TUBE 2ND ANODE VOLTAGE TO BE MEASURED WITH ELECTROSTATIC OR 20K OHM OHM PER VOLT HIGH VOLTAGE METER.
ARROWS ON POTENTIOMETERS INDICATE CLOCKWISE ROTATION.
ALIGNMENT POINTS
CIRCLED LETTERS INDICATE ALIGNMENT AND TEST POINTS.
CHASSIS

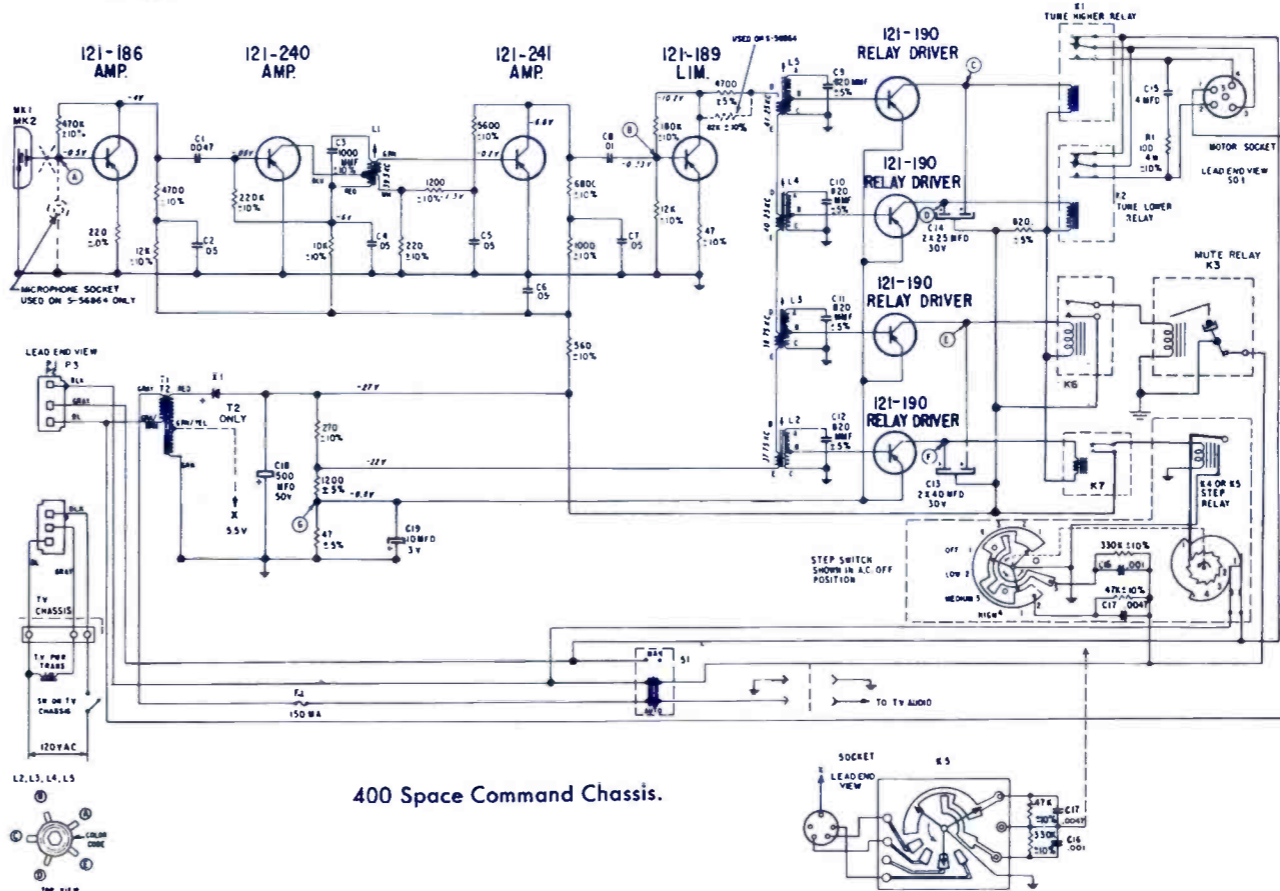
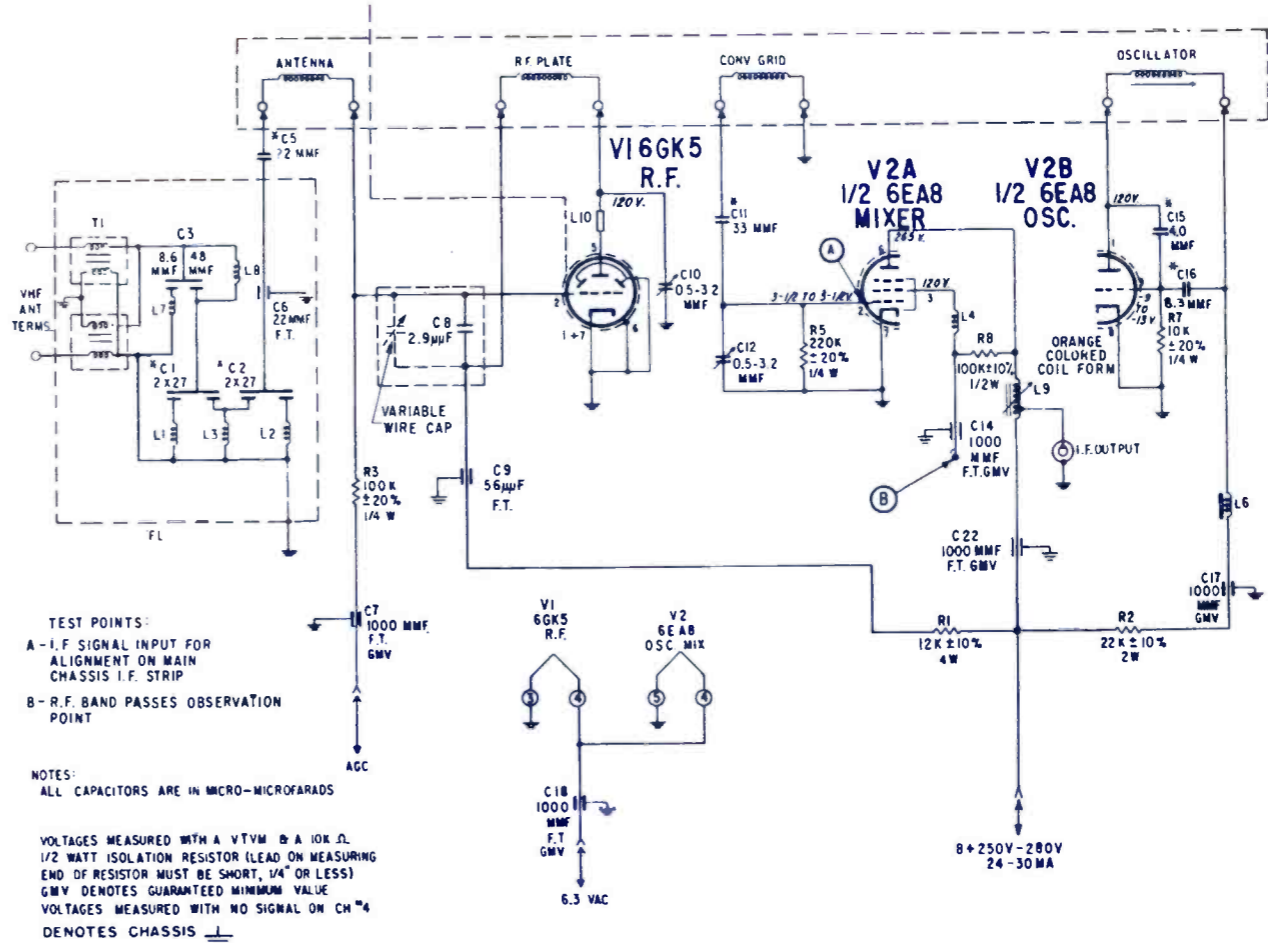
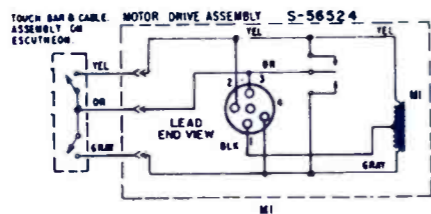
TEST POINTS:
C1 PICTURE DETECTOR OUTPUT.
C2 SYNC - SOUND DETECTOR OUTPUT.
D CRT CATHODE - VIDEO OUTPUT.
E IF AGC.
F GROUNDED FOR LE. ALIGNMENT.
G 3RD I.F. GRID.
H SOUND LIMITER PLATE.
J SOUND OUTPUT.
K KILLER VOLTAGE (GROUND TO OPEN COLOR CHANNEL).
L GATED BURST.
M ACC. VOLTAGE.
N R-Y GRID OF CRT.
O B-Y GRID OF CRT.
P G-Y GRID OF CRT.
Q R-Y DEMOD. CATHODE.
R COLOR AFC DETECTOR.
S SWEEP FUSE CURRENT.
T SWEEP FUSE CURRENT.
U REGULATOR CURRENT.
V REGULATOR CURRENT.
W REGULATOR CURRENT.

More Data on Reverse Side



CHANNEL 2 STRIP PLACE IN SLOT DIRECTLY UNDER THIS HOLE

NOTE: ITEMS DOTTED-IN USED ON "U" MODELS ONLY



ELECTRONIC TECHNICIAN TEKFAK

AIRLINE
Radio Chassis
Model GEN1731A

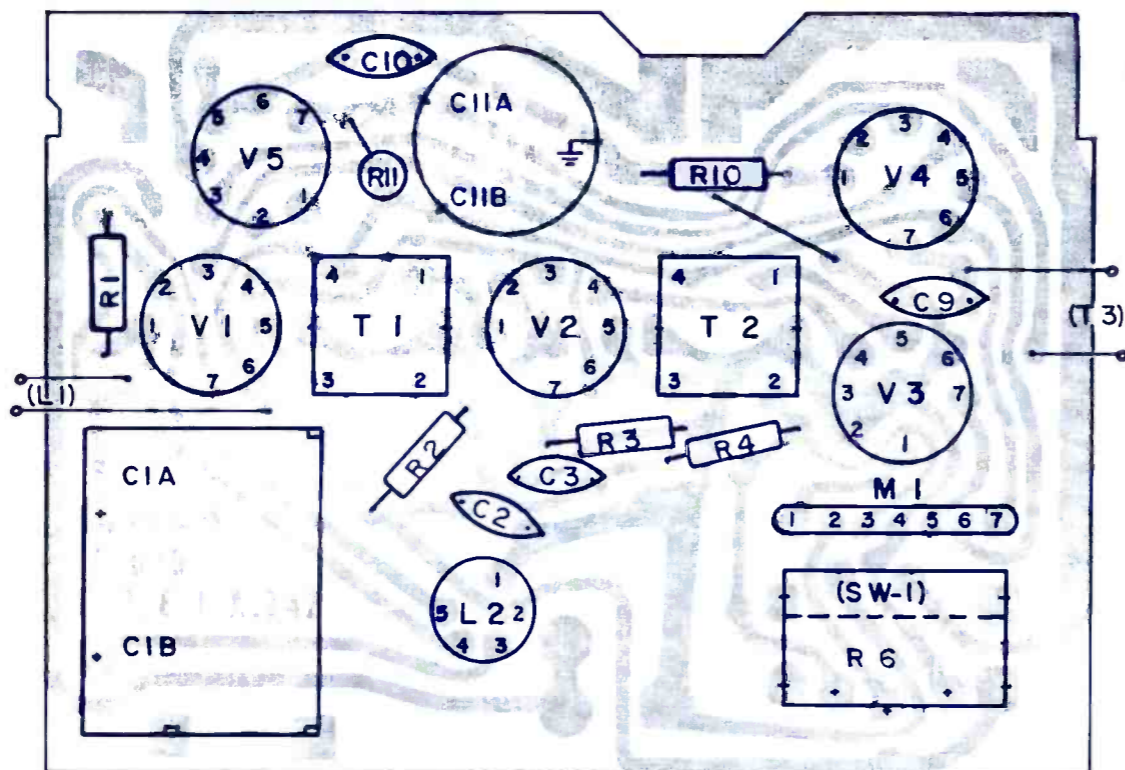


Figure 1. Bottom View

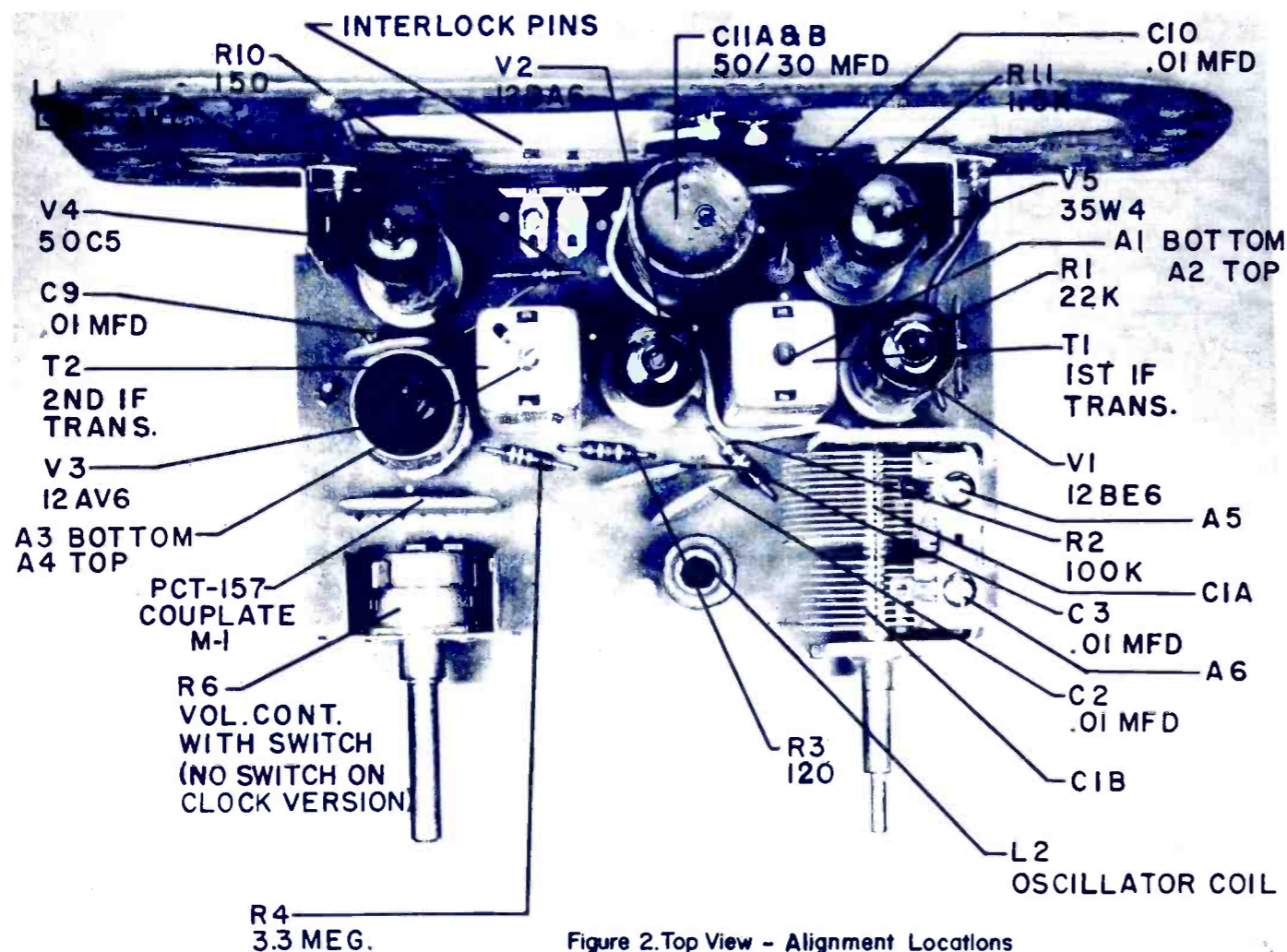
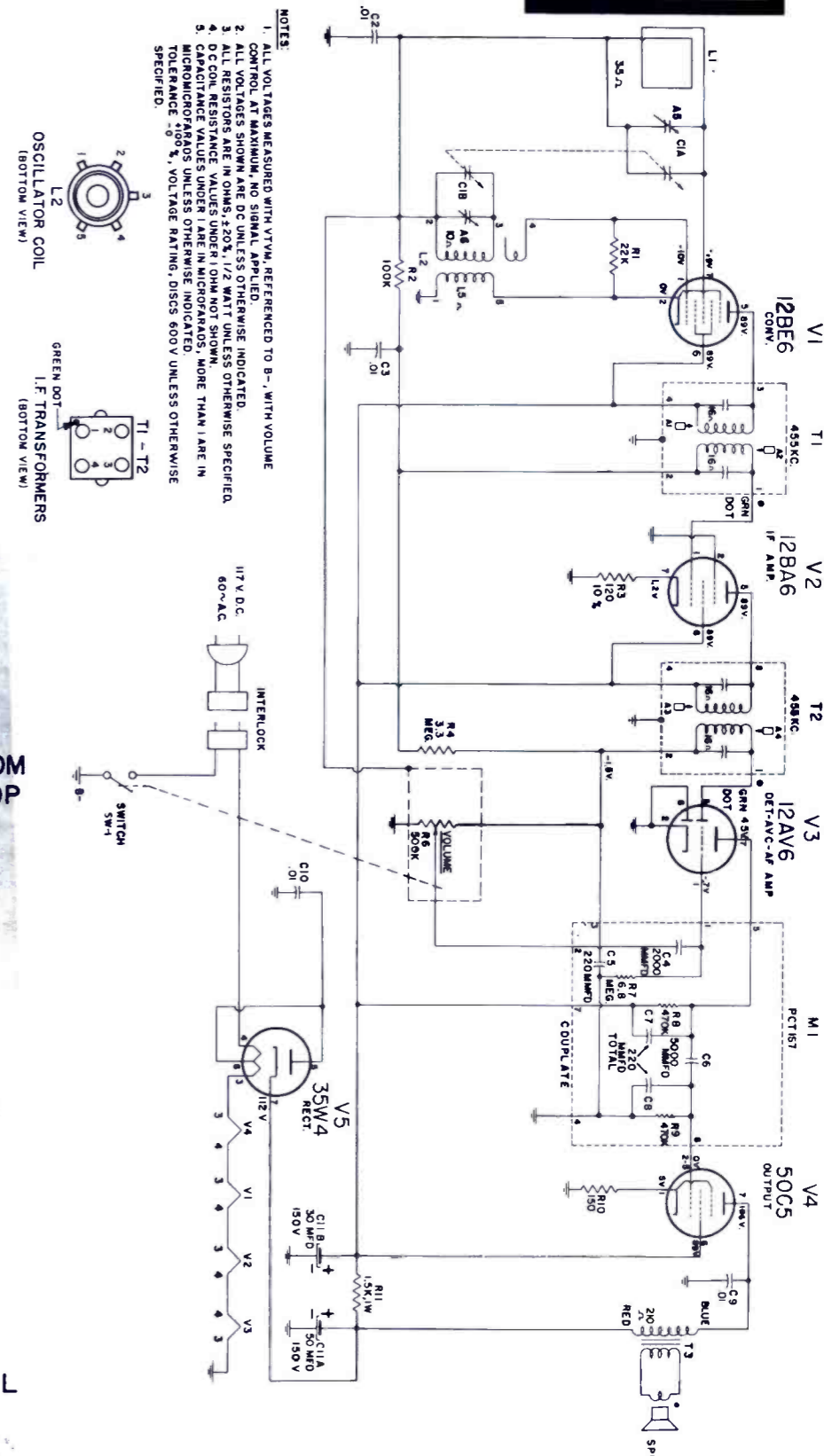


Figure 2. Top View - Alignment Locations



- NOTES:**
1. ALL VOLTAGES MEASURED WITH VTVM, REFERENCED TO B-, WITH VOLUME CONTROL AT MAXIMUM, NO SIGNAL APPLIED.
 2. ALL VOLTAGES SHOWN ARE DC UNLESS OTHERWISE INDICATED.
 3. ALL RESISTORS ARE IN OHMS, ±20%, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 4. DC COIL RESISTANCE VALUES UNDER 1 OHM NOT SHOWN.
 5. CAPACITANCE VALUES UNDER 1 ARE IN MICROFARADS, MORE THAN 1 ARE IN MICROMICROFARADS UNLESS OTHERWISE INDICATED.
 6. TOLERANCE ±100%, VOLTAGE RATING, DISCS 600 V UNLESS OTHERWISE SPECIFIED.



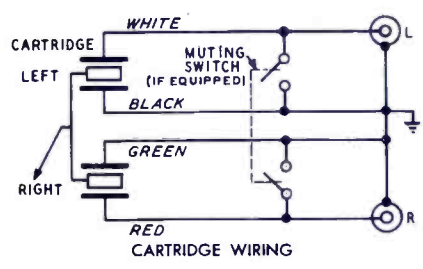
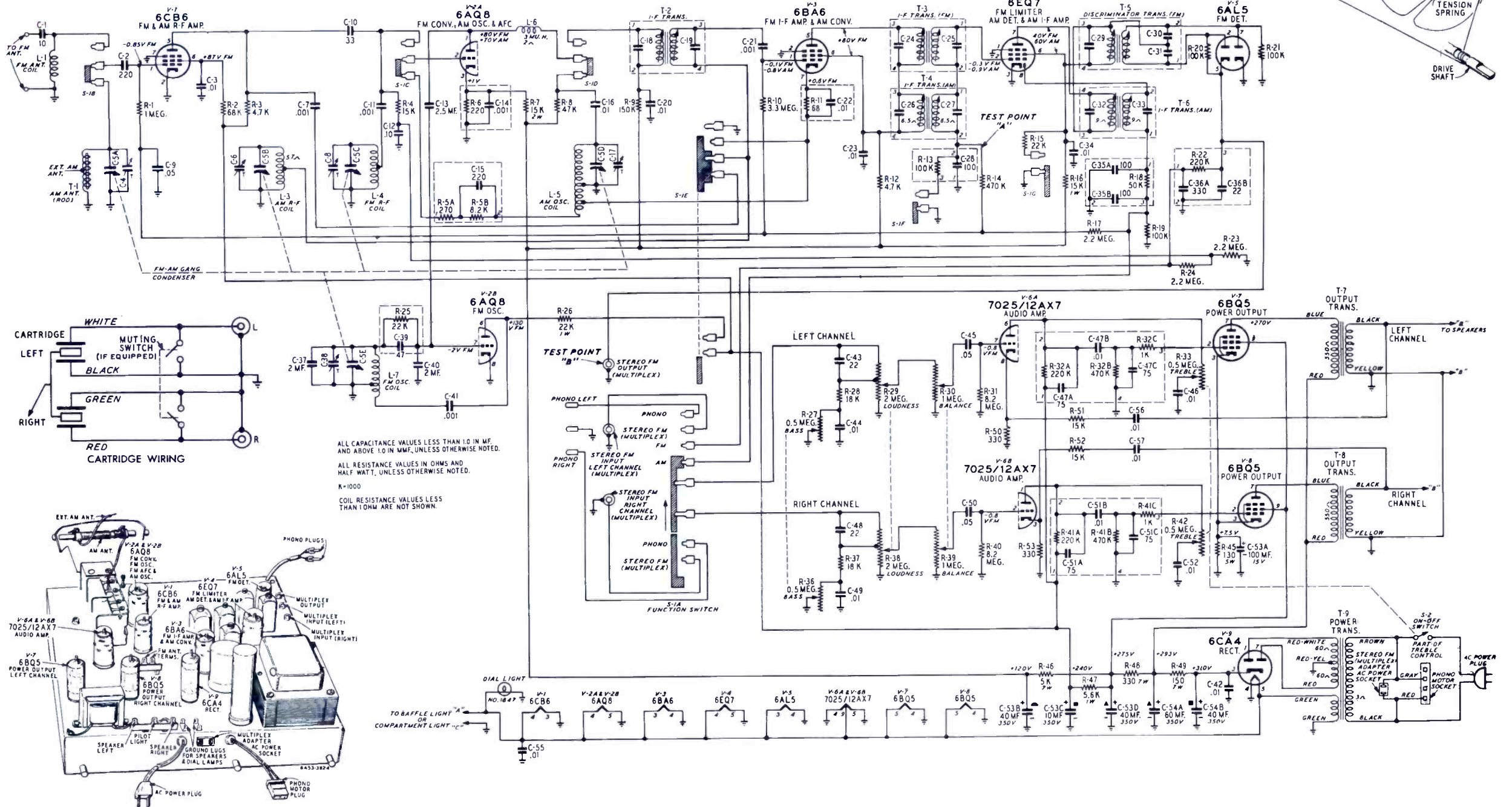
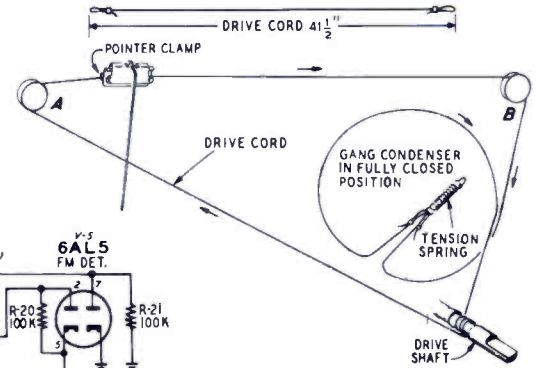
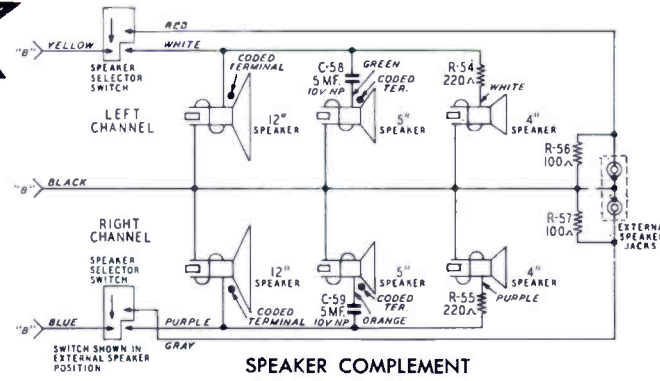
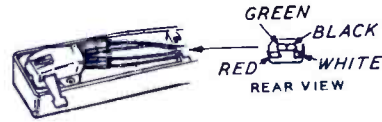
AIRLINE
AM/FM Console
Models
WG-2313A,
43A, 73A, BB,
43B and 73B

ELECTRONIC TECHNICIAN TEKFAK

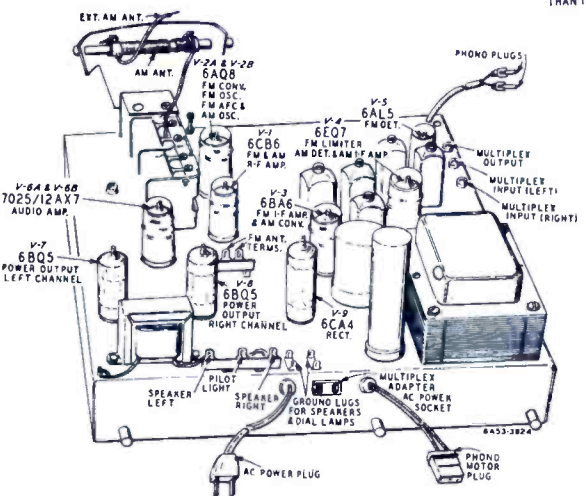
TUBE SOCKET VOLTAGES

Socket voltages are shown on the Schematic diagram of the tube socket terminals. All voltages are between the socket terminal and chassis ground. Plate, screen and cathode voltages were taken with a 1000 ohm-per volt meter with a 300 volt scale used for plate and screen voltages. Audio grid voltages were read with a vacuum tube volt-meter. Conditions of measurement are:

Line voltage 117 Volts AC
Signal Input None
A variation of $\pm 10\%$ is usually permissible.



ALL CAPACITANCE VALUES LESS THAN 1.0 IN MF. AND ABOVE 1.0 IN MMF, UNLESS OTHERWISE NOTED.
ALL RESISTANCE VALUES IN OHMS AND HALF WATT, UNLESS OTHERWISE NOTED.
K=1000
COIL RESISTANCE VALUES LESS THAN 1 OHM ARE NOT SHOWN.



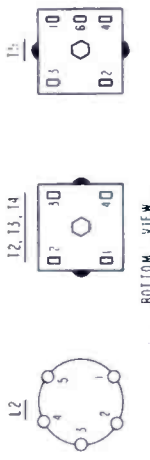
AIRLINE

Clock Radio
Model GTM 18
27A

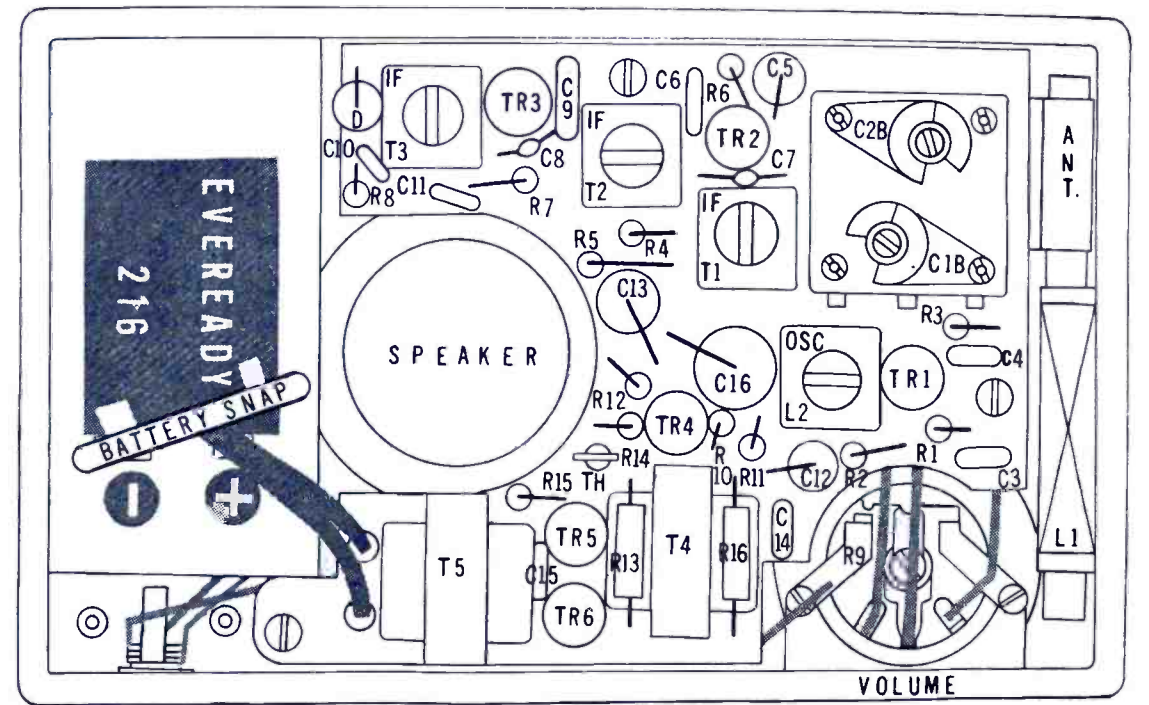
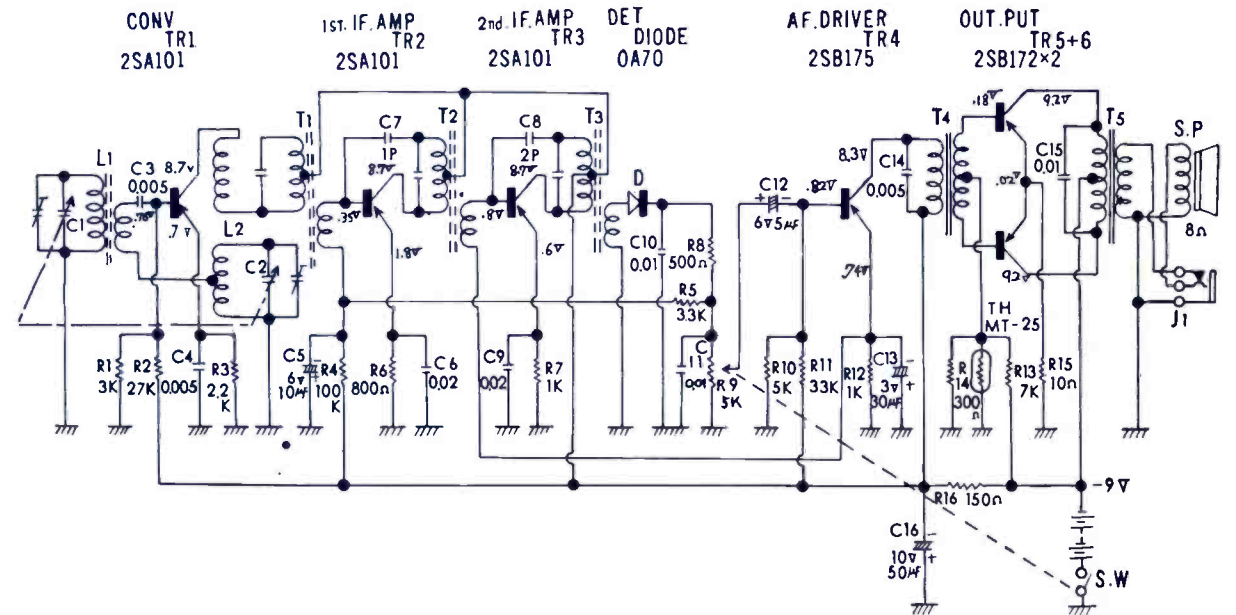
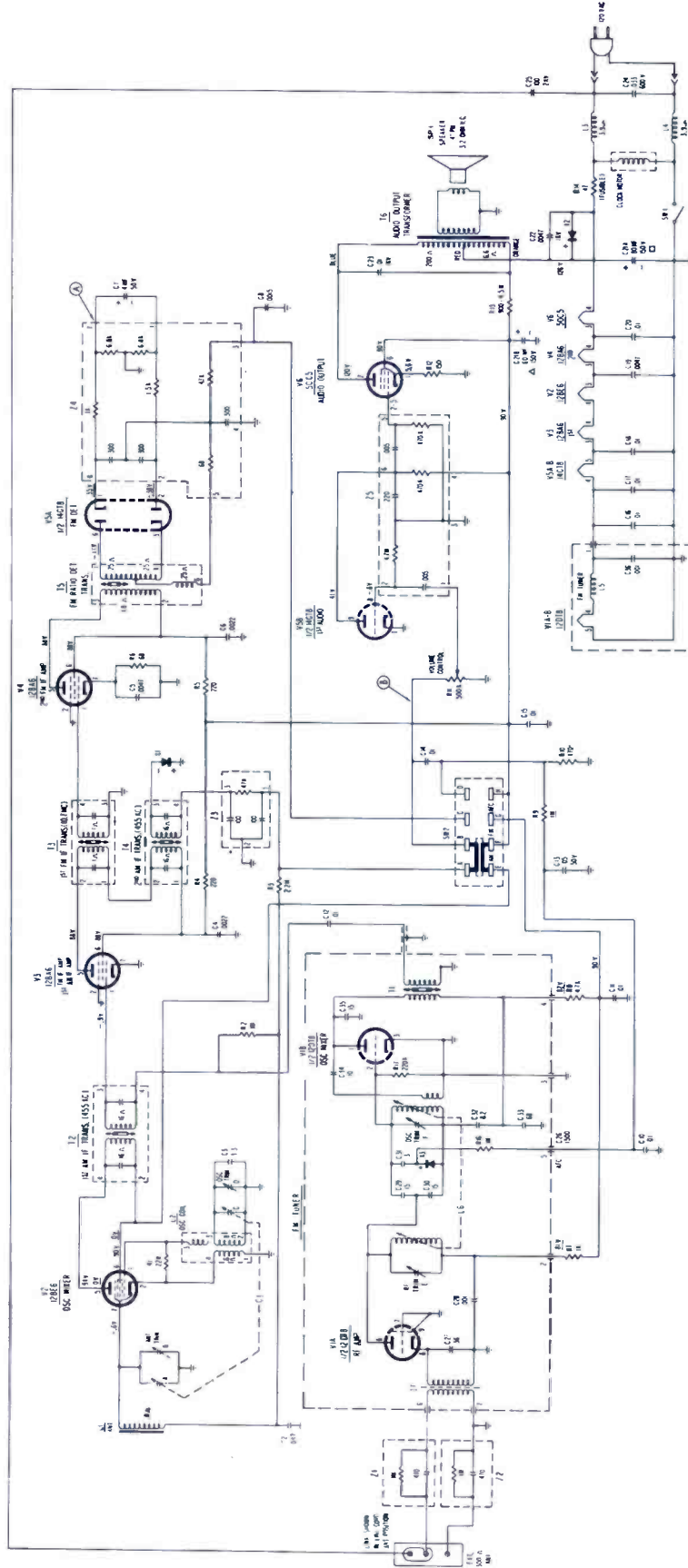
ELECTRONIC TECHNICIAN TEKFAK

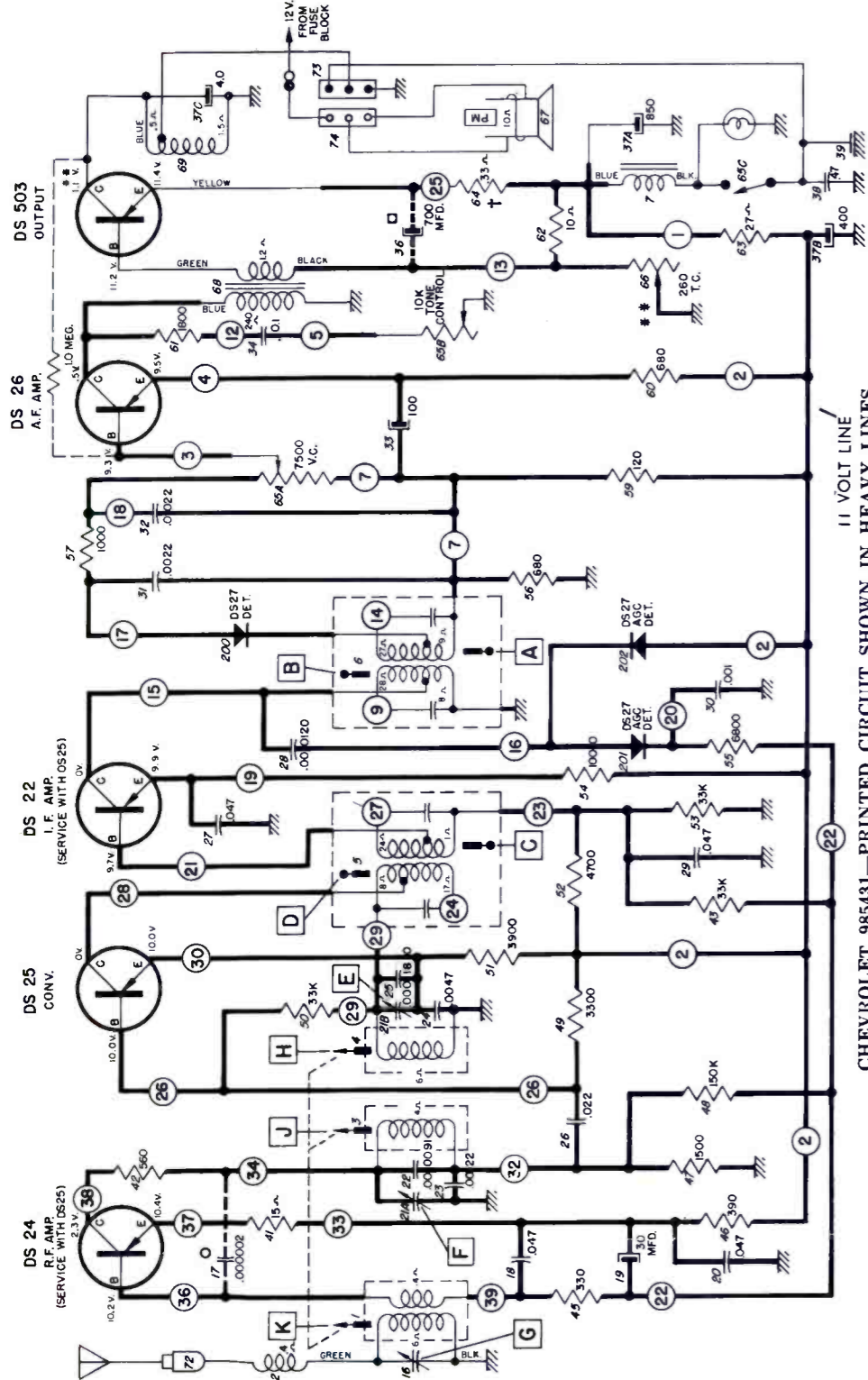
ELECTRONIC TECHNICIAN TEKFAK

AIRLINE
Transistor Radio
Model
Gen 1225A



- NOTES:
1. ALL CAPACITANCE VALUES LESS THAN 100P ARE IN P.F. (PICTOFARAD); ALL RESISTANCE VALUES ARE IN OHMS UNLESS OTHERWISE INDICATED.
 2. VOLTAGES TAKEN WITH A VTVM FROM POINTS INDICATED TO B-; TUNING CAPACITOR AT MAXIMUM VOLUME CONTROL AT MINIMUM LINE VOLTAGE AT 120V AC; NO SIGNAL INPUT; SW2 IN AM POSITION.
- UNDERLINED VOLTAGES SW2 IN FM POSITION.





CHEVROLET 985431—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

Voltages measured terminal to chassis with a volt-ohm meter — no signal and 12 volts applied to radio.

Total battery drain 1.2 amps at 12 volts
Tolerance on voltage $\pm 10\%$.

Before measuring transistor voltages, a 10 ohm speaker must be connected to radio.
** Voltage should be measured from power transistor case to ground. If power transistor is replaced, adjust bias potentiometer (Ill. #66) to obtain proper collector voltage with 12 volts applied to radio.

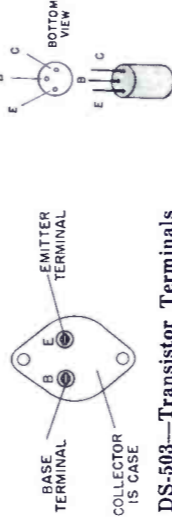
† Illus. #64 is a fuse resistor for the power transistor. Service with exact replacement.

○ Printed on circuit board.

△ Will not appear in all radios.

□ Will not appear in all radios.

CAUTION: Only a 10 ohm speaker should be used on this radio.



DS-503—Transistor Terminals

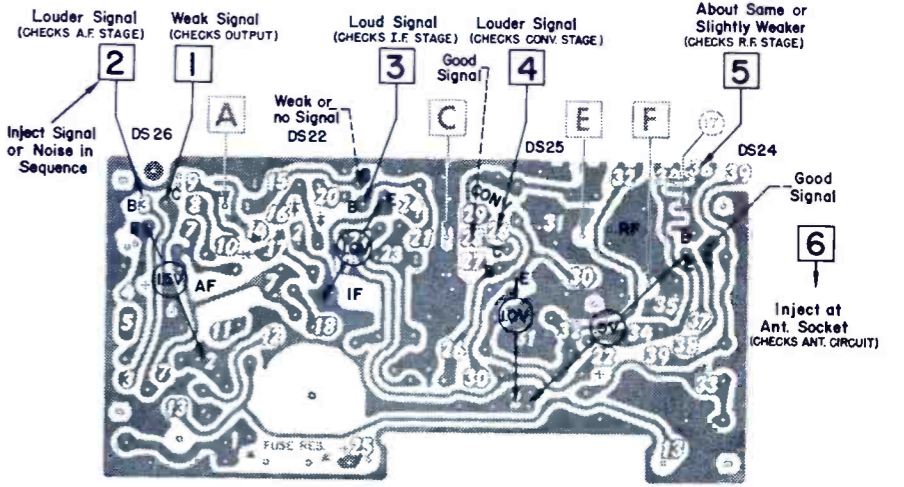
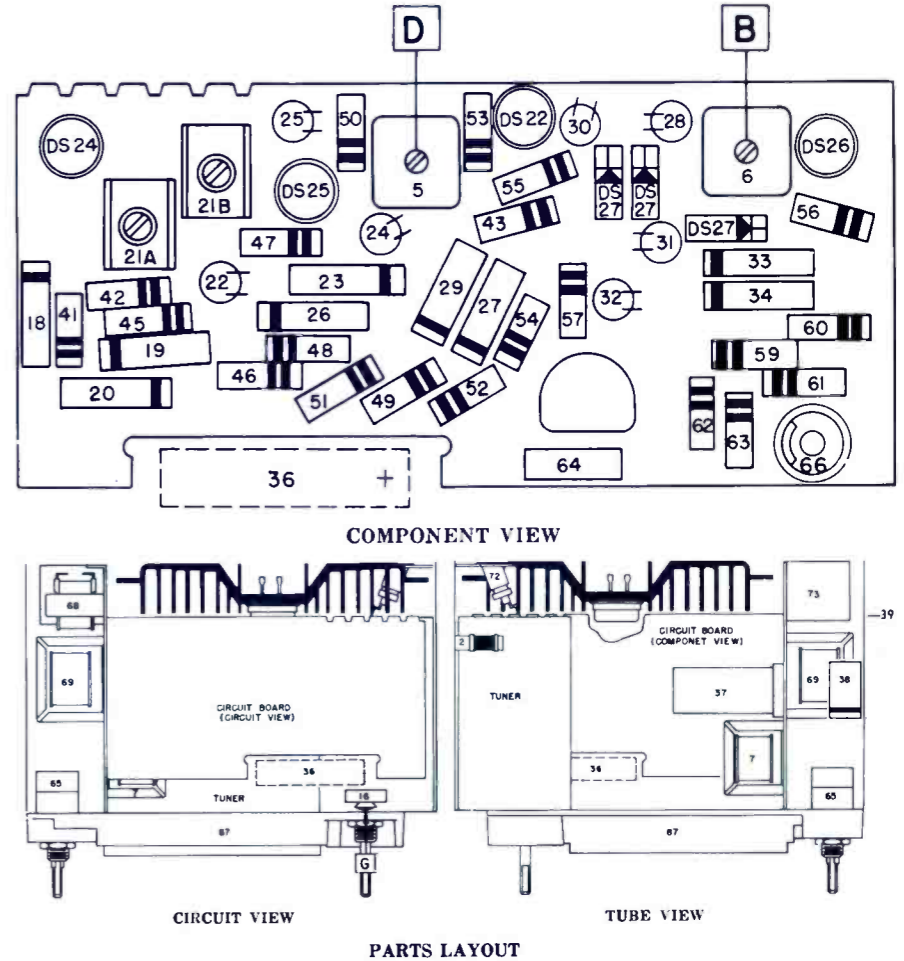
Note: Mtg. Insulators #1221813 not packaged with DS-503.
DS-26—Transistor Terminals
DS-22 Terminals
DS-25

I. TROUBLESHOOTING PROCEDURE

1. Turn radio on (ear near speaker). If no "thump" is heard, suspect: open fuse, open "Fuse resistor," loose speaker plug, open speaker, or shorted DS503 transistor.
2. Isolate trouble to a stage (AF, IF, Conv., RF—see letters on circuit board below). Use a noise generator or other device at each point, starting with 1.
3. Measure voltages in defective stage. **Note:** Voltage between 11.0 V. line (printed conductor #2) and emitter (E) of each stage checks conduction of that stage.

II. TYPICAL TROUBLES

Indication	Probable Trouble
Weak, fading whistles, or station mixing	Antenna trimmer not peaked in car
No "thump". "0" volts on DS-503 case	Shorted DS-503, open fuse res. (Also check value of 10 ohm res., Illus. 62)
Very high DS-24 collector voltage	Defective AGC diode (Normal voltage across each AGC diode is .1 volt)
Intermittent or noisy when tapped	Loose connection or defective I.F. coil
Very high bias (B to E) and no conduction in a stage	*Open small transistor



CIRCUIT BOARD (PRINTED VIEW)

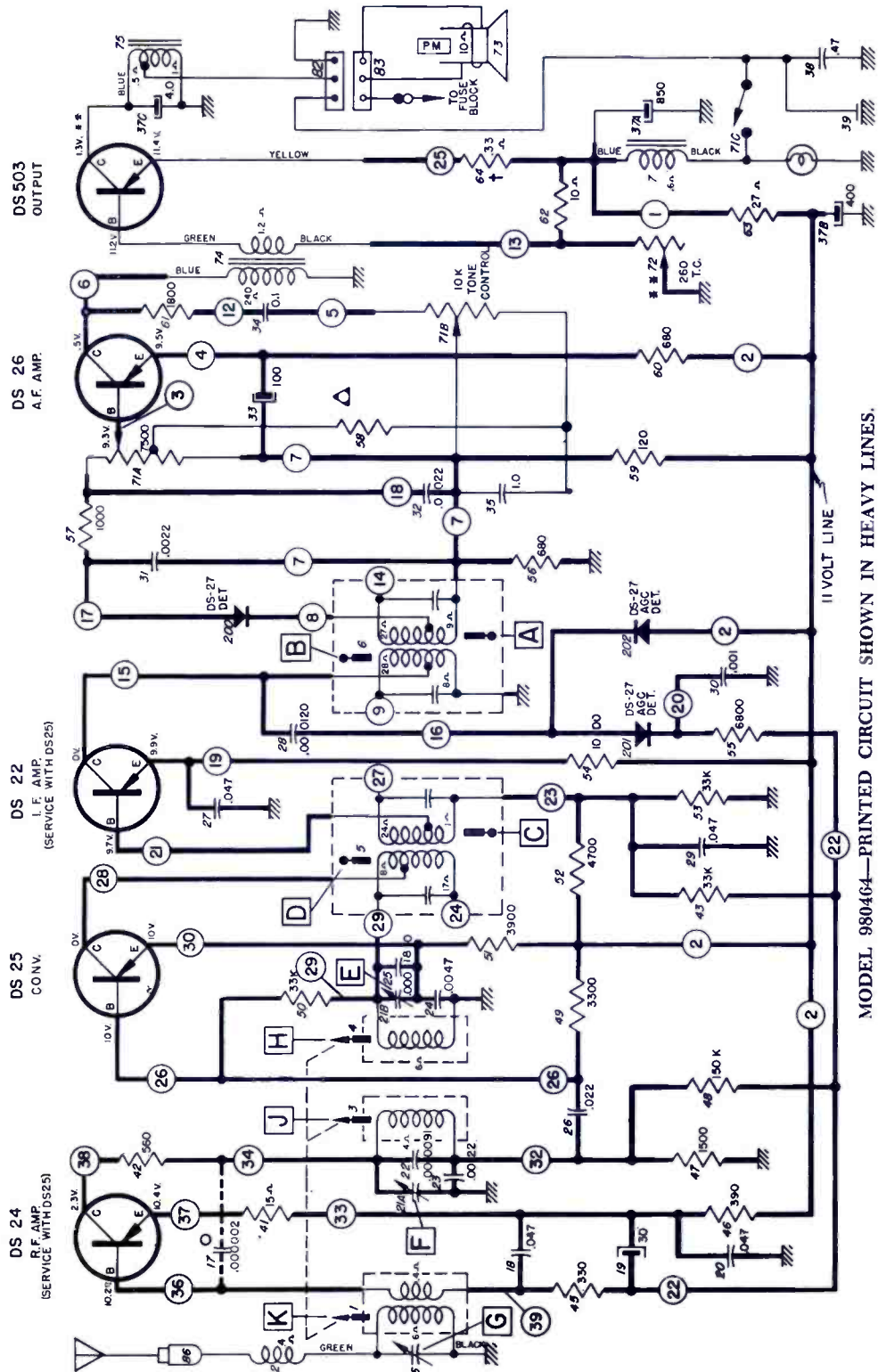
COMPONENT VIEW

CIRCUIT VIEW

PARTS LAYOUT

TUBE VIEW

CAUTION: Collector Voltage of DS-503 Transistor should be measured at Transistor Case (not the Heat Radiator)



MODEL 980464—PRINTED CIRCUIT SHOWN IN HEAVY LINES.

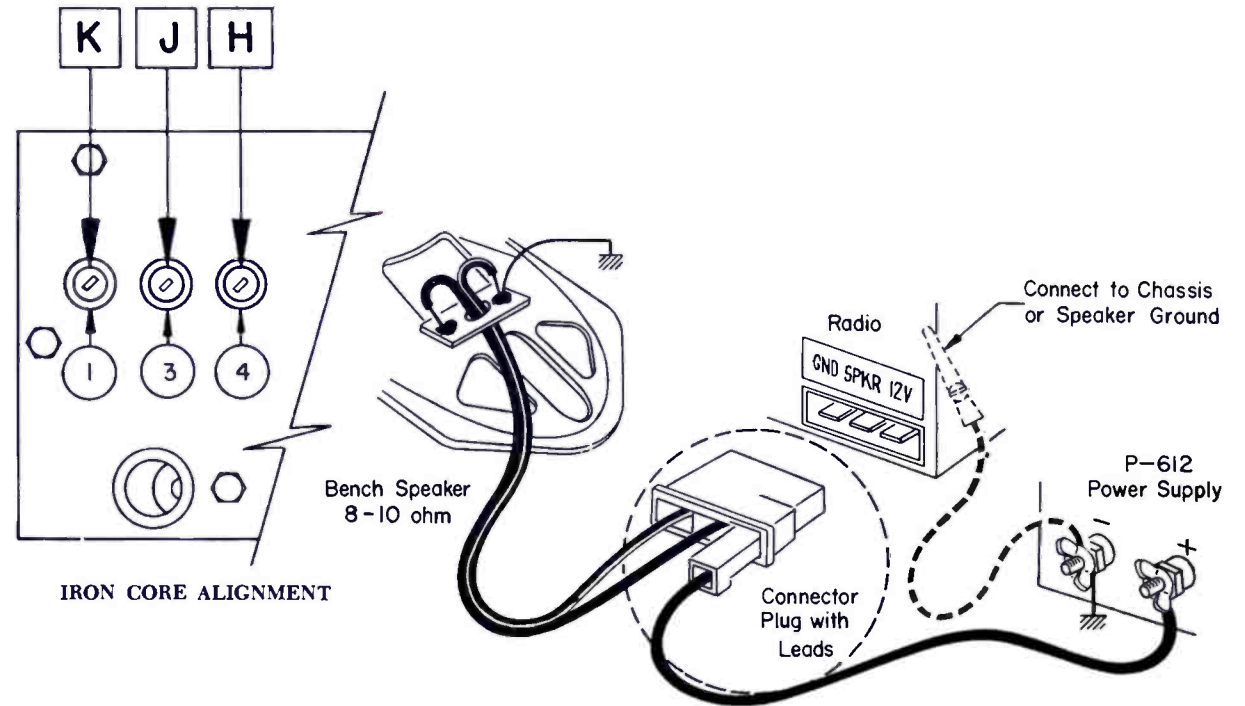
Volts measured terminal to chassis with a volt-ohm meter - no signal and 12 volts applied to radio.
Total battery drain 1.2 amps at 12 volts.
Tolerance on voltages 10%.
Before measuring transistor voltages, a 10 ohm speaker must be connected to radio.
••Voltage should be measured from power transistor case to ground. If power transistor is replaced, adjust bias potentiometer (Ill. #72) to obtain proper collector voltage with 12 volts applied to radio.
Δ Illus. #58 Resistor is 330 ohm.
† Illus. #64 is a fuse resistor for the power transistor. Service with exact replacement.
⊕ Printed on circuit board.

CAUTION: Only a 10 ohm speaker should be used on this radio.

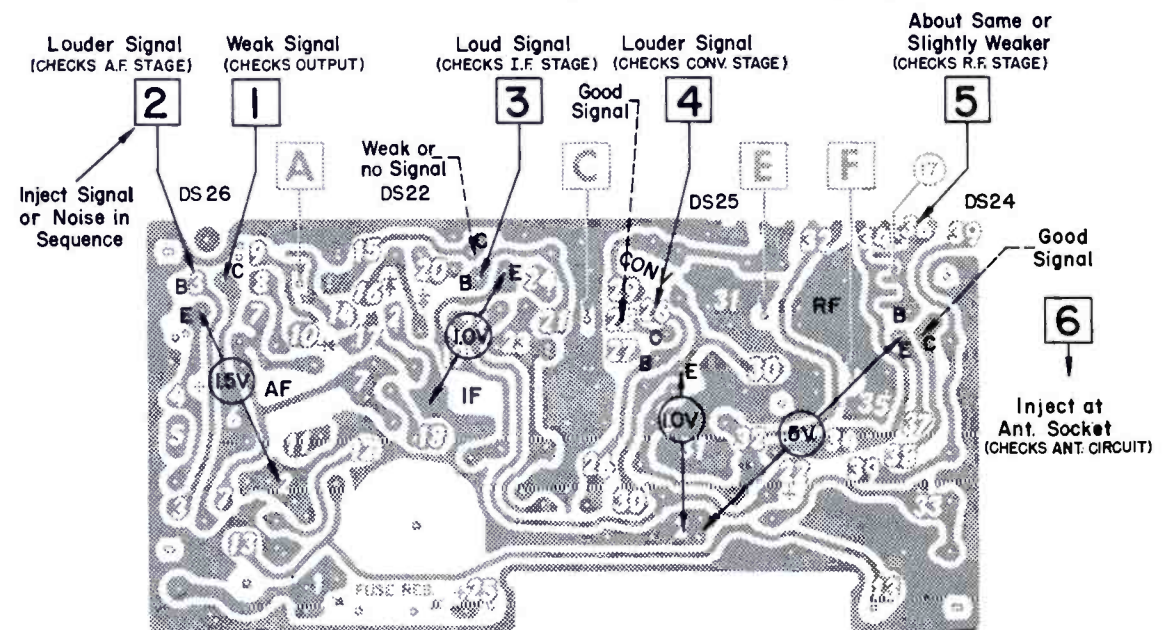


DS503—TRANSISTOR TERMINALS
DS22, DS25, and DS26 TRANSISTOR TERMINALS

NOTE: Mfg. Insulators #1221813 not packaged with DS-503.



USING NEW CONNECTOR PLUG SIMPLIFIES SERVICING
(Available with leads under part #1221833)



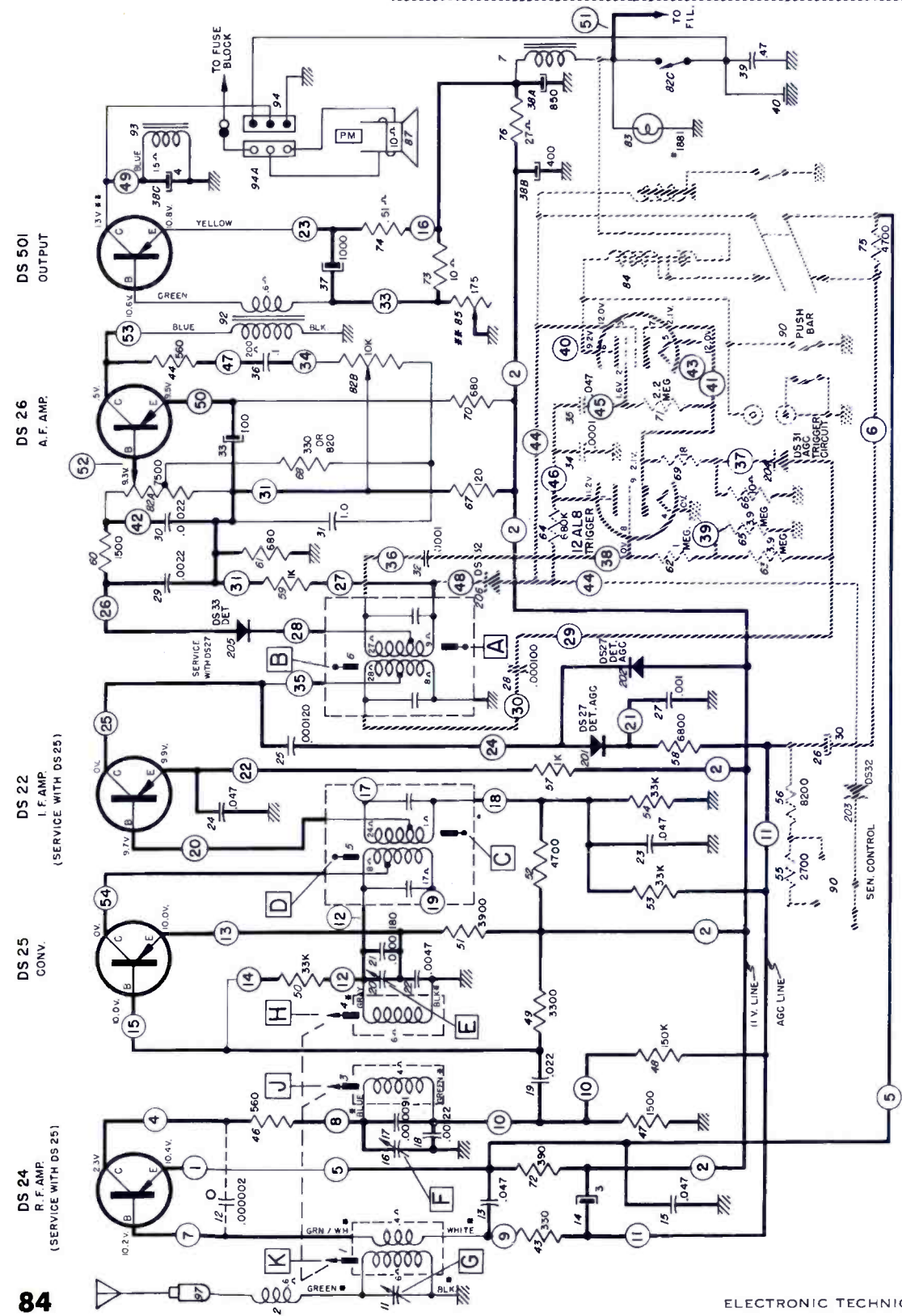
CIRCUIT BOARD (PRINTED VIEW)

NUMBERS IN SQUARES ARE MAJOR TEST POINTS FOR STAGE ISOLATION—INJECT SIGNAL OR NOISE GENERATOR.

DELCO
Oldsmobile
Model 9821137

ELECTRONIC TECHNICIAN TEKFAK

IF RADIO IS POWERED BY BATTERY ELIMINATOR, USE 16 VOLTS FOR PROPER SOLENOID ACTION.



PRINTED CIRCUIT SHOWN IN HEAVY LINES

TUNER CIRCUIT COMPONENTS

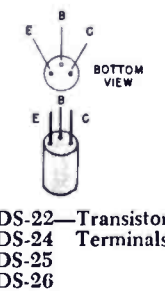
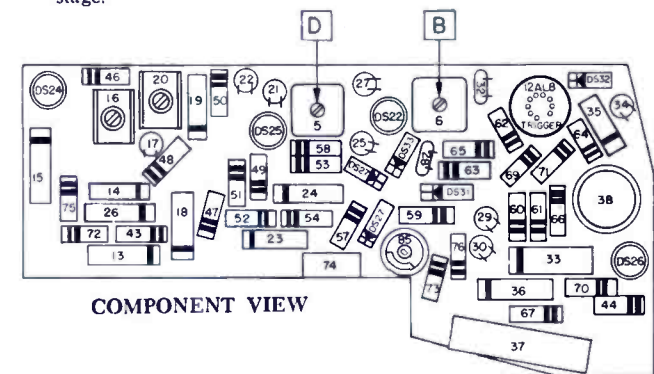
I. TROUBLESHOOTING PROCEDURE

1. Turn radio on (ear near speaker). If no "thump" is heard, suspect: open fuse, open "Fuse resistor," loose speaker plug, open speaker, or shorted DS-501 transistor.
2. Isolate trouble to a stage (AF, IF, Conv., RF—see letters on circuit board below). Note that the triggering signal passes through the RF, Conv. and IF before reaching the trigger tube.
3. Measure voltages in defective stage. Note: Voltage between 10.8 V. line (printed conductor #2) & emitter (E) of each stage checks conduction of that stage.

II. TYPICAL TROUBLES

Indication	Probable Trouble
Weak, fading, whistles, or station mixing	Antenna trimmer not peaked in car
No "thump." "0" volts on DS-501 case	Shorted DS-501, open fuse res. (Also check value of 10 ohm res., Illus. 73)
Very high DS24 collector voltage	Defective AGC diode (Normal voltage across each AGC diode is .1 volt)
Intermittent or noisy when tapped	Loose connection or defective I.F. coil
Very high bias (B to E) or wrong conduction in a stage (See circled voltages Page 2)	*Open or leaky small transistor. (Also check emitter capacitor).

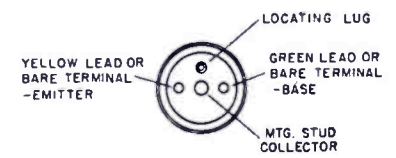
*Check for open by bridging good one across, similar to way capacitors are checked in circuit.



NOTE: ILLUS. 74 IS FUSE RESISTOR. OPEN FUSE RESISTOR MAKES TRANSISTOR COLLECTOR VOLTAGE 0 VOLTS.
NUMBERS ON PRINTED CIRCUIT BOARD CORRESPOND WITH NUMBERS IN CIRCLES ON SCHEMATIC DIAGRAM.

SCHEMATIC DATA

- Voltages measured terminal to chassis with a volt-ohm meter - no signal and 12 volts applied to the radio.
 - Total battery drain 1.9 amps at 12 volts.
 - Tolerance on voltages $\pm 10\%$.
 - Indicates lead from Tuner Assembly.
 - Before measuring transistor voltage a 10 ohm speaker must be connected to the radio. If power transistor is replaced, adjust bias potentiometer (Ill. to #85) to obtain proper collector voltage with 12 volts applied to radio. Voltage should be measured from power transistor case to ground.
 - † Ill. #74 is a fuse resistor for the power transistor. Service with exact Delco service replacement.
 - Printed on circuit board.
- Trigger tube voltages are read with a VTVM and with the tuner seeking. Use a Delco P-612 power supply or battery for proper tuner action.
CAUTION: Only a 10 ohm speaker should be used on this radio.

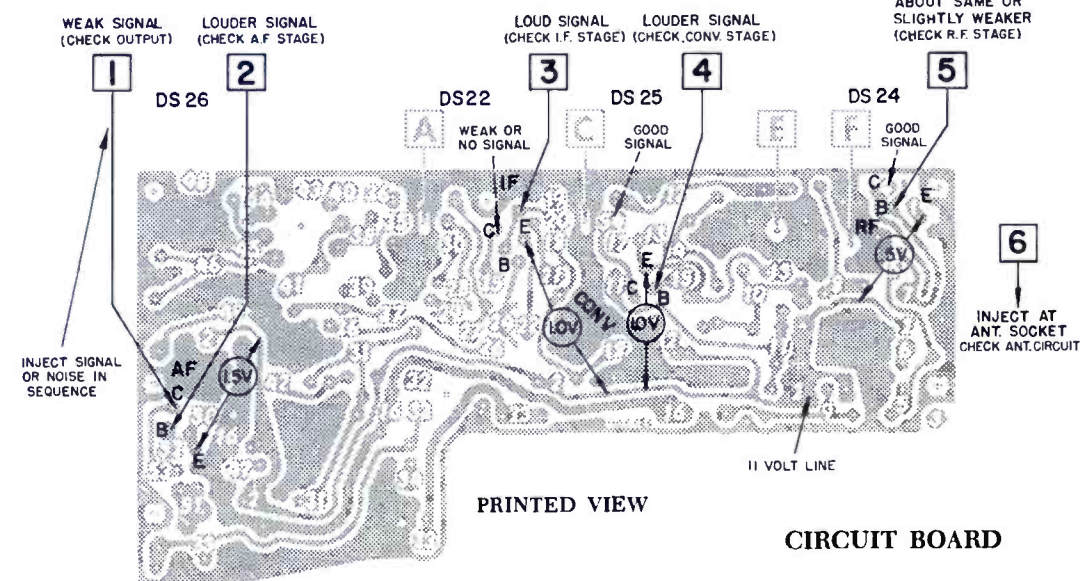


DS-501 Transistor Terminals

Note: Mtg. Insulators #1221847 not packaged with DS-501.

ADDITIONAL INFORMATION

- Tuner—Bulletin 6D-624 and 6D-626.
- Transistor—Bulletin 6D-207 and 6D-206.
- Printed Circuit—Bulletin 6D-555.

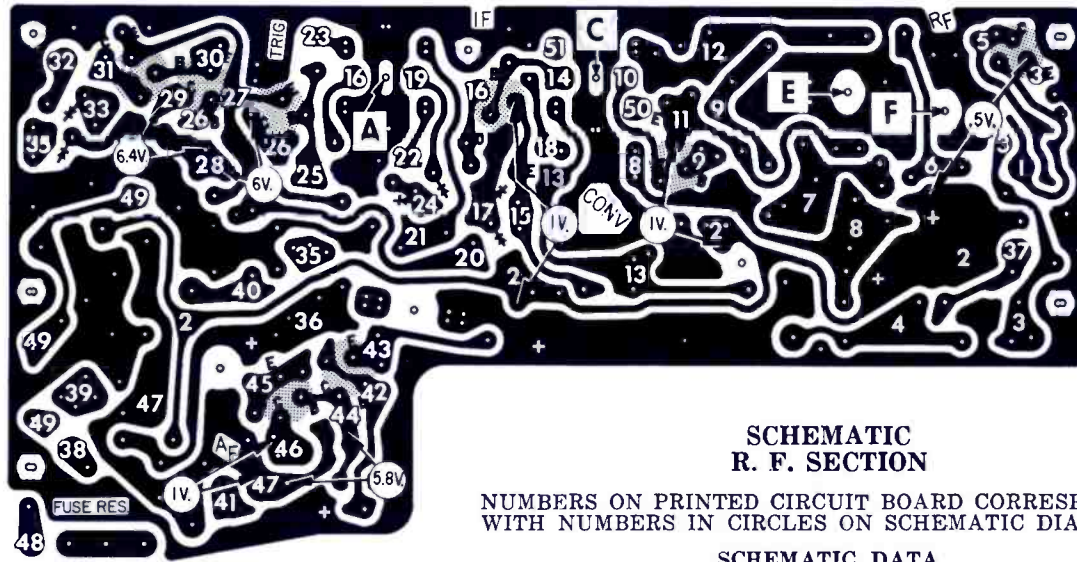


PRINTED VIEW

CIRCUIT BOARD

ELECTRONIC TECHNICIAN TEKFAK

DELCO
Auto Radio
Cadillac Model
7286315



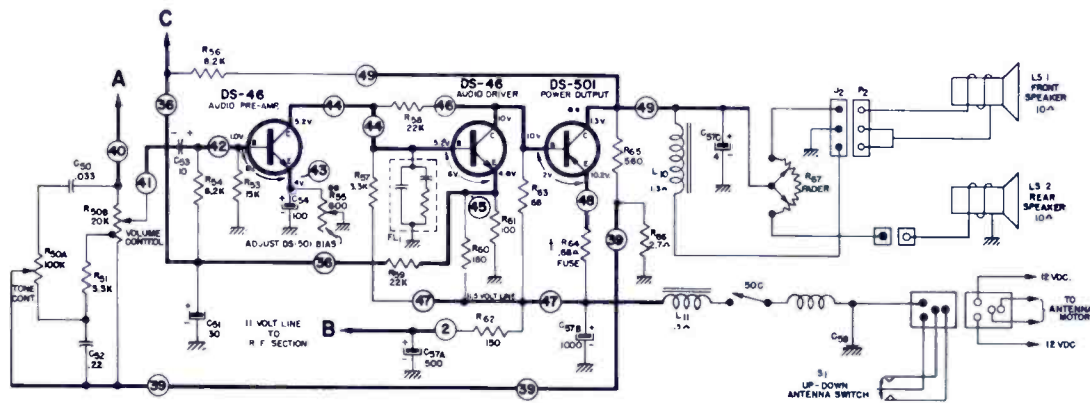
SCHEMATIC R. F. SECTION

NUMBERS ON PRINTED CIRCUIT BOARD CORRESPOND WITH NUMBERS IN CIRCLES ON SCHEMATIC DIAGRAM.

SCHEMATIC DATA

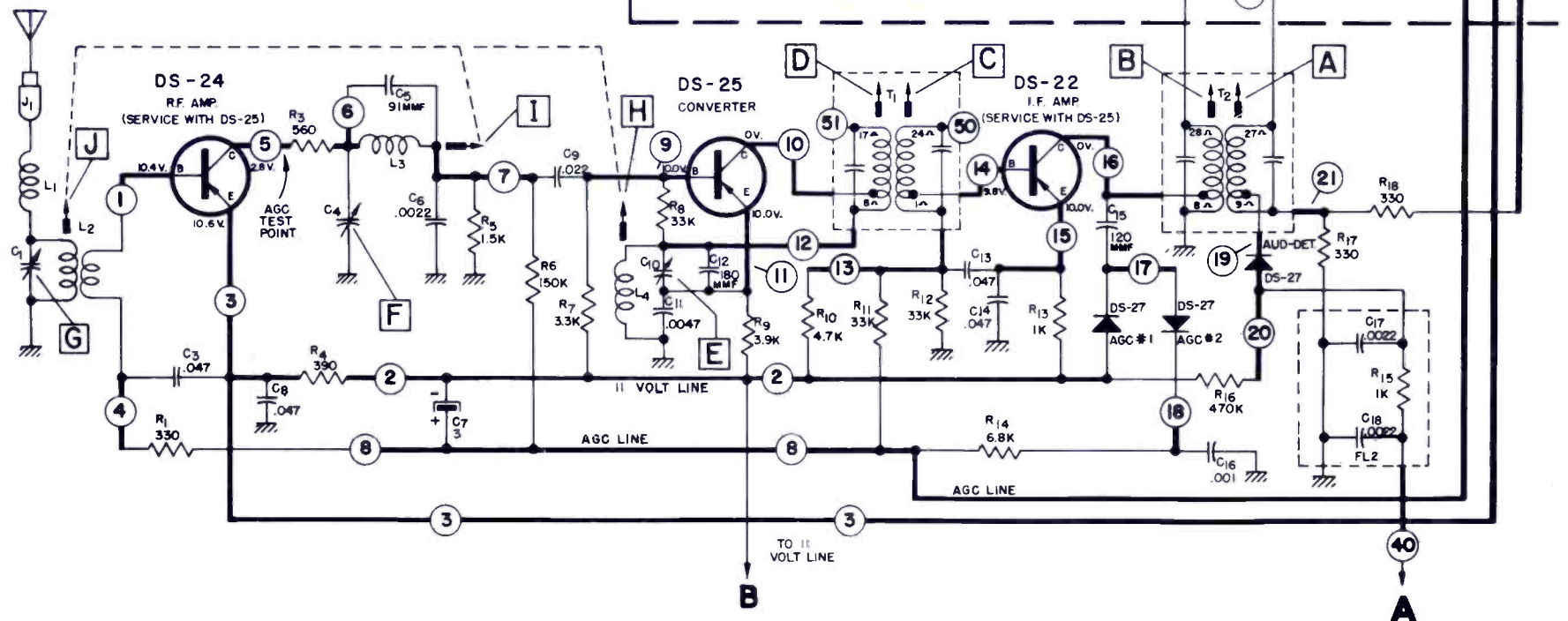
Voltages measured terminal to chassis with a volt-ohm meter —no signal and 12 volts applied to the radio. Use VTVM in Trigger Circuit.

Total battery drain 1.2 amps at 12 volts.
Tolerance on voltages $\pm 10\%$.



SIGNAL INJECTION

ISLAND NO.	LOCATION	OUTPUT
46	Base of DS-501	Weak
44	Base of Audio Driver	Loud
42	Base of Audio Pre Amp	Very Loud
14	Base of I.F. Amp.	Louder
9	Base of Converter	Louder
1	Base of R.F. Amplifier	Very Loud



** Before measuring transistor voltage a 10 ohm speaker must be connected to the radio. If power transistor is replaced, adjust bias potentiometer to obtain proper collector voltage with 12 volts applied to radio. Voltage should be measured from power transistor case to ground.

† Ill. #64 is a fuse resistor for the power transistor. Service with exact Delco service replacement.

Trigger voltages are read with a VTVM and with the tuner seeking. Use a Delco P-612 power supply or battery for proper tuner action.

TRIGGER CIRCUIT

DELCO
Chevrolet
Auto Radio
Model 985332

ELECTRONIC TECHNICIAN TEKFAK

ELECTRONIC TECHNICIAN TEKFAK

EMERSON
Transistor Radio
Chassis 120664,
664L

MAJOR CHASSIS ITEMS (Cont'd)

T-1	1st I-F Transformer	720444
T-2	2nd I-F Transformer	720445
T-3	3rd I-F Transformer	720446
T-4	Audio Driver Transformer	734218
J-1	Listening Attach. Jack	508038
SP-1	Spkr. 2-3/4" PM (100 Ohms)	180280
X-1	Audio Demodulator Diode	817091

TRANSISTORS

		CH. 120664	CH. 120664L
* Q-1	Converter	815065 or 815066	815115
Q-2	AGC Ampl.	815105	815118
Q-3	1st I-F Ampl.	815103	815116
Q-4	2nd I-F Ampl.	815068	815117
Q-5	Audio Ampl.	815114	815120A
* Q-6	Audio Driver	815114	815120-B or -C, -D, -E
* Q-7, 8	Audio Output	815070A or -B, -C, -D	815120-B or -C, -D, -E

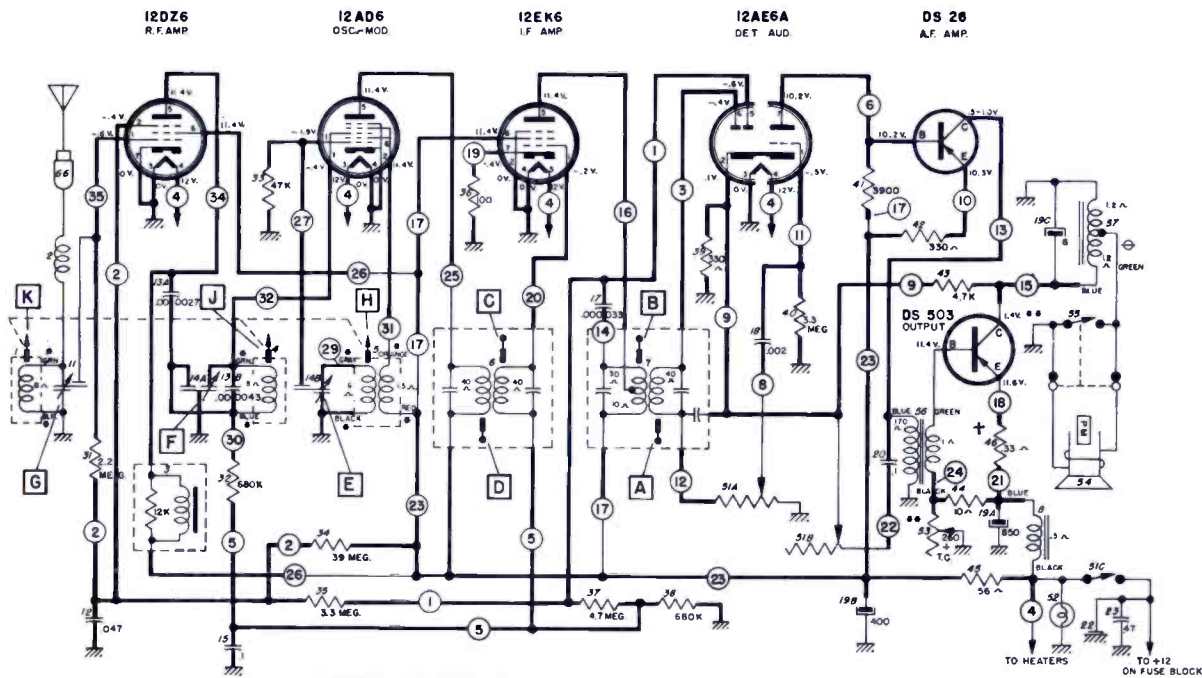
*NOTE: Proper combinations must be observed when replacing some of the transistors indicated by an asterisk. Refer to the schematic diagram for details.

MAJOR CABINET ITEMS

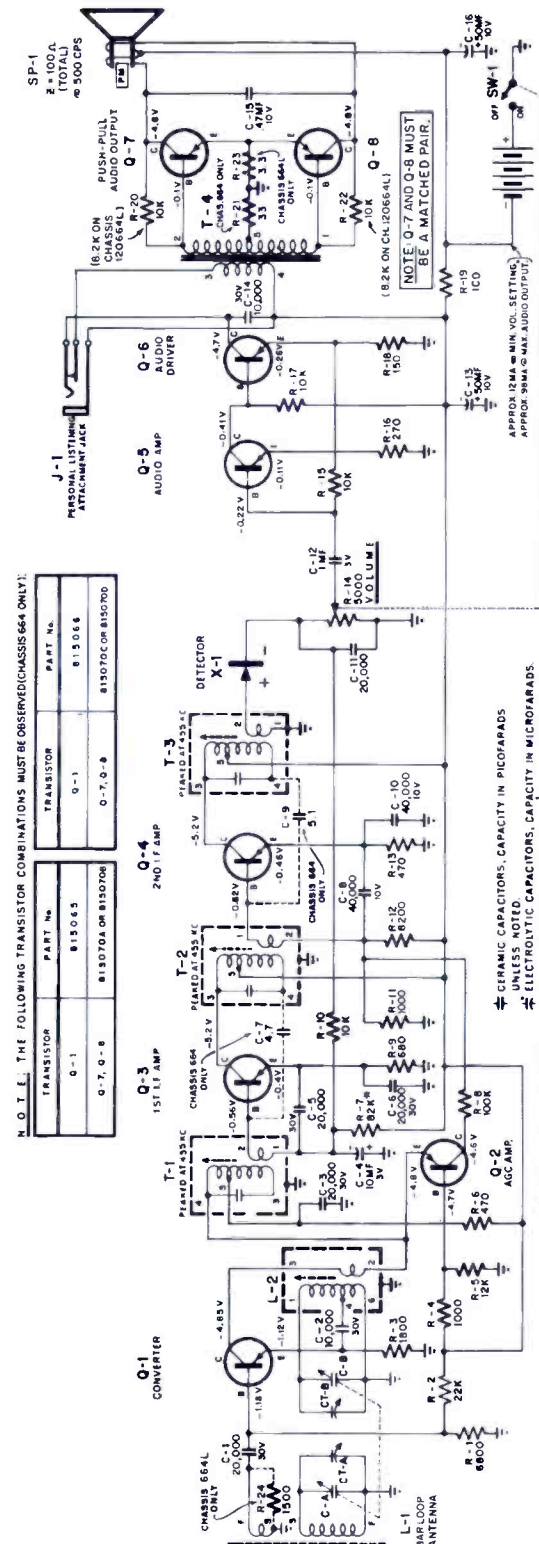
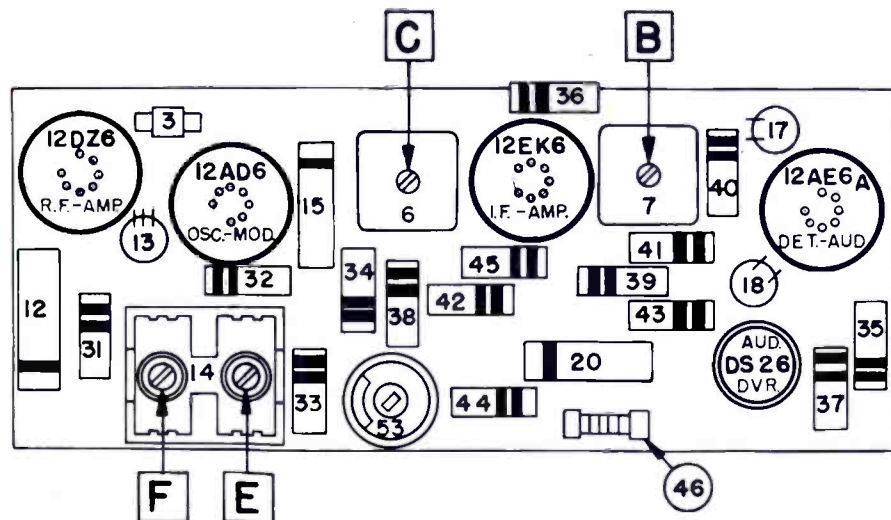
Cabinet Front Complete - Ebony	141338
Cabinet Front Complete - Green	141338A
Cabinet Front Complete - White	141338B
Cabinet Front Complete - Red	141338C
Cabinet Front Complete - Turquoise	141448D
Cabinet Front Complete - Charcoal	141338E
Cabinet Back - Ebony	141428
Cabinet Back - Green	141428A
Cabinet Back - White	141428B
Cabinet Back - Red	141428C
Cabinet Back - Turquoise	141428D
Cabinet Back - Charcoal	141428E
Volume Control Knob	461566
Tuning Control Knob	461567
Retaining Screw for above	265162
Screw - Cabinet Back Ret'g	265096A
Battery Container Assembly	963730

MAJOR CHASSIS ITEMS

C-A, B	Variable Capacitor	900217
C-4	10 Mf Electrolytic, 3V.	925486
C-13, 16	50 Mf Electrolytic, 10V.	925561
R-14	Volume Control w/switch	390730
L-1	Barloop Antenna	700183
L-2	Oscillator Coil	716147



CHEVROLET 985332—PRINTED CIRCUIT SHOWN IN HEAVY LINES.
VOLTAGES MEASURED TERMINAL TO CHASSIS WITH A VTVM—NO SIGNAL AND 12.0 VOLTS AT ILLUS. 22.
OSCILLATOR GRID VOLTAGE TAKEN WITH SET TUNED TO 1000 KC.
TOTAL "A" DRAIN AT 12V.—1.4 AMPS.
TOLERANCE ON VOLTAGES ± 10%
*—INDICATES LEAD FROM TUNER COIL ASS'Y.
**—BEFORE MEASURING TRANSISTOR VOLTAGES, THE SHORTING TYPE SPEAKER SOCKET MUST BE OPENED AND A 4 OHM SPEAKER CONNECTED. IF TRANSISTOR IS REPLACED, ADJUST BIAS POTENTIOMETER (ILLUS. 53) TO OBTAIN PROPER COLLECTOR VOLTAGE WITH 12 VOLTS INPUT TO RADIO.
†—ILLUS. 46 IS A FUSE RESISTOR FOR THE TRANSISTOR.



N.O.T.E.: THE FOLLOWING TRANSISTOR COMBINATIONS MUST BE OBSERVED (CHASSIS 664L ONLY):

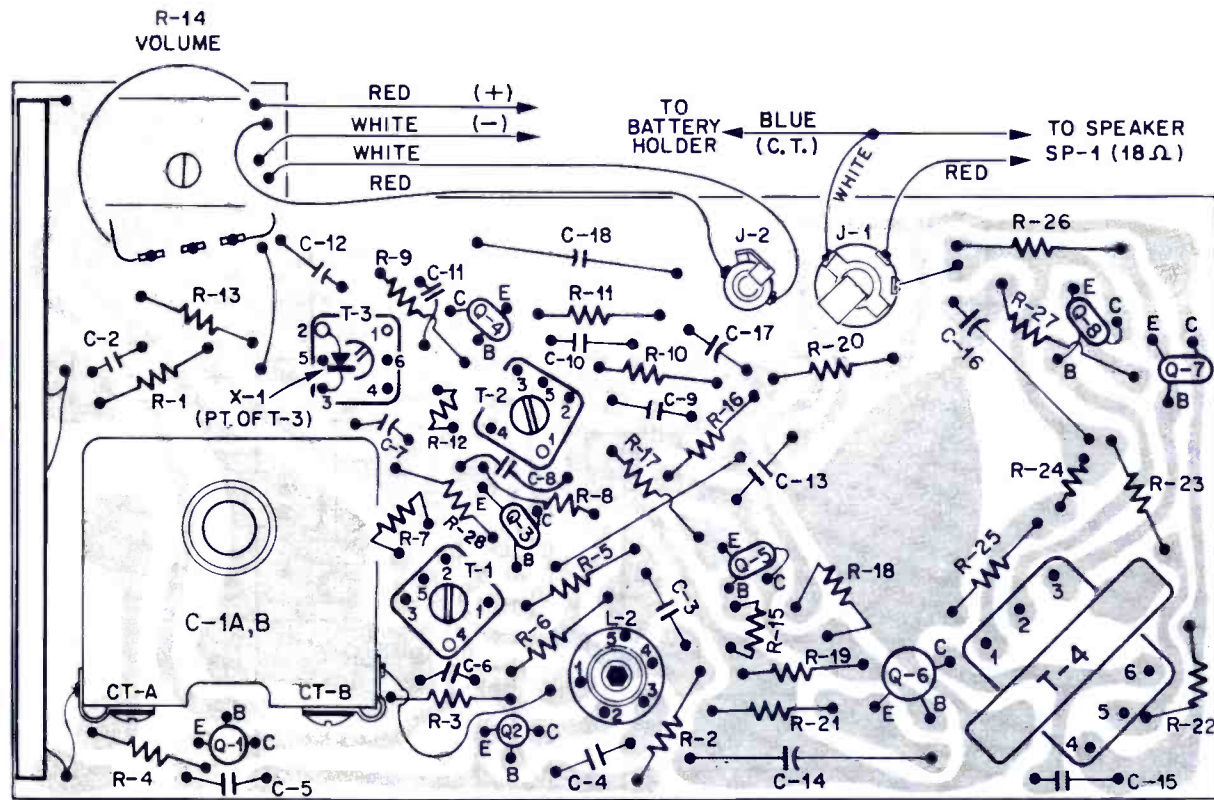
TRANSISTOR	PART No.	TRANSISTOR	PART No.
Q-1	815065	Q-7, Q-8	815070A OR B15070C OR B15070D
Q-2	815066		

N.O.T.E.: THE FOLLOWING TRANSISTOR COMBINATIONS MUST BE OBSERVED (CHASSIS 664L ONLY):

TRANSISTOR	PART No.	TRANSISTOR	PART No.
Q-1	815065	Q-7, Q-8	815120A OR B15120B OR B15120C
Q-2	815066		

ELECTRONIC TECHNICIAN TEKFAX

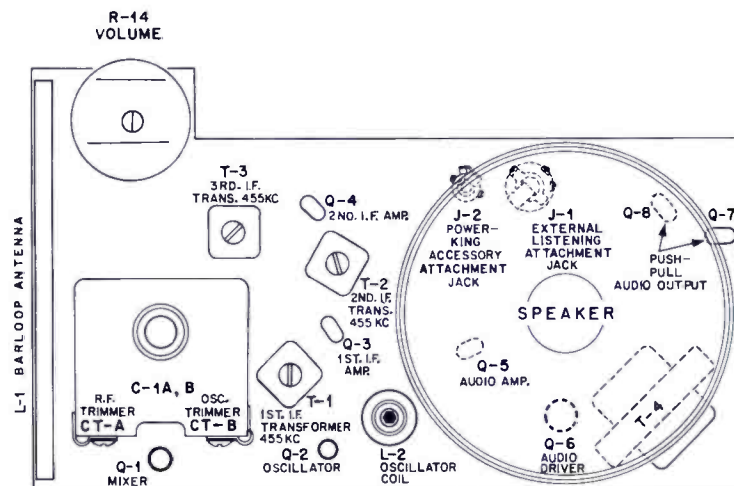
EMERSON
Transistor Radio
Chassis 120655



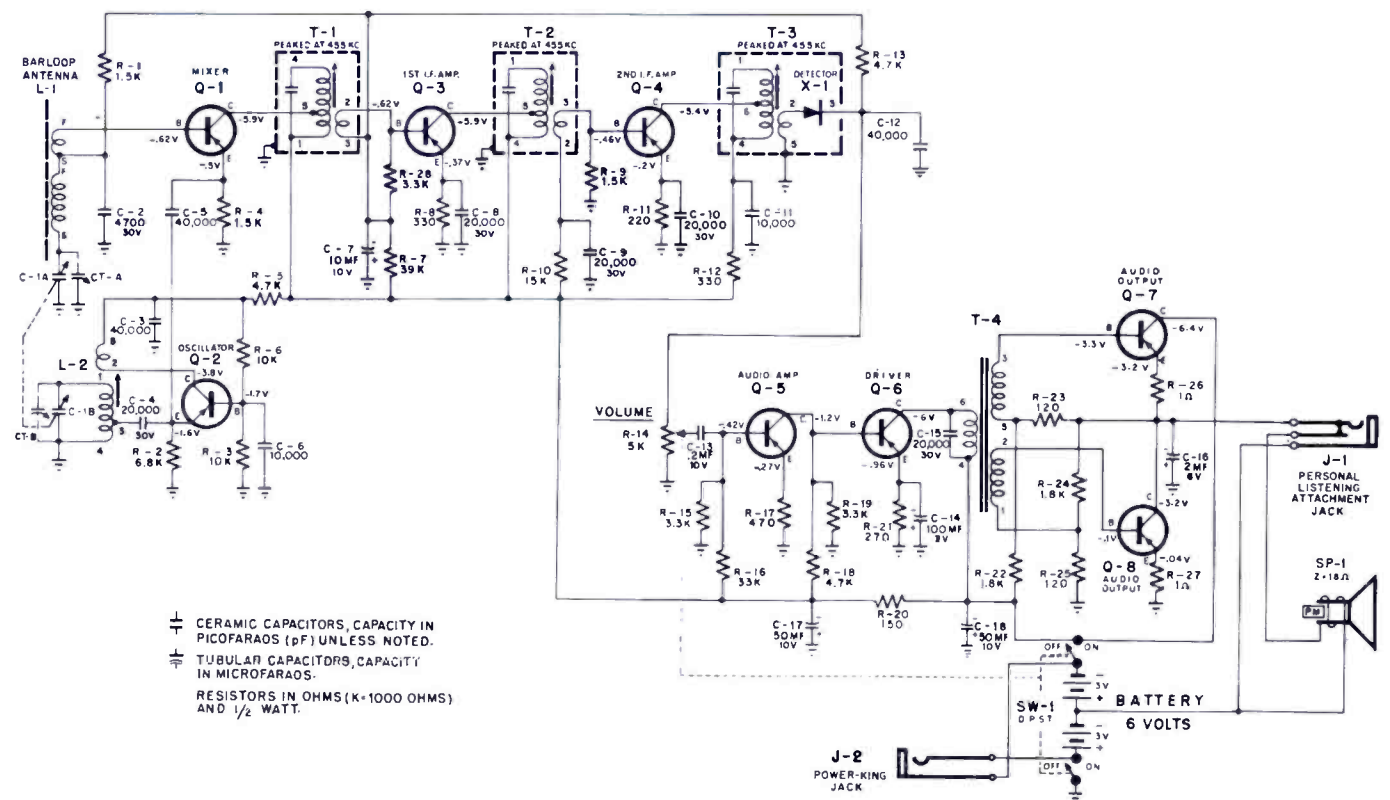
TITAN



GALAXY



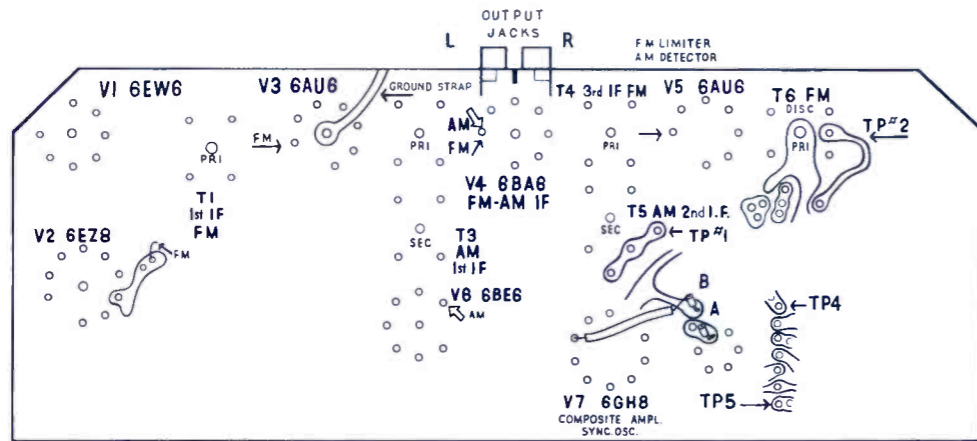
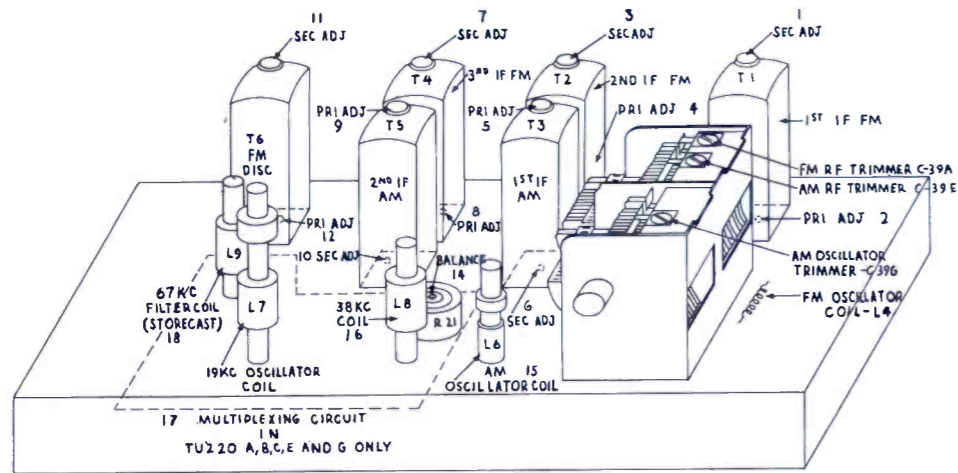
TRANSISTOR AND ALIGNMENT POINT LOCATION



GENERAL ELECTRIC
AM FM Tuners
Chassis TU 220

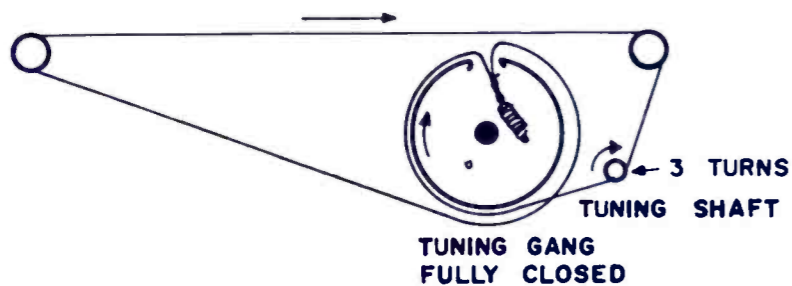
ELECTRONIC TECHNICIAN

TEKFAX

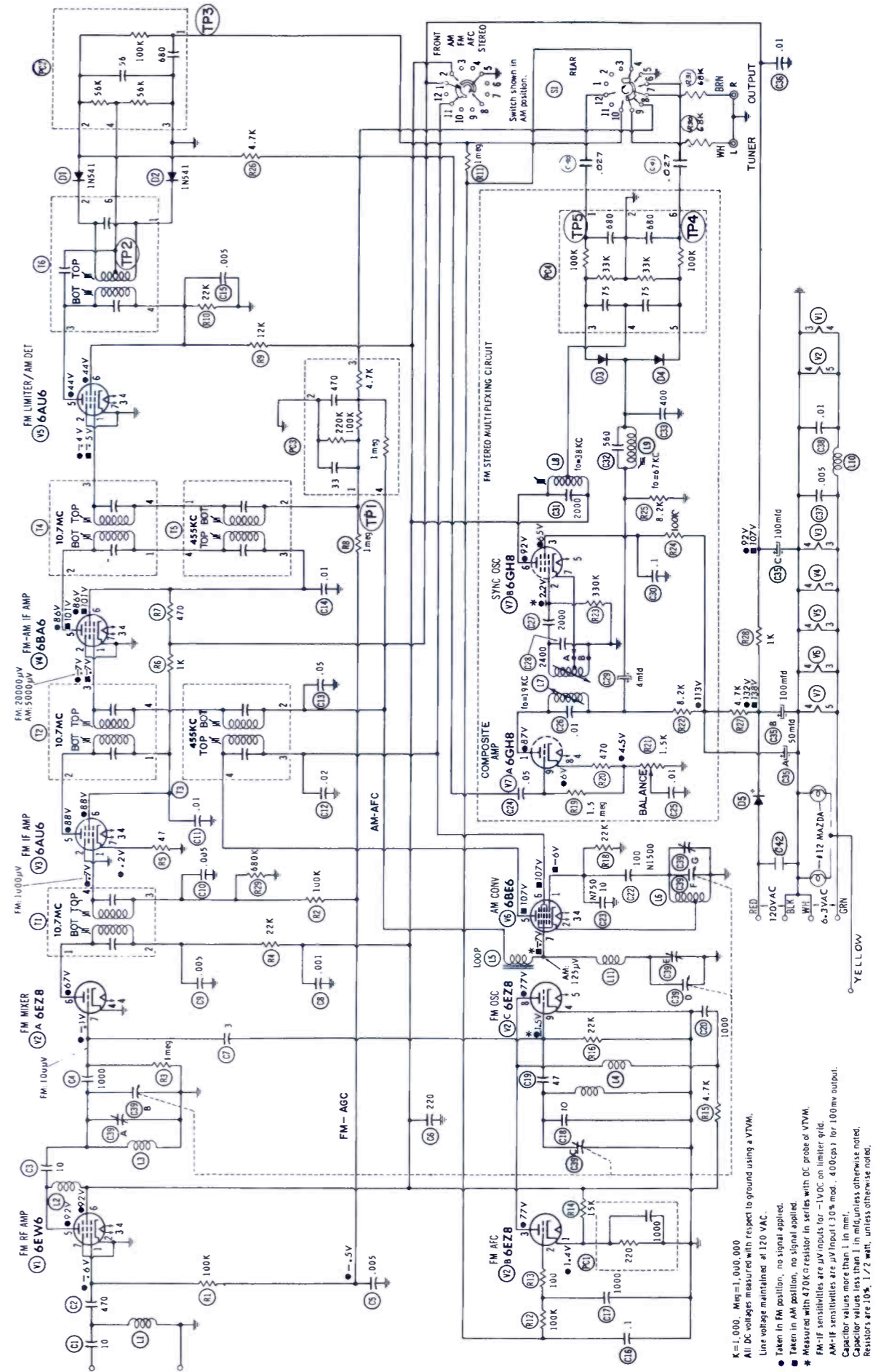


← AM SIGNAL INPUT POINT
 ← FM SIGNAL INPUT POINT

BOTTOM VIEW



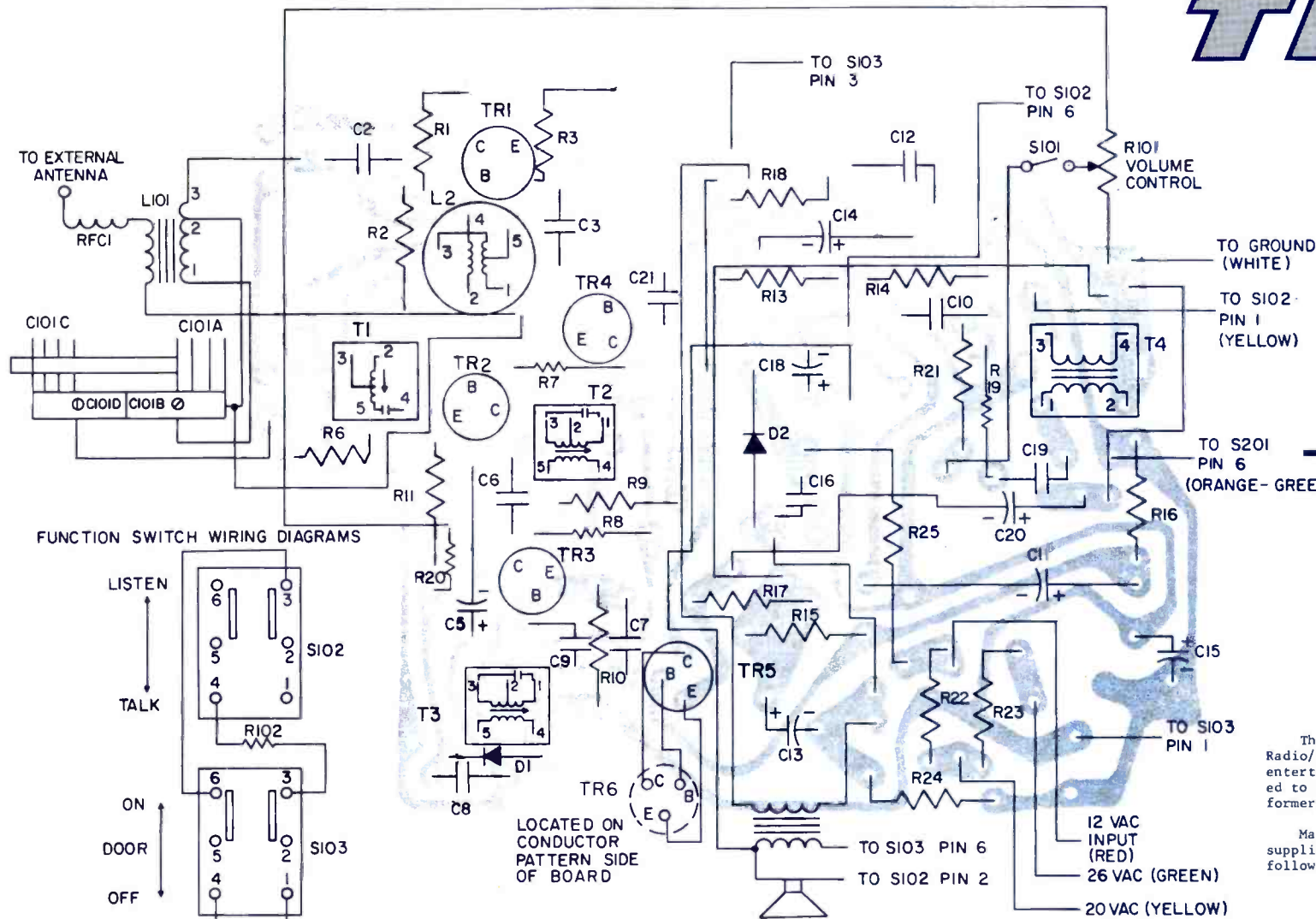
TU220 A, B, C, D, H
STRINGING DIAGRAM



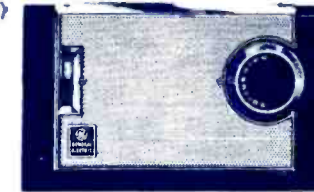
K=1,000, Meg=1,000,000
 All DC voltages measured with respect to ground using a VTVM.
 Line voltage maintained at 120 VAC.
 • Taken in FM position, no signal applied.
 * Measured with 470K resistor in series with DC probe of VTVM.
 FM-IF sensitivities are μ V input for -1VDC on limiter grid.
 AM-IF sensitivities are μ V input (30% mod., 400 cps) for 100mv output.
 Capacitor values more than 1 in mmf.
 Capacitor values less than 1 in mfd unless otherwise noted.
 Resistor values are 10%, 1/2 watt, unless otherwise noted.

ELECTRONIC TECHNICIAN TEKFAX

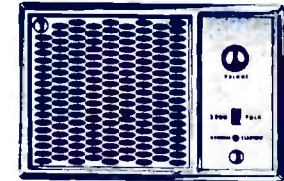
GENERAL ELECTRIC
Radio-Intercom
Model W360A



BUILT-IN RADIO / INTERCOM



MASTER STATION W360A



INDOOR REMOTE STATION

GENERAL INFORMATION

The General Electric model W360 Built-in AM Radio/Intercom System is a six-transistor home entertainment and intercommunications device designed to operate from any class 2 door-chime transformer, rated at 10, 16, or 24 Volts AC.

Materials for installation of model W360 are supplied in a single package. They include the following items:

- 1 - master wall box
- 4 - Hold-it clamps
- 4 - mounting screws
- 25 - wire nuts
- 1 - master radio
- 1 - indoor remote wall box
- 1 - outdoor remote wall box
- 1 - indoor remote
- 1 - outdoor remote
- 1 - spool 5-conductor wire (125 ft.)

SPECIFICATIONS

POWER: 10,16,24,Volts AC,Transformer Operated
OPERATING FREQUENCIES: 540 - 1600 KC (455 KC IF)
POWER OUTPUT: Undistorted: 100 milliwatts
Maximum: 140 milliwatts
SEMI-CONDUCTORS: 6 Transistors
2 Diodes

DISASSEMBLY

MASTER RADIO REMOVAL

1. Remove four screws which are used at the top and bottom of the cabinet to secure the radio to the wall box.
2. Remove all wire nuts from transformer, antenna, and remote station leads, carefully labeling each wire. Then remove the master radio from the wall.

REMOTE STATION REMOVAL

1. Remove the two knurled-head bolts appearing in the upper left and lower right corners on the remote station escutcheon.
2. Remove wire nuts from wires going to the speaker.
3. Remove remote unit from the wall.

COLOR CODE FOR DIFFERENT TRANSFORMER OUTPUTS

When the transformer is rated at:	Use power leads from radio colored:
10 Volts A.C.	Red and White
16 Volts A.C.	Yellow and White
24 Volts A.C.	Green and White

When using one indoor and one outdoor remote station, the following connections should be made at the master station:

Connect Wire From:	to:	to:
Master Radio	Outdoor Remote	Indoor Remote
Colored:	Colored:	Colored:
Blue	Blue	Blue
Black	Black	Black
Brown	Green	Black
Green & White	Green	Green
Orange & Green	Yellow	Yellow
Orange	Red	Red

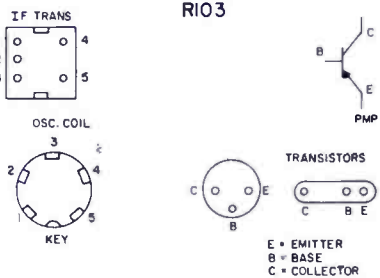
The other end of each remote station cable should be connected color for color to the wires on each remote assembly. Use the wire nuts provided to make all connections.

TRANSISTOR REPLACEMENT

A transistor suspected to be defective can either be checked by the substitution method or by the use of a suitable transistor checker. Care must be taken to avoid overheating the transistor while soldering as it may be easily damaged. Always check the circuit for defects which could damage the new transistor being placed into the circuit.

If the leads from a transistor are disconnected, make sure that each wire is reconnected to the proper place. Otherwise, voltages of reversed polarity may be applied across a transistor— an action which may cause serious damage to it.

A heavy duty soldering iron should not be used. Make certain that the iron to be used does not have current leakage. An isolation transformer can be used to prevent current leakage. A transistor should never be removed or replaced while power is on, as a surge of current may damage it.



BOTTOM VIEWS

AVERAGE QUIESCENT TRANSISTOR VOLTAGE						
	TR1	TR2	TR3	TR4	TR5, TR6	
E	.695	.29	.24	0	1.77	
B	.615	.42	.35	.18	1.90	
C	7.05	7.06	7.1	2.75	8.8	

ALIGNMENT

SET VOLUME CONTROL AT MAXIMUM
CONNECT OUTPUT METER OR SCOPE ACROSS
VOICE COIL
INDUCTIVELY COUPLE SIGNAL
GENERATOR TO RECEIVER

NOTES:

- 1 UNLESS OTHERWISE NOTED: CAPACITORS MORE THAN 1 μMF CAPACITORS LESS THAN 1 μMF RESISTORS ARE 1/2 WATT & K=1000
- 2 VOLTAGES & CURRENT READINGS ARE AVERAGE UNDER NO SIGNAL CONDITIONS VOLTAGES ARE NEGATIVE WITH RESPECT TO GROUND.
- 3 REPLACE WITH TRANSISTOR TYPES SHOWN OR ORDER BY CATALOG NUMBER AS LISTED IN PARTS LIST
- 4 "S201 OR S301" DESIGNATES OPTIONAL REMOTE CONNECTIONS TO BE USED IN CONJUNCTION WITH "MULTIPLE TO REMOTE UNITS" DESIGNATIONS WHEN ADDITIONAL REMOTE UNITS ARE NOT USED, THE CORRESPONDING SWITCH IS ELIMINATED AND CONNECTIONS FOLLOW THE DOTTED LINES.
- 5 AC VOLTAGES STATED ARE TEST VOLTAGES AND ARE NOT TRANSFORMER RATED VOLTAGES.

**GENERAL
ELECTRIC**
Radio
Model P970A

ELECTRONIC TECHNICIAN TEKFAK

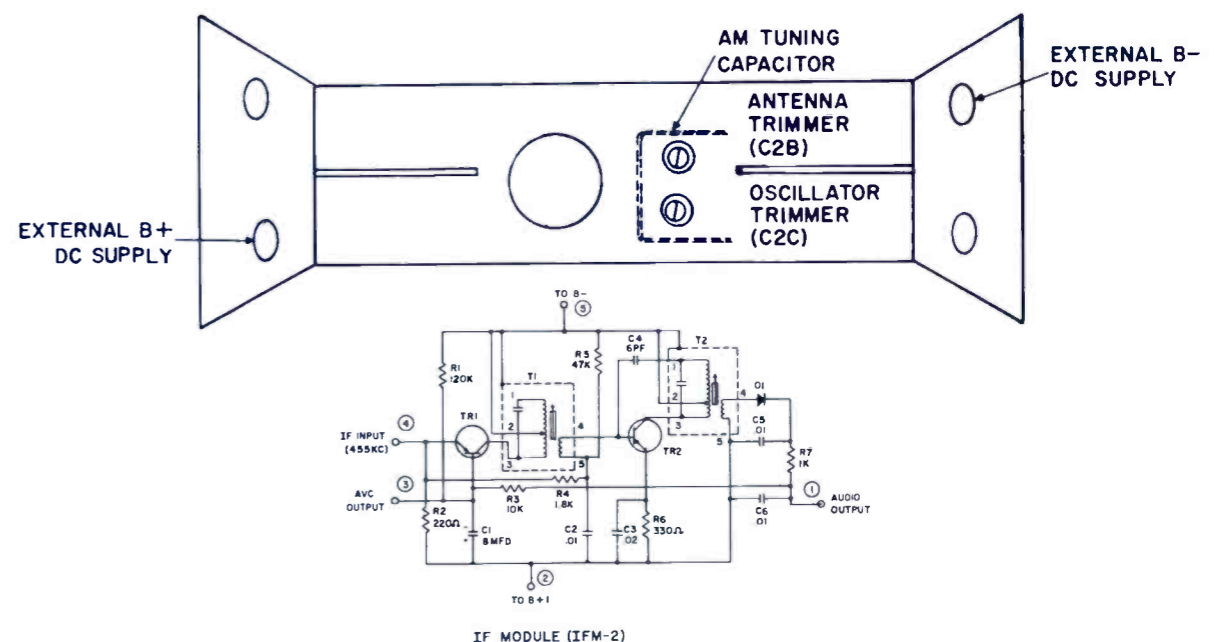
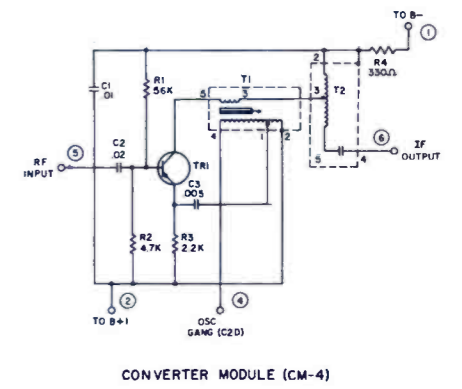
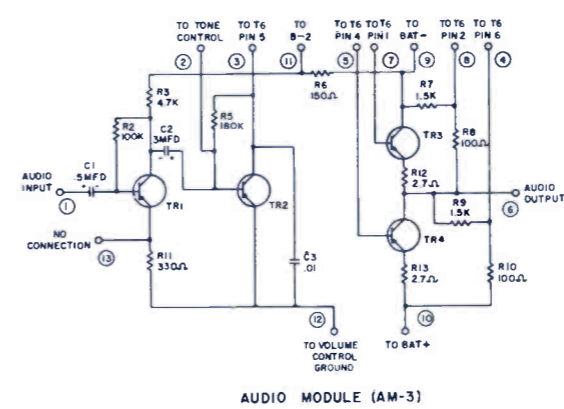
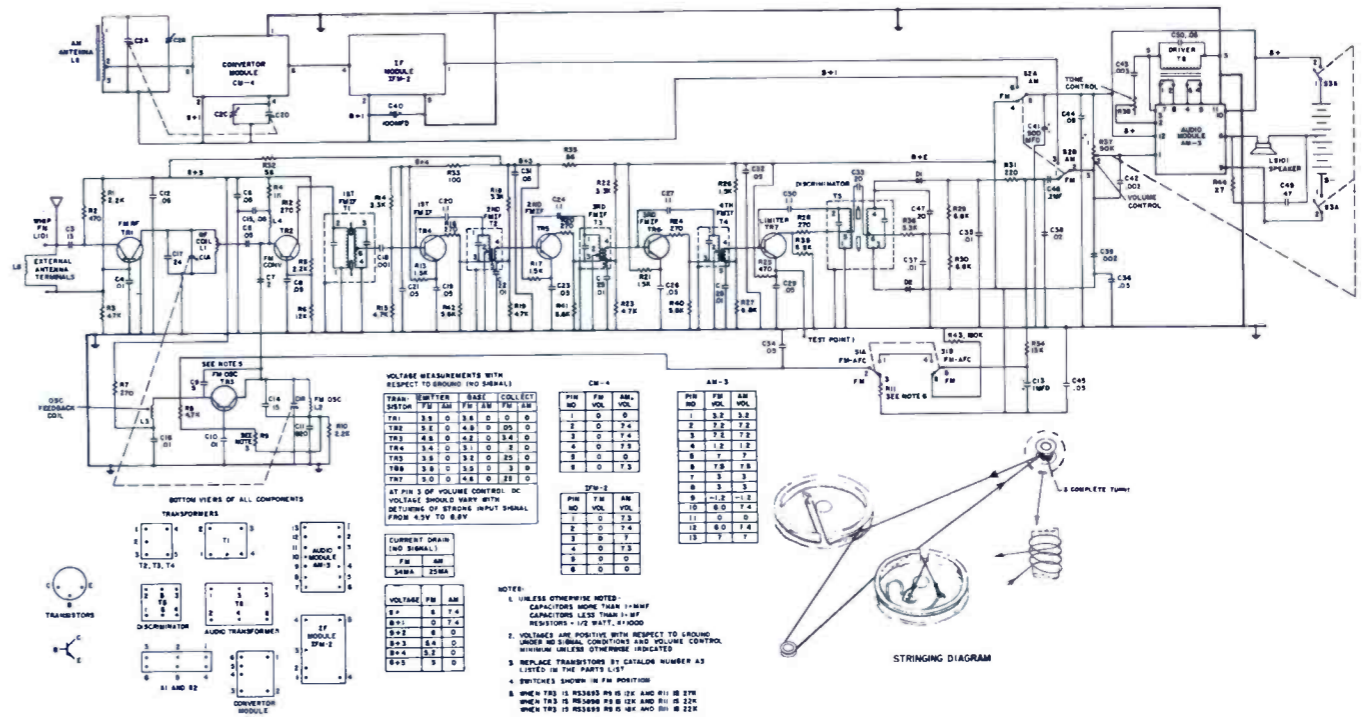
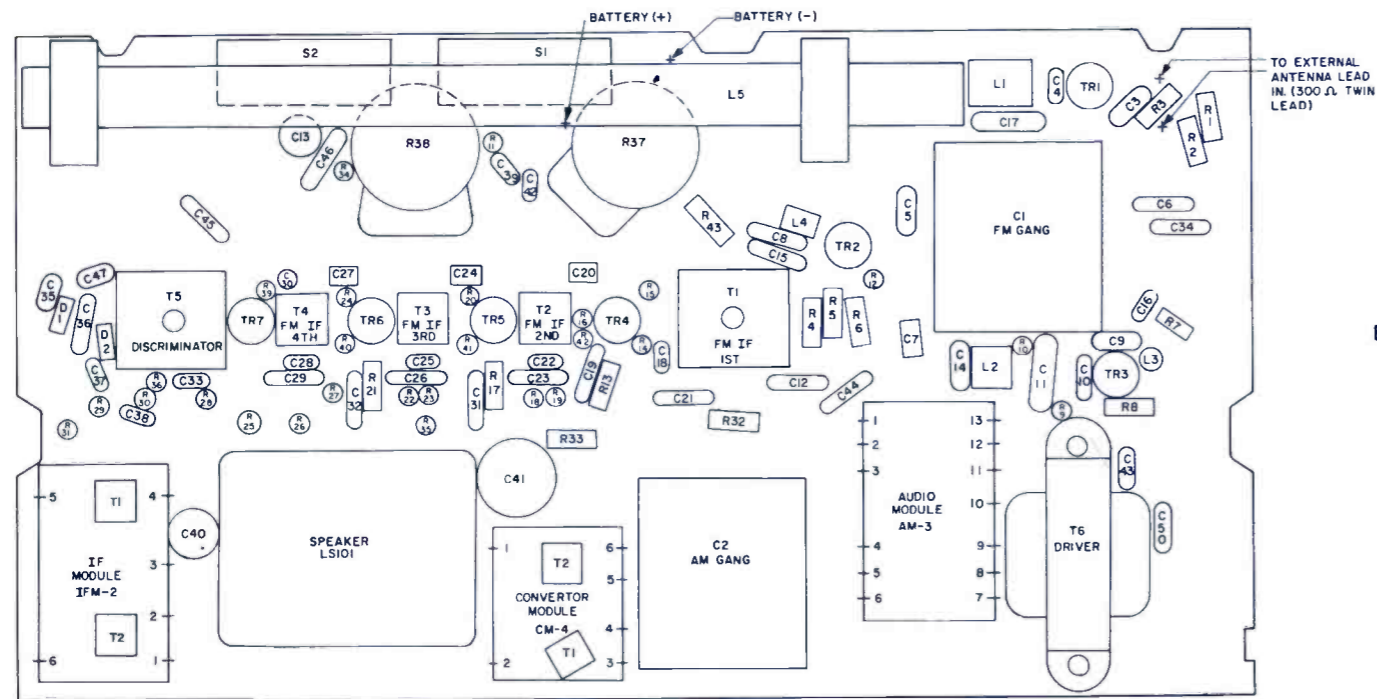
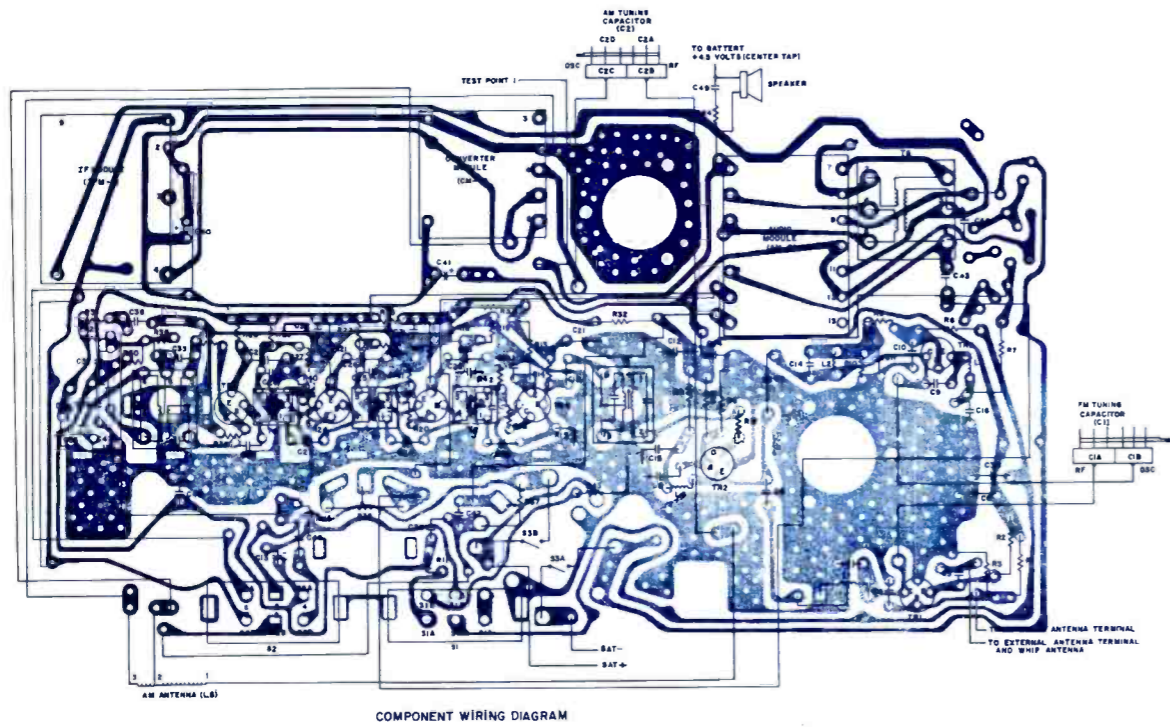


CHART 2. FM ALIGNMENT

Step	Signal Generator	Generator Setting	Tuning Gang	VTVM Connection	Adjustment	Notes
1	Couple output to C1A Couple ground to tuning gang	10.7 MC AM Modulated 80% or less	Open	TP1 Emitter of TR7 Use 1.5 AC Scale	T4, T3, T2, T1 for max. gain	Keep gen. out- put level as low as possible. S1 and S2 in FM position
2	Same	Same	Open	Same	T5 (bottom slug) for slight null	Same
3	Same	Same	Open	S2B-2	T5 (top slug) for sharp null	Same
4	Repeat all steps					
5	* Couple output and ground to FM antenna terminals	108.25 MC Unmodulated	Open	S2B-2	Adjust coils of L1 and L2 for best null in noise level.	If FM modulation is avail- able, make all adjustments for max. gain in steps 5 - 7
6	Same	87.75 MC Unmodulated	Closed	S2B-2	Adjust coils of C1B and C1A for best null in noise level.	Use weakest possible signal
7	Same	98 MC Unmodulated	98 MC	S2B-2	Adjust coils of L1 for best null in noise level.	
8	Recheck steps 5 - 7					

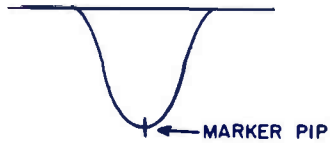


FIGURE 1

GENERAL ELECTRIC
Radio
Model P970A

**ELECTRONIC
TECHNICIAN**
TEKFAX

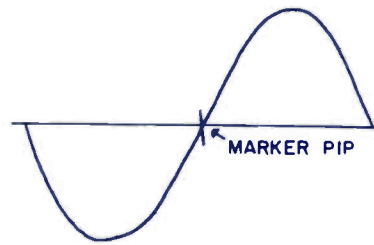


FIGURE 2

CHART 3. AM ALIGNMENT

Step	Signal Generator	Generator Setting	Tuning Gang	Connect Scope or Output Meter	Adjustments
1	Radiate Output to L5	455 KC Modulated 400 cycles at 30%	Open	Voice Coil	T2 of CM4 and T1, T2, of IFM-2 for max.
2	Repeat step 1				
3	Radiate Output to L5	1630 KC	Open	Voice Coil	Oscillator trimmer C2C for max.
4	Same	580 KC	580 KC	Voice Coil	AM Oscillator T1 of CM4 while rocking gang.
5	Same	1400 KC	1400 KC	Voice Coil	Peak Antenna trimmer C2B while rocking gang
6	Repeat steps 1 - 5 as necessary				

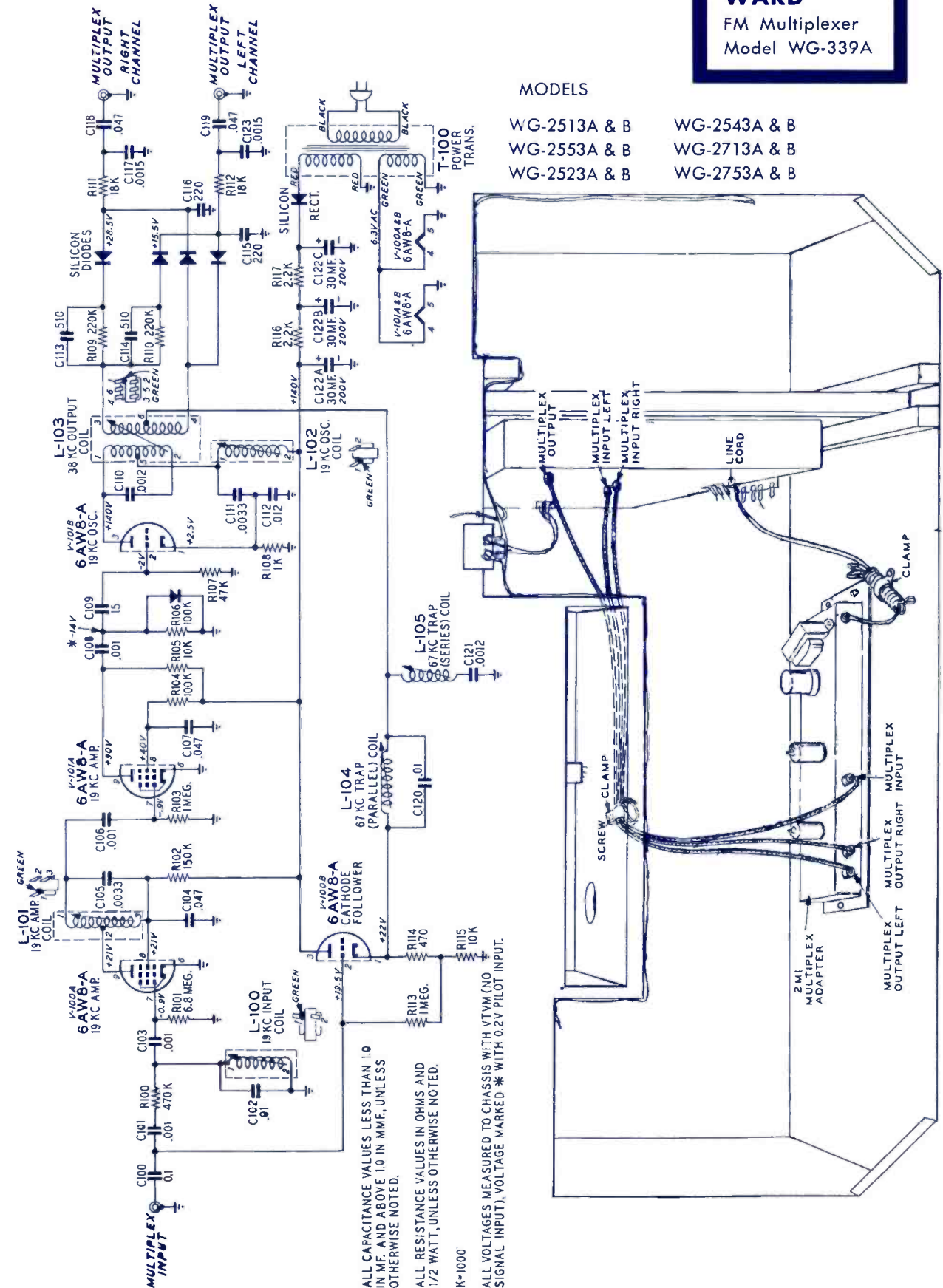
*DC Isolate both input antenna terminals with .05 mfd, 200 volts capacitor.

ELECTRONIC TECHNICIAN TEKFAX

**MONT-
GOMERY
WARD**
FM Multiplexer
Model WG-339A

MODELS

WG-2513A & B WG-2543A & B
WG-2553A & B WG-2713A & B
WG-2523A & B WG-2753A & B



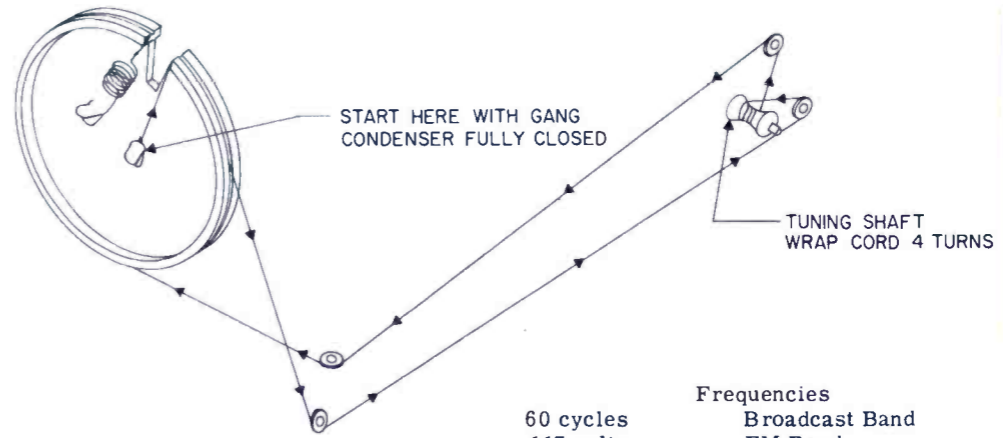
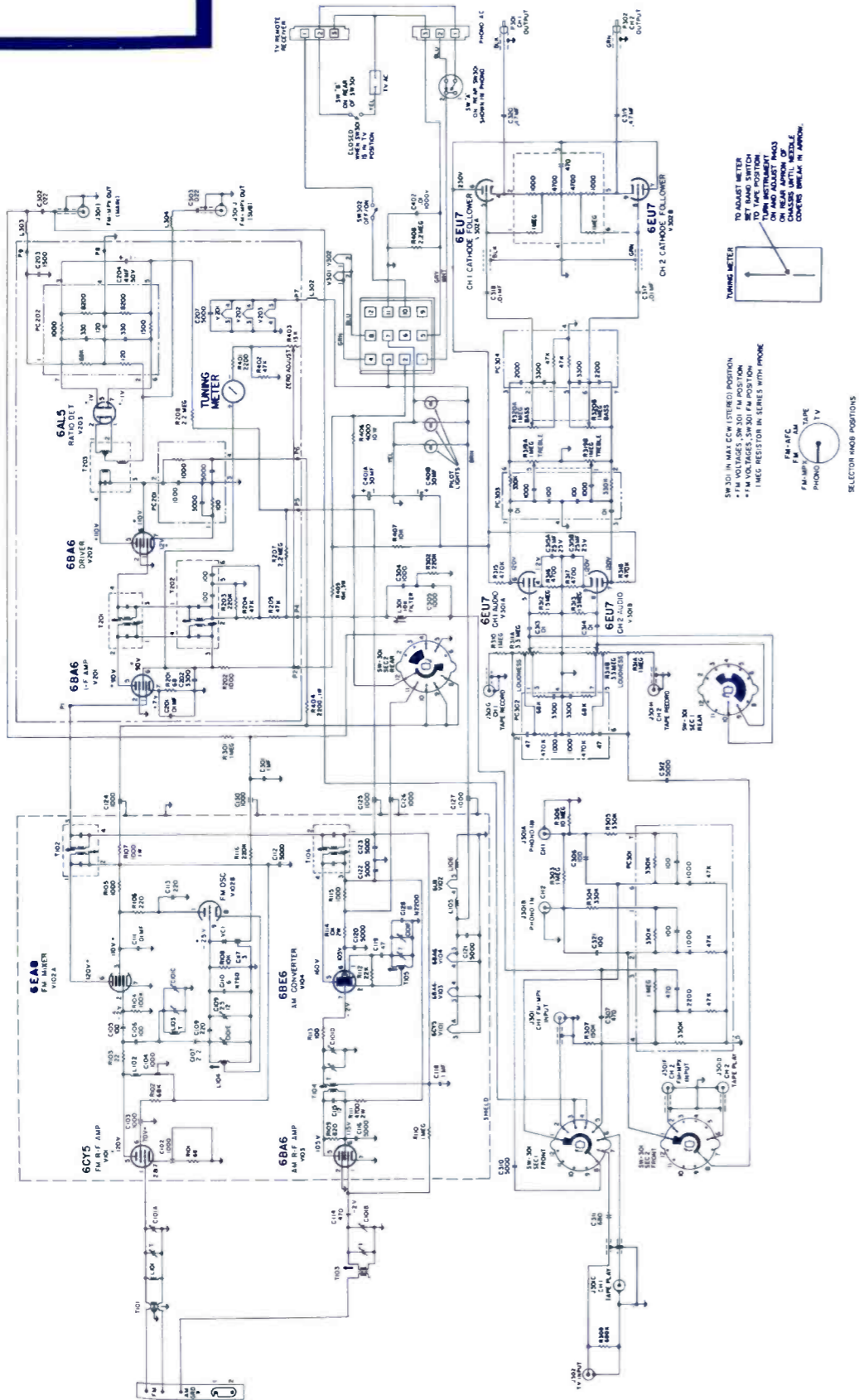
MAGNAVOX
AM-FM Tuner
Model 77-01

ELECTRONIC TECHNICIAN TEKFAX

MAGNAVOX
AM-FM Tuner
Model 77-01

**ELECTRONIC
TECHNICIAN
TEKFAX**

77-01 SCHEMATIC DIAGRAM



Power Source Rating
Frequency
Voltage
Wattage (with 93 amp.)

60 cycles
117 volts
185 watts

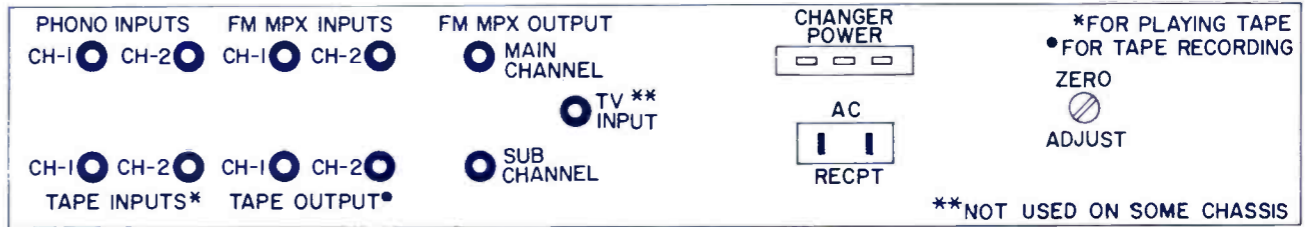
Frequencies
Broadcast Band
FM Band
IF Frequency (AM)
(FM)

540-1620KC
88-108MC
455KC
10.7MC

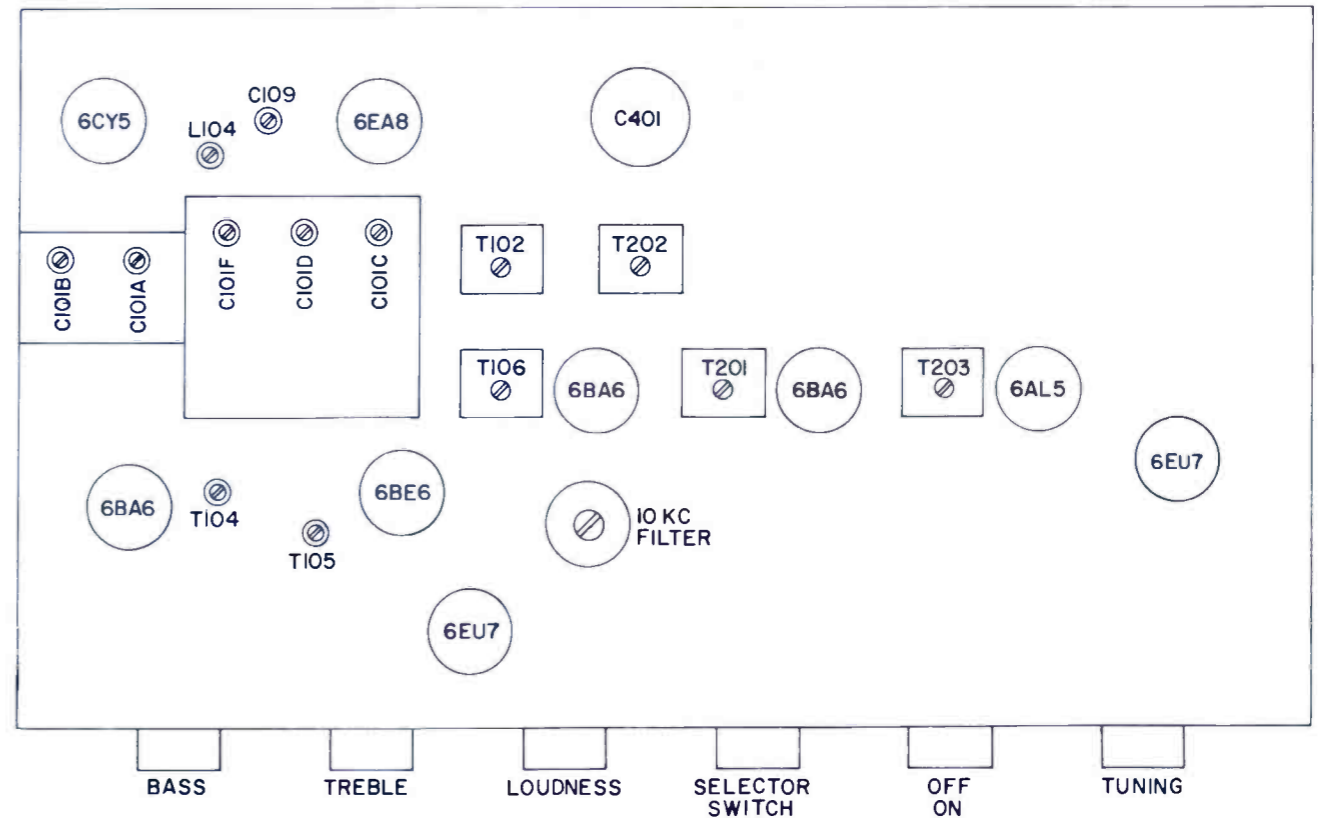
TUBE COMPLEMENT

Ref.	Function	Type	Ref.	Function	Type
V101	FM-RF Amplifier	6CY5	V202	IF Amplifier	6BA6
V102	FM Mixer	6EA8	V203	Ratio Detector	6AL5
V103	AM-RF Amplifier	6BA6	V301	Audio Amplifier	6EJ7
V104	AM Converter	6BE6	V302	Cathode Follower	6EJ7
V201	IF Amplifier	6BA6			

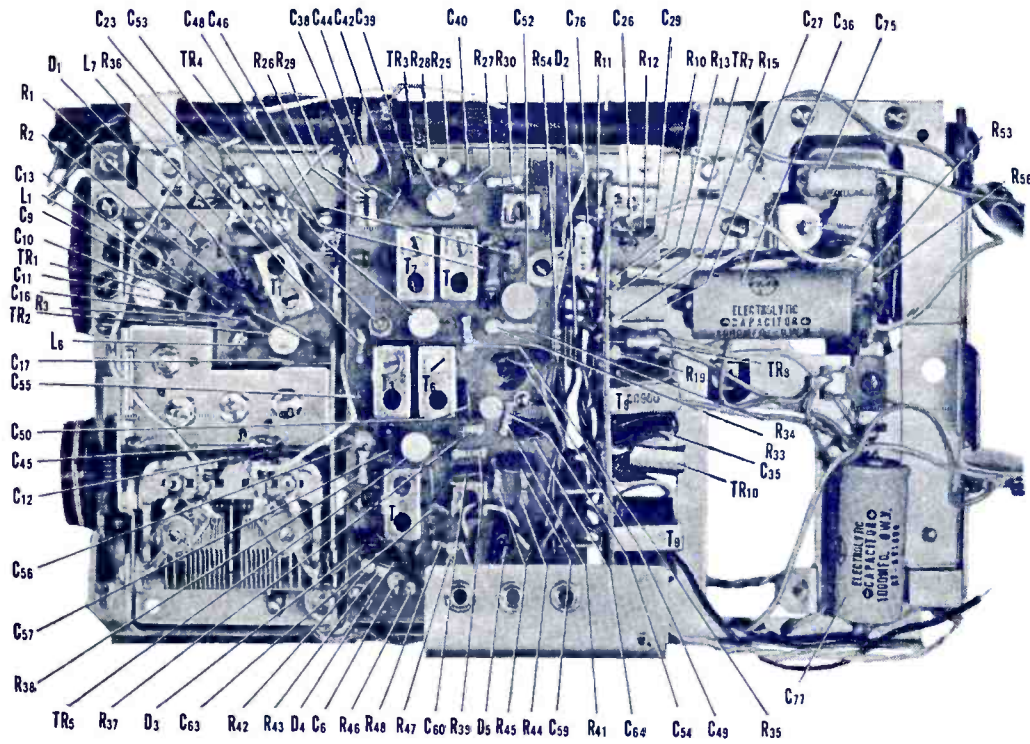
CHASSIS REAR PANEL



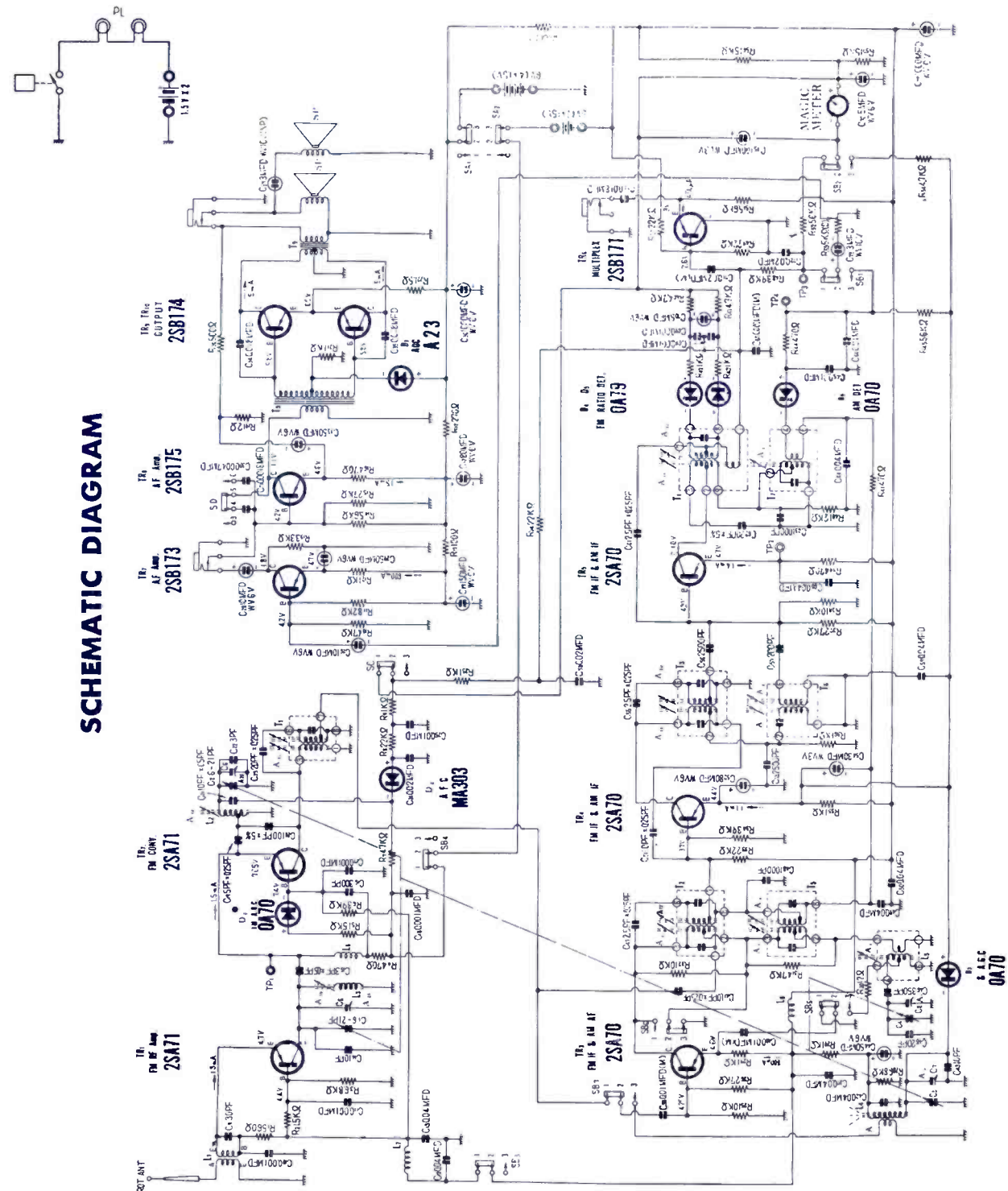
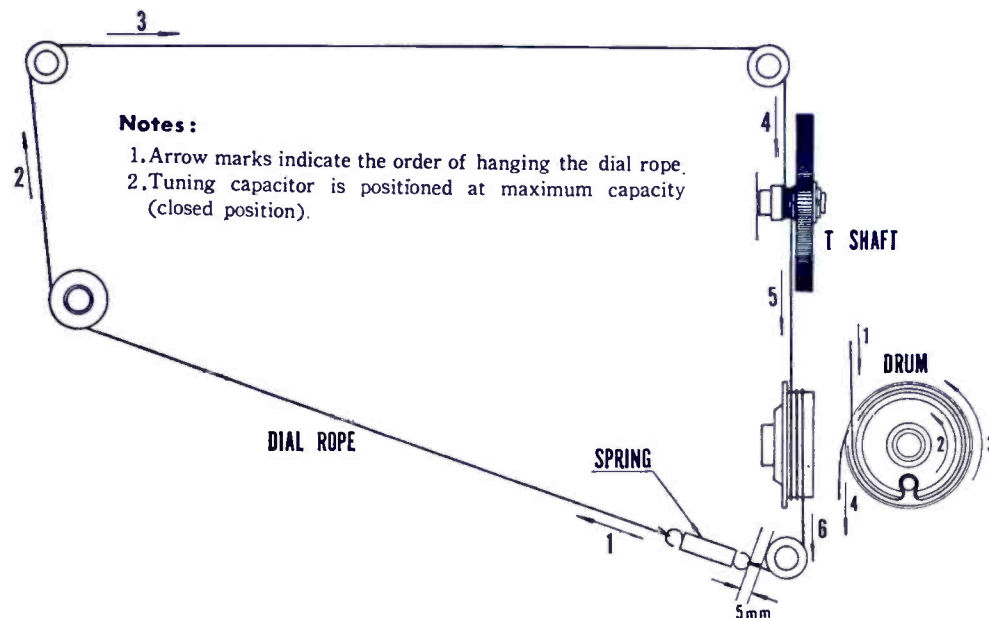
CHASSIS LAYOUT



MAIN PARTS ON THE CHASSIS



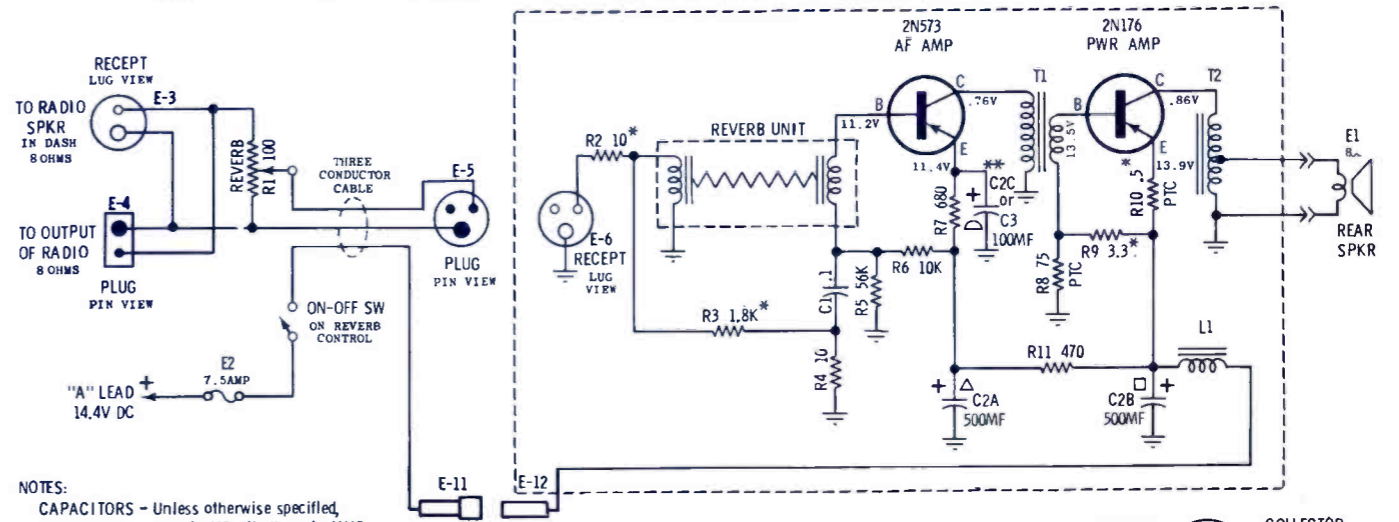
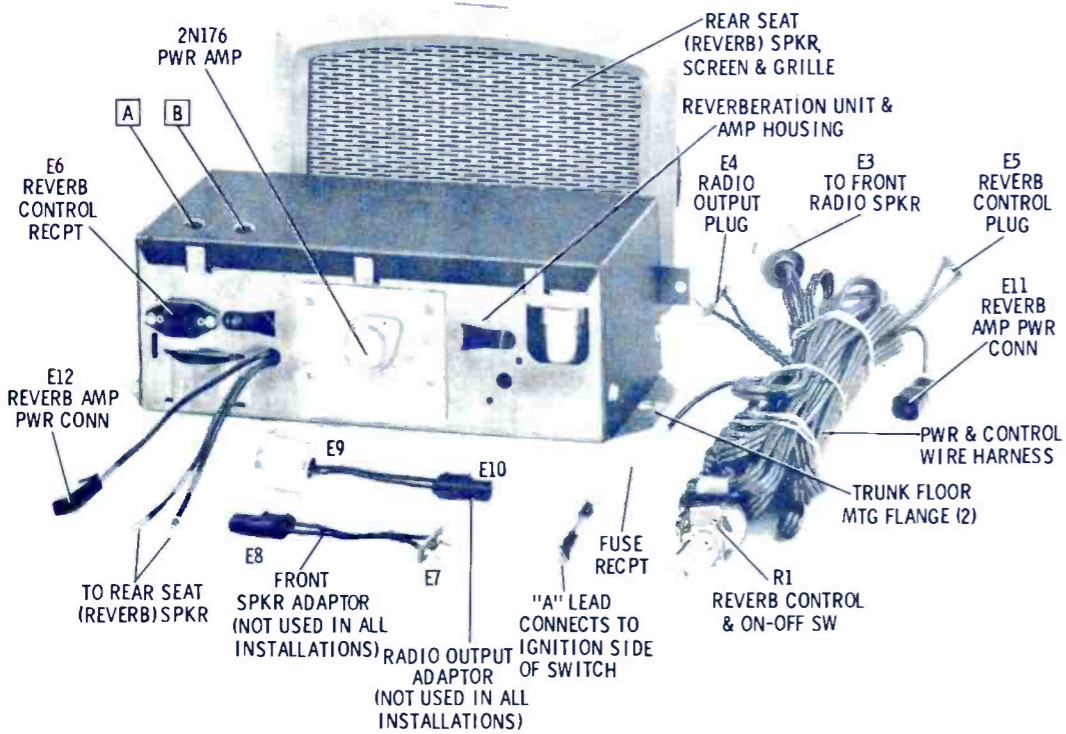
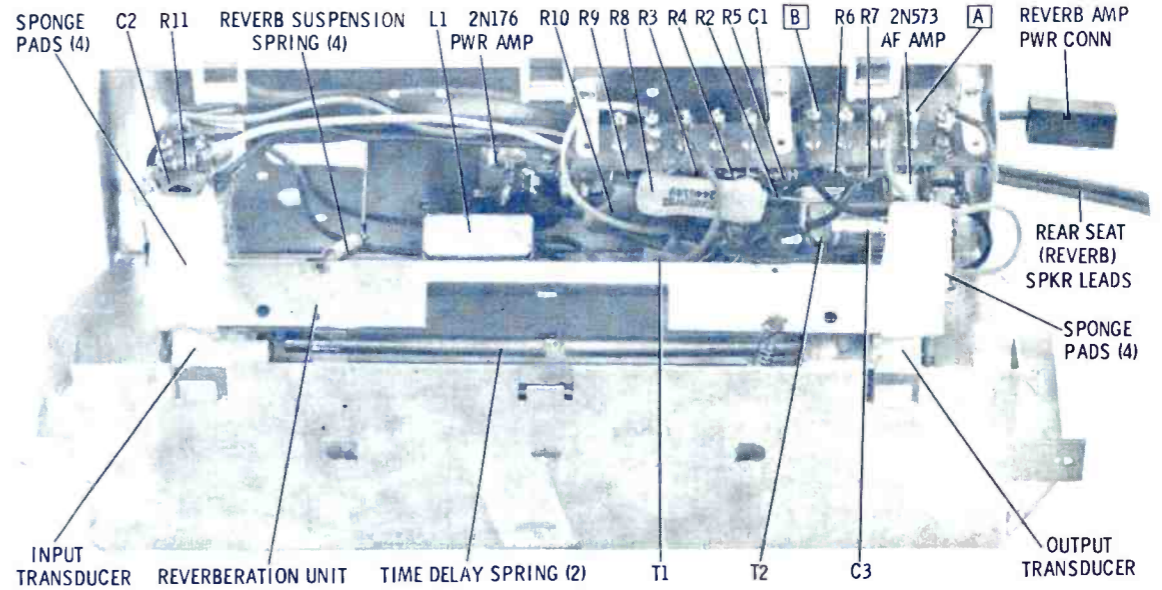
DIAL CORD STRINGING



SCHEMATIC DIAGRAM

MOTOROLA
Radio
Reverberator
Model RV2F

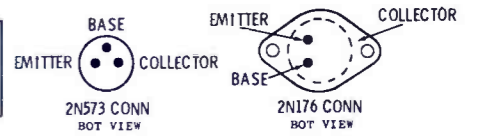
ELECTRONIC TECHNICIAN TEKFAX



NOTES:

- CAPACITORS - Unless otherwise specified, values less than one in MF; all others in MMF.
- VOLTAGES - Measured from point indicated to ground with a VTVM, $\pm 10\%$ No signal in.
- INPUT VOLTAGE - 14.4V DC
- * The exact value to be determined by production process. Replace with the same value of the original part.
- ** Production units may have 100MF electrolytic either as an individual unit (C3) or as a separate section in the multiple electrolytic (C2).

CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. UNIT WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

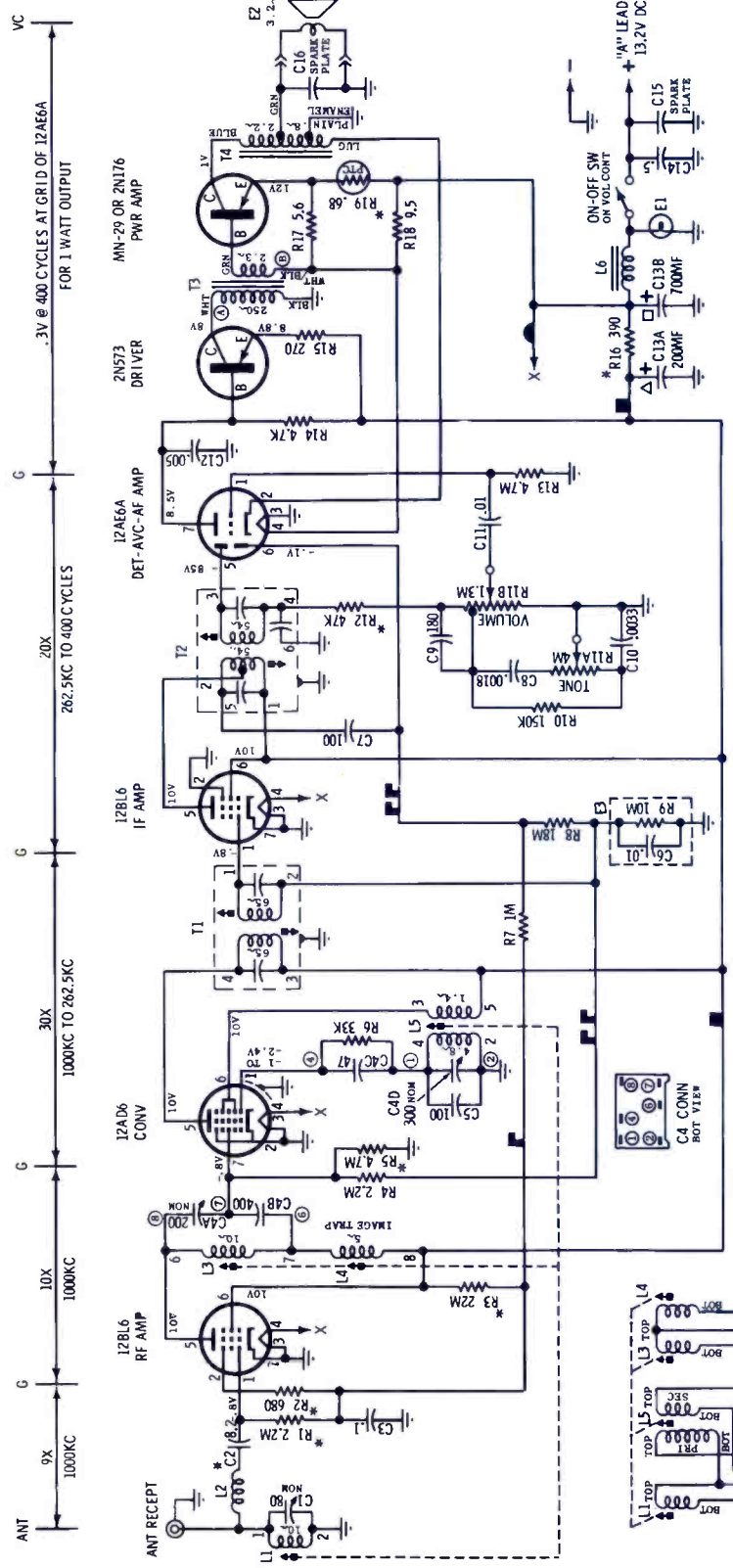


MOTOROLA
Models 202,
203 and 204

ELECTRONIC TECHNICIAN TEKFAX

ELECTRONIC TECHNICIAN TEKFAX

MOTOROLA
FORD
Auto Radio
Model
C2AA-18806-M,
-N, and
C2YA-18806-E

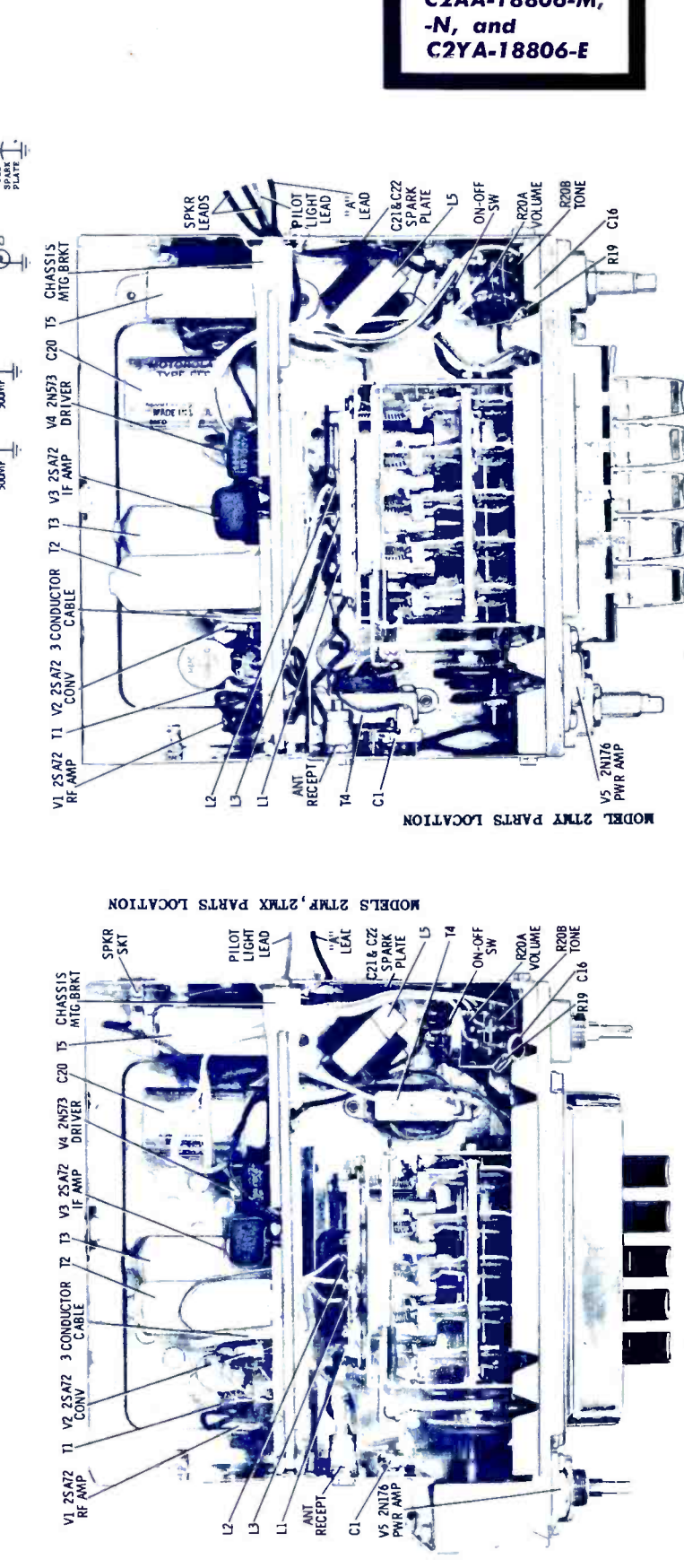
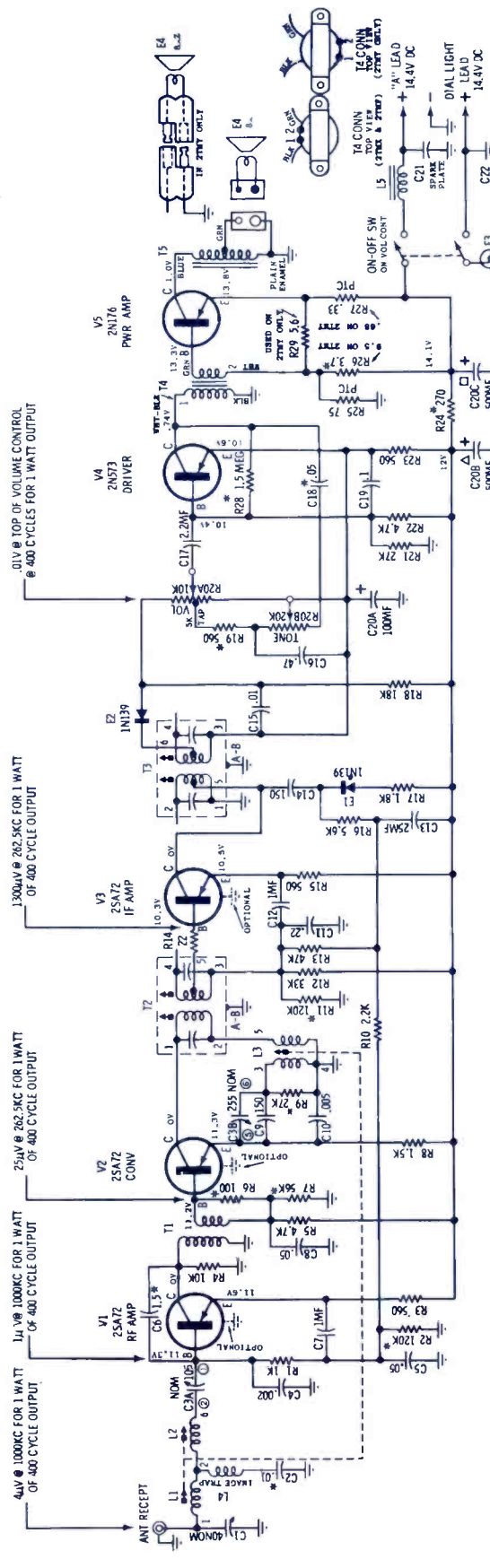


NOTES:
CAPACITORS - UNLESS OTHERWISE SPECIFIED, DECIMAL VALUES IN MF. ALL OTHERS IN MMF. VOLTAGES - MEASURED FROM POINT INDICATED TO CHASSIS WITH A VTVM. ± 10% NO SIGNAL IN. INPUT VOLTAGE - 13.2V DC. TUNING RANGE - 540 KC TO 1610 KC. IF FREQ. - 262.5 KC. * THESE VALUES ARE NOMINAL. EXACT VALUE DETERMINED BY PRODUCTION REQUIREMENTS. WHEN SERVICING REPLACE WITH VALUE REMOVED.

PLATED CHASSIS BOARD WIRING LEGEND
 ⊕ = B+ ⊖ = FIL ⊕ = RF AVC ⊕ = IF & CONV AVC
 ⊕ = GND LUG ⊕ = T3 CONN ⊕ = T2 CONN ⊕ = T1 CONN

CAUTION
"A" LEAD MUST BE CONNECTED TO POSITIVE (+) SIDE OF POWER SUPPLY. RADIO WILL NOT OPERATE AND DAMAGE TO COMPONENTS WILL RESULT IF CONNECTED OTHERWISE.

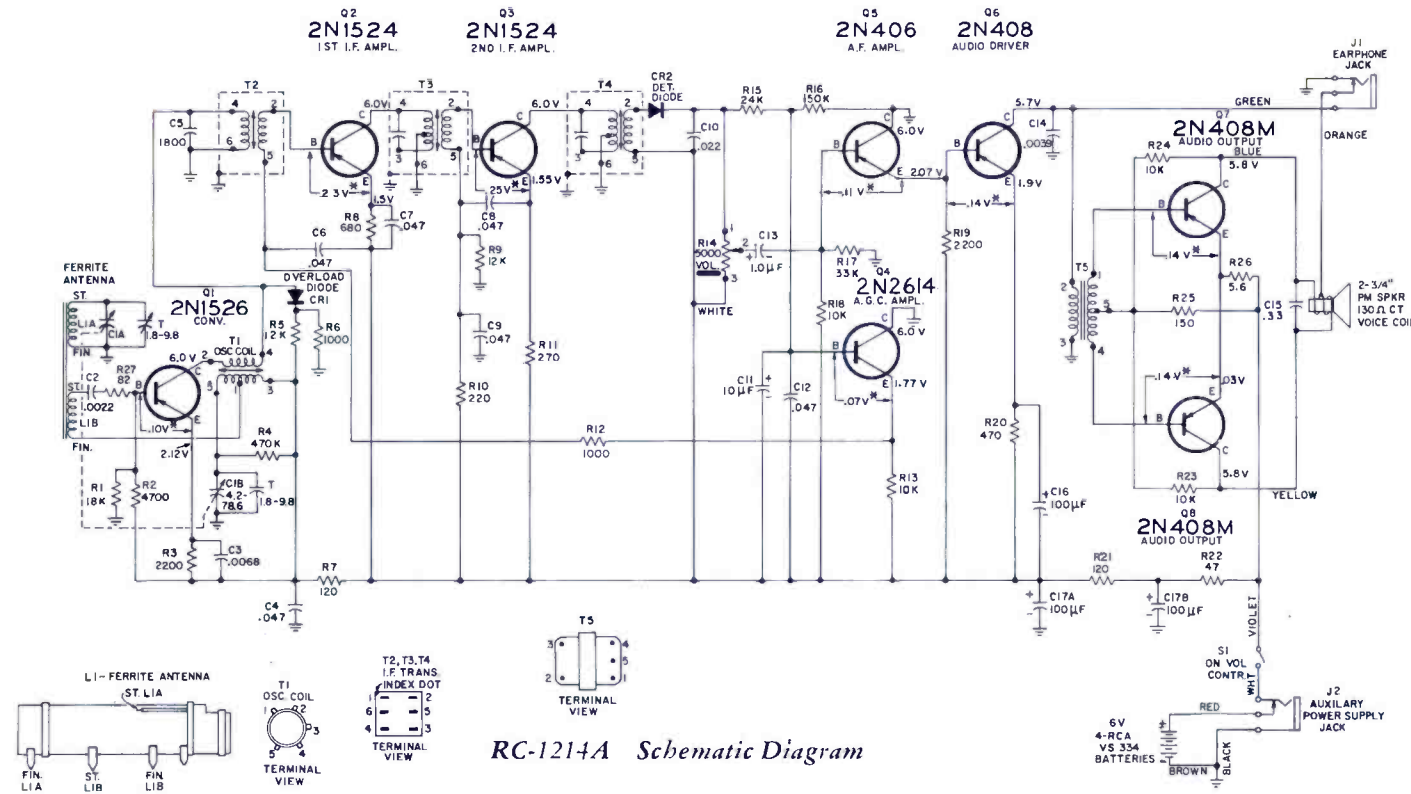
TRANSISTOR CONNECTIONS
 ⊕ = EMITTER ⊖ = COLLECTOR
 ⊕ = BASE ⊕ = 2N573



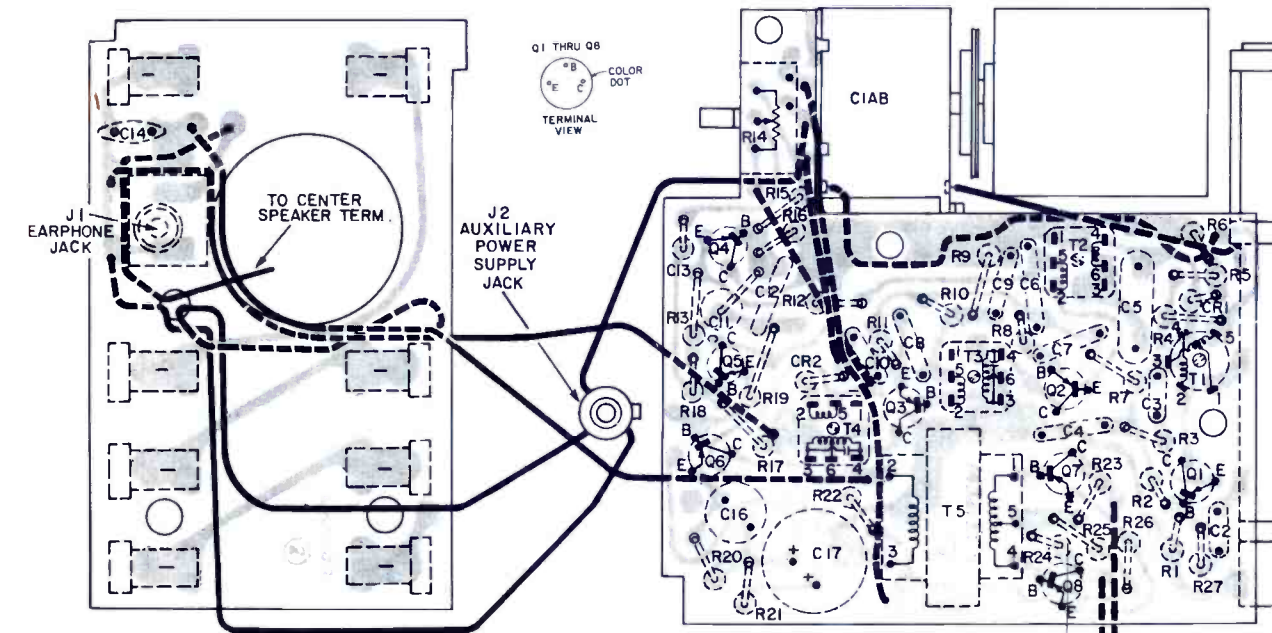
RCA
Radio Chassis
RC-1214A

ELECTRONIC TECHNICIAN TEKFAK

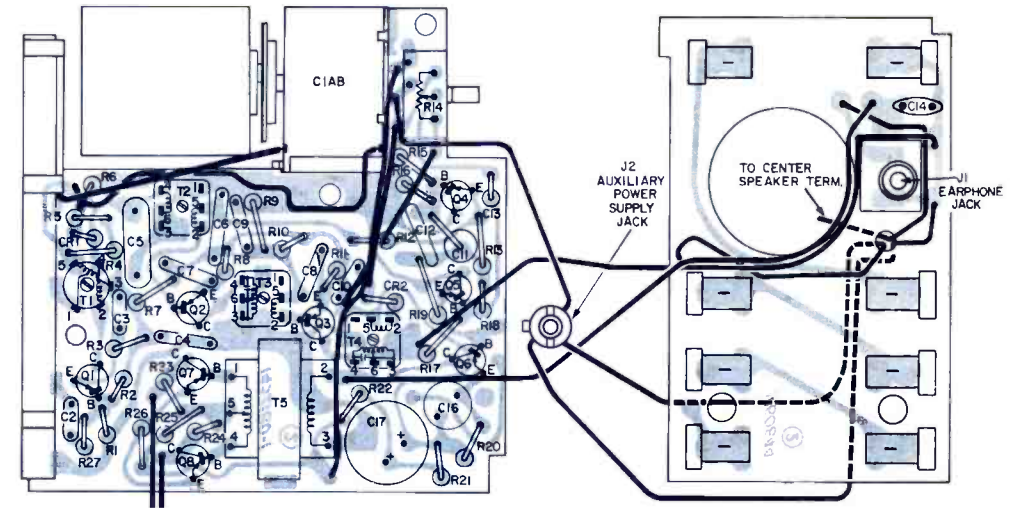
VOLTAGES MEASURED WITH "VOLTOHMYST"
FROM (+) BATTERY, SHOULD HOLD WITHIN ±20%
WITH NEW BATTERY, VOLUME CONTROL AT
MINIMUM & NO SIGNAL.
K=1000. ALL RESISTANCE VALUES IN OHMS.
ALL CAPACITANCE VALUES LESS THAN 1.0 ARE IN
MF, THOSE ABOVE 1.0 ARE IN MMF EXCEPT AS NOTED.
Q7 & Q8 ARE A MATCHED PAIR
* MEASURED WITH HIGH SENSITIVITY VTVM.



RC-1214A Schematic Diagram



RC-1214A Chassis Layout, Wiring Side
(removed from case)



RC-1214A Chassis Layout, Component Side
(removed from case)

ALIGNMENT PROCEDURE

For all alignment operations, keep generator output as low as possible to avoid AVC action and clipping. (approx. 20 milliwatts output)

Connect output meter across speaker voice coil. Clip onto extreme ends of speaker terminals only, to avoid damage to voice coil leads.

BATTERY REPLACEMENT

1. Press down on center of top side of back section, under handle.
2. Pull front and back sections apart from the top as though bottom were hinged.
3. Lift back section off.
4. Replace batteries observing correct polarity—negative (—) terminal toward outside of case.

CHASSIS REMOVAL

1. Open case as described under "Battery Replacement."
2. Remove nut holding auxiliary power jack.
3. Remove three (3) screws holding circuit board and two (2) screws holding battery board.
4. Raise loose end of boards slightly and pull them out of slots holding opposite end.

BATTERY CURRENT vs. POWER OUTPUT

11.5 ma	0 mw
22.5 ma	20 mw
32.0 ma	50 mw
41.5 ma	100 mw
60.5 ma	250 mw
75.0 ma	400 mw

CRITICAL LEAD DRESS

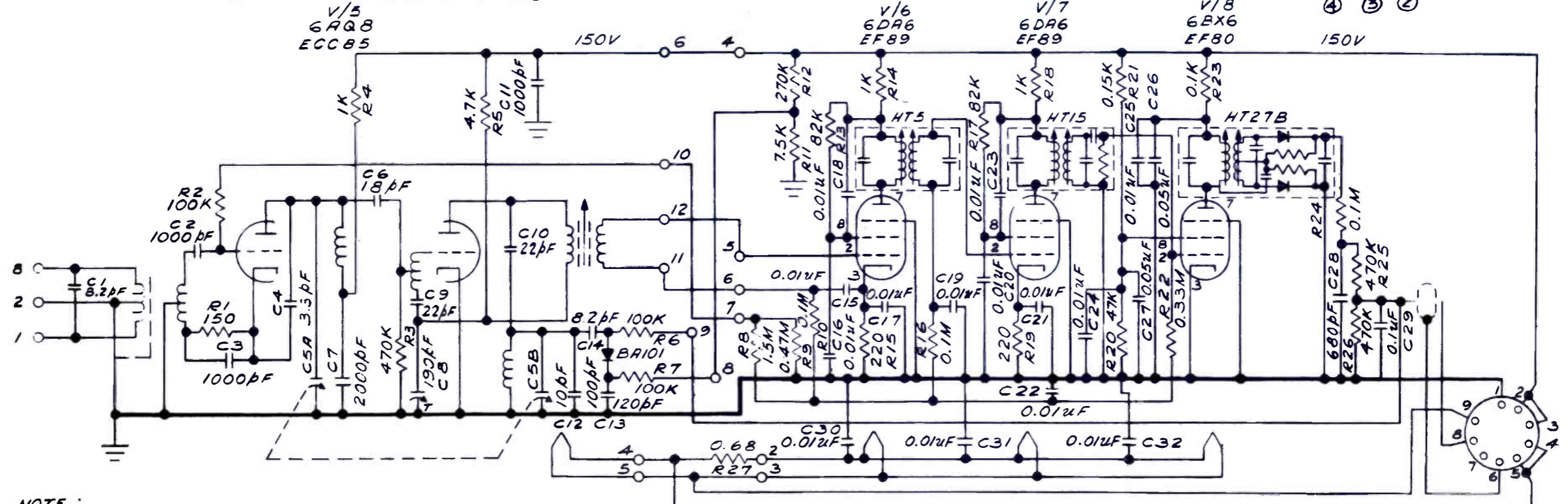
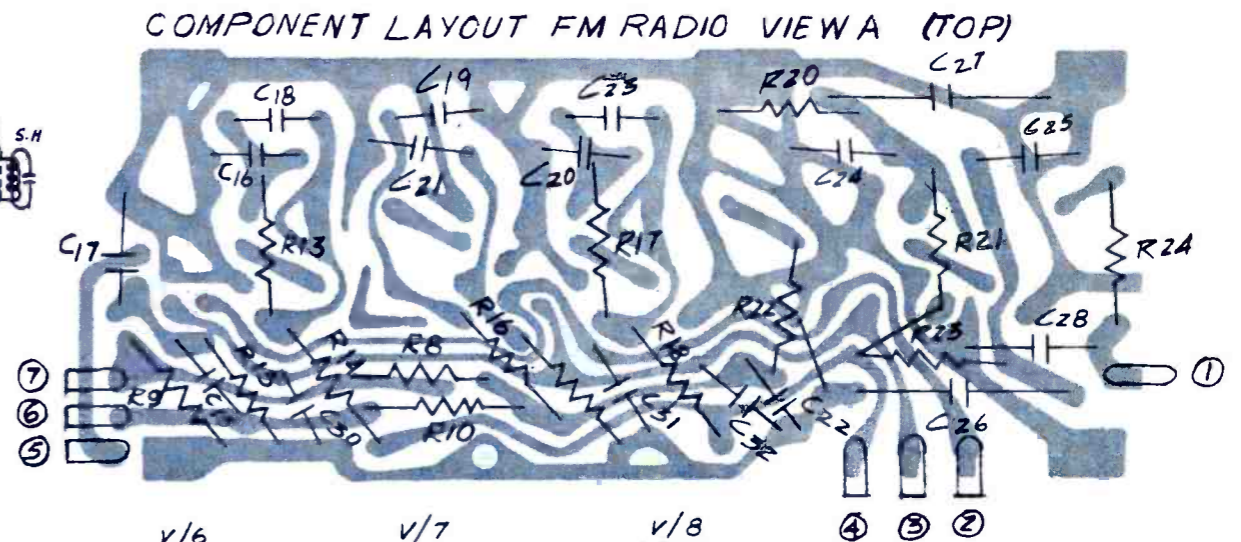
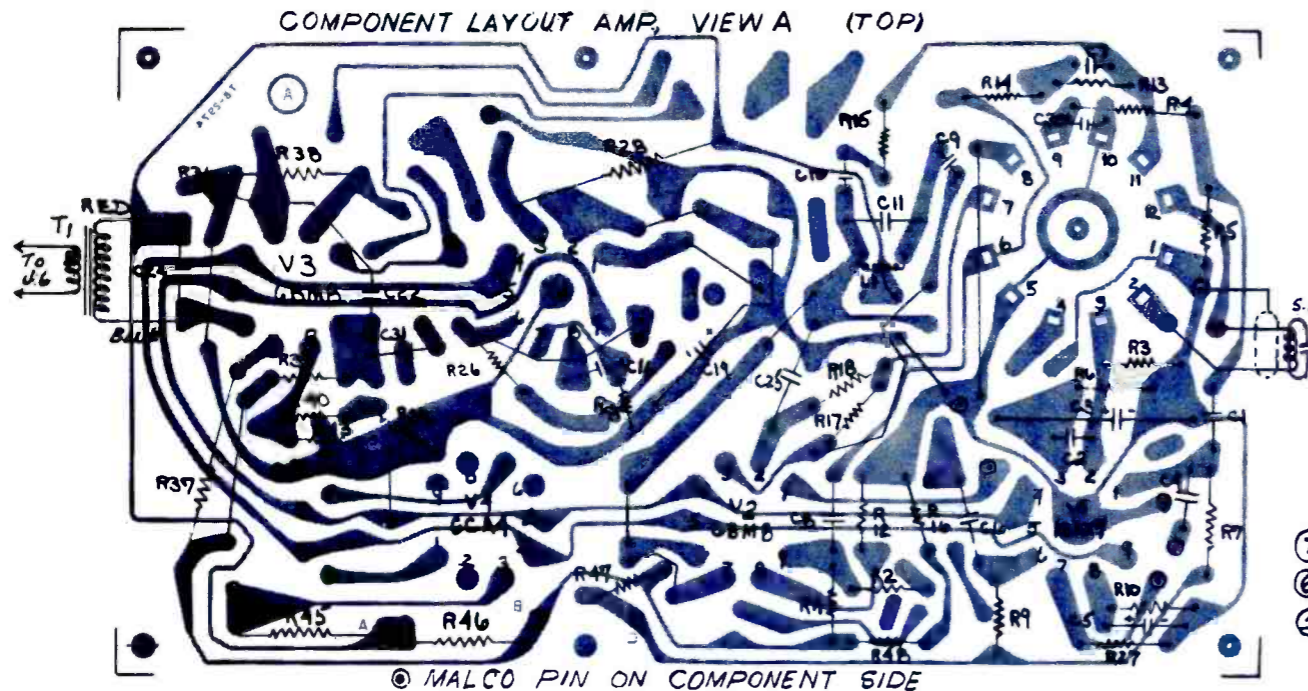
1. Dress gray lead from oscillator gang terminal against gang bracket, away from gang plates and through hole in bracket.
2. Dress all wires in the area of the volume control away from the oscillator gang terminal.
3. Dress lead from antenna to antenna gang terminal so that when the chassis is in the case the lead lies midway between the circuit components and the front of the case.

STEP	Connect Signal Generator To—	Signal Gen. Output—	Dial Setting	Adjust— for maximum
1				T4 (3rd IF)
2		455 kc	Fully Open	T3 (2nd IF)
3				T2 (1st IF)
4	Loop of wire placed near antenna	Repeat steps 1, 2 and 3		
5		1620 kc	Fully open	C18-T (osc. trimmer)
6		1400 kc	1400 kc (Rock gang)	C1A-T (ant. trimmer)
7		600 kc	600 kc (Rock gang)	T1
8			Repeat steps 5, 6 and 7	

USE PROPER ALIGNMENT TOOL FOR MAKING ADJUSTMENTS. CORES ARE EASILY BROKEN BY IMPROPER HANDLING, MAKING REPLACEMENT OF ENTIRE COIL OR TRANSFORMER NECESSARY.

ELECTRONIC TECHNICIAN TEKFAK

**TELECTRO
(Emerson)**
Tape Recorder —
Radio
Model 215



- NOTE:
1. ALL RESISTORS IN OHMS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
 2. ALL VOLTAGES INDICATED ARE D.C.
 3. ALL D.C. VOLTAGES TO GROUND IN PLAYBACK AND NO SIGNAL APPLIED.
 4. D.C. VOLTAGES TAKEN WITH VTVM 11 MEGOHMS INPUT
 5. POSSIBLE VARIATION IN VOLTAGE AND RESISTANCE MEASUREMENTS ±20%

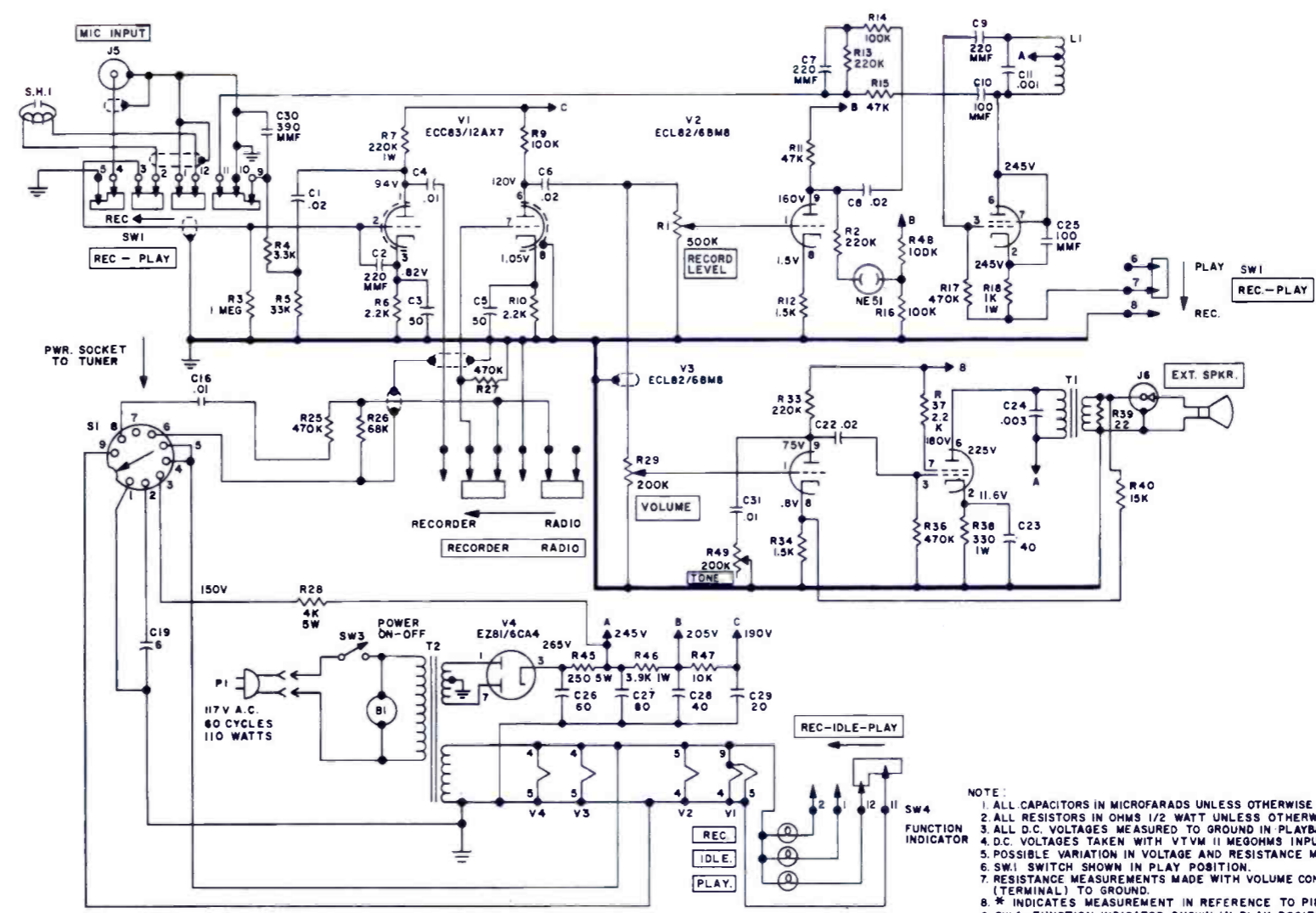
REF	TUBE	1	2	3	4	5	6	7	8	9
V6	EF89/6DA6		0.4	0.9				143	54	
V7	EF89/6DA6		0.4	0.9				143	54	
V8	EF80/6BX6		0.5					70	30	

REF	TUBE	1	2	3	4	5	6	7	8	9
V1	ECC83/12AX7	234.2K*	1K	2.2K	0	D	114.2K*	59.4K	2.2K	.145 Ω
V2	ECL82/6BM8	143K	—	—	0	145 Ω	270 Ω *	270 Ω *	1.5K	51.2K*
V3	ECL82/6BM8	143K	330 Ω	470K	.145 Ω	0	700 Ω *	6.4k*	1.36K	224.2k*
V4	EZ81/6CA4	150 Ω	∞	—	.145 Ω	0	∞	150 Ω	∞	∞
SI	POWER TUNER	0	4.25k*	∞	.145 Ω	.145 Ω	D	∞	∞	0

TELECTRO (Emerson)
Tape Recorder-Radio
Model 215

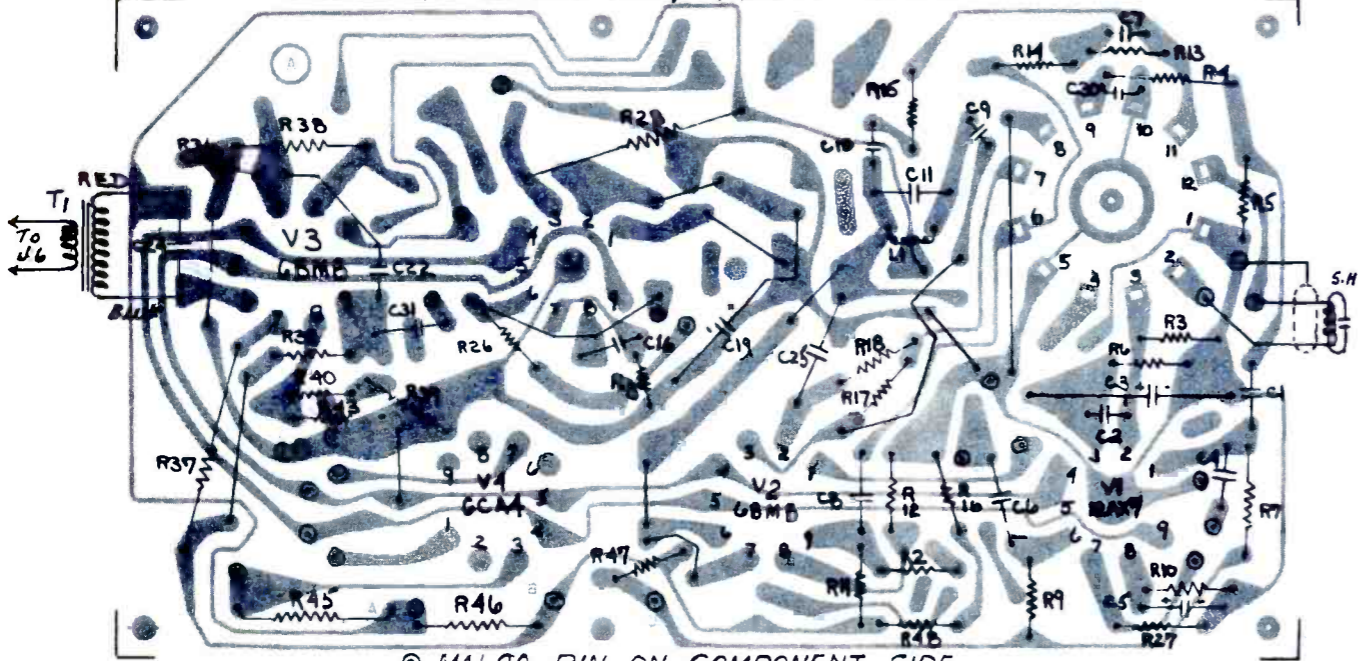
**ELECTRONIC
TECHNICIAN**

TEK FAX



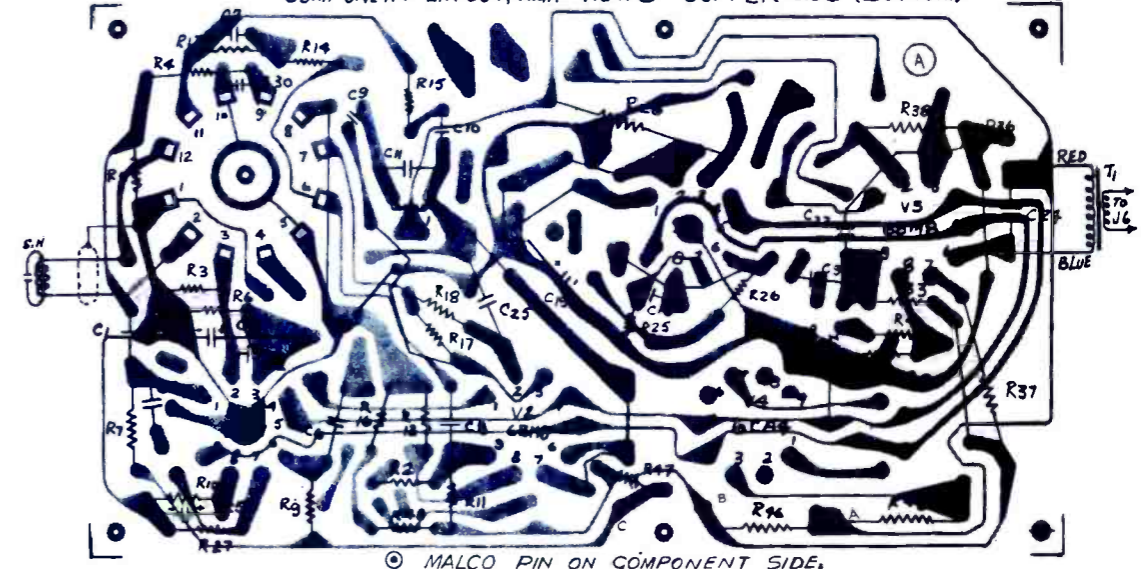
NOTE:
1. ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
2. ALL RESISTORS IN OHMS 1/2 WATT UNLESS OTHERWISE SPECIFIED.
3. ALL D.C. VOLTAGES MEASURED TO GROUND IN PLAYBACK & NO SIGNAL APPLIED.
4. D.C. VOLTAGES TAKEN WITH VTVM 11 MEGOHMS INPUT.
5. POSSIBLE VARIATION IN VOLTAGE AND RESISTANCE MEASUREMENT $\pm 20\%$.
6. SW1 SWITCH SHOWN IN PLAY POSITION.
7. RESISTANCE MEASUREMENTS MADE WITH VOLUME CONTROL FULLY C.W. FROM PIN (TERMINAL) TO GROUND.
8. * INDICATES MEASUREMENT IN REFERENCE TO PIN 7 OF V3.
9. SW4-FUNCTION INDICATOR SHOWN IN PLAY POSITION.

COMPONENT LAYOUT AMP, VIEW A (TOP)



© MALCO PIN ON COMPONENT SIDE

COMPONENT LAYOUT, AMP VIEW B COPPER SIDE (BOTTOM)



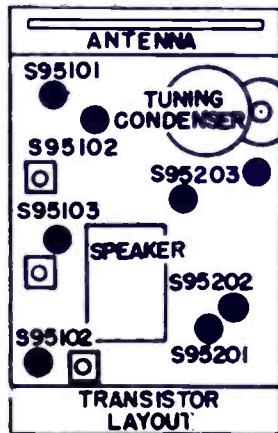
© MALCO PIN ON COMPONENT SIDE

**WESTERN
AUTO**
Transistor Radio
Model DC3438

ELECTRONIC TECHNICIAN TEKFAX

ELECTRONIC TECHNICIAN TEKFAX

**WESTING-
HOUSE**
AM/FM Tuner/
Amplifier V-2515-6



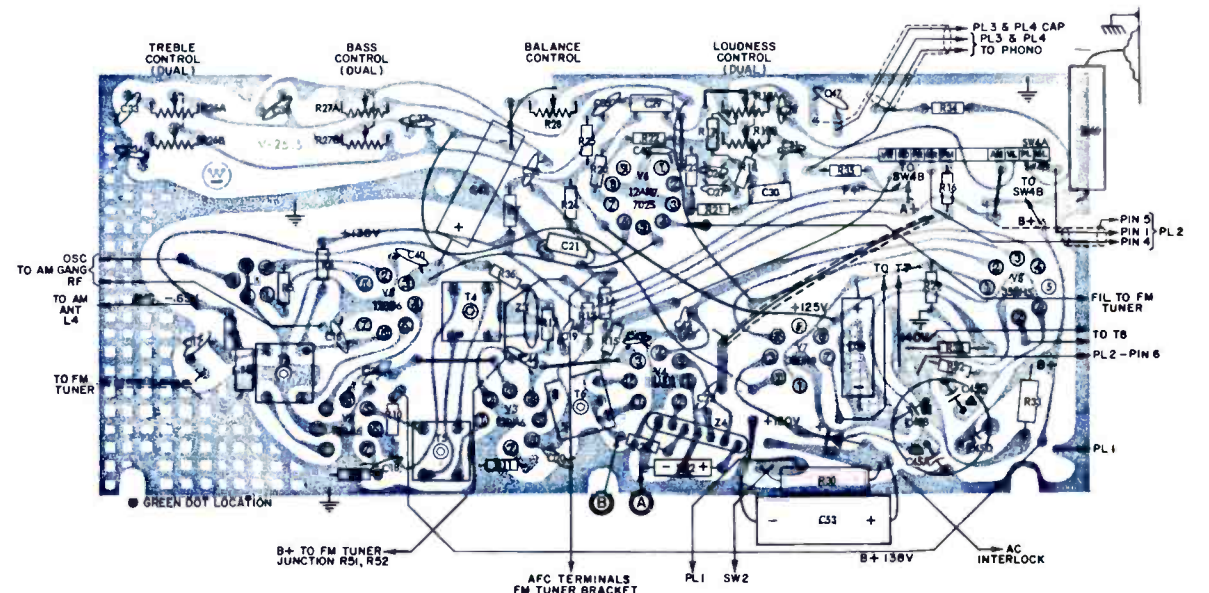
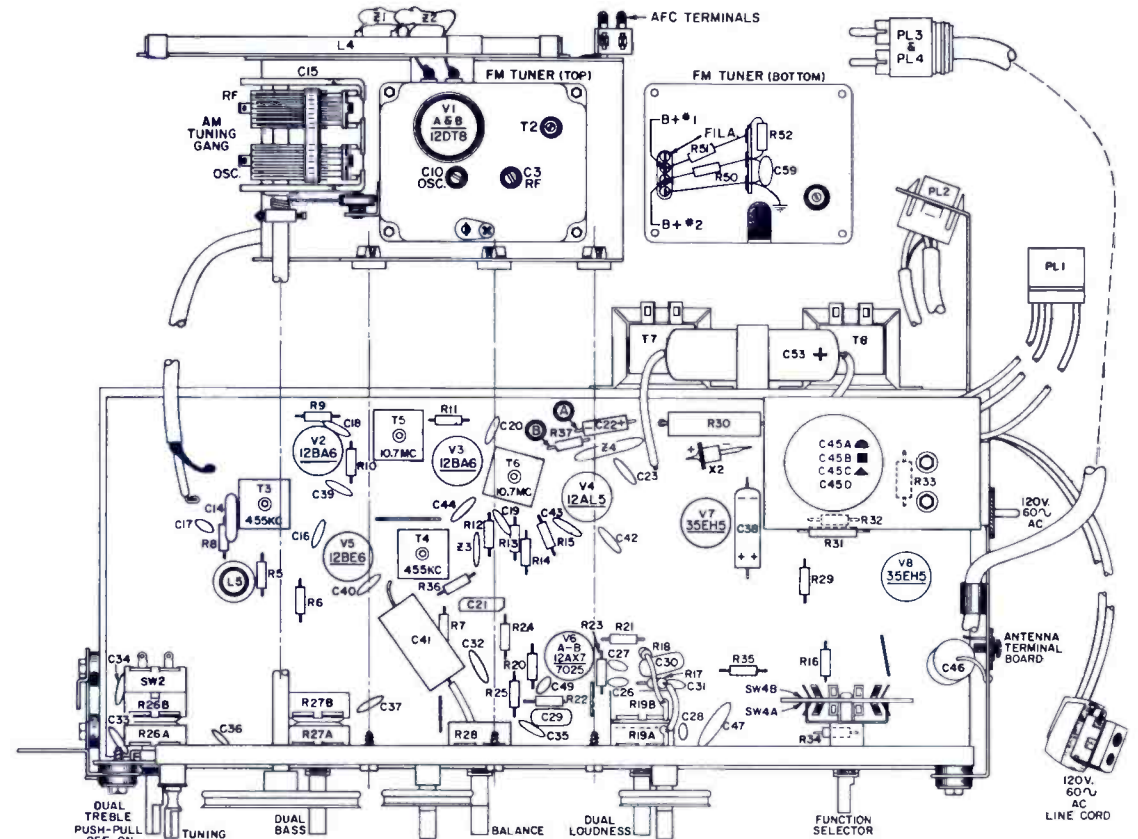
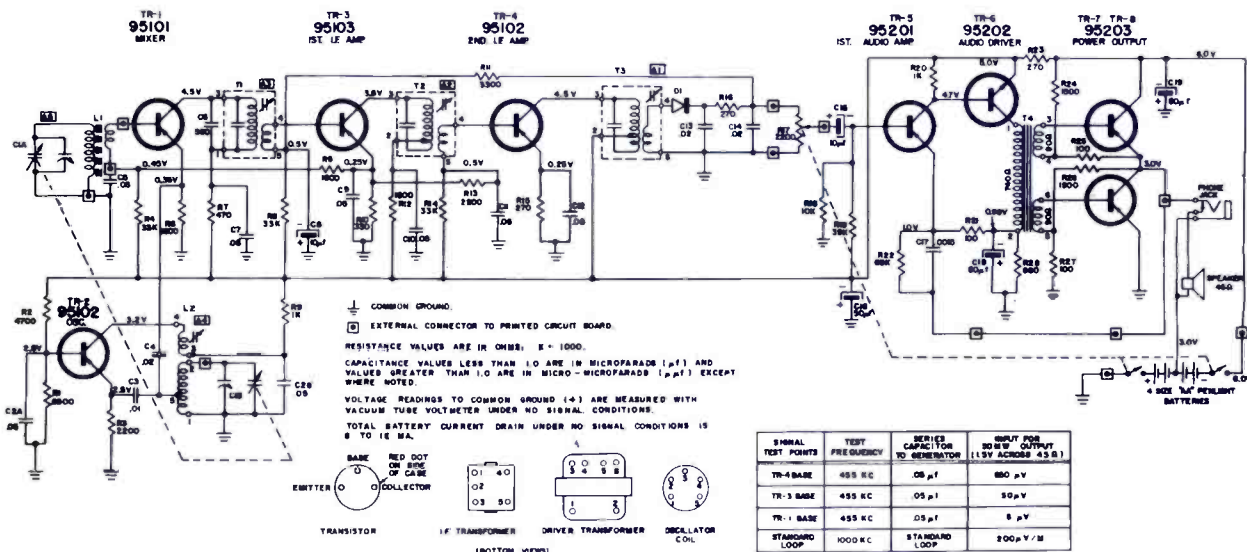
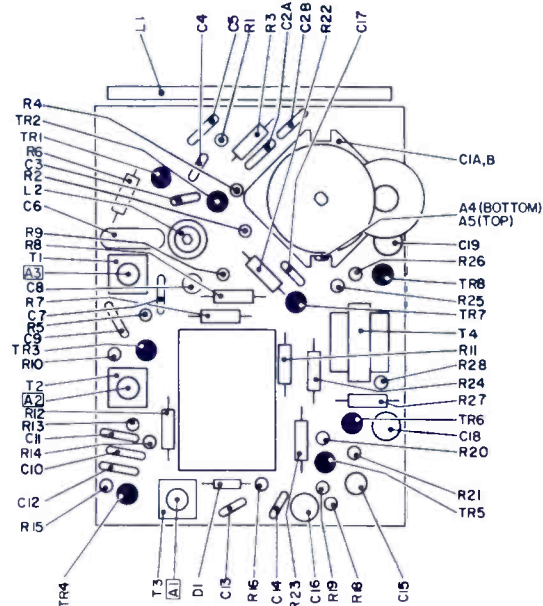
ALIGNMENT PROCEDURE

Output Meter reading to indicate 5 milliwatts47V
Output Meter connection Across speaker voice coil
Connection of generator ground lead Common Ground
Generator Modulation 30% 400 cycles
Position of volume control Fully clockwise

The alignment procedure should be repeated in the original order for greatest accuracy. Always keep the output from the signal generator at its lowest possible value to make the AVC action of the receiver ineffective.

Position Of Variable	Generator Frequency	Dummy Antenna	Generator Connection	Trimmers Adj. In order shown for max. output	Function of Trimmer
Open	455 Kc	.05 uf	C1A	A1 (Top of T3) A2 (Top of T2) A3 (Top of T1)	L. F. L. F. L. F.
Open 1400 Kc 600 Kc	1670 Kc 1400 Kc 600 Kc		* Test Loop * Test Loop * Test Loop	A4 A5 Check point	Oscillator Antenna

*Standard Hazeltine Test Loop Model 1150 or 3 turns of wire about 6" in diameter placed about one foot from the set loop.



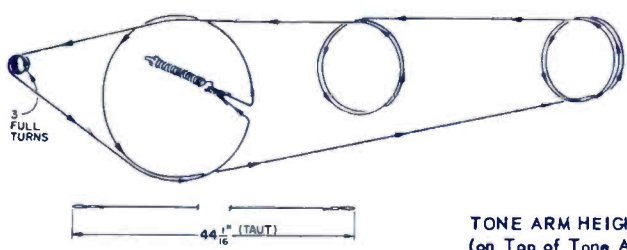
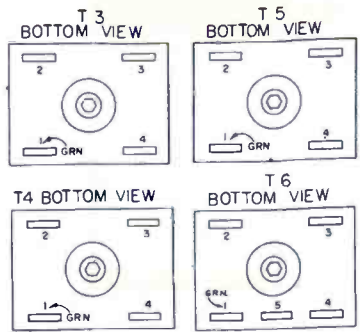
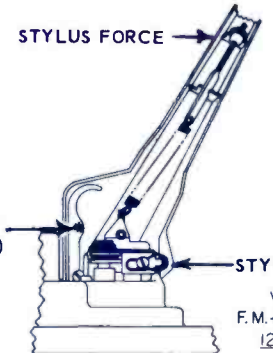
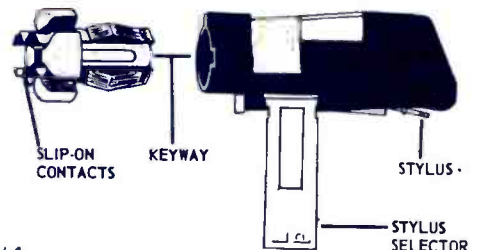
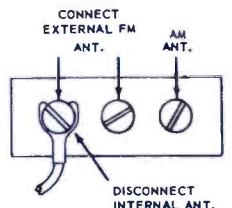


Figure 2 - Dial Cord Stringing.



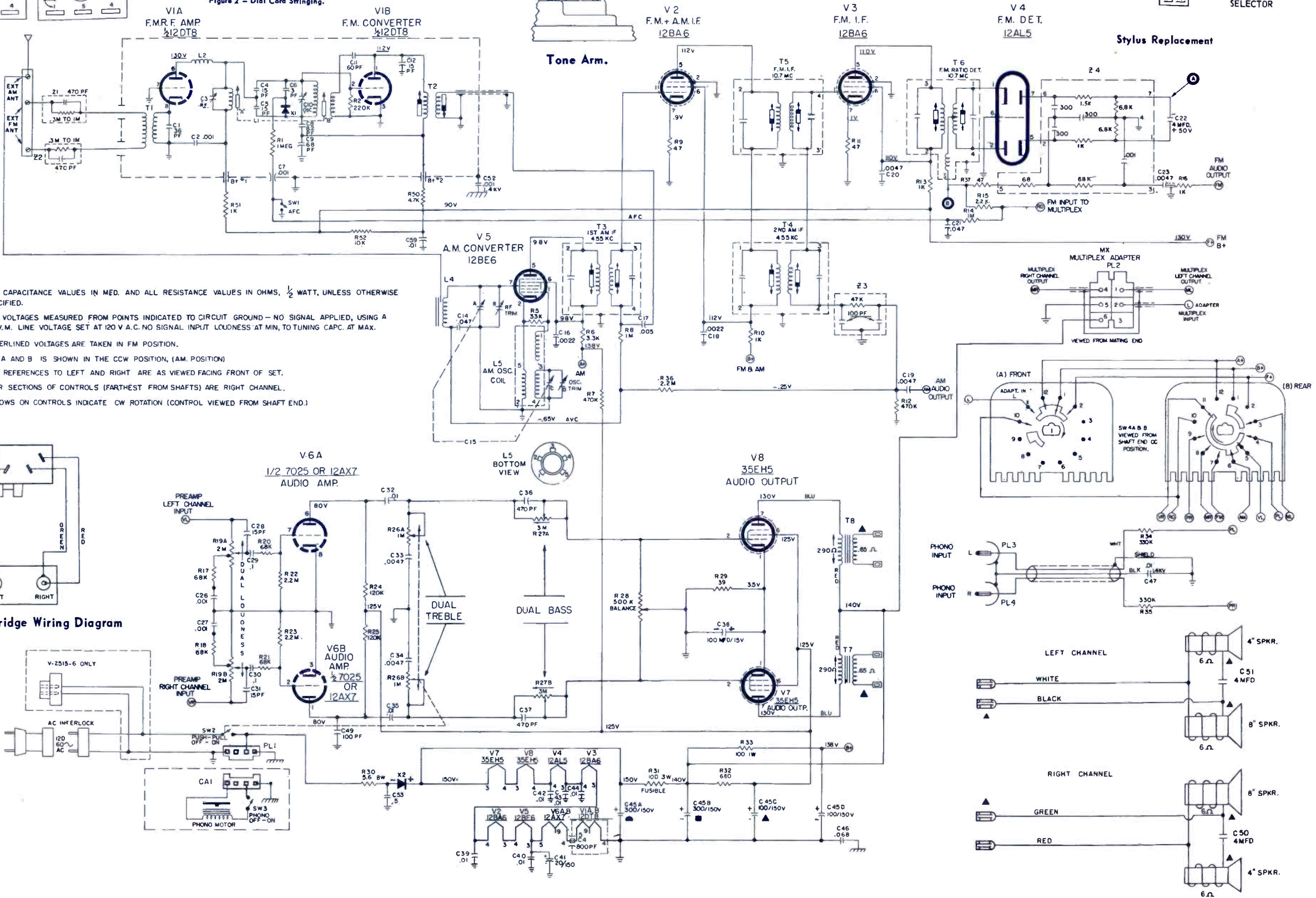
WESTINGHOUSE
AM/FM
Tuner/Amplifier
V-2515-6

ELECTRONIC TECHNICIAN
TEK FAX

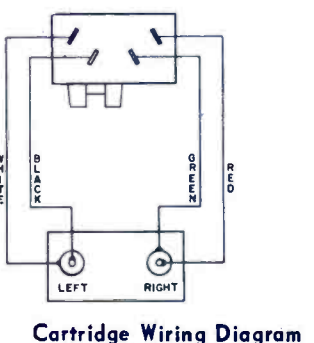


External AM or FM Antenna Hookup.

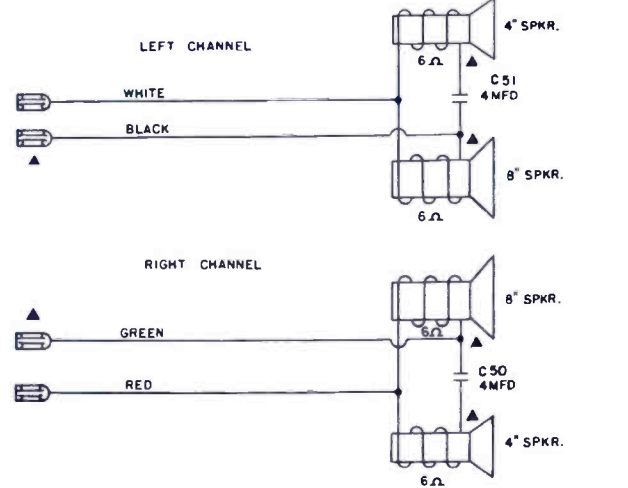
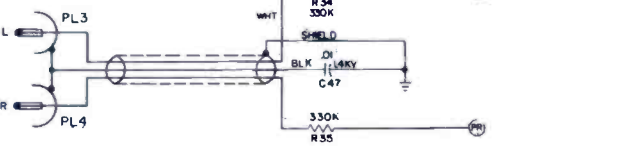
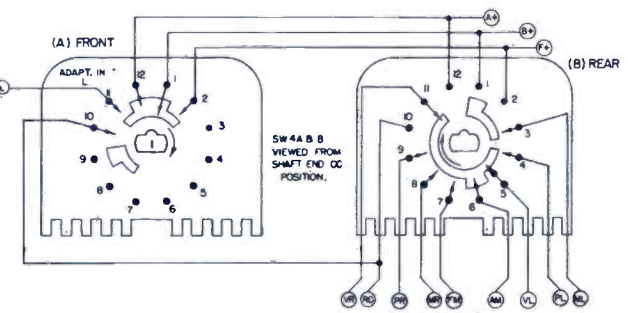
Stylus Replacement



1. ALL CAPACITANCE VALUES IN MED. AND ALL RESISTANCE VALUES IN OHMS, $\frac{1}{2}$ WATT, UNLESS OTHERWISE SPECIFIED.
2. D.C. VOLTAGES MEASURED FROM POINTS INDICATED TO CIRCUIT GROUND - NO SIGNAL APPLIED, USING A V.T.V.M. LINE VOLTAGE SET AT 120 V A.C. NO SIGNAL INPUT. LOUDNESS AT MIN, TO TUNING CAP. AT MAX.
3. UNDERLINED VOLTAGES ARE TAKEN IN FM POSITION.
4. SW4A AND B IS SHOWN IN THE CCW POSITION, (AM POSITION)
5. ALL REFERENCES TO LEFT AND RIGHT ARE AS VIEWED FACING FRONT OF SET.
6. REAR SECTIONS OF CONTROLS (FARTHEST FROM SHAFTS) ARE RIGHT CHANNEL.
7. ARROWS ON CONTROLS INDICATE CW ROTATION (CONTROL VIEWED FROM SHAFT END.)

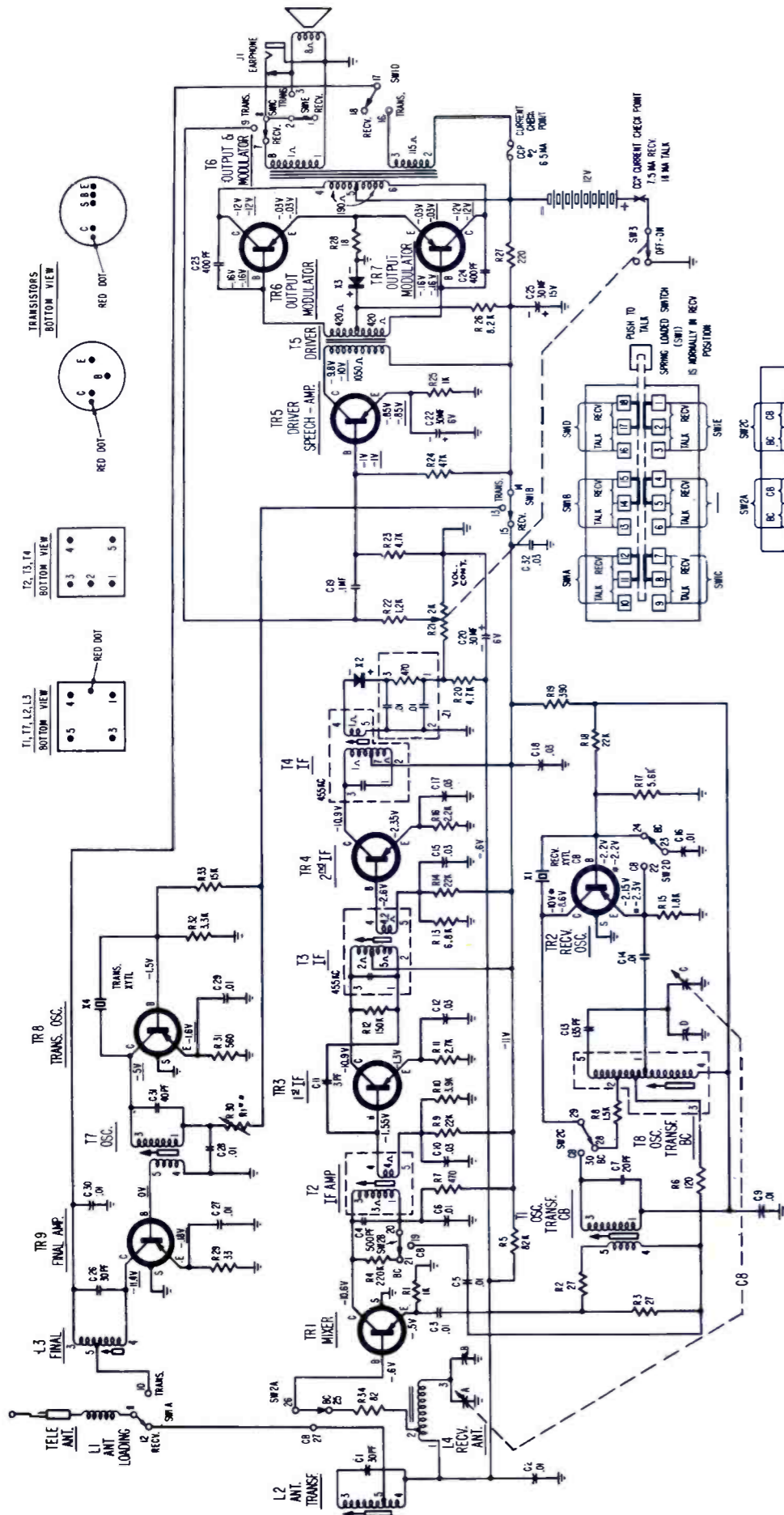


Cartridge Wiring Diagram

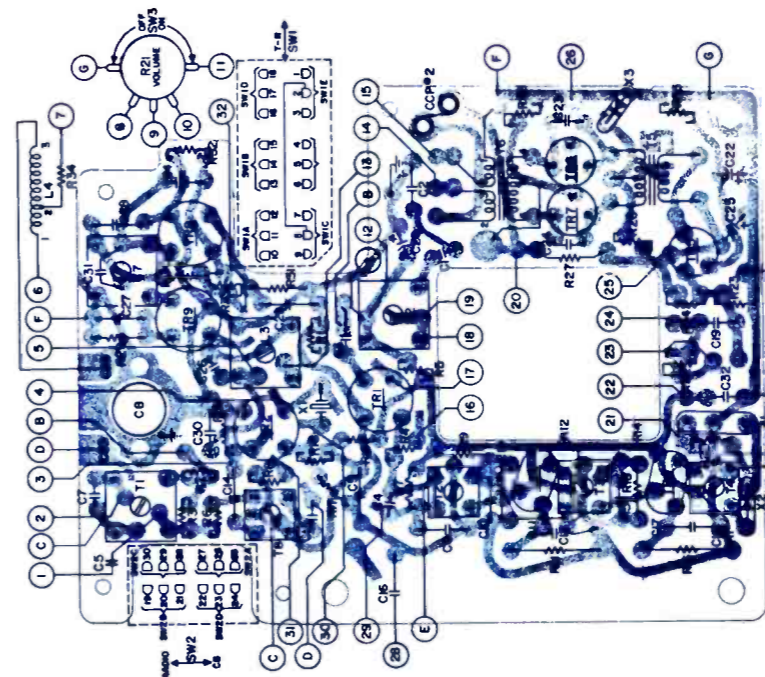


ELECTRONIC TECHNICIAN TEKFAK

WESTINGHOUSE
CB Transceiver and
Radio
Chassis V-2451-2



NOTES:
1. ALL CAPACITANCE VALUES ARE IN MFD. ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE SPECIFIED.
2. VOLTAGE MEASUREMENTS MADE WITH V.T.M. FROM POINTS INDICATED TO ± WITH MINIMUM BATTERY VOLTAGE OF 2 VOLTS, VOLTIMES SHOULD BE WITHIN ±5% OF THESE INDICATED, WITH NO SIGNAL APPLIED.
3. SWITCH SW1 IS NORMALLY IN RECEIVE POSITION IN TALK POSITION.
4. UNDERLINED VOLTAGES WERE TAKEN WITH SW2 IN CB POSITION.
5. * VOLTAGES WERE TAKEN WITH SW2 IN CB POSITION.
6. ** IS A VARIABLE RESISTANCE WHICH IS ADJUSTED DURING ALIGNMENT.

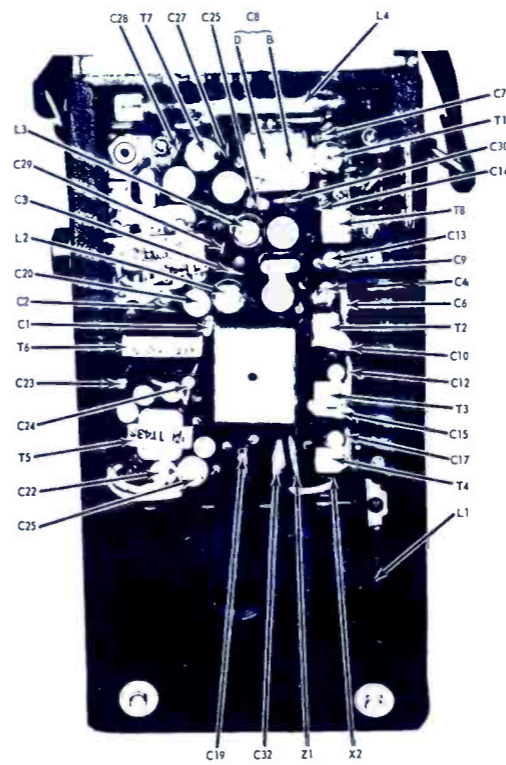


Bottom View of PC Board Showing Top Components in Solid Outline.

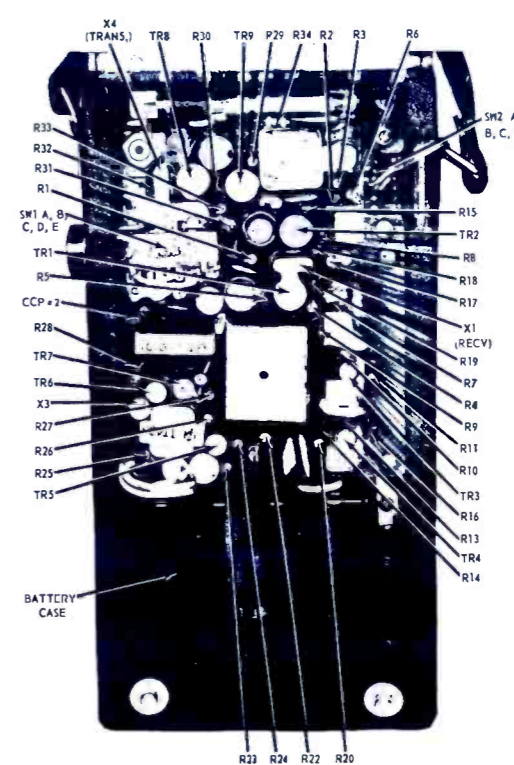
Jumper Wires on Board

- A-A —
- B-B —
- C-C —
- D-D —
- E-E —
- F-F —
- G-G —

- 1 — SW2B-19
- 2 — SW2C-30
- 3 — SW2D-22
- 4 — SW2C-29
- 5 — SW1D-17
- 6 — L2-4
- 7 — SW2A-25
- 8 — To ⏏
- 9 — R22
- 10 — R20
- 11 — To Batt. +
- 12 — To L41
- 13 — SW1A-10
- 14 — SW1D-16
- 15 — SW1C-7
- 16 — SW2B-21
- 17 — SW2A-26
- 18 — SW2A-27
- 19 — SW1A-12
- 20 — To Batt. -
- 21 — To R21
- 22 — SW1B-15
- 23 — To R21
- 24 — SW1C-9
- 25 — SW1B-14
- 26 — To Spkr. V.C.
- 27 — To R21
- 28 — SW2D-23
- 29 — SW2B-20
- 30 — SW2D-24
- 31 — SW2C-28
- 32 — SW1B-13



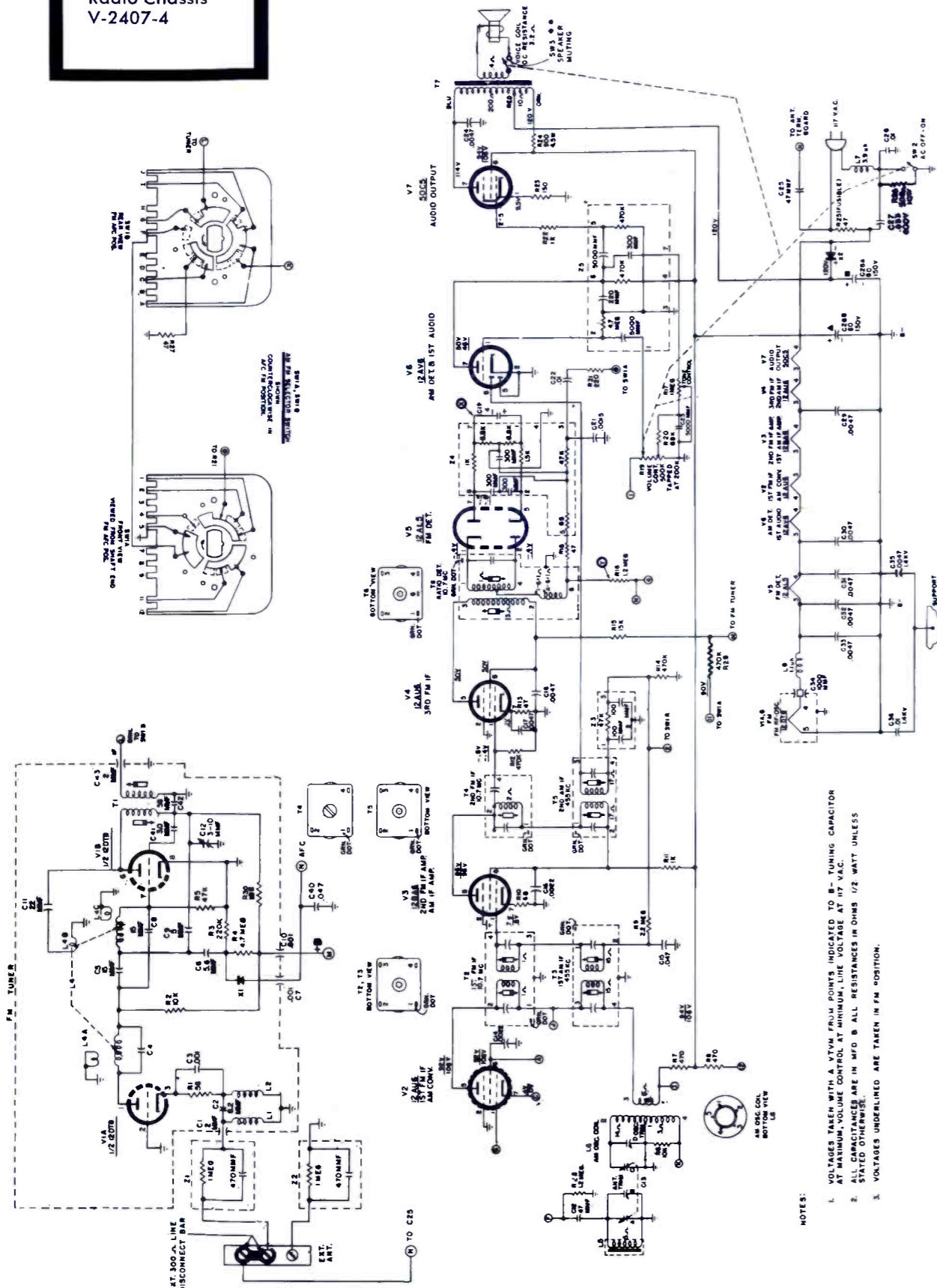
Location of Capacitors, Transformers Etc.



Location of Resistors, Transistors and Switches.

WESTINGHOUSE
Radio Chassis
V-2407-4

ELECTRONIC TECHNICIAN TEKFAK

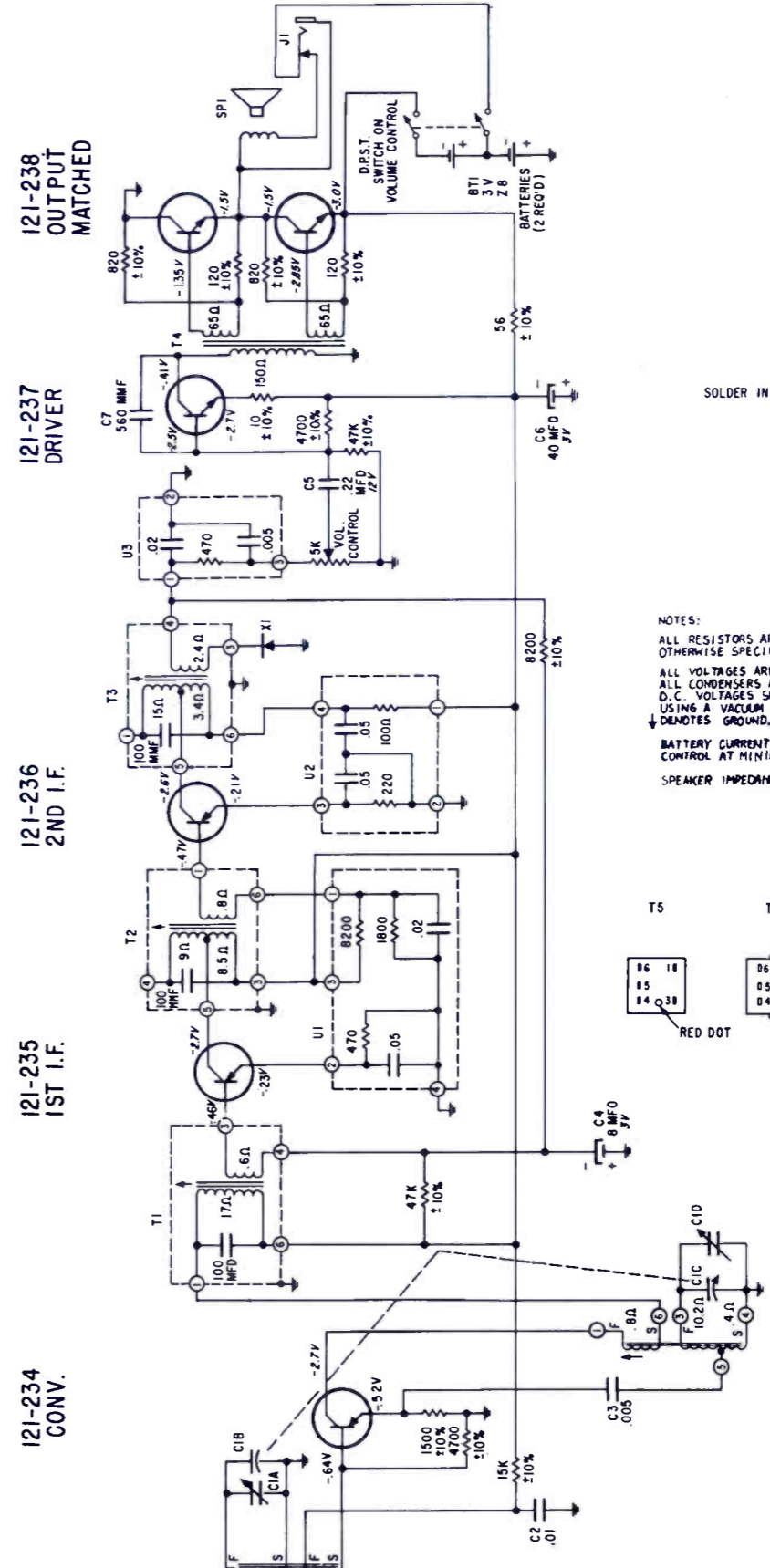


NOTES:

- VOLTAGES TAKEN WITH A VTVM FROM POINTS INDICATED TO B-TUNING CAPACITOR AT MAXIMUM VOLUME CONTROL AT MINIMUM LINE VOLTAGE AT 117 V.A.C.
- ALL CAPACITANCES ARE IN MFD & ALL RESISTANCES IN OHMS 1/2 WATT UNLESS STATED OTHERWISE.
- VOLTAGES UNDERLINED ARE TAKEN IN FM POSITION.

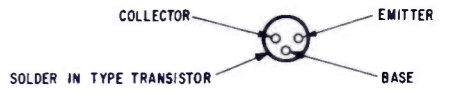
ELECTRONIC TECHNICIAN TEKFAK

ZENITH
Transistor Portable
Radio
Model Royal 50L
Chassis 6KT40Z1

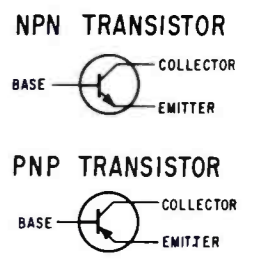
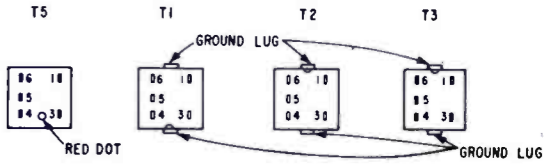


NOTES:

- ALL RESISTORS ARE CARBON, 1/2 WATT, ±20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
- ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
- ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
- D.C. VOLTAGES SHOWN ARE MEASURED FROM GROUND WITH NO SIGNAL USING A VACUUM TUBE VOLTMETER.
- ↓ DEMOTES GROUND.
- BATTERY CURRENT DRAIN: APPROXIMATELY 12 M.A. WITH VOLUME CONTROL AT MINIMUM.
- SPEAKER IMPEDANCE: 11 OHMS.

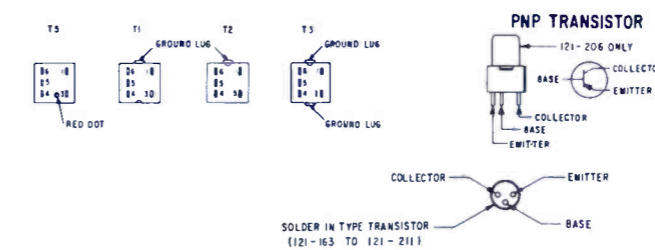
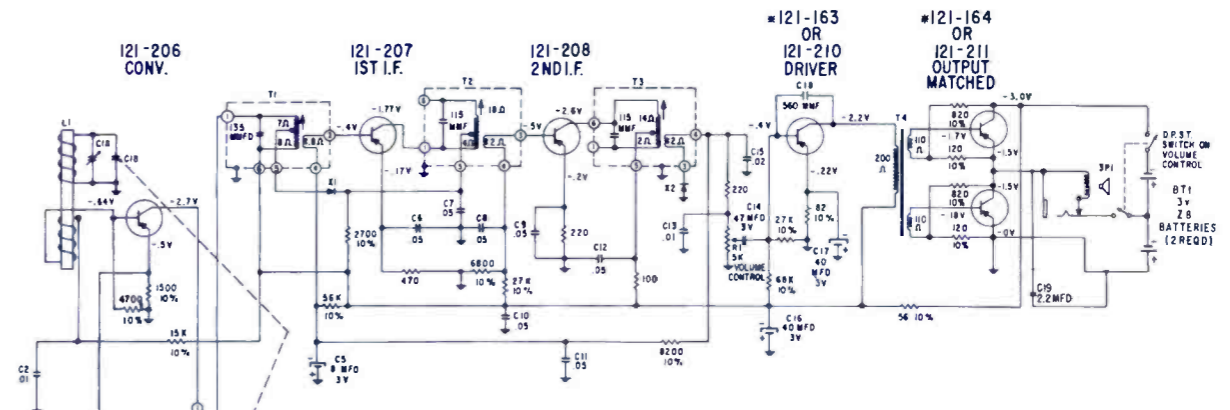
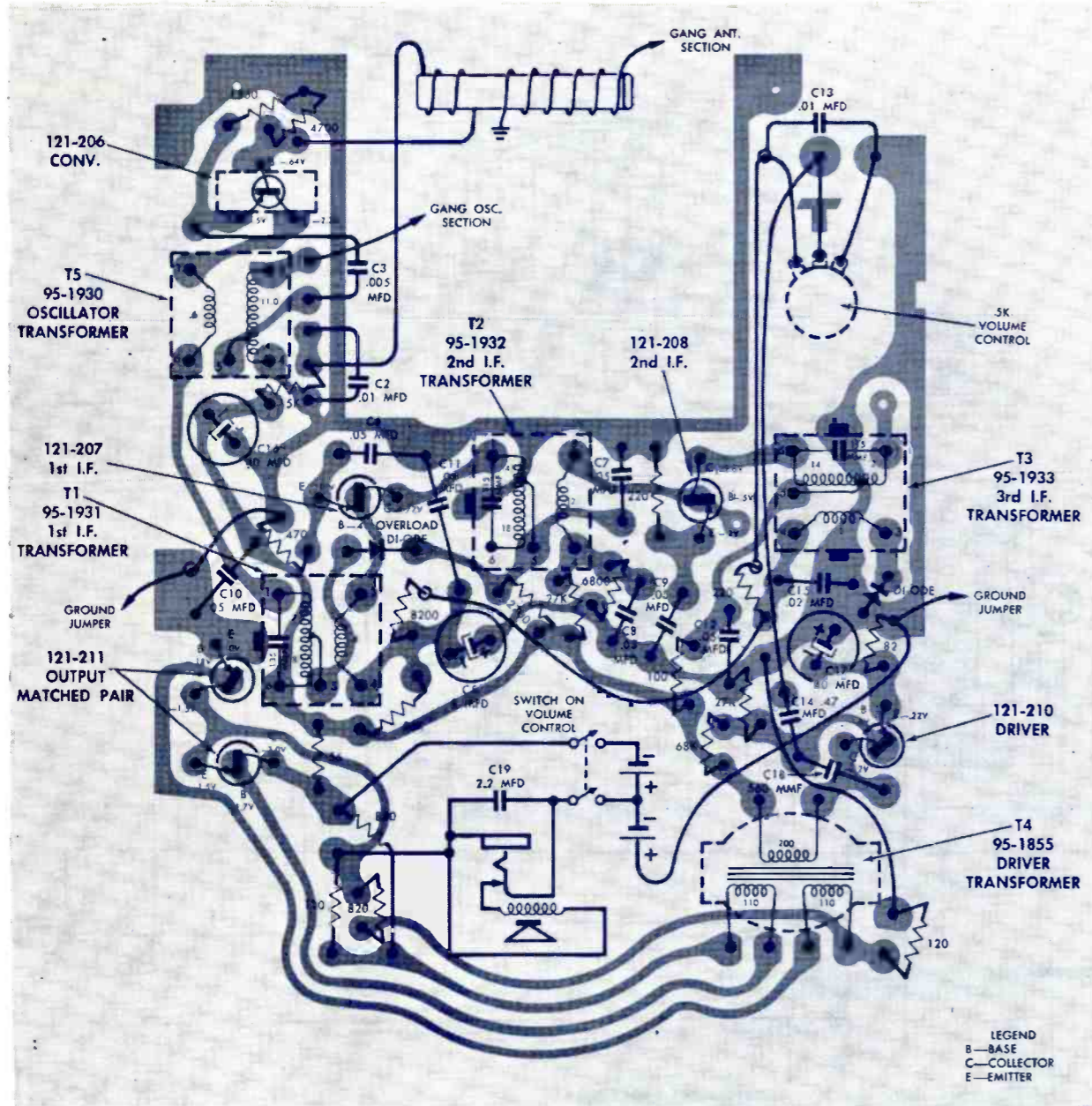


CHASSIS 6KT40Z1



ELECTRONIC TECHNICIAN TEKFAK

ZENITH
Transistor Radio
Models 6JT40Z1,
6JT41Z1



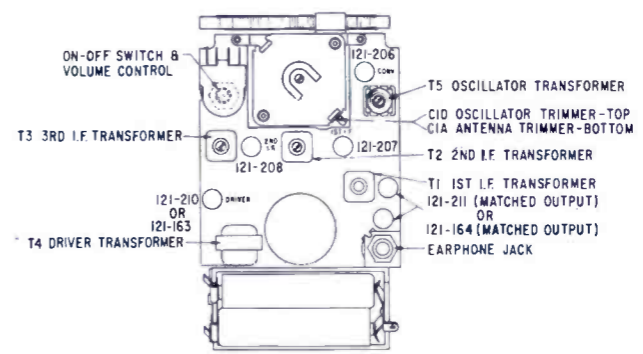
NOTES:
ALL RESISTORS ARE CARBON, 1/4 WATT, 20% TOLERANCE UNLESS OTHERWISE SPECIFIED.
ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
ALL CONDENSERS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL USING AN A.C.-D.C. OR VACUUM TUBE VOLTMETER.
DENOTES CHASSIS
BATTERY CURRENT DRAIN: APPROXIMATELY 12MA. WITH VOLUME CONTROL AT MINIMUM
SPEAKER IMPEDANCE: 11 OHMS
*121-210 DRIVER TRANSISTOR MUST BE USED WITH 121-211 OUTPUT TRANSISTORS.
WHEN 121-210 DRIVER TRANSISTOR WITH YELLOW DOT IS USED
121-211 OUTPUT TRANSISTORS MUST HAVE MATCHING COLOR DOT
*121-163 DRIVER TRANSISTOR MUST BE USED WITH 121-164 OUTPUT TRANSISTORS.

ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inner Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455 KC	ONE TURN LOOSELY COUPLED TO WAVEMAGNET	Chassis	600 KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620 KC		-	Gang wide open.	C1D	Set Oscillator to dial scale.
3	600 KC		-	Near 600 KC	Adjust slug in T5	While rocking gang, adjust T5 for maximum output regardless of dial accuracy.
4	1260 KC		-	1260 KC	C1A	Align loop ant.
5	REPEAT STEPS 2, 3, & 4		-	-	-	-

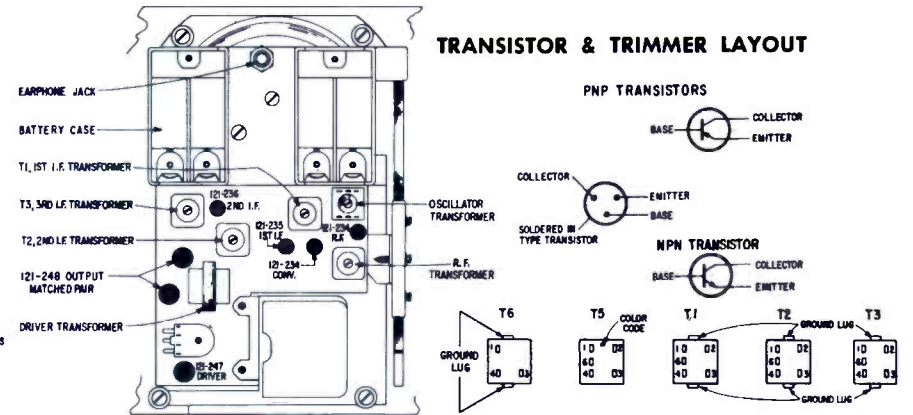
CHASSIS INFORMATION CHART

Chassis	Transistor Layout Label Color	Part No.	Conv.	1st I.F.	2nd I.F.	Crystal Diode Detector	Driver	Output-Output	Supplier
6JT40Z1 and 6JT41Z1	Black 102-8274	Zenith	121-206	121-207	121-208	103-19	121-210 or 121-163	121-211 or 121-164 Matched Pair	Texas Instrument R.C.A.



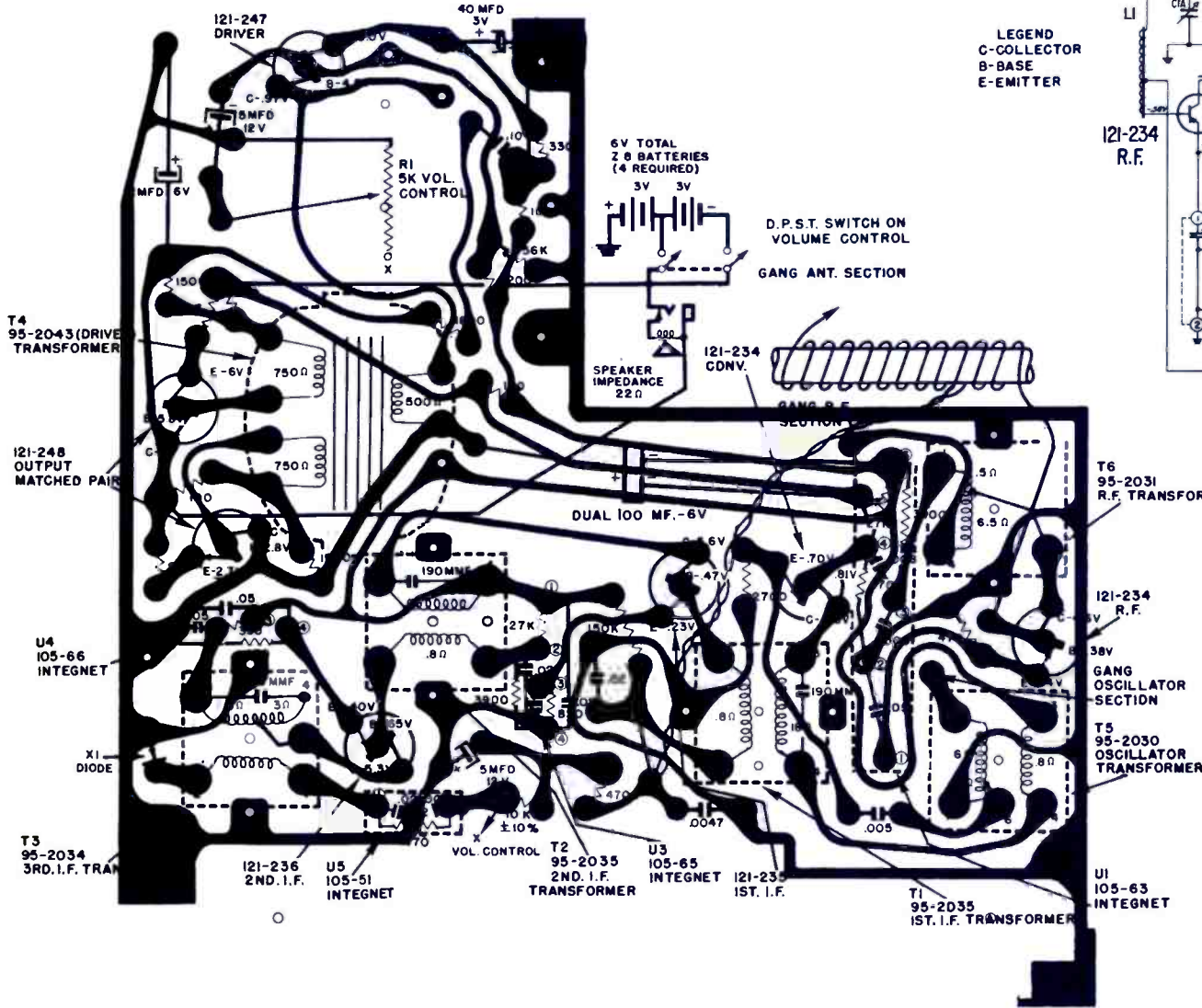
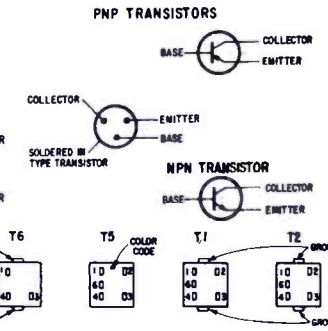
ZENITH
 Transistor Radio
 Model Royal 490,
 Chassis 7KT45Z1

ELECTRONIC TECHNICIAN TEKFA~~X~~

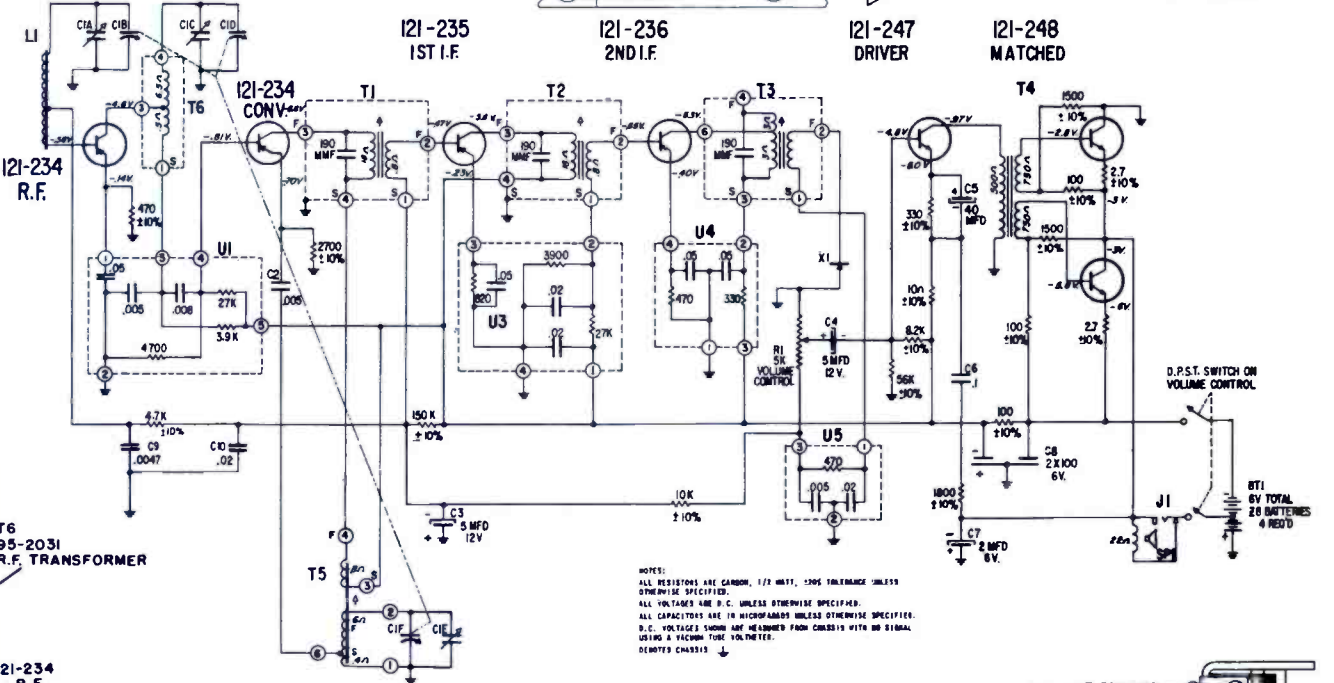


DRIVER	MATCHED OUTPUT
I21-247	I21-248
VIOLET	BLACK
BLACK	VIOLET
WHITE	BLUE

* THE MATCHING IDENTIFICATION WILL BE A COLORED DOT. THE MATCHING OF THE DRIVER AND OUTPUT TRANSISTORS WILL BE AS INDICATED IN THE ABOVE CHART



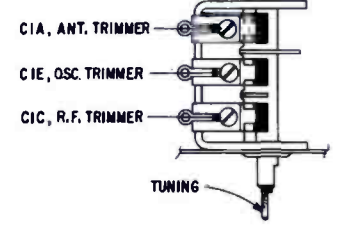
LEGEND
 C-COLLECTOR
 B-BASE
 E-EMITTER



NOTES:
 ALL RESISTORS ARE CARBON, 1/2 WATT, 5% TOLERANCE UNLESS OTHERWISE SPECIFIED.
 ALL VOLTAGES ARE D.C. UNLESS OTHERWISE SPECIFIED.
 ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.
 D.C. VOLTAGES SHOWN ARE MEASURED FROM CHASSIS WITH NO SIGNAL USING A VACUUM-TUBE VOLTMETER.

ALIGNMENT PROCEDURE

Operation	Input Signal Frequency	Connect Inner Shield Conductor From Oscillator To	Connect Outer Shield Conductor From Oscillator To	Set Dial At	Trimmers	Purpose
1	455KC		Chassis	600KC	Adj. T1, T2, T3 for maximum output.	For I.F. Alignment
2	1620KC			Gang wide open	C1E	Set Oscillator to dial scale.
3	600KC	One Turn Loosely Coupled To Wavemagnet		Set dial near 600KC	Adjust slug in T5	Adjust T5 for maximum output while rocking gang. Adjust for maximum output regardless of dial accuracy.
4	600KC				Adjust slug in T6	Adjust T6 for maximum output
5	REPEAT STEPS 2, 3 & 4					
6	1260KC			1260KC	C1A, C1C	Align ant. & R.F.



AIRLINE
Reverberation Unit
Model GVC-9019A

ELECTRONIC TECHNICIAN TEKFAK

IF NO SOUND IS PRESENT-CHECK THE FOLLOWING:

1. Is wall outlet used supplying current?
2. Is instrument volume turned on?
3. Are amplifier and reverberation controls and switches ON.
4. Is your amplifier Stand-By switch open?
5. Are fuses on amplifier or reverberation blown?
6. Are tubes seated firmly? Is there a defective tube?
7. Are any of the connecting cords defective?

IF NO REVERBERATION SIGNAL - CHECK THE FOLLOWING:

1. Is REVERBERATION INTENSITY control turned on?
2. Is INTENSITY control turned high enough(CLOCK-WISE)?
3. Are Reverberation foot and toggle switches turned ON?
4. Are cord connections correctly placed?
5. Is there a defective tube or blown fuse in Reverberation unit?

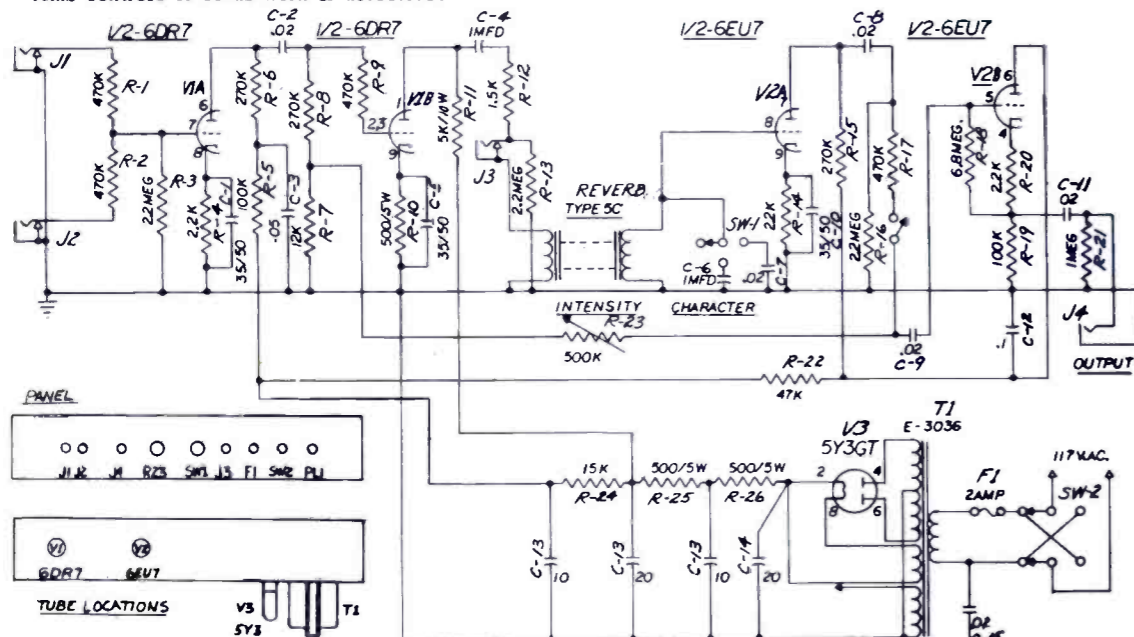
IF YOU ARE GETTING FEEDBACK, DISTORTION, OR OTHER UNDESIRABLE NOISES - CHECK THE FOLLOWING:

1. Is your instrument too close to the amplifiers?
2. Is volume too high on the amplifier?
3. Is amplifier near or on line with motors, shavers, neons, fluorescent lights, etc.?
4. Check for defective or microphonic tubes.
5. Are speakers damaged or worn? Are any of the systems controls or cords worn or defective?

MAINTENANCE

1. Your Reverberation unit is a sensitive electronic device. Treat it with care. Avoid rough handling.
2. Check tubes occasionally if unit is used regularly. When replacing tubes take care to place only in correct sockets and push in -- do not twist -- to avoid pin damage.

REF. NO.	PART NUMBER	NAME OF PART	REF. NO.	PART NUMBER	NAME OF PART
RESISTORS			MISCELLANEOUS		
R1, R2, R9, R17	*CB1447	470K-1/2 WATT-10%	C15	*MB-51	.01 MFD..1400V.
R3, R13, R16	*CB1522	2.2MEG.-1/2 WATT-10%	J1, J2, J3	304-6	CLOSED CIRCUIT JACK
R4, R14, R20	*CB1222	2.2K-1/2 WATT-10%	J4	304-3	OPEN CIRCUIT JACK
R5, R19	*CB1410	100K-1/2 WATT-10%	REVERB UNIT 580-4 TYPE SC		
R6, R8, R15	*CB1427	270K-1/2 WATT-10%	SW-1	304-18	ROTARY SWITCH
R7	*CB1312	12K-1/2 WATT 10%	SW-2	304-21	A.C. TOGGLE SWITCH
R10, R25, R26	*WF5150	500 OHM-5 WATT	T1	330-3	POWER TRANSFORMER
R11	*WF5250	5K-10 WATT	F1	*312002	FUSE-2 AMP.
R12	*CB1215	1.5K-1/2 WATT-10%	304-7 FUSEHOLDER		
R18	*CB1568	6.8MEG.-1/2 WATT-10%	308-1 KNOBS FOR CONTROLS		
R21	*CB1510	1 MEG.-1/2 WATT-10%	PL1	310-4	PILOT LIGHT (NEON)
R22	*CB1347	47K-1/2 WATT-10%	304-24 LINE CORD & PLUG		
R23	302-4	500K-CONTROL & SW.	SK-1	311-3	9 PIN TUBE SOCKET (UNSHIELDED)
R24	*CB1315	15K-1/2 WATT-10%	SK-2	311-2	9 PIN TUBE SOCKET (SHIELDED)
CONDENSORS			313-1 TUBE SHIELD		
C1, C5, C10	303-54	35 MFD..50V.	304-10 PLUG		
C2, C7, C8, C9, C11	*6TM-520	.02 MFD..500V.	505-52 CABINET		
C3	*6TM-550	.05 MFD..400V.	505-52A HANDLE		
C4, C6	*6TM-M1	1 MFD..400V.	304-8 PHONO PLUG		
C12	*6TM-P10	1 MFD..600V.	500-1 FOOT SWITCH		
C13	303-53	20-10-10 MFD..450V.	311-1 8 PIN TUBE SOCKET		
C14	303-57	20 MFD..450V.			



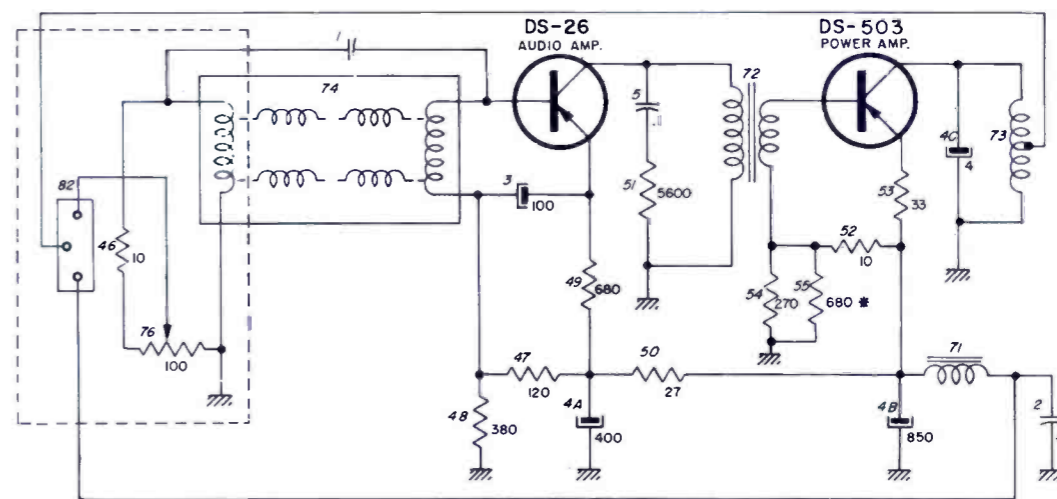
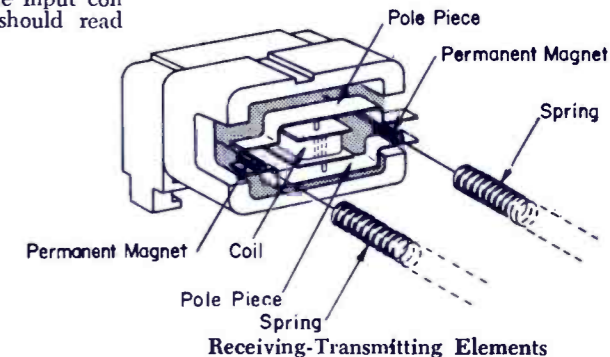
ELECTRONIC TECHNICIAN

ELECTRONIC TECHNICIAN TEKFAK

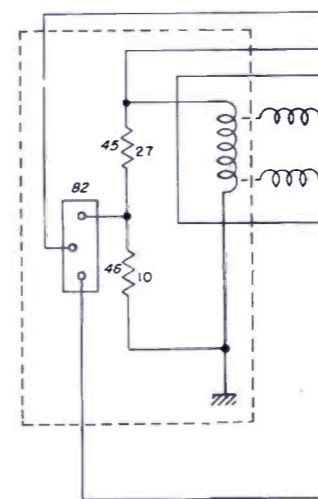
DELCO
Reverberation Unit
Oldsmobile &
Pontiac Models
7284742 and
7284893

TROUBLE SHOOTING

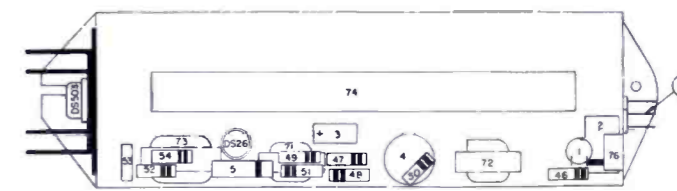
1. Turn on unit and listen for thump in speaker. If no thump is heard, remove the cover of the unit and pluck one of the springs.
2. If no twang is heard, inject an audio signal at the base of the DS-26. Use normal trouble shooting procedures for trouble shooting the audio stages.
3. To test the delay, remove the green or black leads and check for continuity of the coils. The input coil should read 1 ohm. The output coil should read 300 ohms.



SCHEMATIC DIAGRAM



INPUT CIRCUIT (OLDSMOBILE)



PARTS LAYOUT

OJIBWAY BUILDING, DULUTH 2, MINNESOTA

DELCO
Garage Door
Opener
Models R59
and T59-12V

ELECTRONIC TECHNICIAN TEKFAX

ADDITIONAL ALIGNMENT AND ADJUSTMENT PROCEDURES

— USE ONLY WHEN REQUIRED —

No alignment should be necessary, except under one of the following conditions:

(Try first re-positioning receiver antenna for inadequate range or phantom operation.)

- The receiver antenna is replaced—use steps 2, 3, 4.
- Range is poor—use steps 1, 2, 3, 4, 6, 7.
- Phantom operation—use steps 2, 3, 6, 7.

D.C. voltmeter connection Across relay coil

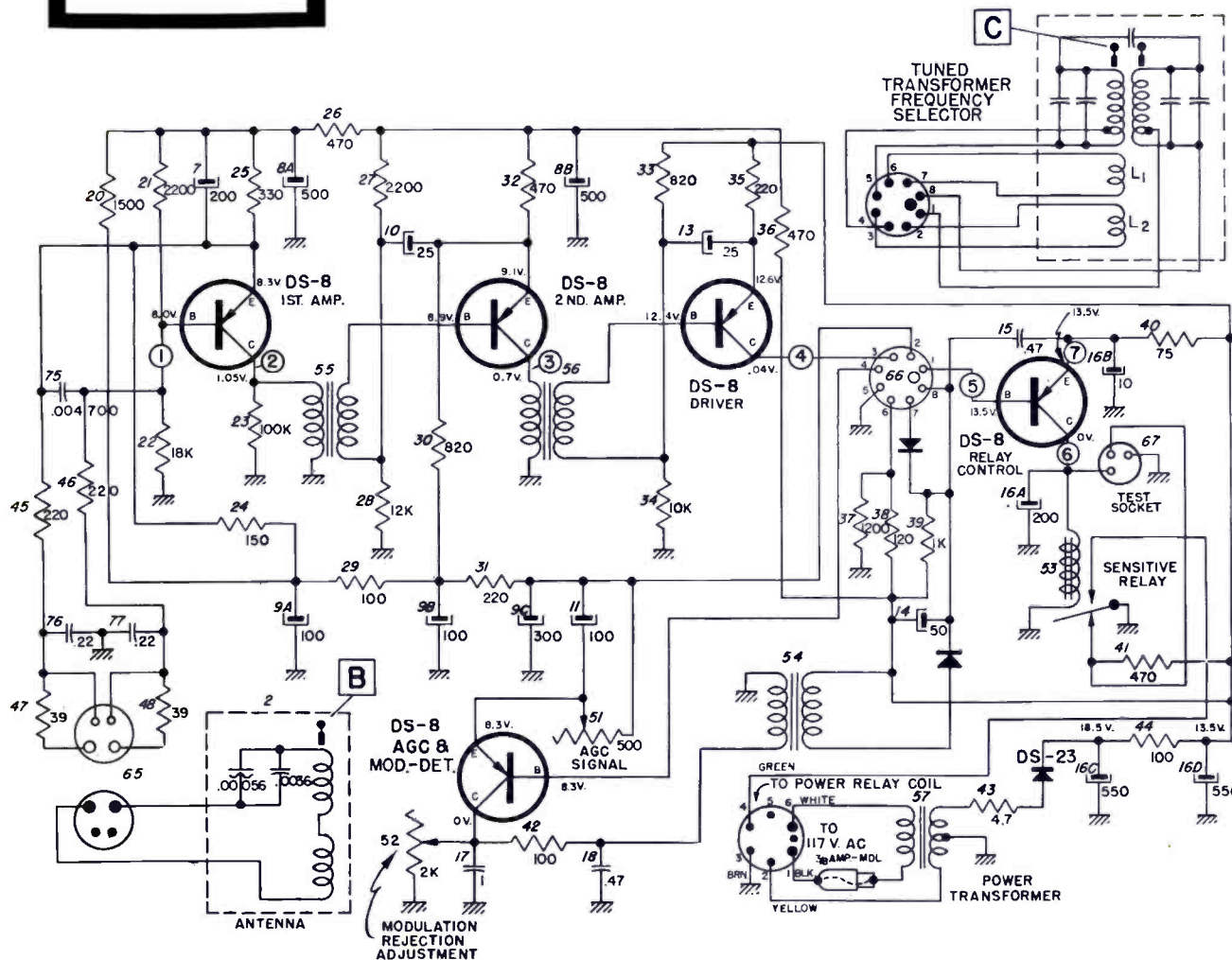
Step	Adjust	Transmitter On	Voltmeter	Comments
1	Transmitter Coil (A)	Yes	Maximum	Sets transmitter to receiver frequency.
2**	Receiver Ant. Position	Yes	Maximum	Polarize with car antenna.
3**	Receiver Ant. Position	No	Check for low noise level.	Locate away from a. c. lines and over 6 Ft. from receiver.
4	Receiver Ant. (B)	No	Maximum	
5*	Receiver Coil (C)	No—use Generator	Maximum	Sets receiver frequency.
6	AGC Control	No	
7****	Modulation Control	No	Less than .3 volts	Sets noise level (at garage)

**Receiver antenna is positioned for minimum noise level if sufficient range is obtained in that position. End to end polarization with transmitting antenna gives best range, but broadside polarization is less directional.

*Receiver coil is pre-set at factory and adjustment should not be necessary. Requires audio generator at proper channel frequency.

**Adjustment is made by spacing antennas 14 feet apart; key transmitter and set AGC control at receiver relay. (Receiver must be plugged into operator at garage).

****Incorrect adjustment may result in phantom operation.



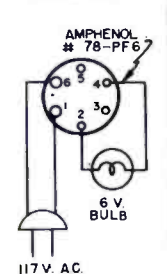
BENCH TEST SET UP

The receiver must be connected to 110-120 volt a. c. A six prong amphenol socket should be used (see Fig. 2) and a 6 volt light bulb may be connected to indicate when the receiver relay energizes. A jumper connected between the normally closed relay contact and chassis should be used when the receiver is operated with a bench test adapter. This jumper maintains a constant B+ voltage to the receiver regardless of whether the relay is closed or open.

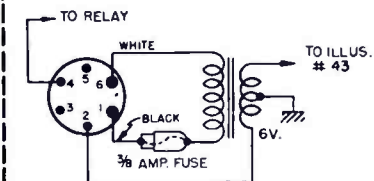
Procedure:

- Connect a d. c. voltmeter across sensitive relay
- Remove end caps on antenna and push core out of fiber tube.
- Point end of antenna close to receiver. (Point end which gives most voltage.)
- Adjust either sliding coil on antenna for maximum relay voltage.

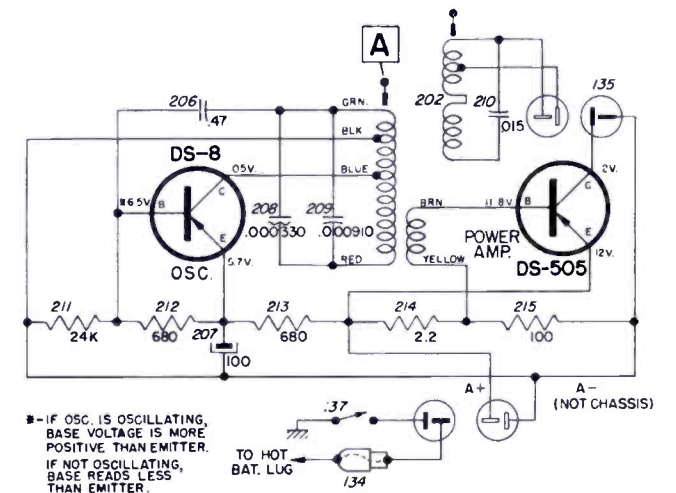
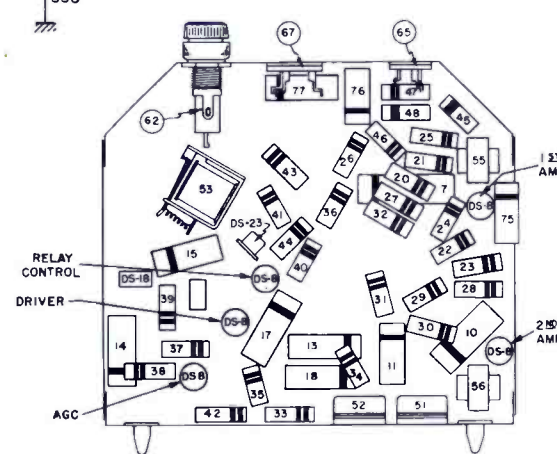
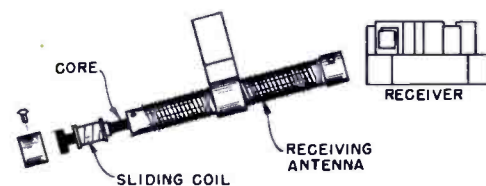
BENCH TEST ADAPTER



RECEIVER

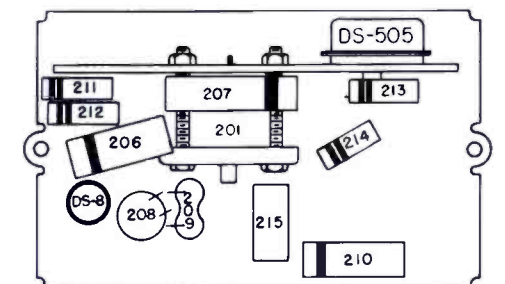


The receiver antenna can be peaked, but this should not be necessary unless the antenna is replaced.



*- IF OSC. IS OSCILLATING, BASE VOLTAGE IS MORE POSITIVE THAN EMITTER. IF NOT OSCILLATING, BASE READS LESS THAN EMITTER.

Channel	Freq. (Cycles/Sec.)
83	7955
85	8179
87	8409
89	8645
90	8766
91	8888
93	9138
95	9396
97	9660
99	9932

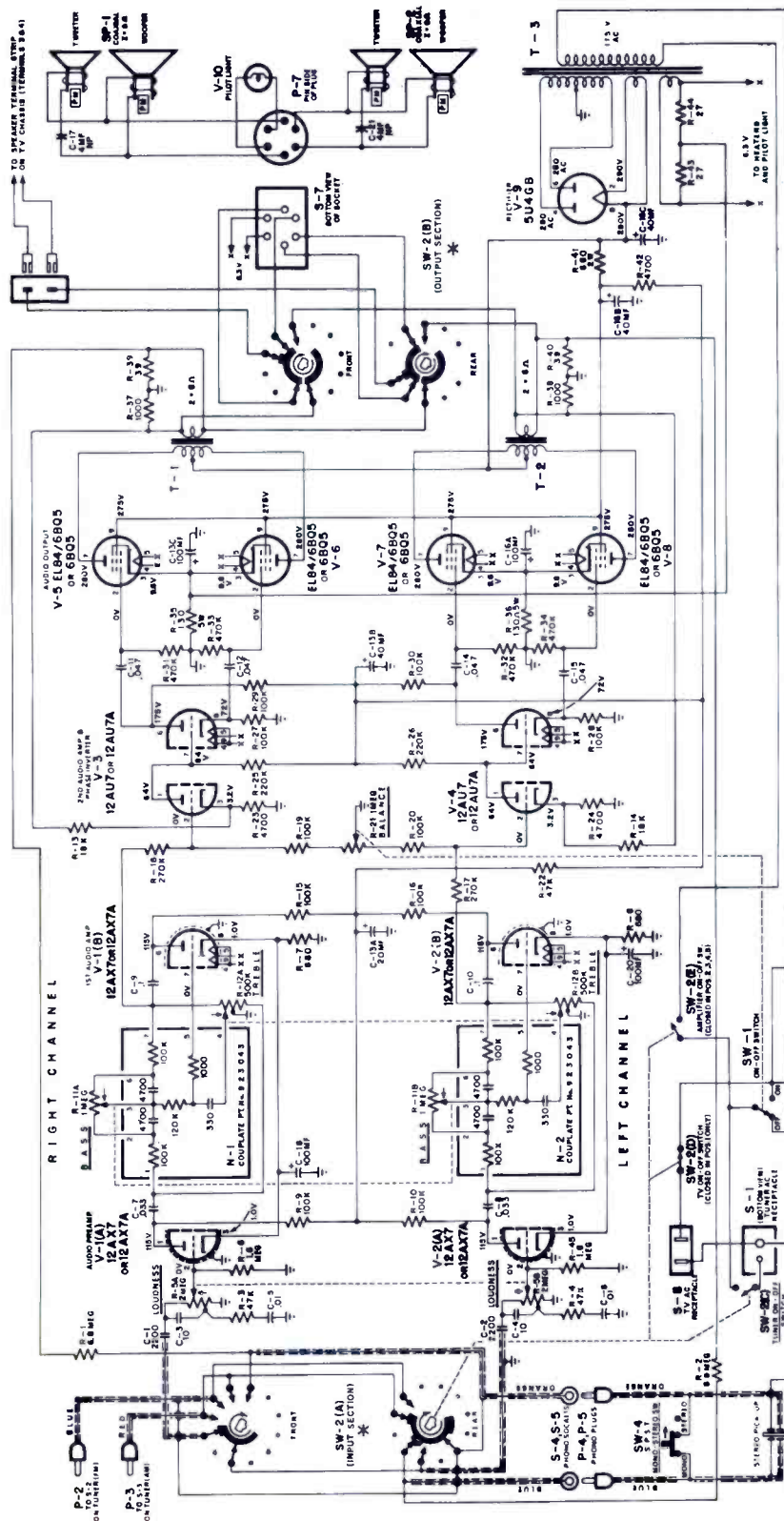


DUMONT
Stereo Amplifier
Chassis 120509-B

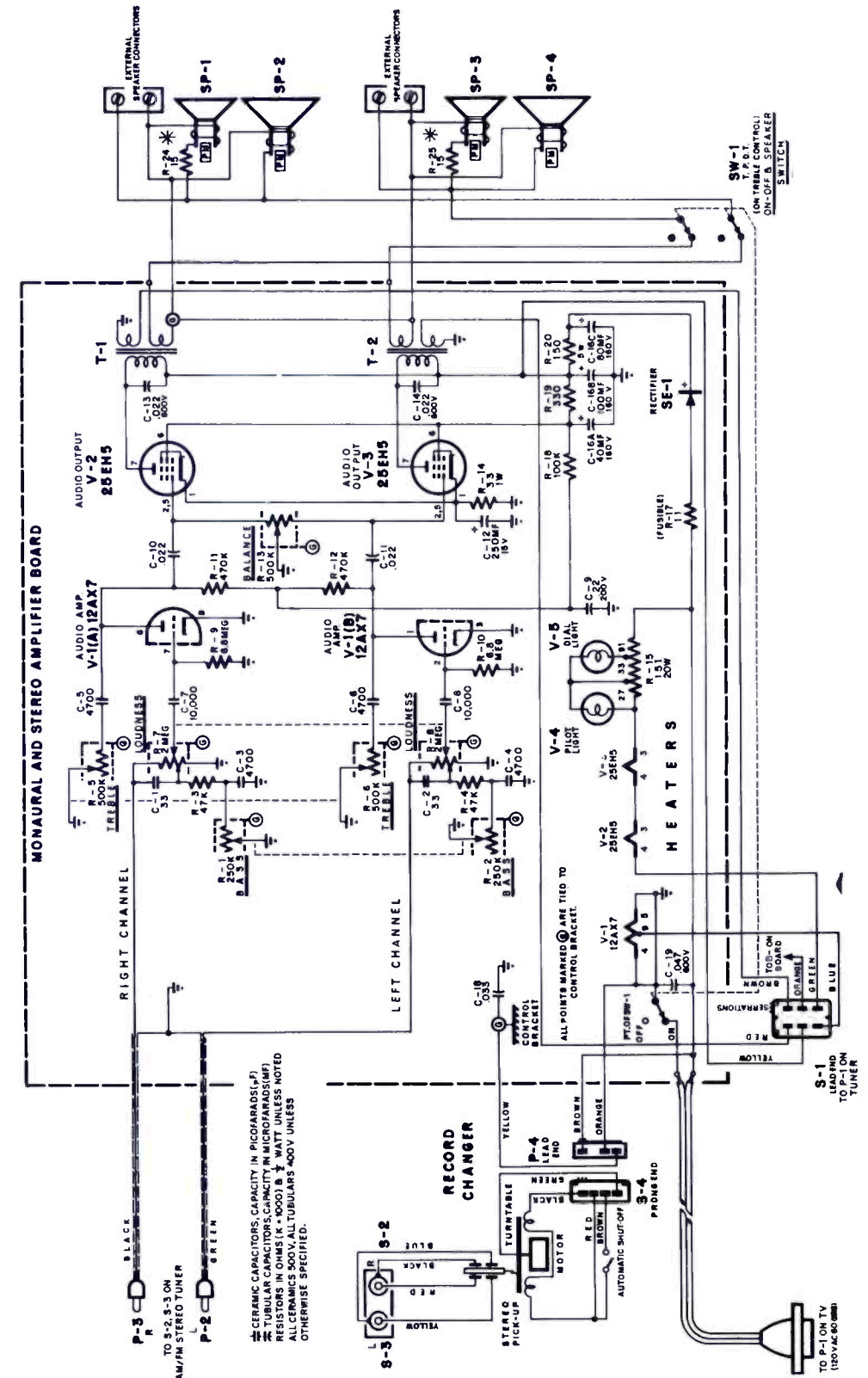
ELECTRONIC TECHNICIAN TEKFAX

ELECTRONIC TECHNICIAN TEKFAX

EMERSON
Stereo Amplifier
Chassis
120637



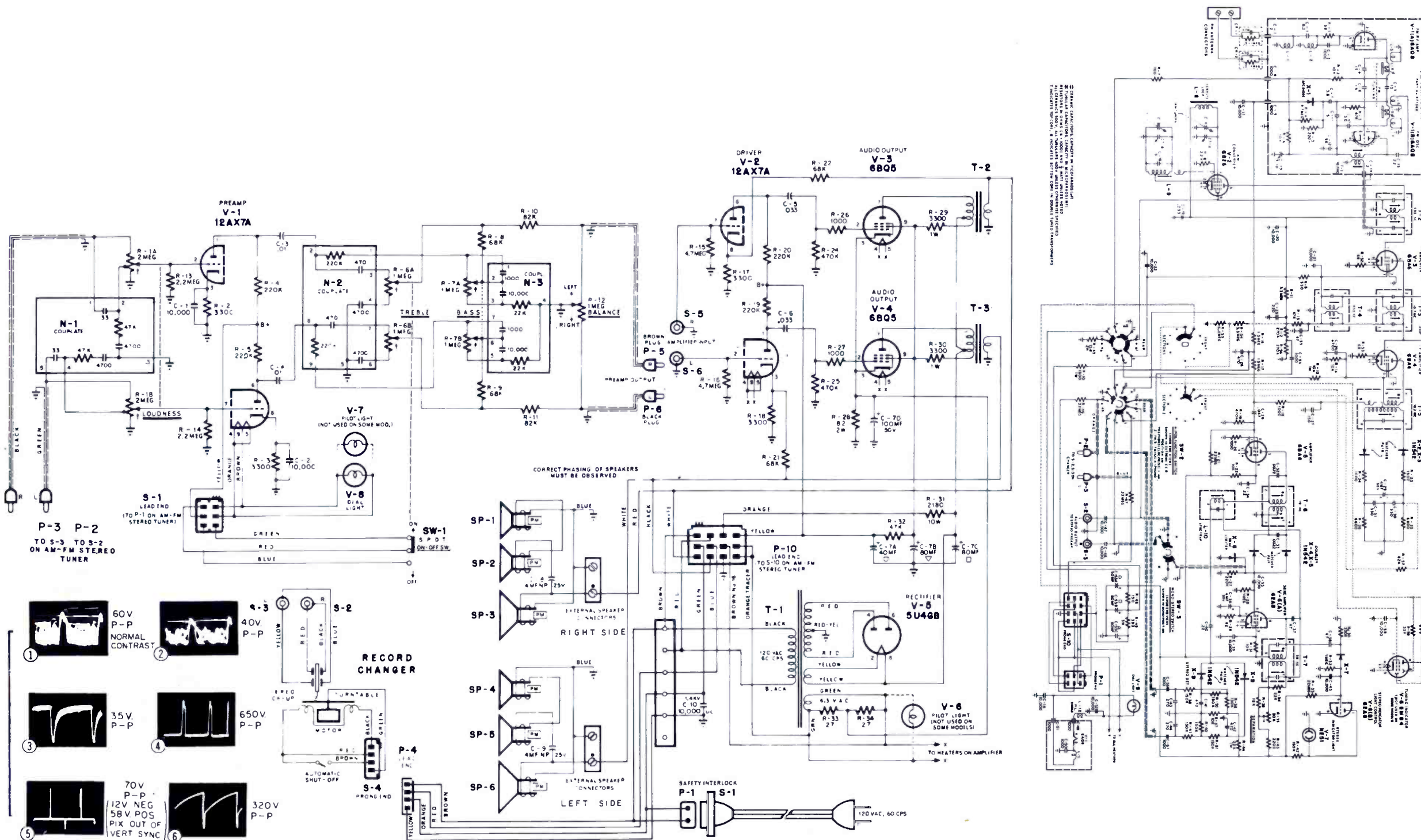
NOTES:
 ☐ CERAMIC CAPACITORS, CAPACITY IN MICRO-
 MICROFARADS.
 ☐ TUBULAR CAPACITORS, CAPACITY IN
 MICROFARADS.
 ☐ RESISTORS IN OHMS (K=1000 OHMS) AND
 1/2 WATT UNLESS OTHERWISE NOTED.
 * SW-2(A,B) SWITCH IN MICRO-
 SHOWN IN EXTREME COUNTER-
 POSITIONS (CLOCKWISE) L-T.V.
 2-AM, 3-PM, 4-AM/PM, 5-PM, 6-AM/PM.
 † ROTATION.



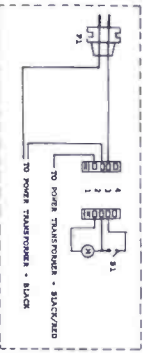
NOTES:
 ☐ CERAMIC CAPACITORS, CAPACITY IN MICROFARADS (PF)
 ☐ TUBULAR CAPACITORS, CAPACITY IN MICROFARADS (MF)
 ☐ RESISTORS IN OHMS (K=1000) & 1/2 WATT UNLESS NOTED
 ALL CERAMICS 500V, ALL TUBULARS 400V UNLESS
 OTHERWISE SPECIFIED.

EMERSON
Stereo Radio-
Phonograph
Model P-1913

ELECTRONIC TECHNICIAN TEKFAX



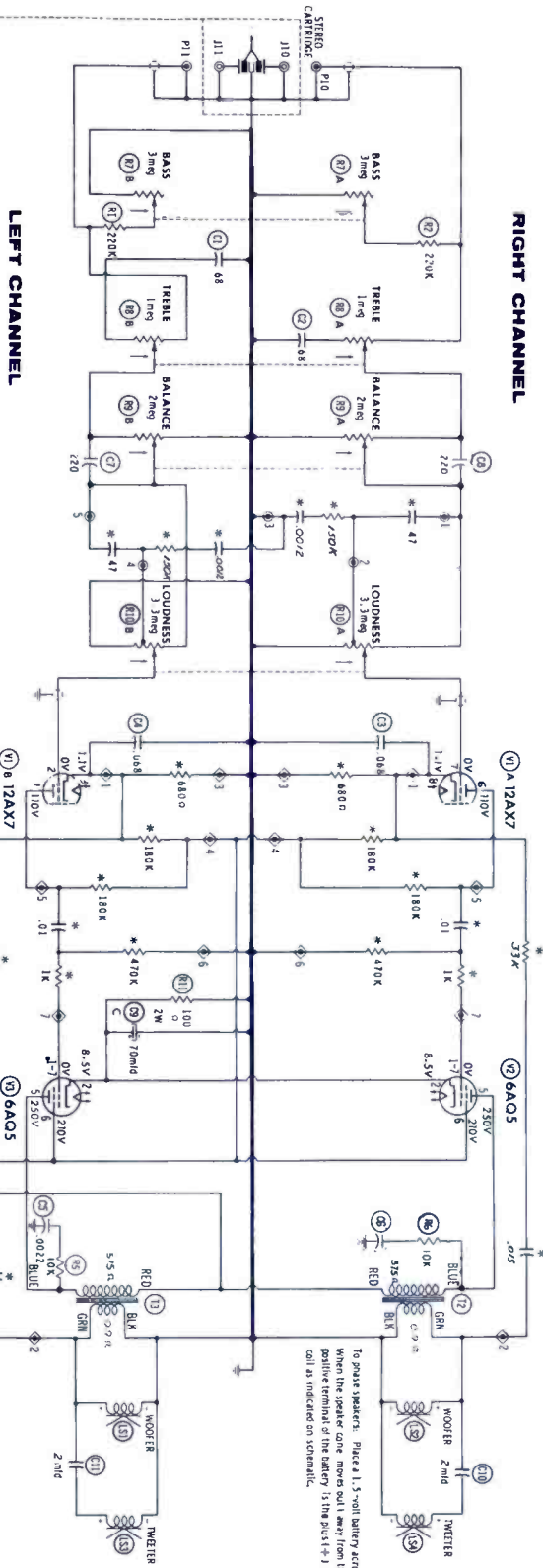
RP2060 SCHEMATIC DIAGRAM



Capacitor values near 1 μ are μF.
 Capacitor values less than 1 μ are in microfarads otherwise noted.
 Resistor values are Ohms, 1/2 watt, unless otherwise noted.
 K = 1,000, Meg = 1,000,000.
 Arrows on controls indicate clockwise rotation.
 P = denotes plugs. 1 denotes jacks with the numbers omitted.
 * = designates resistors from 8 1/2" grid, 7 with 50,000 ohms per volt meter with no signal applied.

- ⊙ RC Network printed board contact points for Tone circuit
- ⊙ RC Network printed board contact points for Amplifier Circuit
- * Denotes components located in RC Networks

LEFT CHANNEL

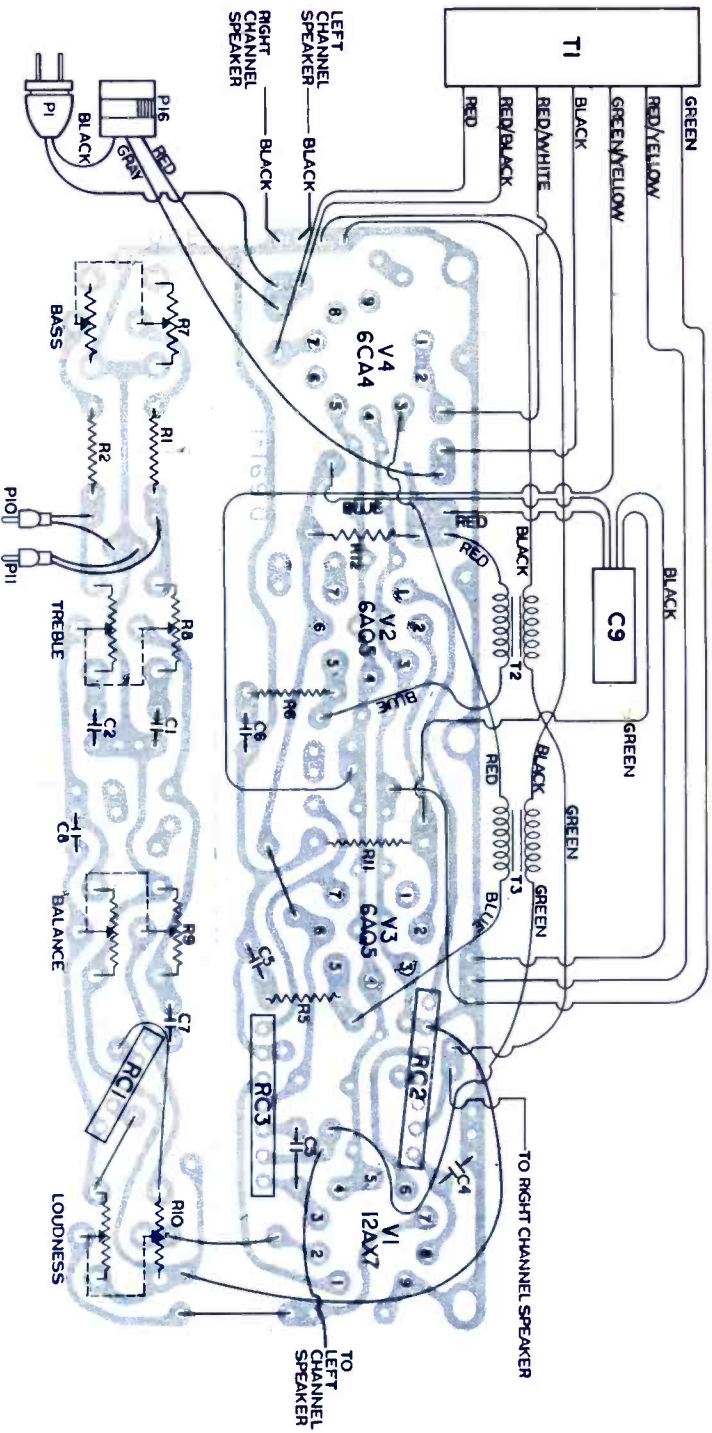


To power speakers - Place 1.5 volt battery across the voice coil.
 Note the speaker's size and the speaker's impedance. The
 positive terminal of the battery is the speaker's (+) side of the voice
 coil as indicated on schematic.

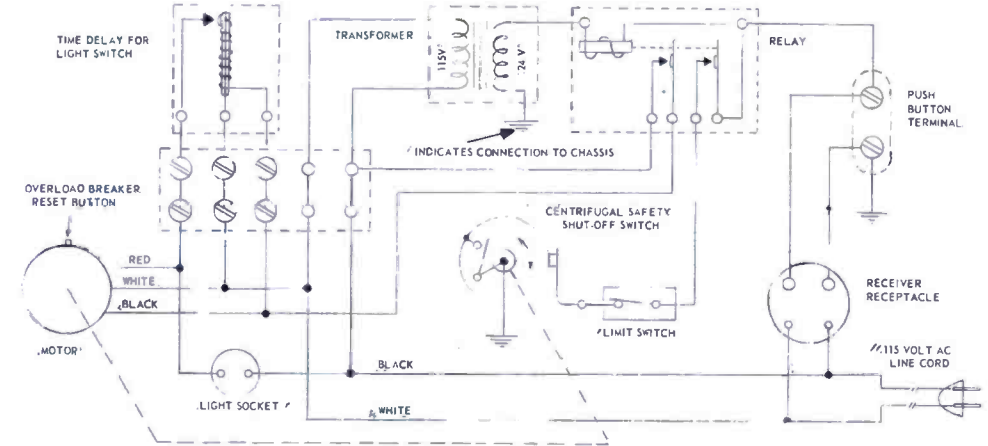
CABINET: RP2060 - Black RP2061 - Walnut	RECORD CHANGER: CH61
ELECTRICAL RATING: 105-120 Volts 60 Cycle AC 60 Watts - Power Consumption	CARRIAGE: General Electric C-100 Cartridge less Stylus - Cat. No. RS3824
TUBE COMPLEMENT: V1-12AX7 - Pre-amplifier V2-6AQ5 - Power Amplifier V3-6AQ5 - Power Amplifier V4-6CA4 - Voltage Rectifier	STYLUS: General Electric C-100 Stylus Assembly Sapphire/Diamond - Cat. No. RS3825.
	POWER OUTPUT: 5 Watts - Total Music Power

SPECIFICATIONS

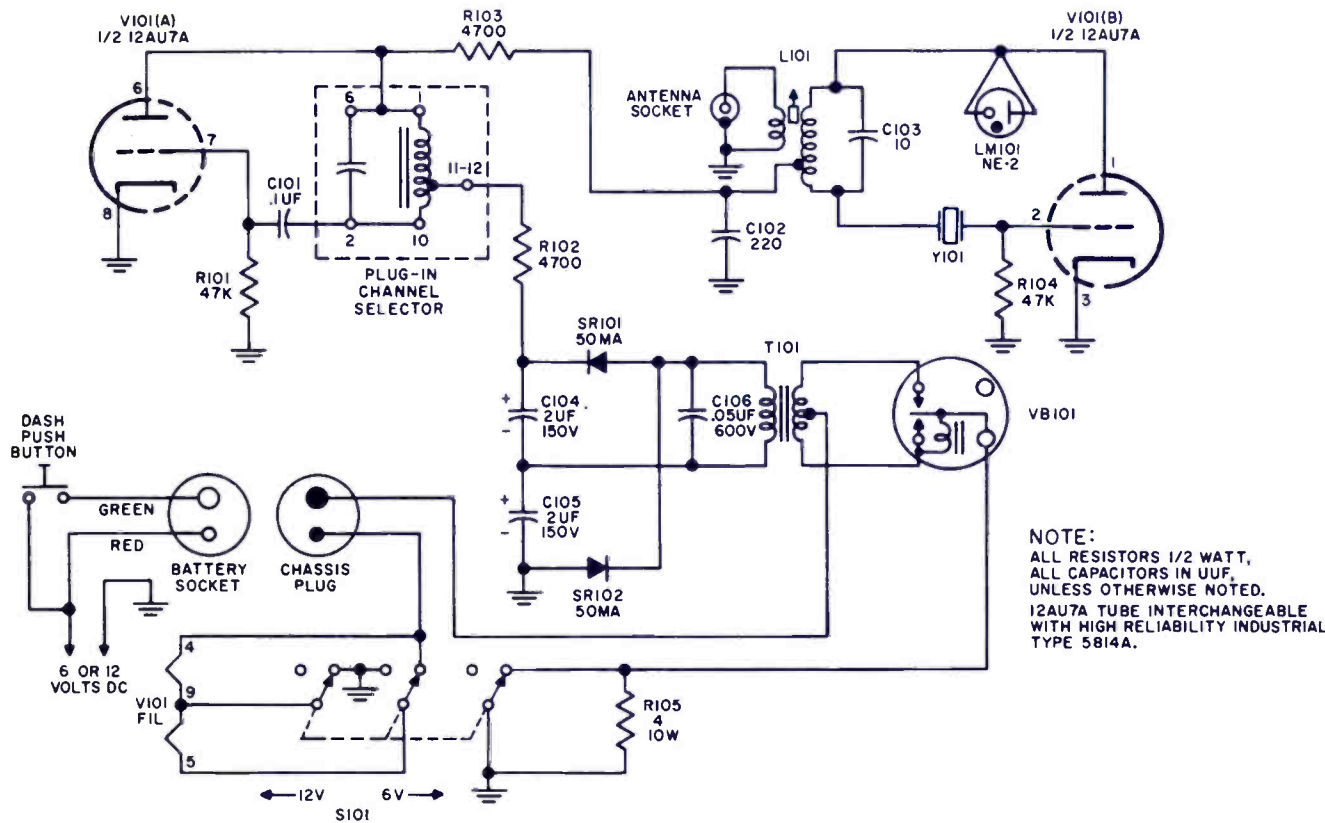
RP2060 BOARD LAYOUT



G500 ELECTRICAL WIRING DIAGRAM



MODEL RC-200 TRANSMITTER



NOTE:
ALL RESISTORS 1/2 WATT,
ALL CAPACITORS IN UUF,
UNLESS OTHERWISE NOTED.
12AU7A TUBE INTERCHANGEABLE
WITH HIGH RELIABILITY INDUSTRIAL
TYPE 5814A.

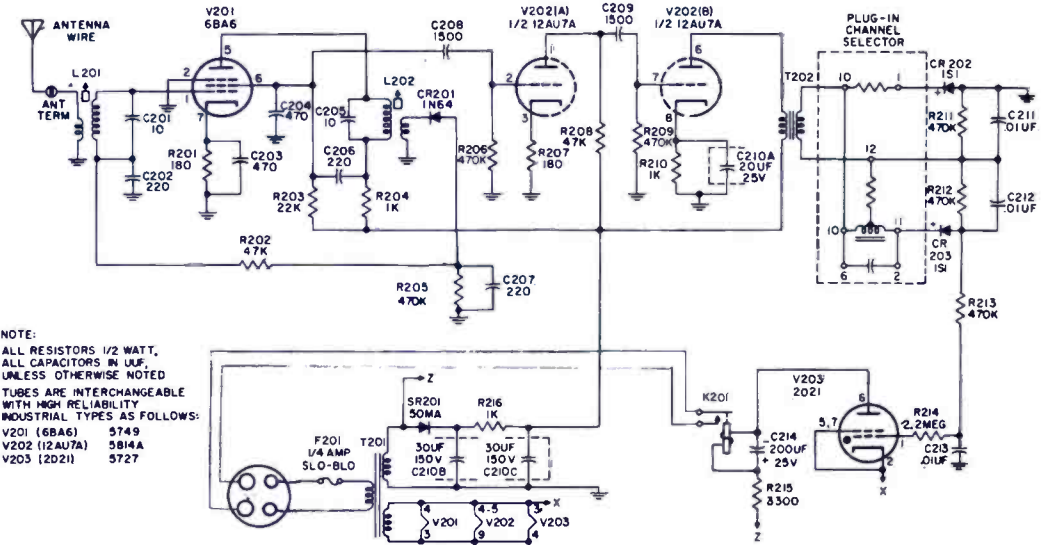
VOLTAGE CHART

VOLTAGES ARE MEASURED WITH A 20,000 OHM PER VOLT DC METER AND 1000 OHM PER VOLT AC METER. ALL MEASUREMENTS MADE BETWEEN POINT INDICATED AND CHASSIS. MEASUREMENTS MADE AT 117 VOLT LINE WITH NO SIGNAL.

TUBE NO.	SOCKET PIN NO.								
V201 (6BA6)	1	2	3	4	5	6	7	8	9
V202 (12AU7A)	0	0	0	6.0 AC	+120	+78	+1.5	-	-
V203 (2D21)	DO NOT MEASURE	6.0 AC	6.0 AC	6.0 AC	6.0 AC	+125	0	+4.3	0

NOTE: B+ VOLTAGE ACROSS C210B: +140 VOLTS

MODEL G-500 RECEIVER



NOTE:
ALL RESISTORS 1/2 WATT,
ALL CAPACITORS IN UUF,
UNLESS OTHERWISE NOTED
TUBES ARE INTERCHANGEABLE
WITH HIGH RELIABILITY
INDUSTRIAL TYPES AS FOLLOWS:
V201 (6BA6) 5749
V202 (12AU7A) 5814A
V203 (2D21) 5727

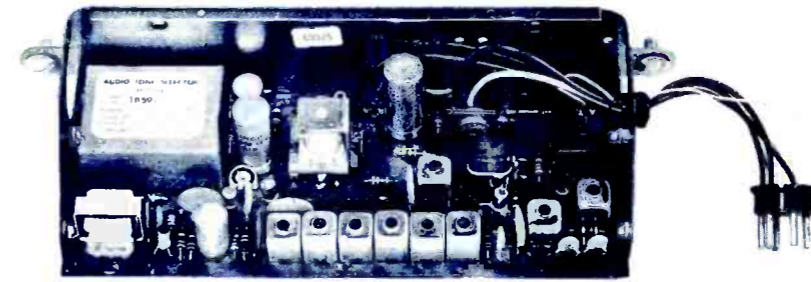
CIRCUIT SYMBOL	PART	PART NUMBER
R201, R207	180 OHM ±10% 1/2 WATT	
R202, R208	47,000 OHM ±20% 1/2 WATT	
R203	22,000 OHM ±20% 1/2 WATT	
R204, R210, R216	1,000 OHM ±20% 1/2 WATT	
R205, R206, R209, R211, R212, R213	470,000 OHM ±20% 1/2 WATT	
R214	2.2 MEG OHM ±20% 1/2 WATT	
R215	3300 OHM ±20% 1/2 WATT	
C201, C205	10 MMF ±10% NPO CERAMIC DISC	
C202, C206, C207	220 MMF ±20% GF CERAMIC DISC	
C203, C204	470 MMF ±20% GF CERAMIC DISC	
C208, C209	1500 MMF 0MV CERAMIC DISC	
C210	30-30 MFD/150 WV 20 MPD/25 WV	30A3
C211, C212, C213	10,000 MMF GMV CERAMIC DISC	
C214	200 MFD/25 WV ELECTROLYTIC	30A4
CR201	GERMANIUM DIODE TYPE 1N64	
CR202, CR203	SELENIUM DIODE TYPE 1S1	1S1
SR201	SELENIUM RECTIFIER 130V AC 50MA DC	159A1
L101	ANTENNA COIL ASSEMBLY	1A16
L201	RF COIL ASSEMBLY	1A17
T201	POWER TRANSFORMER	204A10
T202	INTERSTAGE TRANSFORMER	204A11
F201	FUSE 1/4 AMP 3AG SLO-BLO	
K201	RELAY, 2800 OHM, 6-7MA DC	160A3

PERMA-POWER.

Remote Control System
Models G230, 1,
2 Receiver,
Models G340, 50
Transmitter

ELECTRONIC TECHNICIAN
TEKFAK

- Antenna not fully extended, wire broken within insulation or loose connection on circuit board pin.
- Receiver Plug disconnected from (or loose in) Socket
- Receiver Plug wires broken, disconnected or loose on circuit board pins.
- Selector Channel not firmly connected on board.



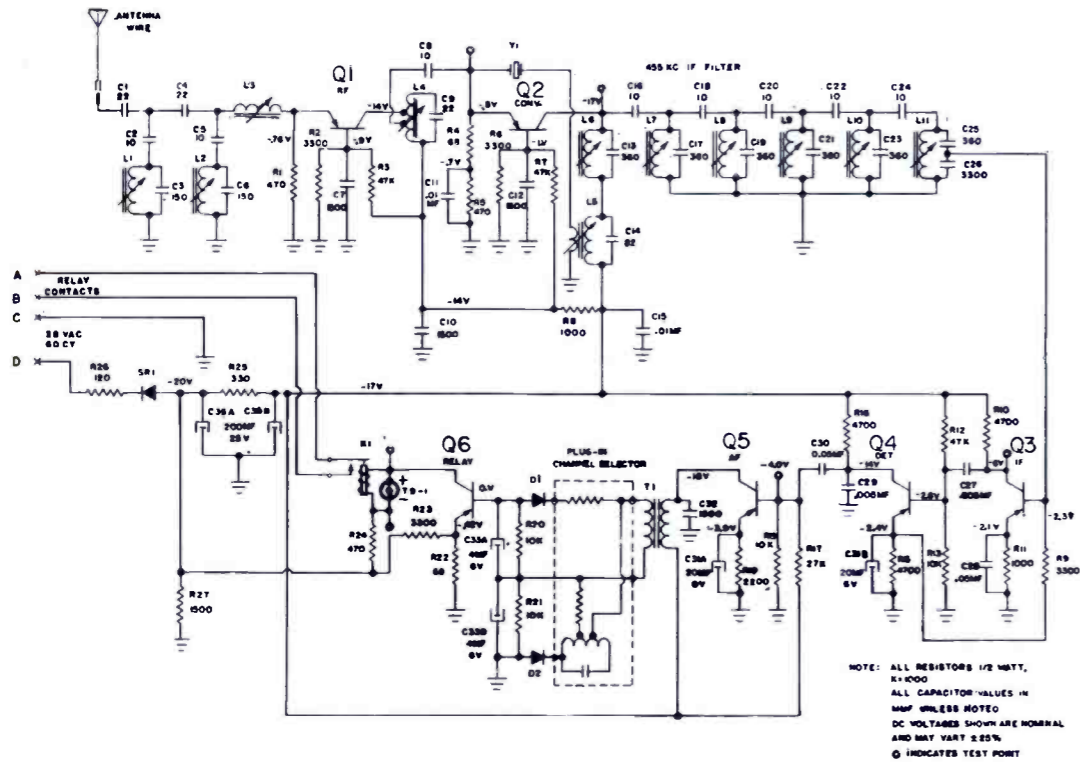
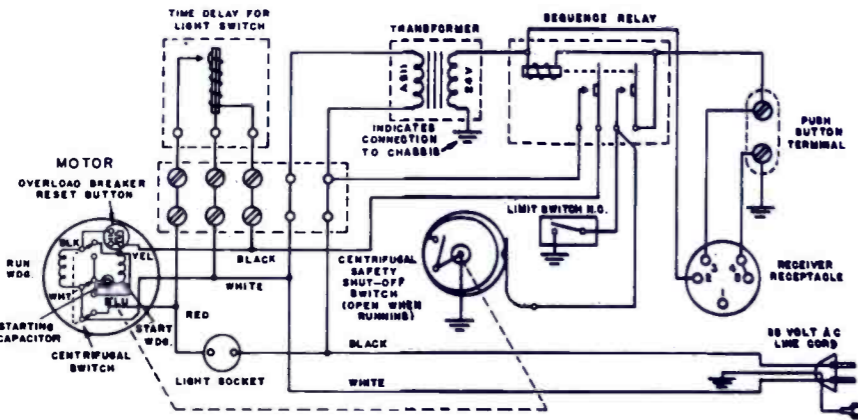
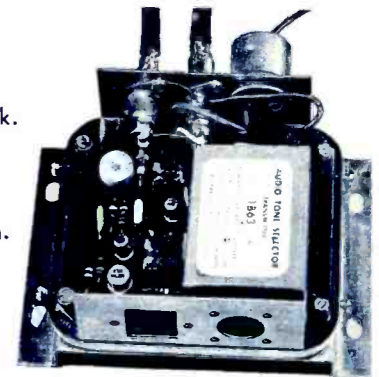
PORTABLE TRANSMITTER CHECKLIST

- Battery properly installed and plugged in.
- Weak battery. Measure at least 7 volts when operating.
- Location in automobile. Try operation from outside of automobile and without Mounting Bracket to check.
- Code number same as Receiver.

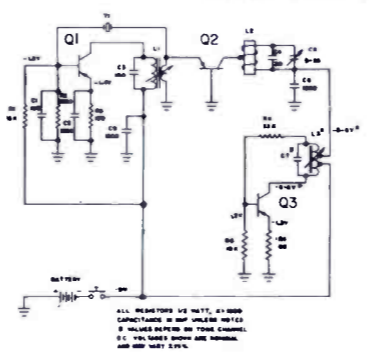


WIRED-IN TRANSMITTER CHECKLIST

- Power Cord improperly connected to automobile supply (see diagram in housing cover for selecting proper battery voltage and polarity).
- Broken Power Cord wire, or defective jumper cable. Test for continuity or shorts.
- Defective push-button – short the 2 wires connected to push-button together, to check.
- Automobile radio antenna connected and radio antenna extended at least 2 feet.
- Mounting bracket connected to metal of automobile to make battery ground connection.
- Code number same as Receiver.

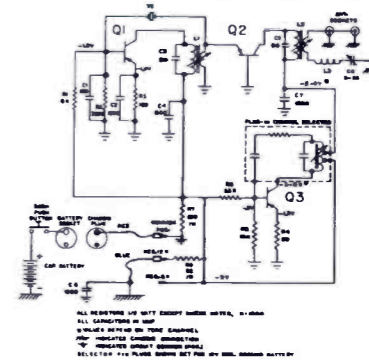


MODEL G 340 TRANSMITTER



CIRCUIT	PART	PART NUMBER
R1	1.5M Ohm 1/2 W	3011
R2	1.5M Ohm 1/2 W	3011
R3	1.5M Ohm 1/2 W	3011
R4	1.5M Ohm 1/2 W	3011
R5	1.5M Ohm 1/2 W	3011
R6	1.5M Ohm 1/2 W	3011
C1, C2	100 MUF 1/2 W	3011
C3	100 MUF 1/2 W	3011
C4	100 MUF 1/2 W	3011
C5	100 MUF 1/2 W	3011
C6	100 MUF 1/2 W	3011
C7	100 MUF 1/2 W	3011
C8	100 MUF 1/2 W	3011
C9	100 MUF 1/2 W	3011
C10	100 MUF 1/2 W	3011
C11	100 MUF 1/2 W	3011
C12	100 MUF 1/2 W	3011
C13	100 MUF 1/2 W	3011
C14	100 MUF 1/2 W	3011
C15	100 MUF 1/2 W	3011
C16	100 MUF 1/2 W	3011
C17	100 MUF 1/2 W	3011
C18	100 MUF 1/2 W	3011
C19	100 MUF 1/2 W	3011
C20	100 MUF 1/2 W	3011
C21	100 MUF 1/2 W	3011
C22	100 MUF 1/2 W	3011
C23	100 MUF 1/2 W	3011
C24	100 MUF 1/2 W	3011
C25	100 MUF 1/2 W	3011
C26	100 MUF 1/2 W	3011
C27	100 MUF 1/2 W	3011
C28	100 MUF 1/2 W	3011
L1	100 MUF 1/2 W	3011
L2	100 MUF 1/2 W	3011
L3	100 MUF 1/2 W	3011
L4	100 MUF 1/2 W	3011
L5	100 MUF 1/2 W	3011
L6	100 MUF 1/2 W	3011
L7	100 MUF 1/2 W	3011
L8	100 MUF 1/2 W	3011
L9	100 MUF 1/2 W	3011
L10	100 MUF 1/2 W	3011
L11	100 MUF 1/2 W	3011
L12	100 MUF 1/2 W	3011
L13	100 MUF 1/2 W	3011
L14	100 MUF 1/2 W	3011
L15	100 MUF 1/2 W	3011
L16	100 MUF 1/2 W	3011
L17	100 MUF 1/2 W	3011
L18	100 MUF 1/2 W	3011
L19	100 MUF 1/2 W	3011
L20	100 MUF 1/2 W	3011
L21	100 MUF 1/2 W	3011
L22	100 MUF 1/2 W	3011
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L38	100 MUF 1/2 W	3011
L39	100 MUF 1/2 W	3011
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L44	100 MUF 1/2 W	3011
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L96	100 MUF 1/2 W	3011
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L99	100 MUF 1/2 W	3011
L100	100 MUF 1/2 W	3011

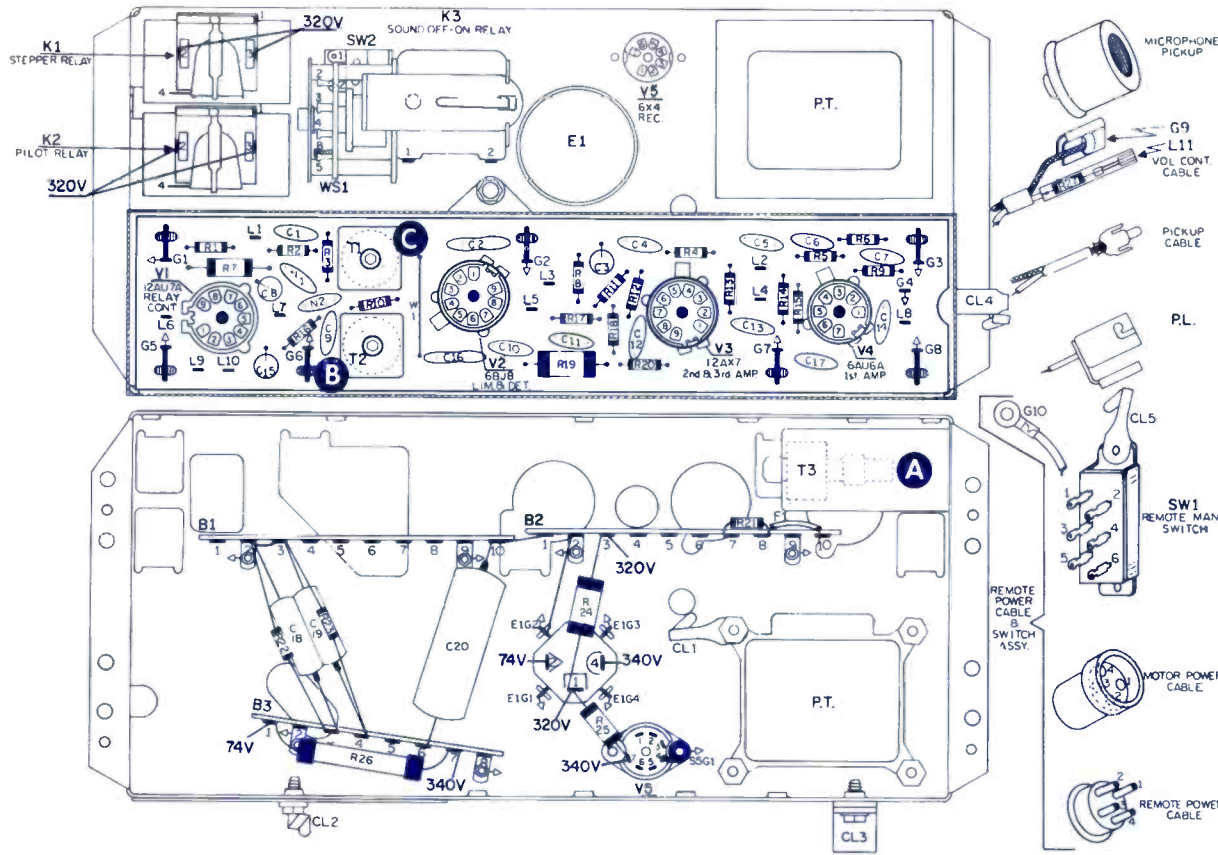
MODEL G 350 TRANSMITTER



CIRCUIT	PART	PART NUMBER
R1	1.5M Ohm 1/2 W	3011
R2	1.5M Ohm 1/2 W	3011
R3	1.5M Ohm 1/2 W	3011
R4	1.5M Ohm 1/2 W	3011
R5	1.5M Ohm 1/2 W	3011
R6	1.5M Ohm 1/2 W	3011
R7	1.5M Ohm 1/2 W	3011
R8	1.5M Ohm 1/2 W	3011
R9	1.5M Ohm 1/2 W	3011
R10	1.5M Ohm 1/2 W	3011
R11	1.5M Ohm 1/2 W	3011
R12	1.5M Ohm 1/2 W	3011
R13	1.5M Ohm 1/2 W	3011
R14	1.5M Ohm 1/2 W	3011
R15	1.5M Ohm 1/2 W	3011
R16	1.5M Ohm 1/2 W	3011
R17	1.5M Ohm 1/2 W	3011
R18	1.5M Ohm 1/2 W	3011
R19	1.5M Ohm 1/2 W	3011
R20	1.5M Ohm 1/2 W	3011
R21	1.5M Ohm 1/2 W	3011
R22	1.5M Ohm 1/2 W	3011
R23	1.5M Ohm 1/2 W	3011
R24	1.5M Ohm 1/2 W	3011
R25	1.5M Ohm 1/2 W	3011
R26	1.5M Ohm 1/2 W	3011
R27	1.5M Ohm 1/2 W	3011
R28	1.5M Ohm 1/2 W	3011
R29	1.5M Ohm 1/2 W	3011
R30	1.5M Ohm 1/2 W	3011
R31	1.5M Ohm 1/2 W	3011
R32	1.5M Ohm 1/2 W	3011
R33	1.5M Ohm 1/2 W	3011
R34	1.5M Ohm 1/2 W	3011
R35	1.5M Ohm 1/2 W	3011
R36	1.5M Ohm 1/2 W	3011
R37	1.5M Ohm 1/2 W	3011
R38	1.5M Ohm 1/2 W	3011
R39	1.5M Ohm 1/2 W	3011
R40	1.5M Ohm 1/2 W	3011
R41	1.5M Ohm 1/2 W	3011
R42	1.5M Ohm 1/2 W	3011
R43	1.5M Ohm 1/2 W	3011
R44	1.5M Ohm 1/2 W	3011
R45	1.5M Ohm 1/2 W	3011
R46	1.5M Ohm 1/2 W	3011
R47	1.5M Ohm 1/2 W	3011
R48	1.5M Ohm 1/2 W	3011
R49	1.5M Ohm 1/2 W	3011
R50	1.5M Ohm 1/2 W	3011
R51	1.5M Ohm 1/2 W	3011
R52	1.5M Ohm 1/2 W	3011
R53	1.5M Ohm 1/2 W	3011
R54	1.5M Ohm 1/2 W	3011
R55	1.5M Ohm 1/2 W	3011
R56	1.5M Ohm 1/2 W	3011
R57	1.5M Ohm 1/2 W	3011
R58	1.5M Ohm 1/2 W	3011
R59	1.5M Ohm 1/2 W	3011
R60	1.5M Ohm 1/2 W	3011
R61	1.5M Ohm 1/2 W	3011
R62	1.5M Ohm 1/2 W	3011
R63	1.5M Ohm 1/2 W	3011
R64	1.5M Ohm 1/2 W	3011
R65	1.5M Ohm 1/2 W	3011
R66	1.5M Ohm 1/2 W	3011
R67	1.5M Ohm 1/2 W	3011
R68	1.5M Ohm 1/2 W	3011
R69	1.5M Ohm 1/2 W	3011
R70	1.5M Ohm 1/2 W	3011
R71	1.5M Ohm 1/2 W	3011
R72	1.5M Ohm 1/2 W	3011
R73	1.5M Ohm 1/2 W	3011
R74	1.5M Ohm 1/2 W	3011
R75	1.5M Ohm 1/2 W	3011
R76	1.5M Ohm 1/2 W	3011
R77	1.5M Ohm 1/2 W	3011
R78	1.5M Ohm 1/2 W	3011
R79	1.5M Ohm 1/2 W	3011
R80	1.5M Ohm 1/2 W	3011
R81	1.5M Ohm 1/2 W	3011
R82	1.5M Ohm 1/2 W	3011
R83	1.5M Ohm 1/2 W	3011
R84	1.5M Ohm 1/2 W	3011
R85	1.5M Ohm 1/2 W	3011
R86	1.5M Ohm 1/2 W	3011
R87	1.5M Ohm 1/2 W	3011
R88	1.5M Ohm 1/2 W	3011
R89	1.5M Ohm 1/2 W	3011
R90	1.5M Ohm 1/2 W	3011
R91	1.5M Ohm 1/2 W	3011
R92	1.5M Ohm 1/2 W	3011
R93	1.5M Ohm 1/2 W	3011
R94	1.5M Ohm 1/2 W	3011
R95	1.5M Ohm 1/2 W	3011
R96	1.5M Ohm 1/2 W	3011
R97	1.5M Ohm 1/2 W	3011
R98	1.5M Ohm 1/2 W	3011
R99	1.5M Ohm 1/2 W	3011
R100	1.5M Ohm 1/2 W	3011

ELECTRONIC TECHNICIAN TEKFAX

PHILCO
Remote Control
Receiver
Model RC-65



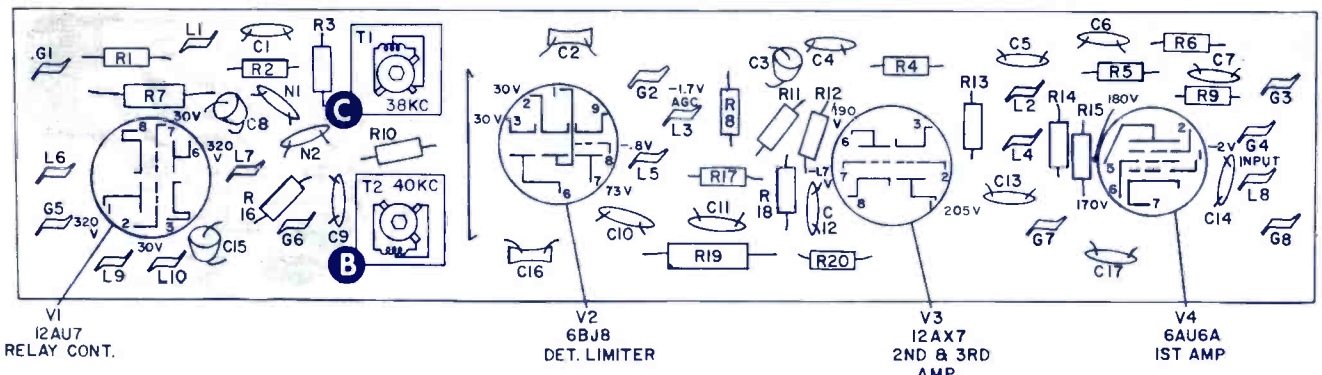
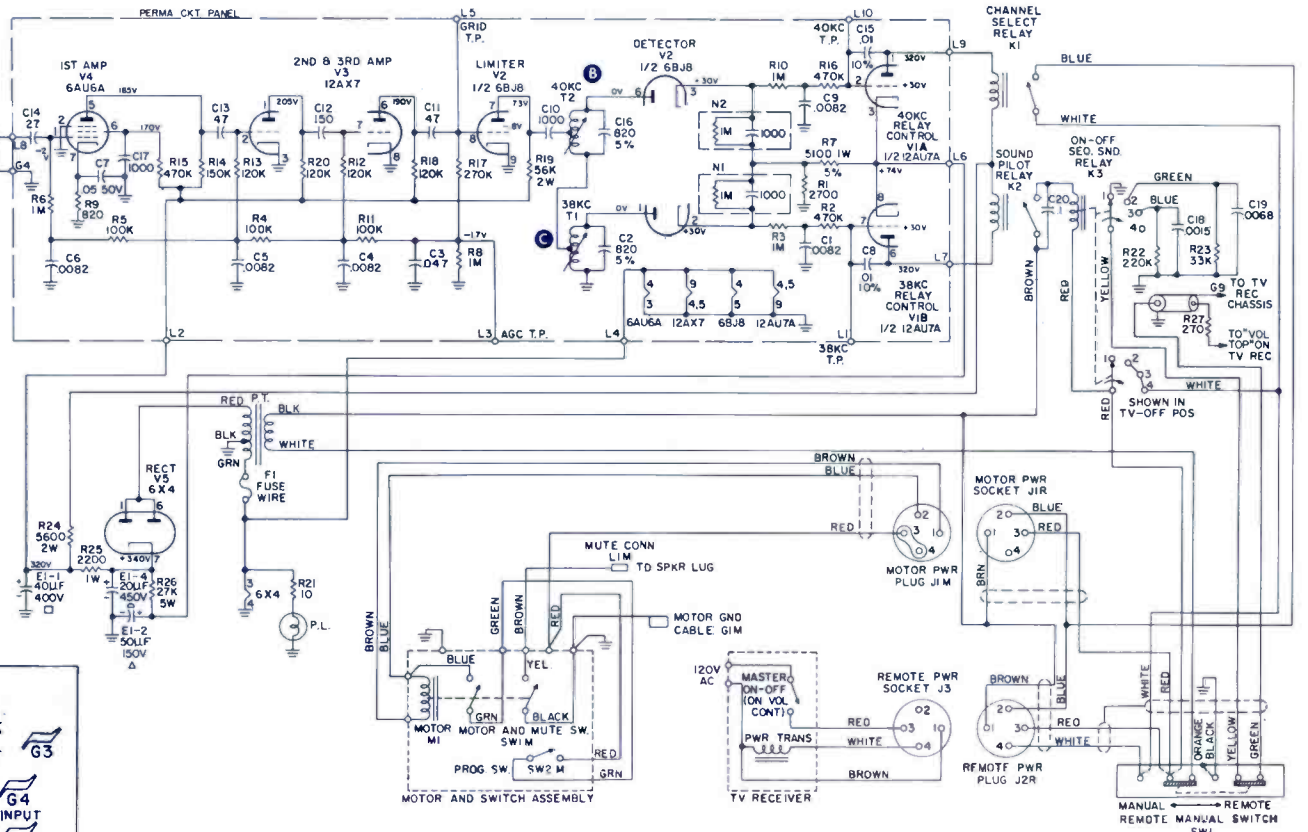
RESISTANCE CHART

TUBE	USE	1	2	3	4	5	6	7	8	9
V1 12AU7A	Relay Cont.	40K	2 Meg	4K	fil.	fil.	40K	2 Meg	4K	fil.
V2 6BJ8	Limiter & Detector	4 Ohms	1 Meg	1 Meg	fil.	fil.		90K	1.25 Meg	Grnd.
V3 12AX7	2nd and 3rd Amp.	150K	1.2 Meg	Grnd.	fil.	fil.	150K	1.2 Meg	Grnd.	fil.
V4 6AU6A	1st Amp.				fil.	fil.	200K	470K		
V5 6X4	Rect.								30K	

All resistances read from tube pins to ground.

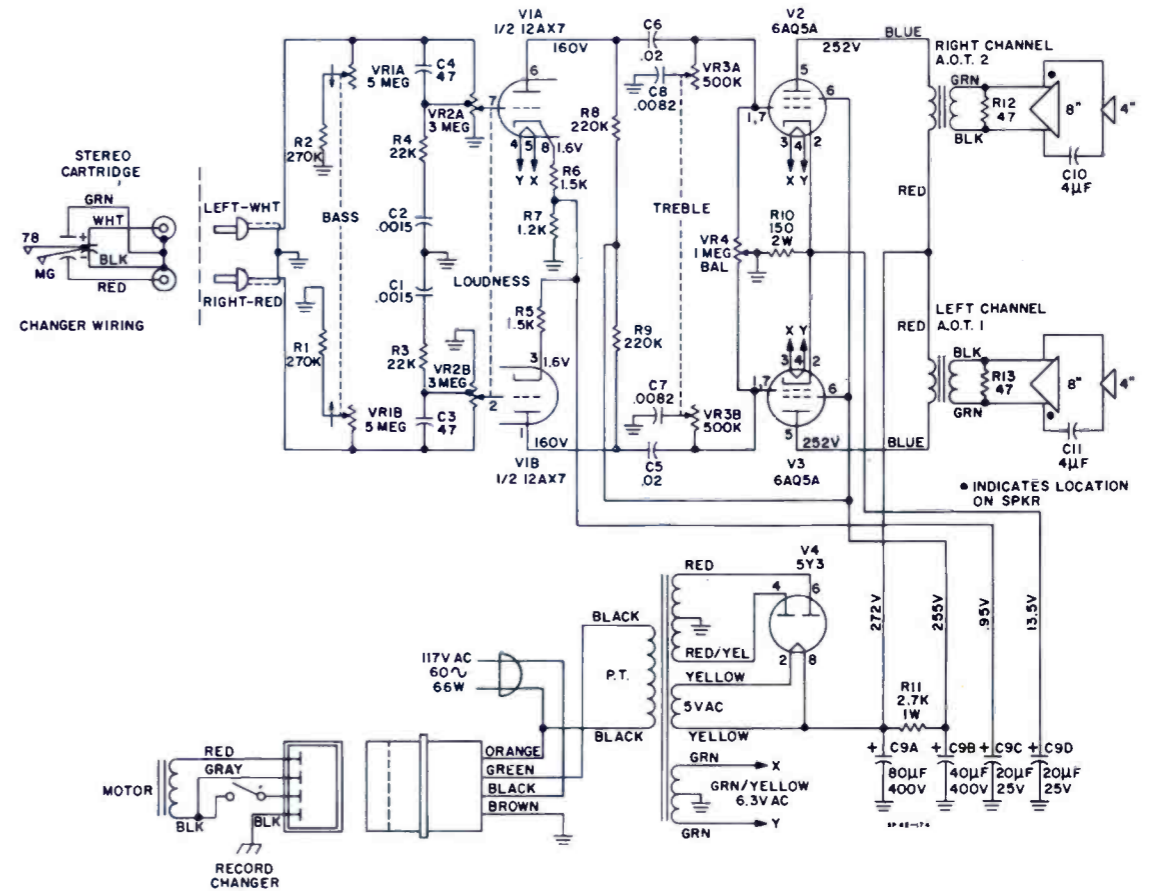
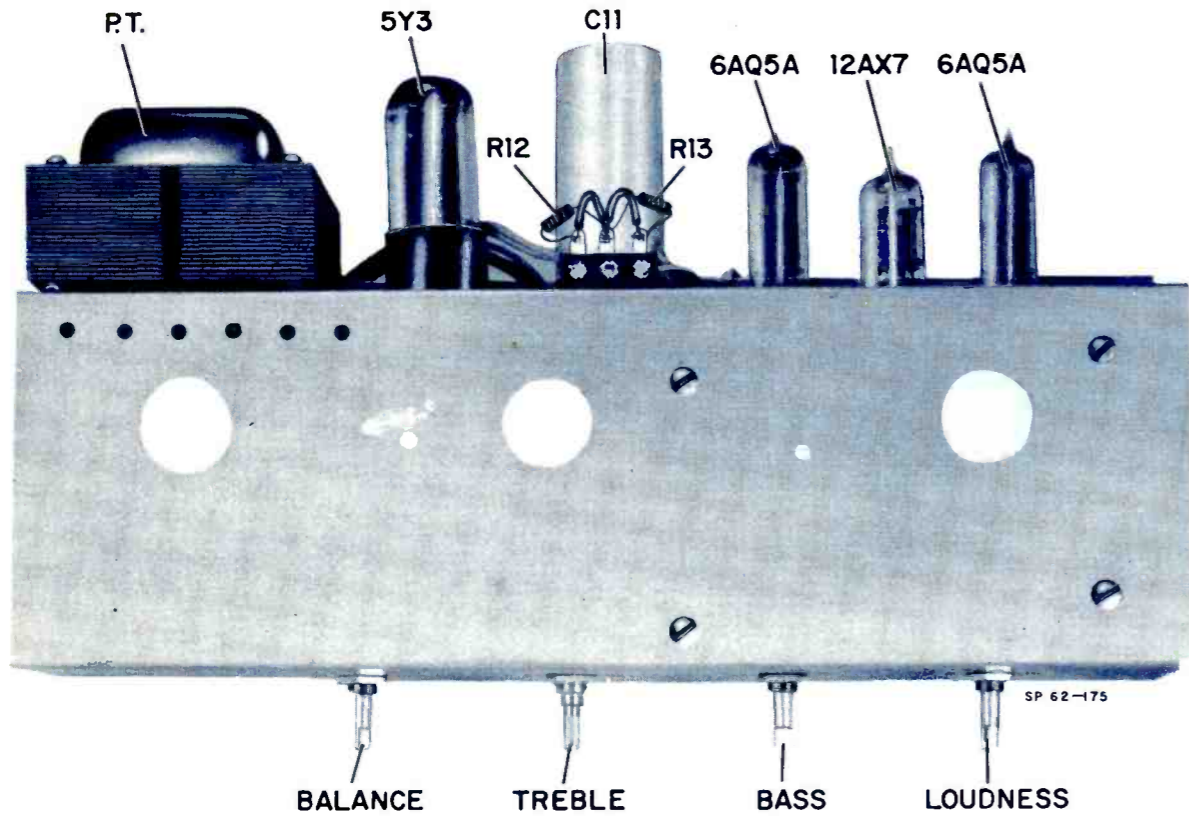
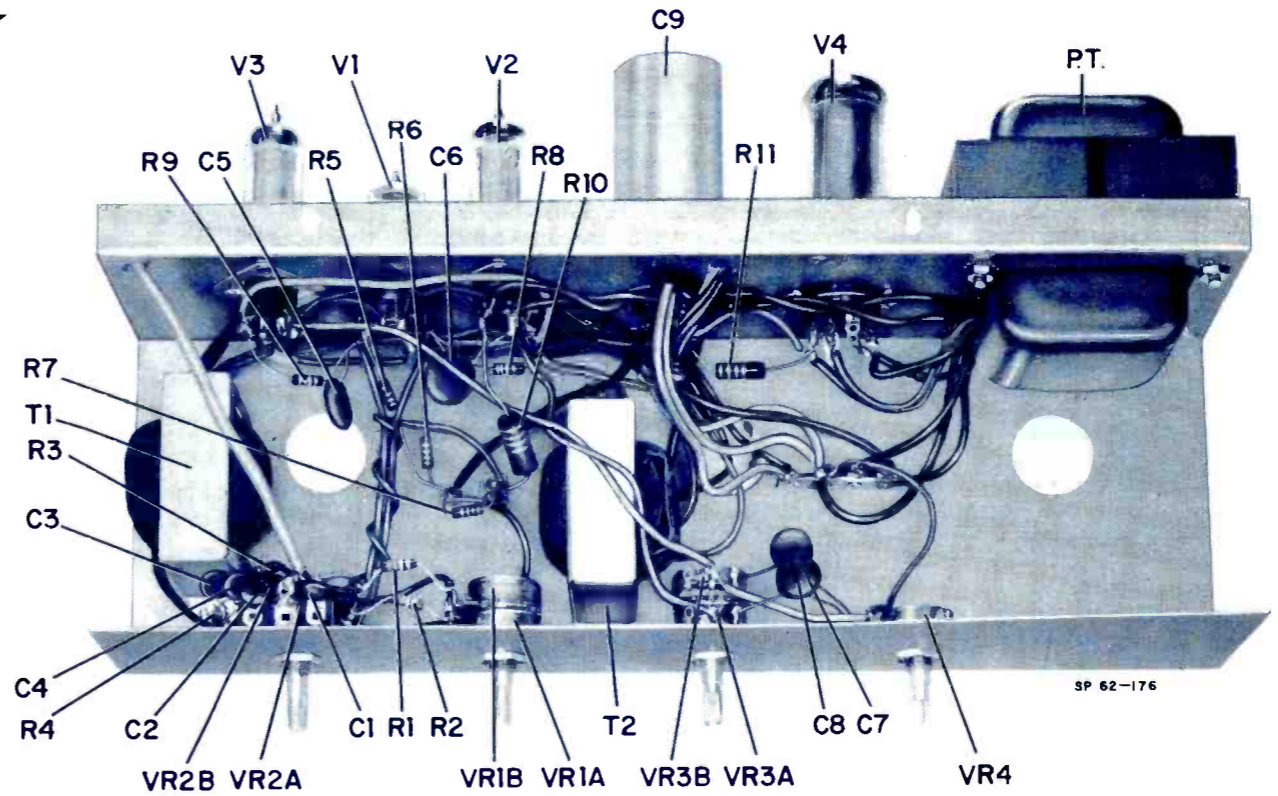
PANEL LUG CONNECTIONS
Model RC-65

- L1 N/C—38KC test point
- L2 Lead to E1-1
- L3 N/C—AGC test
- L4 Lead to B2-9
- L5 N/C grid test
- L6 Lead to B3-1
- L7 Lead to K2-3
- L8 Lead to pick-up cable
- L9 Lead to K1-3
- L10 N/C—40KC test



PHILCO
Stereo
Phonograph
Model L-1532

ELECTRONIC TECHNICIAN TEKFAX

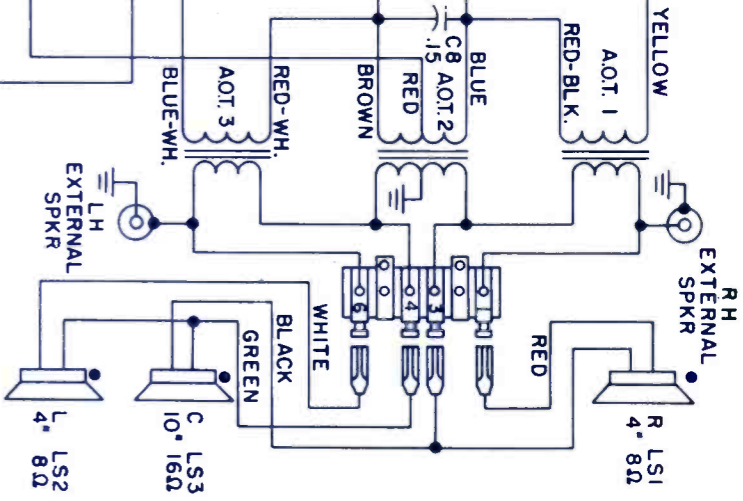


PHILCO
Hi Fi Stereo
Phonograph
Model L-1650

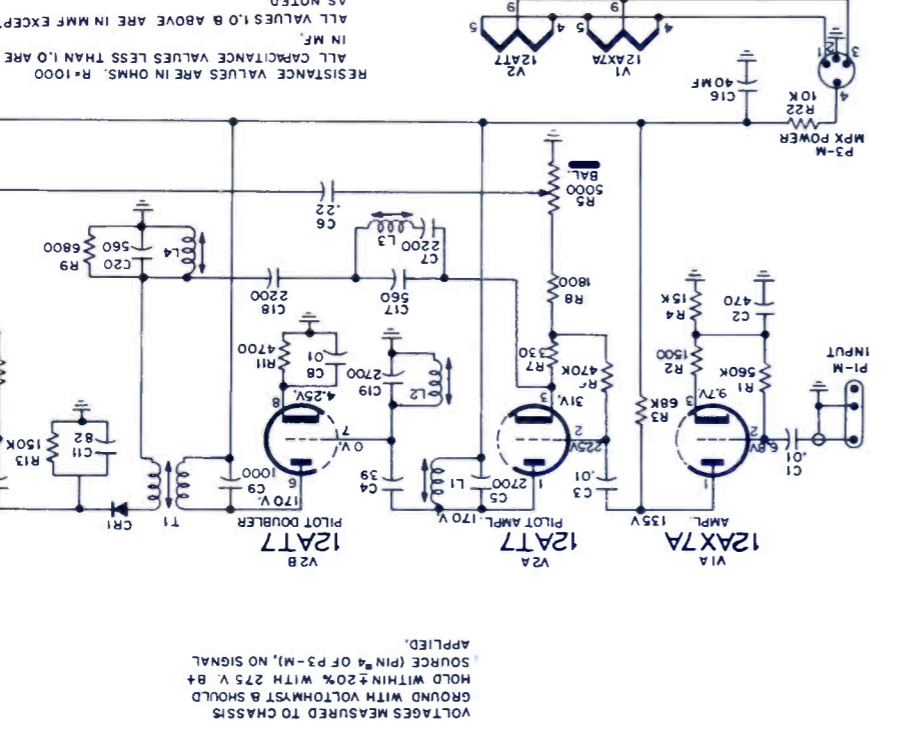
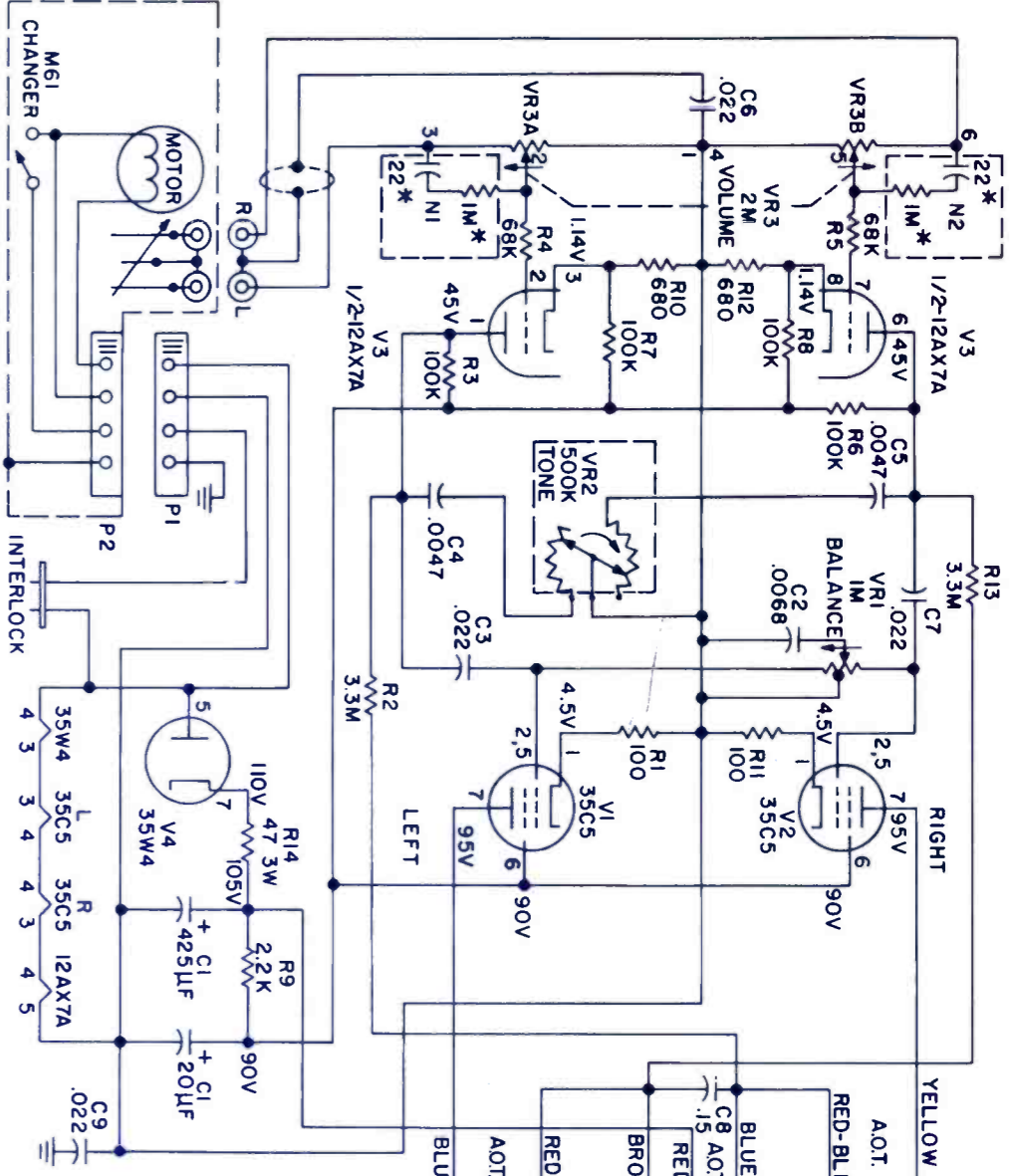
ELECTRONIC TECHNICIAN
TEKFAX

ELECTRONIC TECHNICIAN
TEKFAX

RCA
Stereo Adapter
Chassis RS-200
Model RK-295



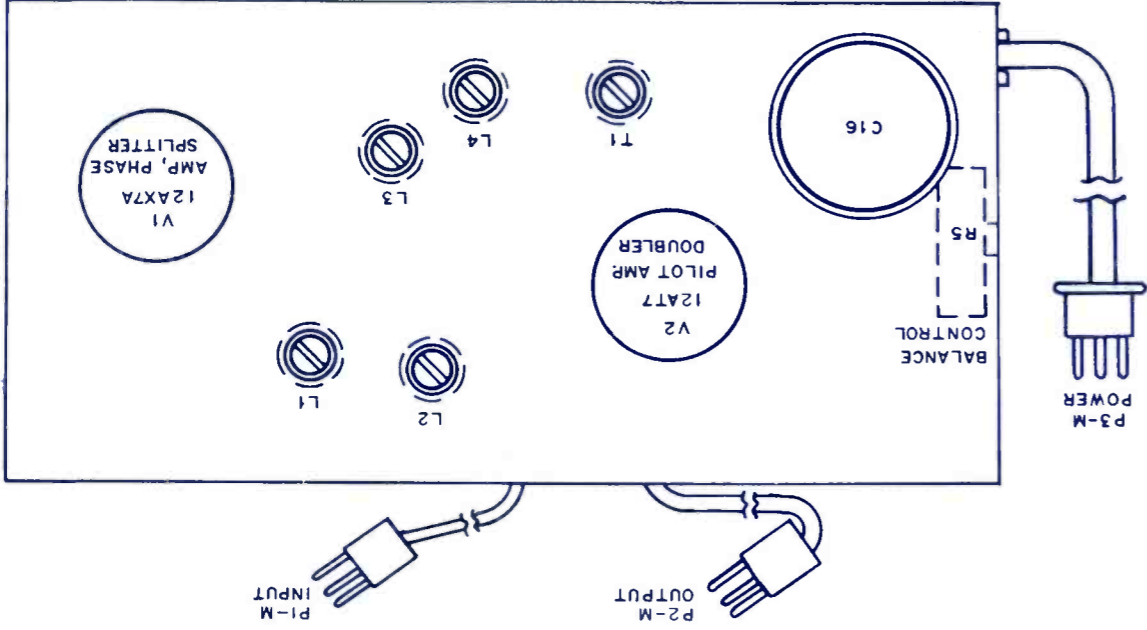
- INDICATES GREEN DOT ON SPEAKER
 - * INDICATES COMPONENTS IN PART NO. 30-6039-8
 - ↓ INDICATES CW ROTATION
- ALL VOLTAGES TAKEN WITH "PRECISION" V.T.V.M. MODEL 88
ALL CONTROLS SET AT MINIMUM NO SIGNAL INPUT.
VOLTAGES TAKEN TO B-



VOLTAGES MEASURED TO CHASSIS
GROUND WITH VOLTOHMST & SHOULD
HOLD WITHIN ±20% WITH 275 V. B+
SOURCE (PIN #4 OF P3-M), NO SIGNAL
APPLIED.

RESISTANCE VALUES ARE IN OHMS. R-1000
IN MF. ALL CAPACITANCE VALUES LESS THAN 1.0 ARE
AS NOTED.

P2-M
OUTPUT



ELECTRONIC TECHNICIAN TEKFAK

ACCESS TO TUBES

All tubes are accessible through the small panel on the rear of the instrument.

1. Remove power cord.

2. Remove three (3) plated screws holding small access panel on rear of instrument.
3. Swing panel down and to right on its pivot. **DO NOT ATTEMPT TO REMOVE PANEL.**

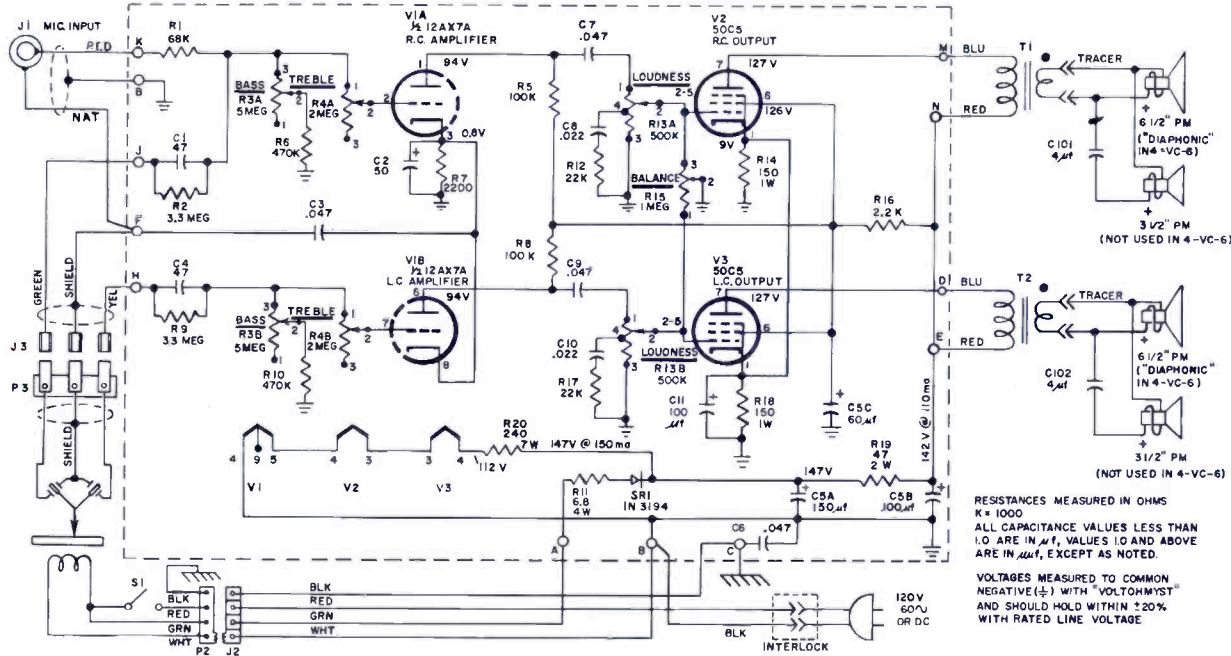
CHASSIS REMOVAL

The top of the record changer compartment comprises the complete chassis. It rests on and is secured to a ledge at the front and is held by screws at the rear. The recommended procedure for its removal is as follows:

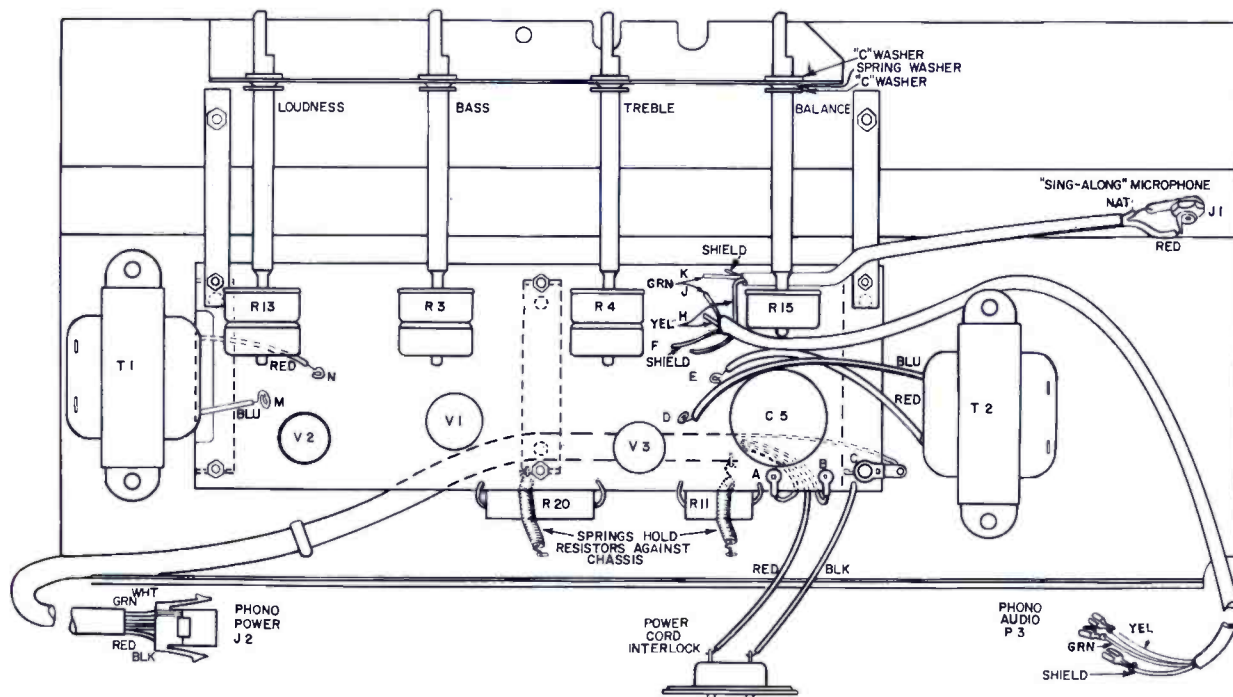
1. Remove knobs.
2. Open small access panel as described in "Access to Tubes."
3. Position two (2) holes in access panel over screws holding power cord interlock.
4. Remove two (2) machine screws holding interlock.
5. Pull record changer drawer down.
6. Unscrew two (2) bolts securing record changer in access holes in turntable, one at front and one at rear. (Lift mat of turntable and reach bolts through

access holes in turntable, one at front and one at rear.) **DO NOT ATTEMPT TO REMOVE RECORD CHANGER DRAWER.**

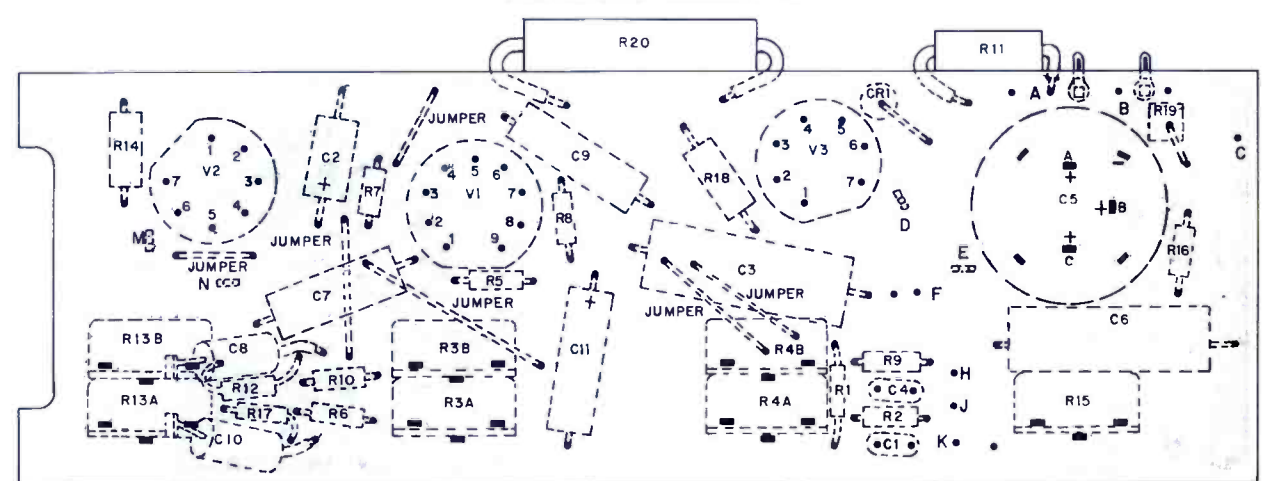
7. Lift up changer and disconnect cables.
8. Remove four (4) plated screws holding front of chassis to horizontal ledge located inside of compartment at front of top.
9. Remove wires, running down each back corner of compartment, from holding clips.
10. Remove four (4) painted screws holding rear of chassis to rear of instrument—just below the access panel. (Hold chassis—top of compartment—to prevent its falling.)
11. Chassis may then be lowered and removed.
12. Disconnect speaker cables from transformers and lift chassis out of case.



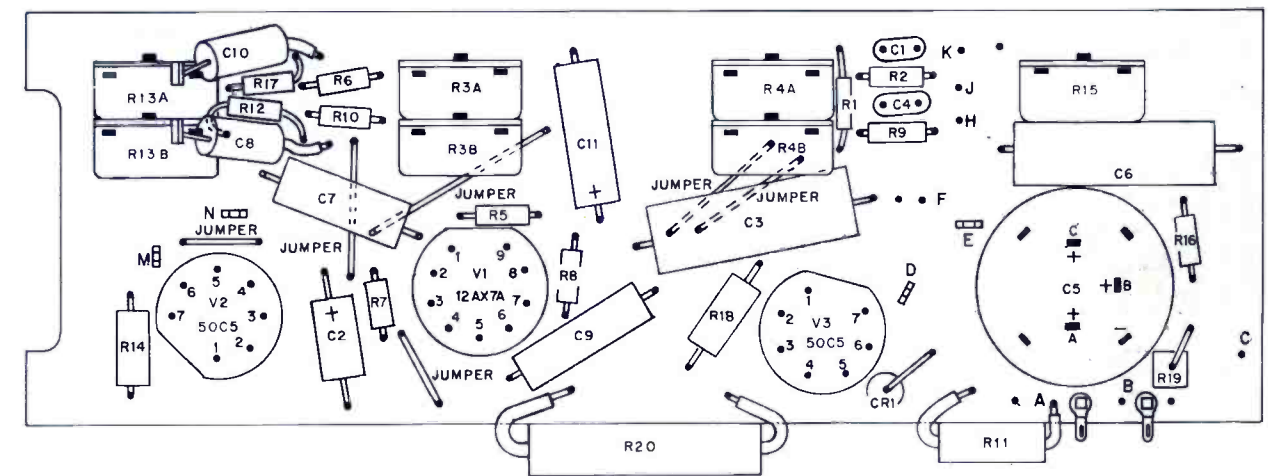
Schematic Diagram



Chassis Layout



Printed Wiring Board—View from Wiring Side



Printed Wiring Board—View from Component Side

ELECTRONIC TECHNICIAN TEKFAX

SONAR
CB Model "G"
Tranceiver

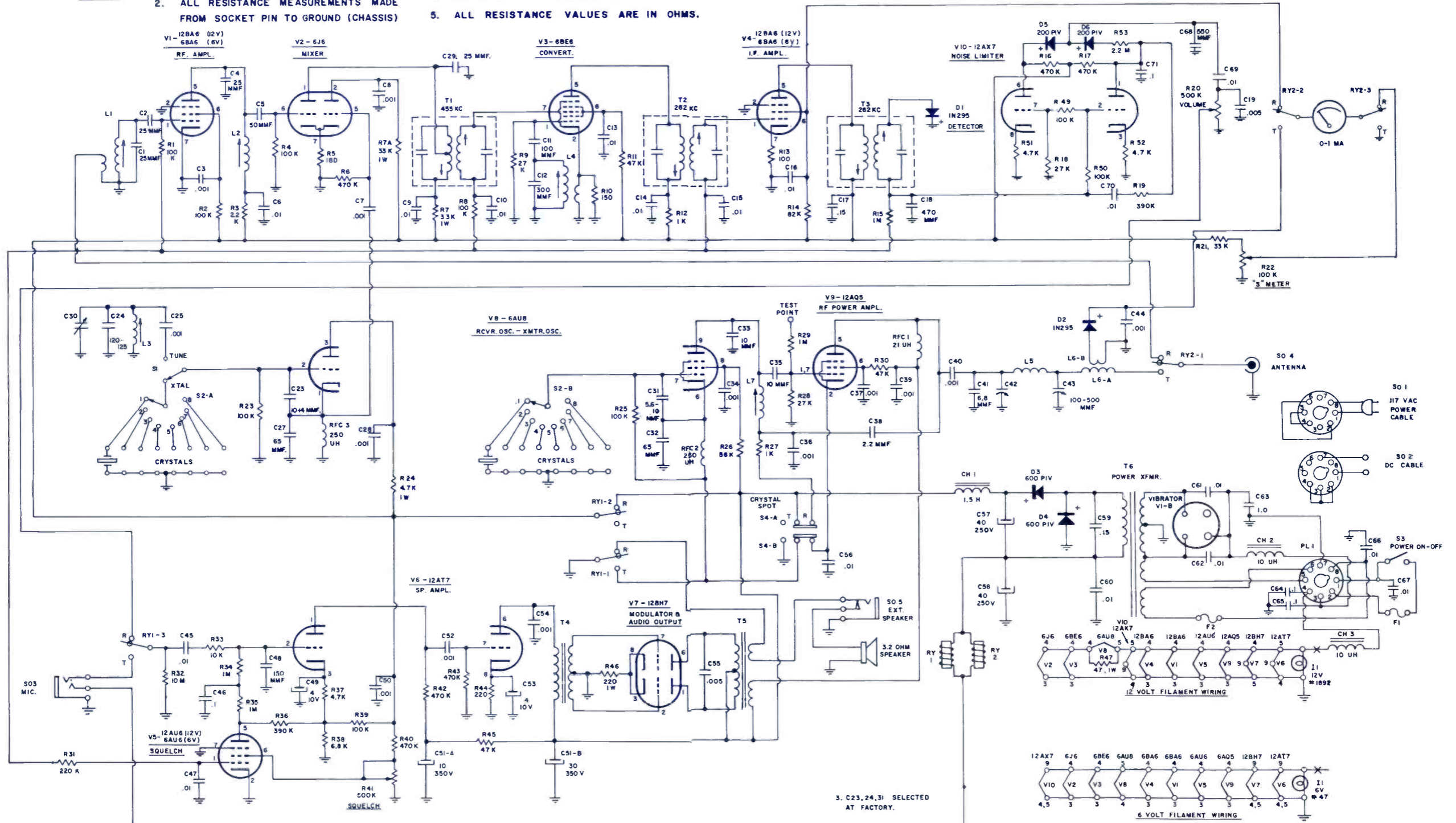
NO.	TUBE	PIN 1	PIN 2	PIN 3	PIN 4	PIN 5	PIN 6	PIN 7	PIN 8	PIN 9
V1	12BA6	28 K	INF	0	0.8	30 K +	100 K	27 K	—	—
V2	6J6	70 K	40 K	0.8	0	47 K	100 K	220	—	—
V3	6BE6	27 K	0.8	0	0.8	40 K	87 K	1 M	—	—
V4	12BA6	1 M	0	0	0.8	40 K	27 K	100	—	—
V5	12AU6	1.2 M	0	0	0.8	400 K	0	0	—	—
V6	12AT7	500 K	2 M	10 K	0	0.8	40 K	470 K	220	4
V7	12BH7	40 K	13	220	0.8	0	40 K	13	220	4
V8	6AU8	22	33 K	46 K	0.6	0.8	INF	INF	80 K	40 K
V9	12AQ5	27 K	INF	0	0.8	40 K	95 K	27 K	—	—
V10	12AX7	1 M	60 K	4.7 K	0	0.8	500 K	27 K	4.7 K	NC

NOTES

1. SQUELCH CONTROL IN COUNTERCLOCKWISE POSITION.
2. ALL RESISTANCE MEASUREMENTS MADE FROM SOCKET PIN TO GROUND (CHASSIS)
3. RECEIVER SWITCH IN TUNE POSITION.
4. RESISTANCE MAY VARY 10%.
5. ALL RESISTANCE VALUES ARE IN OHMS.

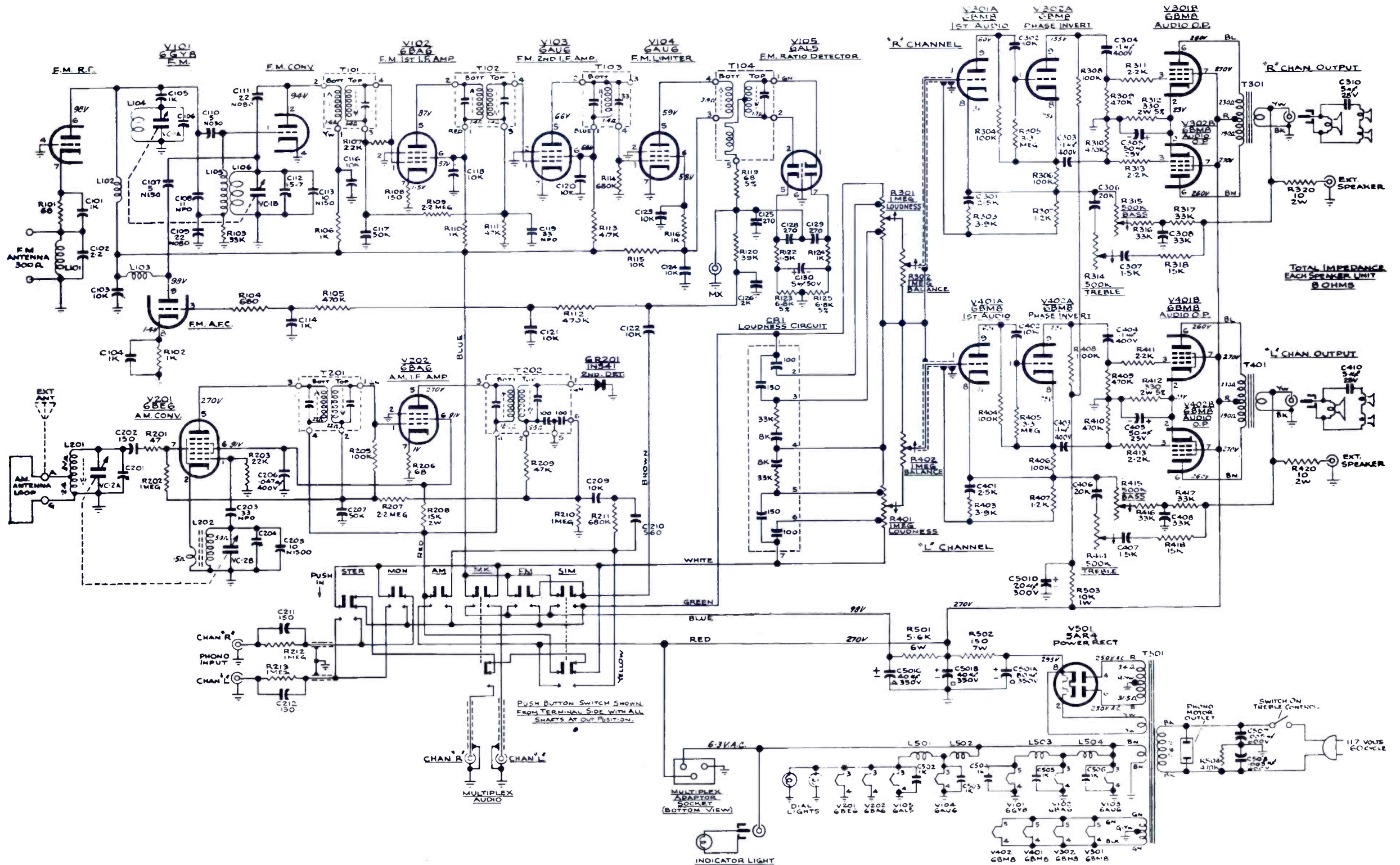
NOTE

The crystals used in the SONAR Model "G" are 1/2 fundamental units with .005% frequency tolerance, .486 inch pin spacing, and .050 inch diameter pins.



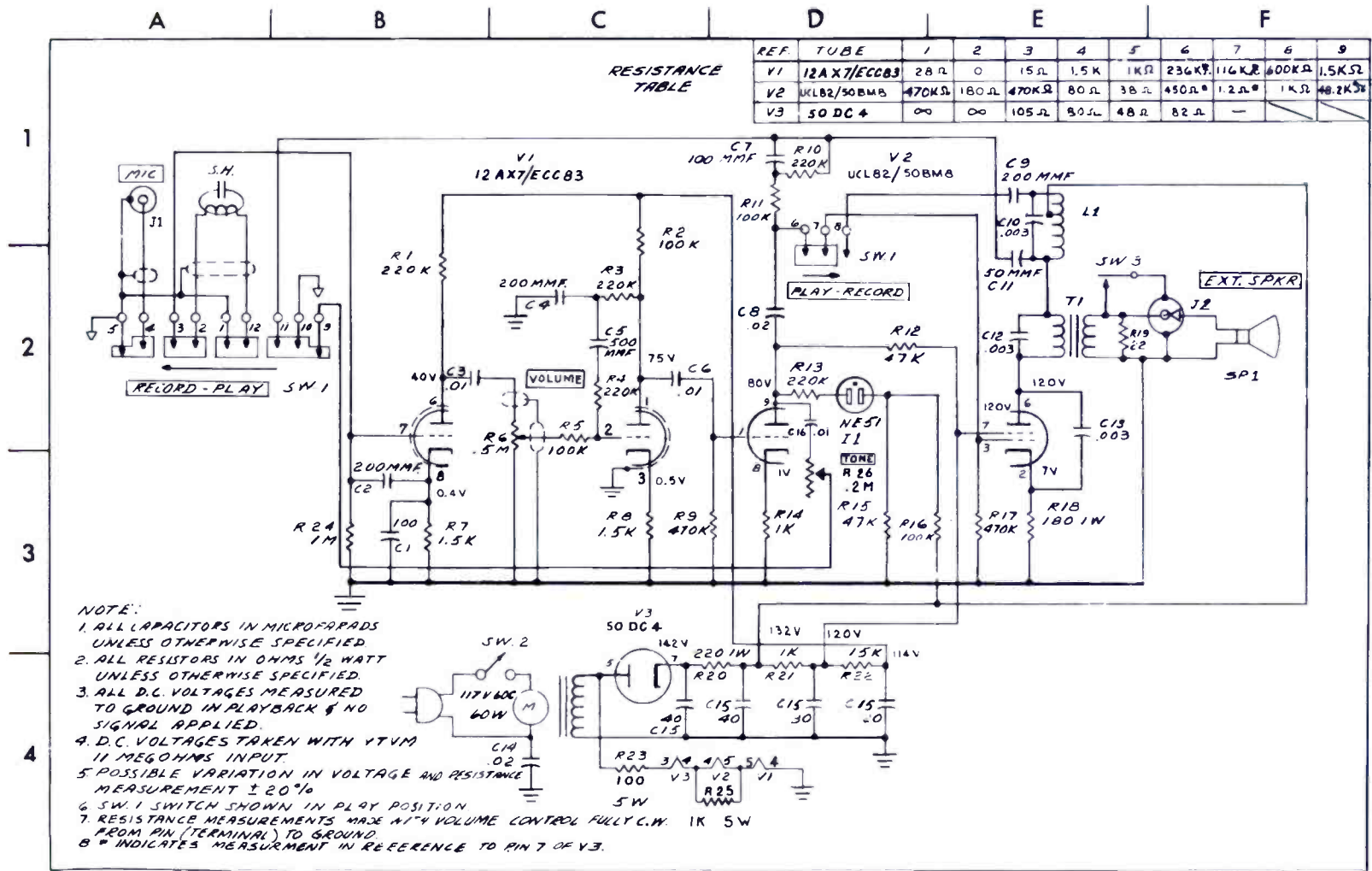
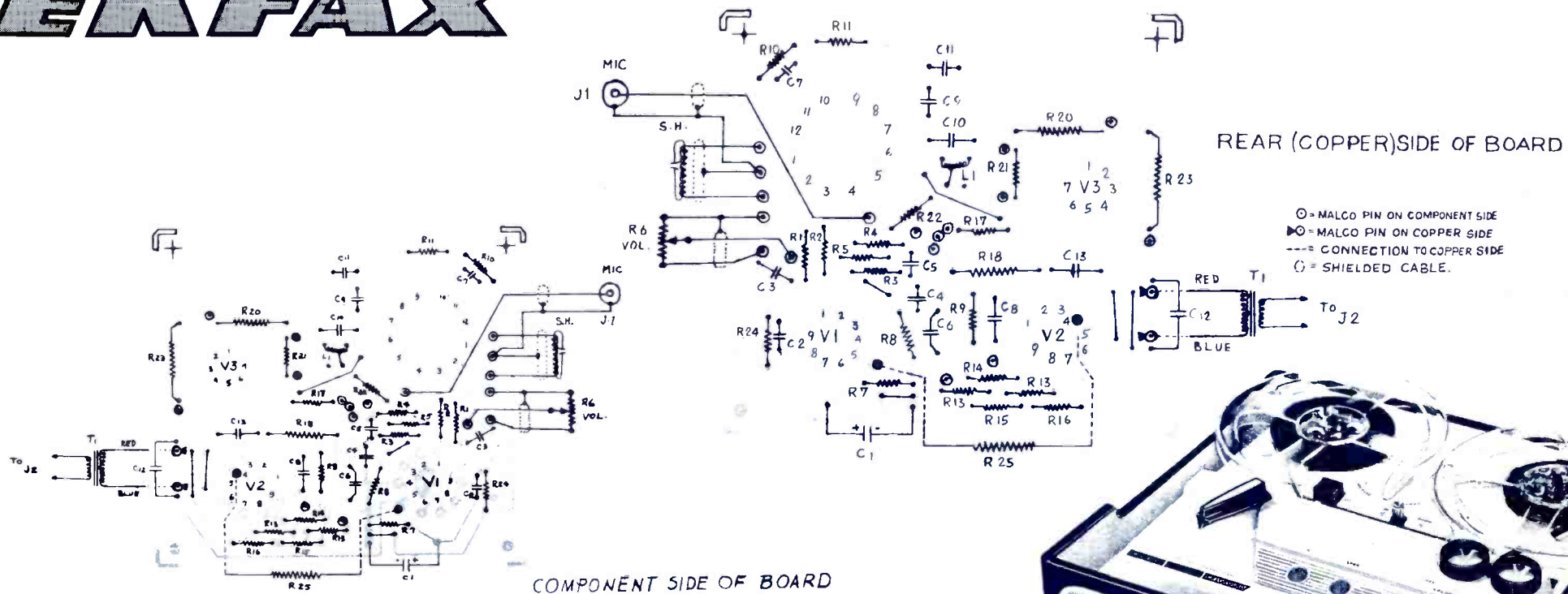
SPARTON
Stereo Phonograph
Model 12M5-P

ELECTRONIC TECHNICIAN TEKFAX



TELECTRO
Tape Recorder
Model MM-214

ELECTRONIC TECHNICIAN TEKFAX



PART NO.	DESCRIPTION
TA-3166	Carrying Case and Cover
TA-3168	Escutcheon - Front
TE-274-10	Escutcheon - Rear
TA-3040	Knob - Function Selector
TK-243-1	Knob - Wind - Rewind
TK-310-2	Knob - Volume & Tone
TK-302-1	Knob - Record
TP-1606-2	Dress Plate, Motor Board
480024	Bearing Spindle
120027	Capstan Sleeve Assembly
120028	Capstan Roller Plate Assembly
TS-3874	Spring Record Head
120029	Erase Magnet Assembly
360018	Spring Erase Magnet Return
960132	Motor Board
120024	Bearing Motor Rivet Assembly
960035	Bracket Brake Rod Guide
120031	Flywheel Assembly
TP-1609	Pulley Supply Spindle
960068	Motor Board, Sub Plate
960065	Bracket Motor Mount
TA-3169	Motor and Pulley Assembly
960071	Stop Bracket - Wind
960070	Stop Bracket - Rewind
360015	Pressure Pad Spring
960058	Bracket, Motor Pivot
TP-1608	Pulley Take-up Spindle & Counter
TA-3170	Pressure Pad Assembly
TB-2921	Belt Drive (Spindles)
TA-3114-2	Lever Wind & Rewind Assembly
TA-3171	Spindle Reel Assembly
TA-3172	Record Lock Assembly
TA-3112	Brake Cord Assembly
TR-1846	Roller Capstan
TR-2387	"O" Ring Counter Drive
TB-2923	Handbook, Operating Instructions
TM-576	Microphone

ELECTRONIC TECHNICIAN TEKFAX

UTICA
CB Tranceiver
Model T&C II

1. Connect VTVM to point "A" on diagram. Set for DC operation, all grounds to chassis.
2. Connect the generator to the antenna input.

The frequency must correspond to the frequency the receiver is set for. This frequency is determined by the receiving crystal (Y2).

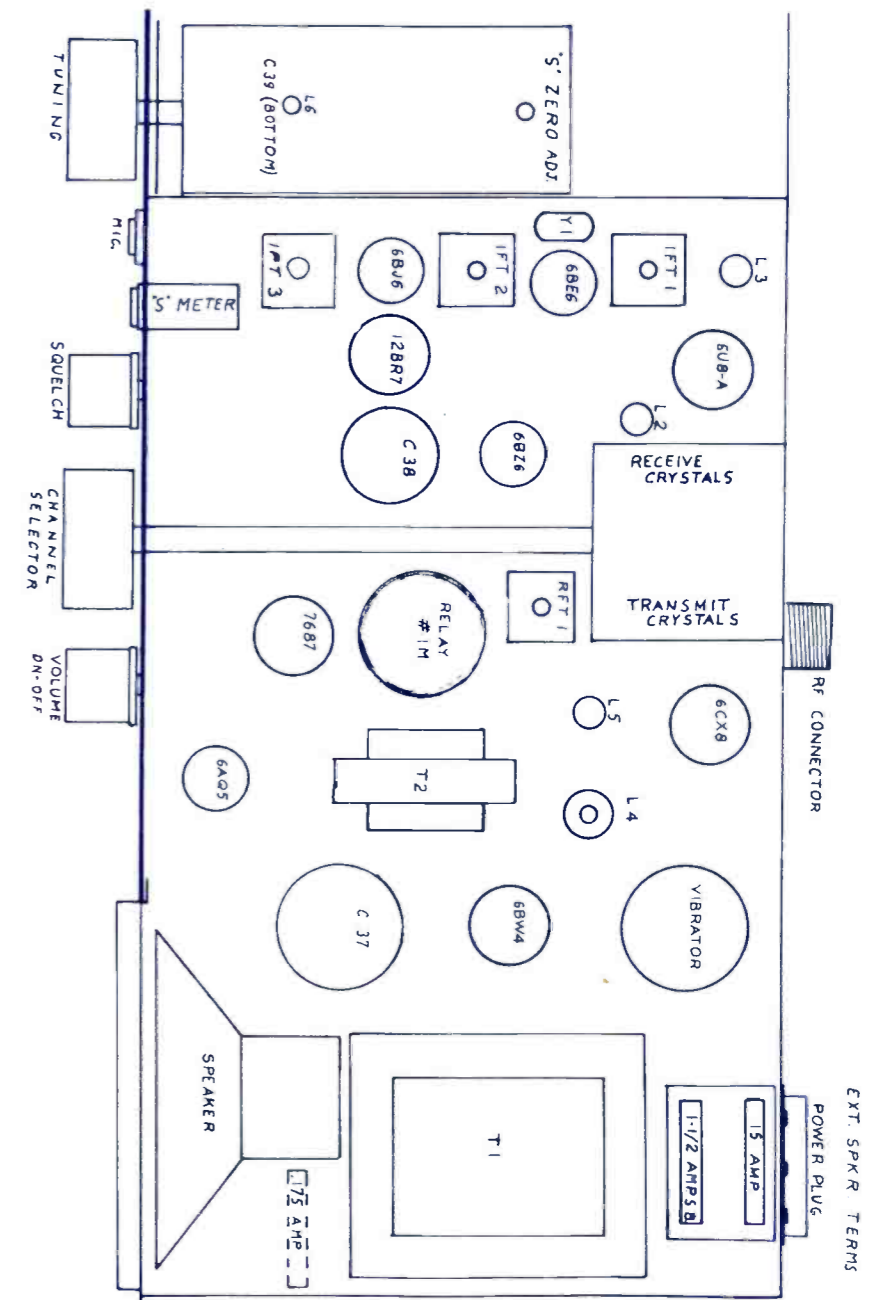
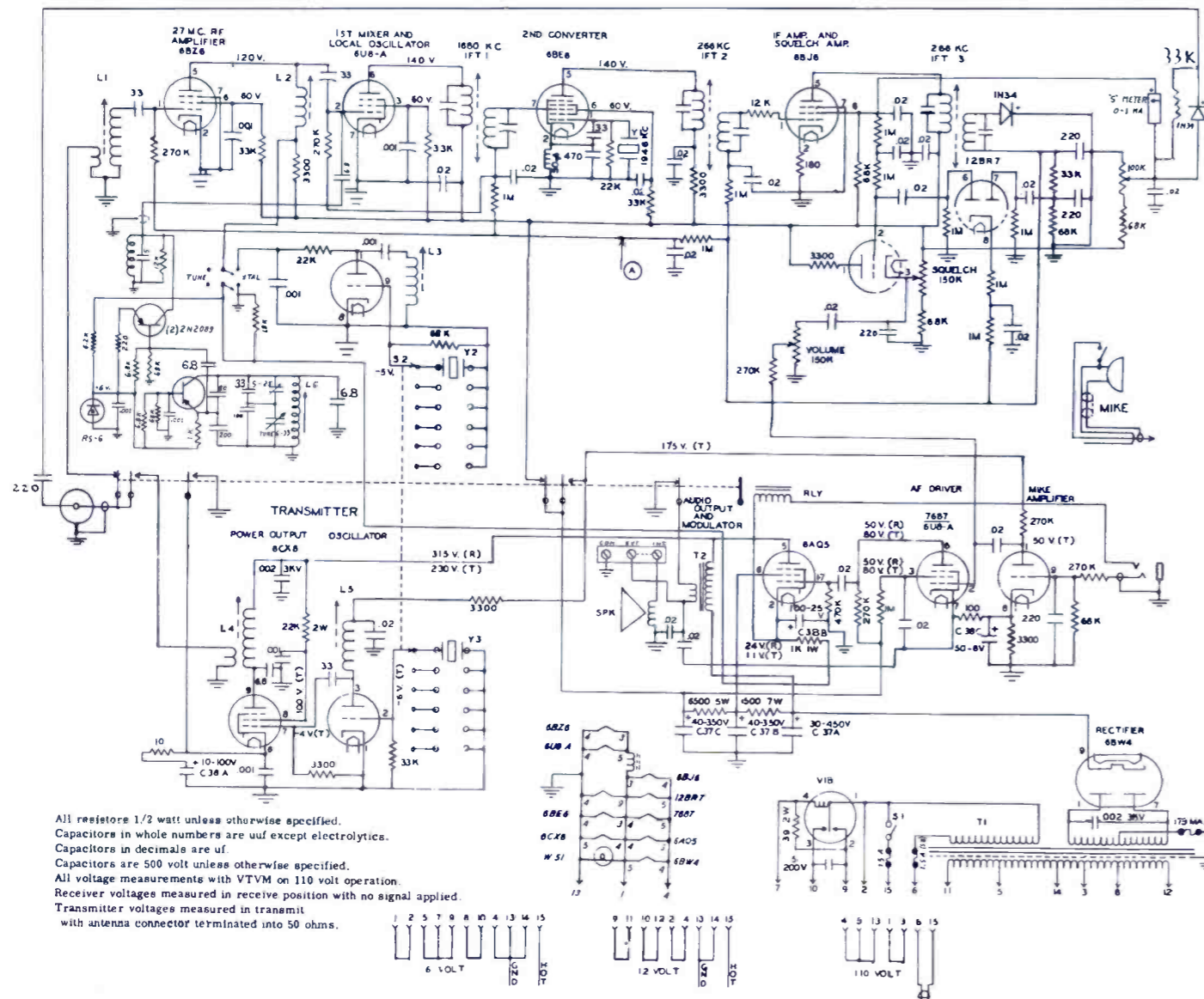
3. Adjust the output of the generator until - 2v. is read on the VTVM.

During alignment, reduce the generator output so that this voltage is never more than - 2 volts. Failure to reduce the generator output may result in an overload condition and subsequent incorrect alignment.

4. Adjust RFT1, L2 and L3 for maximum reading.

5. Adjust IFT1, 2, 3 for maximum reading.

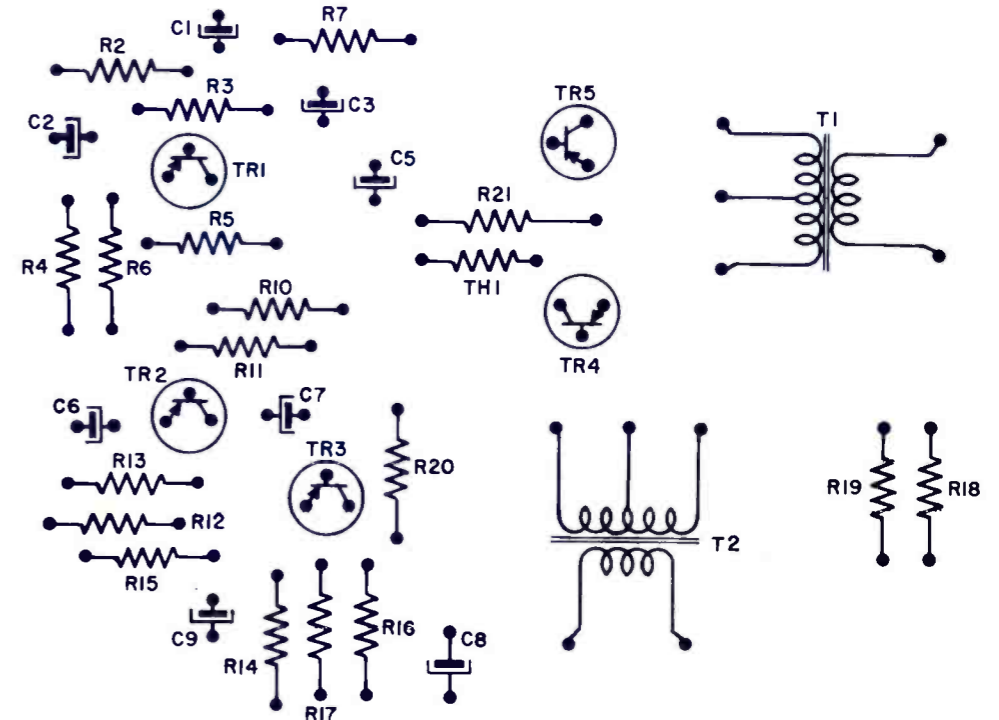
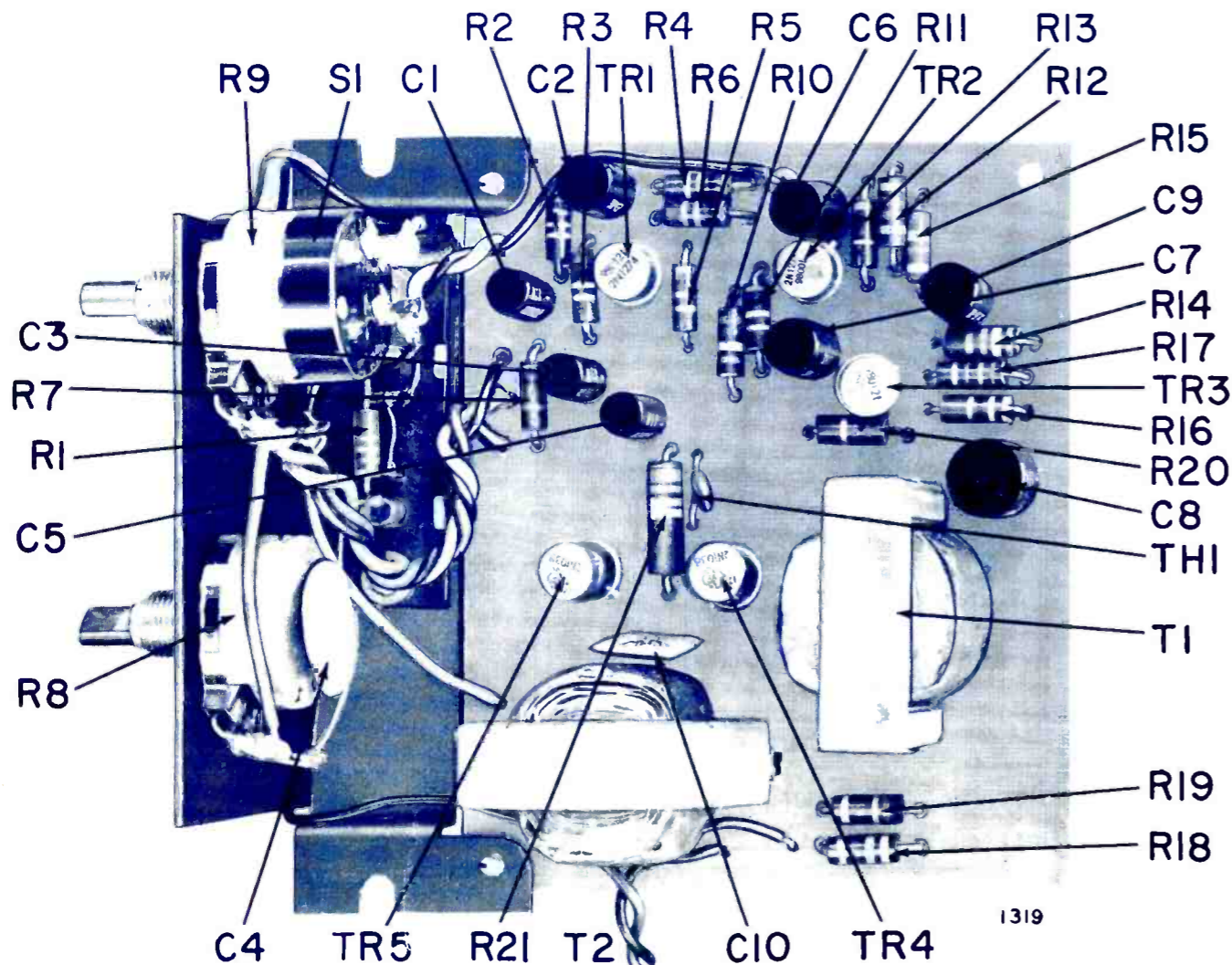
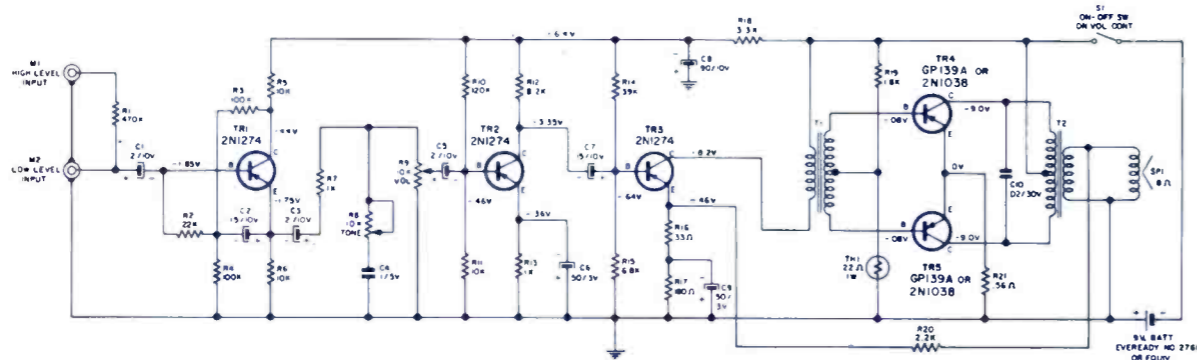
If two peaks are noticed, use the peak with the adjusting slug most withdrawn. The peak will be evidenced by a pronounced increase in VTVM reading.



ELECTRONIC TECHNICIAN TEKFAX

WEBCOR
Amplifier-
Speaker System
Model 4210

- NOTES
1. ALL RESISTORS RATED 1/2 WATT $\pm 10\%$ UNLESS OTHERWISE SPECIFIED.
 2. ALL CAPACITOR VALUES ARE IN MFD.
 3. ALL D.C. VOLTAGES MEASURED WITH A V.T.V.M. OF 11 MEGOHM INPUT RESISTANCE OR BETTER AND A SUPPLY VOLTAGE OF 9.0 V.D.C. WITH NO SIGNAL APPLIED.
 4. MEASURED VOLTAGES SHOULD BE WITHIN $\pm 10\%$ OF INDICATED VOLTAGES.

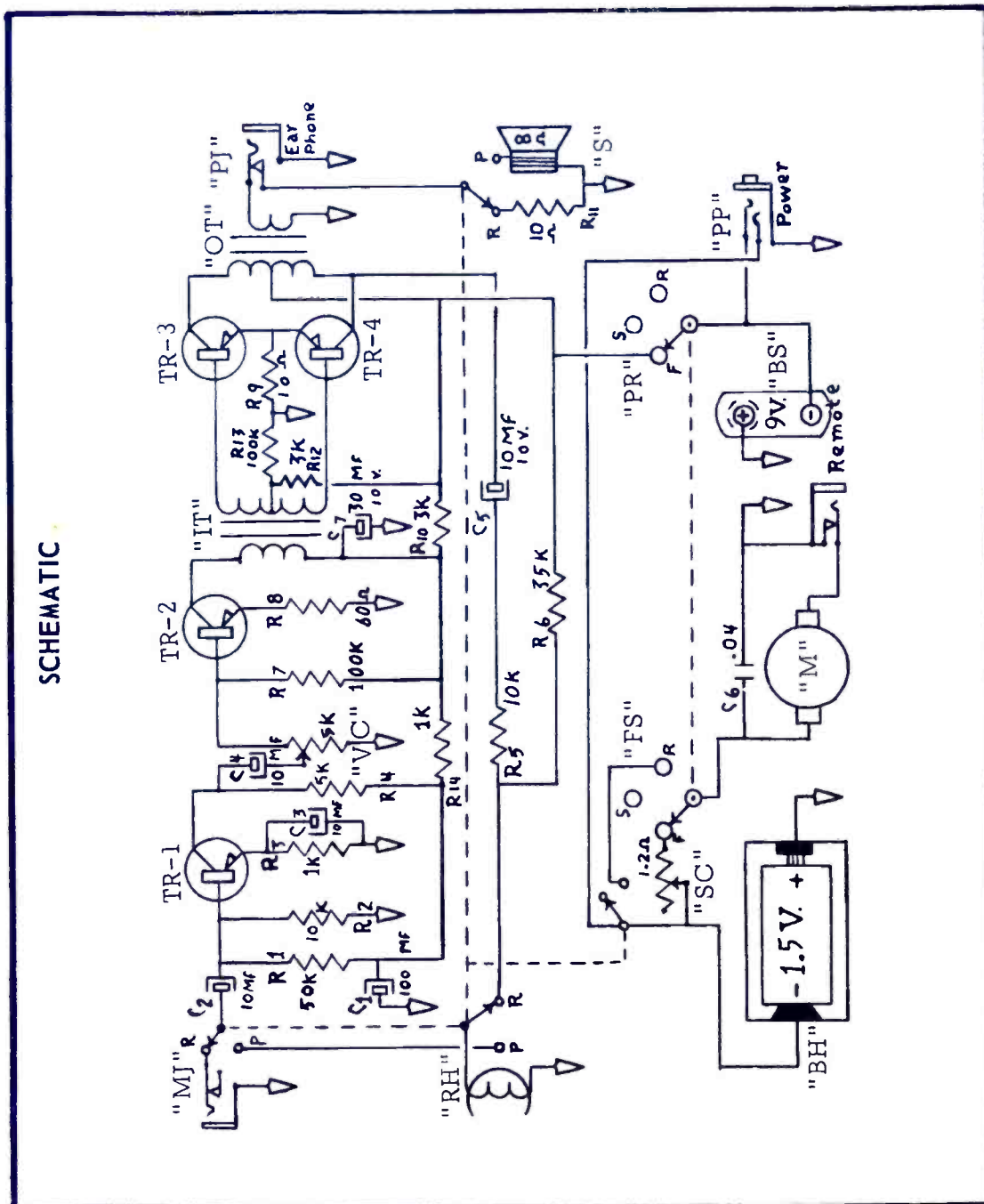


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**WESTERN
AUTO**
Tape Recorder
4DC7465

ELECTRONIC TECHNICIAN
TEKFAK

SCHEMATIC



WESTINGHOUSE
Stereo Phonograph
Chassis V-2515-2
Models H-M1800, 01, 03,
H-M1900, 01, & 03

