TSD-2B SERIES Microwave Sound Diplexing Equipment

RADIO CORPORATION OF AMERICA

1B-EDC100-5-I

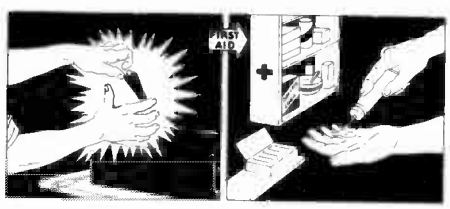
FIRST AID

WARNING!

Operation of electronic equipment involves the use of high voltages which are dangerous to life. Operating personnel must at all times observe all safety regulations. Do not change tubes or make adjustments inside the equipment with voltage supply on. Under certain conditions dangerous potentials may exist in circuits with power controls in the off position due to charges retained by capacitors, etc. To avoid casualties, ALWAYS DISCHARGE AND GROUND CIRCUITS PRIOR TO TOUCHING THEM.

ABOUT FIRST AID

Personnel engaged in the installation, operation and maintenance of this equipment or similar equipment are urged to become familiar with the following rules both in theory and in the practical application thereof. It is the duty of every radioman to be prepared to give adequate First Aid and thereby prevent avoidable loss of life.

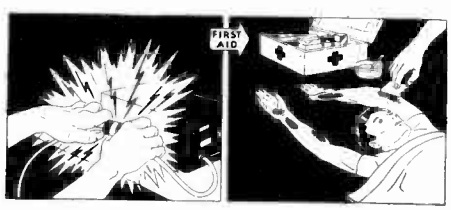


FIRST DEGREE BURN

SKIN REDDENED. Temporary treatment—Apply baking soda or Unguentine.

SECOND DEGREE BURN

SKIN BLISTERED. Temporary treatment—Apply baking soda, wet compress, white petroleum jelly, foille jelly, olive oil, or tea.



THIRD DEGREE BURN

FLESH CHARRED. Temporary treatment—Apply baking soda, wet compress, white petroleum jelly, or foille spray. Treat for severe shock.

BACK PRESSURE—ARM LIFT METHOD OF ARTIFICIAL RESPIRATION

(Courtesy of the American Red Cross)

1. Position of the subject (See Fig. 1)

Place the subject in the face down, prone position. Bend his elbows and place the hands one upon the other. Turn his fact to one side, placing the cheek upon his hands.

FIGURE 1

2. Position of the operator (See Fig. 2)

Kneel on either the right or left knee at the head of the subject facing him. Place the knee at the side of the subject's head close to the forearm. Place the opposite foot near the elbow. If it is more comfortable, kneel on both knees, one on either side of the subject's head. Place your hands upon the flat of the subject's back in such a way that the heels lie just below a line running between the armpits. With the tips of the thumbs just touching, spread the fingers downward and outward.

3. Compression phase (See Fig. 3)

Rock forward until the arms are approximately vertical and allow the weight of the upper part of your body to exert slow, steady, even pressure downward upon the hands. This forces air out of the lungs. Your elbows should be kept straight and the pressure exerted almost directly downward on the back.

FIGURE 2

4. Position for expansion phase (See Fig. 4)

Release the pressure, avoiding a final thrust, and commence to rock slowly backward. Place your hands upon the subject's arms just above his elbows.

5. Expansion phase (See Fig. 5)

Draw his arms upward and toward you. Apply just enough lift to feel resistance and tension at the subject's shoulders. Do not bend your elbows, and as you rock backward the subject's arms will be drawn toward you. Then lower the arms to the ground. This completes the full cycle. The arm lift expands the chest by pulling on the chest muscles, arching the back, and relieving the weight on the chest.

FIGURE 3

THE CYCLE SHOULD BE REPEATED 12 TIMES PER MINUTE AT A STEADY, UNIFORM RATE. THE COMPRESSION AND EXPANSION PHASES SHOULD OCCUPY ABOUT EQUAL TIME; THE RELEASE PERIODS BEING OF MINIMUM DURATION.

Additional related directions:

It is all important that artificial respiration, when needed, be started quickly. There should be a slight inclination of the body in such a way that fluid drains better from the respiratory passage. The head of the subject should be extended, not flexed forward, and the chin should not sag lest obstruction of the respiratory passages occur. A check should be made to ascertain that the tongue or foreign objects are not obstructing the passages. These aspects can be cared for when placing the subject into position or shortly thereafter, between cycles. A smooth rhythm in performing artificial respiration is desirable, but split-second timing is not essential. Shock should receive adequate attention, and the subject should remain recumbent after resuscitation until seen by a physician or until recovery seem assured.

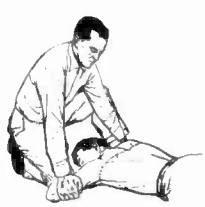


FIGURE 4

FIGURE 5

RCA

TV MICROWAVE

SOUND DIPLEXING EQUIPMENT

RADIO CORPORATION OF AMERICA
ENGINEERING PRODUCTS DIVISION
Camden 2, New Jersey

Notice: This book with all included addenda applies to the following equipment:

TSD-2B	Modulator	M1-26443-C	TSD-4B	Modulator	M1-43443
	Demodulator	M1-26444-C		Demodulator	M1-43444
TSD-3A	Modulator	M1-26493-B	TSD-5B	Modulator	M1-43493
	Demodulator	M1-26494-B		Demodulator	M1-43494

INSTRUCTION BOOK

Printed in U.S.A.

IB-EDC100-5-1

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SECTION I

SPECIFICATIONS

Sound Subcarrier Diplexing System

A. GENERAL

Video Signal	NTSC Color or Monochrome
Video Response	500 Lines or better
Audio Response	±0.5 db 50 to 13000 cps -1.5 db max at 15000 cps
Signal/Noise	-55 db to -75 db below rated output
Distortion	0.1% to 1% maximum below program level (+14 dbm sine wave)
Maximum Operating Temperature	-20° C. to 85° C.

MODULATOR MI-26443-A
Sound Diplexer Transmitting Unit:

Type	FM special with AF, RF and AFC feedback
Carrier Stabilization	Referred to temperature compensated discriminator
Video Input Level	1.5 V P-P maximum
Video Input Impedance	75 ohms
Video-Subcarrier Output Level	1.5 V P-P to 2.0 V P-P maximum
Video-Subcarrier Output Impedance	75 ohms
Audio Input Level	-5 dbm minimum, +7 dbm maximum
Audio Input Impedance, Nominal	500/600 ohms, balanced or unbalanced
Power Requirements	115 VAC, 60 cps, 57 watts
Tube Complement	3 ea. 6U8; 1 ea. 6CL6; 1 ea. 6AL5; 1 ea. 6AU6; 1 ea. 0A2; 1 ea. 5Y3.

DEMODULATOR MI-26444-A
Sound Diplexer Receiving Unit:

Type	TRFM special with audio squelch and carrier indicator light
Video-Subcarrier Input Level	2 V P-P maximum
Video-Subcarrier Input Impedance	75 ohms
Video Output Level	1.5 V P-P maximum
Video Output Impedance	75 ohms
Audio Output Level	+17 dbm rated maximum, +14 dbm operating
Audio Output Impedance, Nominal	500/600 ohms balanced or unbalanced
Power Requirements	115 VAC, 60 cps, 56 watts
Tube Complement	5 ea. 6AU6; 1 ea. 6AL5; 2 ea. 12AU7; 1 ea. 0A2; 1 ea. 5Y3.

B. MECHANICAL SPECIFICATIONS

Rack Mount, 5¼" recessed chassis less cabinet

Modulator Overall	3-15/32" H x 19" W x 7-3/4" D	8 lbs 4 oz.
Demodulator Overall	3-15/32" H x 19" W x 7-3/4" D	9 lbs 5 oz.
Finish	Umber Gray	

C. ACCESSORY EQUIPMENT

TSD-3A Dual Channel Diplexing System 6.2 mc

SECTION II

DESCRIPTION

A. GENERAL:

The TSD-2B Sound Diplexing Equipment is a complete, closed circuit subcarrier system whose function allows the transmission and reception of broadcast quality audio signals in conjunction with television monochrome or color picture signals over a microwave transmitter--receiver system. It may be used in conjunction with other TSD Sound Diplexing Equipment for multiple program channel applications conforming to STL specifications. This process is accomplished with negligible interference of signals.

Stability: The stability of the subcarrier system is such that at an ambient temperature of 20° C., useable program may be received within 15 to 30 seconds of application of power to the Modulator and Demodulator. The system design was generally based on military specifications for continuous performance and stability under wide temperature and humidity variations. All RF and AF wave filters incorporate special circuitry to insure full stability. The Modulator AFC discriminator, Demodulator RF amplifiers and discriminator all incorporate special circuitry complete with temperature compensation.

Noise: Design parameters, carefully established with particular attention paid to all low level stages, grid circuits and time constants, enable the system to achieve a closed circuit back-to-back signal-to-noise ratio of approximately -70 to -85 db under good line conditions with shot and thermal noise approximately -90 db.

Metering: All key circuits incorporate test points allowing the measurements of existing RF, DC and/or modulating voltages. This same design allows stage by stage testing including the insertion and extraction of test signals without demounting the equipment.

Component Rating: The majority of all components are overrated on an average of 2 to 1 with most tubes working well under their CCS ratings.

Mechanical: An advanced type of fabrication is employed allowing a symmetrical arrangement of components, minimum lead dress, minimum space and maximum accessibility. This same construction allows the subcarrier system to meet rigid vibration and shock requirements.

B. USE:

The specifications of the single or dual channel Sound Subcarrier System allow its utilization in the following services:

1. Studio Transmission Link (STL)
2. Remote
3. Studio to Studio and/or Master Control providing the system response has been checked for linearity and phase distortion through 7 Mc/s.
4. Camera to Studio

Note 1: Particular attention has been given in passing full picture resolution with proper phase shift characteristics vital to video color picture signals.

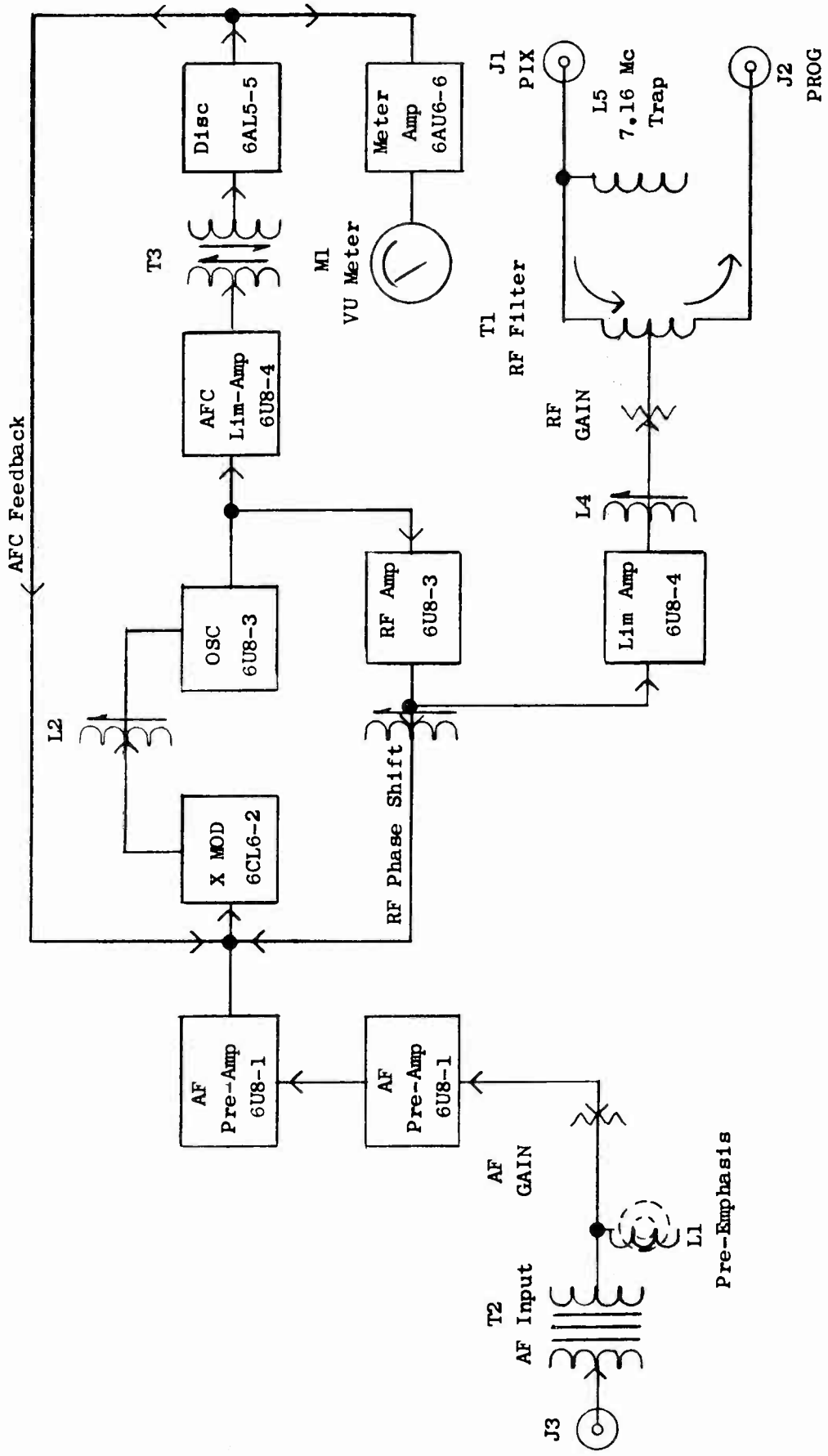
Note 2: For one camera shows, such as emergency coverage of special events, etc., the Modulator subcarrier signal may be inserted directly at the camera by placing it in series with the video pre-amp output. The small power requirement of less than ½ amp. at 115 VAC is readily available on the camera.

In this case it is necessary to use a portable pre-amp to bring microphones up to proper level.

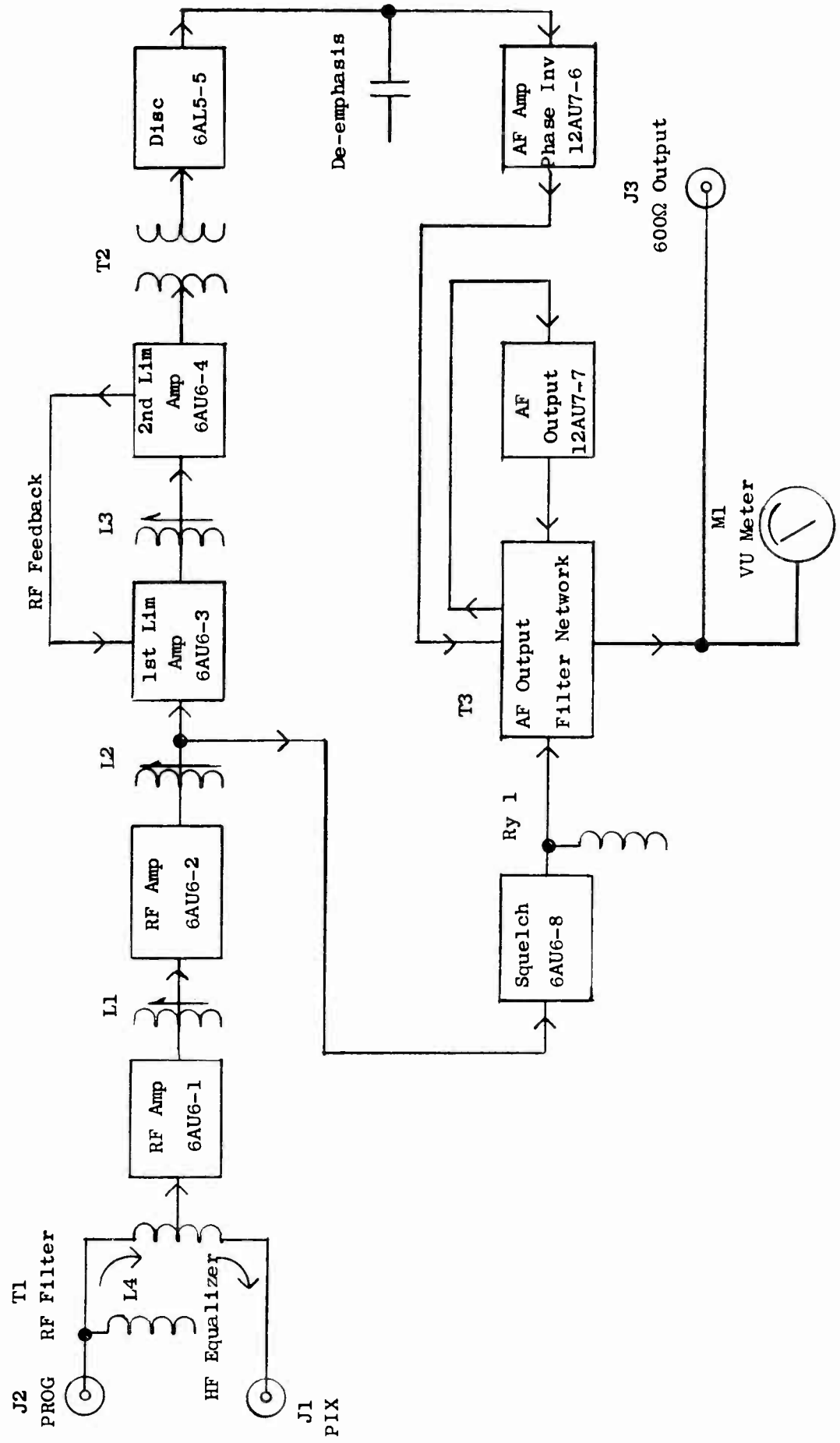
C. BLOCK DIAGRAMS:

1. Subcarrier Modulator Block schematic page 5.

2. Subcarrier Demodulator block schematic page 6.


J1
PIX
J2
PROG
L5
7.16 Mc
Trap
Meter
Amp
6AU6-6
Disc
6AL5-5
T3
M1
VU Meter
T1
RF Filter
AFC
Lim-Amp
6U8-4
RF
GAIN
AFC Feedback
L4
OSC
6U8-3
RF Amp
6U8-3
Lim Amp
6U8-4
L2
X MOD
6CL6-2
RF Phase Shift
AF
Pre-Amp
6U8-1
AF
Pre-Amp
6U8-1
AF
GAIN
L1
Pre-Emphasis
T2
AF Input
J3

SOUND DEMODULATOR



D. THEORY OF OPERATION:

1. Modulator Theory:

A maximum signal of 1.5 V P-P, composite picture, monochrome or color, is fed through 75 ohm input (J1), labelled PIX, to RF filter (T1), where high frequency components such as video harmonics and iconoscope noise are rejected at 6.8 Mc/s. The frequency modulated sound signal operating at 6.8 Mc/s is added to the video signal with the combined output appearing at (J2), labelled PROG. This output is fed directly to the microwave transmitter video input, which is terminated in 75 ohms.

Note 3: (J1) and (J2) are not terminated but must work into properly terminated lines.

An audio signal of -5 dbm to a maximum of +7 dbm is fed into 600 ohm input (J3).

Note 4: CAUTION: Make certain for unbalanced operation that there is NO connection from the incoming line to center tap terminal A on (J3). Otherwise, improper operation or damage may result.

The audio signal from (J3) fed through line matching transformer (T2) is impressed across a 75 micro-second pre-emphasis network consisting of (R2) and (L1). The adjustment of (R2) sets the degree of pre-emphasis to correspond with the de-emphasis network used in the receiver. (R1) serves as a building out resistor for the secondary impedance of (T2). The input level, therefore, deviation of the transmitter, is controlled by (R3) labelled AF GAIN. Isolation preamplifier (6U8-1) is tied in cascade and employs cathode degeneration to reduce distortion.

The audio output from the pentode section of (6U8-1) is then fed to reactance modulator (6CL6-2) tied across the triode section of oscillator tube (6U8-3). (L2) serves as the oscillator tank and is inductively tuned to 6.8 Mc/s.

The resultant frequency modulated signal is then transferred to two different circuits. The first circuit is comprised of the pentode section of (6U8-4) serving as a limiter amplifier driving (T3) discriminator transformer and (6AL5-5) discriminator. The secondary of (T3) is a modified Foster-Seeley discriminator circuit with a center frequency of 6.8 Mc/s. Resistors (R18) and (R19) in shunt with each diode section of (6AL5-5) serve to hold the non-conducting impedance of each diode to a low value in addition to swamping the secondary of (T3). This results in extreme linearity over a wide bandpass. The recovered audio

frequency is fed to (6AU6-6) which serves as a meter amplifier. The adjustment of (R23) to 0 VU on VU meter (M1) establishes the 100% modulation index. The recovered audio and the DC component is further fed back to the grid of the reactance modulator tube. Therefore, the incoming audio signal, the audio feedback voltage 180 degrees out of phase with the incoming audio and the DC AFC correction voltage at the grid of (6CL6-2) controls the effective inductive reactance of the oscillator circuit resulting in direct linear frequency modulation and frequency stabilization.

The second circuit fed from (6U8-3) oscillator triode drives the pentode section of (6U8-3) which serves as an RF amplifier driving a phase shift network comprised of (C24), (C25) and (R28) with the exact degree of phase shift zeroed by the tuning of (L3).

Note 5: THE TUNING OF (L3) IS FACTORY SET AND SHOULD NEVER BE ADJUSTED.

The resultant phase shifted RF voltage is fed back to the grid of the reactance modulator causing a 90 degree phase displacement between the plate current and plate voltage which allows the tube to appear as an inductive reactance across (L2).

The frequency modulated signal is further fed from (6U8-3) to the triode section of isolation limiter amplifier (6U8-4). This tube serves to isolate the subcarrier Modulator from the video line and filter networks. Filter network (C19), (C20) and (L4) in conjunction with limiter tube (6U8-4) limits and filters the frequency modulated signal and reduces the amplitude modulation component to a low degree. (R25) labelled RF GAIN serves to control the output RF voltage. At the minimum adjustment there is normally sufficient RF voltage to hold the squelch circuit in the Demodulator. Filter network (T1) serves as a bandpassed 6.8 Mc/s rejection trap filtering out high frequency video components. The incoming picture signal fed to (J1) is added, NOT MIXED, to the 6.8 Mc/s subcarrier signal with the combined output appearing at (J2) labelled PROG. (C17) and (L5) serve as a 7.16 Mc/s trap filtering the second harmonic of the color sync generator.

2. Demodulator Theory:

The composite video picture signal, monochrome or color, with the subcarrier signal is fed from the picture or monitor output of the microwave receiver to input (J2) labelled PROG. Filter (T1) serves as a bandpassed RF rejection filter that shunts the subcarrier signal into the Demodulator and stops it from being passed on to the terminal picture equipment tied to (J1) labelled PIX. (L4) serves in the high frequency equalizer network. The subcarrier signal fed across isolation

resistor (R1) is amplified in conventional RF amplifier stages (6AU6-1) and (6AU6-2). The signal is then coupled to the first limiter amplifier (6AU6-3). Particular attention has been paid to the time constant formed by (C12) and (R9) in conjunction with crystal (CR1) which allows rapid limiting action on fast pulses. The output of the first limiter is coupled to the second limiter stage with a slightly different time constant which limits additional types of pulse signals. Negative feedback is employed between the limiter stages by (R13) to stabilize limiter performance under varying conditions of RF input voltages encountered in operational use. The output of the second limiter amplifier (6AU6-4) coupled through discriminator transformer (T2) is demodulated by the (6AL5-5) discriminator tube. (T2) is a modified Foster-Seeley discriminator circuit with a center frequency of 6.8 Mc/s. Swamped bandpass is accomplished by (R14) and (R15) with (R17) and (R18) in shunt with the diodes serving to hold the non-conducting impedance of each diode to a moderately low value and further serve as the DC return path for the discriminator network. The resultant audio output is de-emphasized in a standard 75 micro-second filter network comprised of (R19) and (C18).

Negative bias developed on the grid of the first limiter stage (6AU6-3) is decoupled, filtered and fed to squelch amplifier tube (6AU6-8). Under signal conditions the squelch tube is biased to cutoff allowing (RY1) relay to supply B+ voltage to AF output amplifier (12AU7-7). The squelch circuit prevents noise from being amplified into the audio system should a failure occur in the subcarrier or microwave link system.

Capacitor (C23) couples the audio signal from the de-emphasis network across potentiometer (R16) labelled AF GAIN, loading the grid of the preamplifier section of (12AU7-6). Cathode bias resistor (R21) furnishes degenerative stabilization. The output of the preamplifier section feeds a special bandpassed rejection filter, located in (T3), with a frequency centered at 15,750 cps, to attenuate any remaining horizontal sync frequency components. The output of this filter is fed to the second half of (12AU7-6), which serves as a phase inverter. The audio signal developed across (R22) being 180 degrees out of phase with the signal developed across (R23) is coupled in push-pull to audio output stage (12AU7-7).

(T3) incorporates a low pass filter to attenuate any remaining equalizing frequency components at 31,500 cps. The output of (T3) audio transformer filter network feeds 600 ohm output (J3). A VU meter with 0 VU equal +14 dbm monitors the output audio level.

Note 6: CAUTION: Make certain for unbalanced operation that there is no connection from the audio tie line to center tap terminal A on (J3) otherwise improper operation or damage may result. Terminal 9 is ground on (T3).

SECTION III

INSTALLATION AND SYSTEM ALIGNMENT

A. UNPACKING AND SUBCARRIER SYSTEM TEST:

1. The microwave sound subcarrier equipment is ready for use when received. After unpacking, however, inspect the system for any evidence of damage that may have occurred in transit. Check to insure that all tubes are in place and firmly seated. THE SYSTEM MAY BE IMMEDIATELY INSTALLED READY FOR OPERATION AS OUTLINED IN PARAGRAPH C & D THIS SECTION. HOWEVER, TO CHECK MAXIMUM SPECIFICATION PERFORMANCE, THIS COMPLETE SECTION OF A, B, C & D MUST BE EXACTLY FOLLOWED.

2. The sound subcarrier system should now be checked against performance specifications before application to the microwave system as follows:

   a. Connect 115 VAC, 60 cycle, single phase into (J9) on the Modulator and to (J8) on the Demodulator.

   b. Connect a short length of coaxial cable from (J2) of the Modulator to (J2) of the Demodulator. Terminate Demodulator (J1) with 75 ohms.

   c. On the Demodulator, terminate (J3) audio output with a 600 ohm resistor across terminals C hot and B ground, if output is unbalanced.

   Note 7: For best signal-to-noise ratio, make certain that terminal B is grounded for unbalanced operation.

   d. After the equipment has warmed up approximately 30 minutes, check Modulator test point (J6) for 0 VDC. Adjust the red knob on (L2) for zero center.

istortion %: e. Feed a 600 ohm audio line to (J3) on the Modulator. REFER TO NOTE 7 THIS PAGE. Turn AF GAIN control maximum counterclockwise and set up a 1,000 cps note at a level of 0 dbm. Adjust AF GAIN control clockwise for a reading of 0 VU (100% modulation).

   Adjust AF GAIN control on the Demodulator for an output of 0 VU (+14 dbm) across the 600 ohm load resistor. REFER TO NOTE 7 THIS PAGE. Complete distortion measurements 50 cps to 15 Kc/s as outlined in Maintenance-Alignment Section V.

Response: f. Complete frequency response check as outlined in Maintenance-Alignment Section V.

S/N: g. Complete S/N tests as outlined in Maintenance-Alignment Section V. The closed circuit back-to-back noise will fall between -70 and -85 dbm. If not, and a 60 or a 120 cps ripple is noted, refer again to Maintenance-Alignment Section V for procedure to minimize noise.

3. Completing this check, the subcarrier system should require no further attention.

B. MICROWAVE SYSTEM TEST:

To properly handle the modulated subcarrier diplexer, the microwave system itself must be in a good state of alignment.

Misalignment of the microwave system will have its primary effect on the audio signal-to-noise ratios obtainable with the subcarrier diplexer. Parameters of prime importance are the differential phase shift between 6 and 7 Mc/s and the amplitude-frequency response. It is also necessary that the antenna alignment be such that a good video signal-to-noise ratio is obtained, before a good audio signal-to-noise ratio can be expected.

There is no ready way of measuring differential phase shift at 6.8 Mc/s but if differential phase at 3.58 Mc/s is optimized and does not exceed 3°, subcarrier diplexer performance will be adequate.

Amplitude-frequency response may readily be checked by using a sweep generator. The microwave receiver output must be properly terminated in 75 ohms. Response should not be down by more than 3 db from mid band at 6.8 Mc/s with a standard roll-off for good subcarrier diplexer performance.

For further information, please refer to the Microwave Relay instruction book.

C. INSTALLATION:

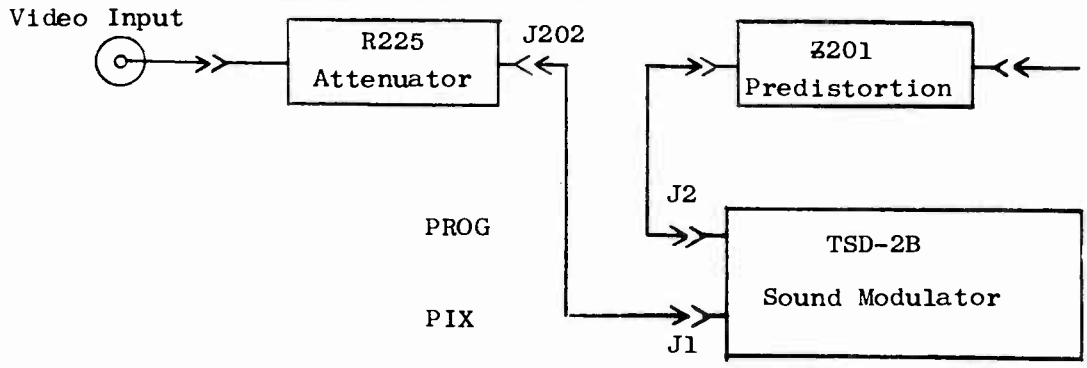
1. Audio and power connections are as outlined under Paragraph A-2, this section.

2. The sound diplexing system may be connected externally to the microwave system. The preferred installation is inter-connected within the microwave equipment as shown in Block Diagram, page 12.

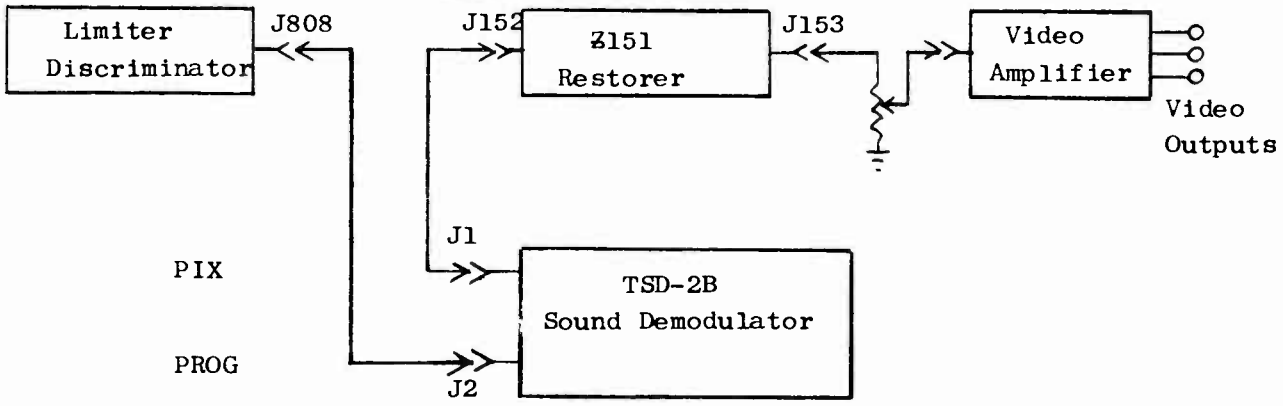
3. Refer to Paragraph E, this section, for heat considerations, if sound diplexing equipment is physically installed within the microwave equipment.

SYSTEM BLOCK DIAGRAMS

TVT-1A Microwave Transmitter



TVR-1A Microwave Receiver



D. SYSTEM BENCH ALIGNMENT

1. Apply power to the subcarrier and microwave systems and allow a warm-up period of 30 minutes or more.

2. Accomplish standard microwave set-up and video level set procedure with a 20 mile attenuator between the microwave transmitter and receiver. Set the composite video input and output level between 1 and 1.5 V P-P without subcarrier signal.

3. Subcarrier Modulator Adjustments:

   a. Adjust red frequency control knob on top of (L2) for a 0 VDC reading at (J6).

   b. Turn AF GAIN control to minimum position (counter-clockwise). Turn RF GAIN control to minimum position (counter-clockwise).

4. Subcarrier Demodulator Adjustments:

   a. Turn AF GAIN to minimum position (counter-clockwise).

   b. Observe amber subcarrier indicator light indicating the presence of the subcarrier signal in the Demodulator.

5. a. Set up a 1,000 cps tone of 0 dbm into (J3) on the subcarrier Modulator and increase the AF GAIN control for a reading of 0 VU on Meter (M1). 100% modulation.

   b. At the subcarrier Demodulator, insert a 600 ohm resistive load across (J3) and adjust the VU meter for a reading of 0 VU which equals +14 dbm.

6. Make signal-to-noise measurement and gradually increase the RF GAIN control in the subcarrier Modulator until a satisfactory signal-to-noise ratio is obtained and/or adjust subcarrier level equal to 10 to 15% of P-P signal. Observe picture monitor for preservation of picture quality.

7. On the microwave receiver, turn the AFC to the off position and vary tuning slightly to ascertain if the signal-to-noise ratio can be improved. Observe the picture monitor for preservation of picture quality.

   Note 8: If a change in S/N is noted, turn the AFC on and set the receiver AFC (MOD BAL CONTROL) to hold tuning at this point. Readjustment should be slight.

8. Observing the noise meter, now reduce the subcarrier RF GAIN control to see if the signal-to-noise reading can be improved at any point. The present reading should fall between -55 dbm and -75 dbm.

9. Further reductions in noise may be accomplished by reducing the microwave transmitter modulation gain control.

   Note 9: INCREASED MODULATION OF THE MICROWAVE TRANSMITTER INCREASES THE EXCURSION IN THE MICROWAVE RECEIVER IF TO WHERE PHASE LINEARITY MAY BE MARGINAL. THE SIGNAL TO NOISE OF ANY SUBCARRIER MICROWAVE SYSTEM IS DETERMINED BY THE SYSTEM PATH LOSS, PHASE LINEARITY, AND POWER LINE HUM. A CRO ON THE NOISE METER OUTPUT WILL READILY DISTINGUISH THESE COMPONENTS.

10. Measure and record for Reference:

    a. The P-P subcarrier Modulator output voltage without the video signal.

b. The P-P composite video input voltage without the subcarrier signal.

c. The video gain control setting on the microwave transmitter.

E. HEAT:

1. When it is desired to physically install the subcarrier equipment within the microwave housing, it may be necessary to slightly readjust the diplexer Modulator frequency due to the higher heat normally encountered in the microwave transmitter than the receiver. The frequency may now be checked by referring to the Demodulator test point (J7) to ascertain that there is 0 VDC ±0.25 volts output. If not, 0 VDC on the Demodulator may be used as a frequency reference while touching up the Modulator frequency by adjustment of (L2) and the secondary adjustment of (T3) for 0 VDC at test point (J6) on the Modulator, while maintaining 0 VDC at test point (J7) on the Demodulator.

SECTION IV

OPERATING INSTRUCTIONS

A. GENERAL:

1. Apply power to the subcarrier Modulator and microwave transmitter at the transmission location. After a satisfactory warm-up period, complete standard set-up procedure and accomplish microwave antenna orientation.

   a. Microwave Transmitter Adjustments at the Transmission Location:

      (1) Set up the composite video signal P-P input voltage recorded in Section III, Paragraph D-10-b. Otherwise, set composite video at 1 V P-P.

      (2) Set the video gain control to the setting recorded in Section III, Paragraph D-10-c.

   b. Subcarrier Modulator Adjustments at the Transmission Location:

      (1) Check for a 0 VDC reading ±0.25 V at (J6). If necessary, adjust red frequency control knob on (L2).

   Note 10: The AFC stability and bandwidth characteristics of the subcarrier system are such that once the frequency is adjusted at operating temperature, it requires only occasional readjustment. CONTINUED READJUSTMENT WILL CAUSE EXCESSIVE WEAR ON (L2) NECESSITATING CONTINUOUS FUTURE ADJUSTMENTS.

      (2) Place a wide band oscilloscope (0-10 Mc/s) in test point (J8) and adjust RF GAIN control for the output voltage recorded in Section III, Paragraph D-10-a. Otherwise adjust RF GAIN control until the subcarrier signal is slightly short of filling in sync (amplitude, approximately 0.25 V P-P).

2. Apply power to the subcarrier Demodulator and microwave receiver at the reception location. After a satisfactory warm-up period, complete standard microwave set-up and antenna orientation procedure.

   a. Microwave Receiver Adjustment at the Reception Location:

      (1) Recheck tuning and ascertain that the AFC holds receiver tuning where audio noise is minimum.

   b. Subcarrier Demodulator Adjustments at the Reception Location:

      (1) Check for amber program indicator light indicating the presence of subcarrier signal.

(2) Set AF GAIN control to mid-position.

(3) At the transmission location apply a 1,000 cps tone at 0 dbm and adjust VU meter for 0 VU. (100% modulation.)

At the receiver location, readjust AF GAIN control for 0 VU (+14 dbm) across 600 ohm load.

(4) If reception location advises that noise is objectionable, vary the video gain control on the microwave transmitter and RF GAIN control on the subcarrier Modulator until best signal noise ratio is obtained.

SECTION V

MAINTENANCE - ALIGNMENT

A. SUBCARRIER MODULATOR: (1 Hour Warm-Up Period With Demodulator)

1. Frequency Alignment:

a. Set RF GAIN control for 0.5 V P-P output and terminate (J2) in 75 ohms.

Across (J2) attach an accurately calibrated 6.8 Mc/s frequency meter such as an (LM13), (BC221) or a crystal controlled frequency standard tied through a pair of (1N48) mixer-demodulator diodes fed to an oscilloscope.

b. On Modulator units incorporating inductively tuned discriminators, the following procedure should be used:

(1) Completely detune (T3) by screwing out the primary (top) and secondary (bottom) slugs. Adjust the red frequency control knob on (L2) for a zero beat.

(2) Insert the positive lead of a zero center VTVM into (J6). Start screwing in slowly on the primary slug (top) of (T3) until a maximum negative voltage is reached. At this point, change to the secondary (bottom) slug, noting that the meter deflection will gradually increase in the negative direction until a new maximum voltage is noticed with a fast reversal back in the positive direction. As the needle swings through 0 VDC, adjust meter for lowest DC range and center the secondary exactly for 0 VDC. It will be noticed that the frequency has drifted off slightly due to the loading effect of (T3). Make a slight adjustment of (L2) toward zero beat and retouch the secondary of (T3) toward zero beat. Continue balancing the frequency adjustment of (L2) and the secondary balance adjustment of (T3) until 0 VDC is right on the zero beat indicated by the frequency standard.

c. On Modulator units incorporating capacitively tuned discriminators, the following procedure must be followed:

(1) Remove the AFC bus by disconnecting (R17) from (R18). Adjust (L2) for zero beat with the frequency standard.

(2) Turn AF GAIN control (R3) to the minimum position and apply a 1 Kc/s modulating tone. Readjust AF GAIN for a 0 VU reading on Meter (M1). The input tone level will be much lower than normal due to lack of feedback.

(3) Insert the positive lead of a zero center VTVM and a CRO into test point (J6). Tune the primary capacitor for a maximum CRO indication. Adjust the secondary tuning capacitor for a maximum indication. Continue these adjustments for maximum output and as this point is reached, readjust the secondary tuning capacitor for 0 VDC with the VTVM on the lowest DC range. Remove modulation and reconnect AFC. Readjust (L2) and the secondary tuning capacitor for 0 VDC at zero beat with the frequency standard.

2. RF Rejection Alignment:

a. The adjustment of this filter affects the maximum amount of subcarrier output voltage, the distortion and audio response and the signal-to-noise ratio. Therefore, its alignment in the field is not recommended except for emergencies.

(1) Connect a 0-10 Mc/s video sweep generator to (J1) and connect an oscilloscope through a demodulator probe to a 75-ohm termination on (J2). Adjust RF GAIN (R25) for maximum output.

Detune (C1), (C2), (C3) and (C4). Adjust in sequence (C1) and (C2) for exact dip centering on the 6.8 Mc/s marker blip. Adjust (C3) for a dip on the low frequency side and adjust (C4) for a dip on the high frequency side. At maximum rejection the bandpass should be equally centered on 6.8 Mc/s. Readjust RF GAIN (R25) for output of 0.4 V P-P.

Turn the sweep generator off and apply a 1 Kc/s tone to the Modulator audio input (J3) at full modulation (0 VU). Place a wideband oscilloscope into test point (J8) and carefully adjust (L4) for minimum amplitude modulation. Carefully readjust (C4) for minimum amplitude modulation. Continue balancing (L4) against (C4) until the minimum amplitude modulation component is obtained. The adjustment of (L4) will cause a change in RF output level. Make certain that the RF level is held constant at approximately 0.4 V P-P as the adjustments of (L4) and (C4) are made. Occasionally it may be necessary to touch up (C3) to minimize the AM component. After all adjustments are accomplished, ascertain that there is available a 0.5 V P-P subcarrier output or better by adjusting RF GAIN (R25). Recheck the demodulated sweep pattern at (J2) ascertaining that the tuning procedure has not caused any severe detuning of the rejection notch. The notch may not look as good as the original adjustment but the important thing is to minimize the amplitude modulation component.

(L5) is now adjusted to approximately 7.16 Mc/s by using accurate external frequency standard or by feeding a color signal into (J1) and adjusting (L5) for minimum picture interference. Under normal conditions the adjustment of (L5) will have little effect. Its primary purpose is to trap out any residual second harmonic of the color sync subcarrier signal. Misadjustment of (L5) on the low frequency side of the rejection curve may cause a slight loss in high frequency resolution.

3. Measurements:

All voltage measurements indicated on the schematics are made at a line voltage of 115 VAC with the Tektronix 524 Oscilloscope and an RCA WV-87A VTVM.

4. Replacements:

Signal-to-noise as well as distortion is controlled principally by tubes (6U8-1) and (6CL6-2). Excessive hum noticed during signal-to-noise measurements can be corrected by replacement. Refer to noise measurements, Paragraph E of this section.

B. SUBCARRIER DEMODULATOR:

1. RF Rejection Alignment:

Connect the subcarrier Modulator with an output of 0.4 V P-P through a unity gain distribution amplifier to Demodulator input (J2) labelled PROG. If a distribution amplifier is not available, a 6 db, 75 ohm pad may be used. Place a wideband (0-10 Mc/s) oscilloscope across a 75 ohm termination in Demodulator (J1) labelled PIX. Detune (C1), (C2), (C3) and (C4). Adjust in sequence for maximum attenuation (C1), (C2), (C3) and (C4). The sweep generator is turned off during this adjustment.

Apply 100% modulation at 1 Kc to the Modulator and readjust (C4) for minimum amplitude modulation. It may be necessary to touch up (C3). (After final adjustments have been made, it would be well to sweep the Demodulator video filter to ascertain that all elements are tuned within a single notch area at 6.8 Mc/s.)

2. RF Alignment:

Remove tone from the Modulator and check that it is still in zero beat with the frequency standard with 0 VDC at the Modulator test point (J6). Proceed with peaking the Demodulator for maximum bias--(L1) at test point (J4), (L2) at test point (J5) and (L3) at test point (J6).

a. On Demodulator units incorporating inductively tuned discriminator (T2), the following procedure should be used:

(1) Completely detune the primary and secondary by screwing out the slugs. Place the positive lead of a zero center VTVM into test point (J7).

(2) Start screwing in slowly the primary slug (top) of (T2) until a maximum negative voltage is reached. At this point change to the secondary slug (bottom) noting that the meter deflection will gradually increase in the negative direction until a new maximum voltage is reached with a fast reversal back toward the positive direction. As the meter swings back to 0 VDC, adjust the VTVM for the lowest DC range and center the secondary exactly for 0 VDC.

b. On Demodulator units incorporating capacitively tuned discriminators, the following procedure must be followed:

(1) Adjust the Demodulator AF GAIN control to the minimum position (counter-clockwise). Connect an oscilloscope and a zero center VTVM to Demodulator test point (J7).

(2) Apply 100% modulation at 1 Kc to the Modulator.

(3) Adjust primary tuning capacitor (C29) for a maximum CRO indication. Adjust secondary tuning capacitor (C30) for a maximum CRO indication. Continue these adjustments for maximum output and as this point is reached, adjust secondary tuning capacitor (C30) for 0 VDC with the VTVM on the lowest DC range. Remove modulation and readjust (C30) for 0 VDC.

3. Squelch:

a. The squelch circuit may be made inoperative for audio tests, etc., by removing squelch tube (6UA6-8).

b. Squelch sensitivity can be increased or decreased by varying the resistance of (R40).

4. Measurements:

All voltage measurements indicated on the schematics are made at a line voltage of 115 VAC with an RCA WV-87A VTVM.

5. Replacements:

a. Signal-to-noise as well as distortion is controlled principally by tubes (12AU7-6) and (12AU7-7). Excessive distortion and/or hum may be reduced by replacing one of both of these tubes. Refer to noise measurements, Paragraph E of this section.

C. SUBCARRIER MODULATOR-DEMODULATOR DISTORTION ALIGNMENT:

1. Set up the Modulator and Demodulator in a closed circuit, with or without a distribution amplifier, by tying a coaxial line from Modulator (J2) to Demodulator (J2) terminating (J1) with 75 ohms.

2. Turn Demodulator AF GAIN to minimum position (counter-clockwise) and terminate (J3) in a 600 ohm resistor attached to a distortion analyzer.

3. Insert the 600 ohm output from a low distortion (0.1%) audio oscillator at 1 Kc into Modulator audio input (J3) and adjust Modulator AF GAIN for 100% modulation (0 VU). Adjust Demodulator AF GAIN for +14 dbm (0 VU).

4. On subcarrier units incorporating inductive tuning, primary tuning is accomplished by the top slug and secondary tuning by the bottom slug.

Note 11: After each adjustment of discriminator primary tuning to minimize distortion, remove the modulating tone and check both the Modulator discriminator output at test point (J6) and the Demodulator discriminator output at test point (J7) for 0 VDC. The Modulator must still be in zero beat with the frequency standard. These adjustments shift the secondary slightly out of balance and must be compensated by touching up secondary tuning. Under modulation, a small shift in balance is acceptable.

Accomplish distortion measurement at 1 Kc. Adjust first the Modulator discriminator primary and then the Demodulator discriminator primary for a further dip in distortion. Recheck secondary balance. Next, holding the same audio input level (Modulator VU meter response falls off too far to read) measure the distortion at 50 cps. Adjust balance pot (R25) for minimum 50 cps distortion. Holding the Demodulator output constant, make distortion measurements at all other desired frequencies up to 1 Kc. Above 1 Kc hold the Modulator VU meter to a 0 VU reading. In doing this it will be necessary to decrease the Modulator input due to pre-emphasis, at the same time increasing the gain of the distortion analyzer to compensate for Demodulator de-emphasis.

D. SUBCARRIER MODULATOR-DEMODULATOR FREQUENCY RESPONSE:

Due to the 75 micro-second pre-emphasis utilized, the audio response of the subcarrier system must be checked as follows:

1. Set up a 1 Kc tone to the Modulator at 100% modulation (0 VU). Adjust the Demodulator for an output of +14 dbm (0 VU). Calibrate the monitoring equipment and run response measurement from 50 cps to 1 Kc. Reduce the

audio input to the Modulator by 20 dbm and increase the gain of the monitoring equipment tied to the Demodulator by 20 dbm. Using 1 Kc as a reference, make response measurements up to 15 Kc.

Note 12: If the high frequency audio response does not hold within ±0.5 db, return to 1 Kc and make a slight adjustment of Modulator potentiometer (R2) in the direction of response. Readjust Modulator AF GAIN to maintain the same Demodulator output level. Repeat response measurement from 1 Kc to 15 Kc. All the adjustments of Modulator (R2) should be referenced at 1 Kc. Normal adjustment is for a +0.5 db rise at approximately 8 to 10 Kc. In doing this, many systems will have a response within 1 dbm at 15 Kc.

A reference frequency of 400 cps may be used, if desired, repeating the above procedure of adjusting audio response.

E. SUBCARRIER MODULATOR-DEMODULATOR NOISE MEASUREMENT:

Feed a 1 Kc note at 0 dbm into the Modulator and adjust the AF GAIN control for 100% modulation (0 VU). Adjust the Demodulator for +14 dbm output (0 VU). Disconnect the audio input from (J3) on the Modulator and measure residual noise. If excessive hum is noted, check for ground loops by reversing the polarity of the different power plugs, including test equipment. The noise should fall between -70 and -85 dbm. If not, adjust the hum balance control (R31) on the Modulator for best noise reading. This same procedure can be repeated on (6CL6-2). Occasionally the (6AL5) discriminator tubes or the (12AU7) Demodulator tubes can contribute hum to the system.

EQUIPMENT LOST OR DAMAGED IN TRANSIT

When delivering the equipment to you, the truck driver or carrier's agent will present a receipt for your signature. Do not sign it until you have (a) inspected the containers for visible signs of damage and (b) counted the containers and compared with the amount shown on the shipping papers. If a shortage or if evidence of damage is noted, insist that notation to that effect be made on the shipping papers before you sign them.

Further, after receiving the equipment, unpack it and inspect thoroughly for concealed damage. If concealed damage is discovered, immediately notify the carrier, confirming the notification in writing, and secure an inspection report. This item should be unpacked and inspected for damage WITHIN 15 DAYS after receipt.

Report all shortages and damages to RCA, Broadcast and Television Department, Camden 2, N. J.

Radio Corporation of America will file all claims for loss and damage on this equipment so long as the inspection report is obtained. Disposition of the damaged item will be furnished by RCA.

REPLACEMENT PARTS AND ENGINEERING SERVICE

RCA field engineering service is available at current rates. Requests for field engineering service may be addressed to your RCA Broadcast Field Representative or the RCA Service Company, Inc., Broadcast Service Division, Camden, N. J. Telephone: WOodlawn 3-8000.

When ordering replacement parts, please give symbol, description, and stock number of each item ordered.

The part which will be supplied against an order for a replacement item may not be an exact duplicate of the original part. However, it will be a satisfactory replacement differing only in minor mechanical or electrical characteristics. Such differences will in no way impair the operation of the equipment.

The following tabulations list service parts and electron tube ordering instructions according to your geographical location.

SERVICE PARTS

LOCATION	ORDER SERVICE PARTS FROM:
Continental United States, Alaska and Hawaii	Service Parts Order Service, Bldg. 60, 19th & Federal Sts., Camden 5, New Jersey or through your nearest RCA Regional Office. Emergency orders may be telephoned, telegraphed, or teletyped to RCA Emergency Service, Bldg. 60, Camden, N. J. (Telephone: WO 3-8000).
Dominion of Canada	RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office.
Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada	RCA International Division, Clark, N. J., U.S.A. or through your local Sales Representative.

ELECTRON TUBES

LOCATION	ORDER ELECTRON TUBES FROM:
Continental United States, Alaska and Hawaii	Local RCA Tube Distributor.
Dominion of Canada	RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec or through your local Sales Representative or his office.
Outside of Continental United States, Alaska, Hawaii and the Dominion of Canada	Local RCA Tube Distributor or from: Tube Department RCA International Division 30 Rockefeller Plaza New York 20, New York, U.S.A.

RETURN OF ELECTRON TUBES

If for any reason, it is desired to return tubes, please return them through your local RCA tube distributor, RCA Victor Co. Ltd., or RCA International Div., depending on your location.

PLEASE DO NOT RETURN TUBES DIRECTLY TO RCA WITHOUT AUTHORIZATION AND SHIPPING INSTRUCTIONS.

It is important that complete information regarding each tube (including type, serial number, hours of service and reason for its return) be given.

When tubes are returned, they should be shipped to the address specified on the Return Authorization form. A copy of the Return Authorization and also a Service Report for each tube should be packed with the tubes.

LIST OF RCA REGIONAL OFFICES

Atlanta 3, Georgia
1121 Rhodes-Haverty Bldg.
134 Peachtree St. N.W.
JAckson 4-7703

Boston 16, Mass.
Room 2301, John Hancock Bldg.
200 Berkley St.
HUbbard 2-1700

Chicago 54, Ill.
1186 Merchandise Mart Plaza
DElaware 7-0700

Cleveland 15, Ohio
1600 Keith Bldg.
CHerry 1-3450

Dallas 35, Texas
7901 Freeway #183
FLeetwood 2-3911

Hollywood 28, Calif.
RCA Bldg., 1560 N. Vine St.
HOllywood 9-2154

Kansas City 6, Missouri
340 Dierks Bldg.
HArrison 1-6480

New York 20, New York
36 W. 49th St.
JUdson 6-3800

Branch—San Francisco 2, Calif.
420 Taylor St.
ORdway 3-8027

TABLE OF REPLACEMENT PARTS

SOUND MODULATOR

MI-26443-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
C1 to C4	Capacitor: variable, ceramic, 8-50 mmf, 350 v, N750 temp. coeff.	56232
C5	Capacitor: metallized paper, 1.0 mf, ±20%, 200 v.	56694
C6	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type.	205656
C7	Capacitor: metallized paper, 1.0 mf, ±20%, 200 v. Same as C5.	56694
C8	Capacitor: electrolytic, 100 mf, 15 v.	79784
C9	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C6.	205656
C10	Capacitor: fixed, ceramic, 100 mmf, ±20%, 500 v, Hi-k type.	210169
C11	Capacitor: fixed, ceramic, 10 mmf, ±20%, 500 v, Hi-k type.	205657
C12	Capacitor: fixed, ceramic, 100 mmf, ±20%, 500 v, Hi-k type. Same as C10.	210169
C13	Capacitor: metallized paper, 0.25 mf, ±20%, 200 v.	56693
C14	Capacitor: fixed, ceramic, 47 mmf, ±20%, Hi-k type.	205659
C15	Capacitor: metallized paper, 0.25 mf, ±20%, 200 v. Same as C13.	56693
C16	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C6.	205656
C17	Capacitor: fixed, ceramic, 47 mmf, ±20%, Hi-k type. Same as C14.	205659

TABLE OF REPLACEMENT PARTS

SOUND MODULATOR

MI-26443-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
C18	Capacitor: fixed, ceramic, 15 mmf, +10% -35%, 500 v, GP2 type.	216754
C19	Capacitor: fixed, ceramic, 100 mmf, ±20%, 500 v, Hi-k type. Same as C10.	210169
C20	Capacitor: fixed, ceramic, 100 mmf, ±5%, 500 v, NPO temp. coeff.	212453
C21	Capacitor: fixed, ceramic, 10 mmf, ±20%, 500 v, Hi-k type. Same as C11.	205657
C22	Capacitor: electrolytic, 40/40 mf, ±20%, 450 v; 40 mf, ±20%, 150 v.	212454
C23	Capacitor: fixed, ceramic, 100 mmf, ±5%, 500 v, NPO temp. coeff. Same as C20.	212453
C24, C25	Capacitor: fixed, ceramic, 30 mmf, ±1.5 mmf, 500 v, NPO temp. coeff.	212455
C26, C27	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C6.	205656
C28	Capacitor: fixed, electrolytic, 3 mf, 6v.	216751
F1	Fuse: 1 amp, 125 v, slow-blow type, cartridge.	205121
I1	Lamp: pilot light, neon type, red.	210265
J1, J2	Connector: female, coaxial, panel mounting.	212456
J3	Connector: male, 3 contact, chassis mounting.	210266
J4 to J8	Connector: test point, tip jack, white.	205119
J9	Connector: male, 3 contact, chassis mounting.	210267
L1	Inductor: toroidal, 150 millihenries.	212457
L2	Coil: oscillator.	212458

TABLE OF REPLACEMENT PARTS

SOUND MODULATOR

MI-26443-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
L3	Coil: peaking, adjustable.	212459
L4	Coil: peaking, adjustable.	212460
L5	Coil: peaking, adjustable. Same as L3.	212459
M1	Meter: volume unit measuring.	210264
R1	Resistor: fixed, composition, 33,000 ohms, ±10%, ½ w.	502333
R2	Resistor: variable, composition, 0-5,000 ohms, ±10%, 1/8 w.	214818
R3	Resistor: variable, composition, 500,000 ohms, ¼ w.	94993
R4	Resistor: fixed, composition, 470 ohms, ±10%, ½ w.	502147
R5	Resistor: fixed, composition, 33,000 ohms, ±10%, ½ w. Same as R1.	502333
R6	Resistor: fixed, composition, 5,600 ohms, ±10%, ½ w.	502256
R7	Resistor: fixed, composition, 1,100 ohms, ±5%, ½ w.	502211
R8	Resistor: fixed, composition, 2,200 ohms, ±10%, ½ w.	502222
R9	Resistor: fixed, composition, 33,000 ohms, ±10%, ½ w. Same as R1.	502333
R10	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w.	502410
R11	Resistor: fixed, composition, 5,600 ohms, ±10%, ½ w. Same as R6.	502256

TABLE OF REPLACEMENT PARTS

SOUND MODULATOR

MI-26443-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
R12, R13	Resistor: fixed, composition, 390 ohms, ±10%, ½ w.	502139
R14	Resistor: fixed, composition, 2,200 ohms, ±10%, ½ w. Same as R8.	502222
R15, R16	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R10.	502410
R17	Resistor: fixed, composition, 5,600 ohms, ±10%, ½ w. Same as R6.	502256
R18, R19	Resistor: fixed, carbon film, 20,000 ohms, ±1%, ½ w.	59177
R20	Resistor: fixed, composition, 56,000 ohms, ±10%, ½ w.	502356
R21	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R10.	502410
R22	Resistor: fixed, composition, 56,000 ohms, ±10%, ½ w. Same as R20.	502356
R23	Resistor: variable, composition, 0-5,000 ohms, ±10%, 1/8 w. Same as R2.	214818
R24	Resistor: fixed, composition, 2,200 ohms, ±10%, ½ w. Same as R8.	502222
R25	Resistor: variable, composition, 25,000 ohms, ¼ w.	216750
R26, R27	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R10.	502410
R28, R29	Resistor: fixed, composition, 2,200 ohms, ±10%, ½ w. Same as R8.	502222
R30	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R10.	502410

TABLE OF REPLACEMENT PARTS

SOUND MODULATOR

MI-26443-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
R31	Resistor: adjustable, wire wound, 50 ohms, 2 w.	205654
R32	Resistor: fixed, wire wound, 2,250 ohms, ±10%, 20 w.	212463
R33	Resistor: fixed, composition, 100 ohms, ±10%, 2 w.	522110
R34	Resistor: fixed, composition, 100,000 ohms, ±10%, 1 w.	512410
R35	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R10.	502410
S1	Switch: toggle, S.P.S.T., bat handle.	97715
T1	Transformer: RF, filter.	212464
T2	Transformer: AF, input.	205662
T3	Transformer: discriminator.	214811
T4	Transformer: power.	210262
	Connector: male, coaxial, cable mounting.	211551
	Connector: female, 3 contact, cable mounting.	210467
	Connector: female, 3 contact, cable mounting, spin type, locking.	210646
	Holder: fuse.	205914
	Hood: connector, 0.520" high X 0.5" O.D. with cable clamp, aluminum.	210562
	Socket: tube, 9 contact miniature for V1 to V4.	212469
	Socket: tube, 7 contact miniature, for V5, V6, V8.	212468
	Socket: tube, octal for V7.	68590

TABLE OF REPLACEMENT PARTS

SOUND DEMODULATOR

MI-26444-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
C1 to C4	Capacitor: variable, ceramic, 8-50 mmf, 350 v, N750 temp. coeff.	56232
C5	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type.	205656
C6	Capacitor: fixed, ceramic, 100 mmf, ±5%, 500 v, NPO temp. coeff.	212453
C7	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C5.	205656
C8	Capacitor: fixed, ceramic, 100 mmf, ±5%, 500 v, NPO temp. coeff. Same as C6.	212453
C9	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C5.	205656
C10	Capacitor: fixed, ceramic, 100 mmf, ±5%, 500 v, NPO temp. coeff. Same as C6.	212453
C11	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C5.	205656
C12	Capacitor: fixed, ceramic, 30 mmf, ±1.5 mmf, 500 v, NPO temp. coeff.	212455
C13	Capacitor: fixed, ceramic, 100 mmf, ±5%, 500 v, NPO temp. coeff. Same as C6.	212453
C14	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C5.	205656
C15	Capacitor: fixed, ceramic, 100 mmf, ±5%, 500 v, NPO temp. coeff. Same as C6.	212453
C16	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C5.	205656
C17	Capacitor: fixed, ceramic, 220 mmf, ±20%, 500 v, Hi-k type.	205661

TABLE OF REPLACEMENT PARTS

SOUND DEMODULATOR

MI-26444-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
C18	Capacitor: fixed, ceramic, .001 mf, ±10%, 500 v, Hi-k 1200HA type.	102234
C19, C20	Capacitor: metallized paper, 0.25 mf, ±20%, 200 v.	56693
C21	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C5.	205656
C22, C23	Capacitor: metallized paper, 0.25 mf, ±20%, 200 v. Same as C19.	56693
C24	Capacitor: electrolytic 20/20/40 mf, ±20%, 150 v.	205684
C25	Capacitor: electrolytic, 40/40 mf, 450 v.	58567
C26 to C28	Capacitor: fixed, ceramic, 0.01 mf, +80% -20%, 500 v, Hi-k type. Same as C5.	205656
C29, C30	Capacitor: Variable, ceramic, 5-25 mmf, 350 v, NPO temp. coeff.	214819
C31	Capacitor: fixed, silver mica, .0036 mf, ±5%, 300 v.	216748
CR1, CR2	Rectifier: crystal diode, 1N34A	59395
F1	Fuse: 1.0 amp, 125 v, slow-blow type, cartridge.	205121
I1	Lamp: pilot light, neon type, amber.	210273
I2	Lamp: pilot light, neon type, red.	210265
J1, J2	Connector: female, coaxial, panel mounting.	212456
J3	Connector: female, 3 contact, chassis mounting	210268
J4 to J7	Connector: test point, tip jack, white.	205119.

TABLE OF REPLACEMENT PARTS

SOUND DEMODULATOR

MI-26444-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
J8	Connector: male, 3 contact, chassis mounting.	210267
L1 to L3	Coil: peaking, adjustable.	212460
L4	Coil: peaking, fixed, 20 microhenries, ±5%.	216747
M1	Meter: volume unit measuring.	210264
R1	Resistor: fixed, composition, 10,000 ohms, ±10%, ½ w.	502310
R2	Resistor: fixed, composition, 390 ohms, ±10%, ½ w.	502139
R3	Resistor: fixed, composition, 2,200 ohms, ±10%, ½ w.	502222
R4	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w.	502410
R5	Resistor: fixed, composition, 10,000 ohms, ±10%, ½ w. Same as R1.	502310
R6	Resistor: fixed, composition, 390 ohms, ±10%, ½ w. Same as R2.	502139
R7	Resistor: fixed, composition, 2,200 ohms, ±10%, ½ w. Same as R3.	502222
R8	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R4.	502410
R9	Resistor: fixed, composition, 10,000 ohms, ±10%, ½ w. Same as R1.	502310
R10	Resistor: fixed, composition, 2,200 ohms, ±10%, 1 w.	512222
R11	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R4.	502410

TABLE OF REPLACEMENT PARTS

SOUND DEMODULATOR

MI-26444-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
R12	Resistor: fixed, composition, 10,000 ohms, ±10%, ½ w. Same as R1.	502310
R13	Resistor: fixed, composition, 56,000 ohms, ±10%, 1 w.	512356
R14, R15	Resistor: fixed, composition, 10,000 ohms, ±10%, ½ w. Same as R1.	502310
R16	Resistor: variable, composition, 500,000 ohms, ¼ w.	94993
R17, R18	Resistor: fixed, carbon film, 100,000 ohms, ±1%, ½ w.	72893
R19	Resistor: fixed, composition, 75,000 ohms, ±5%, ½ w.	502375
R20	Resistor: fixed, composition, 10,000 ohms, ±10%, ½ w. Same as R1.	502310
R21	Resistor: fixed, composition, 2,200 ohms, ±10%, ½ w. Same as R3.	502222
R22, R23	Resistor: fixed, carbon film, 10,000 ohms, ±1%, ½ w.	55665
R24	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R4.	502410
R25	Resistor: variable, composition, 500 ohms, ¼ w.	212913
R26	Resistor: fixed, composition, 270 ohms, ±10%, ½ w.	502127
R27, R28	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R4.	502410
R29 to R31	Resistor: fixed, composition, 1,000 ohms, ±10%, ½ w.	502210

TABLE OF REPLACEMENT PARTS

SOUND DEMODULATOR.

MI-26444-A

SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
R32, R33	Resistor: fixed, composition, 100,000 ohms, ±10%, ½ w. Same as R4.	502410
R34	Resistor: fixed, composition, 100,000 ohms, ±10%, 1 w.	512410
R35	Resistor: fixed, composition, 220 ohms, ±10%, 2 w.	522122
R36	Resistor: fixed, wire wound, 2,500 ohms, ±10%, 20 w.	212907
R37, R38	Resistor: fixed, composition, 10,000 ohms, ±5%, ½ w. Same as R1.	502310
R39	Resistor: fixed, composition, 150 ohms, ±10%, ½ w.	502115
R40	Resistor: fixed, composition, 75,000 ohms, ±5%, ½ w. Same as R19.	502375
R41	Resistor: fixed, composition, 10 ohms, ±5%, ½ w.	502010
R42, R43	Resistor: fixed, composition, 75 ohms, ±5%, ½ w.	502075
R44	Resistor: fixed, composition, 560 ohms, ±5%, ½ w.	502156
RY1	Relay: coil, 9500 ohms, D.P.D.T.	205687
S1	Switch: toggle, S.P.S.T., bat handle.	97715
T1	Transformer: RF, filter.	212464
T2	Transformer: discriminator.	214812
T3	Transformer: AF, output.	213842
T4	Transformer: power.	210262

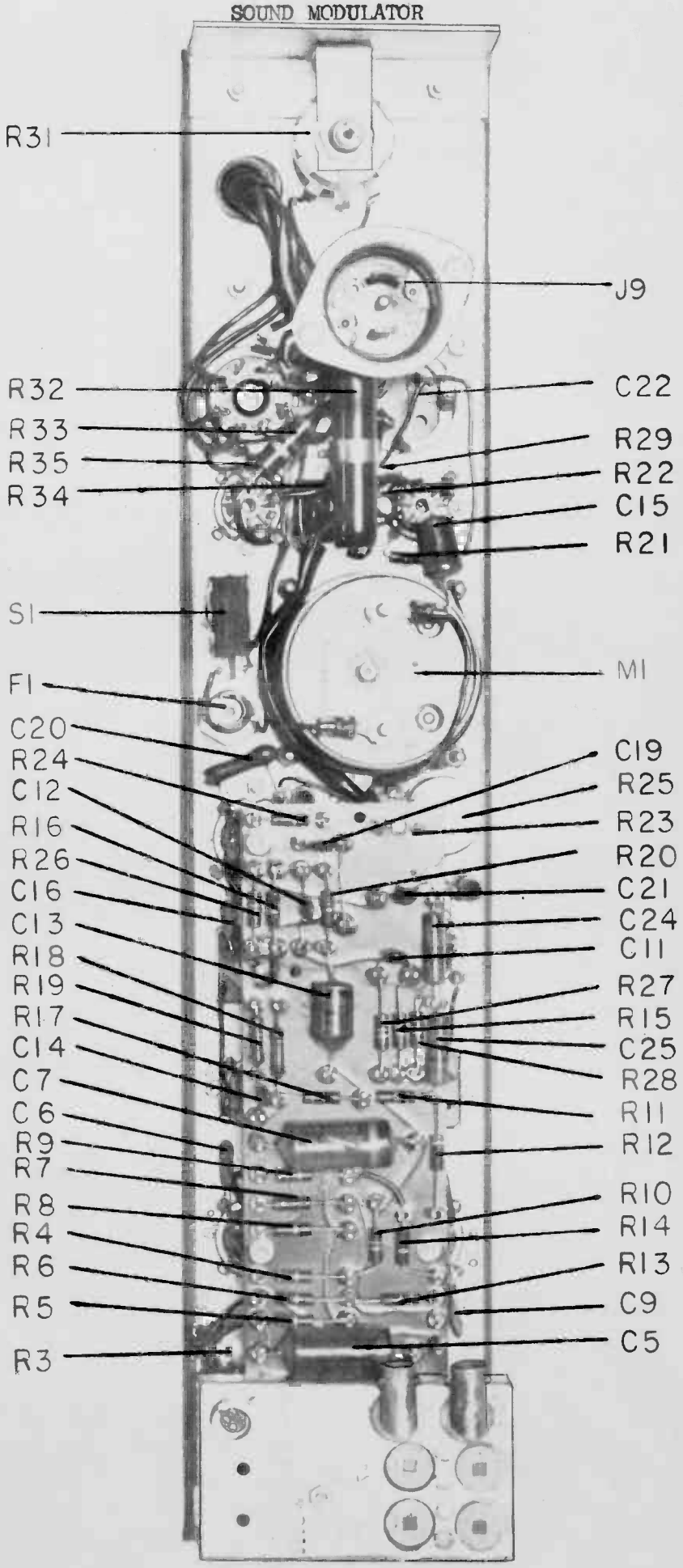
TABLE OF REPLACEMENT PARTS

SOUND DEMODULATOR

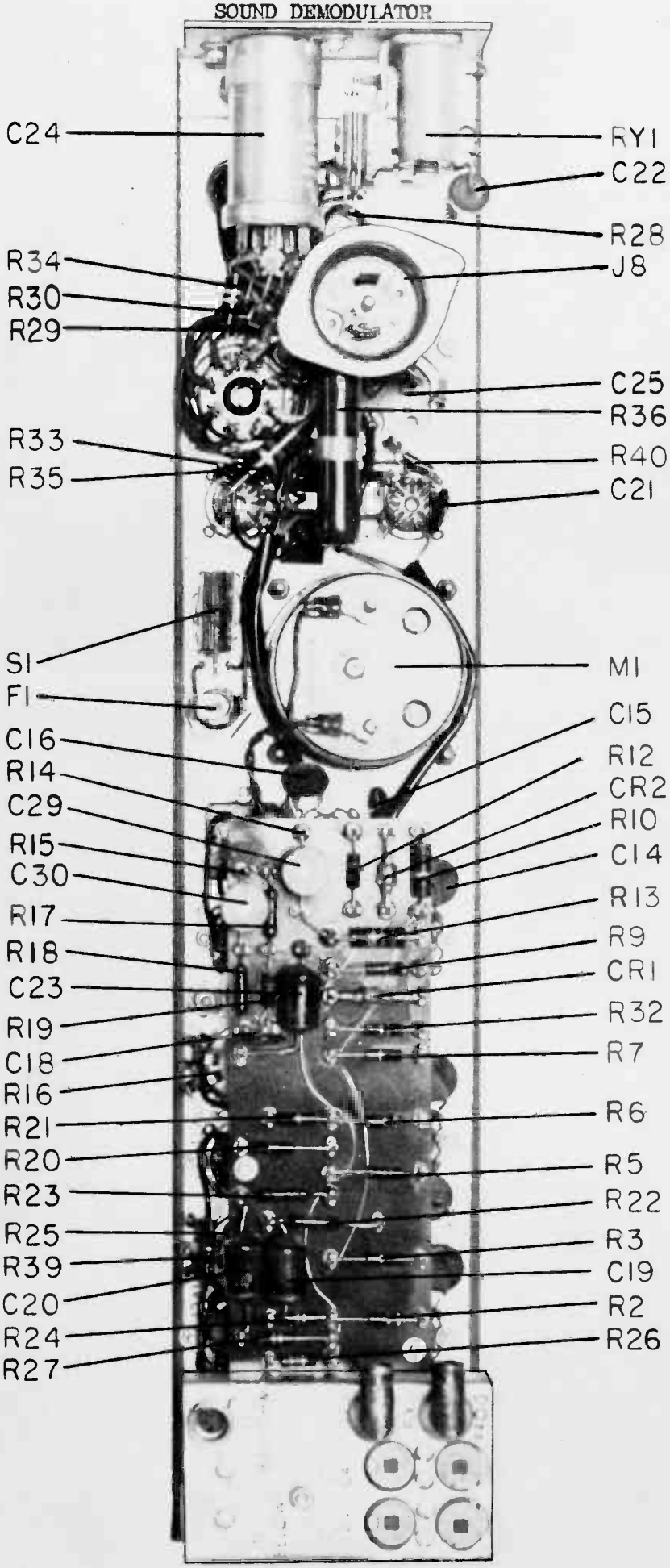
MI-26444-A

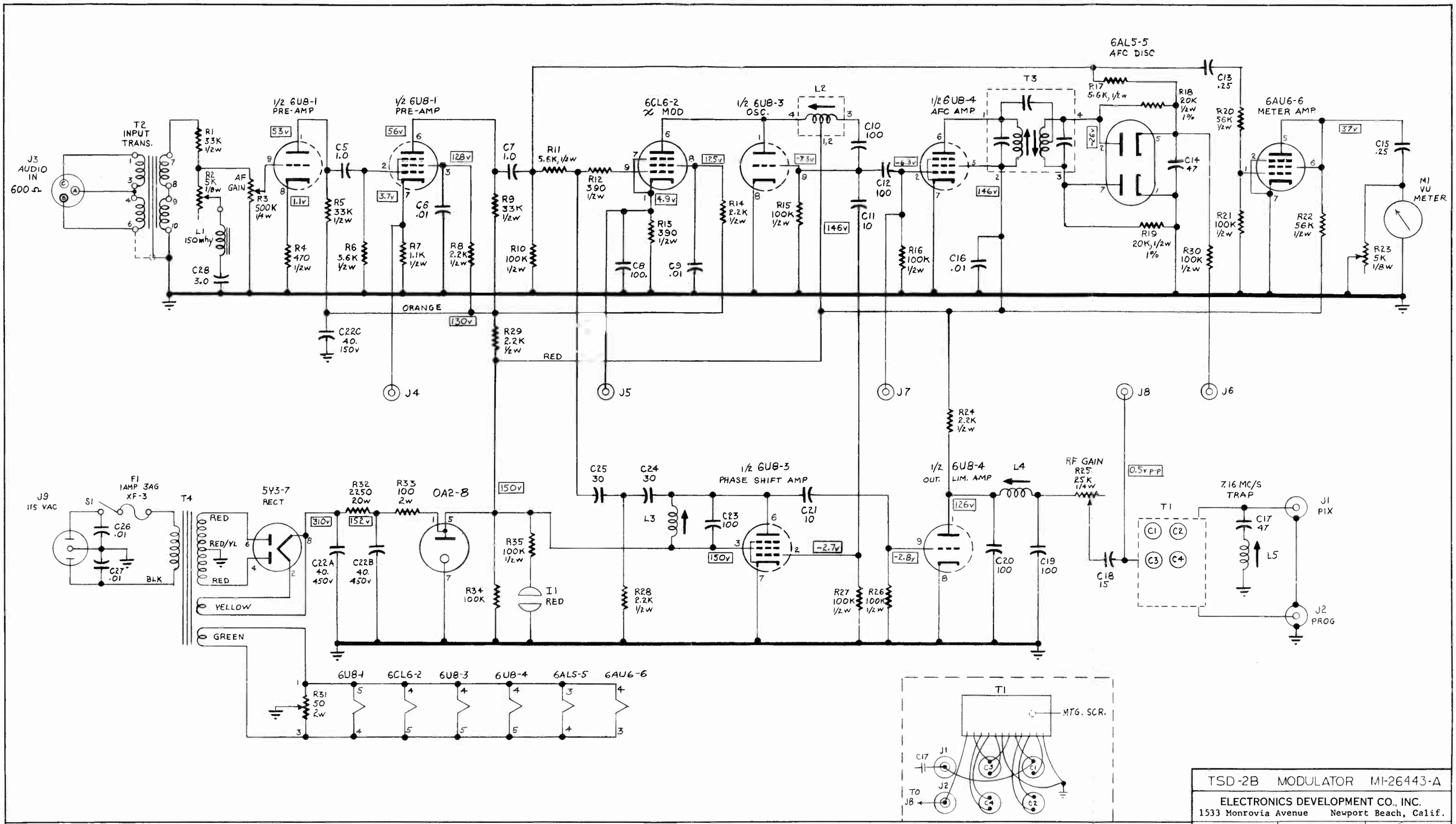
SYMBOL NO.	DESCRIPTION	RCA STOCK NO.
	Connector: male, 3 contact, cable mounting, spin type, locking.	210647
	Connector: male, coaxial, cable mounting.	211551
	Connector: female, 3 contact, cable mounting.	210467
	Holder: fuse.	205914
	Hood: connector 0.520" high X 0.5" O.D., with cable clamp, aluminum.	210562
	Socket: Tube, 7 contact miniature for V1 to V5, V8, V10.	212468
	Socket: tube, 9 contact miniature for V6, V7.	212469
	Socket: tube, octal for V9.	68590

SOUND MODULATOR

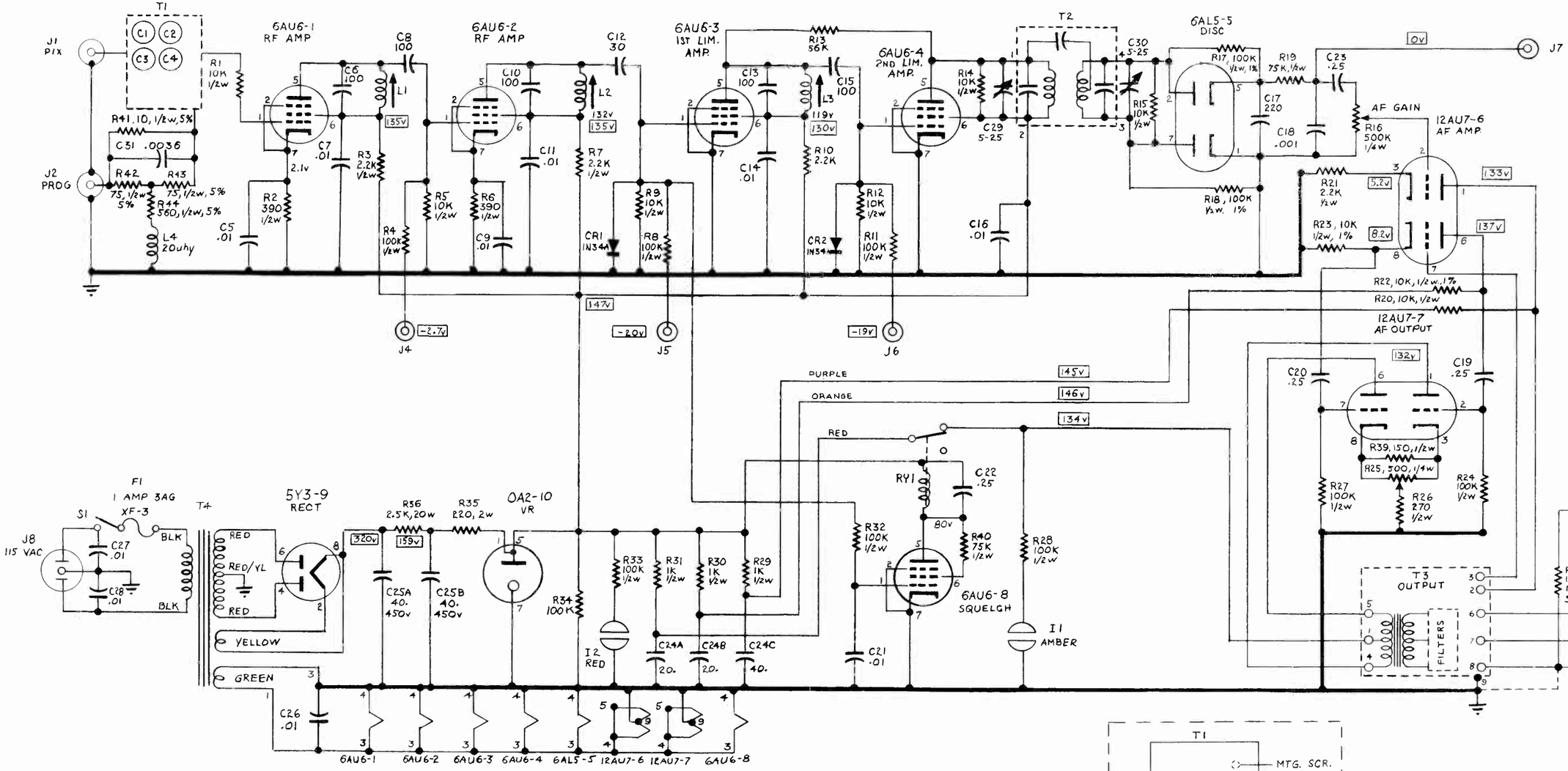


SOUND DEMODULATOR





TSD-2B MODULATOR MI-26443-A	
ELECTRONICS DEVELOPMENT CO., INC. 1533 Monrovia Avenue Newport Beach, Calif.	
DATE 30 Dec 1957	DRAWN BM/SCM APP: Lamb
SCALE :	CAP : MMFD UNLESS NOTED BY DECIMAL
TOL :	RES : 1 WATT UNLESS NOTED
MAT'L :	IND : MICROHENRIES UNLESS NOTED
FIN :	K : 1000 M: 1000000
6.8 Mc/s C28, R33	
PROJECT 100F	DRAWING 100F-Tx-021



TSD-2B DEMODULATOR MI-26444-A	
ELECTRONICS DEVELOPMENT CO., INC. 1533 Monrovia Avenue Newport Beach, Calif.	
DATE DEC. 30, 1957	DRAWN BAISCH APP: Leaming
SCALE :	CAP : MMFD UNLESS NOTED BY DECIMAL
TOL :	RES : 1 WATT UNLESS NOTED
MAT'L :	IND : MICROHENRIES UNLESS NOTED
FIN :	K : 1000 M: 1000000
6.8 Mc/s R49, C31	
PROJECT 100F	DRAWING 100F-Rx-022

SECTION VIII

ADDENDA

TSD-2B, SERIAL 1301 and above.
TSD-3A, SERIAL 1021 and above.

1. Modulator:

   a. Delete: T3, RCA Stock #214811.
   R18, RCA Stock #59177.
   R19, RCA Stock #59177.
   C14, RCA Stock #205659.
   6AL5-5 and all references thereto.

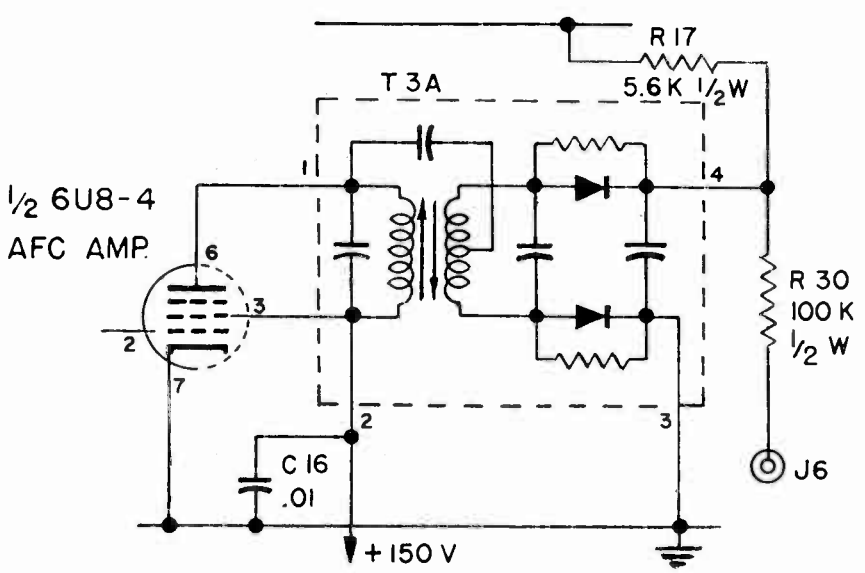
   b. Add: T3A, Transformer, Discriminator, with Integral Diodes, RCA Stock #218559

   c. Change:

      (1) All references to 6AU6-6 to 6AU6-5; 5Y3-7 to 5Y3-6; and OA2-8 to OA2-7.

      (2) Section V, Paragraph A.1.b (1) is changed to read: Temporarily ground the junction of (R17) and (F30). R-30 Completely detune (T3A) by screwing out the primary (top) and secondary (bottom) slugs. Adjust the red frequency control knob on (L2) for a zero beat. Remove ground jumper from junction of (R17) and (R30).

      (3) Modulator Schematic Revision:



IB-EDC100-5-1

SECTION VIII

ADDENDA

B. TSD-2B, SERIAL 1301 and above.

TDS-3A, SERIAL 1021 and above.

1. Demodulator:

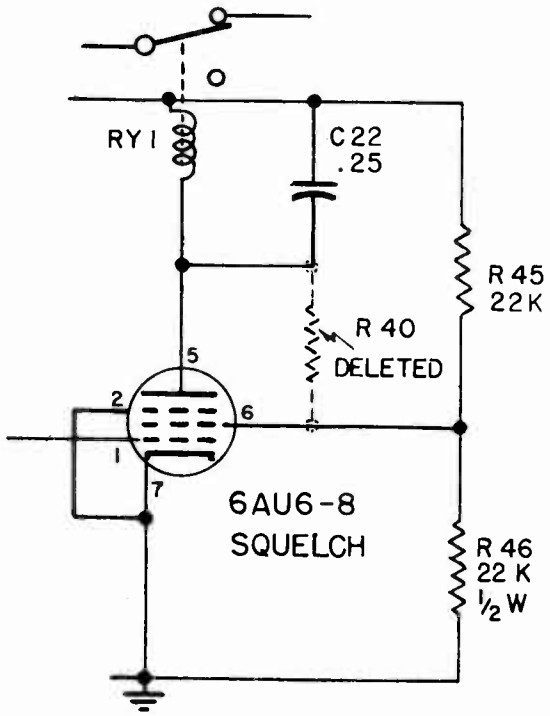
a. Delete: R40, Resistor: fixed, composition, 75,000 ohms, ± 5%, ½W, RCA Stock # 502375

b. Add: R45, Resistor: fixed, composition, 22,000 ohms, ± 10%, 1 W, RCA Stock # 512322.

c. Change:

(1) Section V, Paragraph B.3.b. to read: Squelch sensitivity can be increased or decreased by varying the values of (R45) and (R46).

(2) Demodulator Schematic Revision:



ADDENDA

for

TSD-2B Sound Diplexing Equipment (6.8 mc)
MI-26443-C Modulator
MI-26444-C Demodulator

TSD-3A Sound Diplexing Equipment (6.2 mc)
MI-26493-B Modulator
MI-26494-B Demodulator

TSD-4B Sound Diplexing Equipment (7.5 mc)
MI-43443 Modulator
MI-43444 Demodulator

TSD-5B Sound Diplexing Equipment (8.3 mc)
MI-43493 Modulator
MI-43494 Demodulator

These units are covered in full by IB-EDC100-5-1 with Addenda page containing section VIII A & B plus this addenda. Use this addenda to:

1. Supplement tables of replacement parts, pg. 23 thru 33. Where this addenda and the basic book disagree, the addenda is correct.

2. Replace photographs following pg. 33 by the photographs in this addenda.

3. Replace schematics 100F-TX-021 and 100F-Rx-022 by the schematics in this addenda, Modulator 2286 and Demodulator 2285.

4. Note additions to and changes in basic IB text shown on the addenda pages.

ADDITIONS AND CHANGES TO TEXT

1. Page 1

   a. Change power requirements to read 117/234 VAC, 50/60 cps, 56 watts.

   b. Modulator and Demodulator tube compliments should no longer include 5Y3. This tube, with accompanying changes, has been superseded by crystal diode IN2389.

2. Page 2

   Under Accessory Equipment add:

TSD-4B	Sound Diplexing Equipment 7.5 mc
TSD-5B	Sound Diplexing Equipment 8.3 mc

3. Add the following under Description, Section II

   Note A

   Dual primary AC power transformers are used on both Modulator and Demodulator, allowing use with either 117 VAC or 234 VAC, 50 or 60 cps primary power. Units are shipped connected for 117 VAC operation. This supplement contains instructions and drawings to facilitate field change for 234 VAC operation.

   Note B

   Provision is made for operation in a 525 line or 625 line system. This has been accomplished by providing a factory tuned trimmer capacitor mounted on the Demodulator Audio Frequency Output Transformer/15,750 cps Filter Assembly, designated (T3A), which, when "jumpered" into the circuit, retunes (T3A)'s filter to reject any 15,625 cps (625 line system H. sync rate) components that may appear in the audio circuits. Although this tuning adjustment is pre-set at the factory and will normally not require retuning at time of installation, the tuning procedure is provided.

4. Page 8

   In subparagraph (3), change that portion which reads "The output of the pre-amplifier section feeds a special bandpassed rejection filter, located in (T3), with a frequency centered at 15,750 cps, to attenuate any remaining horizontal sync frequency components." To read: "The output of the pre-**amplifier section feeds a special band rejection filter, located in (T3A), with a frequency centered at 15,750 cps (or at 15,625 cps by soldering a pre-tuned capacitor located at the base of (T3A) in shunt with the 15,750 cps tuning capacitor), to attenuate any remaining horizontal sync frequency components."** Also change subparagraph 4, following above referenced

paragraph, to read: "(T3A) incorporates a low pass filter to attenuate any remaining equalizing frequency components at 31,500 cps (or 31,250 cps if used in a 625 line system). The output of (T3A) audio transformer feeds 600 ohm output (J3). A VU Meter with 0 VU equal +14 dbm monitors the output audio level.

5. Page 11 Add the following under INSTALLATION

4. Modulator & Demodulator

Instructions for reconnecting power transformer primaries for operation from 234 VAC, 50/60 cps power source.

All systems are shipped connected for operation from a 117 VAC, 50/60 cps power source. Provision is made for rapid field change to 234 VAC use. See Drawings #2287 and schematics (at rear of this supplement) for step-by-step conversion data.

6. Add the following under Maintenance-Alignment, Section V

F. AUDIO REJECTION FILTER ADJUSTMENT (15,750 or 15,625 cps)

As mentioned under Circuit Description (Section II, D, 2. Demodulator Theory), (T3A) contains a rejection filter to eliminate any remaining unwanted horizontal sync frequency components. This filter is factory tuned to 15,750 cps, and an additional capacitor (also pretuned) is provided to reduce the rejection filter resonance to 15,625 cps for use in a 625 line system. These capacitors are mounted at the base of (T3A) and are accessible from the bottom rear of the Demodulator chassis, see Dwg. #1237, this supplement.

Field alignment of the rejection filter in (T3A) may be accomplished as follows: With Modulator and Demodulator connected back-to-back as described in SECTION III, INSTALLATION AND SYSTEM ALIGNMENT, apply a 15,750 (15,625 cps used in 625 line system) cycle sine wave signal to Modulator "Audio In" (J3) at such a level as to cause a -2 dbm indication on the Modulator VU meter. Due to pre-emphasis, the required level will be approximately 20 db below the 1 Kc level required to attain 0 dbm as indicated by the Modulator VU Meter. This -2 dbm level is critical and should be maintained throughout the alignment. Also, care should be taken to insure that the sinusoidal tone source is within ±1 cps of 15,750 cps (15,625 cps) as the filter is quite sharp. This may be done by phase locking the audio oscillator to station H. Sync rate, or by using a scope to observe the variable frequency oscillator frequency with respect to the 15,750 (15,625) cps output of the station's synchronization standard.

Place a high gain amplifier (a distortion analyzer in the noise measuring mode is suggested) across the terminated Demodulator audio output (J3). Some means for indicating the output level of the high gain external audio amplifier should be provided -- an ACVTVM and/or an oscilloscope. The use of an oscilloscope is helpful, as when the rejection filter is properly aligned, the 15,750 cps (15,625 cps) component will fall well below the hum and shot noise level and would thus not be indicated by the AC VTVM due to "masking." Alternately adjust the capacitor located at the bottom of (T3A) and the potentiometer located at the front of (T3A) for maximum rejection of the 15,750 (15,625) cps signal, as indicated by the VTVM or oscilloscope, increasing their sensitivity as required. See drawing #1237, attached, for location of these adjustments. Repeat these adjustments until no further decrease in signal can be effected. At this point, the 15,750 (15,625) cps component should be at least 65 db below the demodulator reference level (14 dbm). The 15,625 adjustment procedure is the same, except that a second capacitor (provided) must be connected, per Drawing #1237.

7. Page 24

Add to the description of J3: Stock #210646 mates with this connector.

8. Page 27

Add to the description of #210646: mates with J3.

9. Page 29

Add to the description of J3: Stock #210647 mates with this connector.

10. Page 33

Add to the description of the first item: mates with J3.

11. Page 11

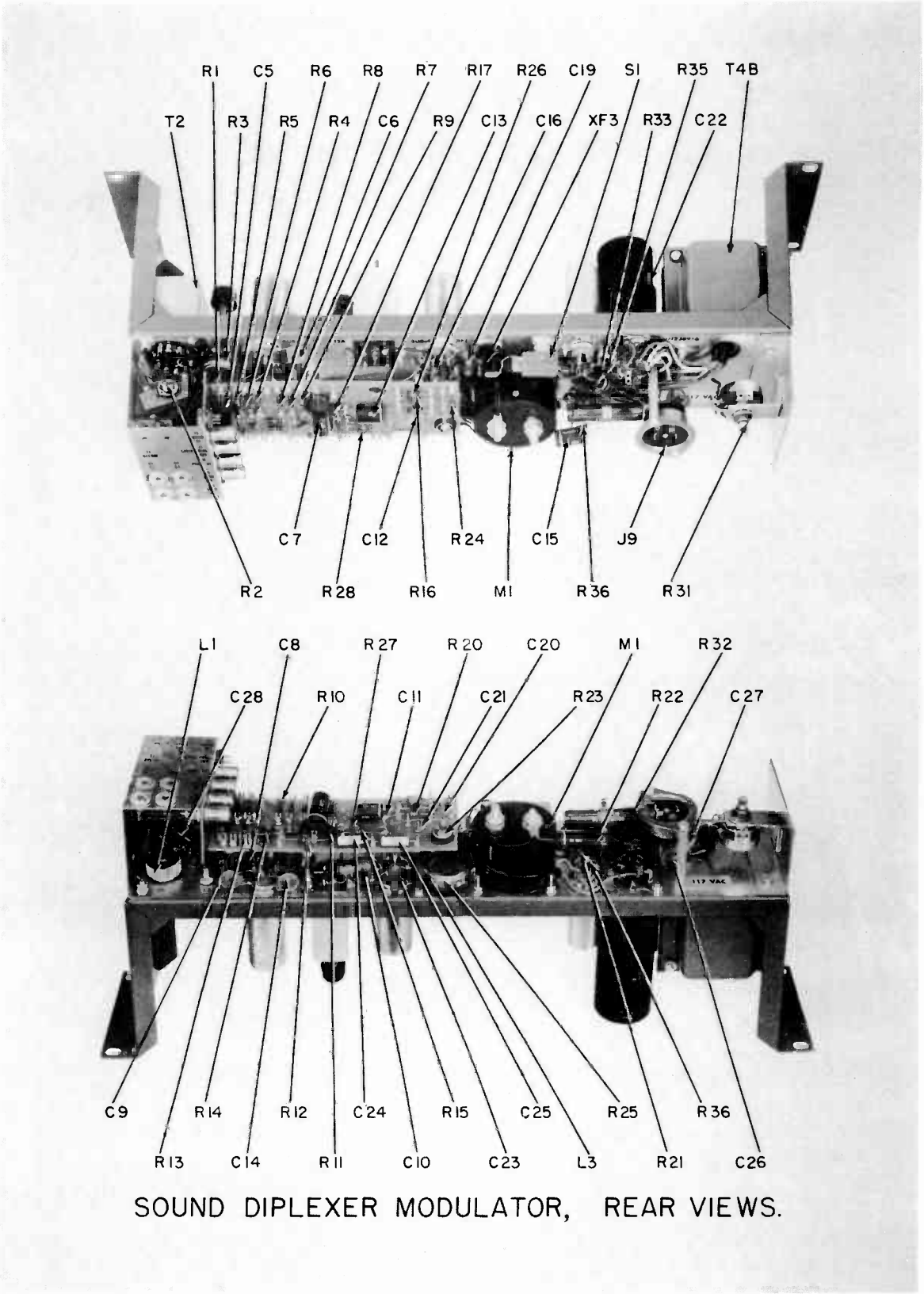
Add the following under INSTALLATION

5. Where two or more sound channels are to be used on a microwave system, the preferred method of interconnection is that shown on the DUAL CHANNEL diagrams in this addenda. (The interconnection of stop filters which this requires, makes necessary careful adjustment of C1-C4. Refer to RF Rejection Information page 18 and 19.)

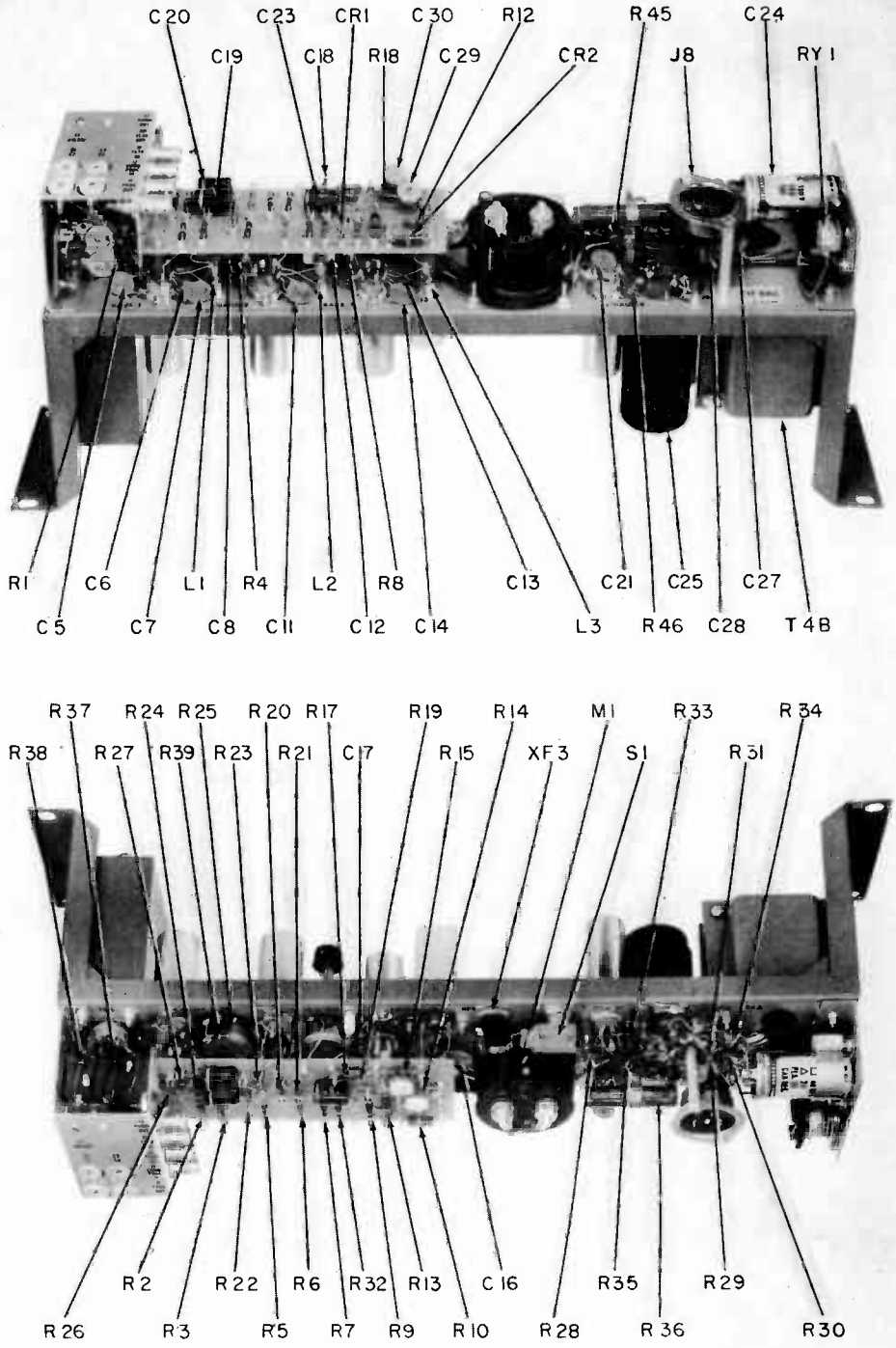
   Where only one sound channel is used, connections are made direct to the lower units shown in Dual Channel diagrams.

SOUND DIPLEXER MODULATOR, FRONT VIEW.

SOUND DIPLEXER DEMODULATOR, FRONT VIEW.



SOUND DIPLEXER MODULATOR, REAR VIEWS.



SOUND DIPLEXER DEMODULATOR, REAR VIEWS.

PARTS LIST SUPPLEMENT

M1-26443-C, M1-26493-B, M-43443, M1-43493

Modulator

Circuit Symbol	Description	RCA Stock No.
C17	Not Used	---
C19	Capacitor, fixed ceramic, NPO, 120pf ±5%, 500V for MI-26493-B	*
C19	Capacitor, fixed ceramic, NPO, 82pf ±5%, 500V for MI-43493	*
C20	Capacitor, fixed ceramic, NPO, 120pf ±5%, 500V for MI-26493-B	*
C20	Capacitor, fixed ceramic, NPO 82pf ±5%, 500V for MI-43493	*
C22	Capacitor, electrolytic, 40/40 +50-10% 500V 100 +100-10% 200V	219592
C23	Capacitor, fixed ceramic, NPO, 120pf ±5%, 500V for MI-26493-B	*
C23	Capacitor, fixed ceramic, NPO, 47pf ±5%, 500V for MI-43493	*
C28	Capacitor, electrolytic, 5 mf. 6V	219784
C33	Capacitor, fixed ceramic disc. .0047 mf -0, +100%,500V	73473
C34	Capacitor, fixed, .01mf	205656
CR-6	Rectifier, plug-in, silicon (1N2389)	219236
	Hood, with cable clamps, for use on P3A	228647
J1	Connector, BNC female, panel mtg.	216050
J2	Connector, BNC female, panel mtg.	216050
J3A	Connector, male, 4 contact, chassis mtg.	96278
J10	Connector, BNC female, panel mtg.	216050
J11	Connector, BNC female, panel mtg.	216050
L2	Coil, oscillator, 6.2mc for MI-26493-B	*
L2	Coil, oscillator, 7.5mc for MI-43443	*
L2	Coil, oscillator, 8.3mc for MI-43493	*
L5	Not used	---
M1	Meter, VU	219263
P3A	Connector, female, 4 contact, cable mtg.	224910
P9	Connector, female, 3 contact, cable mtg.	210467
R4	Resistor, fixed, composition, 680 ohms ±10%, ½W	502168
R32	Resistor, fixed, 2500 ohms, 20 watts-	212907
R33	Resistor, fixed, composition, 220 ohms, 2W	522122
R36	Resistor, fixed, composition, 680 ohms ±10%, ½W	502168
T3A	Transformer, discriminator, 6.2mc for MI-26493-B	*
T3A	Transformer, discriminator, 7.5mc for MI-43443	*
T3A	Transformer, discriminator, 8.3mc for MI-43444	*
T4B	Transformer, power	226650

* Order these items by circuit symbol plus MI number.

PARTS LIST SUPPLEMENT

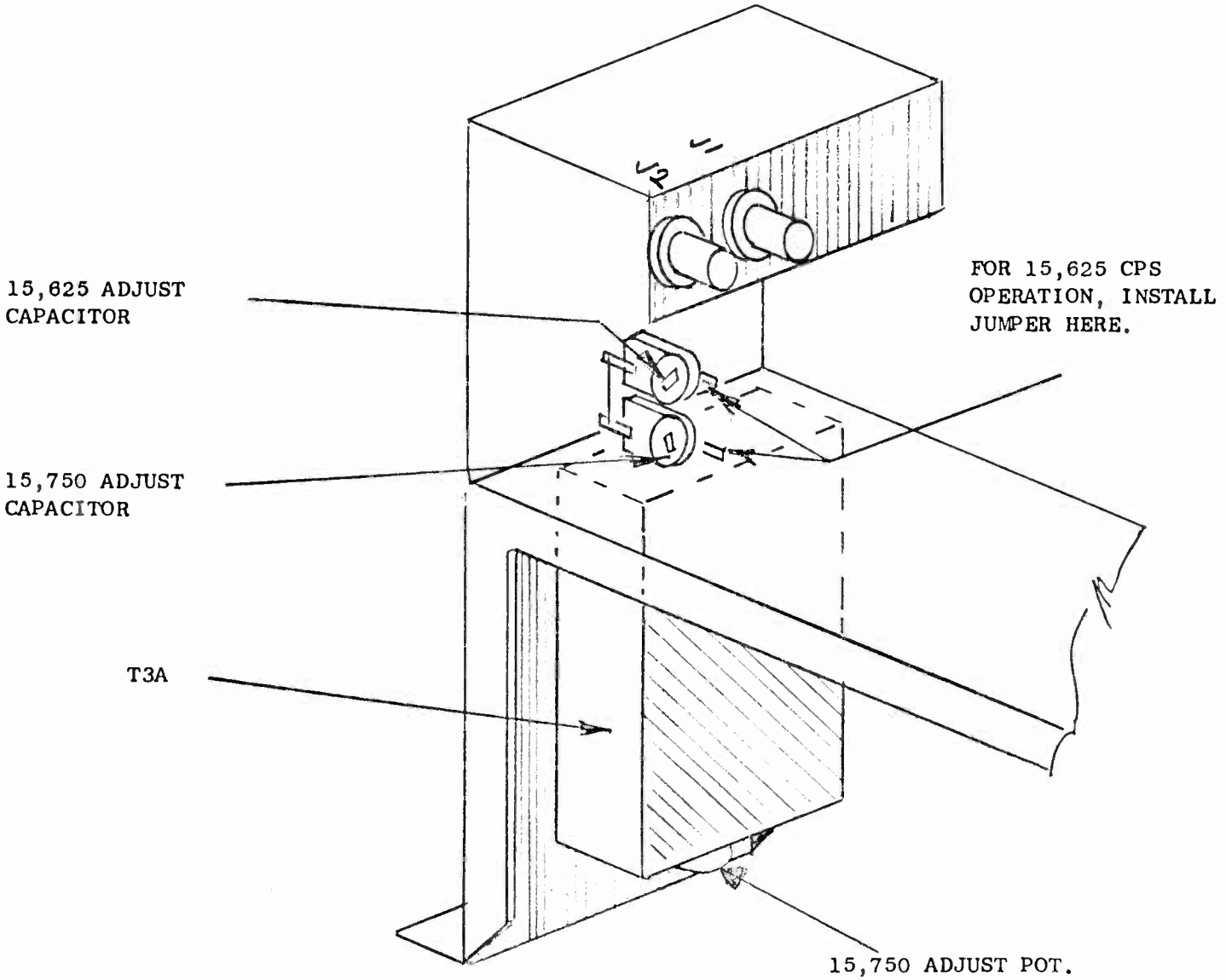
M1-26444-C, M1-26494-B, M1-43444, M1-43494

Demodulator

Circuit Symbol	Description	RCA Stock No.
C6	Capacitor, fixed ceramic, NPO, 120pf ±5%, 500V MI-26493-B	*
C6	Capacitor, fixed ceramic, NPO, 82pf ±5%, 500V MI-43493	*
C10	Capacitor, fixed ceramic, NPO, 120pf ±5%, 500V MI-26493-B	*
C10	Capacitor, fixed ceramic, NPO, 82pf ±5%, 500V MI-43493	*
C13	Capacitor, fixed ceramic, NPO, 120pf ±5%, 500V MI-26493-B	*
C13	Capacitor, fixed ceramic, NPO, 82pf ±5%, 500V MI-43493	*
C32	Capacitor, fixed, ceramic, 100 mmf, 500V	212453
C33	Capacitor, fixed, ceramic, 100 mmf, 500V	212453
CR-1	Crystal diode, type 1N34AG	219264
CR-2	Crystal diode, type 1N34AG	219264
CR-9	Rectifier, plug-in, silicon (1N2389)	219236
	Hood, with cable clamps, for P3A	228647
J1	Connector, BNC female, chassis mtg.	216050
J2	Connector, BNC female, chassis mtg.	216050
J3A	Connector, 4 pin female, chassis mtg.	224910
J9	Connector, BNC female, chassis mtg.	216050
J10	Connector, BNC female, chassis mtg.	216050
M1	Meter, VU	219263
P3A	Connector, 4 pin male, cable mtg.	96278
P8	Connector, 3 pin female, cable mtg.	210467
R13	Resistor, fixed comp. 39K ±10% 1W	512339
R26	Resistor, fixed composition, 150 ohms ±10%, ½W	502115
R36	Resistor, fixed, wirewound, 3K ohms, 20W	51867
RY-1	Relay, coil 9500 ohms DPDT	219593
T2	Transformer, discriminator, 6.2mc, for MI-26493-B	*
T2	Transformer, discriminator, 7.5mc for ML-43443	*
T2	Transformer, discriminator, 8.3mc for MI-43493	*
T3A	Transformer, AF output, with dual pre-tuned 15750/15625 rejection filter	221780
T4B	Transformer, power	226650

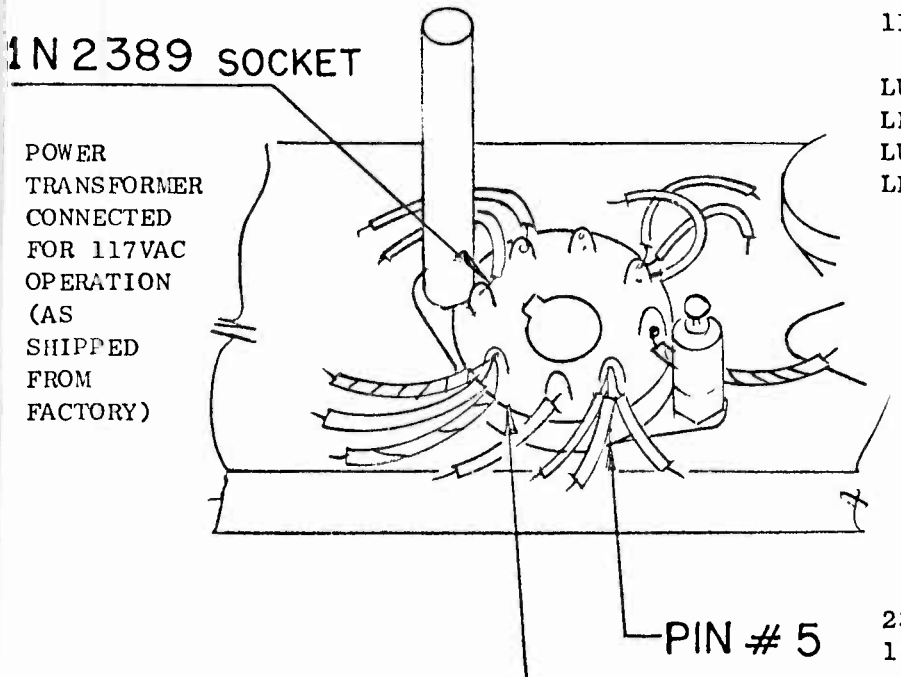
* Order these items by circuit symbol plus MI number.

NOTE: UNITS ARE FACTORY PRETUNED. FOR 15,625 CPS OPERATION, SIMPLY SOLDER JUMPER AT POINT INDICATED__FILTER WILL THEN BE SET FOR 15,625 CPS, AS 15,625 ADJUST CAPACITOR IS PRESET.



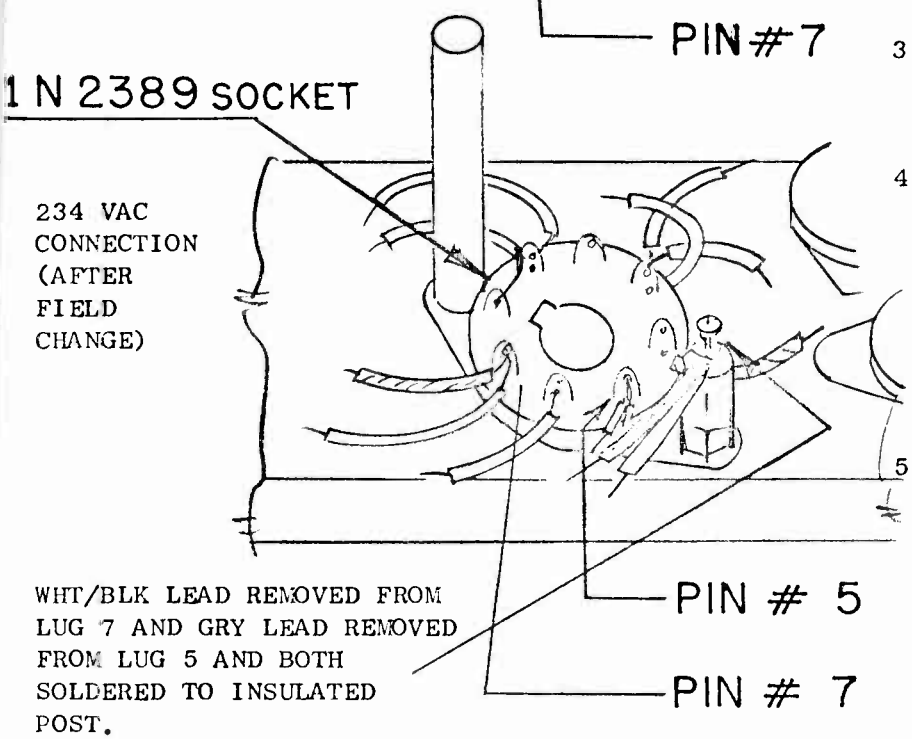
TSD-2B & TSD-3A MICROWAVE SOUND DIPLEXER DEMODULATOR 15,750 CPS/15,625 CPS FILTER ADJUSTMENT LOCATIONS.			SUB TSD-2B DEMOD TSD-3A DEMOD	PROJ 1100	DRAW 1237
ELECTRONICS DEVELOPMENT CORP.					
DATE 8-14-63	DRAWN A.N.R.	APP			
DRG.NO. 1237					

IB-EDC100-5
IB-EDC100-6
060290-7



117 VAC CONNECTION

LUG 7 ON SOCKET CONTAINS WHT/BLK LEAD FROM POWER TRANSFORMER.
LUG 5 ON SOCKET CONTAINS GRY LEAD FROM POWER TRANSFORMER.



234 Volt Transformer Connections.

1. Unsolder and remove wht/blk wire in Lug #7 of Socket.
2. Unsolder and remove gry wire in Lug #5 of Socket.
3. Solder leads removed in steps 1 & 2 to standoff insulator mounted on socket mounting bolt adjacent to socket lugs 4 & 5.
4. Remove screw which secures the power receptacle mounting post nearest to chassis edge. Remove metal plate mounted under receptacle post (marked "117 VAC"). Turn plate over, exposing "234 VAC," and re-insert under power receptacle mounting post. Reinstall securing screw.
5. Remove 3AG, 1 amp, slo-blo fuse from fuseholder, replace with ½ amp, slo-blo type fuse. This completes conversion.

TSD-2B and TSD-3A (MDOULATOR & DEMODULATOR) DUAL PRIMARY (117/234 VAC) POWER TRANSFORMER CONNECTION DIAGRAM.

ELECTRONICS DEVELOPMENT CORP.

1533 MONROVIA AVE. 646-9611 NEWPORT BEACH. CALIF.

DATE	DRAWN	APP
7-25-63	A.N.R.	

APPLICABLE TO FOLLOWING MI #'s
MI-26443-C, MI-26444-C (TSD-2B) &
MI-26493-B, MI-26494-B (TSD-3A).

DWG. NO. 2287

SUB TSD-2B, Mod. & Demod. TSD-3A, MOD. & Demod.

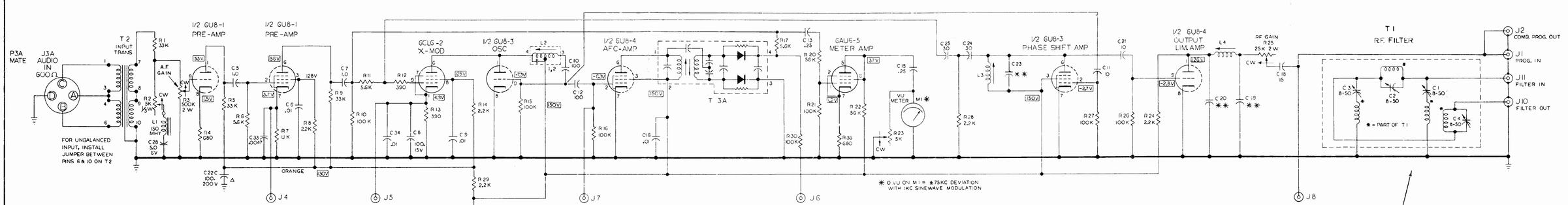
PROJ 1100 E&F

DRAW NO. 2287

IB-EDC100-5

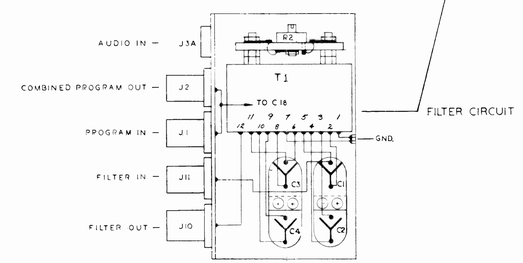
IB-EDC100-6

060280-8

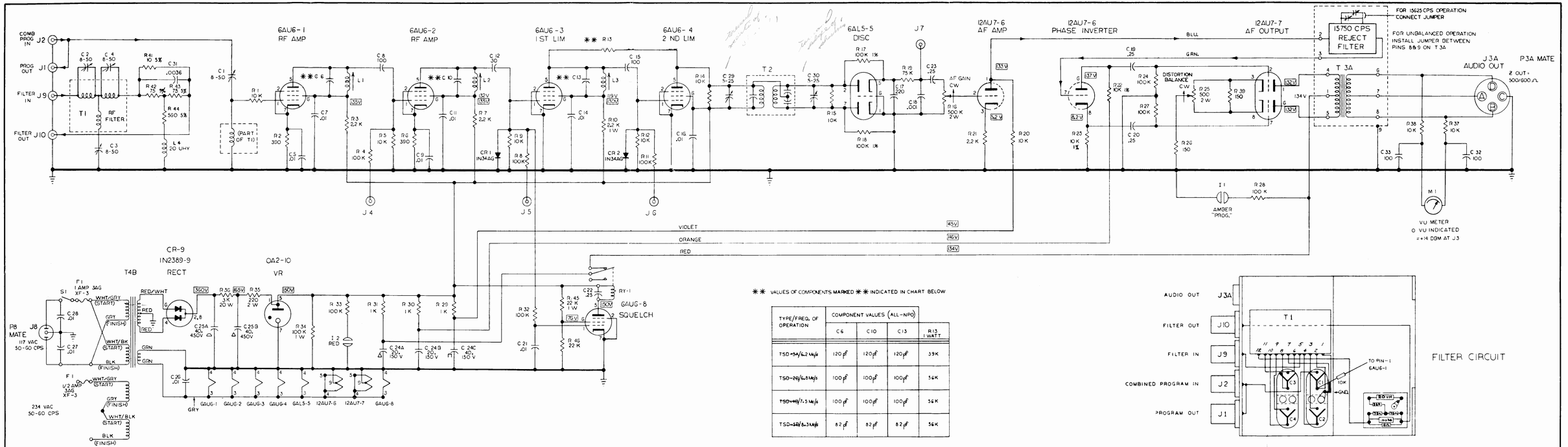


✱✱ VALUES OF CAPACITORS MARKED ✱✱ INDICATED IN CHART BELOW

TYPE/FREQ. OF OPERATION	COMPONENT VALUES (ALL-NPO) C19	C20	C23
TSD-3A/6.2 Mc/s	120 pf	120 pf	120 pf
TSD-2B/6.8 Mc/s	100 pf	100 pf	100 pf
TSD-4B/7.5 Mc/s	100 pf	100 pf	100 pf
TSD-5B/8.3 Mc/s	82 pf	82 pf	47 pf



DRAWN	R.F.G.	VALUE UNLESS NOTED BY	ELECTRONICS DEVELOPMENT CORP.
DATE	1 JULY 1963	IND = MICROHENRIES MH-H	1533 MONROVIA AVE., NEWPORT BEACH, CALIF.
CHECKED	[illegible]	RES = 1/2 WATT 10%	MICROWAVE SOUND DIPLEXER MODULATOR
DATE	25 JULY 1963	CAP = PF = MMFD DEC = MF	DWG. NO. - 2286
		K = 10^3 M = 10^6	



** VALUES OF COMPONENTS MARKED ** INDICATED IN CHART BELOW

TYPE/FREQ. OF OPERATION	COMPONENT VALUES (ALL-NPO)			
	C6	C10	C13	R13 1 WATT
TSD-34/6.2 Mc/s	120 pf	120 pf	120 pf	39K
TSD-28/6.8 Mc/s	100 pf	100 pf	100 pf	56K
TSD-48/7.3 Mc/s	100 pf	100 pf	100 pf	56K
TSD-38/6.3 Mc/s	82 pf	82 pf	82 pf	56K

FILTER CIRCUIT

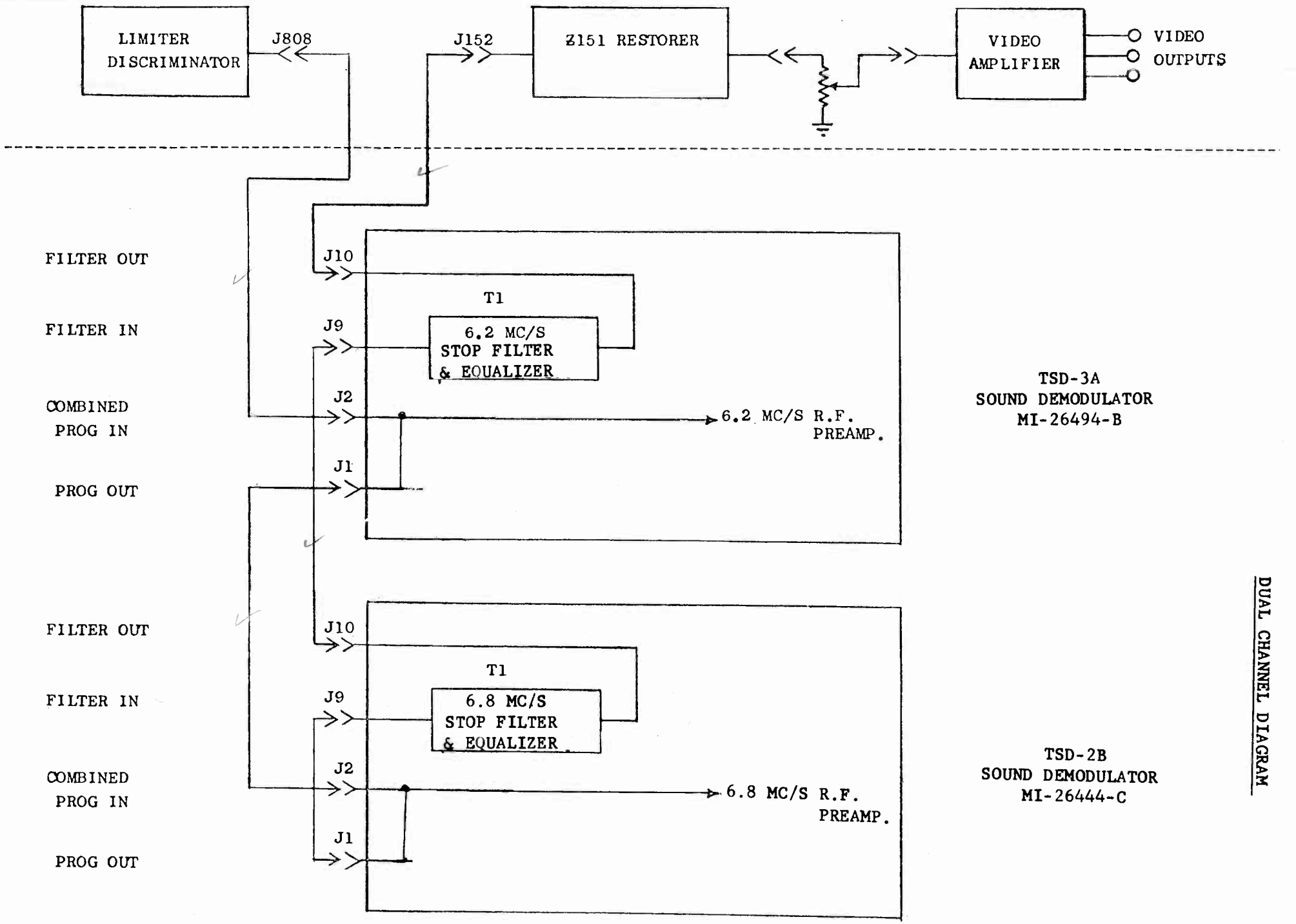
DRAWN	RFG	VALUE UNLESS NOTED	BY
DATE	1 JULY 1963	IND = MICROHENRIES	M+H
CHECKED	Fleming	RES = Ω WATT 10%	
DATE	25 JULY 1963	CAP = PF = MMFD	DEC +.01
		K=10³ M=10⁶	

ELECTRONICS DEVELOPMENT CORP.
1533 MONROVIA AVE., NEWPORT BEACH, CALIF.

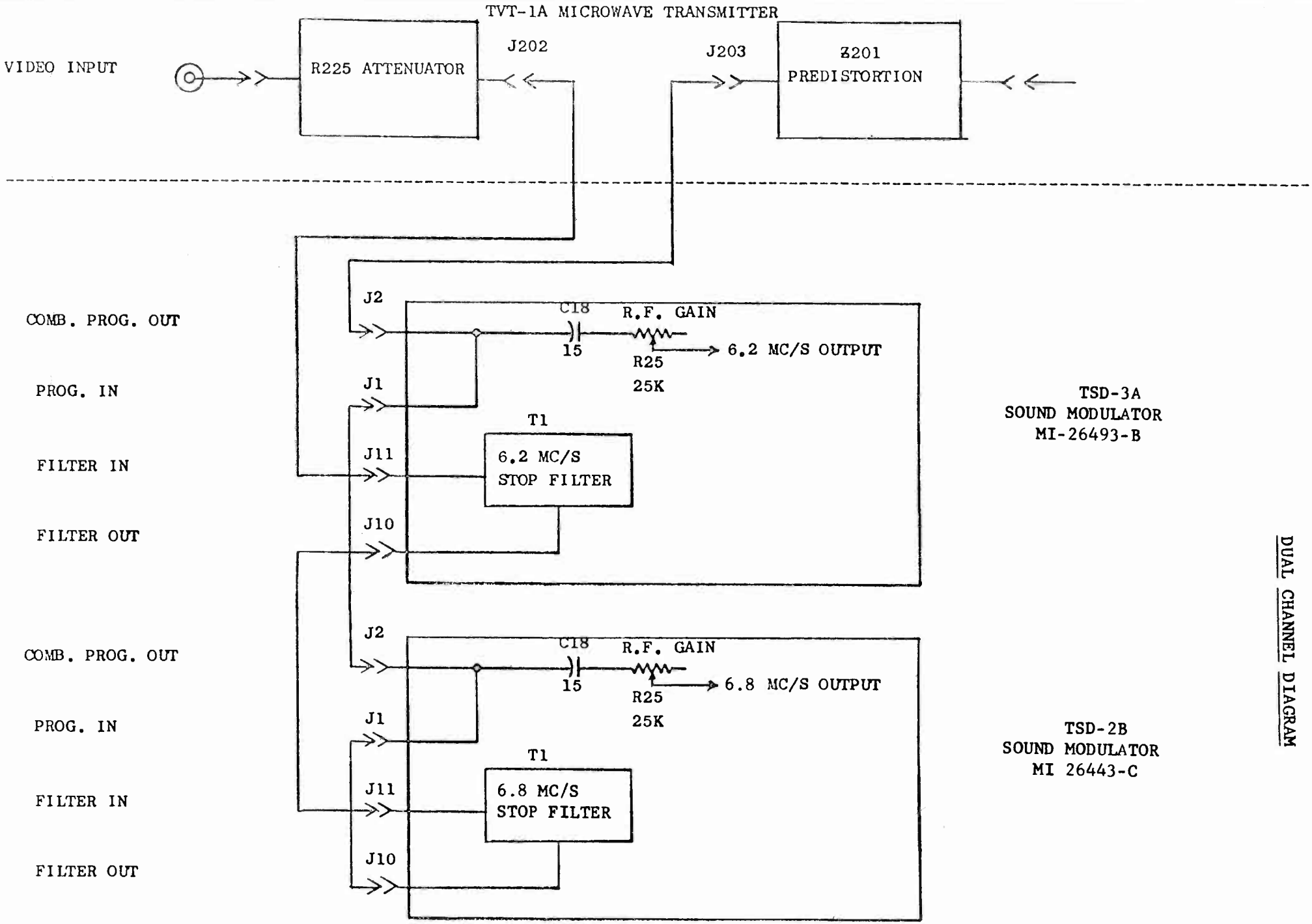
MICROWAVE SOUND DIPLEXER DEMODULATOR

DWG. NO. -- 2285

TVR-1A MICROWAVE RECEIVER



DUAL CHANNEL DIAGRAM


TVT-1A MICROWAVE TRANSMITTER
VIDEO INPUT
R225 ATTENUATOR
J202
J203
Z201
PREDISTORTION
COMB. PROG. OUT
PROG. IN
FILTER IN
FILTER OUT
J2
J1
J11
J10
C18
15
R.F. GAIN
R25
25K
6.2 MC/S OUTPUT
T1
6.2 MC/S
STOP FILTER
TSD-3A
SOUND MODULATOR
MI-26493-B
COMB. PROG. OUT
PROG. IN
FILTER IN
FILTER OUT
J2
J1
J11
J10
C18
15
R.F. GAIN
R25
25K
6.8 MC/S OUTPUT
T1
6.8 MC/S
STOP FILTER
TSD-2B
SOUND MODULATOR
MI 26443-C
DUAL CHANNEL DIAGRAM

RADIO CORPORATION OF AMERICA