INSTRUCTION BOOK

IB-96371

RCA

VIDEO MODULATOR

MODEL ETVM-3B

RCA

RADIO CORPORATION OF AMERICA

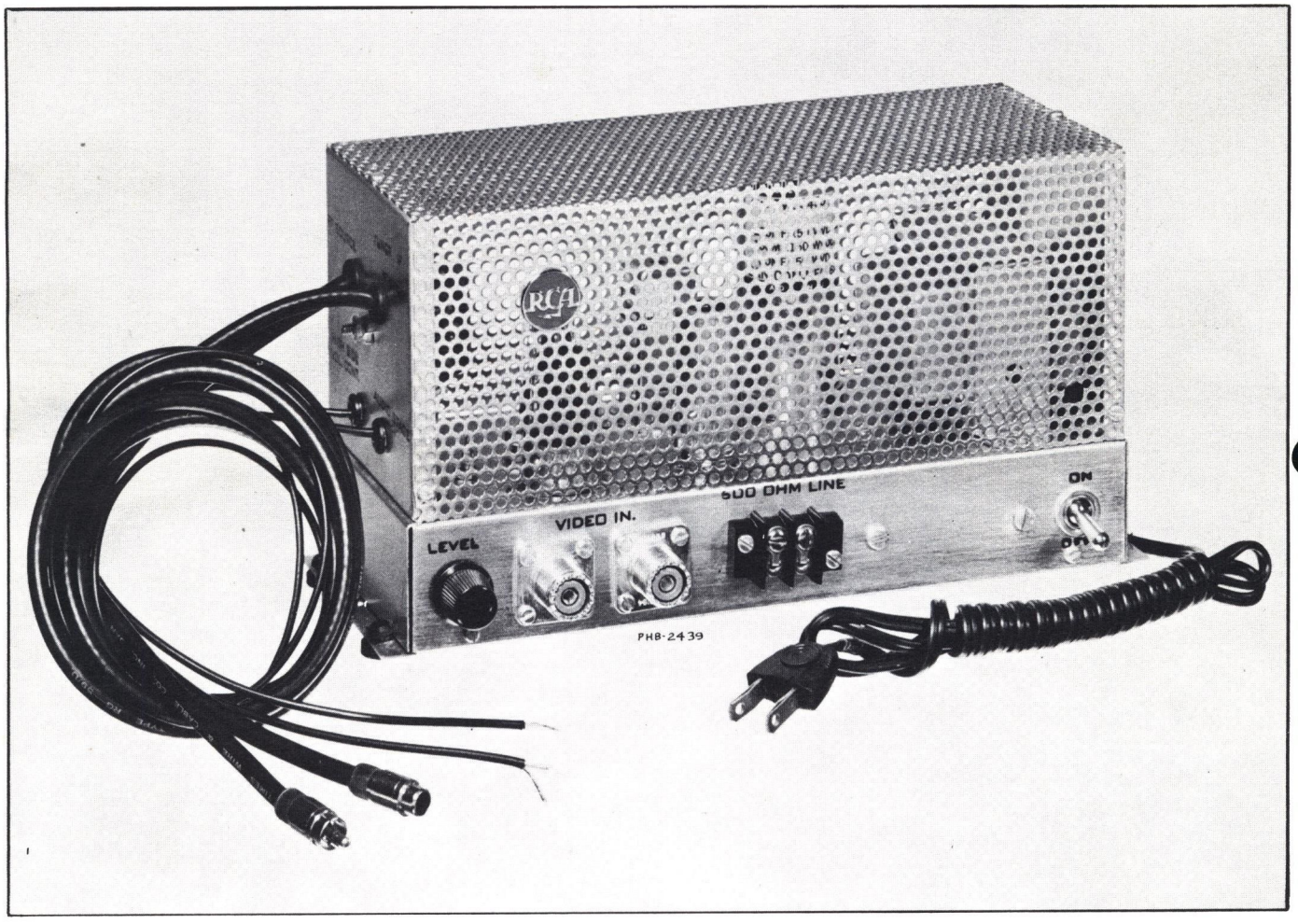


Figure 1—ETVM-3B Video Modulator

TECHNICAL SUMMARY

VIDEO SIGNAL INPUT

Video, sync negative, 0.5 volt to 1.5 volts peak-to-peak

VIDEO INPUT IMPEDANCE

Bridged through

VIDEO SIGNAL OUTPUT

45.75 mc RF with video modulation (negative)

AUDIO INPUT IMPEDANCE

Bridged through. Loading for one unit, approx. 10,000 ohms. Approx. 1.5 v rms required.

FREQUENCY RESPONSE—VIDEO AMPLIFIER

±1.5 db, to 7 mc.

FREQUENCY STABILITY

±2.3 kc over normal temperature range (20°C to 45°C)

POWER REQUIREMENTS

115 volts, 60 cycles, 22 watts maximum

OVERALL DIMENSIONS

Length: 11¼ inches
Width: 3¾ inches
Height: 5¼ inches
Weight: 4 pounds, 13 ounces

TUBE COMPLEMENT

1 — 6AS8
1 — 6CS6
1 — 6C4

SEMICONDUCTOR DIODES

1 — RCA 1N1763

FUSE

1 — 0.5 A., 3AG Slo Blo

GENERAL INFORMATION

The RCA Service Company model ETVM-3B Video Modulator is a self-contained unit designed to feed closed-circuit video information into the 45 mc IF system of a black-and-white or color television receiver. The external video source may be video output from a TV camera chain, a standard 75-ohm video line, or the output of a video tape recording system.

Using only a single switch, the ETVM-3B Video Modulator converts the television receiver from normal operation with an antenna system receiving regularly broadcast television programs, to a closed-circuit television receiver.

No changes are required in the television receiver circuitry and simple connections permit quick, easy installation.

Audio input to accompany the closed circuit video information is fed to the Video Modulator from a standard 600-ohm audio line. Switching from line audio to "off-the-air" audio is automatic. When the Video Modulator is ON, line audio is fed to the television receiver audio circuits with full control of volume by the receiver volume control. When the Video Modulator is OFF, the television receiver operates normally from its own antenna system.

Re-alignment of the television receiver is not necessary and video compensation is not required. With either line video signals or "off-the-air" signals, the receiver performs to factory standards without adjustment or change to the black-and-white or color set-up, resolution, video response, or peaking. Since no changes are required in the television receiver circuitry the instrument may be returned to normal service at any time.

The ETVM-3B Video Modulator can be attached to any RCA television receiver manufactured since 1951 provided only that the receiver has a 45 mc IF system. The unit may be installed externally, or in many instruments, within the cabinet of the receiver.

With the simplicity of single switch operation, self-contained power supply, small physical dimensions and ease of installation, the ETVM-3B Video Modulator is a reliable and economical solution for providing a closed-circuit video television receiver system. Using standard television receivers it provides the versatility of both an "off-the-air" and a closed-circuit system with minimum installation requirements.

This versatility permits a wide range of application for schools, broadcast stations, municipal offices, hotels and motels, industry, advertising agencies, film producers, hospitals, stores, ships, and in the home.

CIRCUIT DESCRIPTION

VIDEO CIRCUITS

The ETVM-3B Video Modulator uses three tubes. As shown in figure 2, the block diagram, V1-A, the pentode section of a type 6AS8 pentode-diode is a video amplifier to which is applied a negative sync video input signal from a 75-ohm video line. The input level of this signal may be from 0.5 volt to 1.5 volts peak-to-peak. Provision is made for bridging the video signal through.

Output from the video amplifier is fed to #3 grid of V2, a 6CS6 pentode which is the video modulator. The diode section of the 6AS8, V1-B, is a clamp circuit limiting the positive input to the grid of V2.

A crystal controlled oscillator V3, using a type 6C4 triode, and tuned by a variable slug in T2, generates a CW signal at 45.75 mc. This is the picture IF carrier. This signal is applied to the #1 grid of V2. V2 combines the video frequency information and the carrier and produces at its output an RF signal which includes the picture carrier modulated by the video information.

Referring to the schematic diagram, figure 3, T3 in the output circuit of V2 is tuned to pass the frequencies in the approximate range from 45.75 mc to 41.25 mc.

R2 in the cathode circuit of V1-A is a VIDEO LEVEL control. This control varies the gain of V1-A to adjust the 0.5 volt to 1.5 volt peak-to-peak input signal for optimum video level to the modulator stage.

AUDIO CIRCUITS

Audio from a 600-ohm audio line is fed through a transformer, T4, and an isolating capacitor, C15, to the volume control of the receiver, permitting the line volume to be varied by the receiver volume control.

SWITCHING CIRCUITS

All switching from closed-circuit to normal television reception is controlled by the Video Modulator ON-OFF switch, S1. When the switch is ON, power is applied to the unit and to the relay K1. The following switching then takes place at the relay contacts:

1. Contact CT3 on the relay opens the line between the sound detector and the volume control in the receiver and applies audio from the 600-ohm line, through T4 and C15, to the receiver volume control.
2. Contact CT1 opens the IF link between the receiver RF unit converter and the IF input stage and applies output from the video modulator to the receiver IF circuit.
3. Contact CT2 on the relay grounds the IF link from the receiver RF unit, suppressing possible interference from the RF unit.

POWER SUPPLY

The power supply for the ETVM-3B consists of a power transformer, T1; a type 1N1763 diode, CR1; and a filtering system consisting of C9A, C9B, R9 and R10. The output of the power supply includes B-plus at approximately 135 volts, and 6.3 volts AC for the tube heaters and for relay K1. Total power requirement is approximately 22 watts. Circuit protection is provided by a 0.5 ampere Slo Blo fuse in the primary circuit of the transformer.

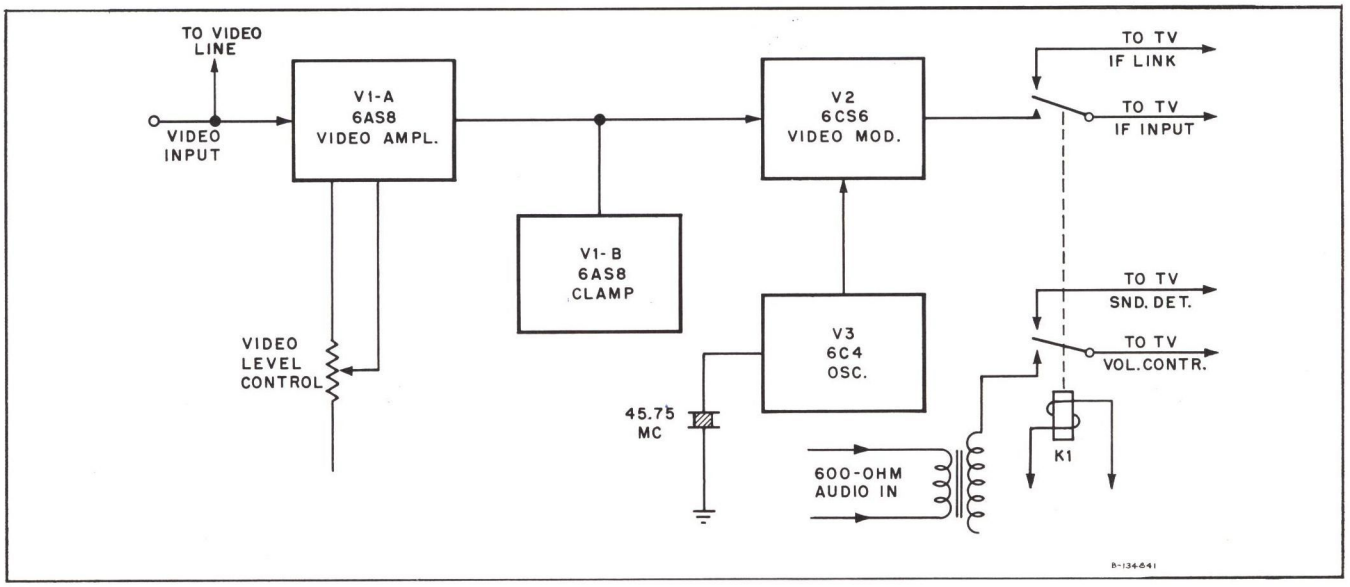


Figure 2—Block Diagram, ETVM-3B Video Modulator

INSTALLATION AND INITIAL ADJUSTMENT

The ETVM-3B Video Modulator is designed for simplicity of installation. All input and output terminals and cables are clearly labeled on the unit and only the normal precautions taken when working with television equipment need be considered.

Following is the installation procedure:

1. Make sure the ON-OFF switches on both the television receiver and the Video Modulator are OFF.
2. Remove the rear cover of the television receiver.
3. If space permits, the Video Modulator may be installed inside the cabinet of the receiver. When this is done provision should be made for clearance to operate the ON-OFF switch of the Video Modulator.

   If the unit is not installed in the receiver cabinet, any convenient location may be used within the length limits of the two IF cables at the side of the unit.

   NOTE

   These RG-59/U cables are cut to exact length (one-half wavelength at 45.75 mc) and should not be altered.
4. Unplug the IF link cable from the RF tuner in the receiver. This cable generally emerges from the receiver chassis and plugs into the top or side of the RF unit.
5. Plug the cable marked "RF UNIT" on the Video Modulator into the jack on the RF unit from which the IF cable was removed.
6. Connect the cable marked "IF LINK CABLE" on the Video Modulator, to the cable that was disconnected from the RF unit in the receiver.
7. At the volume control in the receiver, disconnect the lead connected to the "high" side of the volume control. Refer to the schematic diagram for the television receiver to which the Video Modulator is being attached.
8. Connect the center conductor of the thin cable marked "HIGH SIDE VOL CONTROL" on the Video Modulator, to the terminal on the volume control from which the "high side" lead has just been removed. Ground the shield braid of the cable to a convenient point in the receiver.
9. Connect the center conductor of the thin cable marked "REC SND DET" on the Video Modulator, to the lead that was removed from the volume control terminal lug. Ground the shield braid of the cable to a convenient point in the receiver.
10. Connect a video line to either of the two coaxial connectors marked "VIDEO IN" on the Video Modulator chassis. If the video signal is not bridged through (to another receiver, or to continue the video line) the coaxial connector not used should be terminated with a 75-ohm resistor.
11. Connect a 600-ohm audio line to the terminals labeled "600 OHM LINE" on the chassis of the Video Modulator. Polarity need not be observed for the audio line because the primary of the audio transformer is not grounded.

    Since the audio input is bridged through, the open end of the audio line should be terminated with a resistance equal to the audio line characteristic impedance.
12. Turn the television receiver ON and adjust for a normal picture on any channel.
13. Plug in the AC power cord to the Video Modulator, turn ON the power switch, and allow approximately 30 seconds for warm-up. Switch the receiver to an unused channel. Audio will be from the 600-ohm line. The VOLUME control on the television receiver regulates the sound volume of the audio from the 600-ohm audio input line.
14. Without touching any controls on the television receiver, adjust the LEVEL control on the Video Modulator for a suitable picture.
15. When the Video Modulator ON-OFF switch is turned OFF, and the receiver is switched to a program channel, the picture and sound from the channel tuned in (off-the-air) will come on within a few seconds.

ADJUSTMENT OF IF LINK CIRCUIT

C5, a compression trimmer, is accessible through an opening in the side of the screen cover of the Video Modulator. This capacitor adjusts the matching between the output of the Video Modulator and the IF input of the receiver.

C5 is pre-set at the factory for correct matching to late model RCA television receivers.

In some cases adjustment of C5 may improve the picture when it is definitely known that the television receiver produces a good picture with "off-the-air" programs.

NOTE

If the picture is poor on all channels the receiver may require adjustment or service. If required, all service and adjustment should be completed before installing the Video Modulator.

To set C5 properly (particularly with a color television receiver) observe a color bar pattern. Adjust C5 for a normal color bar display. For black-and-white receivers, adjust C5 for the best picture.

PARTS

Symbol No.	Description
	CAPACITORS:
C1	0.27 mfd., 200 v.
C2	0.27 mfd., 200 v.
C3	ceramic disc, .001 mfd.
C4	ceramic disc, .001 mfd.
C5	trimmer, 25 - 280 mmfd., El Menco No. 454
C6	.047 mfd., 200 v.
C7	ceramic, NPO, 33 mmfd., ±10%
C8	ceramic disc, .001 mfd.
C9	electrolytic, 60-100-200 mfd., 150 v., Sprague type TVL 3450
C10	ceramic disc, .001 mfd.
C11	ceramic disc, .001 mfd.
C12	ceramic disc, .001 mfd.
C13	ceramic, NPO, 1.5 mmfd., ±0.25 mmfd.
C14	ceramic, NPO, 10 mmfd., ±0.25 mmfd.
C15	.047 mfd., 200 v.
CR1	Diode, type 1N1763
F1	Fuse, 3AG, 0.5 A., Slo Blo.
J1	Connector, type SO 239
J2	Connector, type SO 239
K1	Relay, 3PDT, Potter and Brumfield type KA14AY
L1	Inductor, 28-63 uh, CTC type X2060-6
L2	Reactor, 8.2 muh, 850 ma., RCA Stock No. 104630

Symbol No.	Description
	RESISTORS: Allen Bradley, Composition type; unless otherwise noted.
R1	820,000 ohm, ±10%, ½ w.
R2	variable, 500 ohm, linear taper, Ohmite
R3	1500 ohm, ±10%, ½ w.
R4	1 megohm, ±10%, ½ w.
R5	10,000 ohm, ±10%, ½ w.
R6	1000 ohm, ±10%, ½ w.
R7	1000 ohm, ±10%, ½ w.
R8	4700 ohm, ±10%, ½ w.
R9	82 ohm, ±10%, ½ w.
R10	330 ohm, ±10%, ½ w.
R11	1500 ohm, ±10%, ½ w.
R12	1500 ohm, ±10%, ½ w.
R13	27,000 ohm, ±10%, ½ w.
S1	Switch, toggle, SPST
*T1	Transformer, power
*T2	Coil, oscillator
T3	Transformer, IF link, Merit type TV-125
T4	Transformer, line, Stancor type A53
V1	Electron tube, type 6AS8
V2	Electron tube, type 6CS6
V3	Electron tube, type 6C4
XF1	Fuseholder, extractor post type, Littlefuse 342001
*Y1	Crystal, 45.75 mc, ±.005%

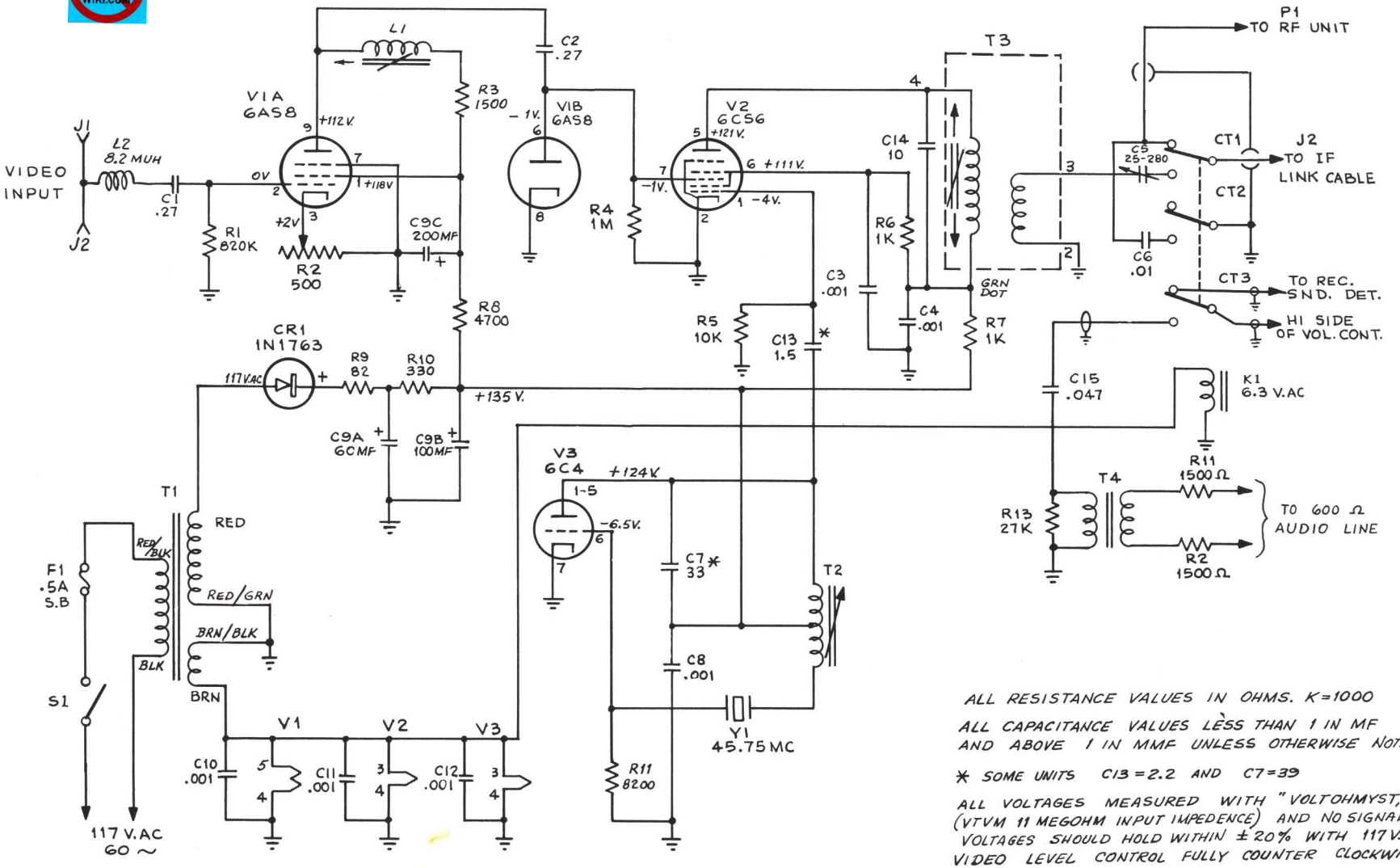
* Order by description from RCA Service Company, Engineering Department, Cherry Hill, New Jersey.

WARRANTY

Radio Corporation of America, hereinafter referred to as "RCA", warrants this instrument to be free from defects in material and workmanship under normal use and service for a period of ninety days from the date of sale.

This warranty shall not apply to any instrument which has been altered or repaired in a way that, in the opinion of RCA, affects the reliability or detracts from the performance of the instrument; nor shall this warranty apply to any instrument which has been subjected to misuse through negligence or otherwise. No warranty is extended as to any instrument which has had its serial number altered, effaced or removed.

The obligation of RCA under this warranty is limited to the repair or replacement of parts found defective in material or workmanship and the return of such repaired or replaced parts, f.o.b. point of shipment. RCA neither assumes nor authorizes any person to assume for it any other liability in connection with the sale of this instrument.



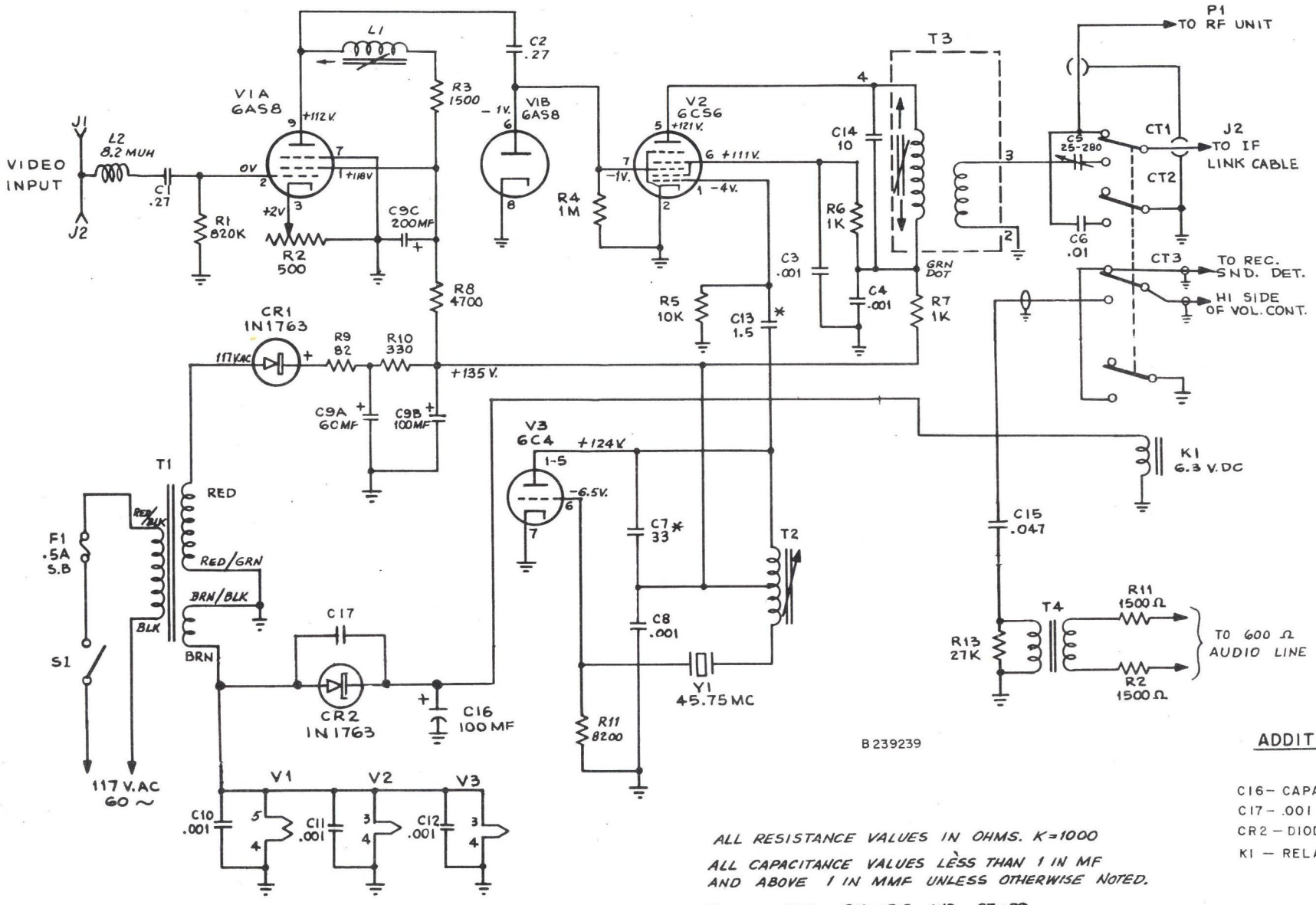
ALL RESISTANCE VALUES IN OHMS. K=1000

ALL CAPACITANCE VALUES LESS THAN 1 IN MF AND ABOVE 1 IN MMF UNLESS OTHERWISE NOTED.

* SOME UNITS C13 = 2.2 AND C7 = 39

ALL VOLTAGES MEASURED WITH "VOLTOHMYST," (VTVM 11 MEGOHM INPUT IMPEDENCE) AND NO SIGNAL INPUT. VOLTAGES SHOULD HOLD WITHIN ± 20% WITH 117 V.AC, SUPPLY VIDEO LEVEL CONTROL FULLY COUNTER CLOCKWISE

Figure 3—Schematic Diagram, ETVM-3B Video Modulator



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ADDITIONAL PARTS LIST

C16 – CAPACITOR 100 MF 15 V.DC
C17 – .001 DISC CERAMIC 500 V.
CR2 – DIODE TYPE IN1763
K1 – RELAY, RELAYMATIC Nº RS 200
4 POLE 130 OHM

FOR ALL OTHER PARTS REFER TO ETVM3B PARTS LIST.

Schematic Diagram ETVM 3C Video Modulator

RCA SERVICE COMPANY

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CHERRY HILL, N. J.

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