TM-6A

Master Monitor

RADIO CORPORATION OF AMERICA
ENGINEERING PRODUCTS DEPARTMENT CAMDEN, N. J.

IB-36088

TYPE TM-6A

MASTER MONITOR

MI-26136

INSTRUCTIONS

Manufactured by
RADIO CORPORATION OF AMERICA
ENGINEERING PRODUCTS DEPARTMENT
Camden, New Jersey, U. S. A.

Printed in U. S. A.

IB-36088

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.

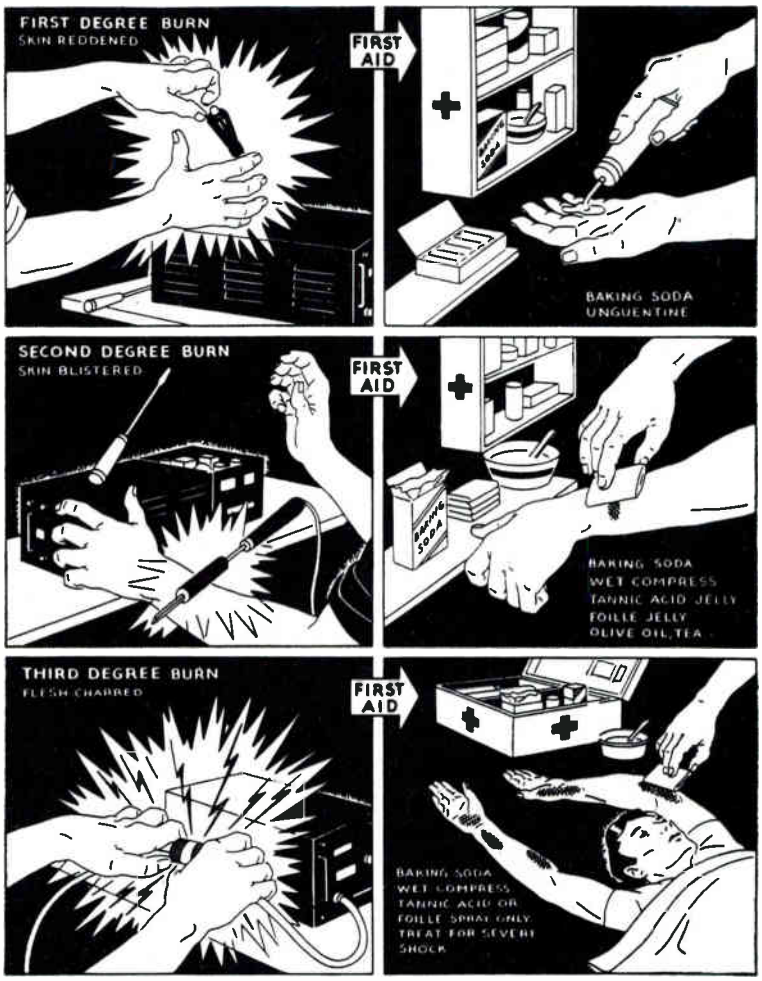
ABOUT FIRST AID

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.

PRONE-PRESSURE METHOD OF RESUSCITATION

1. PROTECT YOURSELF with dry insulating material.
2. BREAK THE CIRCUIT by opening the power switch or by pulling the victim free of the live conductor.

DON'T TOUCH VICTIM WITH YOUR BARE HANDS UNTIL THE CIRCUIT IS BROKEN.



(A) (B) (C)

3. LAY PATIENT ON STOMACH, one arm extended, the other arm bent at elbow. Turn face outward resting on hand or forearm.
4. REMOVE FALSE TEETH, TOBACCO OR GUM from patient's mouth.
5. KNEEL STRADDLING PATIENTS THIGHS. See (A).
6. PLACE PALMS OF YOUR HANDS ON PATIENT'S BACK with little fingers just touching the lowest ribs.
7. WITH ARMS STRAIGHT, SWING FORWARD gradually bringing the weight of your body to bear upon the patient. See (B).
8. SWING BACKWARD IMMEDIATELY to relieve the pressure. See (C).
9. AFTER TWO SECONDS, SWING FORWARD AGAIN. Repeat twelve to fifteen times per minute.
10. WHILE ARTIFICIAL RESPIRATION IS CONTINUED, HAVE SOMEONE ELSE:
    (a) Loosen patient's clothing.
    (b) Send for doctor.
    (c) Keep patient warm.
11. IF PATIENT STOPS BREATHING, CONTINUE ARTIFICIAL RESPIRATION. Four hours or more may be required.
12. DO NOT GIVE LIQUIDS UNTIL PATIENT IS CONSCIOUS.

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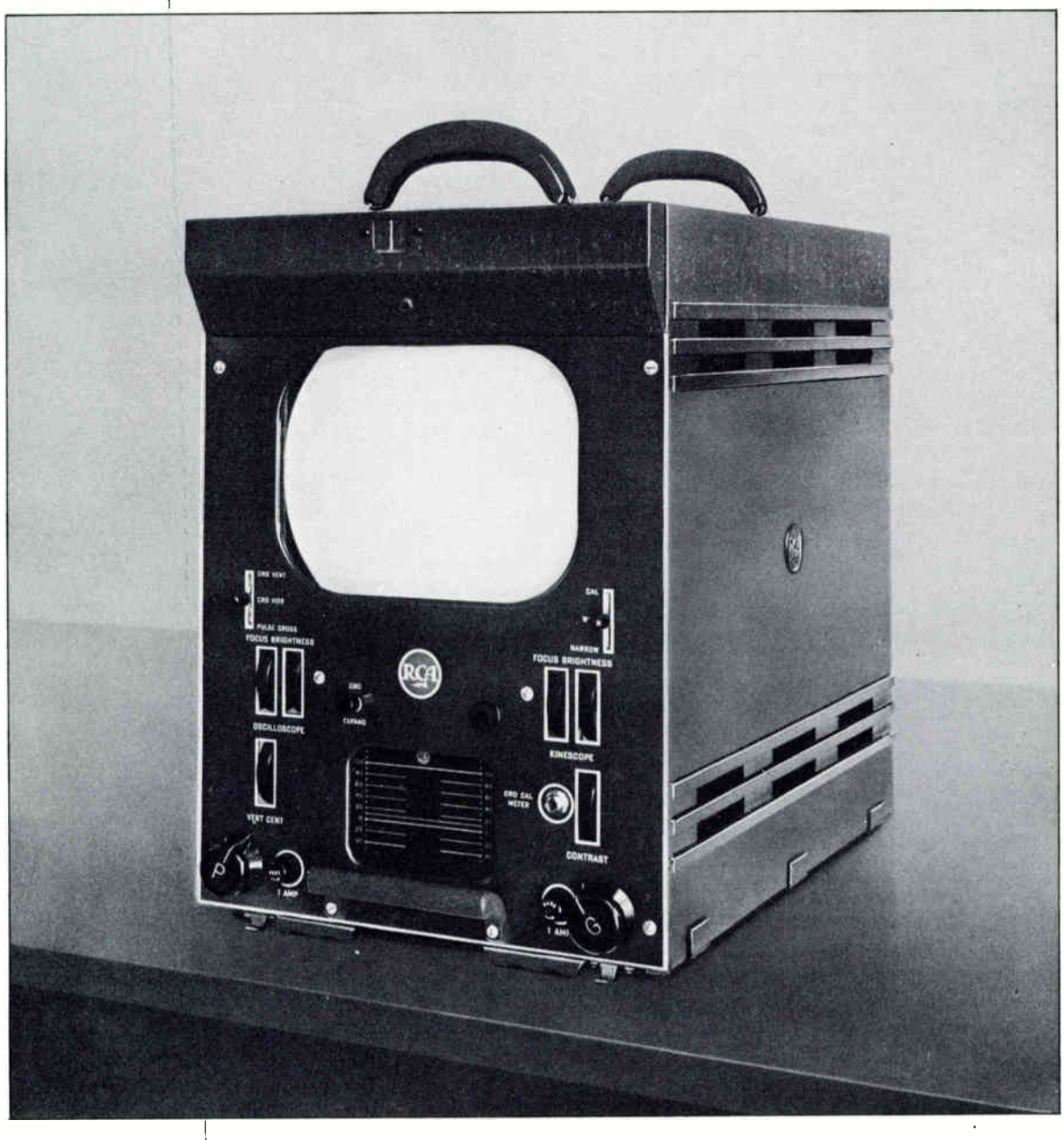


Figure 1 - TM-6A Master Monitor, Mounted in Field Case

TECHNICAL SUMMARY

ELECTRICAL SPECIFICATIONS

INPUT POWER

From A-C Line for Tube Heaters:

Line Rating	105-125 volts, 90 watts
Line Frequency	50 to 60 cycles

From Regulated Power Supply:

Plate Voltage	280 volts, dc
Plate Current	450 ma
Centering Current	450 ma at -4 volts

DRIVING SIGNAL INPUTS (when used as Camera Monitor)

Vertical Drive (60 cps)	4 volts, peak-to-peak
Horizontal Drive (15,750 cps)	4 volts, peak-to-peak

MISCELLANEOUS INPUTS (when used as Camera Monitor)

Tally Light	6.3 volts, 50/60 cycles

FREQUENCY RESPONSE

Kinescope Amplifier	Flat within $\pm$ 1 db to 7.5 mc
Oscilloscope Amplifier (Vertical Deflection)	
Wide Band	Flat within + 1 db to 4 mc
Narrow Band	IRE recommended cutoff

INPUT IMPEDANCE

Oscilloscope Input	High
Kinescope Input	High

SIGNAL INPUT RANGE

CRO Input	0.1 to 4 volts
Kinescope Input	0.1 to 4 volts

MECHANICAL SPECIFICATIONS

Length	20 inches
Height	18 inches
Width	13 1/8 inches
Weight	55 pounds

TUBE COMPLEMENT

Symbol	Type	Function
V1	6AH6	Video Amplifier
V2	6AH6	Video Amplifier
V3	5763	Video Amplifier
V4	12AT7	Sync Amplifier
V5	6AH6	Sync Separator
V6	12AX7	Video Amplifier
V7	6AH6	Video Amplifier
V8	6AH6	Video Amplifier
V9	5763	Video Amplifier
V10	5763	Video Amplifier
V11	6AL5	D-C Restorer
V12	10SP4	Kinescope
V13	5UP1	Oscilloscope
V14	12AT7	Horizontal Osc. and Pulse Amplifier
V15	12AT7	Delay Multivibrator
V16	12AT7	Regenerative Clipper
V17	12AT7	Phase Splitter and Sawtooth Generator
V18	6BQ6-GT	Damper
V19	6BQ6-GT	Driver
V20	12AT7	CRO Horizontal Sweep Generator
V21	12AX7	CRO Sweep Expander
V22	12AU7	CRO Horizontal Output
V23	12AT7	Vert. Block. Osc. and Vert. Sawtooth Gen.
V24	12AU7	Vert. Deflection Amplifier
V25	6S4	Vert. Output
V101	6L6	R-F Oscillator
V102	6BQ7	Regulator
V103	1X2A	Rectifier
V104	1X2A	Rectifier
V105	1X2A	Rectifier
V106	1X2A	Rectifier

EQUIPMENT

The following items comprise the TM-6A Master Monitor, MI-26136.

Type TM-6A Master Monitor chassis, including all tubes
Set of Knobs (4) and setscrews
Oscilloscope scales (3)
Monitor identification markers (numbered 1 to 9)
Set of connectors and coaxial terminations
Shield for oscilloscope
Instruction Book (IB-36088)

RECOMMENDED TEST EQUIPMENT

The following test equipment is recommended to facilitate adjustment and maintenance of the TM-6A Master Monitor.

Plate Current Meter, (for oscilloscope calibration) RCA Type MI-21200-C1
VoltOhmyst, RCA Type WV-97A
Video Sweep Generator, RCA Type WA-21A
Oscilloscope, Tektronix Type 524-D

DESCRIPTION

GENERAL

The RCA Type TM-6A Master Monitor shown in Figure 1, provides in a compact chassis a complete monitoring unit for the observation of picture signals. It may be used for both picture (kinescope) and waveform (oscilloscope) monitoring of signals at any stage of transmission from the camera to the output of the television transmitter. The TM-6A Monitor is normally supplied in chassis form and is designed for mounting in a console housing (MI-26266-B), in a field case (MI-26521-A), or in a standard cabinet rack by using a rack mounting adapter (MI-26526). When the monitor is mounted in the console housing (MI-26266-B), installation of a blower kit (MI-26579-B) is strongly recommended to insure operation of the monitor within its temperature rating of 85° C.

The unit employs a ten-inch aluminized kinescope for direct picture monitoring, and a five-inch cathode ray tube (CRT) for waveform observation. If desired, the kinescope and CRT can be used to display independent signals simultaneously.

Signal voltage levels may be conveniently measured on the CRT by means of an engraved scale mounted in front of the screen. Three separate scales are provided, one each for composite, non-composite, and modulated signals. These scales are edge lighted to increase their legibility and the illumination may be adjusted from full brightness to extinction.

A jack has been provided on the front panel for use of an MI-21200-C1 Plate Current Meter to facilitate oscilloscope calibration.

The horizontal scanning frequency of the oscilloscope is half that of either the horizontal or vertical scanning frequencies, whichever is selected by the operator. The oscilloscope therefore displays two cycles of the corresponding horizontal or vertical waveform. In addition, oscilloscope sweep expansion is provided. This permits detailed observation of the signal during either the vertical or the horizontal synchronizing periods.

The primary operating controls are conveniently located on the front panel. Other operating controls which are used frequently are mounted under a cover at the top of the panel. Controls used only for initial set-up are mounted on the left side of the chassis. See Figure 5. All monitor components are readily accessible for servicing.

A twelve-contact plug, coaxial connectors, and convenient test jacks at the rear of the monitor chassis provide for the connection of all necessary input power, video, and synchronizing signals. A safety interlock switch is mounted on the monitor chassis. Withdrawal of the chassis from its case or the console housing automatically opens the B+ circuits in the unit. When it is necessary to apply power to the unit while the chassis is removed from its case, the interlock switch can be pulled out to a latched position which will permit temporary application of power.

Three transformers built into the unit furnish current for the indicator lights and tube heaters. Power for the tube plate circuits, and the kinescope centering voltage, must be obtained from an external regulated power supply such as the RCA Type WP-33B.

The control cover at the top of the panel incorporates an illuminated plastic number to identify the monitor's position in the video chain. This number changes color when the picture displayed by the monitor is switched into the program line. Replaceable plastic inserts numbered from 1 to 9 are supplied with the equipment.

CIRCUITS

To facilitate description of the circuits in the TM-6A Master Monitor, they may be grouped into sections according to their main function. These groupings are shown in the Block Diagram, Figure 2, and are as follows:

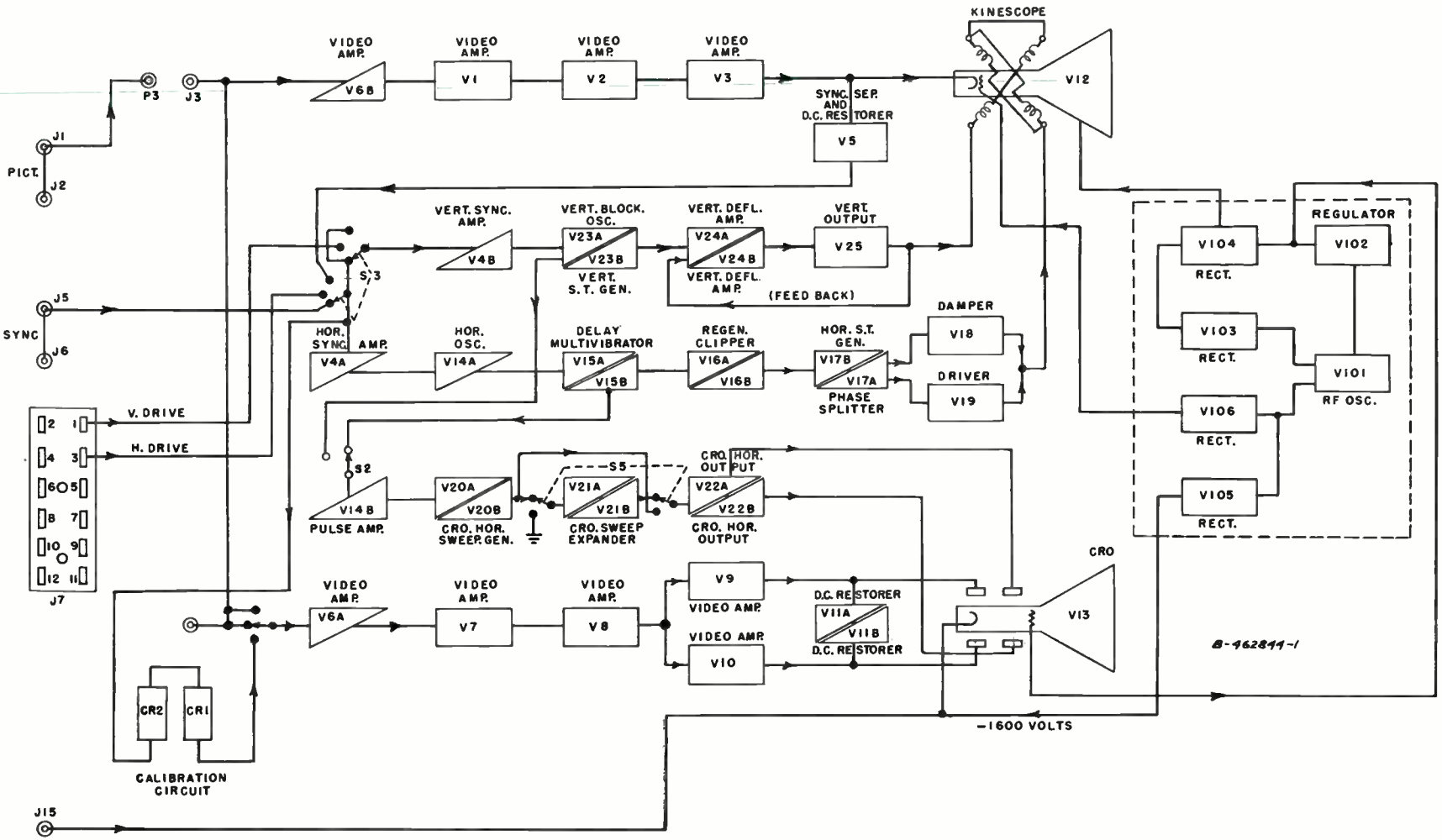


Figure 2 - TM-6A Block Diagram

SIGNAL INPUT
KINESCOPE
Picture signal amplifier
Vertical deflection
Horizontal deflection

OSCILLOSCOPE
Picture signal amplifier
Horizontal deflection

HV POWER SUPPLY

Refer to the Schematic Diagram, Figure 12 during the subsequent circuit description.

Signal Input Circuits

The PICT input jacks, J1 and J2, are connected in parallel to facilitate correct termination of low impedance lines. By disconnecting plug P3 from jack J3, high impedance lines may be connected directly to jacks J3 or J4.

A picture signal applied to one of the PICT input jacks, J1 or J2, normally is fed simultaneously to the kinescope and the oscilloscope picture amplifiers. However, by disconnecting a jumper between jacks J3 and J4, different signals may be applied to the kinescope and the oscilloscope amplifiers.

Kinescope - Picture Signal and Synchronizing Circuits

The picture signal is capacitively coupled to the first picture amplifier, V6B. A variable resistor, R4, in the cathode circuit controls the picture contrast.

Output from the cathode of V6B passes through three stages of amplification, V1, V2, and V3, to the cathode of the kinescope, V12, and to the grid of the synchronizing pulse separator tube, V5. Tube V5 also functions as a d-c restorer to maintain constant picture black level in the kinescope. Resistors R29 and R32 are the kinescope FOCUS and BRIGHTNESS controls.

If a composite signal is used (combined picture and RTMA sync) only the synchronizing portion of the signal is reproduced in the plate circuit of V5. This separated synchronizing signal is then applied to the selector switch, S3, on the right side of the chassis, which should be set to the SEP SYNC position.

When an externally supplied synchronizing signal is used, this signal should be connected to either jack J5 or J6, and switch S3 should be set to the EXT SYNC position.

In either of the preceding cases, the synchronizing signal is fed from S3 to the horizontal and vertical pulse amplifiers, V4A and V4B.

After amplification and inversion, the horizontal synchronizing pulses trigger the horizontal blocking oscillator, V14A. The vertical synchronizing signal is integrated and applied to the vertical blocking oscillator, V23.

When the monitor is used in "Driven" operation, switch S3 should be set to the DRIVE position. This will open the cathode circuits of the horizontal and vertical blocking oscillators and make these tubes inoperative.

Driving pulses obtained from an external synchronizing generator or associated camera control equipment, are connected to the appropriate terminals of the twelve-pin connector, J7. The pulses are then applied through switch S3 to their respective sections of tube V4. The amplified and inverted vertical drive pulse is fed to the vertical sawtooth generator, V23B. The horizontal pulse triggers the horizontal delay multivibrator, V15B.

Kinescope - Vertical Deflection

The plate and grid circuits of V23A are coupled by transformer, T1, to form a blocking oscillator.

The circuit has been designed to oscillate at a frequency much higher than the scanning frequency. During the first cycle of oscillation, the charge developed on capacitor C23 will cut off the plate current of V23A after a single pulse.

The negative blocking charge then leaks off through resistors and the cycle is repeated. This action results in a succession of pulses in the grid and plate circuits of V23A.

The blocking frequency of the oscillator is controlled by the RC values in the grid circuit of V23A and by the grid bias. A variable resistor, R48, is provided in the circuit to adjust the free blocking rate of the oscillator to a frequency slightly below the scanning frequency. The integrated synchronizing pulse from V4B will then lock-in and determine the tripping point of the oscillator for proper synchronization. For "Driven" operation, the oscillator is made inactive and the pulse for the vertical sawtooth generator is obtained from an external source.

The vertical sawtooth generator, V23B, generates the sawtooth waveform in the following manner:

Capacitor C26 is charged slowly through resistor R53 which is in series with the positive supply to the plate of V23B. This results in a gradually rising potential which forms the slanting front of the sawtooth wave. When a positive pulse from the blocking oscillator section is impressed on the grid of V23B, capacitor C26 discharges causing the sharp drop in potential which forms the steep rear edge of the sawtooth wave.

The sawtooth is coupled into the grid of V24A which is a comparison amplifier. Simultaneously, a feedback voltage, corresponding to the current sawtooth in the vertical deflection coils of the yoke, is fed back into the cathode of the same tube. The difference between these two waveforms is amplified and fed through a shaping circuit of V24B. The amplified output of this stage drives the output tube, V25, which is transformer coupled to the deflection yoke. The KINE HEIGHT control, R64, varies the amount of feedback signal and thereby changes the picture size.

Control of vertical centering is obtained from an externally supplied bias potential applied across R64. By moving the adjustable arm on R64 to either side of its center tap, a biasing current will flow through the deflection yoke and form a fixed magnetic field. This field shifts the magnetic deflection field set up by currents from transformer T2 up or down as required.

Kinescope - Horizontal Deflection

The operation of the horizontal blocking oscillator circuit is similar to that of the vertical blocking oscillator. Since the horizontal scanning frequency is much higher (15,750 cycles per second) than the vertical scanning frequency, the values of the frequency determining capacitors and resistors are lower.

The blocking rate of the oscillator is adjusted by R112 to assure proper lock-in and control by the positive timing pulses from the synchronizing pulse amplifier, V4A. For driven operation, the oscillator tube is made inactive and the pulse for the discharge tube is obtained from an external source.

The function of the horizontal delay multivibrator, V15, is to provide a positive pulse at the line frequency, the timing of which may be either coincident or delayed with respect to the synchronizing pulse. This multivibrator is triggered by either a positive pulse from the cathode of the horizontal blocking oscillator, V14A, or the "Drive" pulse from the plate of the horizontal pulse amplifier V4A. The HOR. DELAY control, R120, adjusts the amount of delay.

The desired waveform is selected by the HOR - VERT - PULSE CROSS switch, S2, and then differentiated and fed to the regenerative clipper, V16, to produce a positive rectangular pulse which triggers the horizontal sawtooth generator V17B. With S2 in the PULSE CROSS position, the driving pulse is

delayed a fixed amount with respect to the original synchronizing pulse thereby causing the blanking interval of the video signal to appear on the kinescope. See Figure 3 . The value of capacitor C83 should be adjusted so that the width of the driving pulse is 6.5 microseconds. The phase splitter, V17A, produces a positive-going sawtooth in its cathode and a negative-going sawtooth in its plate. These two signals are coupled to the driver and damper tubes, V19 and V18, respectively.

The horizontal output circuit is similar to a conventional push-pull amplifier but differs in that the damper winding returns to ground. The damper tube controls the energy supplied by the driver tube and thus requires no plate current directly from the power supply. The HOR CENTERING control, R147, is provided to introduce the horizontal centering current in the yoke.

Oscilloscope - Picture Signal Amplifier

The composite picture signal input to the oscilloscope amplifier is capacitively coupled to the grid of the cathode follower tube V6A. An adjustable resistor, R70, is used to control the gain of this tube. The composite picture signal is coupled from the cathode of V6A through two stages of amplification, V7 and V8, to a cathode-coupled amplifier stage using tubes V9 and V10. The output from the amplifier is applied to the vertical deflection plates of the oscilloscope tube, V13, and to the d-c restorer tube, V11.

The lever switch, S1, on the right-hand side of the panel enables selection of either of two response characteristics for the CRO amplifier.

When S1 is in the WIDE position, the bandwidth and flatness of the amplifier are maximum. With S1 in the NARROW position the frequency response complies with the recommended IRE standard roll-off characteristic.

Oscilloscope - Horizontal Deflection

In order to obtain patterns of both vertical and horizontal scanning waveforms on the oscilloscope screen, the oscilloscope scanning frequency is one-half that of the corresponding kinescope line or field frequency. This results in two complete waveforms of the selected scanning rate appearing on the oscilloscope screen.

With switch S2 in the CRO VERT position, the pulse amplifier, V14B, is coupled to the vertical blocking oscillator, V23A. The output of V14B is fed into the half-frequency oscillator, V20, to provide the proper horizontal sweep frequency for the oscilloscope.

With switch S2 in the CRO HOR position, the output of V14B is coupled to the horizontal frequency blocking oscillator, V14A.

The half-frequency oscillator, V20, consists of a common-cathode type multivibrator which is triggered by alternate horizontal or vertical pulses. Either a 30-cycle or a 7850-cycle sawtooth is produced at pin 7 of V20, depending upon which time base is desired.

A sweep expander, V21, may be switched into the CRO scanning circuit to facilitate detailed examination of horizontal and vertical blanking pulses. This tube functions as a cathode coupled clipper, which removes the top and bottom peaks from the deflection sawtooth and then amplifies the signal to its original peak-to-peak magnitude. The center of the sweep interval is deflected at a rapid rate thereby effectively expanding the desired portion of the signal approximately eight times. The portion of the waveform to be expanded is adjustable by means of the CRO EXPAND control, R168, so that the blanking intervals may be exactly centered.

The pattern on the CRO screen may be centered by means of the balanced HOR CENT control, R178-R179, and the VERT CENT control, R100-R101. The CRO ASTIGMATISM control, R197, may be adjusted to eliminate distortion of the CRO electron beam and to provide sharp overall focusing.

High Voltage Power Supply

High voltage power is obtained from an r-f type supply enclosed in a case at the rear of the Master Monitor. See Figures 5, 10, and 11. This power unit contains four rectifier tubes, V103 to V106, which are driven from the r-f oscillator, V101, through the high voltage transformer, T102. See Figure 13.

This unit supplies 11 KV kinescope *ultor potential, the 1800 volt kinescope focusing potential, and the -1600 volt cathode potential for the oscilloscope tube. The values of these output voltages have been established at the factory by presetting a control resistor, R104, in the cathode of the regulator tube, V102.

The regulator circuit which includes V102 and its associated components, stabilizes the output voltages and minimizes voltage change with variation in load current.

This unit is interchangeable with an identical unit used in the TK-31A Field Camera Control, and is available separately as MI-26588.

ADAPTATION FOR CAMERA CONTROL

Two potentiometers, R148 and R149, included in the monitor assembly function only when the monitor is connected to the camera control unit of a camera chain. These potentiometers are ganged with the VERTICAL HOLD control, R48, and the HORIZONTAL HOLD control, R112, respectively. The camera control unit furnishes an 18-volt d-c biasing potential that is applied across the picture gain control, R149, and the pedestal control, R148.

Under this condition of operation, the monitor is used as a driven unit and requires no adjustment of the picture hold controls on the panel. Consequently, when the monitor is used in a driven application, appropriately marked knobs for the pedestal and gain controls are provided for mounting on the control shafts.

*Final accelerating voltage.

INSTALLATION

The Master Monitor chassis is carefully boxed and shipped complete with tubes in place except the kinescope (10SP4) and the cathode ray tube (5UP1). These tubes are shipped in separate cartons.

Carefully remove the monitor chassis from the shipping package, remove all packing material and inspect the unit for possible damage and loose parts incurred during shipment.

CAUTION

DO NOT USE THE HANDLE ON THE KINESCOPE AND YOKE ASSEMBLY AS A MEANS OF LIFTING THE ENTIRE MONITOR.

INSTALLING KINESCOPE AND CATHODE RAY TUBE

Each RCA kinescope and cathode ray tube is shipped in a special carton and should always be left in its carton until ready for installation in the equipment. Retain the cartons for future use.

WARNING

DO NOT OPEN THE SHIPPING CARTON, INSTALL, REMOVE, OR HANDLE KINESCOPE OR OSCILLOSCOPE TUBES IN ANY MANNER UNLESS SHATTERPROOF GOGGLES AND HEAVY GLOVES ARE WORN. PERSONS NOT SO EQUIPPED SHOULD BE KEPT AT A SAFE DISTANCE FROM THE TUBES BEING HANDLED. KEEP THE TUBES AWAY FROM THE BODY AT ALL TIMES.

The kinescope and cathode ray tubes are highly evacuated and, in view of their large surface area, are subjected to considerable air pressure. For this reason, it is important that all cathode ray tubes be handled with extreme care.

The large ends of the tubes, particularly that part at the edge of the viewing screen, must not be scratched, nor subjected to shocks or more than moderate mechanical pressure at any time. If the bulbs fail to slip smoothly into place or any fittings stick or bind, investigate and correct the cause of the trouble. DO NOT FORCE THE TUBES OR FITTINGS.

To Install the Kinescope Proceed as Follows:

1. Loosen the screw in the slotted hole of the interlock mounting bracket. See Figure 6. Temporarily move the interlock to the outside of the chassis.

2. Using a screwdriver, unfasten the band assembly for the large diameter end of the kinescope. See Figure 7.

3. Remove the two thumbscrews which secure the yoke bracket in which the kinescope neck will be supported. See Figure 7.

4. Assemble these components to the kinescope, making certain the HV anode terminal is properly oriented. (The kinescope should be rotated to position the high voltage anode terminal approximately 45 degrees counterclockwise from the handle of the assembly, when viewed from the base end.) Mount the complete kinescope and bracket assembly by reversing the previous instructions.

5. Replace the interlock in its normal position. Plug the connector cable from the deflection yoke into jack J8. Attach the kinescope socket connector to the base of the tube, and the flexible high voltage lead to the anode terminal.

To Install the Cathode Ray Tube

Loosen the supporting band near the panel opening, and remove the thumbscrews from the clamp for the tube neck. See Figure 8. Slip the metal shield over the cathode ray tube neck then mount the tube as shown. Replace the tube supports then plug the connector onto the tube base.

LINE VOLTAGE SETTING

Measure the line voltage on which the equipment is to be used. Adjust the input tap on transformers T6 and T7 by connecting the tap lead to the proper primary terminal, either 2, 3, or 4, for line voltages of 109, 117, or 125 volts respectively.

SWITCH SETTING

The specific manner and location in which the monitor is to be used will determine the setting of switch S3 which is built into the right-hand, rear of the chassis. See Figure 6. Since this switch is not accessible from the front panel it must be preset before the monitor is enclosed.

When the monitor is used with a camera or film pickup chain, external driving signals are supplied by the synchronizing generator; therefore, switch S3 should be set to **DRIVE**.

Where the unit is to be used as a relay or line output monitor and the synchronizing signals in the composite video signal are to be used for synchronizing, switch S3 should be set to **SEP SYNC**.

The horizontal and vertical drive pulses should be connected to jack J7 as shown in the Schematic Diagram, Figure 12.

If the monitor is to be operated with externally supplied synchronizing signals, set switch S3 to the **EXT SYNC** position.

SIGNAL INPUT

Four picture input connectors are provided on the unit, the two at the rear (J1 and J2) are connected in parallel and are used in applications where the kinescope and oscilloscope are to be operated from a common picture signal source. Connectors J3 and J4, on the right side of the chassis, provide for lower capacity inputs and also permit the kinescope and oscilloscope to be operated on independent signal inputs.

The monitor is designed primarily for bridging applications and has a high input impedance for both the kinescope and oscilloscope. When used at the termination of a line it will be necessary to provide the proper line termination in the monitor to obtain satisfactory operation of the unit.

Synchronizing signals should be connected to the monitor through either jack J5 or J6. These parallel connected jacks enable termination or continuation of the line.

The horizontal and vertical drive pulses should be connected to jack J7 as shown in the Schematic Diagram. Figure 12.

SCALES

Three engraved plastic scales intended for use with the oscilloscope are supplied with the monitor. These scales are calibrated to permit convenient determination of the voltage level of the displayed signals.

The appropriate scale should be mounted before the cathode ray tube screen in accordance with the monitors application. These applications and the corresponding scale numbers are as follows:

Scale No. 1 - Used for monitoring video signal before sync has been added.

Scale No. 2 - Used for monitoring composite signals. (The monitor is shipped with this scale in place.)

Scale No. 3 - Used for transmitter monitoring where depth of modulation is to be measured.

The scales are edge-lighted to increase legibility and may be adjusted by a control under the cover at the top of the panel.

INTERCONNECTIONS

All applications of the monitor will require connection to a 280 volt, regulated d-c power supply such as the RCA Type WP-33B Studio Supply, a type TY-31A Field Supply, or an equivalent unit. The power supply must also provide kinescope centering current.

A source of 117 volts a. c. will be required for the primary of the tube heater transformers.

Power and driving pulses (when used) are connected to the twelve contact jack, J7, on the rear of the monitor.

When the monitor is to be used with composite picture signals or external sync pulses, connect jack J7 to the power source through a five conductor cable as follows:

PIN	CONNECT TO
7	117 volts a. c.
8	117 volts a. c.
9	+280 volts d. c.
11	Centering Potential
12	Ground

When the monitor is to be used with horizontal and vertical drive pulses, make the following additional connections using coaxial cable.

PIN	CONNECT TO
1	Vertical Drive Pulses (60 cps)
3	Horizontal Drive Pulses (15, 750 cps)
12	Shielding Braid (ground)

When the monitor is used as part of a camera control, the illuminated identifying number at the top of the panel is connected through J7 and the twelve conductor cable to the camera control and thence to the switching unit.

This number changes from white to red when the picture displayed by the monitor is switched to the program line.

ADAPTATION FOR FILM CAMERA CHAIN

When the monitor is used as part of a film camera chain, a coaxial cable carrying video, and a twelve conductor cable are required between the camera control and the monitor. The two leads in the twelve conductor cable that carry the horizontal and vertical driving pulses should be coaxial to minimize cross-talk from these pulses. This cable also supplies a -18 volt d-c bias potential to the video gain and pedestal controls in the monitor.

When the monitor is used in this type of operation, the knobs marked P and G which are supplied with the equipment should be placed on the left and right potentiometer shafts respectively. Additionally, mount calibration scale number 1 in front of the oscilloscope screen.

PRELIMINARY ADJUSTMENTS

The monitor should be checked as follows for operation before installation in the console or carrying case in which it is to be used.

Place the unit on a support and, after making certain that the HV interlock switch is open, temporarily connect the power input cable as described under "Interconnections." Connect a source of video signals, preferably from a monoscope camera, to the input connector (J1 or J2) and terminate as required.

Pull out the HV safety interlock switch to close the power circuits. Place the kinescope and oscilloscope BRIGHTNESS controls in their minimum position.

WARNING

THE MONITOR UTILIZES VOLTAGES THAT COULD PROVE FATAL IF CONTACTED BY THE HUMAN BODY. OPERATING PERSONNEL SHOULD TAKE EVERY PRECAUTION TO AVOID COMING IN CONTACT WITH EXPOSED CURRENT CARRYING WIRES OR PARTS WHILE MAKING ADJUSTMENTS.

Checking the Kinescope

Switch on the power supply and allow the monitor tubes to warm up for about two minutes.

Gradually increase the KINESCOPE BRIGHTNESS control to the point where the entire kinescope screen becomes illuminated to the proper brightness. If only a horizontal line is obtained, immediately decrease the brightness since this is an indication that the vertical sweep circuits are not functioning. This condition must be corrected before proceeding further. Refer to the Maintenance section of this book for trouble shooting suggestions.

After picture fragments appear, adjust the VERTICAL AND HORIZONTAL HOLD controls on the lower edge of the panel to fix the picture on the screen.

Further adjustment of the KINESCOPE BRIGHTNESS, FOCUS, and CONTRAST controls should bring in the picture clearly and satisfactorily.

The kinescope CENTERING, HEIGHT and WIDTH controls are located under the cover, on the top front of the panel. The two linearity controls, which have been preadjusted at the factory, are on the left side of the chassis.

Checking the Oscilloscope

With a normal picture signal applied, check the operation of the oscilloscope in the following manner:

Place the lever switch which is located on the right-side of the panel in the **CALIBRATE** position, and the switch on the left-side of the panel in the **CRO VERTICAL** position. Adjust the **OSCILLOSCOPE BRIGHTNESS** control slowly until a pattern is obtained on the oscilloscope screen, then adjust the **OSCILLOSCOPE FOCUS** control and the **ASTIGMATISM** control (on the left side of the chassis) for sharpest definition of the **CRO** pattern.

Place the left-hand switch in the **CRO HORIZONTAL** position. The horizontal deflection line should be level. If correction is necessary, shut off the power and loosen the tube clamp. Alternately rotate the tube slightly and reapply power until the deflection line is horizontal; then, with the power off, retighten the tube clamp.

The **CRO VERTICAL CENTERING** adjustment is located on the front panel; the **HORIZONTAL CENTERING** and **VERTICAL GAIN** adjustments are located under the cover at the top of the panel. The **WIDTH** control is mounted on the left side of the chassis.

Oscilloscope Calibration

Set the right-hand lever switch to **CALIBRATE**, then plug a calibration meter (**RCA MI-21200-C1**) into the **CRO CALIBRATION METER** jack on the panel. Adjust the **CRO CALIBRATION** control (located at the top of the panel) until the meter indicates *1.4 ma or any desired reference level.

Remove the meter plug from the jack, then adjust the **OSCILLOSCOPE VERTICAL CENTERING** control and the **CRO GAIN** control until the trace on the cathode ray tube coincides with the proper range on the calibration scale.

*The meter indication in milliamperes corresponds to the peak-to-peak voltage level.

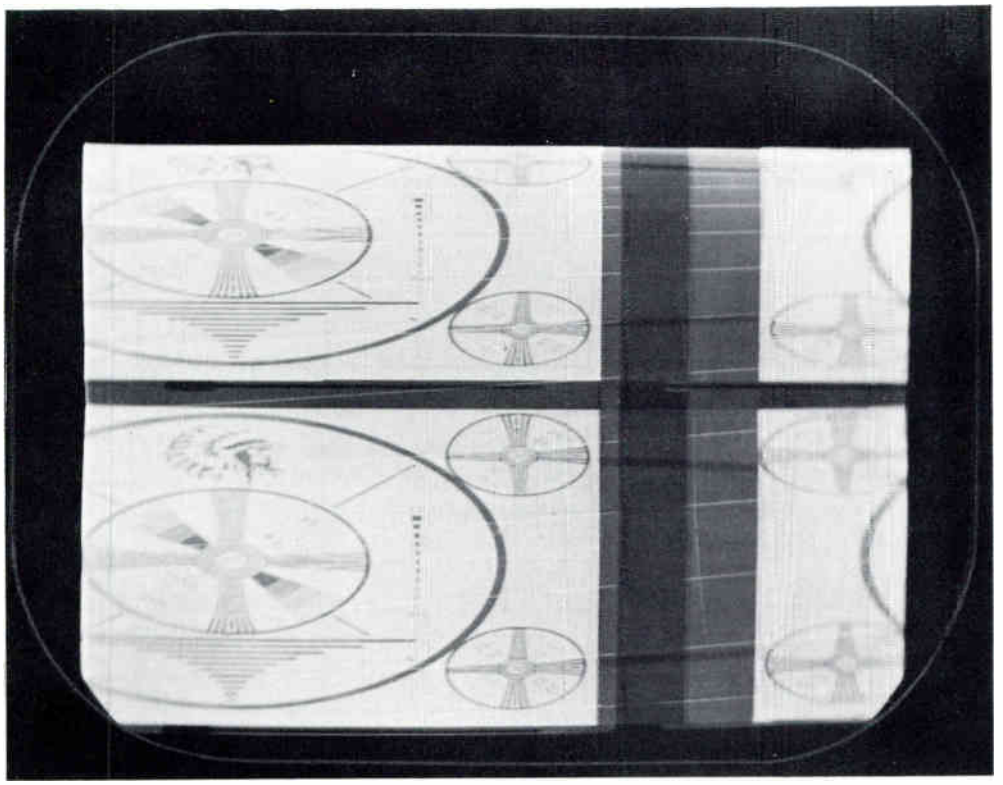


Figure 3 - Pulse Cross Display

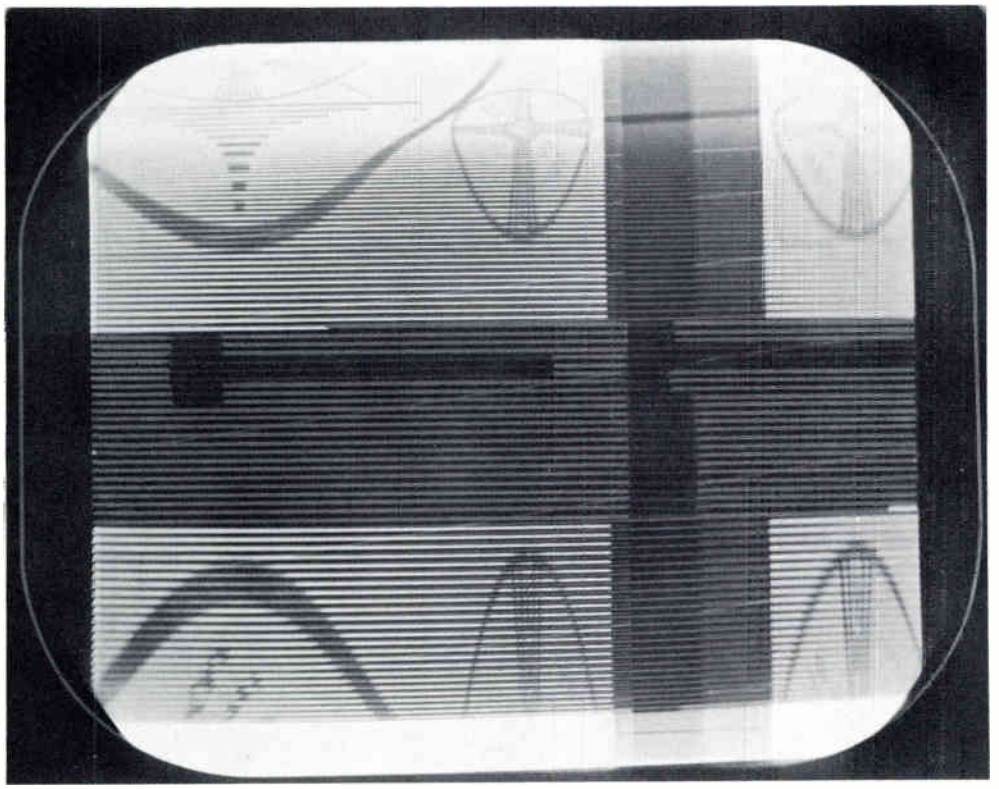


Figure 4 - Pulse Cross Display, Expanded

OPERATION

The TM-6A Master Monitor requires very little adjustment on the part of the operator when in use. It is put into operation simultaneously with its associated equipment by turning on the power supply.

The video signals being handled at the monitoring point will appear as a picture on the kinescope screen and serve to check the output of the pickup chain, relay receiver, or line signals as the case may be. Slight readjustment of kinescope brightness and focus controls may be necessary as tubes age or to compensate for variations in room lighting.

The oscilloscope enables the operator to check the waveform of the composite signal and to measure the voltage levels of the signal input to the monitor.

WAVEFORM CHECK

Place the left-hand lever switch in the CRO VERTICAL position to obtain a double pattern (two fields) of the vertical pulses.

Change the switch to the CRO HORIZONTAL position to obtain a double pattern of the horizontal waveform.

SIGNAL VOLTAGE LEVELS

The waveforms displayed on the oscilloscope screen will have a peak-to-peak value equal to the percentage of the reference signal indicated on the calibration scale.

PULSE CROSS DISPLAY

The pulse cross display provides a convenient means of checking the width of the blanking and synchronizing pulses.

When switch S2 is set to the PULSE CROSS position, the start of each horizontal scanning line is delayed. This causes the horizontal blanking and synchronizing pulses to appear as a vertical band near the center of the raster. The amount of delay may be adjusted by means of the HORIZONTAL DELAY control, R121, on the side of the monitor chassis.

The vertical deflection rate is changed to 30 cycles per second which causes the vertical blanking and synchronizing pulses to appear as a horizontal band near the center of the raster.

The ratio of the measured horizontal pulse width to the total raster width will be a good approximation (neglecting retrace time) of the actual pulse width with respect to the horizontal period.

Vertical pulse widths can be determined by counting the horizontal lines within the pulse. The number of equalizing pulses can be counted directly.

The procedure recommended for setting up the pulse cross display is as follows:

1. With switch S2 in either the CRO VERT or the CRO HOR position, reduce the KINESCOPE CONTRAST and increase the KINESCOPE BRIGHTNESS until the retrace lines are visible.

2. Set switch S2 to the PULSE CROSS position. The picture should change to that shown in Figure 3.

3. Press the CRO EXPAND pushbutton which will expand the picture vertically as shown in Figure 4.

MAINTENANCE

The circuit components and tubes in the TM-6A Master Monitor are operated with an ample factor of safety to assure long life and consistent performance. For this reason, sudden and complete failure is rare and is usually due to causes external to the monitor. Gradual loss of brightness, focus, contrast, or picture size will result from natural aging and decreased electron emission in the tubes.

The following trouble chart will assist in determining the probable cause of improper monitor operation by associating the trouble with tubes or components that may be involved. Check the tubes first, and if the tube is not found defective, then check the associated circuit components for deviation from original values, open circuits, short circuits, or grounds.

When the chassis is withdrawn from the console, the various tubes and circuit components are readily accessible. A defective resistor or capacitor may frequently be detected by visual examination for charred or discolored surfaces that indicate excessive heating.

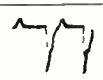
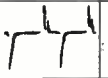
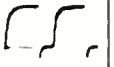
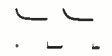
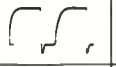
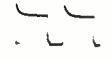
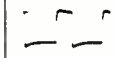
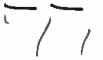
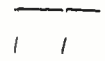
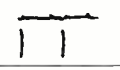
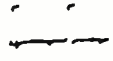
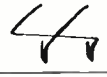
TROUBLE SHOOTING SUGGESTIONS

SYMPTOMS		PROBABLE FAULT
KINESCOPE	OSCILLOSCOPE	
No picture	Remains blank with S2 in any position.	117V supply off. 280V supply off. RF power supply V101, T102.
	Pattern	Picture amplifier, V6B, V1, V2, V3. Anode lead disconnected. Sync drive switch, S3, in wrong position.
	Horizontal line.	No video input signal.
Weak picture, proper deflection.	Pattern	Kinescope BRIGHTNESS control, R32, or kinescope CONTRAST control, R155, improperly adjusted.
	Weak pattern	Picture amplifier, V6. RF Power Supply, V102.
Horizontal deflection incorrect	Large pattern	Hor. generator, V14A, V15. Width control, R130 improperly adjusted.
Vertical deflection incorrect	Normal	Vertical generator, V23, V24, V25. Height control, R65, improperly adjusted.
Picture folded back, left side	Correct pattern	Damper tube, V18. Linearity controls, R132, R140, improperly adjusted.
Picture bounces or tears out on screen	Picture changes size	Low voltage or r-f high voltage power supply not regulating.

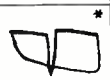
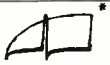
TYPICAL OPERATING VOLTAGES AND WAVEFORMS

	TUBE			PLATE				GRID				CATHODE				SCREEN	
Sym-bol	Type	Function	Operating Condition	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage
V1	6AH6	1st Picture Amplifier	Normal	5	185	1.6		1	1.44	0.45		7	3	0.32	Same as pin 1	6	160
V2	6AH6	2nd Picture Amplifier	Normal	5	265	7.5	Same as V1, pin 1	1	0	1.6	Same as V1, pin 5	7	1.68	0.95	Same as V1, pin 5	6	160
V3	5763	3rd Picture Amplifier	Normal	1	200	40	Same as V1, pin 5	8,9	0	7.5	Same as V1, pin 1	7	5.7	3.0	Same as V1, pin 1	6	235
V4A	1/2-12AT7	Synchronizing Amplifier	Sep. Sync.	1	215	70		2	-0.96	11		3	0	0			
			Drive	1	215	45		2	-0.35	3.0		3	0	0			
			Ext. Sync.	1	215	65	Same as Sep. Sync.	2	-0.4	3.5		3	0	0			
V4B	1/2-12AT7	Synchronizing Amplifier	Sep. Sync.	6	88	11		7	-1.58	11	Same as V4A, pin 2	8	0	0			
			Drive	6	90	55		7	-0.84	3.8		8	0	0			
			Ext. Sync	6	90	10.7	Same as Sep. Sync.	7	-0.96	3.5		8	0	0			
V5	6AH6	D-C Restorer & Sync. Sep.	Sep. Sync.	5	280	11	Same as V4A, pin 2	1	-29	40	Same as V1, pin 5	7	0	0		6	28.5
V6A	1/2-12AX7	Cathode Follower Input	Normal	1	280	0		2	4.6	1.4	Same as V1, pin 1	3	6.7	0.8	Same as V1, pin 1		
V6B	1/2-12AX7	Cathode Follower Input	Normal	6	280	0		7	4.5	1.4	Same as V1, pin 1	8	6.4	1.0	Same as V1, pin 1		
V7	6AH6	1st CRO Video Amplifier	Normal	5	180	1.1	Same as V1, pin 5	1	0	0.05	Same as V1, pin 1	7	1.5	0	Same as V1, pin 1	6	160
V8	6AH6	2nd CRO Video Amplifier	Normal	5	155	8.4	Same as V1, pin 1	1	0	1.1	Same as V1, pin 5	7	2.7	0.71	Same as V1, pin 5	6	160
V9	5763	CRO Video Output Amplifier	Normal	1	190	54	Same as V1, pin 5	8,9	78	8.4	Same as V1, pin 1	7	88	3.2	Same as V1, pin 1	6	280

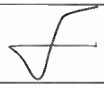
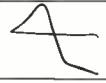
TYPICAL OPERATING VOLTAGES AND WAVEFORMS

	TUBE			PLATE				GRID				CATHODE				SCREEN	
Sym-bol	Type	Function	Operating Condition	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage
V10	5763	CRO Video Output Amplifier	Normal	1	180	49	Same as V1, pin 1	8, 9	78	0		7	88	3.2	Same as V1, pin 1	6	280
V11A	1/2-6AL5	D-C Restorer	Normal	7	-39	4.4						1	4.7	49	Same as V1, pin 1		
V11B	1/2-6AL5	D-C Restorer	Normal	2	28	52	Same as V1, pin 5					5	3.6	4.4	Same as V11A, pin 7		
V14A	1/2-12AT7	Horizontal Oscillator	Sep. Sync. or Ext. Sync.	1	239	350		2	-24	150		3	0.77	31			
V14B	1/2-12AT7	Pulse Amplifier	Sep. Sync. or Ext. Sync. & Vert. or Pulse Cross	6	160	110		7	-6.5	6.5		8	0	0			
			Drive & Vert. or Pulse Cross	6	200	130		7	-9.8	13		8	0	0			
			Horizontal	6	116	80		7	-3.4	9		8	0	0			
V15	12AT7	Delay Multivibrator	Sep. Sync. or Ext. Sync. & Vert. or Hor.	6	248	90		7	0.22	10		8	11.3	14			
			Drive & Vert. or Hor.	6	248	95		7	0.22	5.5		8	11.4	14			
			Vert. or Hor.	1	147	225		2	2.6	75		3	11.3	14	Same as pin 8 (Sep. Sync.)		
V16	12AT7	Regenerative Clipper	Vert. or Hor.	6	275	56		7	54	25		8	66	29			
			Pulse Cross	6	275	56		7	54	25		8	66	29			
			Vert. or Hor.	1	260	20		2	43.5	56	Same as pin 6	3	66	29	Same as pin 8		
			Pulse Cross	1	260	20		2	42	56	Same as pin 6	3	66	29	Same as pin 8		
V17A	1/2-12AT7	Phase Splitter	Normal	1	223	50		2	47	70		3	51	70	Same as pin 2		

TYPICAL OPERATING VOLTAGES AND WAVEFORMS

	TUBE			PLATE				GRID				CATHODE				SCREEN	
Sym-bol	Type	Function	Operating Condition	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage
V17B	1/2-12AT7	Sawtooth Generator	Normal	6	73	70	Same as V17A, pin 2	7	-17	20		8	0	0			
V18	6BQ6	Damper	Normal	Cap	§	§	 *	5	-13.4	50	Same as V17A, pin 1	8	10.8	0.3		4	160
V19	6BQ6	Driver	Normal	Cap	§	§	 *	5	0	65	Same as V17A, pin 2	8	24	0.4		4	170
V20	12AT7	Half-Freq. Multivibrator & Sawtooth Generator	Vert. or Pulse Cross	1	175	115		2	54	31		3	54	26			
			Horizontal	1	175	115		2	54	31		3	54	25			
			Vert. or Pulse Cross	6	126	80		7	38	20		8	54	26	Same as pin 3		
			Horizontal	6	126	80		7	39	17		8	54	25	Same as pin 3		
V21	12AX7	Sweep Expander	Vert. or Pulse Cross & Expand	1	270	6.5		2	-3.1	20	Same as V20, pin 7	3	40	9			
			Hor. & Expand	1	270	6		2	-2.9	18	Same as V20, pin 7	3	40	9			
			Vert. or Pulse Cross & Expand	6	260	26		7	-2.8	0		8	40	9	Same as pin 3		
			Hor. & Expand	6	260	26		7	-2.6	0		8	40	9	Same as pin 3		
V22	12AU7	Cathode Coupled Output	Vert. or Pulse Cross & Expand	1	180	98		2	20.5	26	Same as V21, pin 6	3	29.5	9.5	Same as V21, pin 6		
			Vert. or Pulse Cross & Normal	1	180	82		2	19	19	Same as V20, pin 7	3	29	8	Same as V20, pin 7		
			Hor. & Expand	1	180	105	Same as V21, pin 1	2	20.5	26	Same as V21, pin 6	3	29.5	9.5	Same as V21, pin 6		
			Hor. & Normal	1	180	75		2	19	16	Same as V20, pin 7	3	29	6.5	Same as V20, pin 7		

TYPICAL OPERATING VOLTAGES AND WAVEFORMS

TUBE				PLATE				GRID				CATHODE				SCREEN	
Sym-bol	Type	Function	Operating Condition	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage
			Vert. or Pulse Cross & Expand	6	128	80	Same as V21, pin 6	7	20	0		8	29.5	9.5	Same as V21, pin 6		
			Vert. or Pulse Cross & Normal	6	152	65	Same as V20, pin 7	7	19	0		8	29	8	Same as V20, pin 7		
			Hor. & Expand	6	128	85	Same as V21, pin 6	7	20	0		8	29.5	9.5	Same as V21, pin 6		
			Hor. & Normal	6	152	58	Same as V20, pin 7	7	19	0		8	29	6.5	Same as V20, pin 7		
V23A	1/2-12AT7	Vertical Oscillator	Sep. Sync. or Ext. Sync.	1	180	65		?	-46	250		3	1.1	19			
V23B	1/2-12AT7	Sawtooth Generator	Sep. Sync. or Ext. Sync.	6	2.7	5		7	-63	250	Same as pin 2	8	0	0			
			Drive	6	11.3	5		7	-10.4	18		8	0	0			
V24	12AU7	Vert. Deflection Amp.	Normal	1	140	11.5		2	-2.6	5	Same as V23B, pin 6	3	0.3	3.8	Same as V23B, pin 6		
			Pulse Cross & Expand	1	140	10		2	-2.6	4.3		3	0.3	3.5	Same as pin 2		
			Normal	6	146	50		7	0	5.5		8	2.75	1.1			
			Pulse Cross & Expand	6	146	57		7	0	6		8	2.55	1.3	Same as pin 7		
V25	6S4	Vertical Output	Normal	9	265	360		6	-1.14	50		2	10.5	20			
			Pulse Cross & Expand	9	265	360		6	-13.4	57	Same as V24, pin 6	2	10.5	24			

CRYSTALS IN CALIBRATION CIRCUIT

TUBE				PLATE				GRID				CATHODE				SCREEN	
Sym-bol	Type	Function	Operating Condition	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage D-C	Voltage A-C	Waveform	Pin	Voltage
CR1	1N34A/ 1N48	Calibration Circuit	Sep. Sync.		1.18	8.5							1.28	1.4			
			Drive		1.68	1.7							1.29	1.4			
			Ext. Sync.		1.6	2.4							1.28	1.4			
CR2	1N34A/ 1N48	Calibration Circuit	Sep. Sync.		1.18	8.5	Same as CR1 plate						3.05	11			
			Drive		1.68	1.7	Same as CR1 plate						2.05	3			
			Ext. Sync.		1.6	2.4	Same as CR1 plate						2.35	3.5			
HIGH VOLTAGE POWER SUPPLY																	
V101	6L6	R-F Oscillator	Normal	3	280	§		5	-31	§		8	0	§		4	160
V102	6BQ7	Regulator	Normal	1	160	§		2	-2.7	§		3	0.94	§			
				6	280	§		7	160	§		8	160	§			
V103	1X2A	H-V Rectifier	Normal	Cap	-2.7	§						2, 5, 8	5KV	§			
V104	1X2A	H-V Rectifier	Normal	Cap	5KV	§						2, 5, 8	10.3KV	§			
V105	1X2A	-1600 Volt Rectifier	Normal	Cap	-1540	§						2, 5, 8	0	§			
V106	1X2A	+1800 Volt Rectifier	Normal	Cap	0	§						2, 5, 8	1800	§			

KINESCOPE AND CATHODE RAY TUBE

Symbol	Type	Function	Operating Condition	Voltages and Waveforms
V12	10SP4	Kinescope	Normal picture, composite signal input	Ultor Voltage = 10.3 kilovolts, d.c. Focusing Anode Voltage (pin 6) = 1370 volts d.c. Grid Voltage (pin 2) = -54 volts d.c.; 0 volt a.c. Cathode Voltage (pin 11) = -25 volts d.c.; 40 volts peak-to-peak. (Waveform; same as V1, pin 5.) Screen Voltage (pin 10) = 280 volts d.c.
V13	5UP1	Oscilloscope	Normal presentation, composite signal input	Second Anode Voltage (pin 8) = -0.46 volt d.c. Focusing Anode Voltage (pin 4) = -1140 volts d.c. Grid Voltage (pin 2) = -1525 volts d.c. Cathode Voltage (pin 3) = -1500 volts d.c. Deflection Plates; D-C Voltages: Horizontal - pin 6, 4 volts; pin 7, -2.3 volts Vertical - pin 9, 19 volts; pin 10, -18 volts

*Oscilloscope lead clipped to insulation of plate lead.

/Measured between grid and cathode.

$Do not measure.

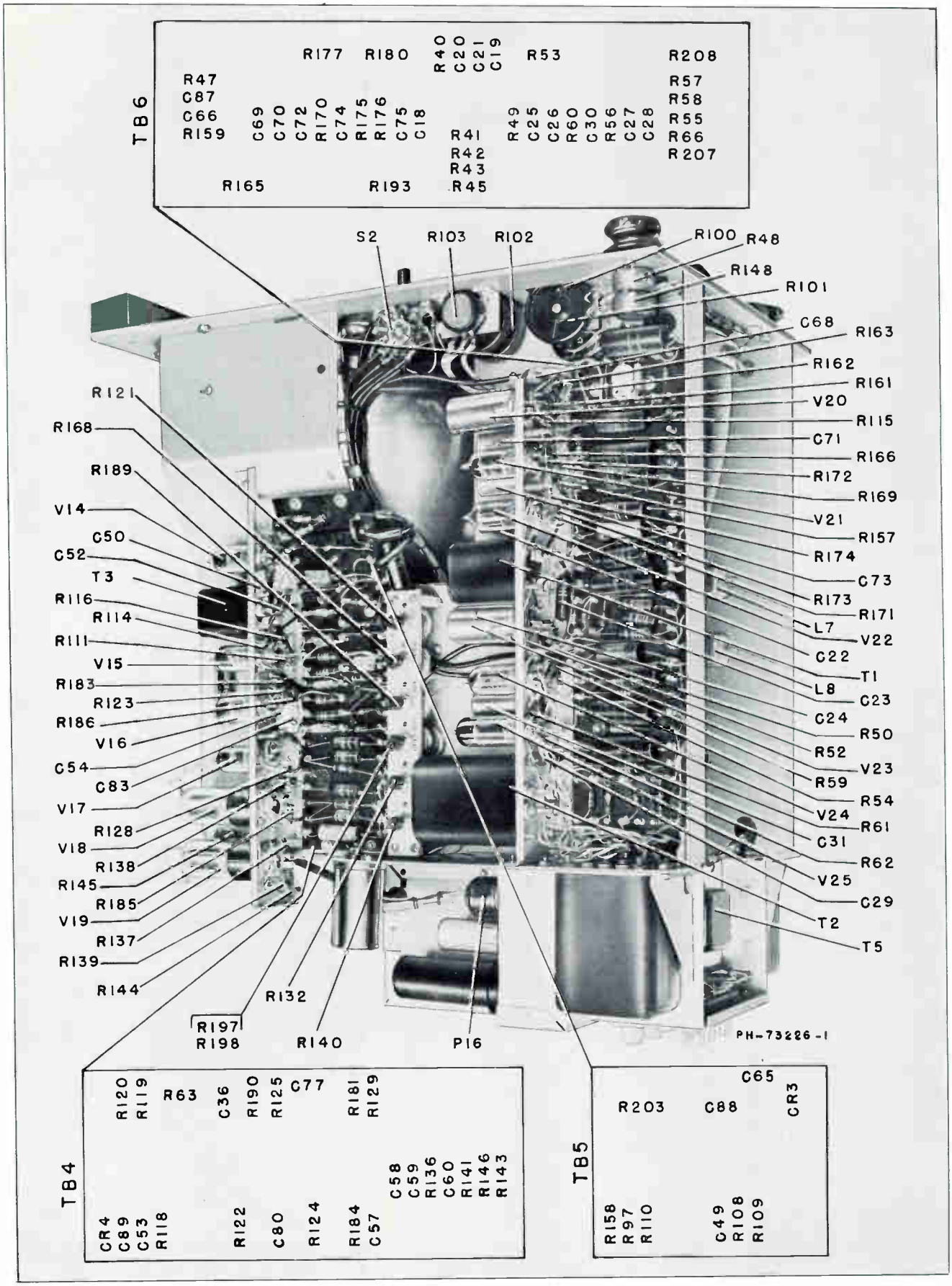


Figure 5 - TM-6A Master Monitor, Left Side

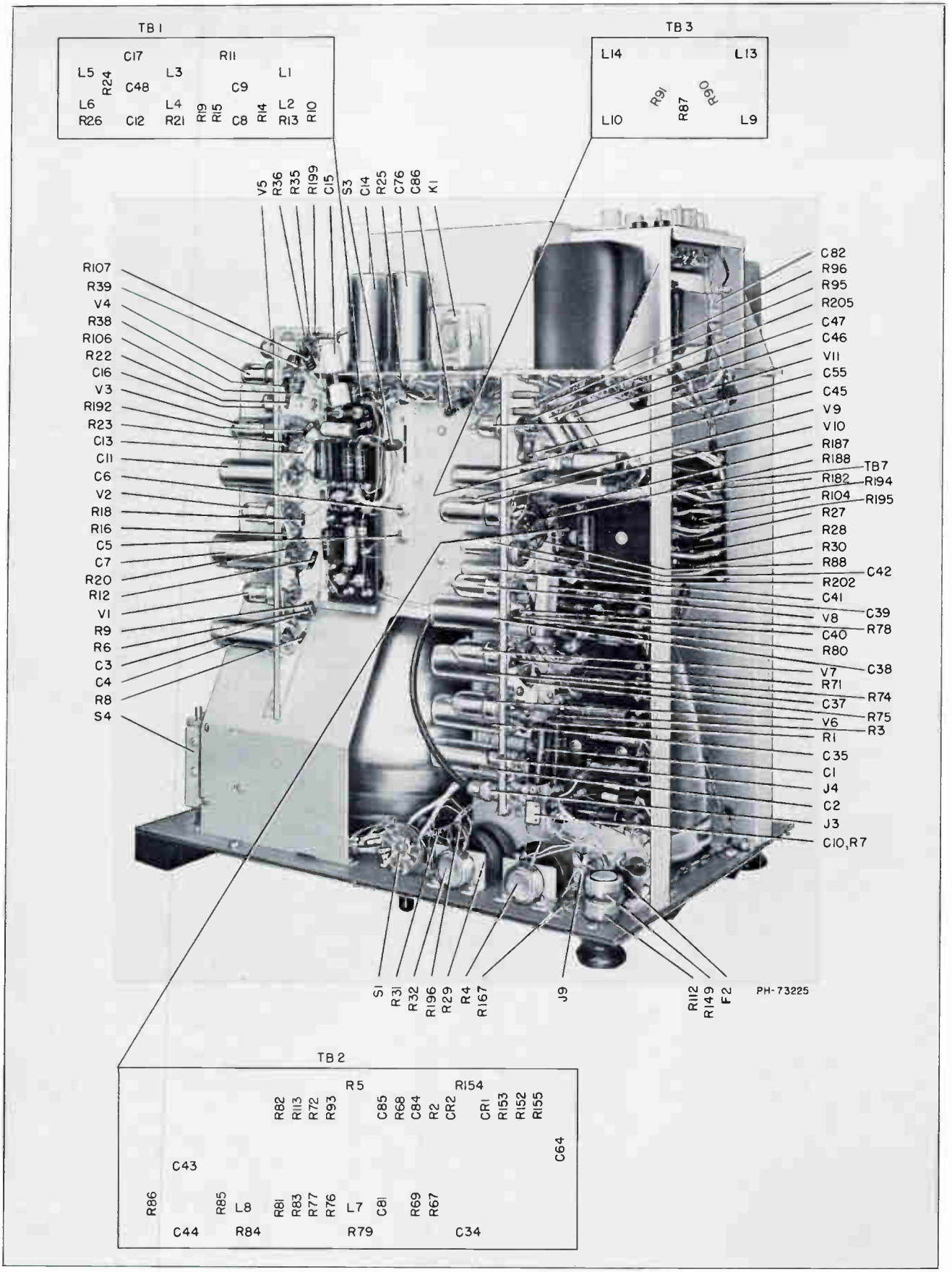


Figure 6 - TM-6A Master Monitor, Right Side

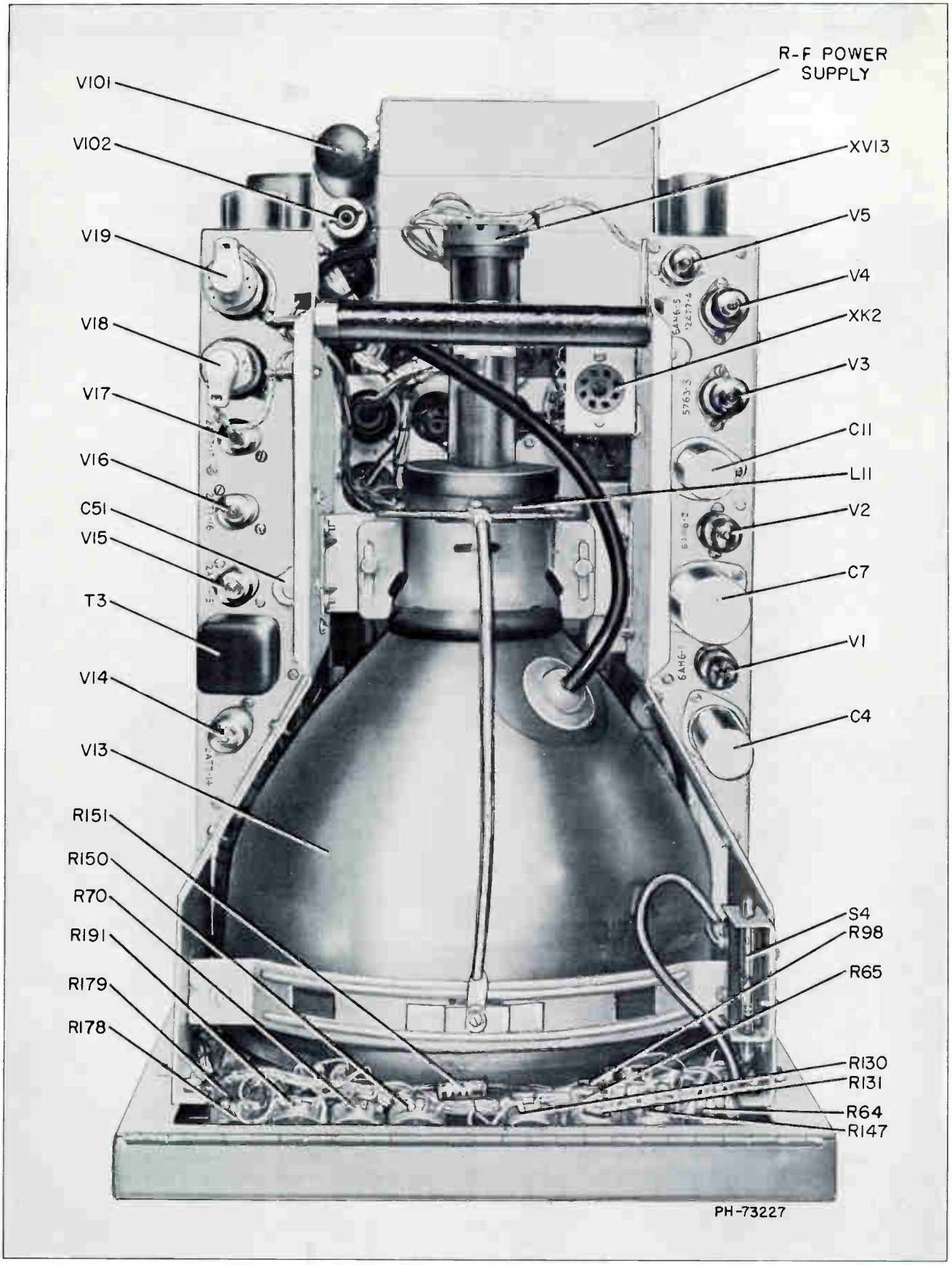


Figure 7 - TM-6A Master Monitor, Top View

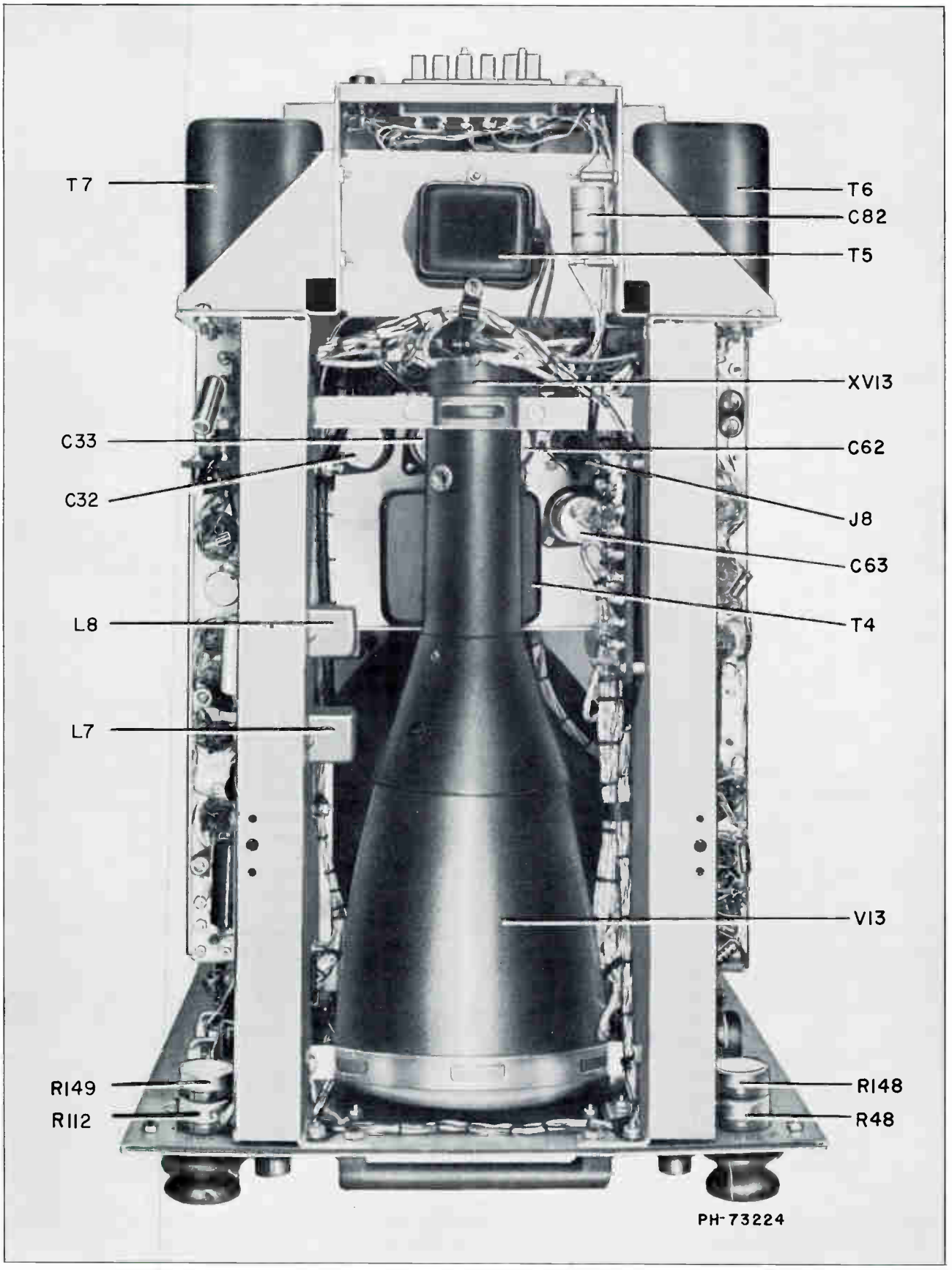


Figure 8 - TM-6A Master Monitor, Bottom View

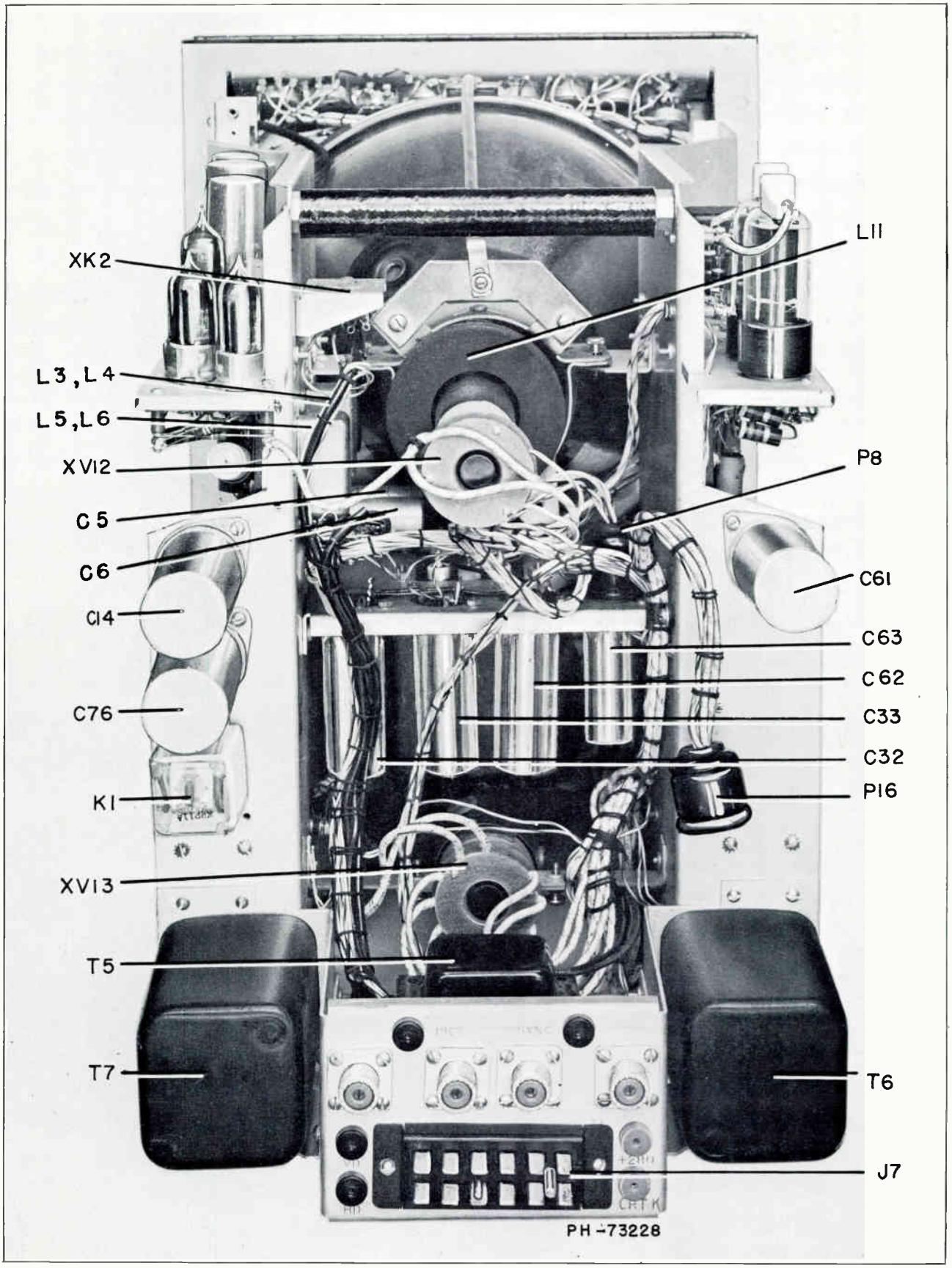


Figure 9 - TM-6A Master Monitor, Rear View

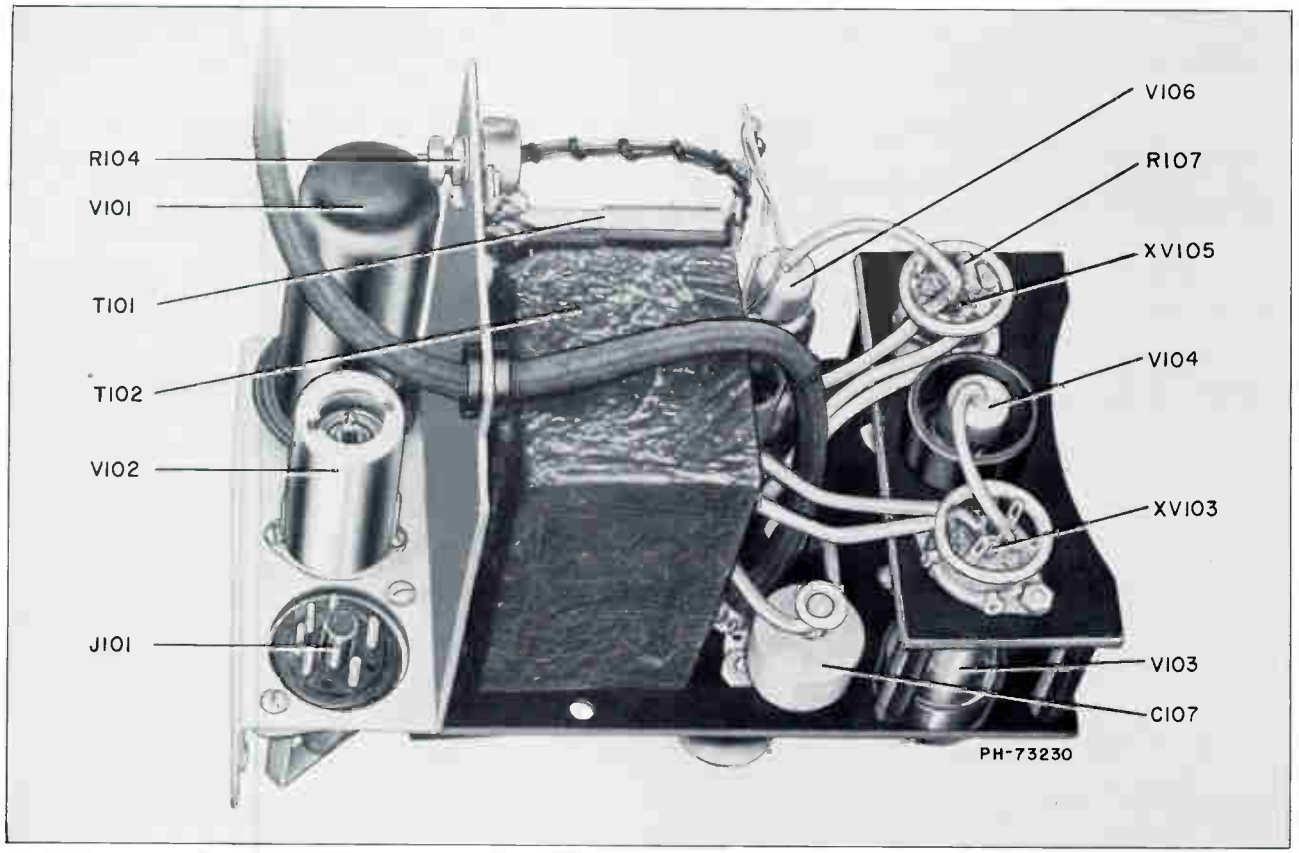


Figure 10 - H-V Power Supply, Cover Removed, Top View

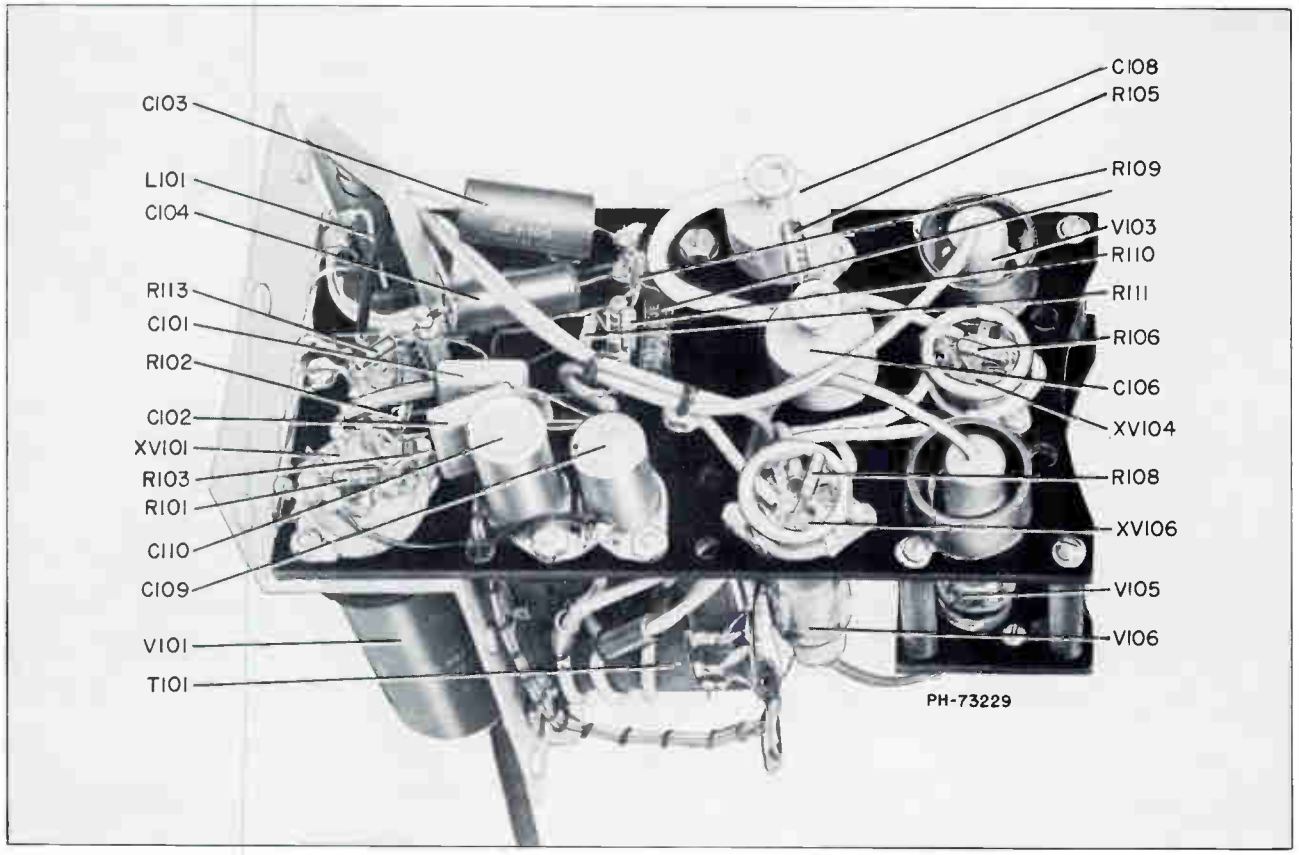


Figure 11 - H-V Power Supply, Cover Removed, Bottom View

REPLACEMENT PARTS AND ENGINEERING SERVICE

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, electron tube, and field engineering service ordering instructions according to the geographical location of the station.

SERVICE PARTS

STATION LOCATION	OBTAIN SERVICE PARTS FROM
Continental United States or Alaska	Local Broadcast Equipment Sales Representative, his office, or directly from the Service Parts Order Service, Bldg.60, 19th and Federal Streets, Camden 5, N. J. Emergency orders may be telephoned, telegraphed, or teletyped to RCA Emergency Service, Bldg.60, Camden, N.J. (Telephone: Woodlawn 3-8000).
Dominion of Canada	Local Broadcast Equipment Sales Representative, his office, or directly from RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec.
Outside of Continental United States, Alaska, and the Dominion of Canada	Local Broadcast Equipment Sales Representative, or Service Parts Order Service, RCA International Division, Gloucester, New Jersey. U.S.A.

ELECTRON TUBES

STATION LOCATION	OBTAIN ELECTRON TUBES FROM
Continental United States or Alaska	Local Distributor or nearest of the following warehouses: 34 Exchange Place Jersey City 2, New Jersey 589 E. Illinois Street Chicago 11, Illinois 420 S. San Pedro Street Los Angeles 13, California
Dominion of Canada	Local Broadcast Equipment Sales Representative, his office, or directly from RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec.
Outside of Continental United States, Alaska, and the Dominion of Canada	Local Distributor or from: Tube Department RCA International Division 30 Rockefeller Plaza New York 20, New York. U.S.A.

If for any reason, it is desired to return tubes, please return them to the place of purchase. If this is not convenient, please notify your RCA serving warehouse so that Return Authorization may be forwarded to you.

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.

FIELD ENGINEERING SERVICE*

STATION LOCATION	REQUEST FIELD ENGINEERING SERVICE FROM
Continental United States or Alaska	Local Broadcast Equipment Sales Representative or the RCA Service Company, Inc., Communications Service Division, Camden, N.J. Telephone: Gloucester 3-4560; emergency service is provided through Woodlawn 3-8000.
Dominion of Canada	Local Broadcast Equipment Sales Representative, his office, or directly from RCA Victor Company Limited, 1001 Lenoir Street, Montreal, Quebec.
Outside of Continental United States, Alaska, and the Dominion of Canada	Chief Engineer RCA International Division 30 Rockefeller Plaza New York 20, New York, U.S.A.

**Charges for field engineering service will be made at current rates.*

PARTS LIST

TM-6A MASTER MONITOR (MI-26136)

FOR ORDERING INFORMATION SEE PAGE 33

SYMBOL NO.	DESCRIPTION	DRAWING NO.	STOCK NO.
C1	Capacitor, 0.47 mf, 200 volt	C-735715-33	73787
C2	Capacitor, 2000 mf, 6 volt	B-458557-2	96185
C3	Capacitor, 180 mmf, 500 volt	P-727856-129	51416
C4	Capacitor, 2000 mf, 6 volt. Same as C2	B-458557-2	96185
C5, C6	Capacitor, 1.0 mf, 300 volt	C-737863-237	94868
C7, A/B/C	Capacitor, three section: sections A and B, 40 mf, 450 volt; section C, 10 mf, 450 volt	B-442900-43	94869
C8	Capacitor, 6800 mmf, 400 volt	C-735715-161	73789
C9	Capacitor, 0.1 mf, 400 volt	C-737818-113	93555
C10	Capacitor, 330 mmf, 500 volt	P-727856-135	39640
C11	Capacitor, 2000 mf, 6 volt. Same as C2	B-458557-2	96185
C12	Capacitor, 0.22 mf, 400 volt	C-737818-95	94904
C13	Capacitor, 330 mmf, 500 volt. Same as C10	P-727856-135	39640
C14, A/B/C	Capacitor, three section: sections A and B, 40 mf, 450 volt; section C, 10 mf, 450 volt. Same as C7	B-442900-43	94869
C15	Capacitor, 0.47 mf, 400 volt	C-737818-96	59512
C16	Capacitor, 0.47 mf, 400 volt	C-737863-383	94867
C17	Capacitor, 4700 mmf, 600 volt	C-735715-259	73920
C18	Capacitor, 0.22 mf, 400 volt	C-735715-129	73794
C19 to C21	Capacitor, 4700 mmf, 600 volt. Same as C17	C-735715-259	73920
C22	Capacitor, 0.47 mf, 400 volt. Same as C16	C-737863-383	94867
C23	Capacitor, 0.022 mf, 400 volt	C-735715-167	73562
C24	Capacitor, 0.13 mf, 400 volt	A-8835368-1	95836
C25	Capacitor, 0.22 mf, 400 volt. Same as C12	C-737818-95	94904
C26, C27	Capacitor, 0.22 mf, 400 volt. Same as C18	C-735715-129	73794
C28, C29	Capacitor, 0.01 mf, 400 volt	C-735715-163	73561
C30	Capacitor, 0.22 mf, 400 volt. Same as C18	P-735715-129	73794
C31	Capacitor, 10 mf, 450 volt	M-86028-3	18793
C32, C33	Capacitor, 2000 mf, 6 volt. Same as C2	B-458557-2	96185
C34	Capacitor, 0.47 mf, 200 volt. Same as C1	C-735715-33	73787
C35	Capacitor, 2000 mf, 6 volt. Same as C2	B-458557-2	96185
C36	Capacitor, 330 mmf, 500 volt. Same as C10	P-727856-135	39640
C37	Capacitor, 2000 mf, 6 volt. Same as C2	B-458557-2	96185
C38, A/B	Capacitor, two section: each section 20 mf, 450 volt	M-95695-39	34889
C39	Capacitor, 0.47 mf, 400 volt. Same as C15	C-737818-96	59512
C40	Capacitor, 220 mmf, 500 volt	P-727856-131	58271
C41, C42	Capacitor, 1.0 mf, 300 volt. Same as C5	C-737863-237	94868
C43	Capacitor, 0.1 mf, 400 volt	C-735715-175	73551
C44	Capacitor, 6800 mmf, 400 volt. Same as C8	C-735715-161	73789
C45	Capacitor, 1.0 mf, 300 volt. Same as C5	C-737863-237	94868
C46, C47	Capacitor, 0.1 mf, 400 volt	C-737818-93	94915
C48	Capacitor, 4700 mmf, 600 volt. Same as C17	C-735715-259	73920
C49	Capacitor, 270 mmf, 500 volt	P-727856-133	39638
C50	Capacitor, 1000 mmf, 300 volt	P-727856-147	53300
C51	Capacitor, 0.47 mf, 400 volt. Same as C16	C-737863-383	94867
C52	Capacitor, 47 mmf, 500 volt	P-727856-115	39620
C53	Capacitor, 82 mmf, 500 volt	P-727856-121	39626
C54	Capacitor, 18 mmf, 500 volt	P-727856-105	39610
C55	Capacitor, 2200 mmf, 500 volt	P-727866-155	39660
C56	Capacitor, 1000 mmf, 300 volt. Same as C50	P-727866-155	53300
C57	Capacitor, 330 mmf, 500 volt. Same as C10	P-727856-135	39640
C58 to C60	Capacitor, 0.01 mf, 400 volt. Same as C28	C-735715-163	73561
C61, A/B/C/D	Capacitor, four section: section A, 20 mf, 450 volt; sections B/C and D, 10 mf, 450 volt	B-442300-30	59759
C62, C63	Capacitor, 2000 mf, 6 volt. Same as C2	B-458557-2	96185
C64, C65	Capacitor, 0.1 mf, 400 volt. Same as C43	C-735715-175	73551
C66	Capacitor, variable, 7-45 mmf	K-868903-3	54221
C67	Capacitor, 0.22 mmf, 400 volt. Same as C18	C-735715-129	73794
C68	Capacitor, 330 mmf, 500 volt. Same as C10	P-727856-135	53113
C69	Capacitor, 0.1 mf, 400 volt. Same as C43	C-735715-175	73551
C70	Capacitor, 0.22 mf, 400 volt. Same as C18	C-735715-129	73794
C71	Capacitor, 0.47 mf, 400 volt. Same as C16	C-737863-383	94867
C72	Capacitor, 0.22 mf, 400 volt. Same as C18	C-735715-129	73794
C73	Capacitor, 0.47 mf, 400 volt. Same as C16	C-737863-383	94867
C74, C75	Capacitor, 0.1 mf, 400 volt. Same as C43	C-735715-175	73551
C76, A/B/C	Capacitor, three section: sections A and B, 40 mf, 450 volt; section C, 10 mf, 450 volt (not used). Same as C7	B-442900-43	94869
C77	Capacitor, 0.01 mf, 400 volt. Same as C28	C-735715-163	73561
C78, C79	Not Used		
C80	Capacitor, 1000 mmf, 300 volt. Same as C50	P-727856-147	53300
C81	Capacitor, 47 mmf, 500 volt	P-727856-115	68737

PARTS LIST (Continued)

FOR ORDERING INFORMATION SEE PAGE 33

SYMBOL NO.	DESCRIPTION	DRAWING NO.	STOCK NO.
C82	Capacitor, 0.01 mf, 1600 volt	A-8898645-3	94908
C83	Capacitor, variable, 7-45 mmf	K-868903-3	54221
C84, C85	Capacitor, 0.47 mf, 200 volt. Same as C1	C-735715-33	73787
C86	Capacitor, 0.01 mf, 400 volt. Same as C28	C-735715-163	73561
C87	Capacitor, 33 mmf, 500 volt	P-727856-111	39616
C88	Capacitor, 390 mmf, 500 volt	P-727856-137	39642
C89	Capacitor, 33 mmf, 500 volt. Same as C87	P-727856-111	39616
C90	Capacitor, 270 mmf, 500 volts. Same as C49	P-727856-133	39638
C91	Capacitor, 1000 mmf, 300 volts	P-727856-147	53300
CR1 to CR4	Crystal, 1N34A or 1N48		59395
F1, F2	Fuse, 1 amp.	K-8851771-3	94877
I1, I2	Light	K-61114-15	11891
I3	Light	A-8890654-1	94863
J1, J2	Connector	P-255223-1	51800
J3, J4	Connector	M-445813-2	54890
J5, J6	Connector. Same as J1	P-255223-1	51800
J7	Connector	P-727969-17	55998
J8	Connector, jack	K-99390-1	54414
J9	Jack	K-845307-3	3802
J10 to J12	Jack	K-845648-1	18348
J13	Jack	K-845648-2	54409
J14	Jack. Same as J10	K-845648-1	18348
J15	Jack. Same as J13	K-845648-2	54409
K1	Relay	B-460355-1	94864
K2	Relay	M-448381-1	56070
L1	Coil	M-455495-503	94875
L2	Coil	M-455495-502	94874
L3	Coil. Same as L1	M-455495-503	94875
L4	Coil. Same as L2	M-455495-502	94874
L5	Coil. Same as L1	M-455495-503	94875
L6	Coil. Same as L2	M-455495-502	94874
L7, L8	Coil	M-455495-504	94876
L9, L10	Coil	M-455495-501	94873
L11	Yoke, deflection		95859
L12 to L15	Coil	M-940144-7	72619
P1	Connector	K-252868-1	66344
P2	Coaxial Termination	K-895438-501	54256
P3, P4	Connector	M-427992-501	56153
P5	Connector. Same as P1	K-252868-1	66344
P6	Coaxial Termination. Same as P2	K-895438-501	54256
P7	Connector	P-727969-21	57196
P8	Connector	M-413691-8	35383
P9 to P15	Not Used		
P16	Connector	K-892255-9	75064
R1	Resistor, 560,000 ohms, 1/2 watt	K-82283-95	502456
R2	Resistor, 2000 ohms ± 5%, 1/2 watt	K-82283-166	502220
R3	Resistor, 560 ohms ± 5%, 1/2 watt	K-82283-153	502156
R4	Resistor, variable, 1000 ohms, 2 watt	M-433196-8	53657
R5	Resistor, 1200 ohms, 1/2 watt	K-82283-63	502212
R6	Resistor, 560,000 ohms, 1/2 watt. Same as R1	K-82283-95	502456
R7	Resistor, 22 ohms, 1/2 watt	K-82283-42	34209
R8, R9	Resistor, 150 ohms, 1/2 watt	K-82283-52	502115
R10	Resistor, 1800 ohms ± 5%, 1/2 watt	K-82283-165	502218
R11	Resistor, 10,000 ohms, 2 watt	K-99126-74	522310
R12	Resistor, 56,000 ohms, 1 watt	K-90496-83	512356
R13	Resistor, 10,000 ohms, 1/2 watt	K-82283-74	502310
R14, R15	Resistor, 1.2 megohms, 1/2 watt	K-82283-99	502512
R16	Resistor, 680,000 ohms, 1/2 watt	K-82283-96	30562
R17	Resistor, 120 ohms, 1/2 watt	K-82283-51	502112
R18	Resistor, 27 ohms, 1/2 watt	K-82283-43	33569
R19	Resistor, 1500 ohms ± 5%, 1/2 watt	K-82283-163	30654
R20	Resistor, 56,000 ohms, 1/2 watt. Same as R12	K-90496-83	512356
R21	Resistor, 10,000 ohms, 1/2 watt. Same as R13	K-82283-74	502310
R22	Resistor, 560,000 ohms, 1/2 watt. Same as R1	K-82283-95	502456
R23	Resistor, 100 ohms, 1 watt	K-90496-50	513110
R24	Resistor, 1500 ohms ± 5%, 5 watt	M-443853-3	52436
R25	Resistor, 12,000 ohms, 1 watt	K-90496-75	512312
R26	Resistor, 12,000 ohms, 1/2 watt	K-82283-75	30436
R27	Resistor, 2.7 megohms, 1/2 watt	K-82283-103	72788
R28	Resistor, 3.9 megohms, 1/2 watt	K-82283-105	502539
R29	Resistor, variable, 2.5 megohms, 2 watt	M-433196-12	53088
R30	Resistor, 470,000 ohms, 1/2 watt	K-82283-94	502447

PARTS LIST (Continued)

FOR ORDERING INFORMATION SEE PAGE 33

SYMBOL NO.	DESCRIPTION	DRAWING NO.	STOCK NO.
R31	Resistor, 470,000 ohms, 1/2 watt	K-82283-80	502333
R32	Resistor, variable, 100,000 ohms, 2 watt	M-433196-4	95243
R33	Resistor, 10 megohms, 1/2 watt. Same as R1	K-82283-110	30992
R34	Resistor, 39,000 ohms, 1/2 watt	K-82283-81	30147
R35	Resistor, 1500 ohms, 1/2 watt	K-82283-64	30654
R36	Resistor, 270,000 ohms, 1/2 watt	K-82283-91	502427
R37	Resistor, 10,000 ohms, 1/2 watt. Same as R13	K-82283-74	502310
R38	Resistor, 1 megohm, 1/2 watt	K-82283-98	502510
R39	Resistor, 100,000 ohms, 1/2 watt	K-82283-86	502410
R40	Resistor, 15,000 ohms, 1/2 watt	K-82283-76	36714
R41 to R43	Resistor, 8200 ohms, 1/2 watt	K-82283-73	502282
R44	Not Used		
R45	Resistor, 4700 ohms, 1/2 watt	K-82283-70	502247
R46	Resistor, 100,000 ohms, 1/2 watt. Same as R39	K-82283-86	502410
R47	Resistor, 120,000 ohms, 1/2 watt	K-82283-87	30180
R48	Resistor, variable, 10,000 ohms, 2 watt (combined with R148)	M-433196-40	53008
R49	Resistor, 1000 ohms, 1/2 watt	K-82283-62	502210
R50	Resistor, 470,000 ohms, 1/2 watt. Same as R30	K-82283-94	502447
R51	Not Used		
R52	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R53	Resistor, 5.6 megohms, 1/2 watt	K-82283-107	31455
R54	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R55	Resistor, 560 ohms, 1 watt	K-90496-59	38884
R56	Resistor, 27,000 ohms, 1 watt	K-90496-79	71990
R57	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R58	Resistor, 330,000 ohms, 1/2 watt	K-82283-92	14983
R59	Resistor, 560 ohms, 1 watt. Same as R55	K-90496-59	38884
R60	Resistor, 27,000 ohms, 1 watt. Same as R56	K-90496-79	71990
R61	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R62	Resistor, 820 ohms, 1/2 watt	K-82283-61	502182
R63	Resistor, 2700 ohms, 1/2 watt	K-82283-67	502227
R64, R65	Resistor, variable, 20 ohms, 2 watt	C-737847-15	54416
R66	Resistor, 10 ohms, 1/2 watt	K-82283-38	502010
R67	Resistor, 560,000 ohms, 1/2 watt. Same as R1	K-82283-95	502456
R68	Resistor, 2000 ohms ± 5%, 1/2 watt. Same as R2	K-82283-166	502220
R69	Resistor, 560 ohms ± 5%, 1/2 watt. Same as R3	K-82283-153	502156
R70	Resistor, variable, 1000 ohms, 2 watt. Same as R4	M-433196-8	53657
R71	Resistor, 560,000 ohms, 1/2 watt. Same as R1	K-82283-95	502456
R72	Resistor, 100,000 ohms, 1/2 watt. Same as R39	K-82283-86	502410
R73	Not Used	K-98126-72	
R74	Resistor, 120 ohms, 1/2 watt. Same as R17	K-82283-51	502112
R75	Resistor, 27 ohms, 1/2 watt. Same as R18	K-82283-43	33569
R76	Resistor, 1800 ohms ± 5%, 1/2 watt. Same as R10	K-82283-165	502218
R77	Resistor, 56,000 ohms, 1 watt. Same as R12	K-90496-83	512356
R78	Resistor, 470,000 ohms, 1/2 watt. Same as R30	K-82283-94	502447
R79	Resistor, 15,000 ohms, 1/2 watt. Same as R40	K-82283-76	36714
R80	Resistor, 150 ohms, 1 watt	K-90496-52	30785
R81	Resistor, 2200 ohms ± 5%, 1/2 watt	K-82283-167	502222
R82	Resistor, 10,000 ohms, 2 watt. Same as R11	K-99126-74	522310
R83	Resistor, 56,000 ohms, 1 watt. Same as R12	K-90496-83	512356
R84	Resistor, 12,000 ohms, 1/2 watt. Same as R26	K-82283-75	30436
R85, R86	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R87	Resistor, 1000 ohms, 10 watt	M-443853-31	94555
R88	Resistor, 150,000 ohms, 1/2 watt	K-82283-88	502415
R89	Resistor, 47 ohms, 1/2 watt	K-82283-46	502047
R90, R91	Resistor, 3000 ohms, 5 watt	M-443853-27	45258
R92	Resistor, 330,000 ohms, 1/2 watt. Same as R58	K-82283-92	14983
R93	Resistor, 10,000 ohms, 2 watt. Same as R11	K-99126-74	522310
R94	Not Used	K-82283-73	
R95, R96	Resistor, 10 megohms, 1/2 watt	K-82283-110	30992
R97	Resistor, 330,000 ohms, 1 watt	K-90496-92	512433
R98	Resistor, 22 ohms, 1/2 watt. Same as R7	K-82283-42	34209
R99	Not Used	K-82283-64	
R100	Resistor, variable, 1 megohm, 2 watt (combined with R101)	P-737815-12	55645
R101	Resistor, variable, 1 megohm, 2 watt (combined with R100)	P-737815-12	55645
R102	Resistor, variable, 50,000 ohms, 2 watt	M-433196-5	51944
R103	Resistor, variable, 500,000 ohms, 2 watt	M-433196-2	52442
R104	Resistor, 620,000 ohms ± 5%, 1 watt	K-90496-226	93467
R105	Not Used	K-82283-90	
R106	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512

FOR ORDERING INFORMATION SEE PAGE 33

SYMBOL NO.	DESCRIPTION	DRAWING NO.	STOCK NO.
R107	Resistor, 8200 ohms, 2 watt	K-99126-73	522282
R108	Resistor, 2200 ohms, 1/2 watt	K-82283-66	502222
R109	Resistor, 560 ohms, 1/2 watt	K-82283-59	5164
R110	Resistor, 120,000 ohms ± 5%, 1/2 watt	K-82283-209	30180
R111	Resistor, 47,000 ohms, 1/2 watt	K-82283-82	30787
R112	Resistor, variable, 10,000 ohms, 2 watt (combined with R149) Same as R48	M-433196-40	53008
R113	Resistor, 100,000 ohms, 1/2 watt. Same as R39	K-82283-86	502410
R114	Resistor, 27,000 ohms, 1/2 watt	K-82283-79	502327
R115	Resistor, 1200 ohms, 1 watt	K-90496-63	512212
R116	Resistor, 2200 ohms, 1/2 watt. Same as R108	K-82283-66	502222
R117	Not Used	K-82283-62	
R118	Resistor, 47,000 ohms, 1 watt	K-90496-82	512347
R119	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R120	Resistor, 2.7 megohms, 1/2 watt. Same as R27	K-82283-103	72788
R121	Resistor, variable, 2.5 megohms, 2 watt. Same as R29	M-433196-12	53088
R122	Resistor, 27,000 ohms, 1 watt. Same as R56	K-90496-79	71990
R123	Resistor, 15,000 ohms, 1/2 watt. Same as R40	K-82283-76	36714
R124	Resistor, 3900 ohms, 1 watt	K-90496-69	512239
R125	Resistor, 4700 ohms, 1 watt	K-90496-70	512247
R126, R127	Resistor, 560 ohms, 1/2 watt. Same as R109	K-82283-59	5164
R128	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R129	Resistor, 560,000 ohms, 1/2 watt. Same as R1	K-82283-95	502456
R130	Resistor, variable, 100,000 ohms, 2 watt. Same as R32	M-433196-4	95243
R131	Resistor, 270,000 ohms, 1/2 watt. Same as R36	K-82283-91	502427
R132	Resistor, variable, 50,000 ohms, 2 watt. Same as R102	M-433196-5	51944
R133	Resistor, 100,000 ohms, 1/2 watt. Same as R39	K-82283-86	502410
R134	Resistor, 10,000 ohms, 1 watt	K-90496-74	512310
R135	Resistor, 220 ohms, 1/2 watt	K-82283-54	502122
R136	Resistor, 10,000 ohms, 1 watt. Same as R134	K-90496-74	512310
R137, R138	Resistor, 100,000 ohms, 1/2 watt. Same as R39	K-82283-86	502410
R139	Resistor, 470 ohms, 2 watt	K-99126-58	522147
R140	Resistor, variable, 500 ohms, 2 watt	M-433196-36	94870
R141	Resistor, 150 ohms, 2 watt	K-99126-52	522115
R142	Resistor, 47 ohms, 1 watt	K-90496-46	512047
R143	Resistor, 5000 ohms, 5 watt	M-428781-31	53368
R144	Resistor, 470 ohms, 2 watt. Same as R139	K-99126-58	522147
R145	Resistor, 47 ohms, 1 watt. Same as R142	K-90496-46	512047
R146	Resistor, 22 ohms, 2 watt	K-99126-42	523022
R147	Resistor, variable, 20 ohms, 2 watt. Same as R64	C-737847-15	54416
R148	Resistor, variable, 500,000 ohms, 2 watt (combined with R48)	M-433196-40	53008
R149	Resistor, variable, 500,000 ohms, 2 watt (combined with R112) Same as R148	M-433196-40	53008
R150	Resistor, variable, 5000 ohms, 2 watt	M-433196-7	51923
R151	Resistor, 47,000 ohms, 2 watt	K-99126-82	44211
R152	Resistor, 940 ohms ± 2%, 1 watt	K-99317-58	94872
R153	Resistor, 60 ohms ± 2%, 1 watt	K-99317-57	94871
R154	Resistor, 8200 ohms, 1/2 watt. Same as R41	K-82283-73	502282
R155	Resistor, 18,000 ohms, 1/2 watt	K-82283-77	3219
R156	Resistor, 1 megohm, 1/2 watt. Same as R38	K-82283-98	502510
R157	Resistor, 1500 ohms, 1/2 watt. Same as R35	K-82283-64	30654
R158	Resistor, 18,000 ohms, 1 watt	K-90496-77	512318
R159	Resistor, 56,000 ohms, 1/2 watt	K-82283-83	502356
R160	Resistor, 15,000 ohms, 1 watt	K-90496-76	512315
R161	Resistor, 18,000 ohms, 1 watt. Same as R158	K-90496-77	512318
R162	Resistor, 10,000 ohms, 2 watt. Same as R11	K-99126-74	522310
R163	Resistor, 39,000 ohms, 1 watt	K-90496-81	71084
R164	Resistor, 5600 ohms, 1/2 watt	K-82283-71	502256
R165	Resistor, 3.9 megohms ± 5%, 1/2 wztt	K-82283-245	502539
R166	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R167	Resistor, 10,000 ohms, 1/2 watt. Same as R13	K-82283-74	502310
R168	Resistor, variable, 10,000 ohms, 2 watt	M-433196-6	68833
R169	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R170	Resistor, 7500 ohms ± 5%, 1/2 watt	K-82283-180	43937
R171	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R172	Resistor, 1000 ohms, 1 watt	K-90496-62	512210
R173	Resistor, 560 ohms, 1/2 watt. Same as R109	K-82283-59	5164
R174	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R175	Resistor, 15,000 ohms, 5 watt	M-443853-11	53658
R176	Resistor, 27,000 ohms, 1 watt. Same as R56	K-90496-79	71990

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SYMBOL NO.	DESCRIPTION	DRAWING NO.	STOCK NO.
R177	Resistor, 5.6 megohms, 1/2 watt. Same as R53	K-82283-107	31455
R178	Resistor, variable, 1 megohm, 2 watt (combined with R179) Same as R100	P-737815-12	55645
R179	Resistor, variable, 1 megohm, 2 watt (combined with R178)	P-737815-12	55645
R180	Resistor, 5.6 megohm, 1/2 watt. Same as R53	K-82283-107	31455
R181	Resistor, 120,000 ohms, 1/2 watt. Same as R47	K-82283-87	30180
R182	Resistor, 5600 ohms, 1/2 watt. Same as R164	K-82283-71	502256
R183	Resistor, 820 ohms, 1 watt	K-90496-61	68025
R184	Resistor, 1500 ohms, 1 watt	K-90496-64	512215
R185	Resistor, 1000 ohms, 1 watt. Same as R172	K-90496-62	512210
R186	Resistor, 1.2 megohms, 1/2 watt. Same as R14	K-82283-99	502512
R187, R188	Resistor, 0.39 ohms, 1/2 watt	K-867970-304	93404
R189	Resistor, variable, 1 megohm, 2 watt	M-433196-1	52433
R190	Resistor, 2200 ohms, 1/2 watt	K-82283-66	502222
R191	Resistor, variable, 200 ohms, 2 watt	M-433196-9	52598
R192	Resistor, 0.39 ohms, 1/2 watt. Same as R187	K-867970-304	93404
R193	Resistor, 22,000 ohms, 1/2 watt	K-82283-78	30492
R194, R195	Resistor, 56,000 ohms, 1/2 watt. Same as R159	K-82283-83	502356
R196	Not Used		
R197	Resistor, variable, 1 megohm, 2 watt (combined with R198) Same as R100	P-737815-12	55645
R198	Resistor, variable, 1 megohm, 2 watt (combined with R197)	P-737815-12	55645
R199	Resistor, 10 megohms, 1/2 watt. Same as R95	K-82283-110	30992
R201	Not Used		
R202	Resistor, variable, 1 megohm, 1/2 watt	C-737887-14	97263
R203	Resistor, 27,000 ohms, 1/2 watt. Same as R114	K-82283-79	502327
R204, R205	Resistor, 10,000 ohms, 1/2 watt. Same as R13	K-82283-74	502310
R206	Resistor, 15,000 ohms, 1/2 watt. Same as R40	K-82283-76	36714
R207	Resistor, 22 ohms, 1/2 watt. Same as R7	K-82283-42	34209
R208	Resistor, 100 ohms, 1 watt. Same as R23	K-90496-50	513110
S1 to S3	Switch	A-8821753-1	95893
S4	Switch, interlock	B-449258-1	95629
S5	Switch	A-8830276-2	93544
T1	Transformer, vert blocking	K-895314-1	51936
T2	Transformer, vert output	K-895383-1	51910
T3	Transformer, hor blocking	K-895315-1	51939
T4	Transformer, hor output	B-629943-501	94862
T5	Transformer, fil scope	B-949447-1	95630
T6, T7	Transformer, filament	K-895326-4	58619
XCR1 to XCR4	Holder, crystal	A-8837869-501	95470
XF1, XF2	Holder, fuse	K-99088-1	58933
XI1, XI2	Socket, light	K-8835763-1	95632
XI3	Socket, lamp	K-8835763-2	95633
XK1, XK2	Socket	K-99390-1	54414
XV1, XV2	Socket, tube	C-737867-18	94879
XV3, XV4	Socket	C-737870-18	94880
XV5	Socket, tube. Same as XV1	C-737867-18	94879
XV6	Socket, tube. Same as XV3	C-737870-18	94880
XV7, XV8	Socket, tube. Same as XV1	C-737867-18	94879
XV9, XV10	Socket, tube. Same as XV3	C-737870-18	94880
XV11	Socket, tube. Same as XV1	C-737867-18	94879
XV12, XV13	Socket, tube	K-8857265-503	54143
XV14 to XV17	Socket, tube	C-737870-14	94926
XV18, XV19	Socket, tube	K-99390-1	54414
XV20	Socket, tube. Same as XV3	C-737870-18	94880
XV21, XV22	Socket, tube. Same as XV14	C-737870-14	94926
XV23	Socket, tube. Same as XV3	C-737870-18	94880
XV24, XV25	Socket, tube. Same as XV14	C-737870-14	94926
	Channel, Kinescope safety glass, rubber, 6-3/8" long	K-897933-4	95636
	Channel, Kinescope safety glass, rubber, 9-1/2" long	K-897933-3	95637
	Cushion, hood assembly	K-985981-2	74956
	Deflector, light, for I3	K-8899243-3	94865
	Glass, Kinescope safety	A-8831762-1	57229
	Handle, Kinescope	B-460310-1	95634
	Handle, for S1 to S3	K-8870309-8	72166
	Hood Assembly, yoke mounting	M-941654-501	75445
	Insulator, for R29, R102, R103	A-8830200-1	95638
	Knob, for R4, R29, R32, R100-R101, R102, R103	A-8830274-1	93543
	Knob, for R64, R65, R70, R121, R130, R132, R140, R147, R150, R168, R178-R179, R189, R191, R197-R198	A-8835762-1	94878
	Latch, cover assembly	P-727537-98	59237

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SYMBOL NO.	DESCRIPTION	DRAWING NO.	STOCK NO.
	Mounting Plate, insulating, for C32, C37, C62, C63	K-85558-2	28452
	Pad, CRO tube clamp, pad only	K-987533-1	75225
	Pad, sponge rubber, support bumper	B-457960-3	95635
	Pushbutton, for S5	K-87133-3	32120
	Shield, tube, 9-pin	K-8858642-2	95639
	Thumb Nut, brass, #8-32	K-181649-106	95642
	Thumb Screw, brass, #6-32 x 1/2" long	K-99017-101	95640
	Thumb Screw, steel, #8-32 x 3/8" long	K-59103-104	95641
	HIGH VOLTAGE POWER SUPPLY		
C101	Capacitor, 10,000 mmf, 300 volt	P-727866-171	53496
C102	Capacitor, 5600 mmf, 500 volt	P-727866-165	39670
C103	Capacitor, 0.22 mf, 400 volt	C-737818-95	94904
C104	Capacitor, 0.1 mf, 400 volt	C-737818-93	94915
C105	Capacitor, 0.01 mf, 400 volt	C-737818-87	94928
C106 to C108	Capacitor, 500 mmf, 10,000 volt	B-464373-1	97499
C109, C110	Capacitor, 0.01 mf, 1600 volt	K-981016-2	95671
J101	Receptacle, cable	K-892255-8	75062
L101	Coil, iron core	B-463316-1	96250
R101	Resistor, 6800 ohms, 1/2 watt	K-82283-72	14659
R102	Resistor, 150 ohms, 1/2 watt	K-82283-52	502115
R103	Resistor, 100 ohms, 1/2 watt	K-82283-50	502110
R104	Resistor, variable, 250 ohms, 1/2 watt	C-737887-10	96218
R105	Resistor, 220,000 ohms, 1 watt	K-90496-90	512422
R106 to R108	Resistor, 1.2 megohms, 1/2 watt	K-867970-316	72787
R109	Resistor, 4700 ohms, 5%, 1/2 watt	K-82283-175	502247
R110, R111	Resistor, 27,000 ohms, 1/2 watt	K-82283-79	502327
R112	Resistor, 100,000 ohms, 1/2 watt	K-82283-86	502410
R113	Resistor, 300 ohms, 1/2 watt	K-82283-146	3792
T101	Transformer, R.F.	B-462247-1	95670
T102	Transformer, high voltage	C-745227-501	95669
XV101	Socket, tube, 8-pin	K-99390-1	54414
XV102	Socket, tube, 9-pin	C-737870-18	94880
XV103	Socket, tube, 9-pin	C-737870-10	94926
XV104	Socket, tube, 9-pin	B-464378-1	97500
XV105, XV106	Socket, tube, 9-pin. Same as XV103	C-737870-10	94926
	BLOWER (MI-26579-B)		
	Blower, 115 volt A.C., 50/60 cycles, 0.14 amp.	B-464311-1	97264
	Capacitor, fixed, paper tubular, 1.0 mf, 200 volts		97266
	Connector, female, cable mtd., 2 contacts (Twistlock)	A-8891256-1	56161
	Connector, male, 2 contacts, cable mtd. (Twistlock)	A-8891256-2	56160
	Gasket, sponge rubber, 3/8" thk, 2-1/2" long x 1" wide	A-7862770-4	51089
	Holder, fuse	A-7862770-4	51089

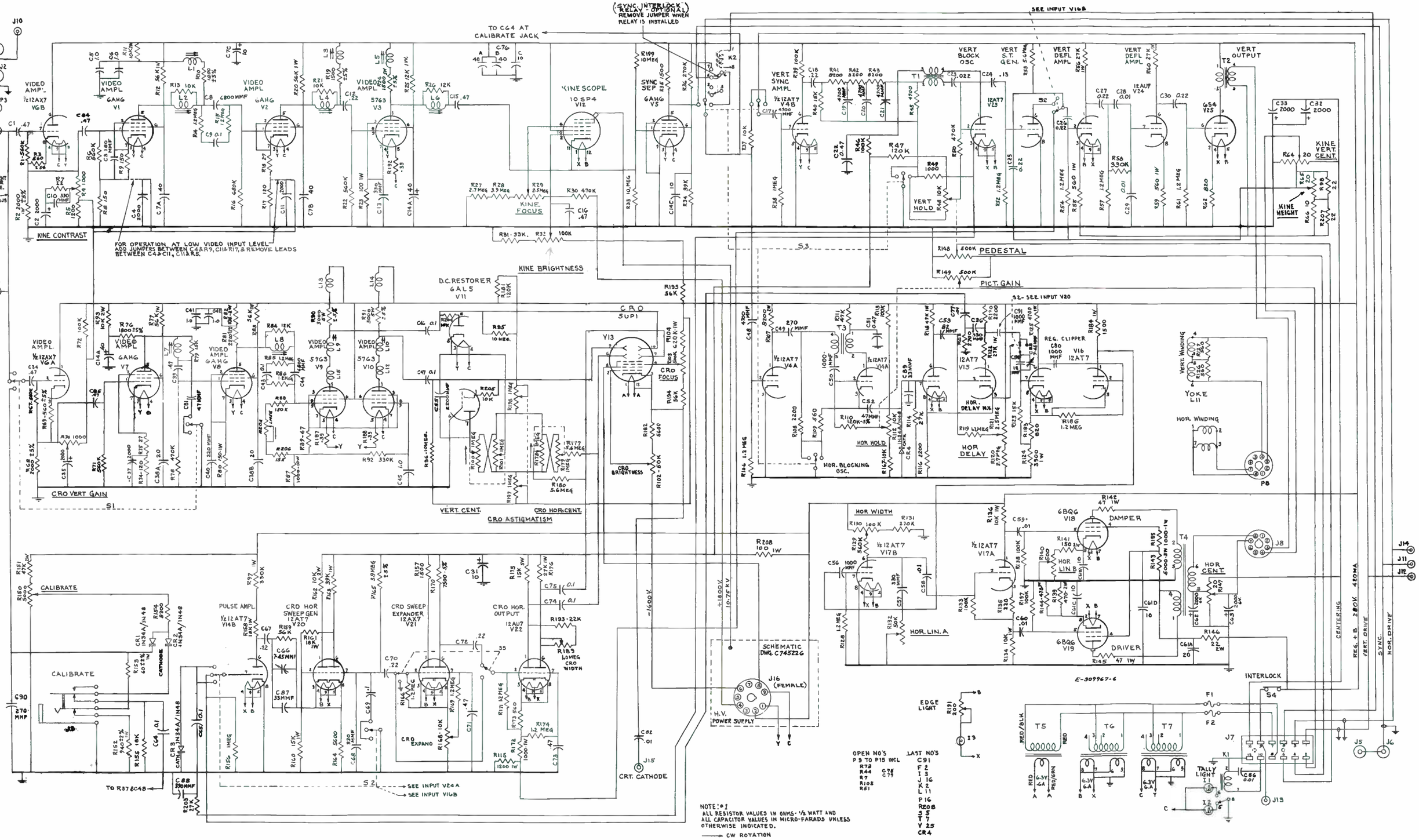

Figure 12 - TM-6A Schematic Diagram

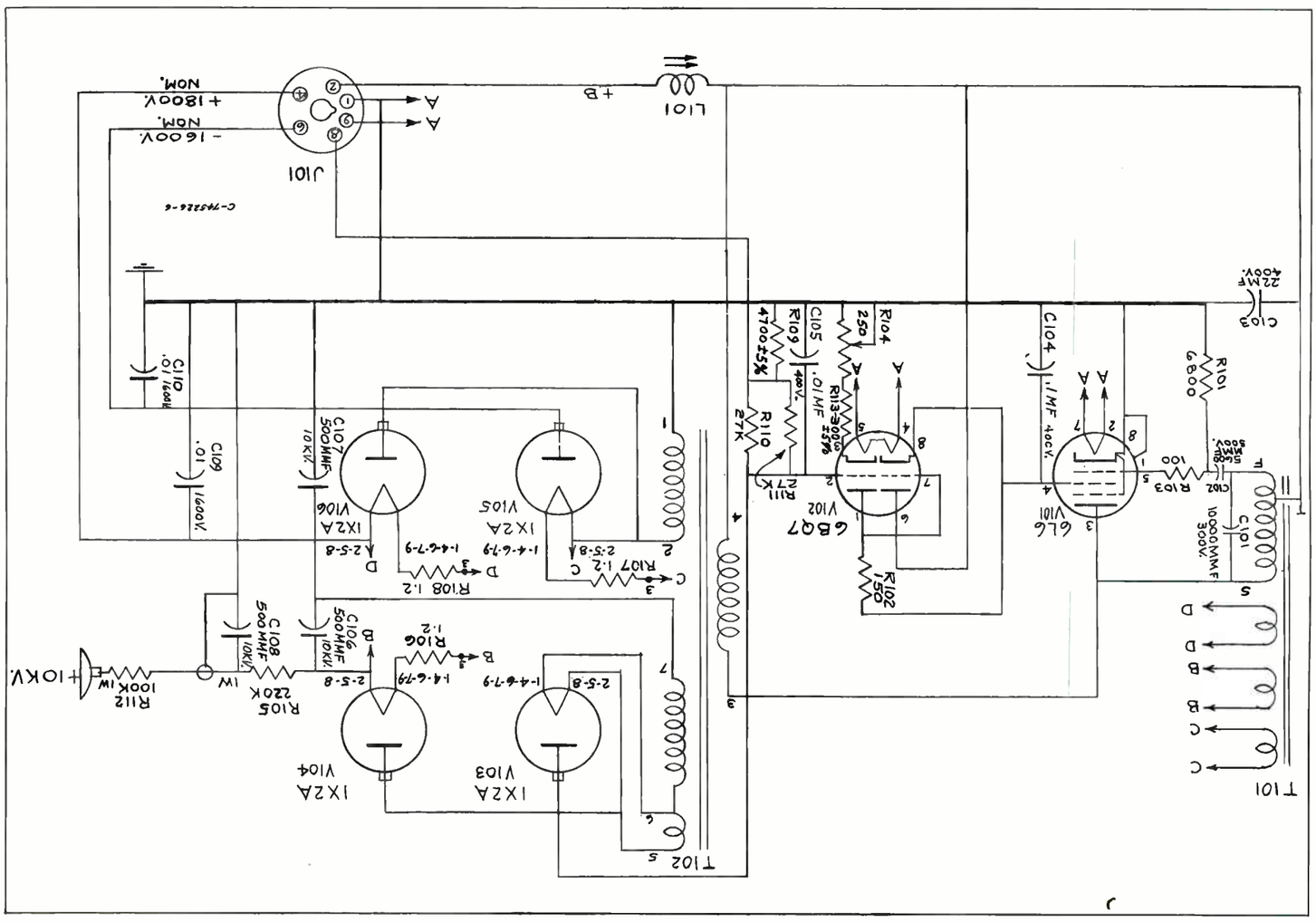

Figure 13 - H-V Power Supply, Schematic Diagram

NOTES


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