MONITORING AMPLIFIER
MODEL RM - 10

RAYTHEON MANUFACTURING COMPANY

COMMERCIAL PRODUCTS DIVISION

WALTHAM 54, MASS.

IB10

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TECHNICAL SUMMARY

Electrical Characteristics:

Input Impedance (unloaded transformer input)..... 50, 200 or 500 Ohms by changing transformer taps

Bridging Input Impedance..... 10,000 Ohms, using either 35 db fixed plug-in H-pad or remote volume control

Output Load Impedance..... 5/8/15/500/600 Ohms

Power Output (with less than 2% distortion)..... 10 Watts

Overall Gain (from 500 Ohm source to 15 Ohm load)..... 102 db

Frequency Response..... ±1.5 db 30-15000 Cycles

Noise Level (for 10 Watt output, 95 db gain)..... -62 db

Power Supply..... 115 Volts 50/60 Cycles

Power Consumption..... 75 Watts

Tube Complement:

2..... 6J7 Metal

1..... 6SN7GT

2..... 6L6G

1..... 5U4G

Mechanical Specifications:

Panel (for mounting in standard relay rack)..... 19"x10½"

Finish..... Raytheon Woodland Brown (Black on special orders)

Weight (net)..... 35 lbs.

DESCRIPTION

Uses. The Model RM-10 Monitoring Amplifier is a high fidelity, high gain, 10 watt amplifier suitable for monitoring, audition, recording and talk-back applications. In emergencies it may be used as a program line amplifier. It makes an ideal amplifier for use in a transcription playback booth because of its high gain, low distortion and excellent frequency characteristics. These same features make it an excellent amplifier for recording purposes.

Construction. The unit requires 10½ inches of panel space in a standard rack or cabinet. The amplifier and power supply are mounted on the same chassis and a dust cover encloses them. All parts are mounted so that the amplifier may readily be serviced without removal from the rack. All electrolytic condensers are of the plug-in type. Tubes and electrolytic condensers may be removed from the front through the door in the panel. Removal of the dust cover exposes the wiring so that resistors and other components may be serviced from the rear of the unit.

Circuit. The RM-10 is a four stage amplifier consisting of a 6J7 pentode stage, a 6J7 triode, a 6SN7GT balanced phase inverter and a 6L6G push-pull output stage. Feedback is used around the phase inverter and output stage to reduce distortion and noise.

Electrical Characteristics. The frequency response is substantially flat from 30 to 15000 cycles, assuring proper monitoring of all types of programs. At 5 watts output the harmonic distortion is less than 0.6 of 1 per cent, while at 10 watts it is approximately 1.2 per cent from 50 to 10,000 cycles and less than 2 per cent at 15000 cycles.

Controls & Connections. Gain adjustment is provided through the use of an interstage variable control on the front panel. A fixed 35 db plug-in H-pad of 10,000/500 ohms impedance is normally furnished with the unit for use on the input circuit. If remote control is desired a unit may be constructed from parts furnished by Raytheon to plug in place of this fixed pad.

Various input and output connections are located on terminal board TB-1 and are as follows:

TERMINALS	CONNECTION
1 & 2	Low Level Direct Input
3 & 4	Bridging Input
5	Ground
9 & 10	500/600 Ohms Output
7 & 8	15 Ohm Output
7 & 9	8 Ohm Output
7 & 6	5 Ohm Output
7	CT on 500 Ohms Output

Terminals 1 & 2 are for low level inputs not exceeding -40 db. The input on the Bridging terminals should not exceed 0 db.

OPERATION

Operation of the unit is simple. The only controls requiring adjustment are the gain control and remote volume control where one is used. If the remote control is used the gain control on the unit should be set at the desired level and the volume may then be controlled from the remote point.

MAINTENANCE

The RM-10 should provide trouble-free service over long periods of time with little or no special attention. When replacements are required they may be identified by referring to the parts list, chassis photographs and circuit diagram.

Tubes. The tubes in this unit may all be tested in a standard tube checker. It is advisable to check the tubes at frequent intervals so that faulty ones can be replaced.

Voltage Measurements. A table of tube socket voltages is shown below. The d-c voltages are measured from the tube socket contacts to ground, the a-c filament voltages are measured between filament contacts.

TUBE VOLTAGES

Voltages read with respect to ground (except filament voltage); 20,000 ohms/volt voltmeter. 115 volts applied to power transformer primary. No signal input.

SYMBOL NUMBER	TYPE	FUNCTION	Ef	Ek	Esg	Ep	Ep
V-1	6J7	1st a-f amp.	6.3	1.8	70	85	
V-2	6J7	2nd a-f amp.	6.3	2		70	
V-3	6SN7GT	Phase Inverter	6.3	4.5		120	120
V-4	6L6G	Output	6.3	17	285	320	
V-5	6L6G	Output	6.3	17	285	340	
V-6	5U4G	Rectifier	5.0			340	340

REPLACEMENT PARTS LIST

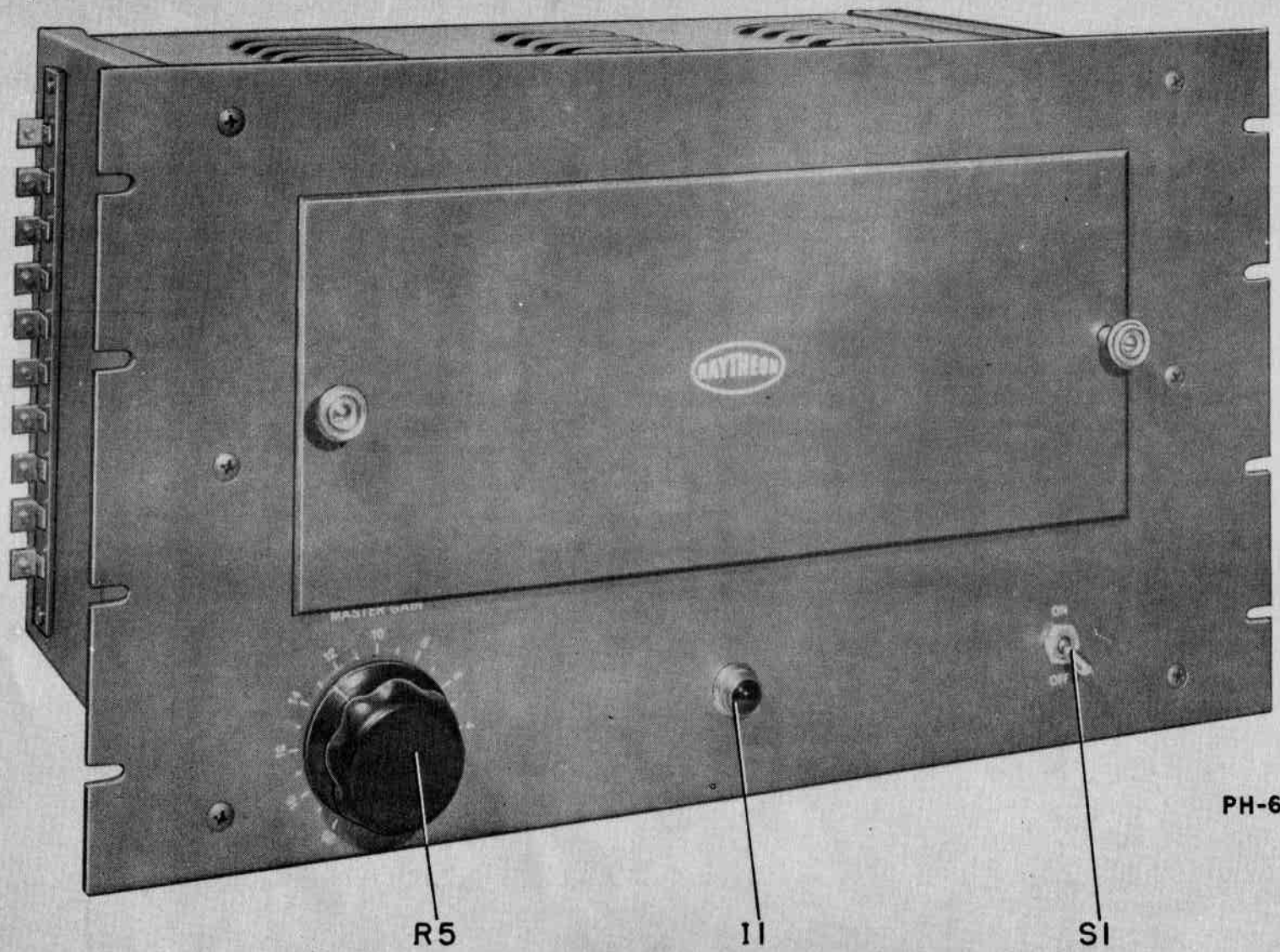
SYMBOL NUMBER	NO. REQ	DESCRIPTION	SUPPLIER	RAYTHEON PART NO.
C-1,5,8	3	Condenser, 50 mfd 50 V, -10% +200% WB39 paper	Mallory	
C-2	1	Condenser, .5 mfd 400 V, paper TP431	Mallory	50-L-28A
C-3	1	Condenser, 15 mfd 450 V. Electrolytic -10% +50% FP143	Mallory	50-L-21B
C-4,6,9,10	4	Condenser, .1 mfd 600 V. paper TP418	Mallory	50-L-10A
C-7AB	1	Condenser, 20-20 mfd 450 V. Electrolytic -10% +50% FP234	Mallory	50-L-26A
C-12,13	2	Condenser, .0025 mfd 16V. paper MD 16D25	Cornell-Dub.	
C-14,15	2	Condenser, 30 mfd 450 V. Electrolytic -10% +60% FPS145	Mallory	50-L-66A
F-1	1	Fuse, 3 amp. type 3 AG	Bussman	112-L-9A
I-1	1	Lamp, Pilot 6-8 V. type R-44	Raytheon	177-L-2A
J-1	1	Plug #61M10	Amphenol	219-L-1A
P-1	1	Receptacle, #61F11 with Clamp	Amphenol	219-L-2A
R-1,6	2	Resistor, 1500 ohm ±10% 1 W. Insl. carbon type GB	Allen-Bradley	237-L-211
R-2,7	2	Resistor, 82,000 ohm ±10% 1 W. Insl. carbon type GB	Allen-Bradley	237-L-232
R-3	1	Resistor, 290,000 ohm ±10% 1 W. Insl. carbon type GB	Allen-Bradley	237-L-240
R-4,14,18	3	Resistor, 10,000 ohm ±10% 1 W. Insl. carbon type GB	Allen-Bradley	237-L-221
R-5	1	Potentiometer, 250,000 ohm #D-13-130	I. R. C.	237-L-767B
R-8	1	Resistor, 470,000 ohm ±10% ½ W. Insl. carbon type EB	Allen-Bradley	237-L-168
R-9,10	2	Resistor, 2700 ohm ±10% 1 W. Insl. carbon type GB	Allen-Bradley	237-L-214
R-11	1	Resistor, 24,000 ohm ±5% 1 W. Insl. carbon type GB	Allen-Bradley	237-L-557

REPLACEMENT PARTS LIST

SYMBOL NUMBER	NO. REQ	DESCRIPTION	SUPPLIER	RAYTHEON PART NO.
R-12,13	2	Resistor, 47,000 ohm ±10% 1 W. Insl. carbon type GB	Allen-Bradley	237-L-241
R-15,16	2	Resistor, 150,000 ohm ±10% ½ W. Insl. carbon type EB	Allen-Bradley	237-L-162
R-17	1	Resistor, 10,000 ohm ±10% ½ W. Insl. carbon type EB	Allen-Bradley	237-L-148
R-19,20	2	Resistor, 390 ohm ±10% 2 W. Insl. carbon type HB	Allen-Bradley	237-L-277
R-21	1	Resistor, 125 ohm ±10% 10 W. WW Brown Devil	Ohmite	237-L-799A
R-22	1	Resistor, 20,000 ohm ±10% 25 W. WW #0218	Ohmite	237-L-802A
R-23	1	Resistor, 2500 ohm ±10% 25 W. WW #0208	Ohmite	237-L-801A
R-24	1	Resistor, 200 ohm ±10% 25 W. WW #0200H	Ohmite	237-L-800A
R-19A,20A	2	Resistor, 4874 ohm ±5% 1 W. Select from 4700 ±5% ½ W. type EB	Allen-Bradley	237-L-395
R-21A,22A	2	Resistor, 29 ohms ±5% ½ W. Select from 30 ohm ±5% ½ W. type EB	Allen-Bradley	237-L-342
R-23A	1	Resistor, 452 ohms ±5% ½ W. Select from 430 ohm ±5% ½ W. type EB	Allen-Bradley	237-L-370
RZ-4	1	H-Pad 10,000/500 to 600 ohm Imp. includes: R-19A, R-20A, R-21A, R-22A, R-23A & P-4A		4-L-318A
S-1	1	Switch, SPST #81015	Arrow Hart & Hegeman	263-L-8A
T-1	1	Transformer, Input, Mike or Line to Single or PP Grid type B 4566	U. T. C.	291-B-107A
T-2	1	Transformer, PP 6L6 or 6V6 8000 to 500/600 ohms Imp. Line or Voice Coil #901041 or Raytheon #M-11663	Air Design or Raytheon	291-L-82B E291-B-62
T-3	1	Transformer, Power - Air Design #P-60049 Raytheon #M-11662	Air Design or Raytheon	291-L-83A 291-A-104A
TB-1	1	Terminal Strip #10-137A	HB Jones	290-U-65A
V-1,2	2	Tube, 1620 or 6J7	Raytheon	

REPLACEMENT PARTS LIST

SYMBOL NUMBER	NO. REQ	DESCRIPTION	SUPPLIER	RAYTHEON PART NO.
V-3	1	Tube, 6SN7	Raytheon	
V-4,5	2	Tube, 6L6G	Raytheon	
V-6	1	Tube, 5U4G	Raytheon	
	1	Fuse Holder - HMC	Bussman	112-L-1A
	1	Knob	John Mack & Son	166-V-2A
	1	Pilot Light Assem. Miniature Bayonet Type 50	Drake	177-L-1A
P-4A	1	Base, Tube Octal	Raytheon	219-L-8A
X-1,2,3, 4,5,7	6	Socket, Octal	Amphenol	256-L-2B
X-6	1	Socket, Octal Floating MIP8-FK	Amphenol	256-L-6A
	1	Shell, Type OZ4	Raytheon	256-L-8A
	4	Socket, Plug in Electrolytic Cond. #54A11523	Cinch	256-L-14A
	6	Terminal Strip #1876	Cinch	290-L-5A
	3	Terminal Strip #1633	Cinch	290-L-6A
	3	Terminal Strip #1522-C	Cinch	290-L-9A
		PARTS REQUIRED FOR REMOTE VOLUME CONTROL (FURNISHED AT EXTRA COST ON CUSTOMER'S ORDER)		
P-2		Octal Male Plug with metal snap-on cap		
R-28		Potentiometer: 500 ohm 4 W No M-500	Mallory	244-L-8A
R-27,26		Resistor: 4700 ohm ½ W	Allen Bradley	237-L-144



PH-60

FIG.1 RM 10 MONITOR - FRONT

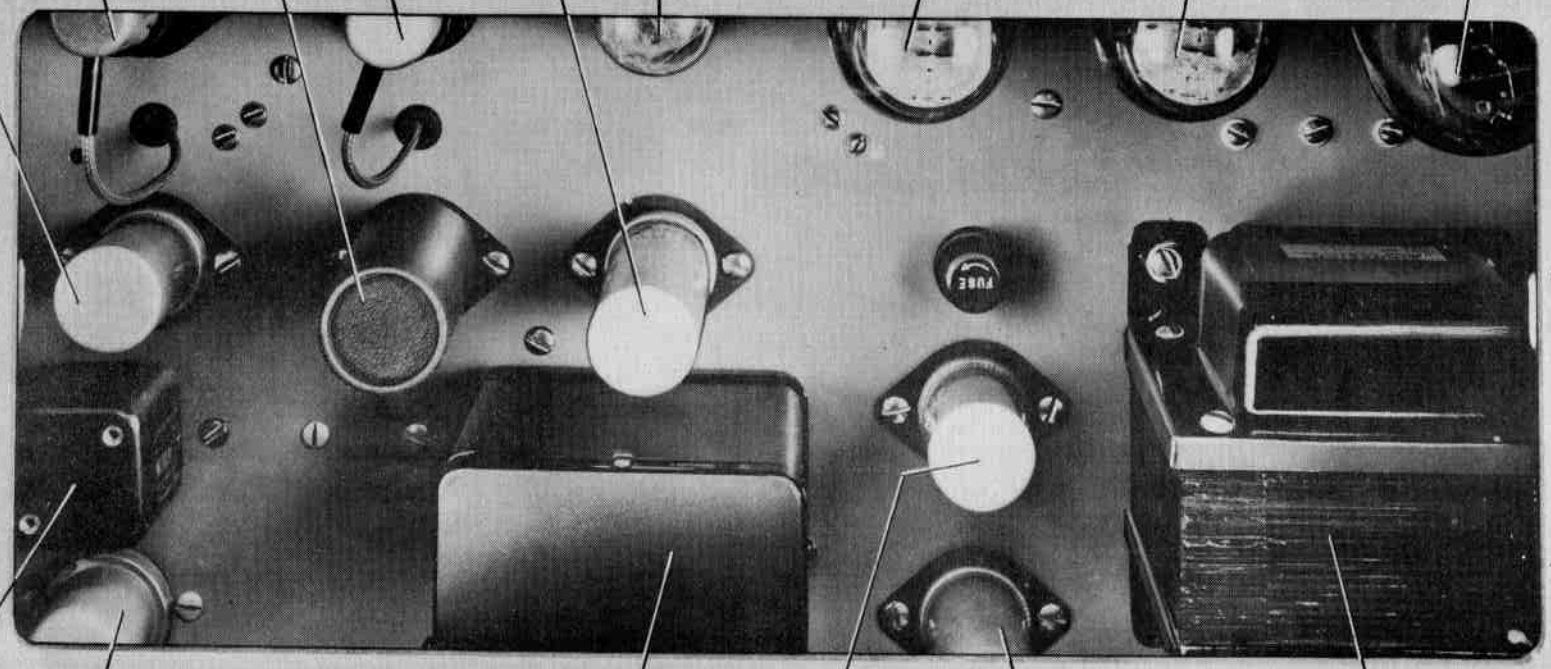


FIG. 2 RM-10 MONITOR-FRONT WITH COVER REMOVED

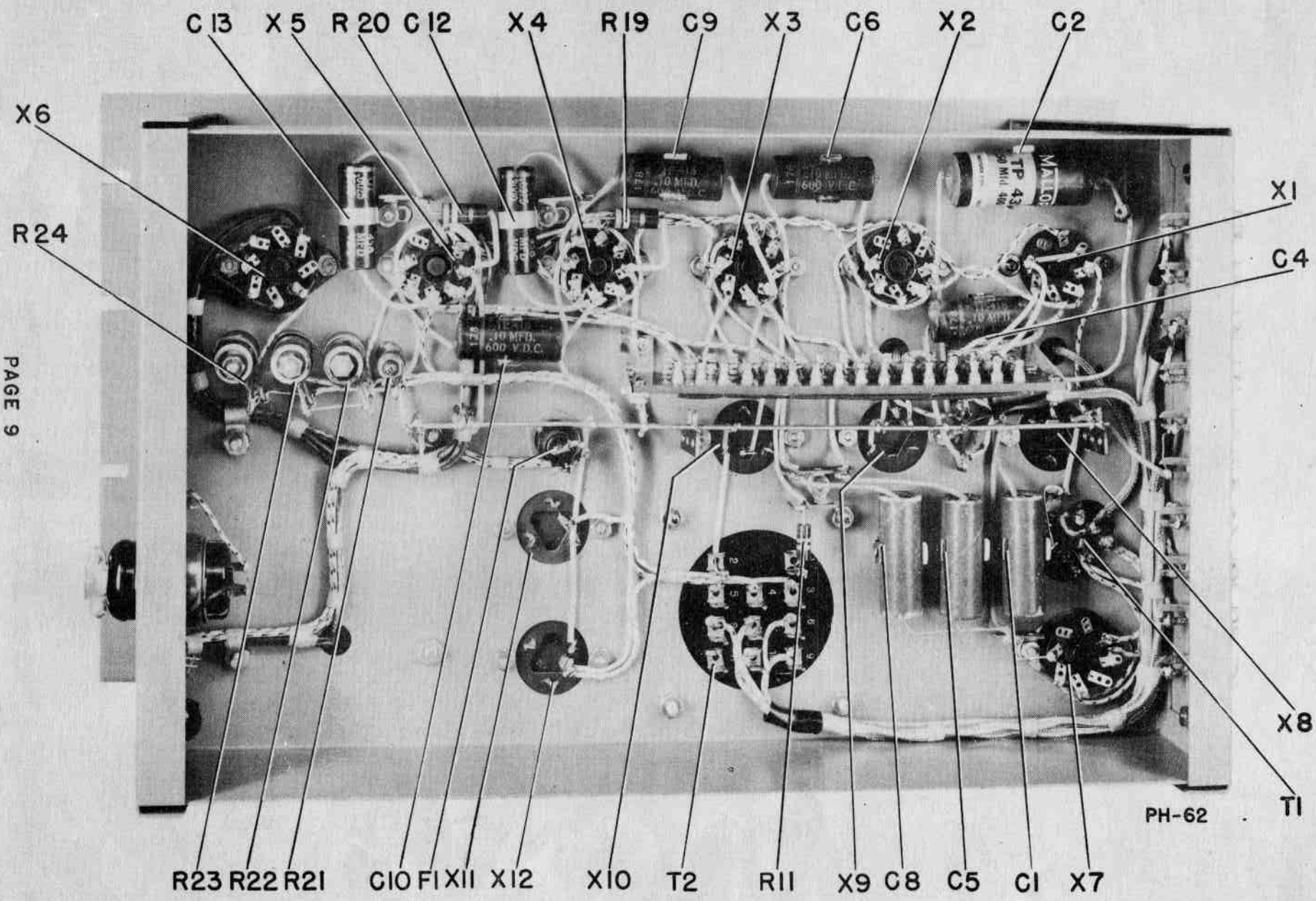
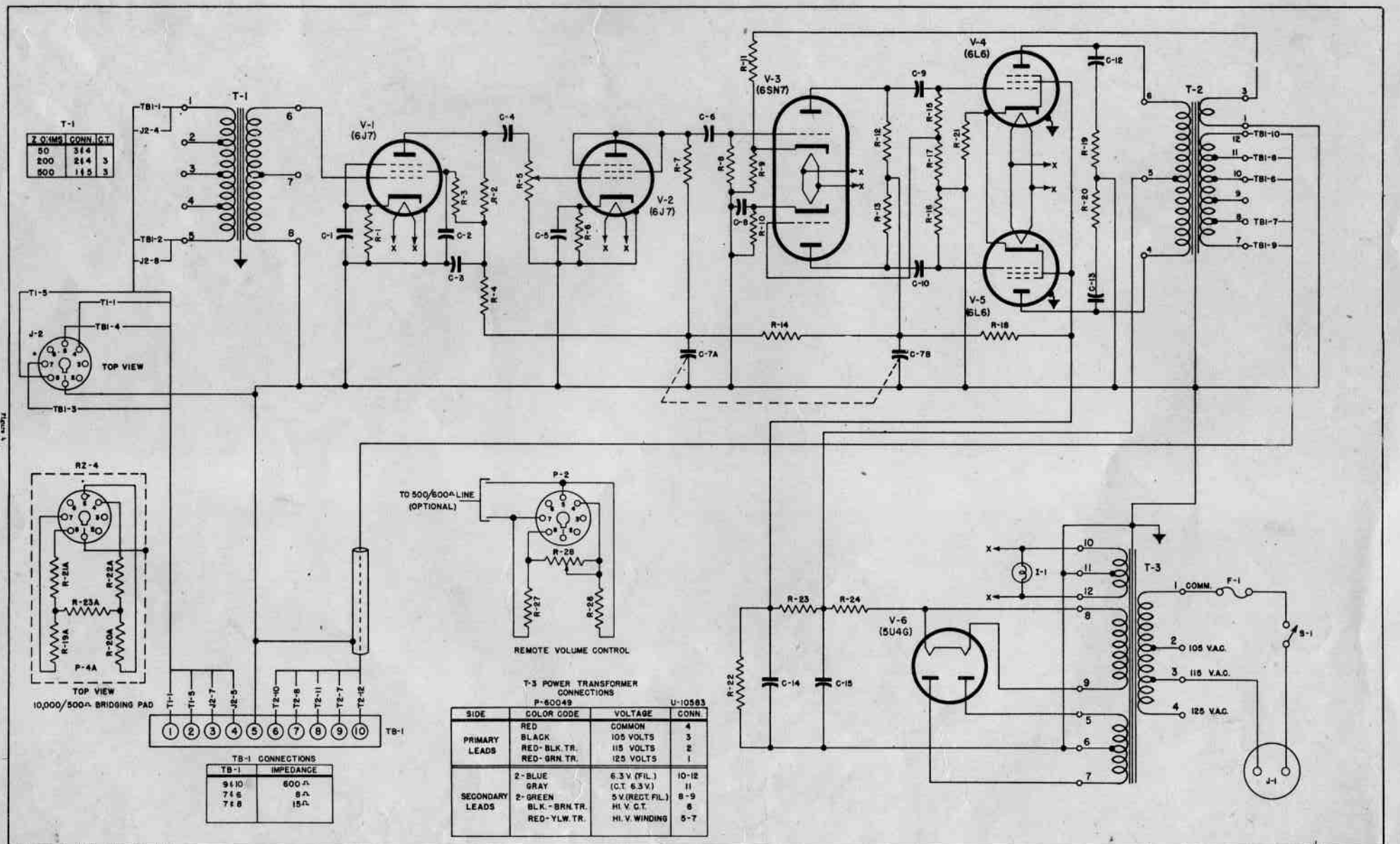


FIG. 3 RM-10 MONITOR - UNDERSIDE VIEW



T-3 POWER TRANSFORMER CONNECTIONS
P-60049 U-10583

SIDE	COLOR CODE	VOLTAGE	CONN.
PRIMARY LEADS	RED	COMMON	4
	BLACK	105 VOLTS	3
	RED-BLK. TR.	115 VOLTS	2
	RED-GRN. TR.	125 VOLTS	1
SECONDARY LEADS	2-BLUE	6.3 V. (FIL.)	10-12
	GRAY	(C.T. 6.3 V.)	11
	2-GREEN	5 V. (RECT. FIL.)	8-9
	BLK.-BRN. TR.	HI. V. C.T.	6
	RED-YLW. TR.	HI. V. WINDING	5-7

TB-1 CONNECTIONS

TB-1	IMPEDANCE
9&10	600 Ω
7&6	8 Ω
7&8	15 Ω

DR. W. J. Bryan DATE 7-3-46 APPR'D CHK.

MONITOR SCHEMATIC DIAGRAM

FIRST USED ON 8514 RM-10

RAYTHEON MFG. CO.
RECEIVING TUBE DIV. CHICAGO

88-W-21C

Figure 1
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