Harvey-WELLS *proudly presents*

A Complete Amateur Station

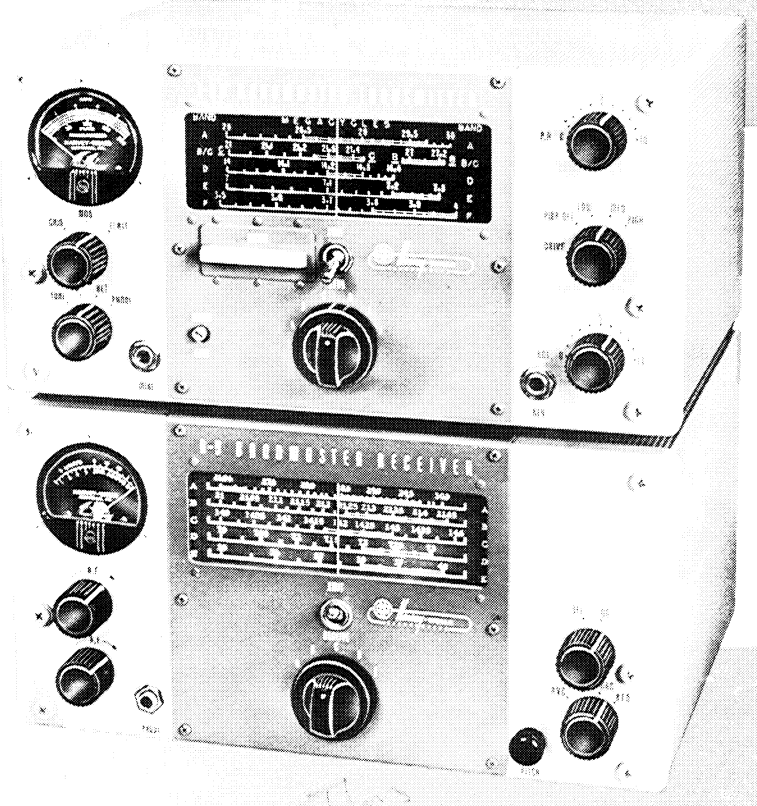
SYSTEM ENGINEERED FOR TOP PERFORMANCE ON ALL BANDS

INSTRUCTION MANUAL

R-9

T-90
90 WATT
TRANSMITTER

R-9
9 TUBE
DOUBLE CONVERSION
RECEIVER



Harvey-WELLS
ELECTRONICS, INC.
SOUTHBRIDGE MASS. U.S.A.

INSTRUCTION MANUAL

R-9

HARVEY-WELLS ELECTRONICS, INC.

SOUTHBRIDGE, MASSACHUSETTS

TABLE OF CONTENTS

SECTION 1

DESCRIPTION

SECTION 2

INSTALLATION

SECTION 3

OPERATION

SECTION 4

SERVICE AND TEST DATA

SECTION 5

ALIGNMENT DATA

ILLUSTRATIONS

IMPORTANT NOTICE

Before disposing of the carton in which the equipment is packed, look for small accessories such as connectors and plugs that may be included as part of the equipment. These small items are usually placed in a small paper bag which may easily be missed.

DAMAGED OR INOPERATIVE EQUIPMENT

This unit has been carefully inspected and was shipped from the factory in perfect operating condition. If the package has been damaged in transit, it is important that you file claim immediately with the carrier.

If the equipment does not function properly and the fault is not obviously apparent, notify the factory. Return the unit by prepaid carrier only after receiving approval to do so from the factory.

When returning the unit, it is important that it be properly packed either in the original or a strong substitute carton. All surfaces should be protected by ample use of a soft packing material. Insure the equipment for its full value against damage or loss.

REMOVAL OF THE DUST COVER

Disconnect all external cables. Stand the Receiver with its front panel up and remove the four (4) screws holding the rubber bumpers. These are the only screws which need be removed. Do not loosen front panel or other screws. Grasp the front panel edges and carefully lift the Receiver out of its case.

When replacing the unit in its enclosure, ascertain first that all tubes are solidly in their sockets. Then place the chassis in the dust cover so that the chassis connectors match the dust cover connector cutouts. Replace the rubber feet. Tighten all screws only after they have been properly placed in their respective positions.

SECTION I

DESCRIPTION

1-1. General.

The new R-9 is a versatile Amateur Band communications receiver, featuring performance and compactness. The overall characteristics are such that either fixed station or mobile operation requirements are effectively fulfilled.

The R-9 utilizes nine tubes plus the rectifier in a double superheterodyne circuit, providing the reception of phone and code signals over the six main amateur bands. Calibrated tuning is furnished for the 80 - 40, 20 - 15, and 10 and 11 meter bands.

1-2. Circuit.

The circuit employed on all bands consists of one stage of radio frequency amplification, a first detector, and stabilized high frequency variable oscillator. This is followed by a second detector, and a second high frequency (fixed) oscillator, giving dual-conversion on all bands.

The first intermediate amplifier operates at 1620 kc., followed by two stages of I.F., at 260 kc. A diode type detector follows, with a diode noise limiter, a high gain audio stage, and the output stage making up the remainder of the R-9 receiver.

Automatic volume control, beat frequency oscillator, voltage regulator and rectifier circuits are all important circuits incorporated in this receiver. All oscillator circuits are voltage regulated, and a full five watts of audio is available.

1-3. Tube Complement.

The R-9 is supplied complete with tubes, which are tested in the receiver at the time of alignment.

The tubes used are as follows:

R. F. Amplifier	6BJ6
First Mixer-Oscillator	6U8
Second Mixer-Oscillator	6U8
First I. F. Amplifier	6BJ6
Second I. F Amplifier	6BJ6
Diode Detector and Noise Limiter	6AL5

SECTION I

DESCRIPTION

First Audio and B. F. O.	12AX7
Output	6CM6
Voltage Regulator	OA2
Rectifier	5Y3GT

1-4. Power Supply.

The R-9 receiver is complete with A. C. power supply. This supply operates on 110/120 volts 50-60 cycles only. A combination vibrator supply, the VPS-R9, can be purchased as a separate unit, and by simply unplugging the jumper connector, P3, furnished with the receiver, and inserting the vibrator power cable plug, 6 or 12 volt D. C. operation can be had for mobile or field installations. (See Section 6)

Normal power consumption is approximately 70 watts. A 3 ampere fuse is connected in one side of the A. C. line, while the vibrator supply has its own fuse. All fuses can be replaced or examined readily.

1-5. Loudspeaker.

The fixed station loudspeaker is mounted in a cabinet finished to match the receiver. This speaker is the oval type, and has an input impedance of 4 ohms. The attached plug connects to the 4 ohm output of the receiver. A second type speaker is available for mobile installations, having the same output impedance but built into a more compact package.

1-6. Performance.

1. Sensitivity - less than 2 microvolts input for a signal to noise ratio of 10 db at 500 milliwatts output.
2. Selectivity - 4 Kc. bandwidth at the 6 db points.
3. Image Rejection - greater than 25 db on all bands.
4. AVC - 3 db change in output for input signal change of 10 to 100 K microvolts.

SECTION 2

INSTALLATION

2-1. Caution Notice

1. Because of the high audio output of the R-9 Receiver it is required that speaker or headphones be connected at all times before turning power on.
2. The R-9 Receiver antenna input terminals should never be subjected to more than 50 volts of R. F.
3. This receiver is calibrated and aligned after a 30 minute warm-up period. The user should allow the full 30 minute warm-up period in order to obtain maximum dial calibration accuracy.

2-2. Antenna.

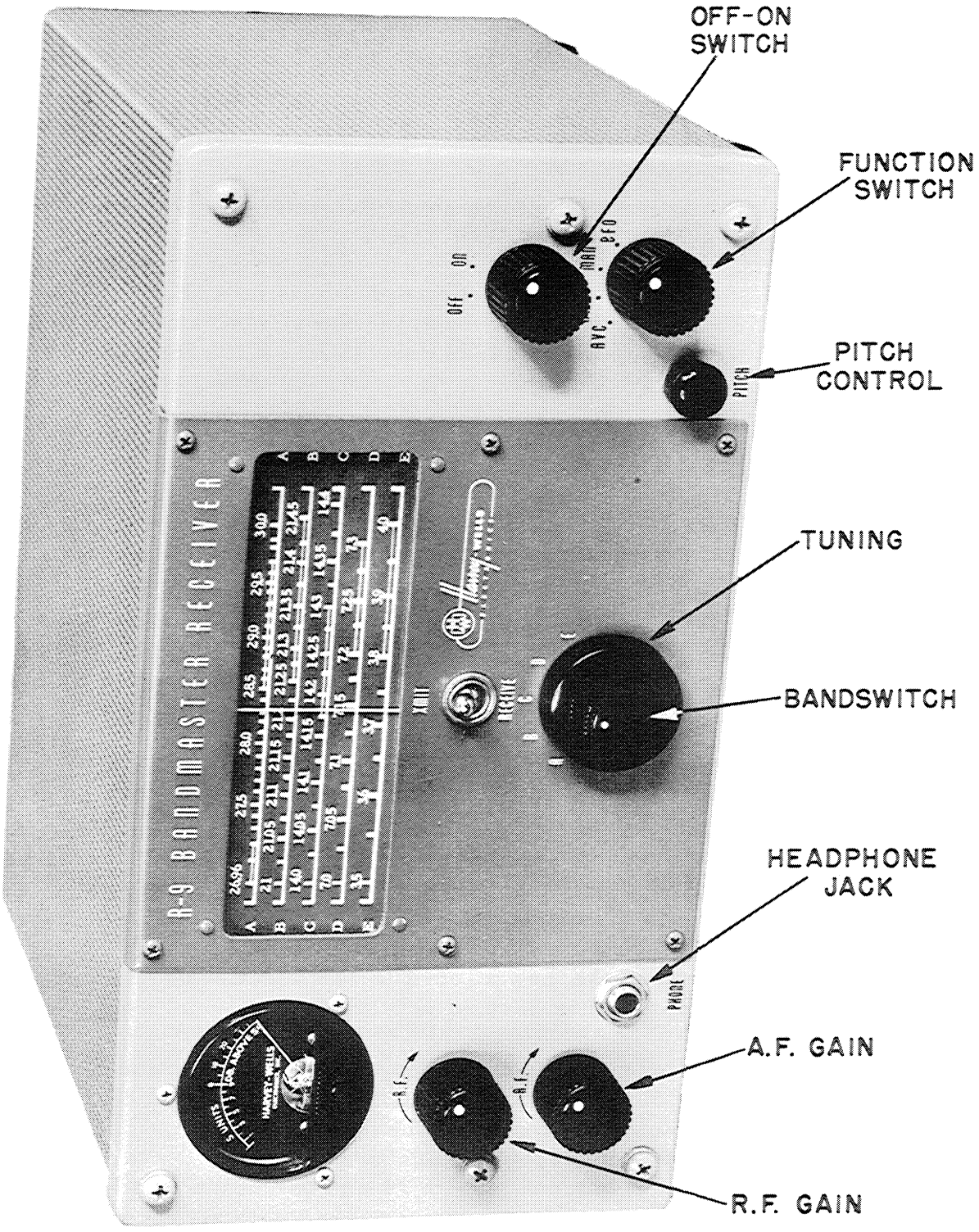
The antenna input circuit is a nominal 50 ohms, and can be operated with single wire or coaxial fed antenna. The antenna connector (J4) at the rear of the R-9 receiver is of the coaxial type, and the mating plug is furnished with all receivers. The ground terminal is obtained thru the metal shell of the mating plug. Where the R-9 is to be used in conjunction with a transmitter, the transmitting antenna may be used for receiving.

2-3. Installation procedure for A. C. operation.

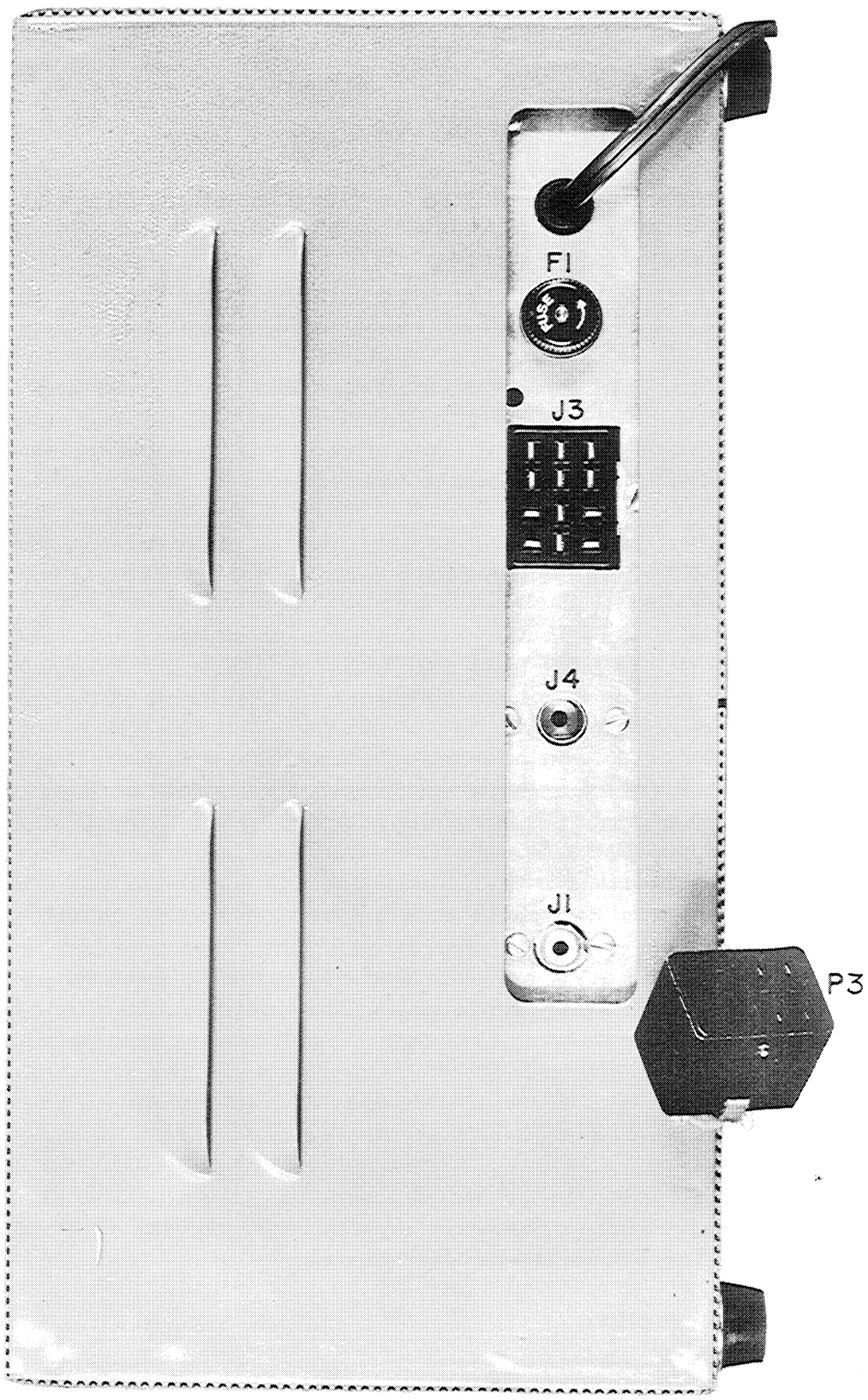
1. Seat P3 jumper plug on rear of chassis firmly into J3.
2. Connect loudspeaker plug to J1.
3. Connect antenna plug to J4 on rear of chassis. This plug is a separate accessory packed with all receivers, and should be wired to the antenna used.
4. Connect the power cord to 115 V.A.C. and set controls as outlined in Section 3.

2-4. Installation procedure for D. C. operation (See Section 6)

1. Remove P3 on rear of chassis.
2. Connect loudspeaker plug to J1.
3. Connect antenna plug to J4 on rear of chassis. This plug is a separate accessory packed with all receivers, and should be wired to the antenna used.
4. Connect the VPS-R9 Vibrator Supply to the proper D. C. source (See Section 6) and set controls as outlined in Section 3 for reception of signals.



FRONT VIEW OF RECEIVER
FIGURE 1



REAR VIEW OF RECEIVER
FIGURE 2

SECTION 4

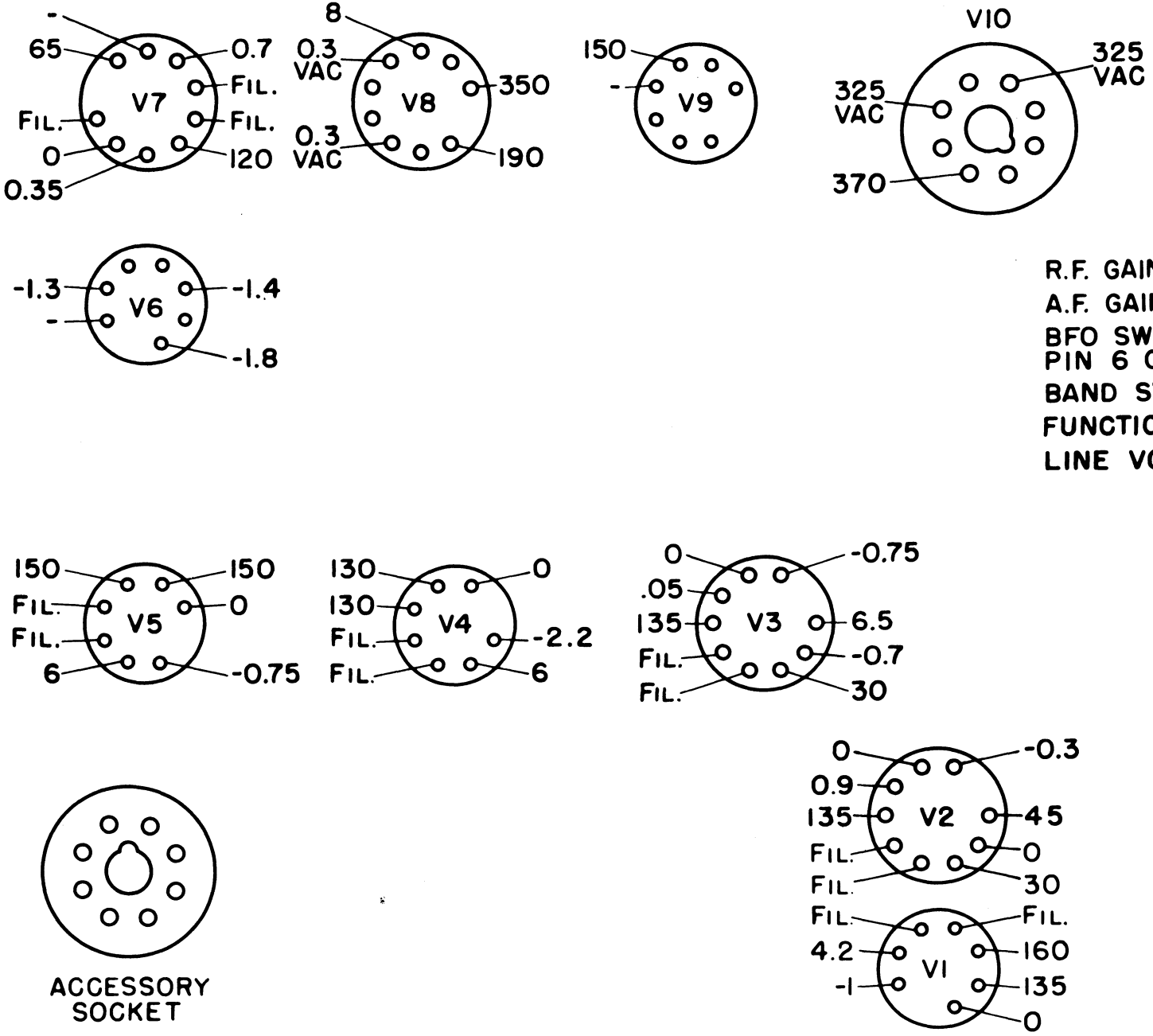
SERVICE AND TEST DATA

4-1. Tube Failures.

Partial or complete failure of a vacuum tube in the receiver may reduce the sensitivity, produce intermittent operation, or cause the equipment to become completely inoperative. If tube failure is suspected, all tubes should be checked on a reliable tube tester, or replaced with tubes of a known quality. Care should be taken in replacing the tubes in the same socket they were removed from, especially the high frequency oscillator tube. A replacement high frequency oscillator tube can be readily checked, for replacement purposes, by the dial calibration. Replacement of all other tubes will have no effect on this calibration.

4-2. Circuit Failures.

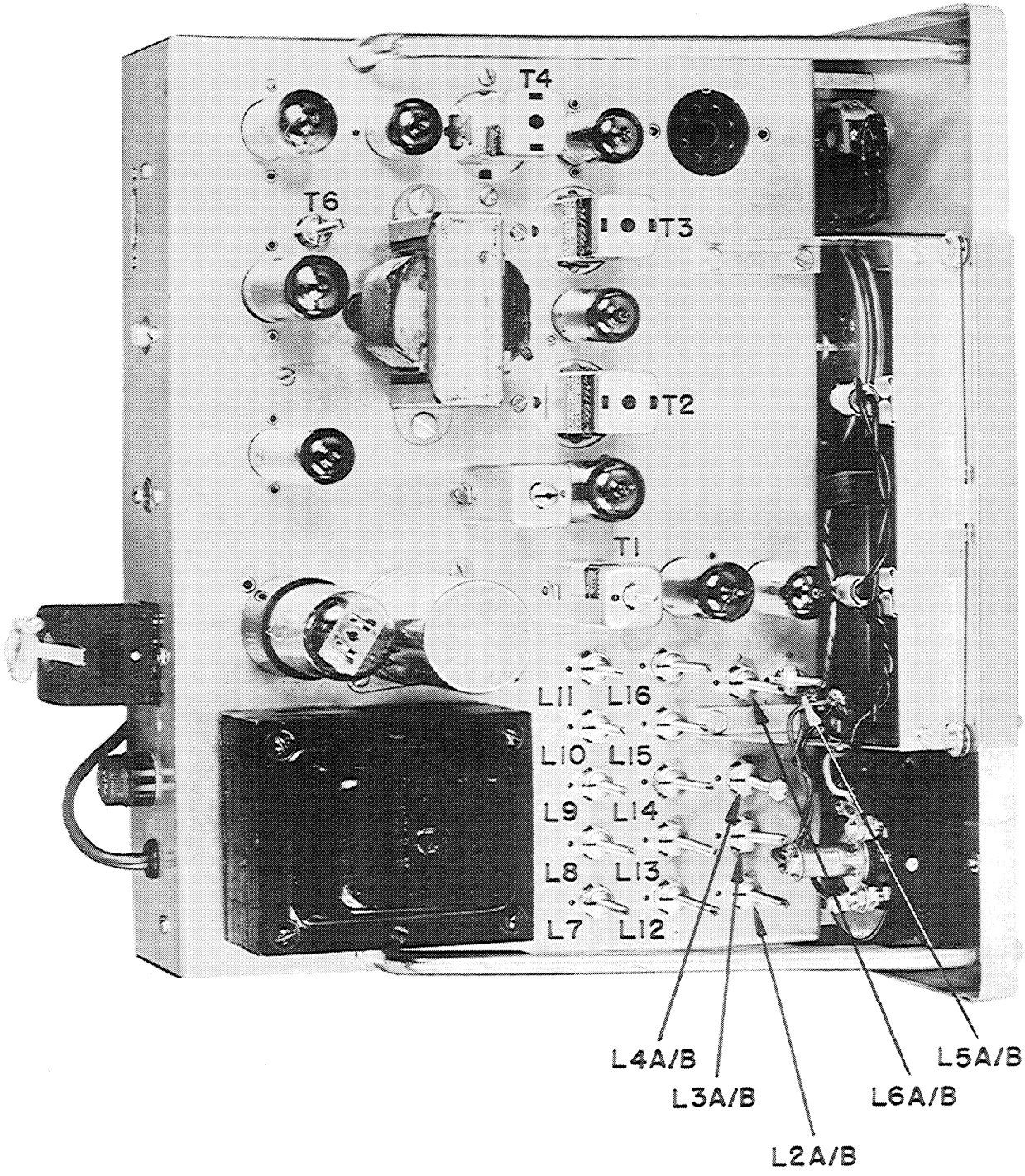
All components in the R-9 receiver have been carefully selected to assure an ample factor of safety. Failure may occur in the breakdown of capacitors or resistors, and measurement of voltages will indicate the particular circuit in which the failure occurred. Figure 3 indicates the proper voltages at each tube socket. All voltage measurements should be made with a high impedance vacuum tube voltmeter, between specified terminal and chassis.



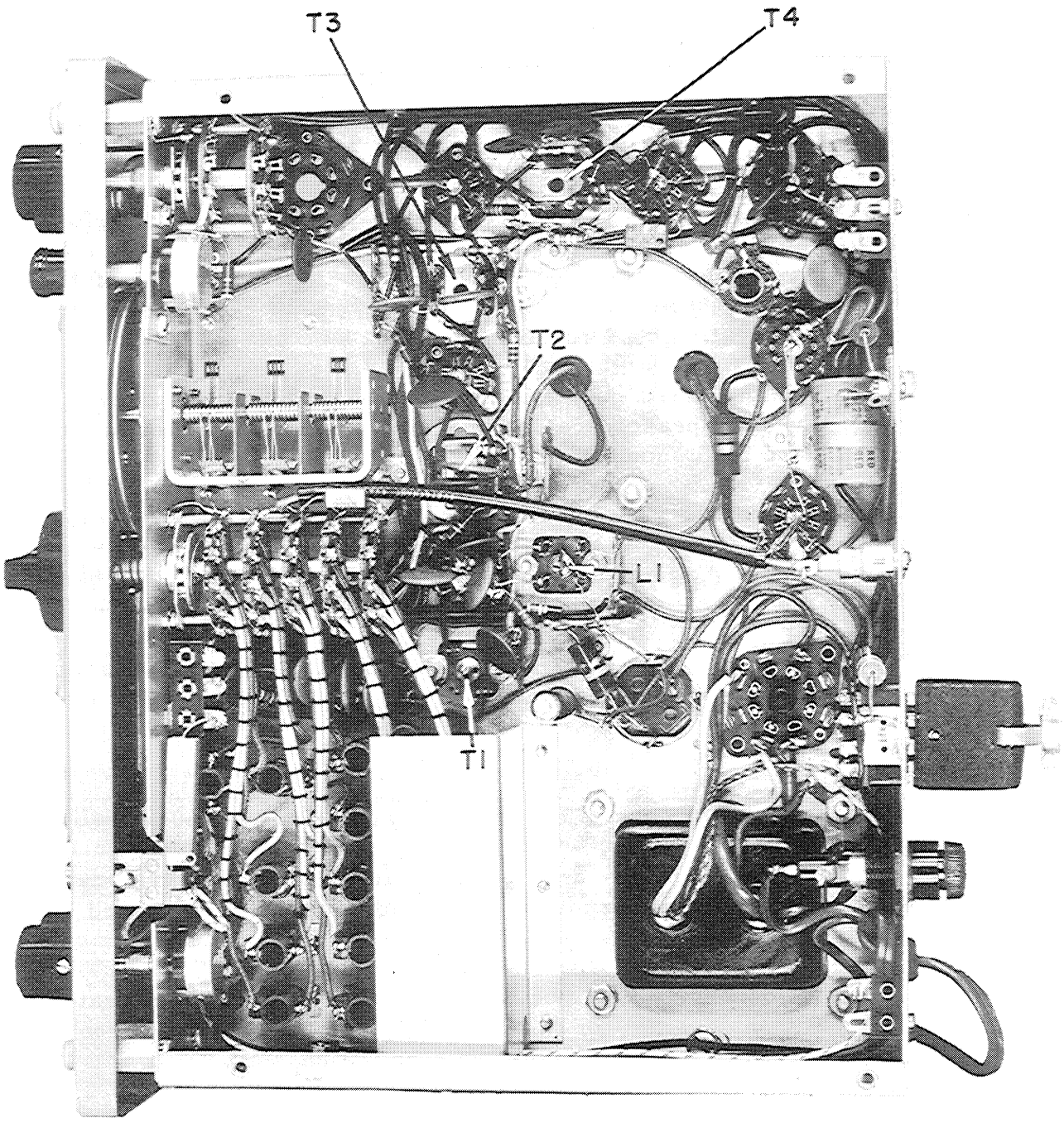
R.F. GAIN - ON FULL.
A.F. GAIN - ON FULL.
BFO SWITCH ON TO MEASURE PIN 6 OF V7.
BAND SWITCH SET AT "C" BAND.
FUNCTION SWITCH SET AT "AVC".
LINE VOLTAGE - 115 V. A.C.

TUBE SOCKET VOLTAGES

FIGURE 3



TOP VIEW OF CHASSIS
FIGURE 4



BOTTOM VIEW OF CHASSIS
FIGURE 5

SECTION 5

ALIGNMENT DATA

5-1. General.

All circuits of the R-9 Receiver are carefully aligned, before shipment, using precision test equipment. Realignment should not be attempted unless the individual has a complete understanding of the functioning of the equipment and has had previous experience in adjusting a communication type receiver.

The receiver must be set up as specified in Section 2-2, except the antenna and loudspeaker are disconnected. An output meter having a 4 ohm resistive load should be connected to the receiver output.

Alignment of the receiver may be divided into two major steps:

1. I. F. Alignment.
2. R. F. Alignment.
   a. H. F. Oscillator (var)
   b. R. F. Amplifier and Mixer
   c. H. F. Oscillator (fixed)

5-2. I. F. Alignment.

The intermediate frequency of the R-9 Receiver is 260 kc.

All I. F. transformers are permeability tuned, with screw type adjustments for alignment purposes. These adjustments are located on Figures 4 and 5.

1. Connect the high output lead of an accurately calibrated signal generator to Pin 2 of V3, and connect the ground lead to any convenient point on the chassis.
2. Set the Function Switch, SW-1, to manual.
3. Set the R. F. Gain control to max.
4. Set the A. F. Gain control to any half scale reading on an output meter with a 4 ohm load.
5. Turn the modulation on the signal generator to 400 cycles and about 30% modulation.
6. Adjust the frequency of the signal generator to 260 kc.
7. With an insulated screwdriver, adjust T4, T3 and T2 for maximum output. While adjusting these tuning slugs it may be necessary to decrease the output from the signal generator in order to avoid circuit overloading as the I. F. Gain increases with alignment.

8. With the signal generator connected as mentioned, turn off the modulation and switch SW-1 to the B. F. O. position. Set the pitch control R35 to approximately the center of its rotation, and adjust T6 for zero beat. This will complete the B. F. O. alignment.

9. The signal generator is now connected to Pin 2 of V2, and with the modulation on and a frequency of 1620 kc. applied, T1 and L1 are adjusted for maximum output. This will complete the I. F. alignment.

5-3. R. F. Alignment.

The data given in this section applies to the alignment of the H. F. oscillator, first detector, and R. F. amplifier stages for all bands.

The original alignment at Harvey-Wells laboratories is done by the use of precision crystal-controlled test oscillators. When aligning bands A, B, C, D, and E, the test signal should have an accuracy of 1% or better.

The location of aligning controls is shown in Figure 4, and the following alignment chart gives the step by step procedure to follow. It is important that the chart of adjustments be adhered to in their proper order.

R. F. ALIGNMENT CHART

R-9 RECEIVER

Step	Set Band Switch to Band	Adjust Sig. Gen. to	Set Tuning Dial to	Adjust to Recv. Signal	Adjust to Max. Output
1	A	26.96	26.96	L11	
2	A	28.0	28.0		L6 *
3	A	29.3	29.3		L16 **
1	B	21.0	21.0	L10	
2	B	21.15	21.15		L5 *
3	B	21.4	21.4		L15 **
1	C	14.0	14.0	L9	
2	C	14.1	14.1		L4 *
3	C	14.35	14.35		L14 **
1	D	7.0	7.0	L8	
2	D	7.1	7.1		L3 *
3	D	7.25	7.25		L13 **
1	E	3.5	3.5	L7	
2	E	3.6	3.6		L2 *
3	E	3.9	3.9		L12 **

* Check Step 1 after adjusting Step 2 inductances.

** Repeat Steps 1, 2 and 3 if necessary.

ELECTRICAL PARTS LIST

R-9 RECEIVER

SYMBOL R-9	DESCRIPTION	H-W PART NUMBER	QTY
C1	Capacitor, variable 2-15 mmf	B-2B1017-1	1
C2, C7, C29, C34, C54	Capacitor, fixed, mica 47 mmf 300 VDCW	1J(CM15D470G)	5
C3, C4, C5, C6, C8, C9, C10, C11, C12, C13, C14, C15, C16, C18, C19, C20, C25, C27, C28, C30, C32, C36, C56	Capacitor, fixed .01 mf 500 VDCW	A-1K3013-14M	22
C22	Capacitor, fixed, mica 100 mmf 300 VDCW	1J(CM15D101K)	1
C23	Capacitor, fixed .02 mf 500 VDCW	A-1K3013-24M	1
C24, C33	Capacitor, fixed, mica 220 mmf 300 VDCW	1J(CM15D221J)	2
C26	Capacitor, Electrolytic 20-20/25V	A-1N1007-1	1
C31	Capacitor, fixed, mica 12 mmf 300 VDCW	1J(CM15D120K)	1
C35, C46	Capacitor, fixed, ceramic 1.5 mmf	A-1K3026-1R50	2

ELECTRICAL PARTS LIST

R-9 RECEIVER

SYMBOL R-9	DESCRIPTION	H-W PART NUMBER	QTY
C37, C41, C42, C47 C48, C52	Capacitor, fixed, mica 27 mmf, 300 VDCW	1J(CM15D270J)	6
C38, C43, C49	Capacitor, fixed, mica 120 mmf, 300 VDCW	1J(CM15D121J)	3
C39, C44, C50	Capacitor, fixed, mica 180 mmf, 300 VDCW	1J(CM15D181J)	3
	Capacitor, fixed, mica 22 mmf, 300 VDCW	1J(CM15D220J)	
C40, C45 C51	Capacitor, fixed, mica 220 mmf, 300 VDCW	1J(CM15D221J)	3
C53	Capacitor, Electrolytic 20-20/450	A-1P3050-10	1
C55	Capacitor, fixed, mica 82 mmf, 300 VDCW	1J(CM15D820K)	1
F1	Fuse	A-43A1001-3	1
J1	Connector, socket	A-18N1002-2	1
J2	Phone Jack	A-16A1010-1	1
J3	Connector	A-17E1001-12	1
J4	Connector, antenna	A-16E1002-1	1
L1	Coil Assembly, 2nd Oscillator	C-12N1003-501	1
L2	Coil Assembly Antenna Band E	C-12E1011-501	1

ELECTRICAL PARTS LIST

R-9 RECEIVER

SYMBOL R-9	DESCRIPTION	H-W PART NUMBER	QTY
L3	Coil Assembly Antenna Band D	C-12E1011-502	1
L4	Coil Assembly Antenna Band C	C-12E1011-503	1
L5	Coil Assembly Antenna Band B	C-12E1011-504	1
L6	Coil Assembly Antenna Band A	C-12E1011-505	1
L7	Coil Assembly Oscillator Band E	C-12N1001-501	1
L8	Coil Assembly Oscillator Band D	C-12N1001-502	1
L9	Coil Assembly Oscillator Band C	C-12N1001-503	1
L10	Coil Assembly Oscillator Band B	C-12N1001-504	1
L11	Coil Assembly Oscillator Band A	C-12N1001-505	1
L12	Coil Assembly Mixer Band E	C-12J1001-501	1
L13	Coil Assembly Mixer Band D	C-12J1001-502	1
L14	Coil Assembly Mixer Band C	C-12J1001-503	1
L15	Coil Assembly Mixer Band B	C-12J1001-504	1

ELECTRICAL PARTS LIST

R-9 RECEIVER

SYMBOL R-9	DESCRIPTION	H-W PART NUMBER	QTY
L16	Coil Assembly Mixer Band A	C-12J1001-505	1
M1	Meter 0 - 1 ma.	C-69C1007-2	1
P1	Connector, Plug	A-18F1001-12	1
P2	Linecord Assembly	A-90A1002-501	1
P3	Connector	A-17A1000-6	1
PL1, PL2, PL3	Pilot Lamp, Miniature	A-42A1000-3	3
R1, R8, R11	Resistor, Fixed Composition 100K ohm 1/2 W	A-5A3002-15M	3
R2, R12	Resistor, Fixed Composition 100 ohm 1/2 W	A-5A3002-12M	2
R3, R30	Resistor, Fixed Composition 47K ohm 1/2 W	A-5A3002-473M	2
R4	Resistor, Fixed Composition 10K ohm 1/2 W	A-5A3002-14M	1
R6, R21 R22, R23	Resistor, Fixed Composition 1 megohm 1/2 W	A-5A3002-16M	4
R7, R10	Resistor, Fixed Composition 82K ohm 1/2 W	A-5A3002-823M	2
R9	Resistor, Fixed Composition 820K ohm 1/2 W	A-5A3002-824M	1
R35	Resistor, Fixed Composition 470 ohm 1/2 W	A-5A3002-471M	2

ELECTRICAL PARTS LIST

R-9 RECEIVER

SYMBOL R-9	DESCRIPTION	H-W PART NUMBER	QTY
R13	Resistor, Variable 2.5K 2 W	A-6E5002-U252K	1
R14	Resistor, Fixed Composition 15K ohm 2 W	A-5A5502-153K	1
R15, R17 R5	Resistor, Fixed Composition 1K ohm 1/2 W	A-5A3002-13K	3
R16, R37	Resistor, Fixed Composition 27K ohm 1/2 W	A-5A3002-273M	2
R18	Resistor, Fixed Composition 18K ohm 1/2 W	A-5A3002-183K	1
R19, R20	Resistor, Fixed Composition 270K ohm 1/2 W	A-5A3002-274M	2
R24	Potentiometer 500K ohm 2 W (A.F.)	A-6A1001-A55M	1
R25	Resistor, Fixed Composition 3.3K ohm 1/2 W	A-5A3002-332M	1
R26	Resistor, Fixed Composition 560K ohm 1/2 W	A-5A3002-564M	1
R27, R32 R33	Resistor, Fixed Composition 470K ohm 1/2 W	A-5A3002-474M	3
R28	Resistor, Fixed Composition 220 ohm 2 W	A-5A5502-221M	1
R29, R31, R36	Resistor, Fixed Composition 22K ohm 1/2 W	A-5A3002-223M	3

ELECTRICAL PARTS LIST

R-9 RECEIVER

SYMBOL R-9	DESCRIPTION	H-W PART NUMBER	QTY
R34	Resistor, Variable 1K ohm 1/4 W	A-6A1002-U13M	1
R38	Resistor, Fixed Composition 39 ohm 2W	A-5A5502-390K	1
R39	Resistor, Fixed Wirewound 5K ohm 10 W	A-5C7000-53M	1
R40	Resistor, Fixed Composition 4.7K ohm 2 W	A-5A5502-472M	1
R41	Resistor, Fixed 10Ω ±10% 7 W	A-5C6513-100K	1
R42	Resistor, Fixed 82% ±20% 1W	A-54A4001-820M	1
R43	Resistor, Fixed 4.7Ω ±10%1W	A-5A4000-4R7K	1
R44	Resistor, Fixed 4.7K±10% 1/2 W	A-5A3002-472K	1
R45	Resistor, Fixed 8.2K±10% 1/2 W	A-5A3002-822K	1
R46	Resistor, Fixed 100K ±10% 1/2 W	A-5A3002-104K	1
SW1	Switch, Function Selector	B-47F1041-1	1
SW2	Bandswitch	B-47F1042-1	1
SW3	Switch, Rotary	C-47A1002-1	1
SW4	Switch, Toggle	B-47B1004-1	1
T1	Transformer, I.F. 1620 kc.	A-10A1014-1	1

ELECTRICAL PARTS LIST

R-9 RECEIVER

SYMBOL R-9	DESCRIPTION	H-W PART NUMBER	QTY
T2, T3	Transformer, I.F. 260 kc.	A-10A1013-1	2
T4	Transformer, I.F. 260 kc.	A-10A1012-1	1
T5	Transformer, Output	B-9G1010-1	1
T6	Coil Assembly, B.F.O.	B-12N1002-501	1
T7	Transformer, Power	C-9A1028-1	1
V1, V4, V5	Tube 6BJ6		3
V2, V3	Tube 6U8		2
V6	Tube 6AL5		1
V7	Tube 12AX7		1
V8	Tube 6CM6		1
V9	Tube 5Y3GT		1
V10	Tube OA2		1
XF1	Fuseholder	A-43B1004-2	1
XV1, XV4, XV5, XV6, XV10	Tube Socket	A-18A1003-1A	5
XV2, XV3, XV7, XV8	Tube Socket	A-18A1003-2	4
XV9	Tube Socket	A-18A1000-2	1
XV11	Accessory Socket	A-18A1000-2	1

SECTION 6

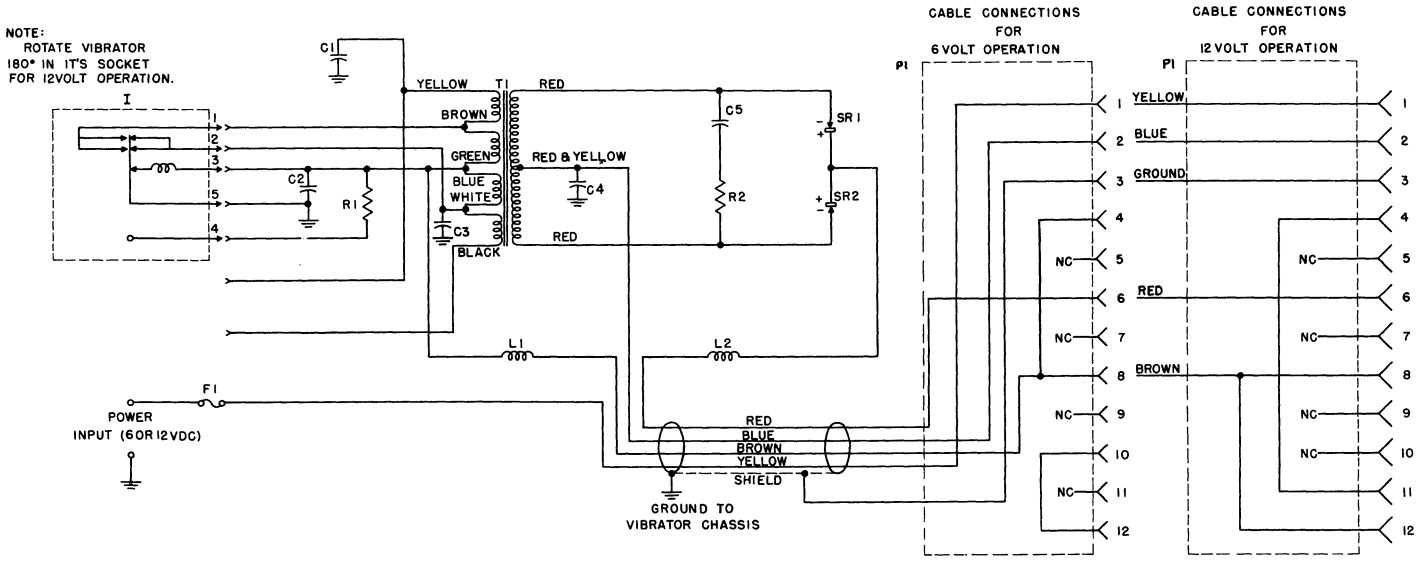
VIBRATOR POWER SUPPLY VPS-R9

6-1. General.

The VPS-R9 Vibrator Supply is a versatile 6 or 12 volt D. C. power supply, designed expressly for use with the R-9 Bandmaster Receiver. This power supply is factory wired for either 6 or 12 volts input depending on the user's requirements. If an input voltage change is required, such as going from a 6 volt ignition system to one of the new 12 volt systems, the vibrator is rotated 180° and the power plug P1 is rewired as shown in the schematic.

By rotating the vibrator 180° the necessary input winding terminals on T1 are automatically connected to the proper voltages, and P1 shall be wired for the type of operation required. No rewiring of the receiver is necessary.

It will be noted from the schematic of the VPS-R9 that no A. C. filtering of the D. C. output is provided in the vibrator power supply unit because this supply is designed for use with the R-9 receiver, and the necessary filtering is provided for in the receiver circuit. There is no change in operation of the R-9 receiver when used with the VPS-R9. (See Sections 1 to 5)



ELECTRICAL PARTS LIST

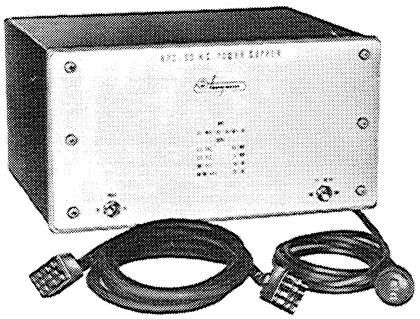
VIBRATOR POWER SUPPLY 6/12 V

SYMBOL	DESCRIPTION	H-W PART NO.	QTY.
C1, C3, C4	Capacitor .02 mf 600 VDCW	A-1K3025-24Z	3
C2	Capacitor 1 mf 120 VDCW	A-1A2022-1ROM	1
C5	Capacitor .002 mf 2.5 KVDC	A-1K4001-23Z	1
F1	Fuse, 10 amp, type 3AG	A-43A1002-3	1
G1	Vibrator	B-45B1001-1	1
P1	Connector	A-18F1001-12	1
L1	Choke, Filter	A-12A1020-3	1
L2	Coil, R. F. 2.5 mh 125 ma.	A-12A1001-5	1
R1	Resistor 39 ohm 2 W	A-5A5502-390J	1
R2	Resistor 10K ohm 1/2 W	A-5A3002-14M	1
SR1, SR2	Selenium Rectifier	B-50A1005-1	2
T1	Transformer	C-9A1032-1	1
XF1	Fuseholder	A-43B1012-1	1
XG1	Socket, Vibrator	A-18A1005-1	1

BANDMASTER *Accessories*

BANDMASTER POWER SUPPLIES

APS-90 AC POWER SUPPLY



The APS-90 Supply was designed specifically for use with the T-90 Bandmaster Transmitter for fixed station operation. It operates with a nominal line voltage input of 115 VAC, 60 cycle, single phase, and provides all the necessary operating and control voltages for the T-90.

The APS-90 is completely contained in a perforated enclosure which is identical in size and appearance to that of the T-90. Two operating switches are on the front panel. One switch is for power "ON" and the other switch is for the primary taps of the high voltage transformer. The S-312-AB connector is located on the rear chassis apron.

A single filament transformer supplies heater voltages to a 5Y3GT, full-wave low voltage rectifier; and a 5R4GY, full-wave high voltage rectifier, both contained in the APS-90. Another winding on this transformer supplies filament power for the T-90 transmitter. This voltage source, in conjunction with a selenium rectifier and filter is also used to provide DC relay control voltage. Separate transformers are used to supply the low and high operating plate voltages, the outputs of which, after rectification, are well filtered and contain bleeder resistors. The high voltage plate transformer has a tapped primary which may be switched thus allowing operation of the T-90 at CCS or ICAS ratings. A low voltage DC relay is used to switch the primaries of both plate transformers.

A 6-foot length of shielded, multiconductor cable, completely wired and terminated with appropriate plugs is supplied with the APS-90. One end of this cable has a P-312-CCT Jones connector for mating with the APS-90 chassis connector and the other end has a S-312-CCT connector for plugging into the T-90 chassis connector.

Since the power switch of the APS-90 is series connected in the line as a safety precaution, completion of the circuit must be made externally. The interconnecting cable ties in the transmitter control circuits and the power switch is normally left in the "ON" position. All functions, with the exception of the high voltage change, are then controlled at the transmitter end.

SPECIFICATIONS

All operating voltages and control circuits are terminated to a Jones S-312-AB chassis connector. Voltages available at this connector are as follows:

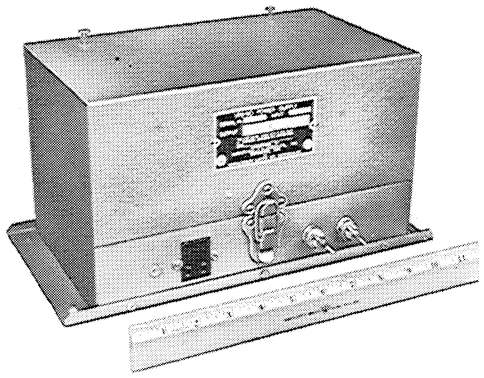
Volts	Current	Function
12.6 VAC	3.5 A	Transmitter Filaments Pilot Lights
12.6 VDC	.5 A	Relay Control
300 VDC	100 ma	Exciter & Speech Plates
500 or 600 VDC	225 ma	Power Amplifier and Modulator Plates

NOTE: When used as a separate supply for other equipment, the filament and relay voltages may be dropped to 6.3 volts by use of suitable external series resistors.

Dimensions: 12⅜" wide, 10½" deep, 6¾" high — same as T-90 Transmitter.
Weight: 35 lbs.

$79.50*

VPS-T90 6/12 VOLT DC SUPPLY



A vibrator power supply designed specifically for the T-90 Bandmaster Transmitter. Provides all necessary voltages. May be used with either 6 or 12 volts D.C. by changing jumpers. Comes complete with 10 foot shielded multiconductor output cable and connectors.

Designed for easy installation and service. Cover removable from front by means of snap latch, input and output connections on same face. Mounts on convenient mounting base.

SPECIFICATIONS

1. Input: 6.3 VDC Nominal
   Output: A. 300 VDC at 100 ma
   B. 300 VDC at 200 ma
   or 500 VDC at 200 ma
2. Input: 12.6 VDC Nominal
   Output: A. 300 VDC at 100 ma
   B. 300 VDC at 200 ma
   or 500 VDC at 200 ma
3. Output Ripple: A. .5% or under
   B. 1% or under
4. Vibrator Frequency 60 CPS
5. Lowest Input Voltage at which supply will operate
   A. 5 VDC
   B. 10 VDC

DIMENSIONS: 11" wide, 6⅝" deep, 6⅝" high.
WEIGHT: 20 lbs.

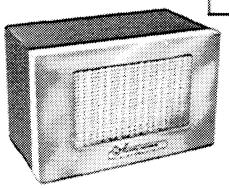
PRICE **$89.50***

VPS-R9 VIBRATOR SUPPLY

Designed for use with R-9 Bandmaster Receiver when operating mobile. 6 or 12 VDC input, outputs as required by R-9 Receiver. Mounts on either bottom or back of case. Input and output leads on same face. Complete with shielded multiconductor interconnect cable and connector. (No modification required to R-9 Receiver, just plug in the cable).

DIMENSIONS: 7½" wide, 6¾" high, 4¾" deep.
WEIGHT: 10 lbs. **$28.50*** (Plus Federal Excise Tax)

BANDMASTER SPEAKERS

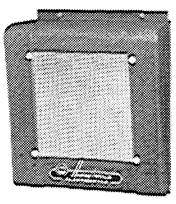


FS-1 FIXED STATION SPEAKER

Designed to match the T-90 and R-9. Incorporates high quality oval speaker 6" x 9". Overall dimensions 12⅜" wide, 6¼" deep, 8" high. Impedance 3.2 ohms.

PRICE **$10.50*** (Plus Federal Excise Tax)

MS-1 MOBILE SPEAKER



A six inch speaker designed for mounting in automobile or cabin. Impedance 3.2 ohms. Dimensions 8" high, 4¾" deep, 6⅝" wide.

PRICE **$7.50*** (Plus Federal Excise Tax)

*Price Subject to change without notice

Harvey-WELLS ELECTRONICS, INC.
SOUTHBRIDGE / MASS. U.S.A.

PRINTED IN U.S.A.

THE *Harvey*-WELLS
BANDMASTER Z MATCH

Physically identical to other units in the complete "System-Engineered" Bandmaster Station.

12⅜" wide x 6¾" high x 10½" deep.

Only $89.00*

THE *Antenna Coupler* THAT COMBINES
4 INSTRUMENTS IN ONE UNIT

1. A PRECISION ENGINEERED ANTENNA MATCHING UNIT
2. A FORWARD-REFLECTED POWER WATTMETER
3. AN R.F. WATTMETER
4. A DUMMY LOAD

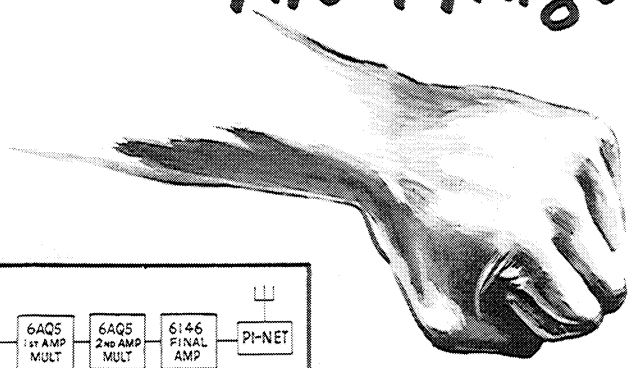
Although originally designed for use with the Harvey-Wells T-90 Bandmaster Transmitter, this antenna coupler may be used with any transmitter for matching into a variety of load impedances ranging from 10 to 2000 ohms. Terminals are provided for line or coaxial antenna feeders. Tuning is continuous from 10 to 80 meters without band-switching. It will conservatively handle a transmitter input of 500 watts.

In addition to its features as an antenna coupler, the Bandmaster Z-Match has a built-in forward-reflected power wattmeter, an R.F. wattmeter, and a dummy load. Curves are supplied to enable the forward-reflected power readings to be converted to VSWR information. The R.F. Wattmeter is in the circuit at all times, and the dummy load may be used to check your transmitter before going on the air.

*PRICE SUBJECT TO CHANGE WITHOUT NOTICE

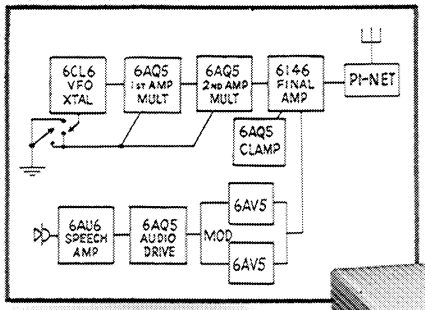
Harvey-WELLS
ELECTRONICS, INC.
SOUTHBRIDGE, MASS. U.S.A.

The Midget with a Mighty PUNCH



MOBILE OR FIXED 90 **WATTS**

(90 watts CW.) (75 watts Phone)



T-90

DIMENSIONS
(overall)
Cabinet
12 3/8" wide
10 1/2" deep
6 3/4" high
weight 17 3/4 lbs.

PRICE
$179.50*

Factory built and tested complete with tubes, less power supply.

Harvey-WELLS T-90 BANDMASTER TRANSMITTER

ELECTRICAL SPECIFICATIONS

Frequency ranges: Six switch positions.

80 Meters	3.5	to 4.0	Mcs.
40 Meters	7.0	to 7.3	Mcs.
20 Meters	14.0	to 14.35	Mcs.
15 Meters	21.0	to 21.45	Mcs.
11 Meters	26.96	to 27.23	Mcs.
10 Meters	28.0	to 29.7	Mcs.

Frequency Control: VFO or Crystal

Power Input:
(1) Phone: 75 Watts ICAS
(2) CW: 90 Watts ICAS

Output Load: Unbalanced PI Network. 20 ohms to 2000 ohms Resistive

Tube Complement:
1 — 6CL6 VFO/Crystal Oscillator
1 — 6AQ5 1st Multiplier/Amplifier
1 — 6AQ5 2nd Multiplier/Amplifier
1 — 6146 Final Amplifier
1 — 6AQ5 Final Amplifier Screen Clamper
1 — 0B2 VFO Screen Voltage Regulator
1 — 6AU6 Speech Amplifier
1 — 6AQ5 Driver, Amplifier
2 — 6AV5 Class B Modulators

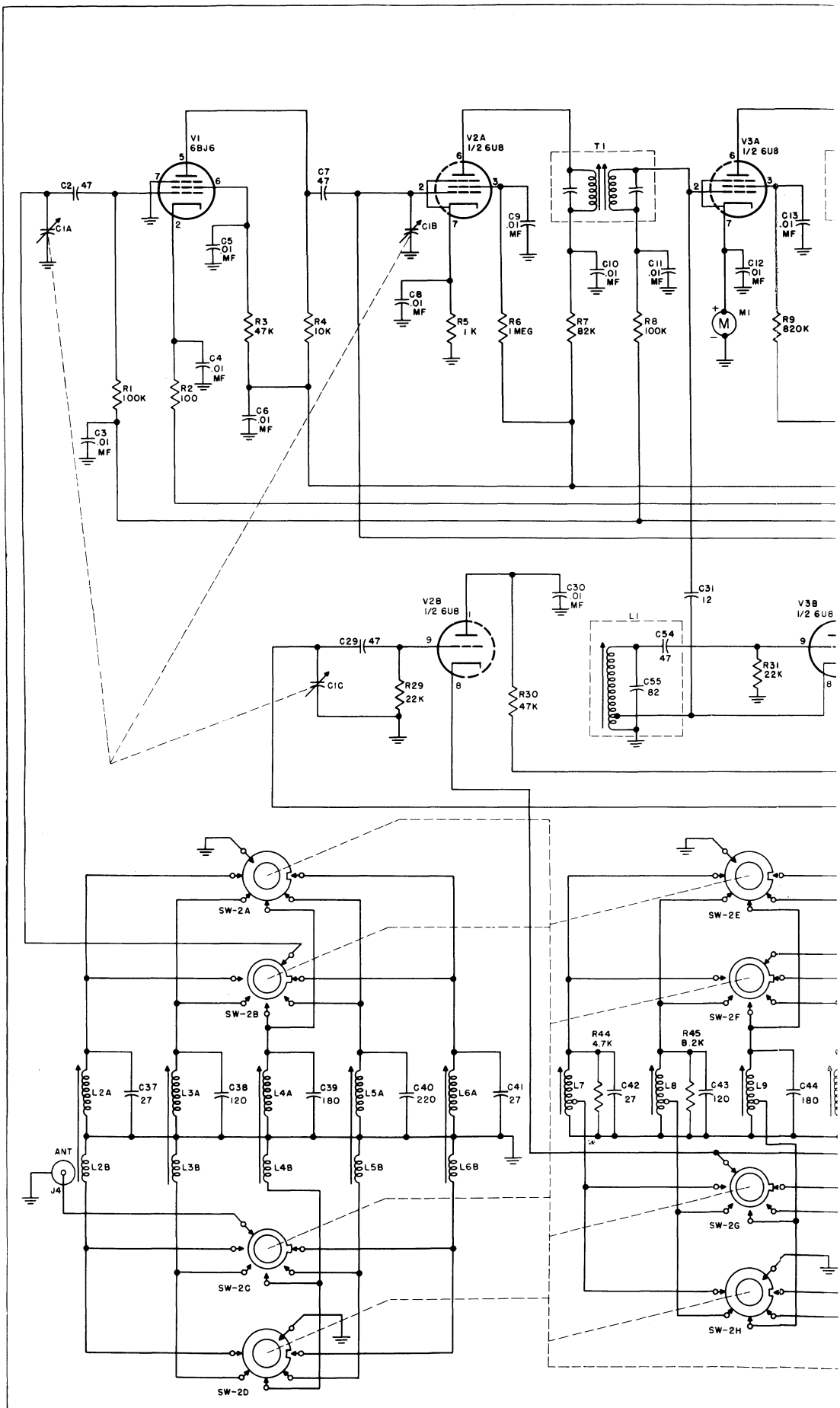
Power Requirements:
Fil: 6.3 volts AC/DC at 7 Amps. — or — 12.6 volts AC/DC at 3.5 Amps.
Relay: 6.3 volts DC at 500 ma. — or 12.6 volts at 500 ma.
Plate: 500-600 volts at 225 ma. and 300 volts at 100 ma.

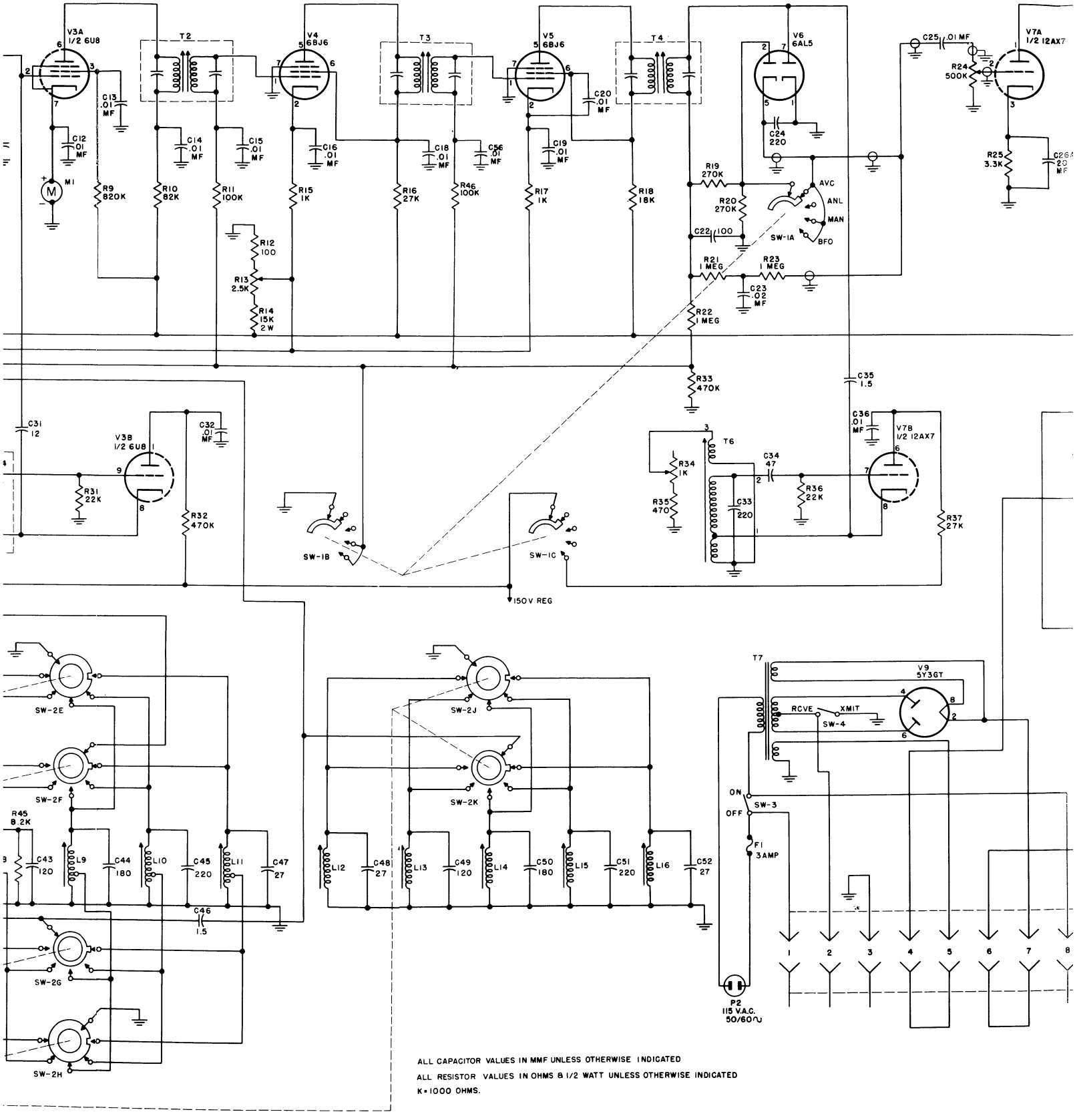
The T-90 is the result of our long study concerning the operating requirements of most amateurs. Sufficient power to "get out" on all bands, either fixed or mobile, under today's QRM conditions, plus space limitations of the average home, has been the prime objective in its design. The many refinements contributing to smooth and efficient operation which have been incorporated in the T-90, have up to this time been found only in transmitters selling at a much higher price. A close study of the following features will provide convincing evidence that the T-90 is the transmitter YOU WANT for your shack or car.

FEATURES

1. TVI Suppressed
2. Complete band-switching; no plug-in coils
3. Complete Break-in Keying — or keying of multiplier stages only
4. VFO Tuning without carrier on
5. Cathode biased Exciter tubes and clamp tube control of Final Amplifier Screen Voltage
6. Initial tuning at reduced power
7. Three position excitation control
8. Antenna loading flexibility
9. Selector switch allows metering of PA Grid, PA Cathode and Modulator currents
10. Remote Break-in and Receiver muting provided by relay control
11. VFO voltage regulated and temperature compensated
12. Illuminated dial and meter
13. Crystal door on front panel
14. Filament Operation 6 or 12 volts AC/DC
15. Low average Modulator current
16. Built-in provision for either Carbon, Crystal or Dynamic microphone and push-to-talk.

*PRICE SUBJECT TO CHANGE WITHOUT NOTICE


V1 6BJ6
V2A 1/2 6U8
V3A 1/2 6U8
T1
C1A
C1B
C1C
C2 47
C3 .01 MF
C4 .01 MF
C5 .01 MF
C6 .01 MF
C7 47
C8 .01 MF
C9 .01 MF
C10 .01 MF
C11 .01 MF
C12 .01 MF
C13 .01 MF
R1 100K
R2 100
R3 47K
R4 10K
R5 1 K
R6 1 MEG
R7 82K
R8 100K
R9 820K
M1
V2B 1/2 6U8
V3B 1/2 6U8
L1
C29 47
C30 .01 MF
C31 12
C54 47
C55 82
R29 22K
R30 47K
R31 22K
SW-2A
SW-2B
SW-2C
SW-2D
SW-2E
SW-2F
SW-2G
SW-2H
ANT
J4
L2A
L2B
L3A
L3B
L4A
L4B
L5A
L5B
L6A
L6B
L7
L8
L9
C37 27
C38 120
C39 180
C40 220
C41 27
C42 27
C43 120
C44 180
R44 4.7K
R45 8.2K
REVISIONS
B

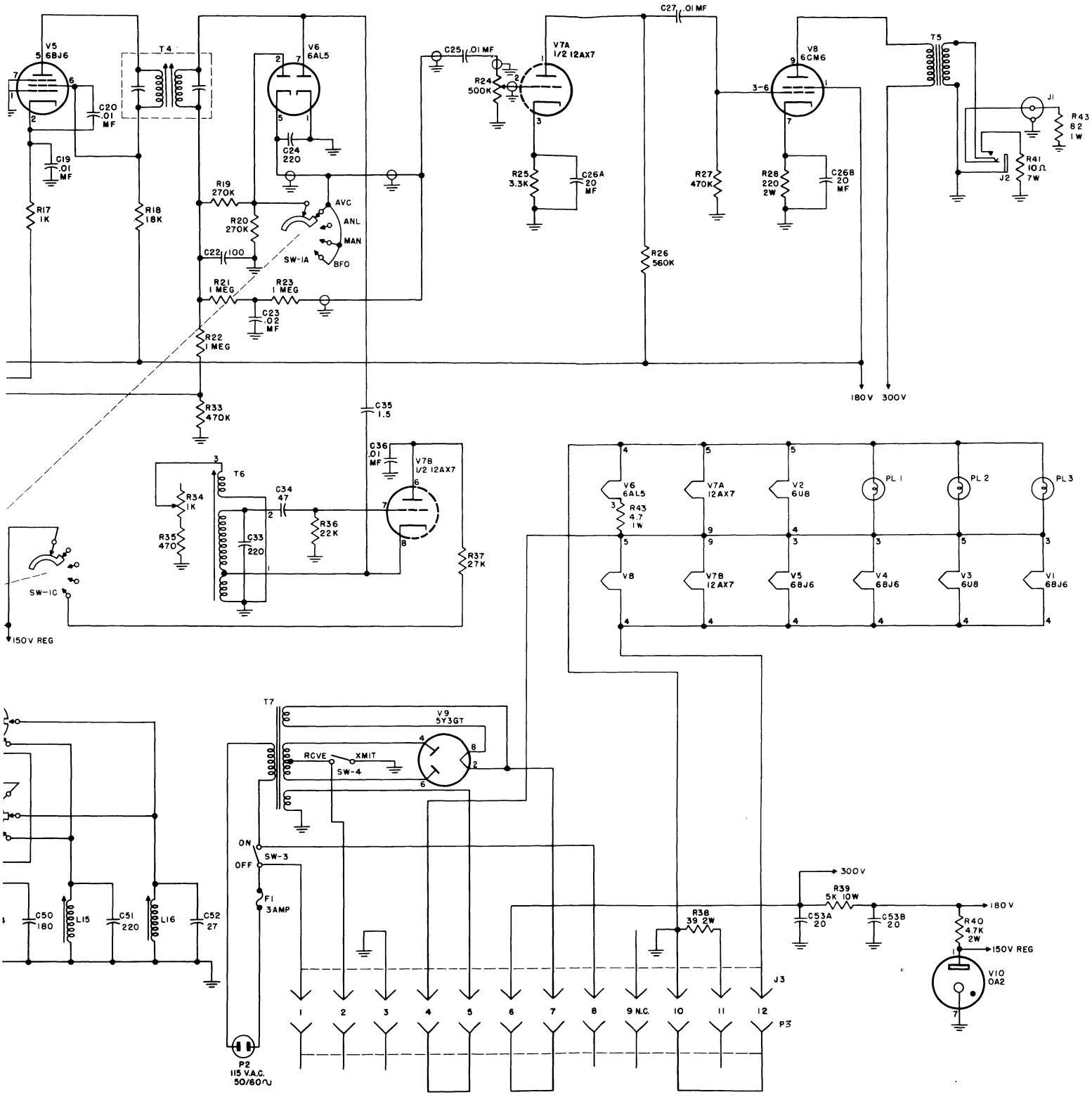


ALL CAPACITOR VALUES IN MMF UNLESS OTHERWISE INDICATED

ALL RESISTOR VALUES IN OHMS & 1/2 WATT UNLESS OTHERWISE INDICATED

K = 1000 OHMS.

E-91A1144



ES IN MMF UNLESS OTHERWISE INDICATED

ES IN OHMS & 1/2 WATT UNLESS OTHERWISE INDICATED

MATERIAL:	
FINISH:	
TOLERANCE EXCEPT AS OTHERWISE INDICATED	SCHEMATIC DIAGRAM
FRACTIONS ±1/64	R-9 RECEIVER
DECIMALS ± .005	FIRST MADE FOR: X-200
ANGLES ± 1°	DRAWN EWP DATE 4-8-58 DRAFT APP. SEE DATE REV
SCALE	CHECKED SEE DATE REV ENG. APP. SEE DATE REV
	HARVEY-WELLS ELECTRONICS, INC. SOUTHBRIDGE, MASS. U.S.A. E-91A1144

HARVEY-WELLS ELECTRONICS, INC.

R-9 AND R-9A

ADDENDUM NO. 1 TO R-9 AMATEUR BAND

COMMUNICATIONS RECEIVER

INSTRUCTION MANUAL

The following information is added to the R-9 Instruction Manual to cover the new R-9A Amateur Band Communications Receiver. The R-9A is similar to the R-9. All installation, operation and service data in the instruction manual covering the R-9, are also applicable to the R-9A unless otherwise specified in this addendum.

Page 9. Figure 3. Substitute figure 3A when trouble shooting and servicing the R-9A model.

Page 10. Figure 4. Substitute figure 4A for the R-9A model.

Page 11. Figure 5. Substitute figure 5A for the R-9A model.

Page 16. Electrical Parts List. In the R-9A the following electrical parts are changed as noted:

C37, C42, and C48	Capacitor, fixed mica 22 mmf 300 VDC	1J(CM15D220J)
R16	Resistor, fixed, composition 100 K ohm, 1/2 W	A-5A3002-104M

Page 27. Schematic Diagram. Change values for R-9A as follows:

C37, C42 and C48 to 22 mmf.

R16 to 100 K.

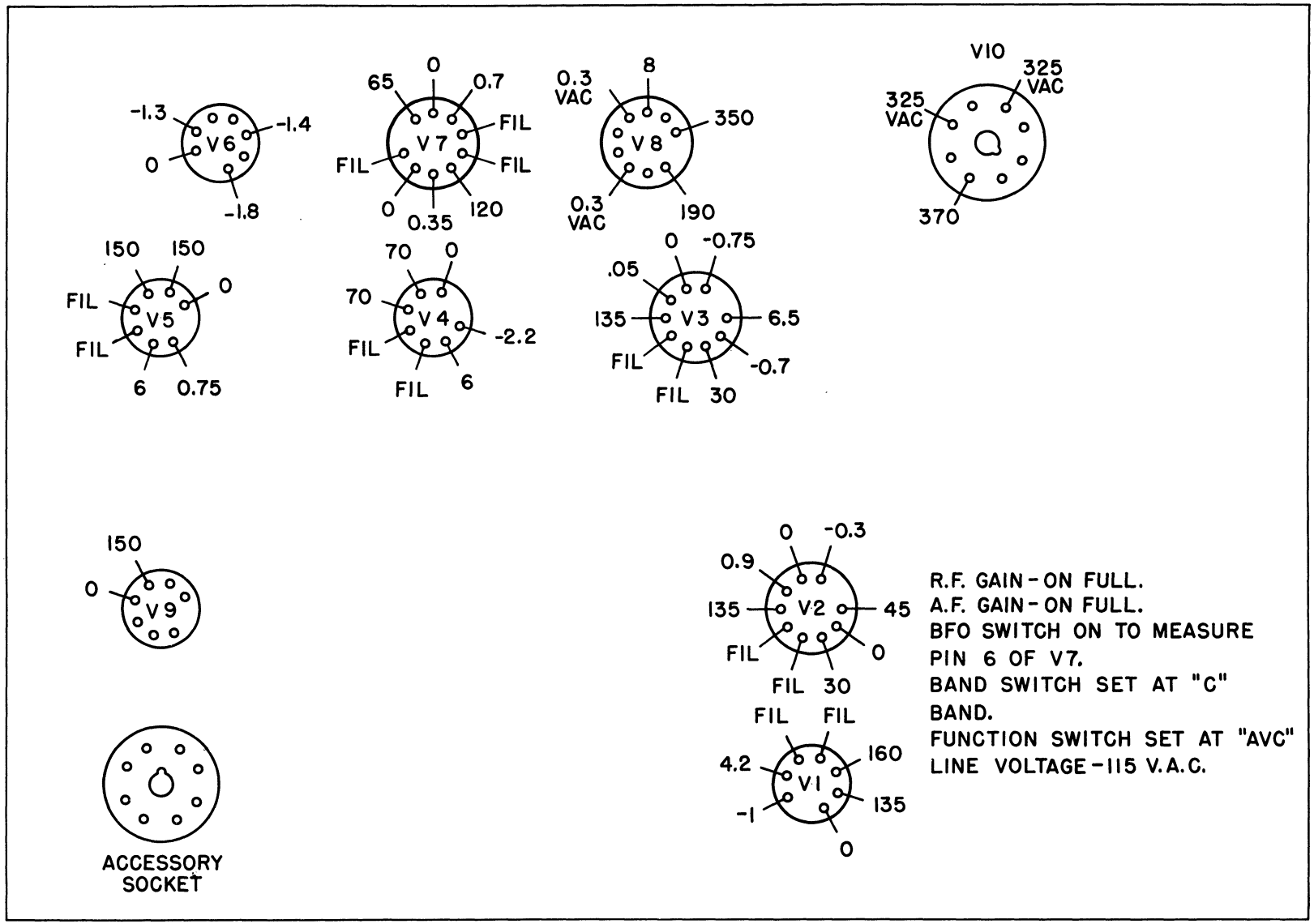


FIGURE 3A. R9A TUBE SOCKET LOCATION AND VOLTAGE DIAGRAM

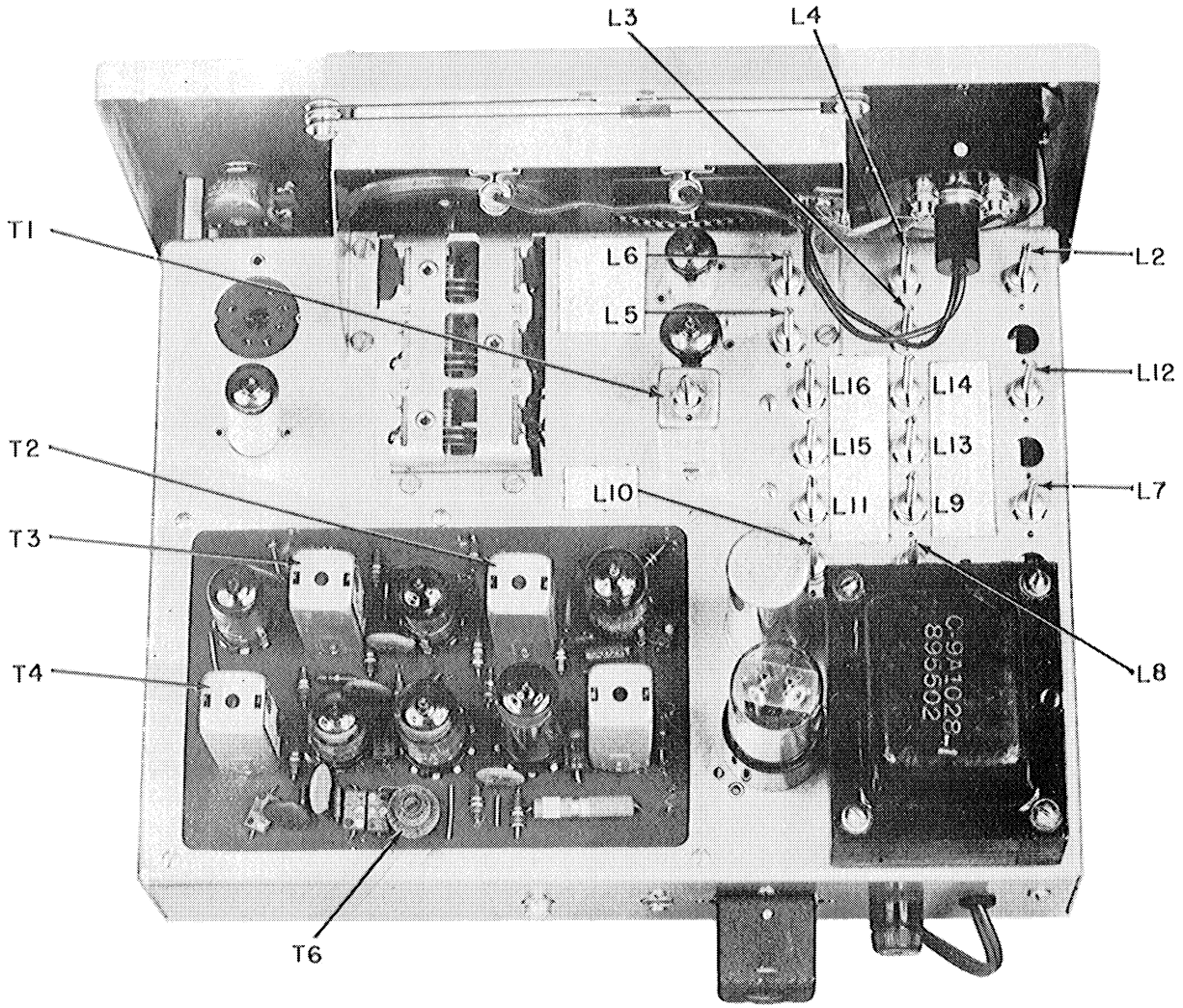


FIGURE 4A. TOP VIEW OF R-9A CHASSIS

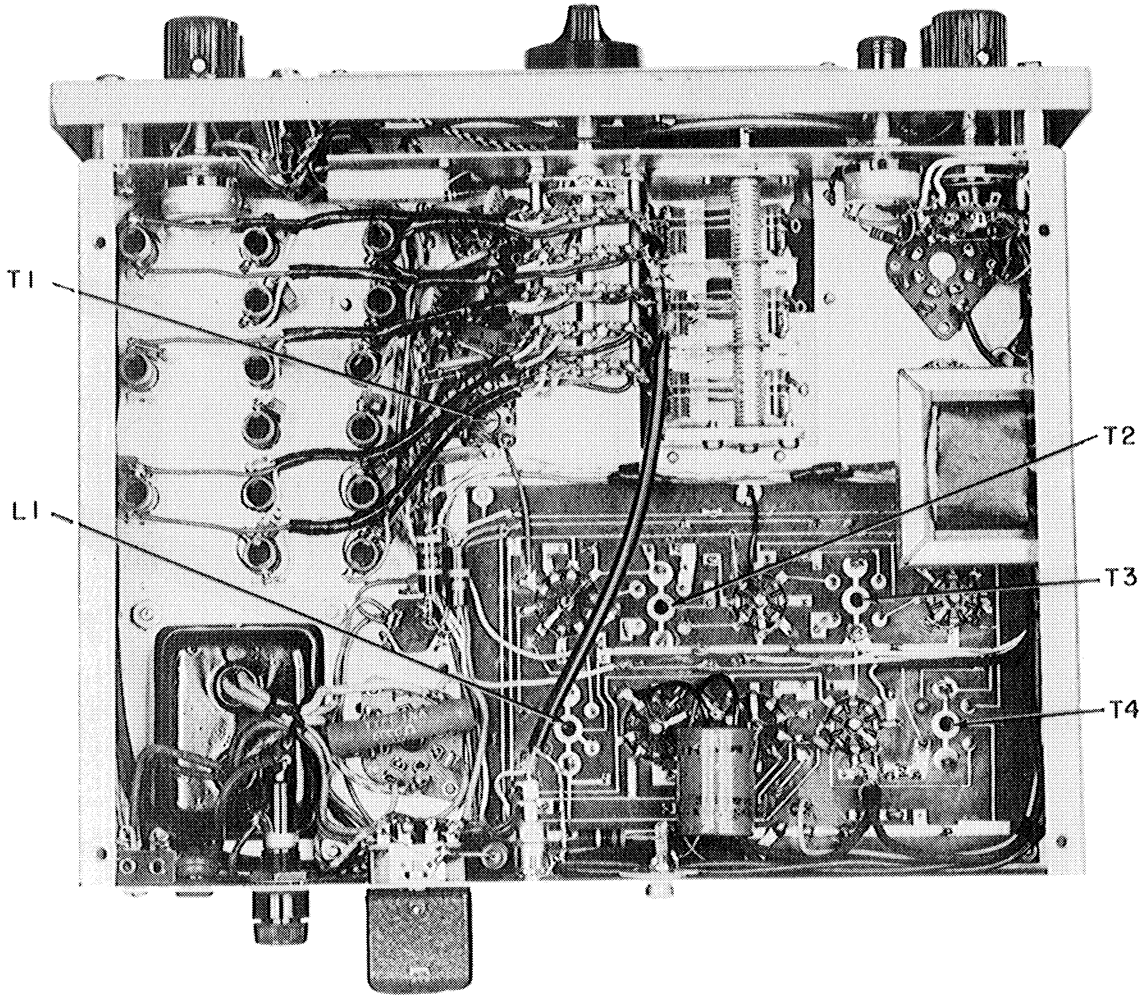


FIGURE 5A. BOTTOM VIEW OF R-9A CHASSIS

HARVEY-WELLS ELECTRONICS, INC.

ADDENDUM NO. 2 TO R-9 AND R-9A AMATEUR BAND

COMMUNICATIONS RECEIVER

INSTRUCTION MANUAL

The following information is added to the R-9 Instruction Manual to cover the latest factory modifications to provide increased hash attenuation. Users of this manual should enter suitable notations where applicable.

Page 15. Electrical Parts List. Add the following immediately after C23.

C58	Capacitor, Fixed 0.02 mf, 500 VDCW	A-1K3013-24M	1

Page 22. VPS-R9 Schematic Diagram. Change the schematic diagram to show capacitor C6 connected between the 6 - 12 VDC input lead (right-hand side of fuse) and the cable shield ground point.

Page 23. Electrical Parts List. Add the following item.

C6	Capacitor, Fixed, 0.5 mf, 120 VDCW	A-1A2024-CR50	1

R-9 Receiver Schematic Diagram. Change the schematic diagram to show C58 connected between pins 2 and 3 of connector J3.

HARVEY-WELLS ELECTRONICS, INC.

ADDENDUM NO. 3 TO R-9 AMATEUR BAND

COMMUNICATIONS RECEIVER

INSTRUCTION MANUAL

The following information is added to the R-9 Instruction Manual and the addenda thereto to cover the new RG-9A General Coverage Communications Receiver. Except for the variations noted below, all installation, operation and service data applicable to the R-9A also pertains to the RG-9A. Users of the RG-9A should insert suitable notations where applicable in the Instruction Manual to denote these variations.

Page 3. Paragraph 2-3, step 1. Not applicable to the RG-9A.

Page 3. Paragraph 2-3, step 4. Add the following to this step: "The RG-9A model may also be used with a 230-volt a-c source. A switch is provided on the rear of this model for changing the connections to the power transformer primary. This model is shipped with this switch locked in the 115-volt position. If the equipment is to be operated from a 230-volt source, remove the lock plate, place the switch in the 230-volt position, flop the lock plate over and fasten it in position before applying power".

Page 3. Paragraph 2-4. Not applicable to the RG-9A.

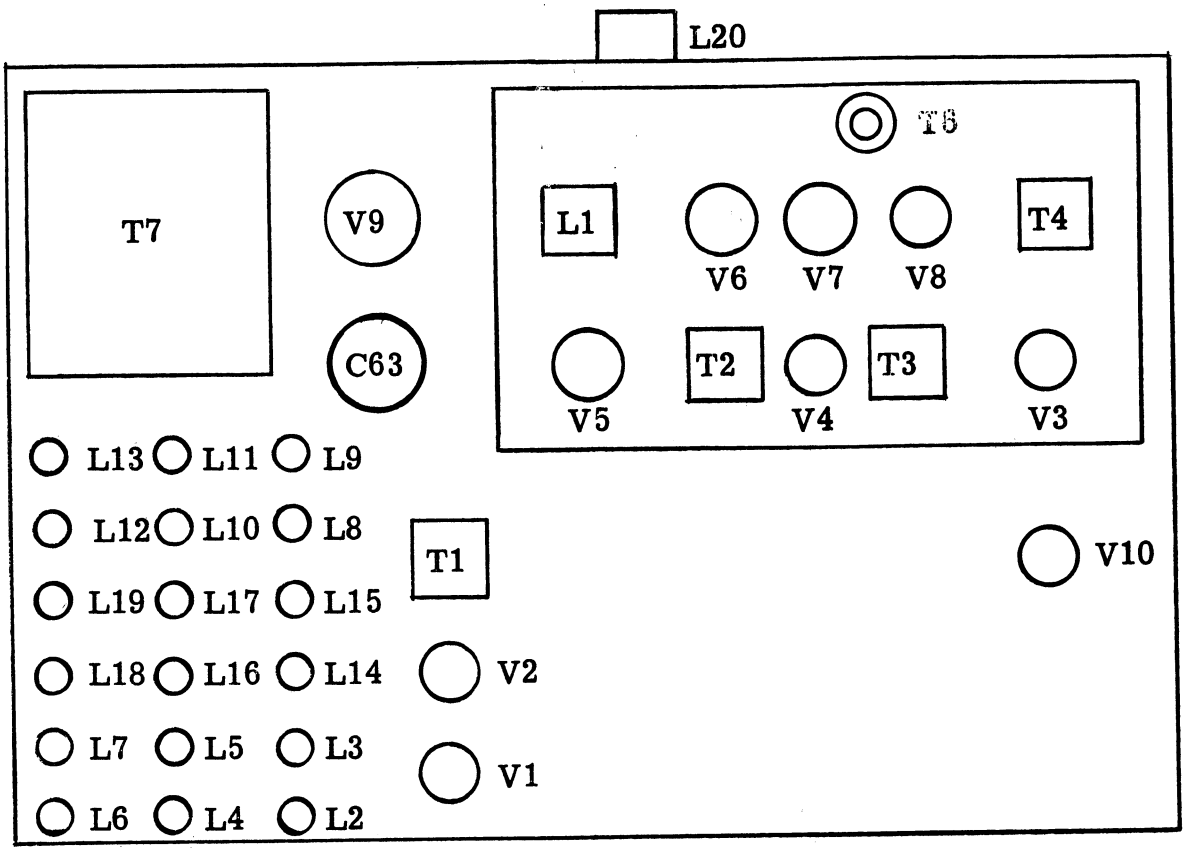
Page 6. Paragraph 3-1. The RG-9A uses a six position bandswitch instead of the five position switch used in the R-9A.

Page 12. Paragraph 5-2. Change reference from figure 4 and 5 to the RG-9A Chassis Layout sketch on the following page.

Page 13. Paragraph 5-2, step 9. Change reference to "1620 kc" to "1650 kc" for the RG-9A.

Page 13. Paragraph 5-2. Add the following after "step 9".

"On the RG-9A models it is also necessary to tune trap L20 which is used to suppress incoming signals at the same frequency level as the first I. F. To



RG-9A Chassis Layout

tune this trap, feed in a modulated signal at 1650 kc, set the Bandswitch to band B and the dial to 1650 kc and tune L20 for minimum output on output indicating device."

Page 13. Paragraph 5-3. Change reference to figure 4 to read "RG-9A Chassis Layout sketch."

Page 14. When aligning the RG-9A, substitute the following R. F. Alignment Chart.

RG-9A R. F. ALIGNMENT CHART

Step	Set Band Switch To	Set Sig. Gen. To	Set Dial To	Adjust To Receive Sig.	
1	F	18 mc	18 mc	L - 8	
2	F	29 mc	29 mc	C - 45	
Repeat Steps 1 and 2 until dial calibrations are correct.					
3	F	18 mc	18 mc	L - 14	L - 2
4	F	29 mc	29 mc	C - 51	C - 39
		---	---		
1	E	9 mc	9 mc	L - 9	
2	E	15 mc	15 mc	C - 46	
Repeat Steps 1 and 2 until dial calibrations are correct.					
3	E	9 mc	9 mc	L - 15	L - 3
4	E	15 mc	15 mc	C - 52	C - 40
		---	---		
1	D	4.5 mc	4.5 mc	L - 10	
2	D	7.5 mc	7.5 mc	C - 47	
Repeat Steps 1 and 2 until dial calibrations are correct.					
3	D	4.5 mc	4.5 mc	L - 16	L - 4
4	D	7.5 mc	7.5 mc	C - 53	C - 41
		---	---		
1	C	2.25 mc	2.25 mc	L - 11	
2	C	3.75 mc	3.75 mc	C - 48	
Repeat Steps 1 and 2 until dial calibrations are correct.					
3	C	2.25 mc	2.25 mc	L - 17	L - 5
4	C	3.75 mc	3.75 mc	C - 54	C - 42
		---	---		
1	B	.975 mc	.975 mc	L - 12	
2	B	1.5 mc	1.5 mc	C - 49	
Repeat Steps 1 and 2 until dial calibrations are correct.					
3	B	.975 mc	.975 mc	L - 18	L - 6
4	B	1.5 mc	1.5 mc	C - 55	C - 43

Step	Set Band Switch To	Set Sig. Gen. To	Set Dial To	Adjust To Receive Sig.	
1	A	.575 mc	.575 mc	L - 13	
2	A	.875 mc	.875 mc	C - 50	

Repeat Steps 1 and 2 until dial calibrations are correct.

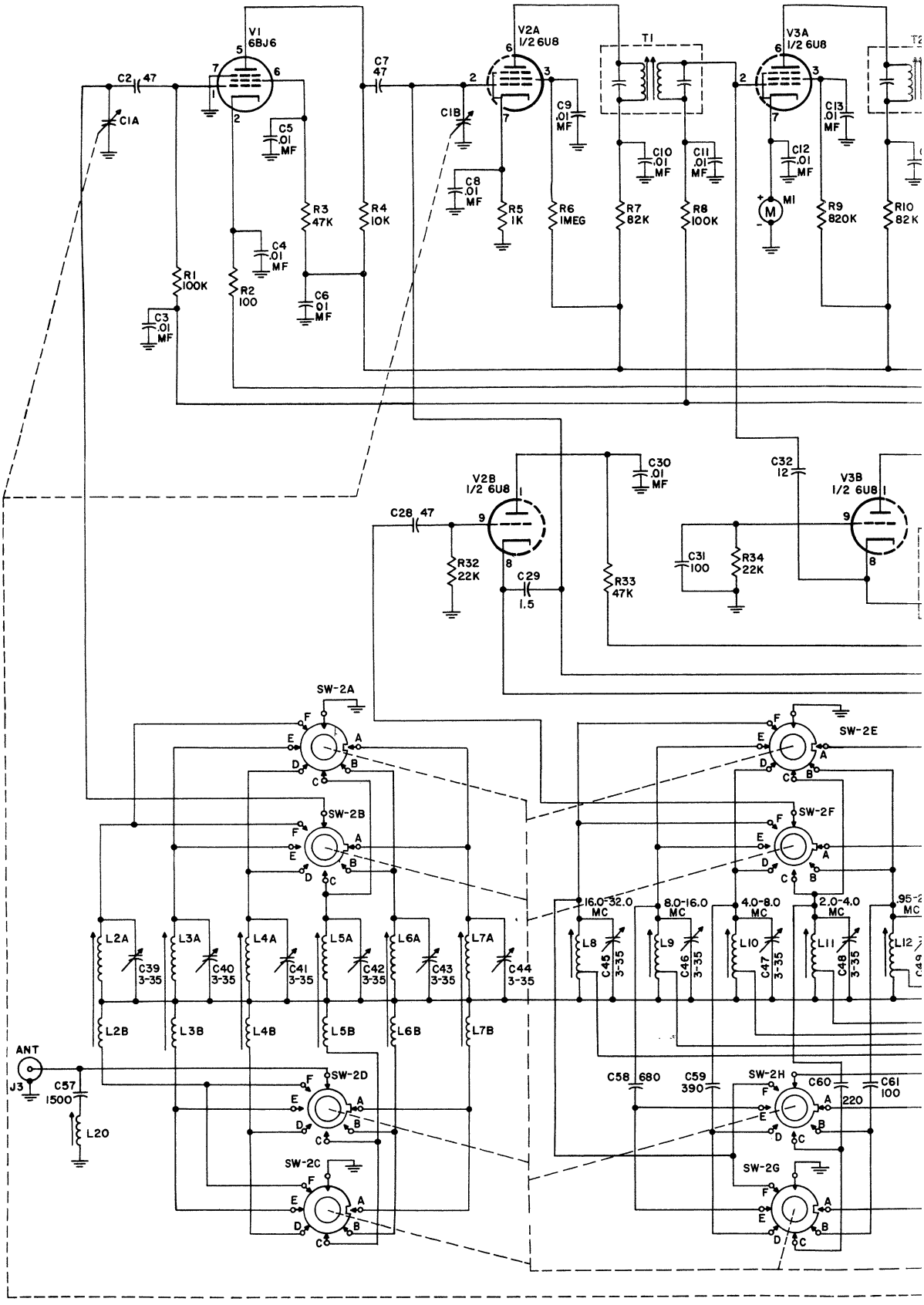
3	A	.575 mc	.575 mc	L - 19	L - 7
4	A	.875 mc	.875 mc	C - 56	C - 44

NOTE: Check Steps 1 and 2 on each band after doing Steps 3 and 4.

Electrical Parts List. - The following list includes RG-9A electrical parts that differ from those used in the R-9A.

J3	Connector, antenna	A-16E1002-1	1
J4	Not used		
L1	Coil Assembly, Oscillator 2nd	C-12N1003-501	1
L2	Coil Assembly, Antenna Band F	C-12E1014-506	1
L3	Coil Assembly, Antenna Band E	C-12E1014-505	1
L4	Coil Assembly, Antenna Band D	C-12E1014-504	1
L5	Coil Assembly, Antenna Band C	C-12E1014-503	1
L6	Coil Assembly, Antenna Band B	C-12E1014-502	1
L7	Coil Assembly, Antenna Band A	C-12E1014-501	1
L8	Coil Assembly, Oscillator Band F	C-12N1014-506	1
L9	Coil Assembly, Oscillator Band E	C-12N1014-505	1
L10	Coil Assembly, Oscillator Band D	C-12N1014-504	1
L11	Coil Assembly, Oscillator Band C	C-12N1014-503	1
L12	Coil Assembly, Oscillator Band B	C-12N1014-502	1
L13	Coil Assembly, Oscillator Band A	C-12N1014-501	1
L14	Coil Assembly, Mixer Band F	C-12J1003-506	1
L15	Coil Assembly, Mixer Band E	C-12J1003-505	1
L16	Coil Assembly, Mixer Band D	C-12J1003-504	1
L17	Coil Assembly, Mixer Band C	C-12J1003-503	1
L18	Coil Assembly, Mixer Band B	C-12J1003-502	1
L19	Coil Assembly, Mixer Band A	C-12J1003-501	1
SW5	Switch, slide	A-47L1003-1	1

Schematic Diagram. - Substitute the attached RG-9A diagram for the R-9A schematic.


V1 6BJ6
V2A 1/2 6U8
T1
V3A 1/2 6U8
V2B 1/2 6U8
V3B 1/2 6U8
C1A
C1B
C2 47
C3 .01 MF
C4 .01 MF
C5 .01 MF
C6 .01 MF
C7 47
C8 .01 MF
C9 .01 MF
C10 .01 MF
C11 .01 MF
C12 .01 MF
C13 .01 MF
C28 47
C29 1.5
C30 .01 MF
C31 100
C32 12
R1 100K
R2 100
R3 47K
R4 10K
R5 1K
R6 1MEG
R7 82K
R8 100K
R9 820K
R10 82K
R32 22K
R33 47K
R34 22K
M1
SW-2A
SW-2B
SW-2C
SW-2D
SW-2E
SW-2F
SW-2G
SW-2H
16.0-32.0 MC
8.0-16.0 MC
4.0-8.0 MC
2.0-4.0 MC
L2A
L3A
L4A
L5A
L6A
L7A
L2B
L3B
L4B
L5B
L6B
L7B
L8
L9
L10
L11
L12
C39 3-35
C40 3-35
C41 3-35
C42 3-35
C43 3-35
C44 3-35
C45 3-35
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C48 3-35
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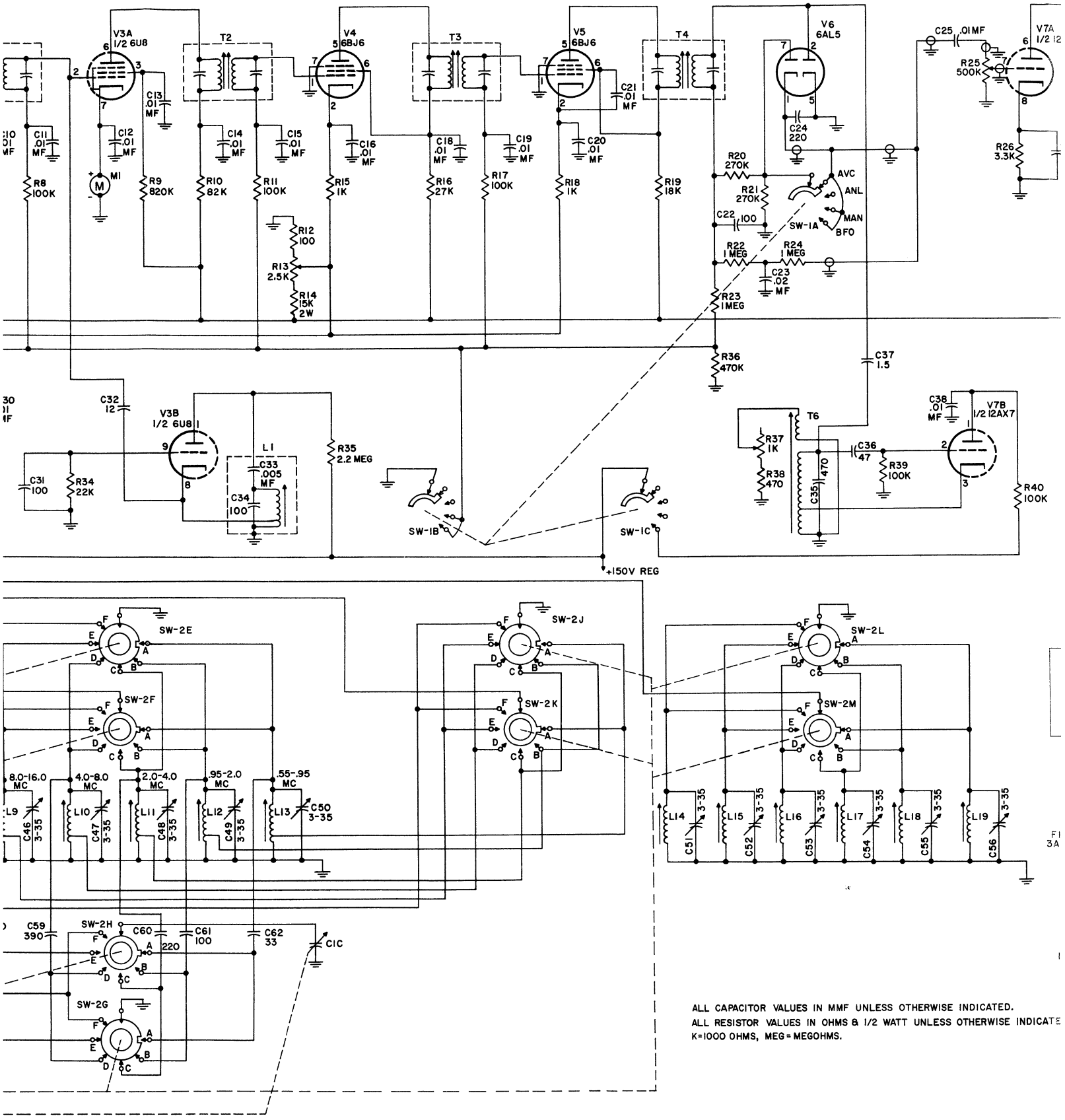
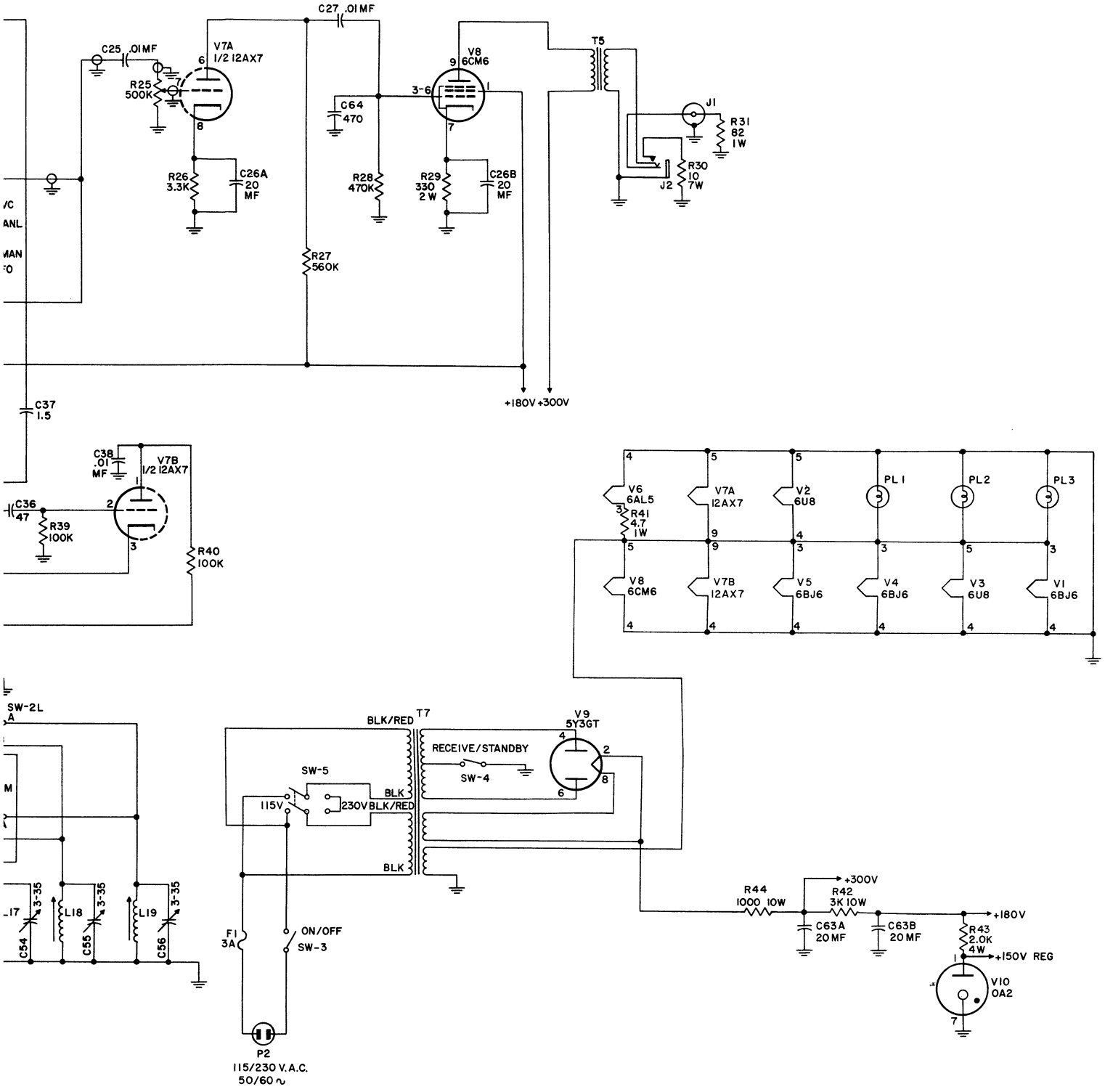
C57 1500
L20
C58 680
C59 390
C60 220
C61 100



ALL CAPACITOR VALUES IN MMF UNLESS OTHERWISE INDICATED.
ALL RESISTOR VALUES IN OHMS & 1/2 WATT UNLESS OTHERWISE INDICATE
K=1000 OHMS, MEG=MEGOHMS.



UNLESS OTHERWISE INDICATED.
& 1/2 WATT UNLESS OTHERWISE INDICATED.

RG-9 AND RG-9A RECEIVER SCHEMATIC DIAGRAM