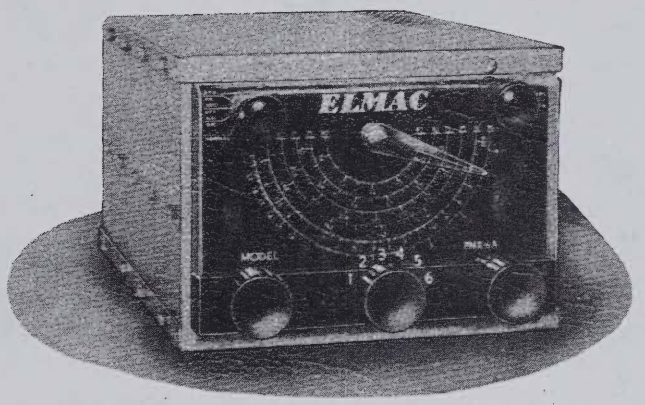
MULTI-ELMAC

Amateur Receiver

MODEL PMR 6A



INSTALLATION
AND
OPERATING INSTRUCTION
MANUAL

MULTI-PRODUCTS CO. **OAK PARK, MICH.**

Manufacturers of ***"MULTI-ELMAC"*** *Products*

MULTI-PRODUCTS COMPANY

Manufacturer of

MULTI-ELMAC

RADIO COMMUNICATIONS

AND CONTROL EQUIPMENT

21470 COOLIDGE HIGHWAY **OAK PARK 37, MICH.**

FORM NO. M-107

Instruction Manual

FOR

MULTI-ELMAC RECEIVER MODEL PMR-6A

SECTION 1 — Description

SECTION 2 — Installation and Operation

SECTION 3 — Service and Alignment

SECTION 4 — Appendix

SECTION 1.

Description

1.1 GENERAL. The MULTI-ELMAC PMR-6A RADIO RECEIVER is a ten-tube double-conversion superheterodyne covering the 160, 80, 40, 20, 15 and 10 meter amateur bands, plus the standard broadcast band. Designed primarily as an efficient communications receiver for mobile use, it is also especially suitable because of its compact size for (1) marine and aircraft installations; (2) portable operation; and (3) as a fixed station or monitoring receiver. It is not intended as a converter or accessory to another unit, but a complete receiver, employing a separate power supply and speaker as described in this manual. Every effort has been made to furnish the user with an extremely stable receiver of rugged construction, compact layout, and high sensitivity.

1.2 DIMENSIONS. The maximum external dimensions of the PMR 6A receiver, including projection of control knobs, are: height, 4⅝"; width, 6¼", and depth, 10⅜". Depth behind panel is 8½ inches. Net receiver weight is 6½ pounds.

1.3 CIRCUIT DESCRIPTION. The circuit employed on all bands except the lowest frequency range consists of one stage of radio frequency amplification; a stabilized high frequency oscillator; a first mixer converting to the first intermediate frequency of 1600 kilocycles; a combination oscillator—second mixer, followed by two stages of intermediate frequency amplification at 455 kilocycles; a combination detector, automatic volume control, and noise limiter; an audio driver; a beam pentode audio output stage; a beat frequency oscillator; and a voltage regulator. On the lowest frequency range, the output of the first mixer feeds directly into the 455 kilocycle I.F. amplifier.

1.4 TUBE COMPLEMENT. The PMR-6A is supplied complete with all tubes tested in the receiver at time of alignment as follows:

R.F. amplifier	6BJ6
First mixer	6BA7*
H.F. oscillator	6C4
2nd mixer-oscillator	6BE6
1st I.F. amplifier	6BA6
2nd I.F. amplifier	6BA6
Detector, noise limiter	6AL5
1st audio amplifier	½–12AT7
Audio output	6BK5
Beat freq. oscillator	½–12AT7
Voltage regulator	OB2

*6BE6 used when 6BA7 is not available.

1.5 TUNING SYSTEM. A three-gang tuning condenser and 18 high-Q coils are used to cover the six separate bands selected by a panel switch, as follows:

Band 1—Broadcast and 160 meters	(590 to 2010 Kc)
Band 2—75 and 80 meters	(3.48 to 4.01 Mc)
Band 3—40 meters	(6.95 to 7.42 Mc)
Band 4—20 meters	(13.95 to 14.45 Mc)
Band 5—15 meters	(20.95 to 21.65 Mc)
Band 6—10 meters	(28.00 to 29.70 Mc)

1.6 NOISE LIMITER. One diode section of the 6AL5 tube is used as an automatic noise limiter. It requires no adjustment and is switched in and out of the circuit by a panel switch.

1.7 ANTENNA INPUT. The receiver is designed for use with a resonant antenna coupled to the receiver input with a transmission line of 50 or 72 ohms impedance. Detailed installation recommendations are contained in paragraph 2.3.

1.8 AUDIO OUTPUT. An output transformer matching the output tube to a permanent magnet dynamic speaker having a voice coil impedance of 3 to 6 ohms is included on the receiver chassis, with terminals brought out to the rear.

1.9 POWER SUPPLY. The PMR-6A receiver was intentionally designed to use an external power supply in order to permit (a) use of the power supply to supply the low level stages of a companion transmitter, and (b) use of the receiver with an A.C. operated power supply at a fixed station or portable location. A single relay utilized as outlined in paragraph 2.7 of this manual will eliminate the necessity for a separate power supply for the low level stages of a companion transmitter. A suitable MULTI-ELMAC power supply is available as an accessory, depending on the power source available in the vehicle or at the fixed location.

1.10 ACCESSORIES. The following accessories are available for use with the MULTI-ELMAC PMR-6A receiver:

PSR-116—Power supply for 115 volt 50-60 cycles. Supplies necessary plate and filament voltages for the receiver and can be used to power the low level stages of a companion transmitter.

PSR-116S—Same as above except that an "S" meter and adjusting potentiometer is included.
(Above supplies also available for 25 cycle operation)

PSR-6—For 6 volt D.C. operation; otherwise similar to PSR-116 above.

PSR-12—For 12 volt D.C. operation; otherwise similar to PSR-116 above.

ESS-2—2 inch relative signal strength meter, mounted in a metal box with 36" wire leads suitable for mobile installations.

SECTION 2.

Installation and Operation

2.1 GENERAL CONSIDERATIONS. No two installations being alike, the owner of an MULTI-ELMAC PMR-6A receiver will vary his installation according to the space available, and the individual operator's desires in regard to operating practices. Regardless of these variations, whenever the receiver is installed in a vehicle, there are three essentials to a proper installation; (1) Convenient location for operation, including ease of observation; (2) rigid mechanical mounting; and (3) elimination of radio noise. The amateur experienced in mobile radio work will have his own preferences. It is suggested that before installation is begun, the owner read the very thorough treatment given to mobile installations in past issues of QST and CQ magazines.

2.2 MOUNTING METHODS. The light weight of the PMR-6A makes it readily adaptable to a hanging mount from the lower edge of the dashboard. A length of aluminum angle stock from the rear corner of the receiver cabinet to the fire wall of the vehicle will complete a simple but rigid mount. Where there is sufficient knee room, and the view of essential instruments will not be obscured, a steering post mounting will be very satisfactory. A steering post mount will place the receiver closer to the normal line of a driver's vision, making for greater safety during mobile operation. If the individual wishes to spend the extra time and money and the car dashboard has sufficient space a very neat installation can be effected by making the proper cut-out into the instrument panel and mounting the receiver flush. This method is suitable where the panel contains a removable metal grille which can be replaced if the receiver is removed. Due to the great number of variations encountered in mounting methods no brackets are included. Most amateurs have enough surplus angles to fashion a bracket that would serve their particular needs better than any universal bracket that could be supplied.

2.3 ANTENNA. The MULTI-ELMAC PMR-6A receiver will perform most efficiently when it is coupled to an antenna resonant in the frequency band to which the receiver is tuned. As in the operation of a fixed amateur station, this condition is most easily obtained by using the same antenna for both transmitting and receiving. A change-over relay operated by the push-to-talk switch on the microphone is required, and may be installed either (a) between receiver and transmitter, with a common coaxial line to the antenna, or (b) at the base of the antenna, switching between individual coaxial lines to the receiver and transmitter. The first method is generally preferred since it requires installation of but one coaxial line to the antenna, and eliminates the requirement of running two relay control wires to the base of the antenna, usually in the rear of the vehicle. Both methods are shown on Drawing No. 167, Fig. A and Fig. B in the appendix of this manual.

2.4 POWER SUPPLY. The MULTI-ELMAC PMR-6A receiver requires a filament voltage of 6.3 volts, either A.C. or D.C., at 3.6 amperes (or in the 12 volt model, 12.6 volts A.C. or D.C. at 1.8 amperes) and a "B" supply voltage of 250 volts at 90 milliamperes. The power supply may be located any place in the vehicle provided the "hot" 6 (or 12) volt supply lead is heavy enough to furnish the necessary current without undue voltage drop. Make sure that the case of the power supply is efficiently grounded to the car body. If this can not be done with the mounting bolts, a heavy copper braid ground strap must be provided. This insures sufficient voltage to the power supply and also eliminates the possibility of the receiver picking up vibrator hash noise. The power supply can be bolted to the fire wall either in the car or under the hood. Simple control circuits to permit the use of MULTI-ELMAC power supplies to supply both the receiver and the low level stages of companion transmitter are discussed in paragraph 2.7 and illustrated in Drawing No. 167. If other than an MULTI-ELMAC power supply is used and this power supply does not have filament filtering circuits incorporated, a Mallory type No. RF582 filament choke and a Mallory No. VO 480 condenser must be installed in the filament lead to the receiver.

2.5 "S" METER. Provision has been made for the attachment of an external "S" meter giving relative signal strength readings. A 0 to 1 milliampere meter is installed in one leg of a bridge circuit feeding the plate of the second 455 Kc. I.F. amplifier. Additional parts required are: 1—100 ohm resistor, 1—82,000 ohm resistor and 1—500 ohm potentiometer. These components are wired together and inserted into the circuit as shown on Drawing Nos. 153 B and 154B. The PSR-116S MULTI-ELMAC power supply is furnished complete with this "S" meter circuit and all connections made.

2.6 RECEIVER CONTROLS. For the convenience of the mobile operator, a minimum number of control knobs and switches are desirable. The MULTI-ELMAC PMR-6A receiver has five controls as shown on

Drawing No. 163, marked "A", "B", "C", "D", and "E", as follows:

Control "A"—Reception selector switch. This has four positions:

1. Normal phone reception, AVC *on*, automatic noise limiter *off*.
2. AVC *on*, noise limiter *on*.
3. AVC *off*, noise limiter *on*.
4. Noise limiter *on*, BFO *on*.

Control "B"—Antenna trimmer. Peak for each band.
Control "C"—Volume control and "on-off" switch.
Control "D"—Bandswitch.
Control "E"—Tuning knob.

2.7 CONTROL CIRCUITS. While this manual does not include within its scope general instruction on control systems for mobile installations, it is important for the user of the PMR-6A receiver to employ control circuits that will (a) protect the receiver from R.F. overload by disabling it during periods of transmission, (b) make the transmitter instantly inoperative when the send-switch is released, and (c) achieve a maximum economy of battery drain. A small single-pole double-throw relay, when using an MULTI-ELMAC power supply, will mute the receiver instantly when transmitting and make the transmitter inoperative as soon as the send-switch is released, as shown in Drawing No. 167. This system permits the use of the receiver power supply for both the receiver and the low level stages of the transmitter. By relieving some of the load on the transmitter dynamotor in this way, more power is available for the final amplifier stage and modulator of the transmitter. This also results in lower current drain by the dynamotor on the battery.

2.8 VEHICULAR NOISE SUPPRESSION. The proper utilization in a mobile installation of a good communications receiver such as the MULTI-ELMAC PMR-6A is possible only when vehicular noise has been effectively eliminated or suppressed. Many radio noises present in a vehicle can be eliminated at their source. Most other noises of local origin can be suppressed, using techniques well described in current literature. (See list of references at end of this paragraph.) After efficient noise suppression has been employed, it will be found that the automatic noise limiter built into the MULTI-ELMAC PMR-6A receiver will reduce all but the worst noise pulses to a level which will not interfere with satisfactory radio communication. It is particularly recommended that the following noise suppression be accomplished:

(1) Installation of spark plugs containing built-in 10,000 ohm suppressors, such as Auto-Lite; or installation of a good quality 10,000 ohm suppressors on each plug. ERIE model No. L7VR-10ME 10,000 ohm units are recommended.

(2) Installation of a .1 mfd coaxial condenser (SPRAGUE type 48P9 or 48P18) in series with the battery lead to the ignition coil. This should be mounted as close as possible to the coil input terminal, and a good ground made to the condenser case.

(3) Installation of a .1 mfd. coaxial condenser in the "hot" lead coming out of vehicle generator armature, replacing the normal automotive unit. This condenser must carry the normal charging current. A Sprague No. 48P18 unit will be suitable and is recommended. The condenser should be carefully grounded to the generator frame, cleaning off all paint and dirt with sandpaper.

(4) Installation of a .1 mfd. coaxial condenser between the battery terminal of the voltage regulator and ground, with the condenser case well grounded; installation of a similar condenser in the armature terminal on the voltage regulator, again with the case of the condenser well grounded, and installation of a .002 mfd. mica condenser in series with a 4 (four) ohm carbon resistor from the field terminal of the voltage regulator to ground.

(5) Residual noise remaining after the above precautions have been taken can be located by a process of elimination. In certain makes of automobiles, the various panel instruments radiate interference at radio frequencies which can be eliminated with appropriate by-pass condensers from the "hot" side of the offending instrument to ground. (See references listed below.)

THE RADIO AMATEUR'S HANDBOOK
RADIO HANDBOOK
CQ MOBILE HANDBOOK
QST Magazine—April, 1952 issue, page 17
QST Magazine—September, 1951 issue, page 59
CQ Magazine—May, 1952 issue, page 51
CQ Magazine—February, 1949 issue, page 30

SECTION 3.

Service and Alignment

3.1 GENERAL. Satisfactory operation of this receiver depends on several external factors. Before removing a receiver which is performing in an unsatisfactory manner, carefully inspect antenna connection, power cables and plugs, the storage battery and its connections (if a vehicular installation), the A.C. power source (if operated in a fixed location), and the speaker connections. It is an aggravating waste of time and effort to remove and attempt to service a receiver when the trouble is an external one.

(a) *Antenna*. If the receiver has its normal noise level, but signals are very weak, look for a broken antenna lead close to the receiver, or for an open or inoperative antenna relay.

(b) *Storage battery*. Check periodically the terminal voltage, specific gravity, level of electrolyte, and tightness of connections.

(c) *Cables and plugs*. The initial installation should locate all cables and plugs where they will not be exposed to physical shock or subjected to twisting and bending.

(d) *Fuses*. Check fuses with an ohmmeter. A good fuse has no appreciable resistance.

3.2 TUBES. Even though modern methods produce more reliable tubes than ever, the first source of trouble is most likely to be a defective tube. Tube failure will produce weak signals, intermittent operation, noise, or a completely dead receiver. When checking tubes, mark them as they are removed from the receiver so that they may be returned to their original sockets. Where a tube change is made in any circuit, that circuit should be re-aligned for peak performance as outlined in paragraphs 3.5 and 3.6. New tubes should be tapped while operating to check for microphonics, which will ruin operation of a mobile receiver.

3.3 CIRCUIT FAILURES. Excluding tubes, the most common source of circuit failure, will invariably be found in the dozens of resistors and capcitors within the receiver. A defective resistor or capacitor can usually be found by a point-to-point continuity test, although a careful visual inspection will often show the defective part, such as a charred resistor. The operating voltage and resistance chart shown on pages 13 and 14 permits a careful check of operating elements. The check should be made with a D.C. voltmeter of 20,000 ohms per volt sensitivity or a vacuum tube voltmeter. All measurements are taken with the antenna input shorted, switch "A" in normal position, bandswitch in band 2 position (75 meters), and a PSR-116S used as a power supply. (Any power supply can be used that will give the same "B" plus voltages.)

3.4 GENERAL ALIGNMENT INSTRUCTIONS. Thoroughly familiarize yourself with the layout of all coils as shown on Drawing No. 163 before beginning alignment. Some coils are located above the chassis and some are located under the chassis. This is done to use the natural shielding of the chassis between the R.F. coils and the converter coils. Check all brass slug adjusting screws to make sure that they are not worn so much that they will not hold their setting. If they are too worn to be serviceable they must be replaced.

Check the index line on the pointer to see that it is aligned properly with respect to the stops on the tuning dial. Check the plates of the tuning condenser to see if they have been badly bent out of shape. The small oscillator section may have the plates bent outward as the receiver comes from the factory for tracking purposes and should not be bent back into position. Before alignment, be sure you have an accurate signal generator. If at all possible, crystal oscillators that fall near the alignment frequencies specified below are to be preferred for maximum accuracy. The alignment of the receiver can never be more accurate than the signal generator with which it was aligned.

3.5 I.F. ALIGNMENT. Remove 6C4 oscillator tube.
Set bandswitch, in band 1 position (Broadcast and 160M).
Turn knob "A" to normal.
Set the signal generator to 455 kilocycles.
Connect the signal generator through a .001 mfd. mica condenser to the rear section of the tuning condenser.

Connect a vacuum tube voltmeter from the A.V.C. buss to ground. (If your receiver power supply is equipped with an "S" meter, the vacuum tube voltmeter is not necessary.)

If an "S" meter is not included and you do not have a vacuum tube voltmeter available, connect a 0 to 10 milliampere meter in series with the lead coming from pin No. 5 of the receiver power plug.

Adjust the slugs of I.F. transformers T3, T4, and T5 for maximum response, being careful to keep the output from the signal generator low enough to prevent overloading the receiver.

When the 455 kilocycle I.F. transformers have been peaked, turn on the B.F.O. (knob "A") and adjust T6 for zero beat.

To align the 1600 kilocycle I.F. stage, turn the bandswitch to band 2 position. (75 M.)

Set the signal generator to 1600 kilocycles.

Adjust the tuning slug of T1 (second conversion oscillator, located under the chassis) for maximum output.

Adjust the tuning slugs of I.F. transformer T2 for maximum output.

Replace 6C4 oscillator tube.

3.6 R.F. ALIGNMENT. Align band 6 (10 M.) first, then align bands 1, 2, 3, 4, and 5 in order. The local oscillator is on the high side of the signal on all bands except band 5. (15 M.)

Set knob "B" for half capacity.
Set bandswitch on band 6 (10 M.)
Set receiver dial at 29 megacycles.
Set signal generator at 29 megacycles.
Connect the signal generator through a 68 ohm carbon resistor to the antenna terminal on the receiver.
Adjust oscillator coil LO-10 until a signal is heard, and peak for maximum output.
Adjust LA-10 (under chassis) and LC-10 for maximum output.
Check oscillator tracking at 28 and 29.7 magacycles. If these frequencies fall short of the band edges, spread the plates of the small section of the oscillator main tuning condenser slightly and re-align at 29 megacycles, and again check the tracking. If 28 and 29.7 megacycles can not be reached with the tuning condenser, squeeze the plates of the oscillator tuning condenser together slightly and re-align as above.

Next align band 1 (broadcast and 160 M).
Set knob "B" at half capacity.
Set bandswitch on band 1.
Set signal generator at 800 kilocycles.
Set receiver dial at 800 kilocycles.
Adjust coil LO-160 (under chassis) until the signal is heard, and peak for maximum output.
Adjust coils LA-160 and LC-160 (under chassis) for maximum output.
Set signal generator at 1800 kilocycles.
Set receiver dial at 1800 kilocycles.
Adjust condenser C30-1 for maximum output.
Adjust condenser C20-1 for maximum output.
Re-check 800 kilocycle setting. (These two adjustments may have to be repeated several times until proper tracking is achieved.)

To align band 2 (75 M).
Set bandswitch on band 2.
Set knob "B" at half capacity.
Set signal generator at 3.5 megacycles.
Set receiver dial at 3.5 megacycles.
Adjust coil LO-80 until signal is heard, and peak for maximum output.
Adjust coil slugs LA-80 (under chassis) and LC-80 for maximum output.
Set signal generator at 4.0 megacycles.
Set receiver dial at 4.0 megacycles.
Adjust condenser C30-2 (under chassis) for maximum output.
Adjust condenser C20-2 (under chassis) for maximum output.
Recheck 3.5 megacycles. (These two adjustments may have to be repeated several times until proper tracking is achieved.)

To align band 3 (40 M).
Set bandswitch on band 3.
Set knob "B" at half capacity.
Set signal generator at 7.2 megacycles.
Set receiver dial at 7.2 megacycles.
Adjust coil slug LO-40 (under chassis) until signal is heard, and peak for maximum output.
Adjust coil slugs LA-40 and LC-40 (under chassis) for maximum output.

To align band 4 (20 M).
Set bandswitch on band 4.
Set knob "B" at half capacity.
Set signal generator at 14.2 megacycles.
Set receiver dial at 14.2 megacycles.
Adjust coil slug LO-20 until signal is heard, and peak for maximum output.
Adjust coil slugs LA-20 (under chassis) and LC-20 for maximum output.

To align band 5 (15 M).
Set bandswitch on band 5.
Set knob "B" at half capacity.
Set signal generator at 21.2 megacycles.
Set receiver dial at 21.2 megacycles.
Adjust coil slug LO-15 (under chassis) until signal is heard, and peak for maximum output.
Adjust coil slugs LA-15 and LC-15 (under chassis) for maximum output.

Notes: When going through the above alignment procedure keep in mind that the oscillator is on the high side of the signal on all bands except band 5 (15 M).

On bands 1 and 2 it is impossible to tune the oscillator to the wrong side of the signal. As a check, turn the signal generator to a frequency of 3.2 megacycles *higher* and the image should be heard. The signal generator output will have to be increased for this test. On band 5 the image will be 3.2 megacycles *lower* than the signal. For example, when band 4 is aligned and the signal generator is set at 14.2 megacycles, the image signal should be heard if the signal generator is set at 17.4 megacycles with the receiver left at 14.2 megacycles.

3.7 "S" METER ADJUSTMENT. Remove antenna and short input jack with piece of bare wire. Adjust potentiometer R-303 until "S" meter reads zero under this zero-signal condition. The "S" meter should read zero when the receiver is turned off. If not, adjust to zero with panel screw adjustment on the meter.

SECTION 4.

Appendix

4.1 PARTS LIST

C1	.005 mfd. ceramic. Centralab No. DD502.
C2	.005 mfd. ceramic. Centralab No. DD502.
C3	.005 mfd. ceramic. Centralab No. DD502.
C4	.005 mfd. ceramic. Centralab No. DD502.
C5	.005 mfd. ceramic. Centralab No. DD502.
C6	.005 mfd. ceramic. Centralab No. DD502.
C7	.002 mfd. ceramic. Centralab No. DD202.
C8	.01 mfd. ceramic. Centralab No. DD1032.
C9	Main tuning condenser. Radio Condenser Co. No. 61-058.
C10	25 mmf. antenna trimmer. A.S.P. No. CT1-0-024.
C10-3	75 mmf. NPO ceramic. Centralab No. TCZ-75.
C10-4	150 mmf. NPO ceramic. Centralab No. TCZ-150.
C10-5	150 mmf. NPO ceramic. Centralab No. TCZ-150.
C10-6	56 mmf. NPO ceramic. Centralab No. TCZ-56.
C11	.005 mfd. ceramic. Centralab No. DD502.
C12	.005 mfd. ceramic. Centralab No. DD502.
C13	.005 mfd. ceramic. Centralab No. DD502.
C14	.005 mfd. ceramic. Centralab No. DD502.
C20-1	5 to 25 mmf. ceramic variable. Centralab No. 822-AZ.
C20-2	5 to 25 mmf. ceramic variable. Centralab No. 822-AZ.
C20-3	75 mmf. NPO ceramic. Centralab No. TCZ-75.
C20-4	150 mmf. NPO ceramic. Centralab No. TCZ-150.
C20-5	150 mmf. NPO ceramic. Centralab No. TCZ-150.
C20-6	75 mmf. NPO ceramic. Centralab No. TCZ-75.
C21	.005 mfd. ceramic. Centralab No. DD502.
C22	.005 mfd. ceramic. Centralab No. DD502.
C23	.005 mfd. ceramic. Centralab No. DD502.
C24	.005 mfd. ceramic. Centralab No. DD502.
C25	10 mmf. NPO ceramic. Centralab No. TCZ-10.
C26	**10 mmf. NPO ceramic Centralab No. TCZ-10.**
C30-1	5 to 25 mmf. ceramic variable. Centralab No. 822-AZ.
C30-2	5 to 25 mmf. ceramic variable. Centralab No. 822-AZ.
C30-3	68 mmf. NPO ceramic. Centralab No. TCZ-68.
C30-4	150 mmf. NPO ceramic. Centralab No. TCZ-150.
C30-5	120 mmf. NPO ceramic. Centralab No. TCZ-120.
C30-6	68 mmf. NPO ceramic. Centralab No. TCZ-68.
C30-12	5 mmf. N750 ceramic. Centralab No. TCN-5.
C30-13	10 mmf. N750 ceramic. Centralab No. TCN-10.
C30-14	12 mmf. N750 ceramic. Centralab No. TCN-12.
C30-15	22 mmf. N750 ceramic. Centralab No. TCN-22.
C30-16	10 mmf. N750 ceramic. Centralab No. TCN-10.
C33	75 mmf. NPO ceramic. Centralab No. TCZ-75.
C34	.05 mfd. ceramic. Centralab No. DF-503.
C42	.005 mfd. ceramic. Centralab No. DD-502.
C43	75 mmf. NPO ceramic. Centralab No. TCZ-75.
C44	.005 mfd. ceramic. Centralab No. DD-502.
C52	.005 mfd. ceramic. Centralab No. DD-502.
C53	.005 mfd. ceramic. Centralab No. DD-502.
C54	.005 mfd. ceramic. Centralab No. DD-502.
C62	.005 mfd. ceramic. Centralab No. DD-502.
C63	.005 mfd. ceramic. Centralab No. DD-502.
C64	.005 mfd. ceramic. Centralab No. DD-502.
C71	100 mmf. GP ceramic. Centralab No. D6-101.

C72	.01 mfd. ceramic. Centralab No. DD-1032.
C73	.002 mfd. ceramic. Centralab No. DD-202.
C81	10 mfd. 50 volt electrolytic. Mallory No. TC-32.
C83	75 mmf. NPO ceramic. Centralab No. TCZ-75.
C84	.005 mfd. ceramic. Centralab No. DD-502.
C91	10 mfd. 50 volt electrolytic. Mallory No. TC-32.
C93	.01 mfd. ceramic. Centralab No. DD-1032
C94	.005 mfd. ceramic. Centralab No. DD-502
C101	10 mfd. 450 volt } C-D No. UP-15D145
C102	15 mfd. 450 volt } or
C103	15 mfd. 450 volt } Sangamo No. PLT-741
C104	250 mmf. GP ceramic. Centralab No. D6-251.
C105	.005 mfd. 1600 volt ceramic. Centralab No. DD16-502
C106	.5 mfd. 120 volt. Mallory No. VO-480.
C107	.5 mfd. 120 volt. Mallory No. VO-480.
C108	250 mmf. GP ceramic. Centralab No. D6-251.
C109	250 mmf. GP ceramic. Centralab No. D6-251.
C110	.5 mfd. 120 volt. Mallory No. VO-480.
C201	10 mfd. 450 volt } C-D No. UP-15D145
C202	15 mfd. 450 volt } or
C203	15 mfd. 450 volt } Sangamo No. PLT-741

R11	68	Ohm	½ Watt	Carbon	Resistor
R12	33,000	Ohm	½ Watt	Carbon	Resistor
R13	100,000	Ohm	½ Watt	Carbon	Resistor
R14	1,000	Ohm	½ Watt	Carbon	Resistor
R21	150	Ohm	½ Watt	Carbon	Resistor
R22	22,000	Ohm	1 Watt	Carbon	Resistor
R23	100,000	Ohm	½ Watt	Carbon	Resistor
R24	1,000	Ohm	½ Watt	Carbon	Resistor
R25	47,000	Ohm	1 Watt	Carbon	Resistor
R33	47,000	Ohm	1 Watt	Carbon	Resistor
R42	22,000	Ohm	1 Watt	Carbon	Resistor
R43	150,000	Ohm	1 Watt	Carbon	Resistor
R44	1,000	Ohm	½ Watt	Carbon	Resistor
R51	470	Ohm	½ Watt	Carbon	Resistor
R52	47,000	Ohm	½ Watt	Carbon	Resistor
R53	100,000	Ohm	½ Watt	Carbon	Resistor
R54	1,000	Ohm	½ Watt	Carbon	Resistor
R61	470	Ohm	½ Watt	Carbon	Resistor
R62	47,000	Ohm	½ Watt	Carbon	Resistor
R63	100,000	Ohm	½ Watt	Carbon	Resistor
R64	1,000	Ohm	½ Watt	Carbon	Resistor
R72	560,000	Ohm	½ Watt	Carbon	Resistor
R73	1 megohm		½ Watt	Carbon	Resistor
R74	220,000	Ohm	½ Watt	Carbon	Resistor
R75	330,000	Ohm	½ Watt	Carbon	Resistor
R76	1.2 megohm		½ Watt	Carbon	Resistor
R81	1,000	Ohm	½ Watt	Carbon	Resistor
R83	47,000	Ohm	½ Watt	Carbon	Resistor
R84	100,000	Ohm	½ Watt	Carbon	Resistor
R85	220,000	Ohm	½ Watt	Carbon	Resistor
R86	500,000	Ohm	Potentiometer and switch. I.R.C. No. 13-133.		
R87	47,000	Ohm	½ Watt	Carbon	Resistor
R91	180	Ohm	1 Watt	Carbon	Resistor
R93	470,000	Ohm	½ Watt	Carbon	Resistor
R101	10,000	Ohm	10 Watt	Wire wound	Resistor
R102	600	Ohm	10 Watt	Wire wound	Resistor
R103	68	Ohm	½ Watt	Carbon	Resistor (6 volt supply)

R103	150	Ohm	½ Watt	Carbon	Resistor (12 volt supply)
R104	68	Ohm	½ Watt	Carbon	Resistor (6 volt supply)
R104	150	Ohm	½ Watt	Carbon	Resistor (12 volt supply)
R105	5,100	Ohm	1 Watt	Carbon	Resistor
R201	10,000	Ohm	10 Watt	Wire wound	Resistor
R202	600	Ohm	10 Watt	Wire wound	Resistor
R301	82,000	Ohm	2 Watt	Carbon	Resistor
R302	100	Ohm	1 Watt	Carbon	Resistor
R303	500	Ohm	Potentiometer I.R.C. No. W500.		

T1	2055 KC Second conversion osc. coil.
T2	1600 KC input IF transformer.
T3	455 KC input IF transformer.
T4	455 KC interstage IF transformer.
T5	455 KC output IF transformer.
T6	455 KC B.F.O. coil.
T7	Audio output transformer (6500 ohm to 3.2 ohm) No. 121A6.
T101	Vibrator transformer for 6 volts. No. 121P4.
T101	Vibrator transformer for 12 volts. No. 121P5.
T201	115 volt, 60 cycle power transformer. No. 121P7.

V1	6BJ6	R.F. amplifier.
V2	6BE6/6BA7	First converter.
V3	6C4	H.F. oscillator.
V4	6BE6	Second converter-oscillator.
V5	6BA6	First I.F. amplifier.
V6	6BA6	Second I.F. amplifier.
V7	6AL5	Detector, AVC rectifier, noise limiter.
V8	12AT7	First audio amplifier, B.F. oscillator.
V9	6BK5	Audio frequency output.
V10	OB2	Voltage regulator.
V101	6X4	Rectifier (6 volt supply)
V101	12X4	Rectifier (12 volt supply)
V201	6X4	Rectifier (A.C. supply)

S1	Bandswitch. Centralab No. 022-QS149.
S2	Noise limiter, AVC, BFO switch. Mallory No. 3234J.
S3	"On-Off" switch on R86. I.R.C. No. 76-1.
L1	.82 Microhenry choke.
L101	Filter choke. 8 henry at 90 Ma. No. 121C2.
L201	Filter choke. 8 henry at 90 Ma. No. 121C2.
L102	Hash choke. Mallory No. 582.
L103	Hash choke. Mallory No. 583.

VIB.	Vibrator, 6 volt. Mallory No. 659 or 859.
VIB.	Vibrator, 12 volt. Mallory No. G659.

UCS	Utility and control socket, used for receiver muting and connecting the low level stages of a companion transmitter.

TUBE PIN No. → / TUBE No. ↓		1	2	3	4	5	6	7	8	9
V1	6BJ6	1.9 meg.	68 ohm	.3 ohm (3.5 ohm)	zero (1 ohm)	Inf.	Inf.	zero	—	—
V2	6BE6	47K ohm	150 ohm	.3 ohm (2 ohm)	zero (zero)	Inf.	Inf.	1.8 meg.	—	—
	6BA7	Inf.	47K ohm	150 ohm	zero (zero)	.3 ohm (2 ohm)	zero	1.8 meg.	zero	Inf.
V3	6C4	Inf.	Inf.	.3 ohm (3.5 ohm)	zero (zero)	Inf.	47K ohm	zero	—	—
V4	6BE6	22K ohm	.2 ohm	.3 ohm (2 ohm)	zero (1 ohm)	Inf.	Inf.	3.0 ohm	—	—
V5	6BA6	1.8 meg.	zero	.3 ohm (.6 ohm)	zero (zero)	Inf.	Inf.	470 ohm	—	—
V6	6BA6	1.8 meg.	zero	.3 ohm (.6 ohm)	zero (zero)	Inf.	Inf.	470 ohm	—	—
V7	6AL5	330K ohm	560K ohm	.3 ohm (.6 ohm)	zero (zero)	zero	zero	330K ohm	—	—
V8	12AT7	Inf.	47K ohm	2.8 ohm	zero (zero)	zero (zero)	Inf.	*zero to 500K ohms	1,000	.3 ohm (.6 ohm)
V9	6BK5	Inf.	—	470K ohm	.3 ohm (.6 ohm)	zero (1 ohm)	180 ohm	470K ohm	Inf.	Inf.
V10	0B2	Inf.	zero	—	zero	Inf.	—	zero	—	—
Plug		zero	.3 ohm (1. ohm)	Inf.	Inf.	Inf.	Inf.	Inf.	Inf.	—

All resistance measurements are taken with power plug removed. Bandswitch in band 2 (75 M) position. Knob "A" in "normal" position, and all tubes in their sockets.

Resistance values in brackets refer to 12 volt models.
Resistance values may vary 20%.
*Depends on volume control setting.

TUBE PIN No. → / TUBE No. ↓		1	2	3	4	5	6	7	8	9
V1	6BJ6	−1.7 V.*	+1 V.	6.3@	zero (12.6)@	+250 V.	+135 V.	zero	—	—
V2	6BE6	−11 V.*	+1 V.	6.3@	zero	+250 V.	+100 V.	−1.7 V.*	—	—
	6BA7	+76 V.	−11 V.*	+1.3 V.	zero	6.3@	zero	−1.7 V.*	zero	+250 V.
V3	6C4	+105 V.	zero	6.3@	zero	+105 V.	−15.V.*	zero	—	—
V4	6BE6	−5.V.*	zero	6.3@	zero (12.6)@	+250 V.	+50 V.	zero	—	—
V5	6BA6	−1.7 V.*	zero	6.3@	zero	+250 V.	+130 V.	+4.V.	—	—
V6	6BA6	−1.7 V.*	zero	6.3@	zero	+250 V.	+130 V.	+4.V.	—	—
V7	6AL5	−1.3 V.*	Do not measure	6.3@	zero	zero	zero	−1.3 V.*	—	—
V8	12AT7	—	—	—	zero	zero	+65 V.	zero	+.9 V.*	6.3@
V9	6BK5	+260 V.	zero	zero	6.3@	zero (12.6)@	+5.5 V.	zero	+250 V.	+265 V.
V10	0B2	+105 V.	zero	zero	zero	+105 V.	zero	zero	—	—
Plug		zero	6.3@ (12.6)@	+265 V.	+250 V.	+250 V.	+105 V.	Do not measure	Do not measure	—

All measurements taken using a PSR-116 power supply or equivalent, with 115 volt supply. Band switch in band 2 (75 M) position. Knob "A" in "normal" position. Antenna input shorted, and volume control on minimum.

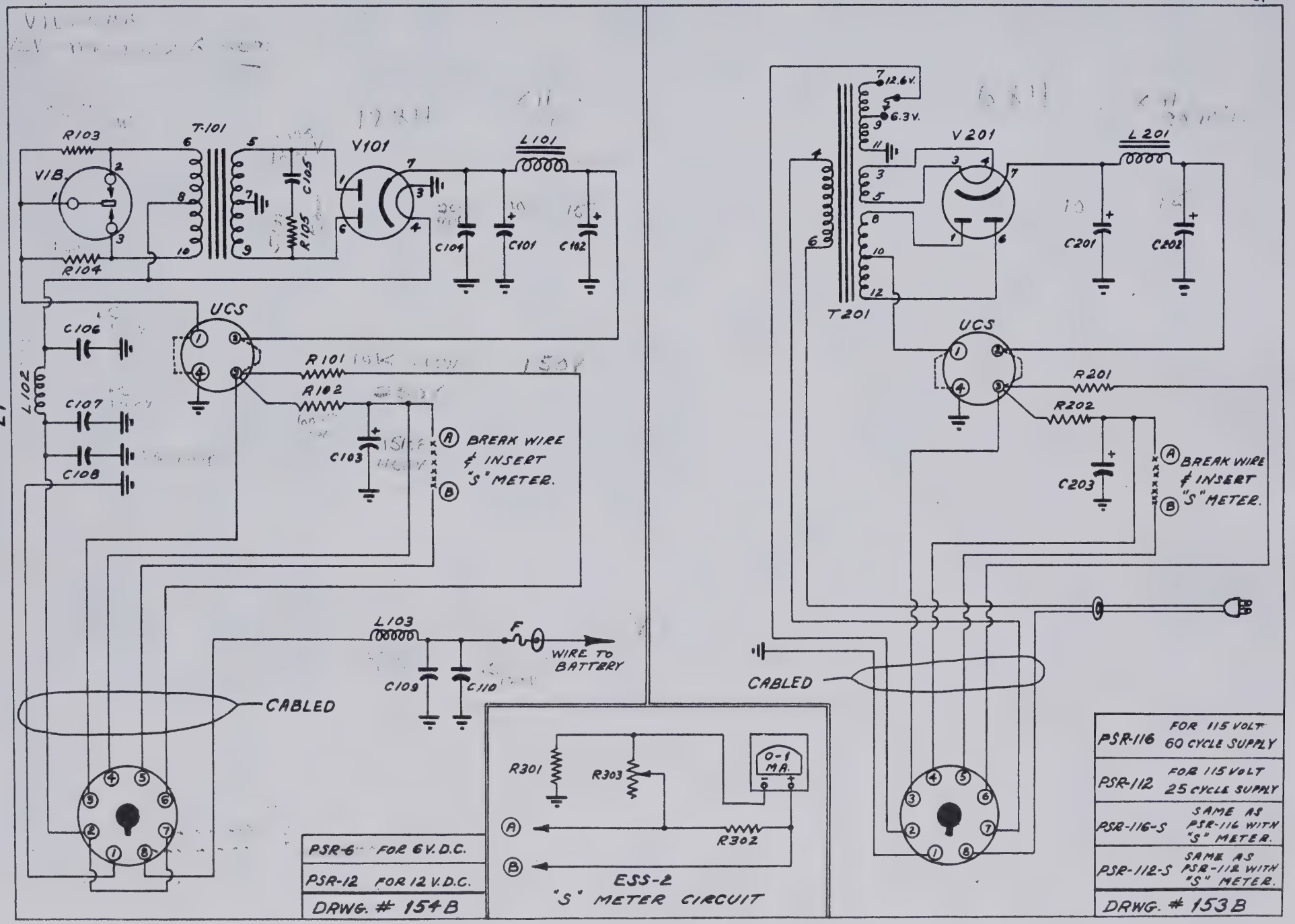
@ Either A.C. or D.C. Brackets refer to 12 volt model.
*Cán be measured only with a vacuum-tube voltmeter. All others with 20,000 ohms/volt meter.

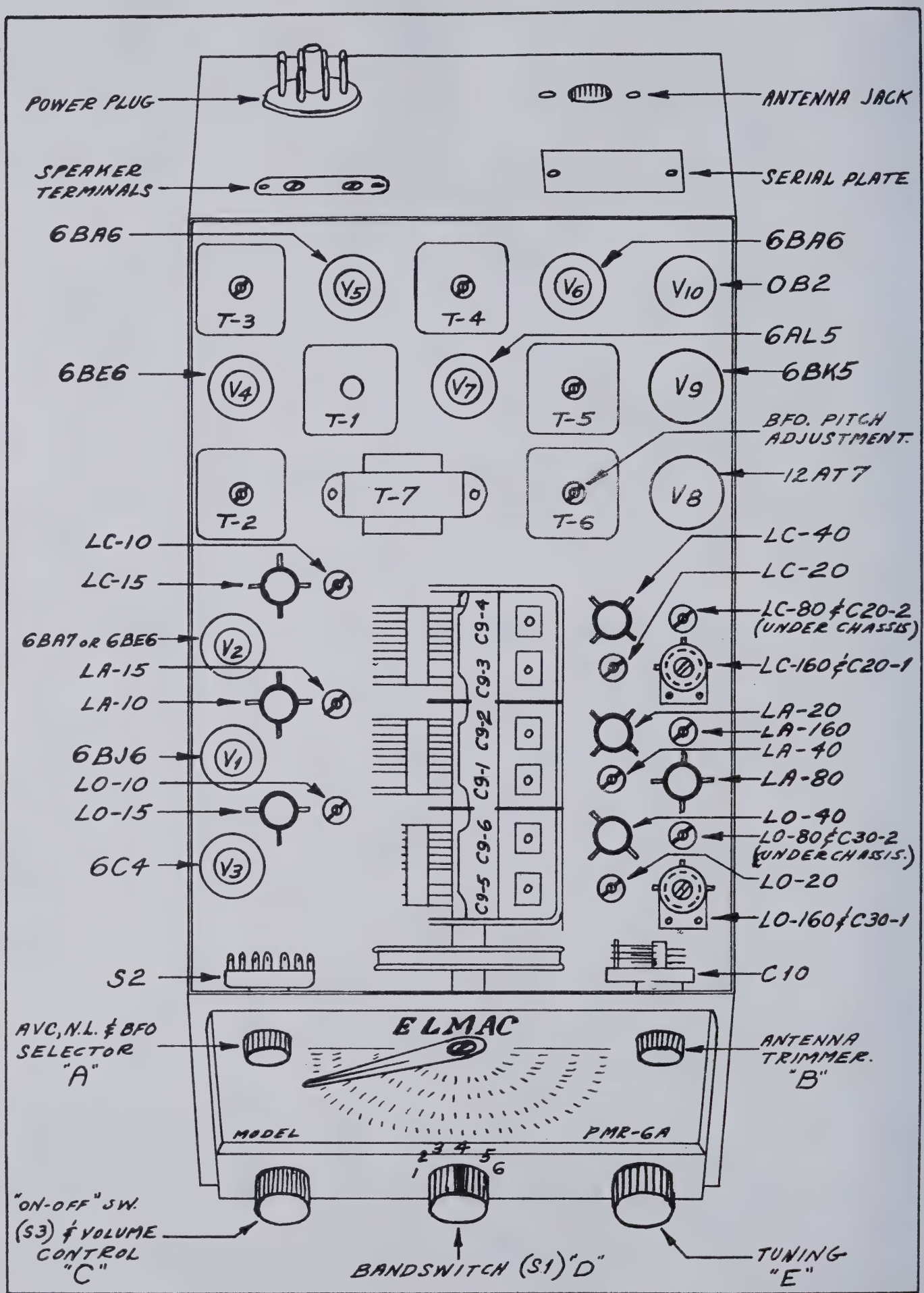
4.4 WARRANTY. This receiver has been carefully tested and was shipped from the factory in perfect operating condition. If the set arrives damaged in transit, it is important that you file claim immediately against the carrier.

THE MULTI-PRODUCTS COMPANY, warranting this receiver to be free from defective materials and workmanship, agrees to repair or replace, without charge, any defective part or accessory provided notice of the claimed defect is given the manufacturer within 90 (Ninety) days of the date of sale to the original purchaser. Any part returned to the manufacturer shall be shipped prepaid by the owner. Any failure of the equipment following modification by the user, or occurring through application of power supply voltages other than those specified in this instruction manual shall not constitute a defect within this warranty.

This warranty shall not become effective until the Owner's Registration Card supplied with the equipment has been filled out and mailed to the manufacturer. Please fill out and mail this card promptly.

The manufacturer reserves the right to make any changes in this receiver without obligating itself with respect to prior production.


R103
T-101
V101
L101
V1B
C105
R105
R104
C104
C101
C102
UCS
C106
L102
C107
C108
R101
R102
C103
A BREAK WIRE & INSERT "S" METER.
B
L103
WIRE TO BATTERY
C109
C110
CABLED
R301
R303
0-1 MA.
R302
A
B
ESS-2
"S" METER CIRCUIT
PSR-6 FOR 6 V. D.C.
PSR-12 FOR 12 V. D.C.
DRWG. # 154B
7 12.6 V.
5
6.3 V.
9
11
4
3
5
8
6
10
12
T201
V 201
L 201
C201
C202
UCS
R201
R202
C203
A BREAK WIRE & INSERT "S" METER.
B
CABLED
PSR-116 FOR 115 VOLT 60 CYCLE SUPPLY
PSR-112 FOR 115 VOLT 25 CYCLE SUPPLY
PSR-116-S SAME AS PSR-116 WITH "S" METER.
PSR-112-S SAME AS PSR-112 WITH "S" METER.
DRWG. # 153B


POWER PLUG
ANTENNA JACK
SPEAKER TERMINALS
SERIAL PLATE
6BA6
6BA6
0B2
6AL5
6BE6
6BK5
BFO. PITCH ADJUSTMENT.
12AT7
T-1
T-2
T-3
T-4
T-5
T-6
T-7
V1
V2
V3
V4
V5
V6
V7
V8
V9
V10
LC-10
LC-15
LC-40
LC-20
LC-80 & C20-2 (UNDER CHASSIS)
LC-160 & C20-1
6BA7 OR 6BE6
LA-15
LA-10
LA-20
LA-160
LA-40
LA-80
6BJ6
LO-10
LO-15
LO-40
LO-80 & C30-2 (UNDER CHASSIS.)
LO-20
6C4
LO-160 & C30-1
C9-1 C9-2 C9-3 C9-4
C9-5 C9-6
S2
C10
AVC, N.L. & BFO SELECTOR "A"
ELMAC
ANTENNA TRIMMER. "B"
MODEL
PMR-6A
1 2 3 4 5 6
"ON-OFF" SW. (S3) & VOLUME CONTROL "C"
BANDSWITCH (S1) "D"
TUNING "E"

DRWG. # 163

4.7

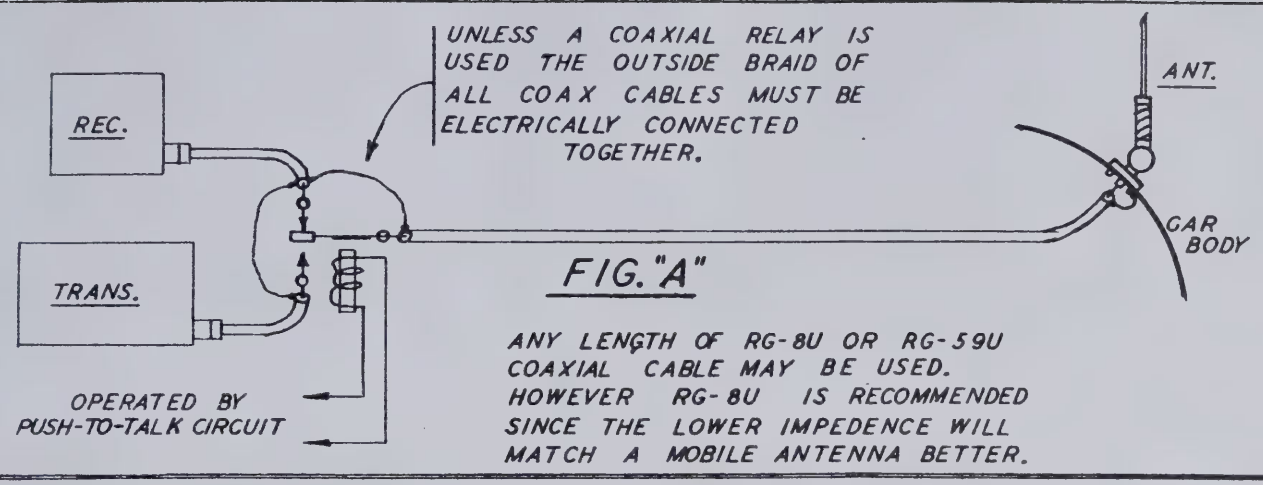


FIG. "A"

ANY LENGTH OF RG-8U OR RG-59U COAXIAL CABLE MAY BE USED. HOWEVER RG-8U IS RECOMMENDED SINCE THE LOWER IMPEDENCE WILL MATCH A MOBILE ANTENNA BETTER.

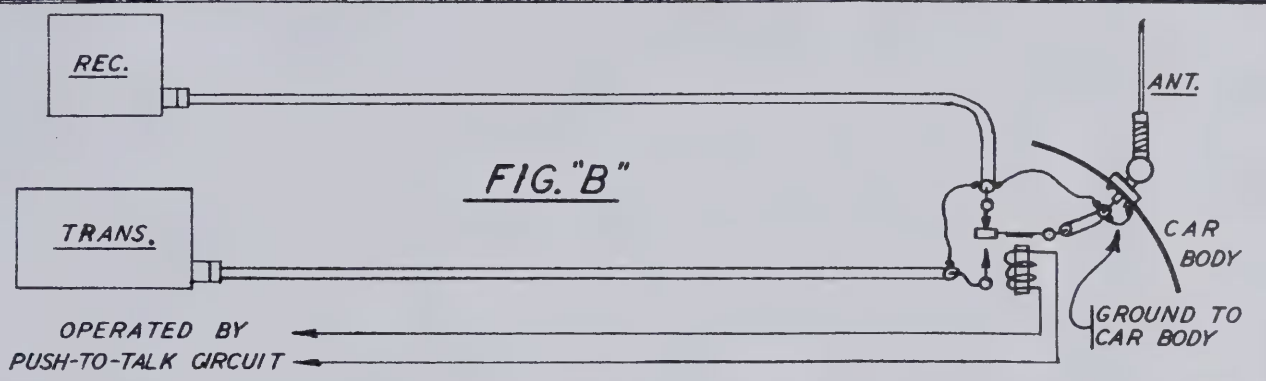
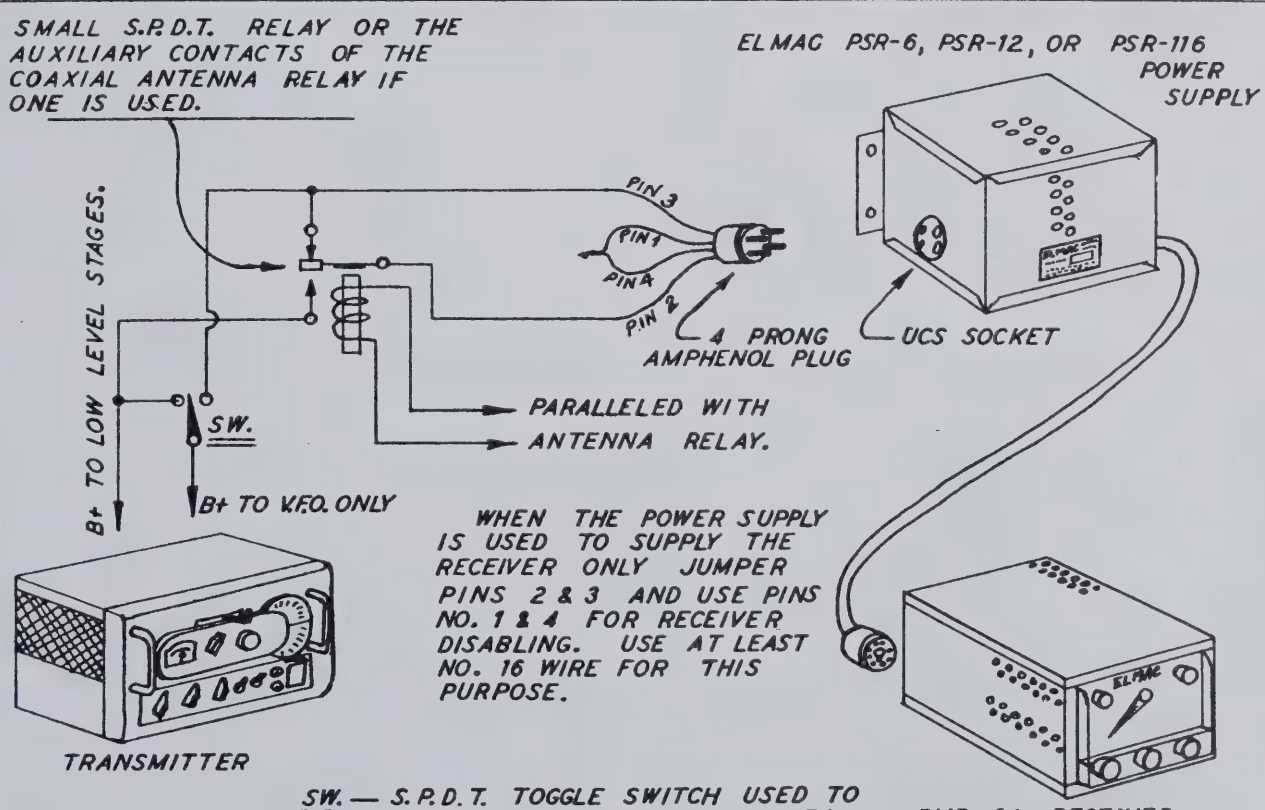


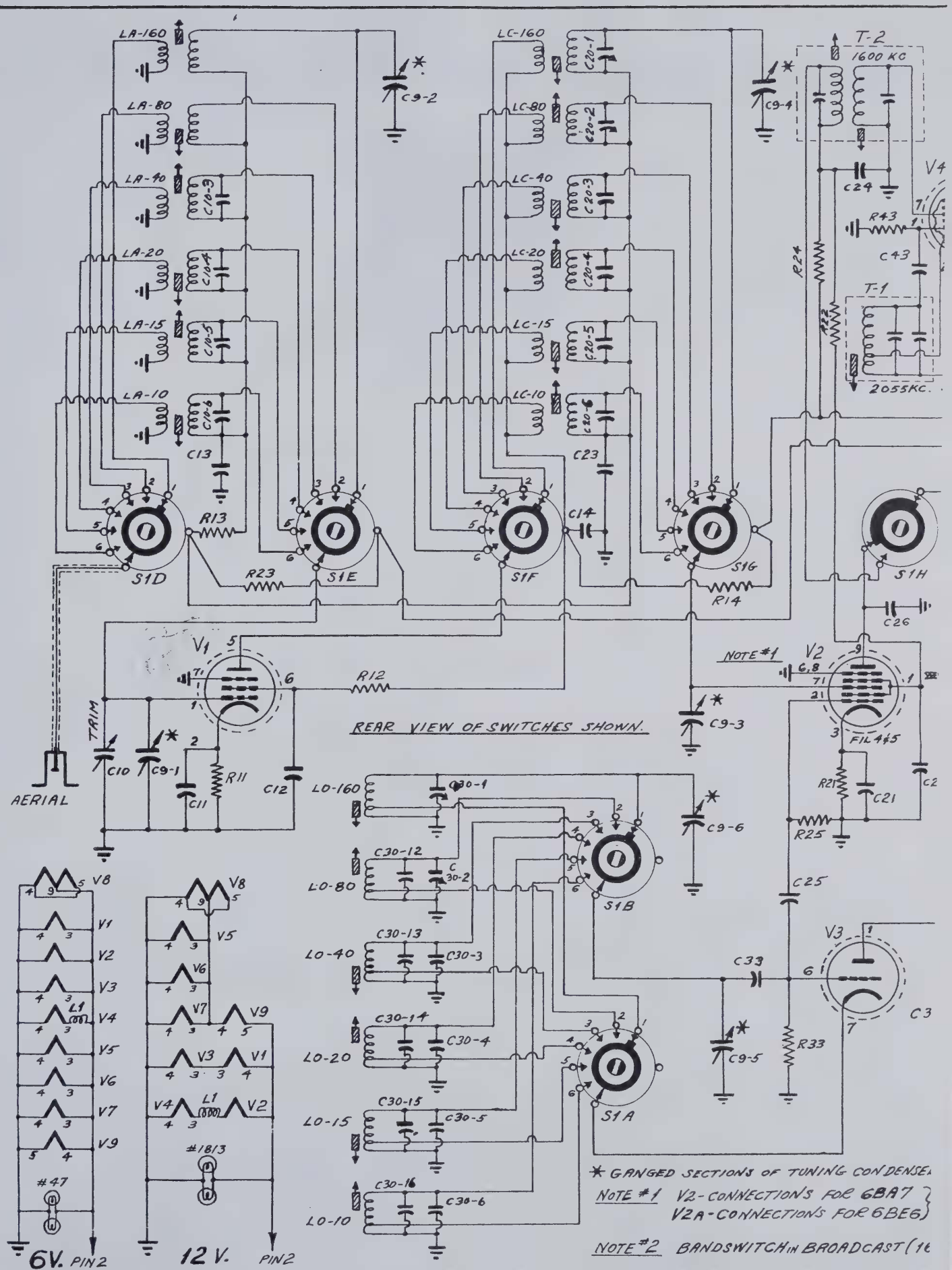
FIG. "B"

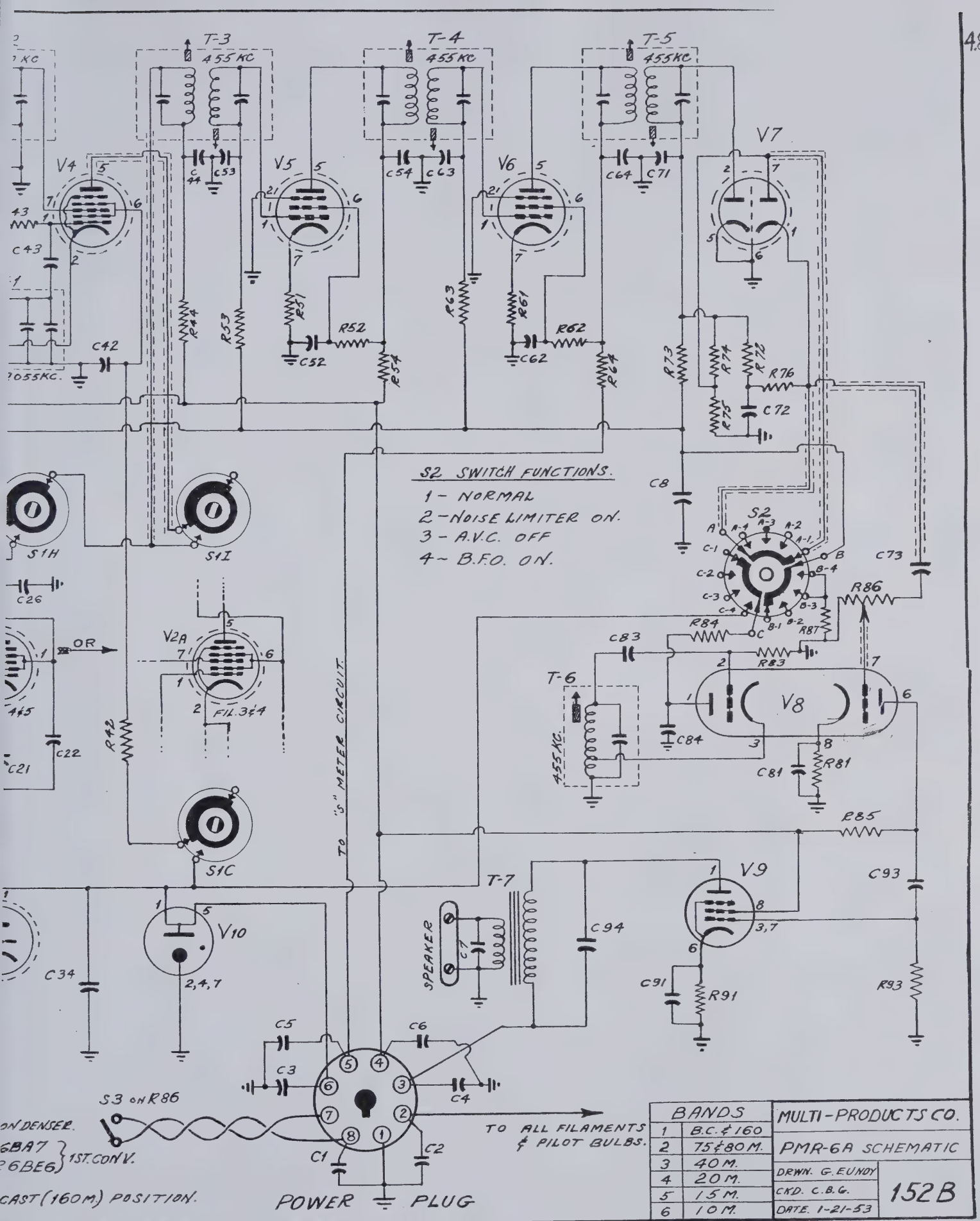


WHEN THE POWER SUPPLY IS USED TO SUPPLY THE RECEIVER ONLY JUMPER PINS 2 & 3 AND USE PINS NO. 1 & 4 FOR RECEIVER DISABLING. USE AT LEAST NO. 16 WIRE FOR THIS PURPOSE.

SW. — S.P.D.T. TOGGLE SWITCH USED TO TURN ON TRANSMITTER V.F.O. ONLY WHEN IT IS DESIRED TO ZERO-BEAT A RECEIVED SIGNAL.

DRWG. NO. 167


LA-160
LA-80
LA-40
LA-20
LA-15
LA-10
C10-1
C10-2
C10-3
C10-4
C10-5
C10-6
C13
C9-2
S1D
S1E
R13
R23
LC-160
LC-80
LC-40
LC-20
LC-15
LC-10
C20-1
C20-2
C20-3
C20-4
C20-5
C20-6
C23
C14
S1F
S1G
R14
C9-4
T-2
1600 KC
C24
R43
C43
T-1
2055KC.
R24
R22
S1H
C26
V4
V1
V2
V3
R12
TRIM
C10
C9-1
C11
R11
C12
AERIAL
REAR VIEW OF SWITCHES SHOWN.
C9-3
NOTE #1
C8
FIL 4#5
R21
C21
R25
C25
C33
R33
C9-5
LO-160
LO-80
LO-40
LO-20
LO-15
LO-10
C30-1
C30-12
C30-2
C30-13
C30-3
C30-14
C30-4
C30-15
C30-5
C30-16
C30-6
S1B
S1A
C9-6
V8
V5
V6
V7
V9
L1
#47
#1813
6V. PIN2
12 V.
PIN2
* GANGED SECTIONS OF TUNING CONDENSE
NOTE #1 V2-CONNECTIONS FOR 6BA7
V2A-CONNECTIONS FOR 6BE6
NOTE #2 BANDSWITCH IN BROADCAST (1



BANDS	
1	B.C. & 160
2	75 & 80 M.
3	40 M.
4	20 M.
5	15 M.
6	10 M.

MULTI-PRODUCTS CO.

PMR-6A SCHEMATIC

DRWN. G. EUNDY

CKD. C.B.G.

DATE. 1-21-53

152B