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Colin Hinson

In the village of Blunham, Bedfordshire.



T.O. 12P5-3SCR718-22

**HANDBOOK
SERVICE INSTRUCTIONS**

RADIO SETS

SCR-718-D

SCR-718-E

SCR-718-F

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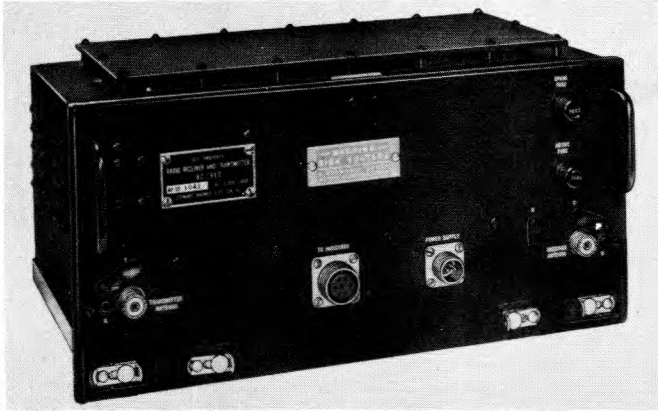
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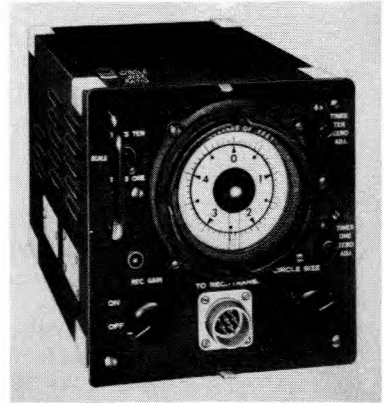
INTRODUCTION

The purpose of this handbook is to provide service instructions for Radio Set SCR-718-D, Radio Set SCR-718-E, and Radio Set SCR-718-F. This handbook is to be used in conjunction with Handbook of Operating Instructions T.O. 12P5-3SCR718-21, Handbook of Overhaul Instructions T.O. 12P5-3SCR718-23, and

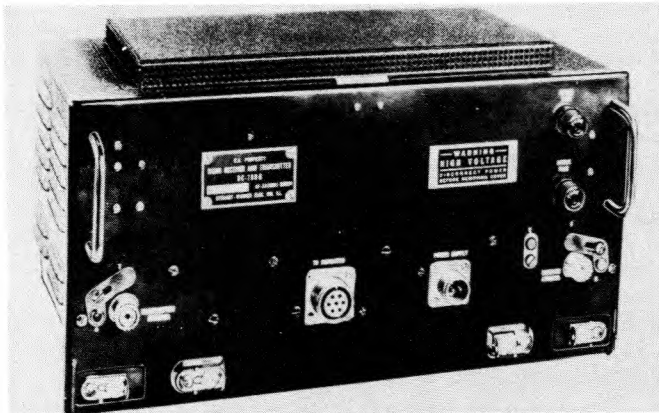
Illustrations Parts Breakdown T.O. 12P5-3SCR718-24. Specifications used in the preparation of this handbook are JAN-STD-15, Electrical and Electronic Symbols MIL-STD-16, Electrical and Electronic Reference Designations, and ANA No. 261, abbreviations and Contractions.



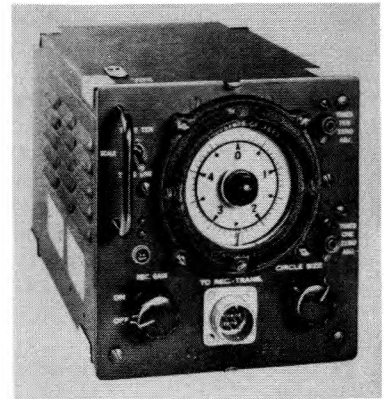
Radio Receiver and Transmitter BC-788-D



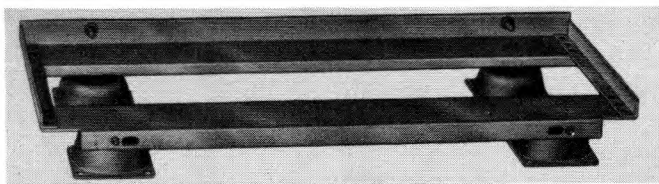
Indicator I-152-D



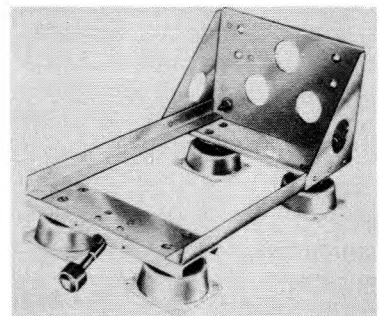
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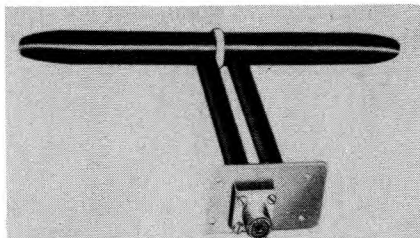
Indicator I-152-E



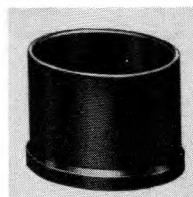
Mounting Base MT-14/ARN-1



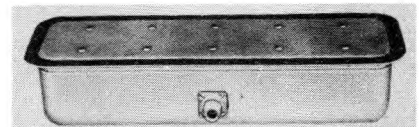
Mounting FT-445-A



Antenna AT-4/ARN-1 or Antenna AT-4A/ARN-1 (2 Required)*



Visor M-387



Antenna Assembly AS-333/AP or Antenna AT-505/AP (4 Required)*

* Either Antenna AT-4/ARN-1, Antenna AT-4A/ARN-1, Antenna Assembly AS-333/AP, or Antenna AT-505/AP (not a combination) may be used, depending upon local installation.

Figure 1-1. Radio Set SCR-718-D or E, Major Components

SECTION I

DESCRIPTION AND LEADING PARTICULARS

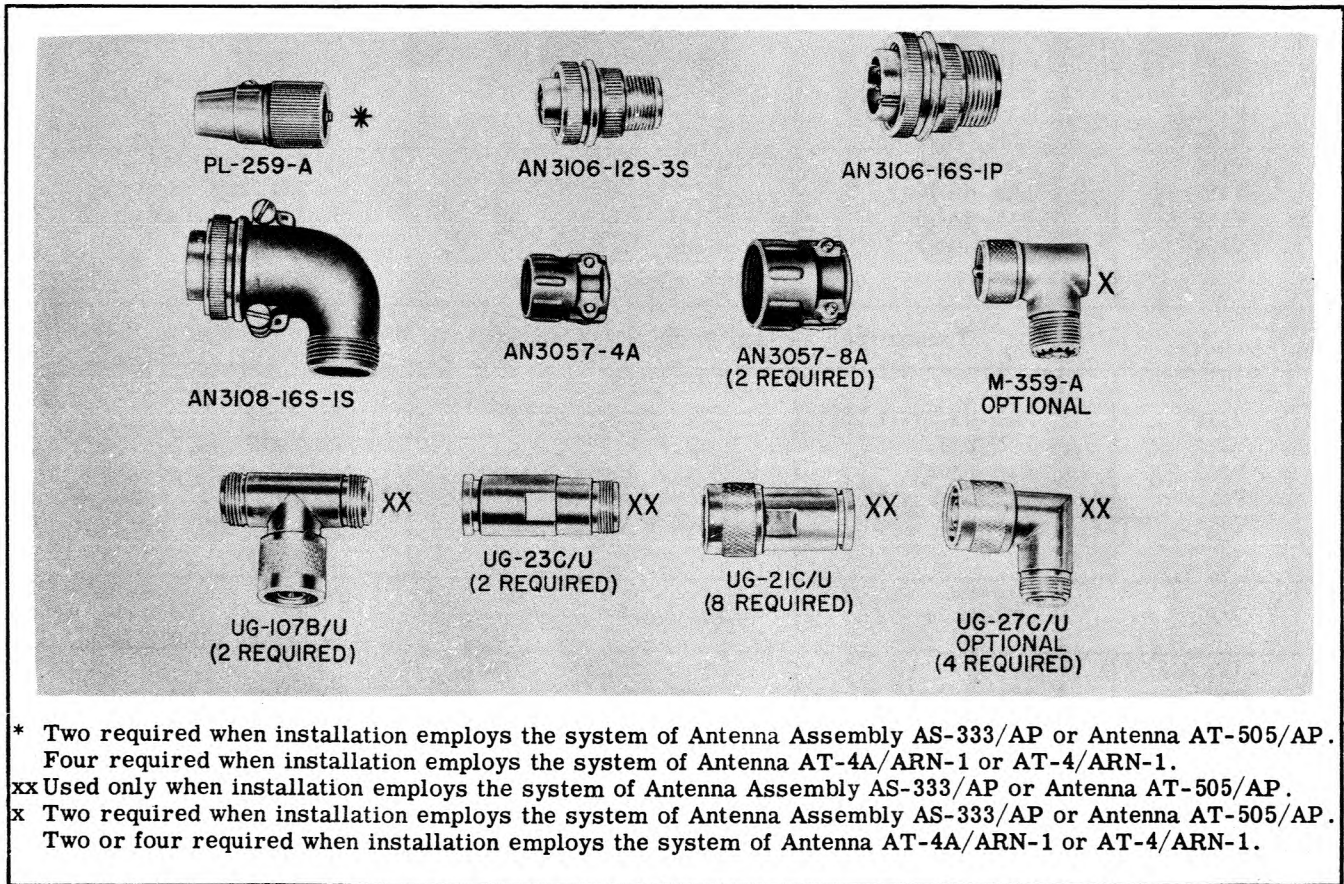
1-1. IDENTIFICATION OF EQUIPMENT.

1-2. This publication comprises service instructions for Radio Set SCR-718-D manufactured under contract AF 33(600)-16687 and Radio Set SCR-718-E manufactured under contracts AF 33(600)-25024, AF 33(600)-27083, AF 33(600)-29711, and AF 33(600)-30067.

1-3. Sections I through VII of this handbook apply to Radio Set SCR-718-D manufactured under contract AF 33(600)-16687 and Radio Set SCR-718-E manufactured under contracts AF 33(600)-25024, AF 33(600)-27083, AF 33(600)-29711, and AF 33(600)-30067. Additional models are covered in Section VIII by the use of Difference data sheets. Service instructions for models included in Section VIII are the same as the procedures given in Sections I through VII, except for the specific differences noted by the applicable Difference data sheets.

1-4. Radio Set SCR-718-D or -E is composed of the major components shown in figure 1-1. Accessories used with Radio Set SCR-718-D or -E are shown in figure 1-2.

1-5. Radio Set SCR-718-D or -E is an altimeter which measures the absolute height of an aircraft above the terrain over which it is flying. The face of the indicator tube, located in Indicator I-152-D or -E, is calibrated in feet (smallest division 50 feet on TIMES ONE position, 500 feet on TIMES TEN). Except for those units of the SCR-718-D using the 5Y3WGTA low voltage rectifier tube in place of the 5Y3GT/G and all units of the SCR-718-E, the equipment cannot be operated above 40,000 feet in non-pressurized cabins. Above that altitude there is danger of arc-over in the power supply using the 5Y3GT/G tube with resultant permanent damage to the equipment. However, if the equipment is installed within a pressurized cabin and the installation procedures of paragraph 3-17 observed, the equipment is capable of operating at altitudes up to 60,000 feet. When properly adjusted, this equipment indicates altitudes accurately to within 50 feet of the actual altitude at any point from zero to 40,000 feet. Because of this possible 50-foot inaccuracy in reading, this equipment is not to be used as an instrument landing device.



* Two required when installation employs the system of Antenna Assembly AS-333/AP or Antenna AT-505/AP. Four required when installation employs the system of Antenna AT-4A/ARN-1 or AT-4/ARN-1.
 xx Used only when installation employs the system of Antenna Assembly AS-333/AP or Antenna AT-505/AP.
 x Two required when installation employs the system of Antenna Assembly AS-333/AP or Antenna AT-505/AP. Two or four required when installation employs the system of Antenna AT-4A/ARN-1 or AT-4/ARN-1.

Figure 1-2. Accessories used with Radio Set SCR-718-D or -E

1-6. Basically, Radio Set SCR-718-D or -E transmits a signal earthward from an aircraft and then receives this same signal as it is reflected back from the earth. The length of time required for the signal to follow this path is measured, and presented as a lobe on a circle on the face of the indicator tube which is so calibrated as to be read directly in feet of altitude.

TABLE 1-2. GENERAL ELECTRICAL CHARACTERISTICS

Preset Frequencies	Timing Oscillator: 98.356 KC in SCR-718-D 98.323 KC in SCR-718-E 440 MC UHF Oscillator 410 MC Local Oscillator 30 MC IF Amplifier 400 KC Clipper
Frequency Stability	± 0.05%
Output Characteristics	Pulse
Sensitivity	65 db
Power Requirements	135 watts 105 to 125 volts 400 to 2400 cps Single phase

TABLE 1-1. FUSE COMPLEMENT

Reference Symbol	Type and Ampere Rating		Function
	BC-788-D	BC-788-E	
F101	3AG 1.5 amp.	4AG 1.6 amp.	Line fuse
F103	3AG 1/8 amp.	4AG 0.15 amp.	B+ fuse

TABLE 1-3. TUBE COMPLEMENT

Symbol	Type		Function
	SCR-718-D	SCR-718-E	
Receiver section of Receiver and Transmitter			
V101	JAN-6J6	JAN-6101/6J6WA*	Converter
V102	JAN-6J6	JAN-6101/6J6WA*	Oscillator
V103	JAN-6AG5	USAF-6186**	1st IF Amplifier
V104	JAN-6AG5	USAF-6186**	2nd IF Amplifier
V105	JAN-6AG5	USAF-6186**	3rd IF Amplifier
V106	JAN-6AG5	USAF-6186**	4th IF Amplifier
V107	JAN-6AG5	USAF-6186**	5th IF Amplifier
V108	JAN-6AG5	USAF-6186**	6th IF Amplifier
V109	JAN-6AG5	USAF-6186**	Detector
Transmitter section of Receiver and Transmitter			
V110	JAN-5Y3WGTA***	JAN-5Y3WGTA***	Rectifier
V111	JAN-6AG5	USAF-6186**	Oscillator
V112	JAN-6AG5	USAF-6186**	Clipper
V113	JAN-6L6	JAN-6L6WGB	Driver
V114	JAN-6J6	JAN-6101/6J6WA*	UHF Output
Indicator			
V201	JAN-2X2A	JAN-2X2A	Rectifier
V202	JAN-6AG5	USAF-6186**	Video Amplifier
V203	JAN-6AG5	USAF-6186**	Video Amplifier
V204	JAN-6AG5	USAF-6186**	Circle Amplifier
V205	JAN-3DP1A+S2	JAN-3DP1A+S2	Cathode Ray Indicator

*USAF 6101 may be used as a replacement for JAN 6101/6J6WA.

**USAF 6186/6AG5-WA may be used as a replacement for USAF 6186.

***JAN-5V4G when employing auxiliary indicator.

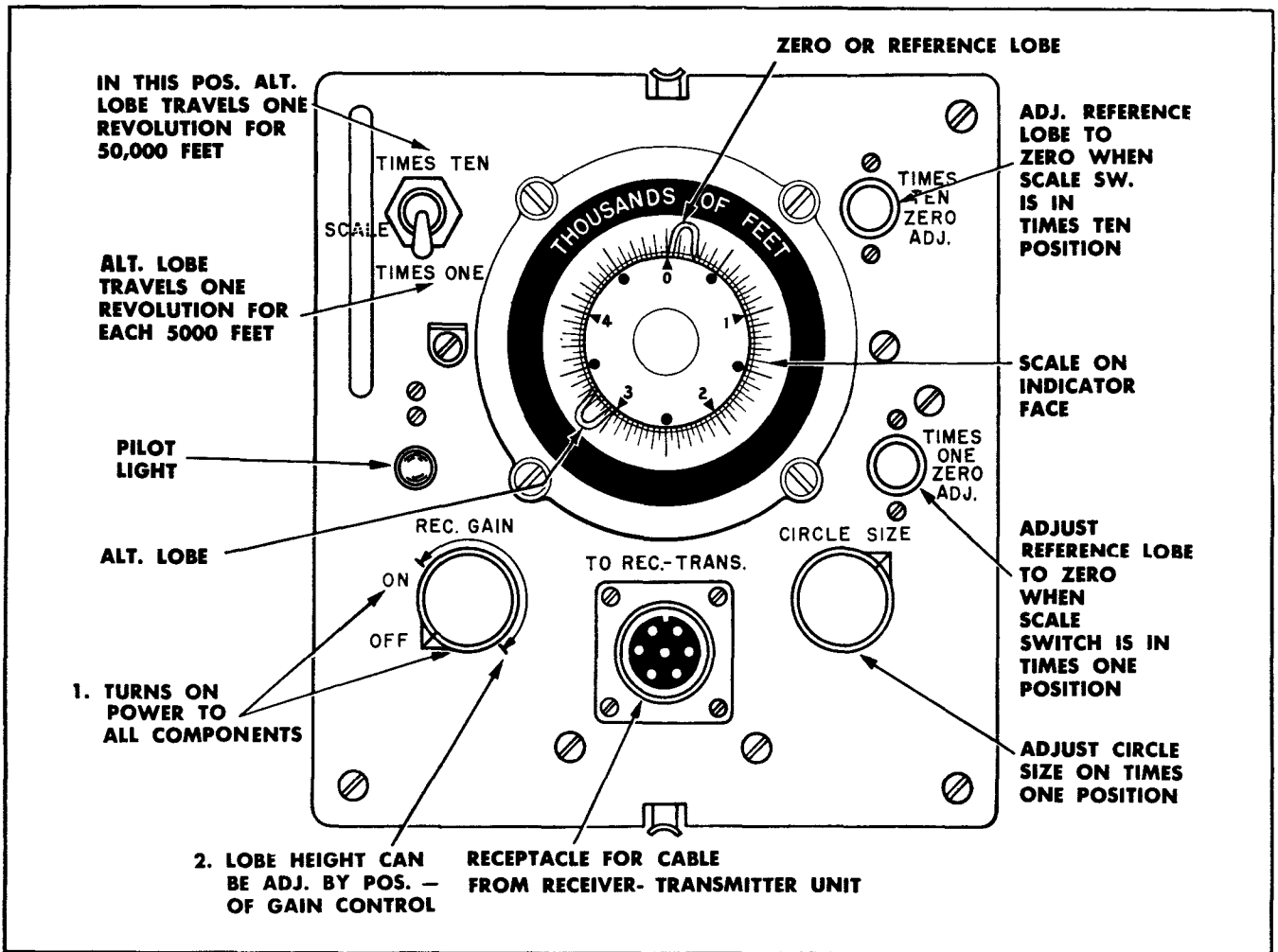


Figure 1-3. Indicator I-152-D or -E Operating Controls.

TABLE 1-4. OPERATING CONTROLS (SEE FIGURE 1-3)

Reference Symbols	Control	Function	Location
S202	SCALE	Selects desired scale to be used: TIMES ONE for 0 - 5000 feet TIMES TEN for 0 - 50,000 feet	I-152-D or -E front panel
R201	REC. GAIN	Controls the height of the reflected pulse; also acts as ON-OFF switch for equipment	I-152-D or -E front panel
R213	CIRCLE SIZE	Controls size of circle on face of indicator tube	I-152-D or -E front panel
T202	TIMES ONE ZERO ADJ.	Sets reference pulse exactly at zero for SCALE switch in TIMES ONE position	I-152-D or -E front panel
T204	TIMES TEN ZERO ADJ.	Sets reference pulse exactly at zero for SCALE switch in TIMES TEN position	I-152-D or -E front panel

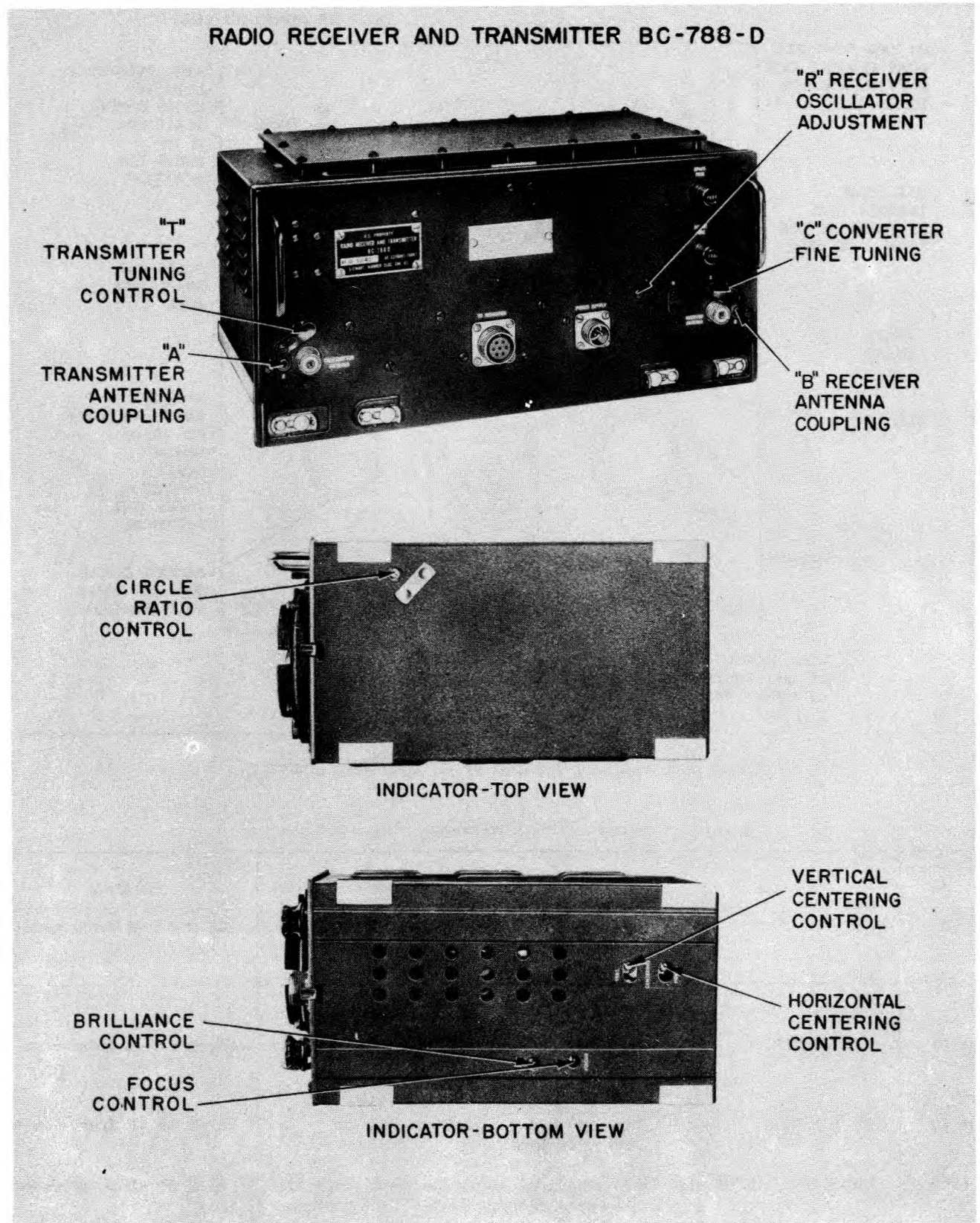


Figure 1-4. Radio Set SCR-718-D or E, External Adjustment Controls

TABLE 1-5. EXTERNAL ADJUSTMENT CONTROLS (SEE FIGURE 1-4)

Ref. Sym.	Control	Function	Location
R205	BRIL.	Controls brightness of circle on face of indicator tube	Underside of I-152-D or -E
R207	FOCUS	Controls focus of circle on face of indicator tube	Underside of I-152-D or -E
R225	VERT. CENT.	Controls position of circle in vertical direction	Underside of I-152-D or -E
R222	HORIZ. CENT.	Controls position of circle in horizontal direction	Underside of I-152-D or -E
R240	CIRCLE SIZE RATIO	Controls ratio of times one circle to times ten circle	Top of I-152-D or -E
C161	A	Varies the transmitter antenna coupling	Front panel of BC-788-D or -E
L127	T	Tuning adjustment for the transmitter	Front panel of BC-788-D or -E
L115	R	Varies receiver oscillator frequency	Front panel of BC-788-D or -E
C116	C	Fine tuning control for the converter	Front panel of BC-788-D or -E
C119	B	Varies the receiver antenna coupling	Front panel of BC-788-D or -E

1-7. DIFFERENCES BETWEEN SCR-718-D and SCR-718-E

1-8. The fundamental operation of Radio Set SCR-718-E is identical to that of Radio Set SCR-718-D. Certain components of the circuits have been changed, as indicated by figures 4-2 through 4-8, mainly to improve performance at the high limit of the equipment's altitude range and at the fringes of allowable line power variations. Changes in replacement part designations also appear in the Illustrated Parts Breakdown, T.O. 12P5-3SCR-718-24, standardizing SCR-718-E parts as much as possible to military specification material and reducing the weight of the equipment. Differences in SCR-718-E

which are most apparent to the maintenance technician and the operator, however, are the use of a spring-return SCALE switch set for only momentary use in the TIMES TEN position; the extension of the effect of the metal shield in front of the radial electrode terminal of the cathode ray tube by use of a conductive glass cover which also eliminates the necessity for the two fine parallel grounding wires embedded in the plastic used on SCR-718-D; the marking of test points (paragraph 5-18) by red dots on the chassis and terminal boards; and extensive changes of electron tube types to utilize the latest modifications. (See Table 1-3.) Maintenance technicians should also be cognizant of the differences in timing oscillator frequencies shown in Table 1-2.

SECTION II

TEST EQUIPMENT AND SPECIAL TOOLS

2-1. TEST EQUIPMENT REQUIRED FOR MAINTENANCE.

and checking for proper operation of Radio Set SCR-718-D or -E. The only items of special test equipment designed especially for use with the SCR-718-D or -E are Test Sets TS-23/APN and TS-10C/APN, which are illustrated in figure 2-1, in addition to being listed in Table 2-1.

2-2. The following table contains a list of the test equipment necessary for trouble-shooting, aligning,

TABLE 2-1
TEST EQUIPMENT REQUIRED FOR MAINTENANCE

Name	Type Designation	Alternate	Application
GENERATOR, SIGNAL, Audio frequency (Optional)	Hewlett-Packard Model 200 D	General Radio Type 1000-A	Timing oscillator alignment
GENERATOR, SIGNAL, Ultra-high frequency (Optional)	Measurements Corp. Model 80	RCA Type 710A	Trouble isolation and alignment in receiver section
MULTIMETER	AN/PSM-6	TS-352/U	Voltage and resistance measurements
OSCILLOSCOPE	AN/USM-24	TS-239/UP	Waveform observation
TEST SET	TS-10C/APN		Tuning and sensitivity measurements
TEST SET	TS-23/APN		Frequency and power measurements
TEST SET, ELECTRON TUBE	TV-7/U	I-177 with MX-949/U	Tube testing
Primary power source 115 ± 10 volts 400-2400 cps			Operating equipment for all testing

2-3. SPECIAL TOOLS REQUIRED FOR MAINTENANCE.

the Indicator I-152-D or -E chassis. The insulated screwdriver is located on the Radio Receiver and Transmitter BC-788-D or -E chassis.

2-4. Table 2-2, below, contains a list of special tools required for maintenance. These tools are supplied with the equipment. The Allen wrench is located on

2-5. CABLE FABRICATION.

TABLE 2-2. SPECIAL TOOLS REQUIRED FOR MAINTENANCE

Stock No.	Name	Application
	Allen Wrench	Used in removal of all set screws used in equipment
	Screwdriver	Used for all trimmer adjustments in equipment.

2-6. The fabrication of the interconnecting cable which connects Radio Receiver and Transmitter BC-788-D or -E and Indicator I-152-D or -E is illustrated in figure 7-1. The cable should be long enough to permit convenient removal of either the radio receiver and transmitter unit, the indicator unit, or the cable itself. However, this cable must not exceed 150 feet in length.

a. When installed, the two antenna cables need not be of the same length as long as the total length of both antenna cables does not exceed 50 feet. The fabrication of the antenna cables is illustrated in figures 7-1 and 7-2.

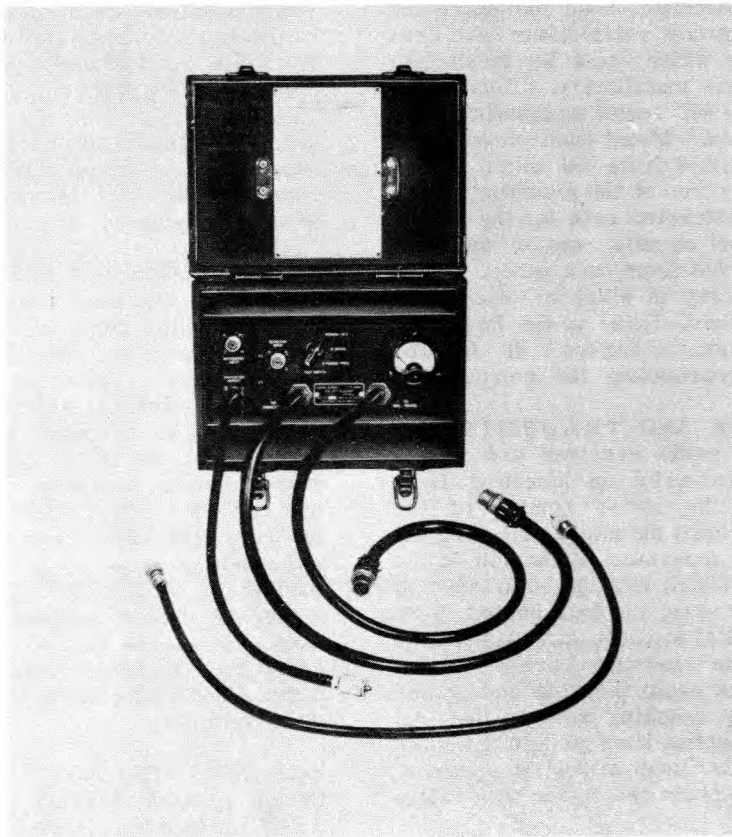
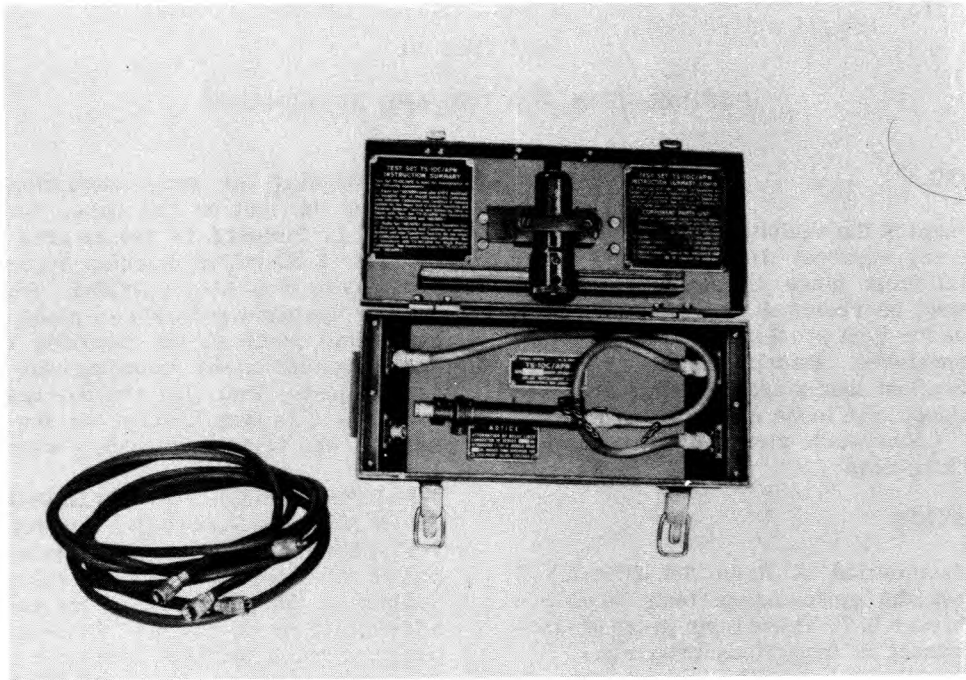


Figure 2-1. Test Sets TS-10C/APN (upper) and TS-23/APN (lower)

SECTION III

PREPARATION FOR USE AND RESHIPMENT

3-1. UNPACKING.

3-2. Carefully unpack the equipment and inspect each component for any apparent damage. Remove any packing material from plugs and connectors. Any dust and dirt must be removed from the equipment. Inspect all tubes for bent prongs, cracked bases, or broken glass envelopes. Inspect the entire equipment for any cracked insulating material, loose or broken connections, and loose solder or other foreign material. Check each piece of the equipment against the packing slip.

3-3. INSTALLATION.

3-4. Prior to installation of Radio Set SCR-718-D or -E, carry out the performance tests described in Tables 5-1 through 5-7. These tests prove whether or not the equipment is functioning properly.

3-5. GENERAL. Before actually installing Radio Set SCR-718-D or -E in an aircraft, read the entire installation procedure. Certain restrictions have been placed on cable lengths which must be taken into account when planning the installation. Violation of any of these restrictions will result in unsatisfactory operation of the equipment. Mount each of the components as far as possible from all other equipment. This is especially true of the antennas, which must have a totally unobstructed path for the transmission and reception of signals, and at the same time must be well shielded from each other. Careful planning is the only way in which a satisfactory installation may be obtained. Refer to the Inter-unit Cabling and Wiring Diagram (figure 7-6) for the proper method of interconnecting the components.

3-6. RADIO RECEIVER AND TRANSMITTER BC-788-D OR -E. The radio receiver and transmitter mounts horizontally on Mounting Base MT-14/ARN-1. Fasten the shock mounts of the mounting base to the aircraft structure, allowing the sway space required for movement of the unit on the base. Each of the four shock mounts is fastened to the aircraft structure by using the four number 8-32 plated machine screws, flat washers and elastic stop nuts provided. When the mounting base is bolted firmly in place, slide the radio receiver and transmitter into place on the mounting base so that the centering pins on the mounting base go into the holes in the case. Push the two snap slides on the front of BC-788-D or -E into place and fasten with safety wire.

3-7. INDICATOR I-152-D OR -E. The indicator is positioned on Mounting FT-445-A either horizontally or vertically, as long as the front panel is visible and accessible to the operator. Fasten the shock mounts of the mounting base to the aircraft struc-

ture, allowing the sway space required for movement of the unit on the base. Each of the shock mounts is fastened to the aircraft structure using the four 8-32 plated machine screws, flat washers and elastic stop nuts provided. When the mounting base is fastened securely in place, slide the indicator into place on the mounting base so that the centering pins on the mounting base go into the holes in the case. Pull the knurled head clamp screw over the clamping bracket on the I-152-D or -E, tighten, and fasten with safety wire.

3-8. INTERCONNECTING CABLING OF BC-788-D OR -E AND I-152-D OR -E. (See figures 7-7 through 7-10.) The length of the cabling between the radio receiver and transmitter and the indicator varies, depending on the placement of the two components in different types of aircraft. However, the maximum length of cable between these two components must not exceed 150 feet. Fabricate the cable as shown in the Cable Fabrication Diagrams (figures 7-1 and 7-2). When installed, be sure that there is enough slack in the cable to allow for any required movement of the cable such as removal of the cable connectors from their respective receptacles.

3-9. The grounding connection for the POWER SUPPLY receptacle consists of a plug AN 3106-12S-3S with a clamp AN3057-4A, and one conductor of number 20 or larger insulated wire cut to the required length.

3-10. ANTENNA INSTALLATION. (See figures 7-5 and 7-6.) The best antenna installation uses elements mounted flush with the skin of the aircraft. Antenna Assembly AS-333/AP may be mounted in the wings, tail assembly, or other non-pressurized area of an aircraft; Antenna AT-505/AP is designed specifically to preserve pressurization so that it may be mounted in the skin of a pressurized cabin. Two elements mounted as a half-wavelength pair are used for transmitting and another pair is used for receiving. Each pair is fed through a Tee with a three-quarter wavelength section of Cable RG-11/U leading to each individual element from the Tee. A second choice antenna installation arrangement uses one antenna unit for transmitting and one for receiving. Either Antenna AT-4A/ARN-1 or Antenna AT-4/ARN-1 may be used interchangeably in this system.

3-11. MOUNTING AS-333/AP OR AT-505/AP. Although Antenna Assembly AS-333/AP and Antenna AT-505/AP differ in their ability to preserve the air seal of a pressurized space, the electrical considerations in their mounting are identical. Take care to remove the anodized coating from the flanged surface of each unit before installing it. The spacing between the pairs of antenna elements, measured from midway between the individual elements of

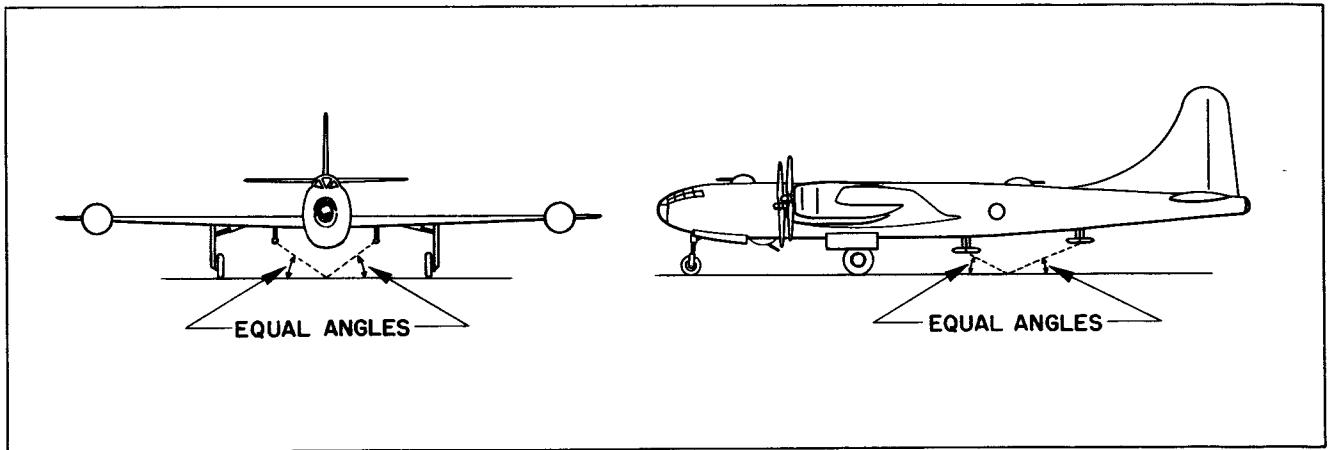


Figure 3-1. Shortest Direct Reflection Paths

each pair, should not be less than 14 feet, nor more than 20 feet. Be sure to allow enough space for connectors and associated wiring to clear obstructions inside the plane. All four units must be placed so that their radiating faces are parallel to each other. The outline drawing of figure 7-5 shows details of the location of necessary mounting holes.

3-12. MOUNTING AT-4A/ARN-1 OR AT-4/ARN-1. Since the only difference between Antenna AT-4A/ARN-1 and Antenna AT-4/ARN-1 is in the material of the dielectric insert between individual dipoles, they need not be differentiated in discussing their mounting. The horizontal radiating members of each antenna are mounted parallel to the line of flight with the thicker edge of the vertical member facing forward. Each antenna is fastened with four Number 8-32 plated machine screws, in mounting holes prepared as shown in the outline drawing of figure 7-6.

3-13. "IN LINE" ARRANGEMENT OF AT-4A/ARN-1 OR AT-4/ARN-1. (See figure 3-2.) This type of installation requires the antennas to be mounted on the underside of the fuselage near the tail of the aircraft. The horizontal portions of the antennas are aligned parallel to the axis of the fuselage of

the aircraft. The distance between the antennas must be kept within the limits of 7 feet minimum and 14 feet maximum.

3-14. "SHIELDED" ARRANGEMENT OF AT-4A/ARN-1 OR AT-4/ARN-1. (See figure 3-3.) This type of installation requires the antennas to be mounted parallel to each other with the horizontal portions of the antenna parallel to the line of flight of the aircraft, and with some substantial metal part of the aircraft directly between the antennas. The ideal location for this type of installation is on the horizontal stabilizer if the tail cone extends at least one foot below the underside of the stabilizer; however, the antennas must be at least two feet away from any shielding projections.

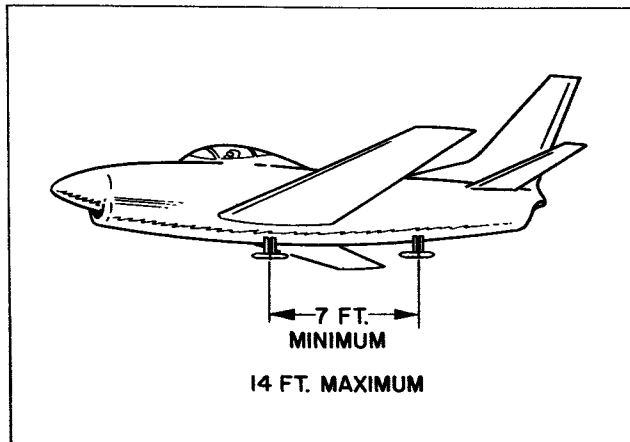


Figure 3-2. "In-Line" Antenna Arrangement

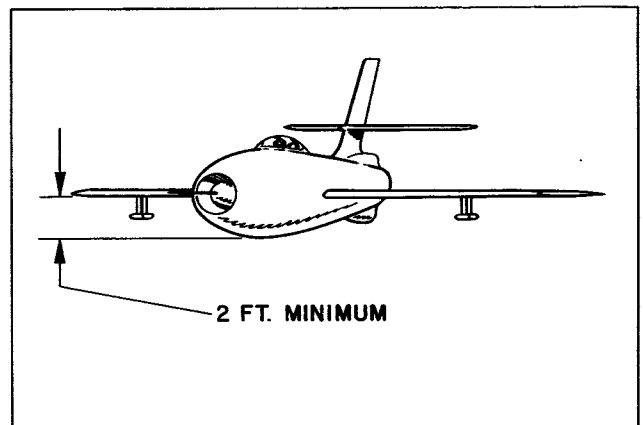


Figure 3-3. "Shielded" Antenna Arrangement

3-15. ANTENNA CABLING. Type RG-9/U or RG-9B/U cable is used in antenna installation. When the two lengths of cable are cut to the required length, the total length of the two cables must not exceed 50 feet. The two cables need not be of the same length. The length of each cable is determined by the positioning of Radio Receiver and Transmitter BC-788-D or -E. Fabricate the cable assembly by referring to the Cable Fabrication Diagrams (figure 7-1 and 7-2). When installing the two cables, they must never be run

parallel to each other. The cable must be routed by the shortest, most direct route possible, with no emphasis on neatness. Never use right angle connectors on the cables unless absolutely necessary.

3-16. LINE VOLTAGE DROP. Radio Set SCR-718-D or -E operates on a line voltage of from 105 to 125 volts ac. The rf output of the transmitter varies, however, with changes in line voltage. This is especially noticeable at altitudes above 40,000 feet, where maximum sensitivity is essential. To insure sufficient transmitter output, the following procedure may be used. (See figure 3-4.)

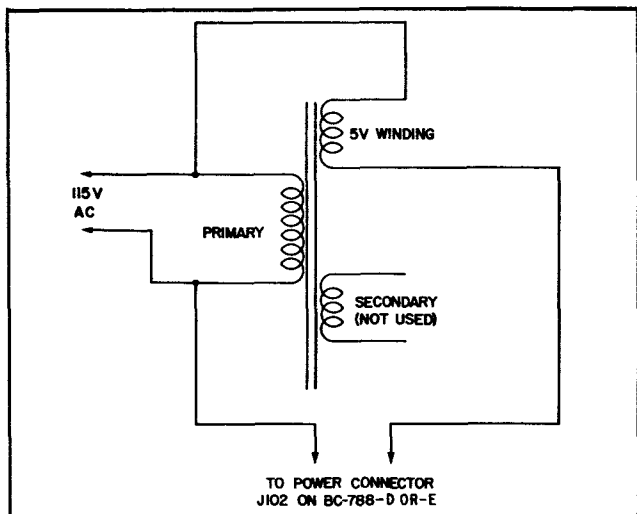


Figure 3-4. Connections for Obtaining Relatively Constant AC Input Voltage

a. Disconnect the 115-volt a-c line at J102, remove both wires from this connector.

b. Using a separate transformer with a five-volt filament winding, connect it as follows:

1. Connect the 115-volt a-c line across the primary of the new transformer.

2. Connect the five-volt filament winding in series with one side of the primary and one terminal of the power connector J102.

3. Connect the opposite side of the primary to the remaining terminal on power connector J102.

c. Using Test Set TS-23/APN, as described in paragraph 5-13, check the B+ voltage. If the d-c voltage reading is at least 315 volts the filament winding is connected in the proper phase to produce the desired 5-volt step up in line voltage. If, however, the voltage drops (it may be as low as 290 volts) reverse the connections of the five-volt filament winding.

3-17. SPECIAL PRECAUTIONS FOR INSTALLATION OF SCR-718-D OR -E FOR OPERATION ABOVE 40,000 FEET. In addition to the installation procedures described in paragraphs 3-2 through 3-16,

the precautions outlined in the steps below help insure minimum reduction of accuracy in operation of the altimeter above its normal maximum altitude of 40,000 feet, and, in certain instances, guard against damage to the equipment in such operation.

a. Avoid using right-angle adapters either at the antennas or at the radio receiver and transmitter.

b. Make every effort to keep the length of the interconnecting cable between the radio receiver and transmitter and the indicator at an absolute minimum, in order to reduce pulse broadening.

c. Due to the rapid decrease of power output from the transmitter with only one or two volts reduction of line voltage, it is important that the voltage at the power transformer of BC-788-D or -E measure 115 volts or more. To avoid increasing the general line voltage for this purpose, which might cause over-voltage on other equipments connected closer to the power source than the altimeter, an auto-transformer is suggested to step up the voltage locally. Refer to paragraph 3-16 for the method of connection.

d. Try for maximum loop sensitivity in the receiver by replacing the RF tubes (V101, V102) and the IF tubes (V103 through V108). If possible, select equipments which give an attenuator reading of 68 or greater, using Test Set TS-10C/APN. (See table 5-7.)

e. Use an AS-333/AP or AT-505/AP antenna installation if possible.

f. Keep antennas clear of obstructions.

g. Use an "in line" antenna installation arrangement like that discussed in paragraph 3-13, or provide shielding between antennas.

h. The low voltage power supply in the SCR-718-E and some units of the -D model has been modified through the use of the 5Y3WGTA rectifier tube. This change enables the equipment to be operated at altitudes up to 60,000 feet without danger to the equipment. However, if the unit still employs the older type 5Y3GT/G tube or it is necessary to use one as a replacement for the 5Y3WGTA tube, special precautions must be observed to prevent voltage breakdown at altitudes above 40,000 feet. Apply Dow-Corning No. 4 ignition sealing compound in each opening between the tube pins. Add sufficient sealing compound to cover the tube socket to prevent arcing between the tube pin terminals and any nearby conductors.

3-18. CHECKS AFTER INSTALLATION.

3-19. The following procedure outlines the steps necessary to determine whether or not the equipment is properly installed and is in a satisfactory operating condition. This procedure is performed after installation and prior to flight.

a. Turn the REC. GAIN control on indicator I-152-D or -E to the ON position.

b. Set the SCALE switch on the indicator to the TIMES ONE position.

c. Check for the presence of the green circular trace on the cathode-ray tube screen.

d. Check the transmitting and receiving antenna with Indicator ID-98A/APN or Test Set TS-10C/APN.

e. Adjust to check for proper operation of all accessible controls on I-152-D or -E.

3-20. RADIO SET SCR-718-D or -E INSTALLATION EMPLOYING AUXILIARY INDICATOR. (See figures 7-9 and 7-10.) In special instances, the SCR-718-D or -E employs two indicators. The installation procedures apply as described for the equipment as normally operated, except where a procedure below is to the contrary.

a. Two cables will replace the interconnecting cabling between BC-788-D or -E and the regular I-152-D or -E. Instead of terminating one end of the cable in connector AN3106-16S-1P and the other end of the cable in connector AN3106-16S-1S, the first cable will now terminate in AN3106-16S-1P and the terminal strip, the second cable will now terminate in AN3106-16S-1S and the terminal strip.

b. A third cable is required for the auxiliary indi-

cator. This cable terminates in the AN3106-16S-1S of the auxiliary indicator and the same terminal strip as above.

c. The antenna system of AS-333/AP or AT-505/AP is recommended.

d. Replace the existing tube V110 (type 5Y3GT/G or 5Y3WGTA) with type 5V4G to provide additional plate power for the auxiliary indicator. Install placard or decal adjacent to the BC-788-D or -E nameplate with wording "TUBE 5Y3GT/G (5Y3WGTA) REPLACED WITH 5V4G FOR DUAL INDICATORS."

e. Install placard or decal adjacent to BC-788-D or -E on aircraft structure near mounting with wording "USE ONLY BC-788-D (BC-788-E) IN WHICH THE 5Y3GT/G (5Y3WGTA) TUBE HAS BEEN REPLACED WITH 5V4G TUBE."

f. Install placard or decal adjacent to each indicator on aircraft structure near mounting with wording "MASTER INDICATOR" and "AUXILIARY INDICATOR," respectively.

3-21. REPACKING.

3-22. Each component of Radio Set SCR-718-D or -E is to be shipped fully assembled. Repack each component individually as illustrated in figure 3-5.

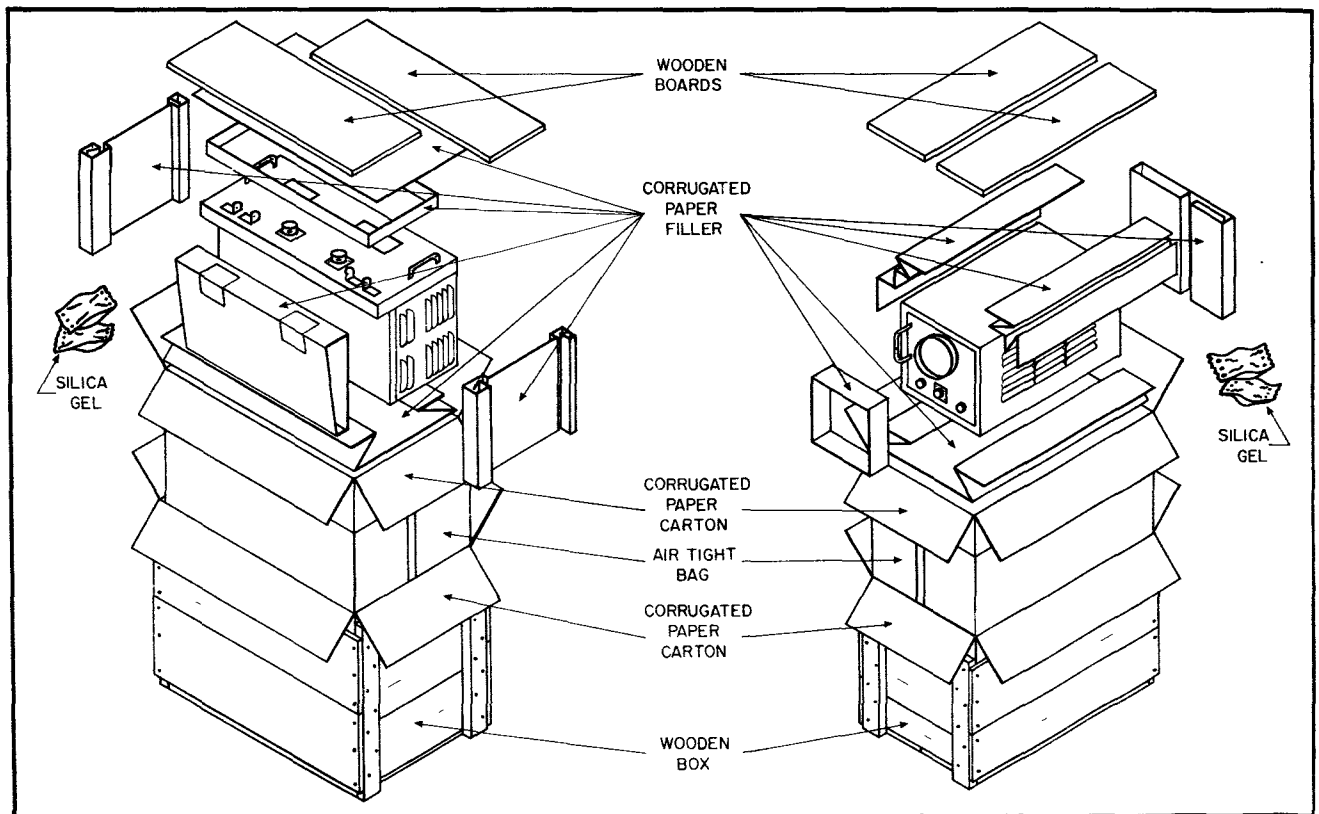


Figure 3-5. Repacking

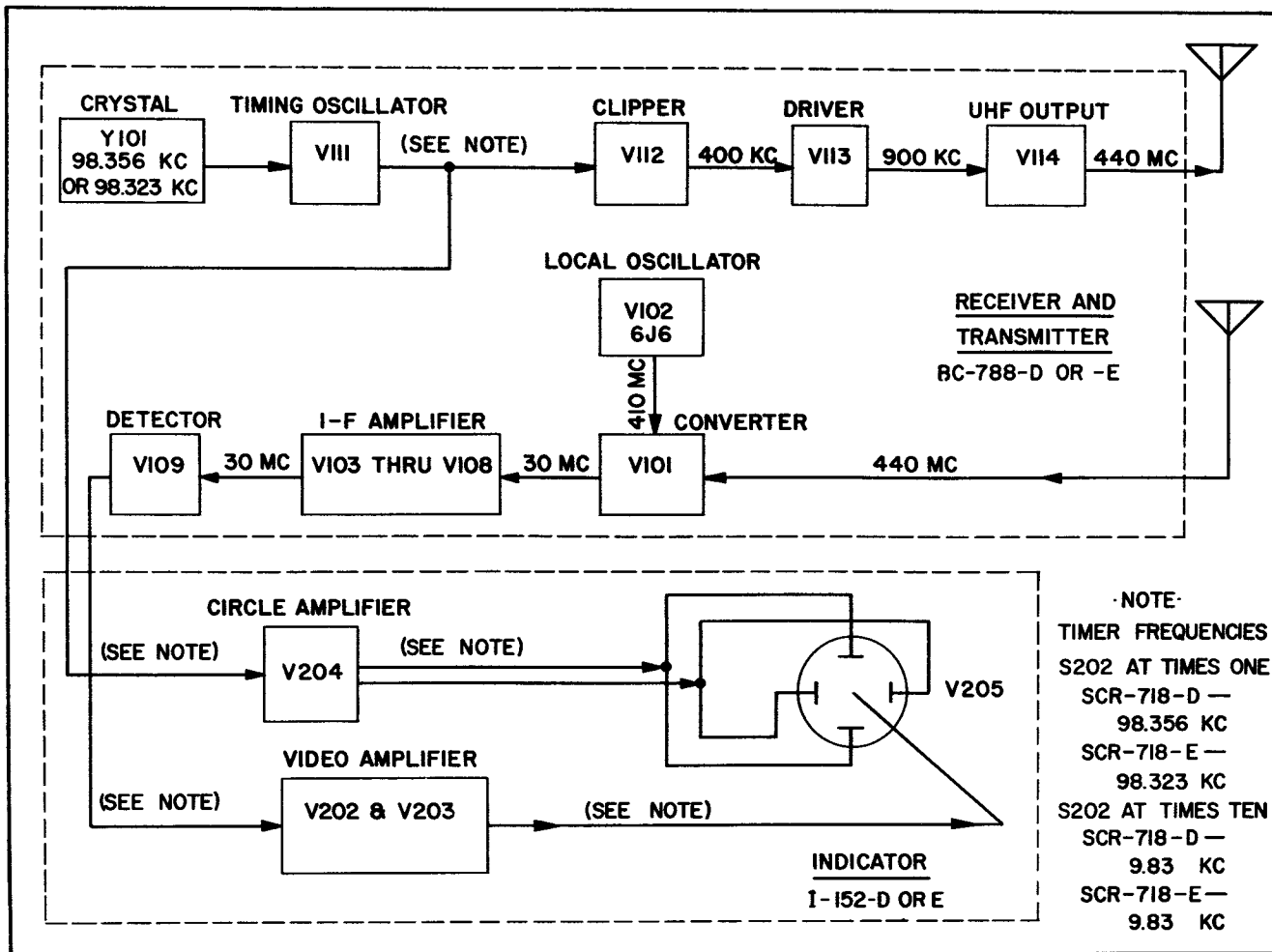


Figure 4-1. Block Diagram of Radio Set SCR-718-D or -E

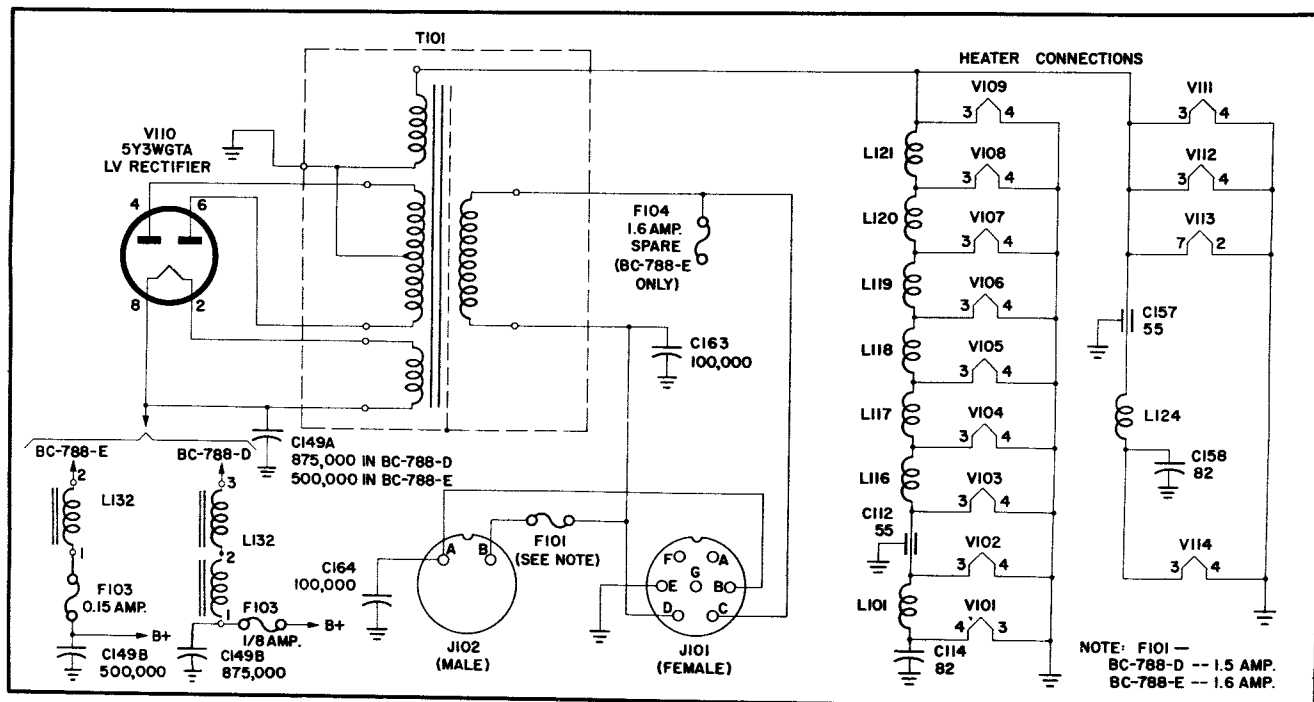


Figure 4-2. Low-Voltage Power Supply, BC-788-D or -E

SECTION IV

THEORY OF OPERATION

4-1. GENERAL SYSTEM OPERATION. (See Figure 4-1).

4-2. The operation of the entire equipment is based on the output of the timing oscillator which is crystal controlled. The output of the timing oscillator is a sine wave of constant frequency and amplitude.

4-3. Part of the timing oscillator output is sent to the circle-forming circuits which produce a circular trace on the cathode-ray tube screen. The rest of the timing oscillator output is applied to a clipper stage. The output of the clipper stage is a series of short pulses of current. These short pulses are applied to a loaded tank circuit which produces a damped voltage-wave-train, of which only the first pulse is used. The damped voltage-wave-train is applied to a driver stage. The first positive peak of the first pulse of each voltage-wave-train produces short pulses of current in the plate circuit of the driver. These pulses are applied to a loaded tank circuit which produces a damped voltage-wave-train, of which only the first pulse of the train is used. These narrow single pulses are applied to a UHF output circuit and then transmitted by an antenna. The pulses leave the antenna and travel toward the earth below. The pulses are reflected back from the earth to a receiving antenna. The received signal is mixed with a signal from the local oscillator and sent through the IF amplifiers. The output of the last IF amplifier is sent to a detector stage which removes the carrier, and the pulses alone are sent to the video amplifier. From the video amplifier the pulses are applied to the radial electrode of the cathode-ray tube. The application of these pulses to the cathode-ray tube causes them to appear as lobes on the circular trace on the screen of the cathode-ray tube. The point at which the lobe appears on the circle corresponds to the time it takes for the pulse to complete its trip. Reading the position of the lobe on the screen of the cathode-ray tube by the calibrated marks, gives the height of the aircraft in feet.

4-4. DETAILED SYSTEM OPERATION.

NOTE

In the following discussion, S202 is in the TIMES ONE position. (See paragraph 4-16 for further information on S202.)

4-5. RADIO RECEIVER AND TRANSMITTER BC-788-D OR -E. The radio receiver and transmitter is electrically composed of two main units and a low voltage power supply which is common to both main units. These are discussed individually in the following paragraphs.

4-6. LOW-VOLTAGE POWER SUPPLY. (See figure 4-2.) The low voltage power supply located in

BC-788-D or -E is a conventional type consisting of a power transformer, T101; a full-wave rectifier, V110; and a filter network, C149A, C149B and L132. The power supply furnishes the B+ voltage and heater voltage needed for the receiver and transmitter and the B+ voltage for the indicator.

4-7. TRANSMITTER. (See figure 4-3.) The accuracy of the entire equipment is dependent on the timing oscillator. In the TIMES ONE range, the crystal Y101 in the grid circuit of the timing oscillator V111 controls the exact frequency, 98.356 kilocycles (98.323 in the BC-788-E). In the TIMES TEN range relay K101 is energized which replaces the crystal with a tuned circuit consisting of L112A, L112B (L175A, L175B in the BC-788-E) and associated capacitors. V111 oscillates at 9.83+ kilocycles for the TIMES TEN range. The oscillator output appears at the plate of V111 as a sinusoidal voltage and is coupled to two separate circuits. L109B in T109 inductively couples one part of the voltage to the circle amplifier circuit in the indicator which is described in paragraph 4-11. The output of V111 is also applied to the grid of the clipper, V112, through C170. Peaks of the oscillator sinusoidal voltage output are sufficient to overcome cut-off bias on the control grid of V112 allowing short pulses of plate current to flow. These pulses provide periodic excitation to the plate tank circuit T110 causing oscillations at approximately 400 kilocycles. However, R110B is placed in the circuit to dampen these oscillations. Therefore, each time T110 is excited by a pulse from V112, only the first oscillation is large; each oscillation thereafter diminishes in magnitude, thus producing a damped voltage-train. The damped voltage-wave-train appearing at the output of T110 is applied to the grid of V113, the driver stage. Because of the bias placed on V113, only the first positive peak of each voltage-wave-train is of sufficient amplitude to cause short pulses of plate current to flow. These short pulses of plate current are applied to the plate tank circuit T111. The application of a pulse of plate current excites T111 and causes it to oscillate at a frequency of approximately 900 kilocycles. R150 serves to dampen the oscillations and thus produce a damped voltage-wave-train. The damped voltage-wave-train is applied to the UHF output circuit which is tuned to 440 megacycles. The UHF oscillator derives its plate voltage entirely from the output of the driver stage. No DC potential appears on the plate of the UHF oscillator except for a small bias developed across resistor R150. The UHF oscillator is connected in push-pull. The frequency of operation is controlled by the position of the shorting bar on plate tank circuit L127 and circuit and tube capacity. The UHF oscillator circuit is

basically a push-pull tuned-grid oscillator circuit, the two grids being tuned by tube capacity. R151 and R152 serve to maintain this frequency constant.

4-8. From the previous discussion it is apparent that the repetition rate of the pulses has remained constant, but that the pulses are now very narrow. The repetition rate of the pulses has remained at 98.3+ kilocycles. Based on this frequency, a pulse is transmitted on a 440-megacycle carrier wave approximately every 10 microseconds. These pulses are now applied to the antenna for transmission.

4-9. RECEIVER. (See figures 4-4 and 4-5.) Pulses, transmitted by the transmitting antenna and reaching the earth, are reflected upward and picked up by the receiving antenna. Pulses picked up by the receiving antenna are applied to coupling loop L131 which induces voltages into converter V101 tank circuit. At the same time, local oscillator V102 is also inducing a voltage into V101 tank circuit through coupling loop L130. The local oscillator produces a frequency of 410 megacycles. The received signal frequency is 440 megacycles. The converter, V101, mixes these two frequencies together and produces a sum and difference frequency of which only the difference frequency is used. This difference frequency is 30 megacycles. The 30-megacycle output of V101 is applied through six identical stages of IF amplification. Each IF amplifier stage is tuned to 30 megacycles. The output of the last IF amplifier, V108, is applied to a detector, V109, which removes the carrier wave from the pulses. The output from the cathode of the detector is applied to Indicator I-152-D or -E through the inter-unit connecting cable.

4-10. INDICATOR I-152-D or -E. The indicator is divided electrically into two main sections and a high-voltage power supply. One main section produces the necessary voltages, wave shapes and phase angles to produce a circular trace on the screen of the cathode-ray tube, V205. The other main section amplifies pulses from the receiver, and places these pulses on the circular trace appearing on the cathode-ray tube. The three sections are discussed in the following paragraphs. The low-voltage power supply of BC-788-D or -E is also common to I-152-D or -E, as mentioned earlier.

4-11. CIRCLE-FORMING CIRCUIT. (See figure 4-6.) Output of the timing oscillator is inductively coupled by L109B (see paragraph 4-7) in T109 and applied to the primaries of T202 and T204. T202 is adjusted to couple the 98.3+ kilocycle sine wave of the TIMES ONE range to the control grid of V204, the circle amplifier. T204 is tuned to couple the 9.83+ kilocycle sine wave of the TIMES TEN range to V204. The secondary of T202 is a variable inductance, L202B; the variable inductance serves as a zero adjustment for correction of the positioning of the zero pulse. Capacitor C205 is placed in parallel with L202B so that, as the inductance of L202B is varied, the relative phase angle of the voltage appearing across L202B also varies. Varying this relative phase angle, varies the starting point of the circular trace on the screen of the cathode-ray tube, V205. The variable resistor, R240, controls the magnitude of the voltage leaving L202B.

The output voltage of T202 is next applied to the grid of the circle amplifier V204, through R213, the circle size control. The circle amplifier, V204, serves only to amplify the applied sine-wave voltage. The output of V204 is coupled directly to the TIMES ONE and TIMES TEN circle forming transformers T203 and T205, respectively. A sinusoidal voltage is coupled from the plate of V204 through C209 to one horizontal deflection plate in the cathode ray tube, V205. Plate current through L203A inductively couples a 98.3+ KC sinusoidal voltage into L203C. Capacitor C212 couples a sinusoidal voltage to the other horizontal deflection plate. The two voltages applied to the horizontal deflection plates are equal in amplitude and 180 degrees out of phase with respect to each other. If no voltage is applied to the vertical deflection plates, a single horizontal line will appear across the screen of V205. Similarly a sinusoidal voltage is coupled from L203A to L203B. The TIMES ONE shape control, R227 introduces a variable phase shift across L203B. Since L203D is inductively coupled to L203B, the phase will be shifted across it as well. R227 is adjusted to shift the 98.3+ KC signal 90 degrees. Capacitor C210 couples the phase shifted voltage to one vertical deflection plate in V205 and another voltage, shifted 180 degrees in phase, is taken from L203D and applied to the other vertical deflection plate. In TIMES TEN range, T203 is a low impedance and can be considered as not being in the deflection circuit. T205 is used in its place and provides the 9.83+ KC deflection voltages. R237 is the TIMES TEN circle shape control.

4-12. The result of applying these sine-wave voltages, properly shifted in phase, to the deflection plates is a single circular trace on the screen of the cathode-ray tube. Resistors R227 and R237 are variable so that a 90-degree phase shift is obtainable even though parts values may vary slightly due to aging. A phase shift of 90 degrees is essential to obtain a truly circular trace on V205. The variable resistors R222 and R225 are included so that the magnitude of the sine-wave voltages may be varied with respect to each other in order to maintain the circular trace centered on the screen of the cathode-ray tube.

4-13. VIDEO AMPLIFIER CIRCUIT. (See figure 4-7.) The output of the detector, V109, is applied to the grids of the video amplifier which consists of V202 and V203 connected in parallel. The video amplifier is used to amplify the weak pulses, from the detector, to a usable level. The output of the video amplifier is applied to the radial electrode of V205, through C208. Therefore, the pulses appearing at the radial electrode occur at the rate of 98.3+ pulses every second, or approximately one pulse every 10 microseconds. This is, of course, the rate at which the pulses are being transmitted and received, as explained previously.

4-14. Since a circle is formed and a pulse is applied the same number of times each second, one pulse is applied for every circle formed. However, the time duration of the applied pulse is much shorter than the time required to form a circle. Therefore, when a pulse is applied to the circle,

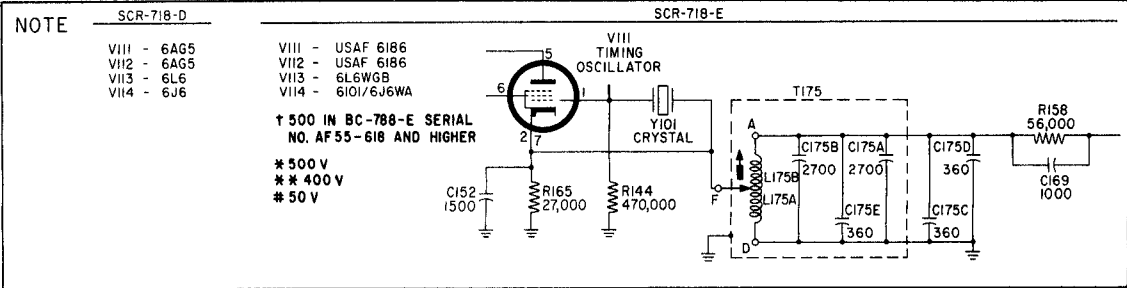
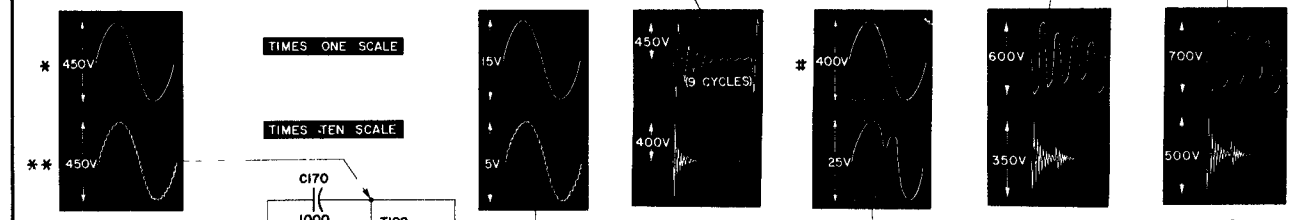
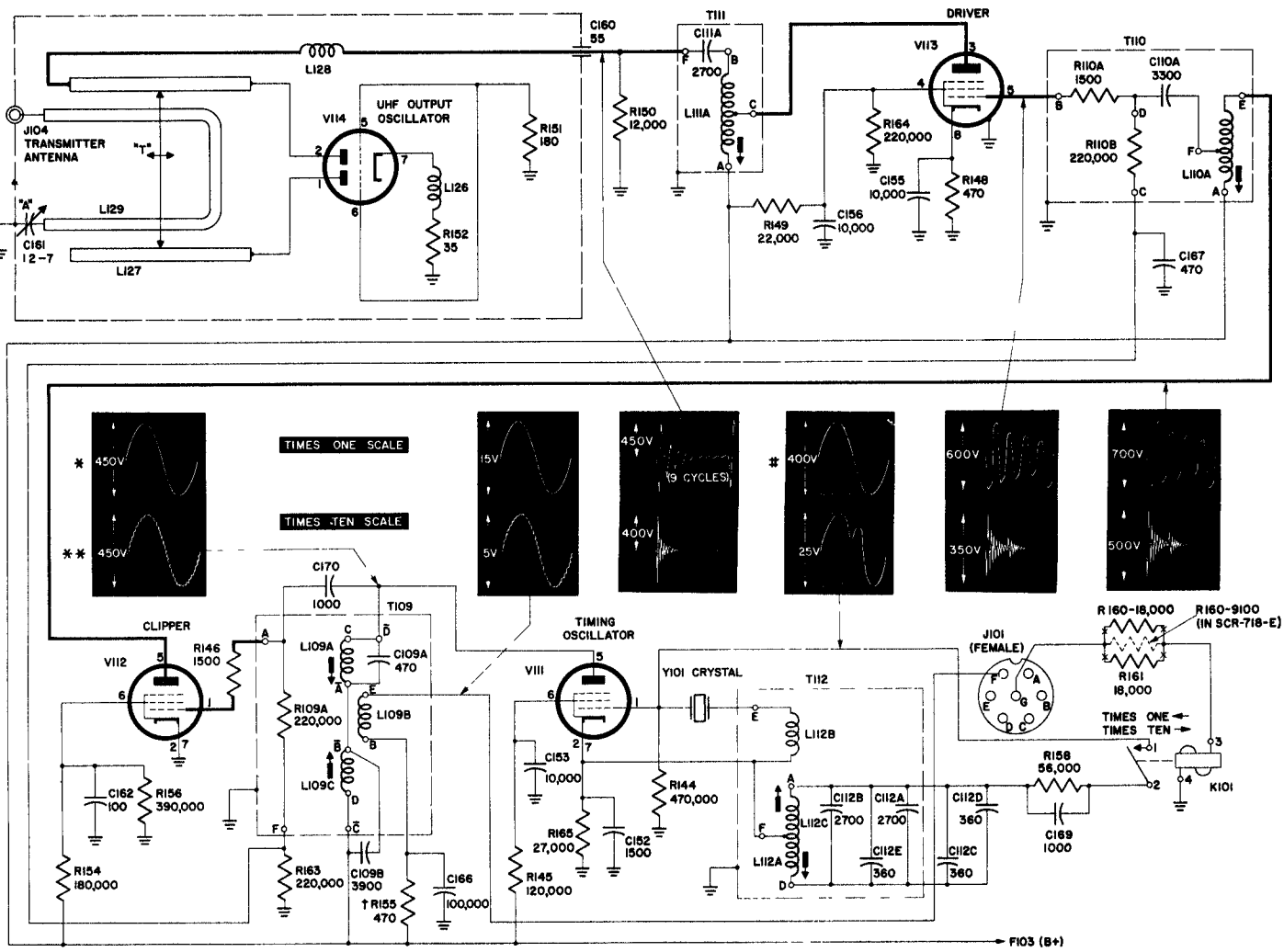
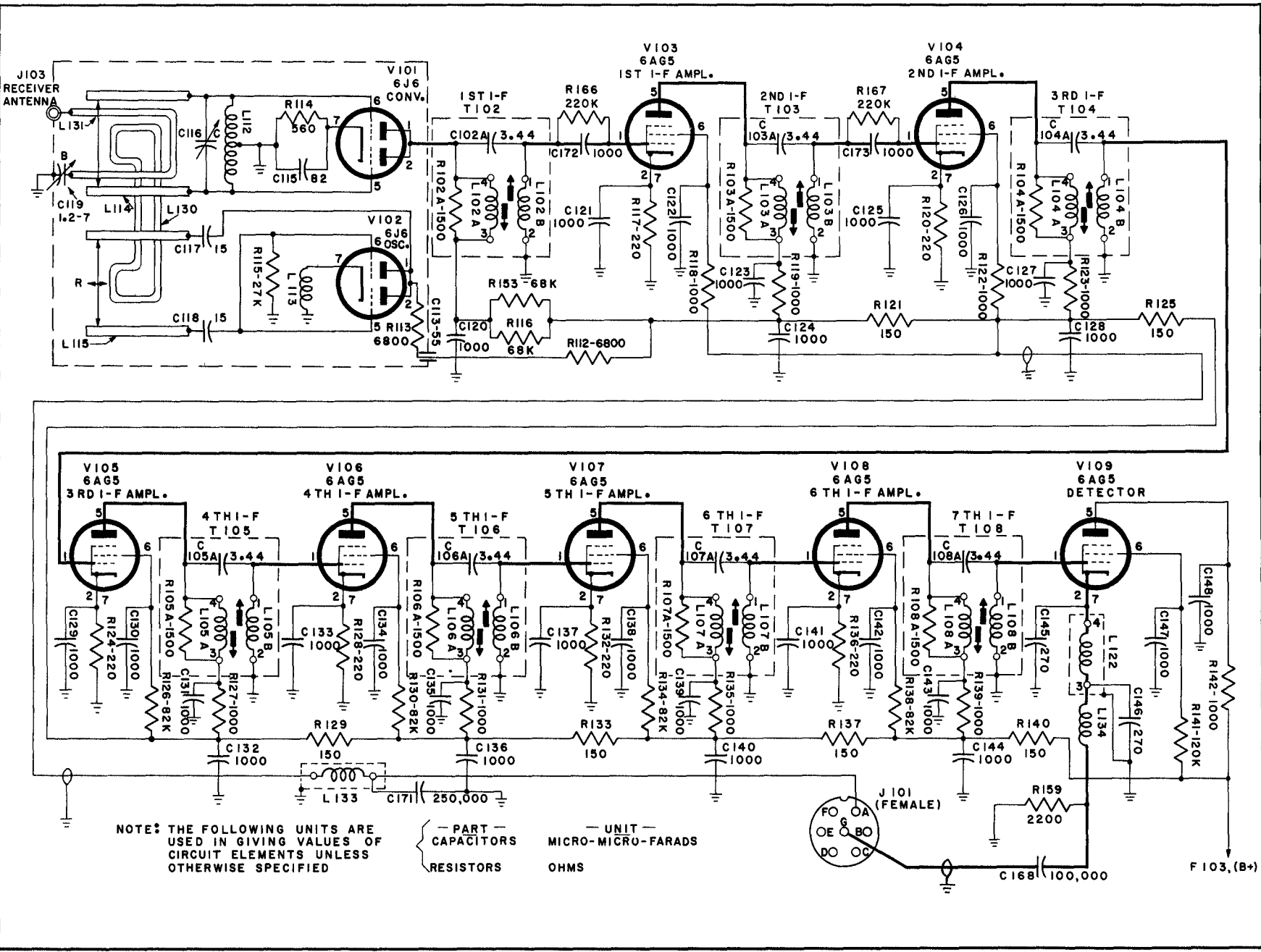
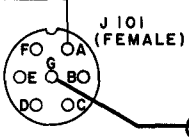


Figure 4-3. Transmitter Circuit, BC-788-D or -E



NOTE: THE FOLLOWING UNITS ARE USED IN GIVING VALUES OF CIRCUIT ELEMENTS UNLESS OTHERWISE SPECIFIED

--- PART ---
 CAPACITORS MICRO-MICRO-FARADS
 --- UNIT ---
 RESISTORS OHMS



F 103, (B+)

Figure 4-4. Receiver Circuit, BC-788-D

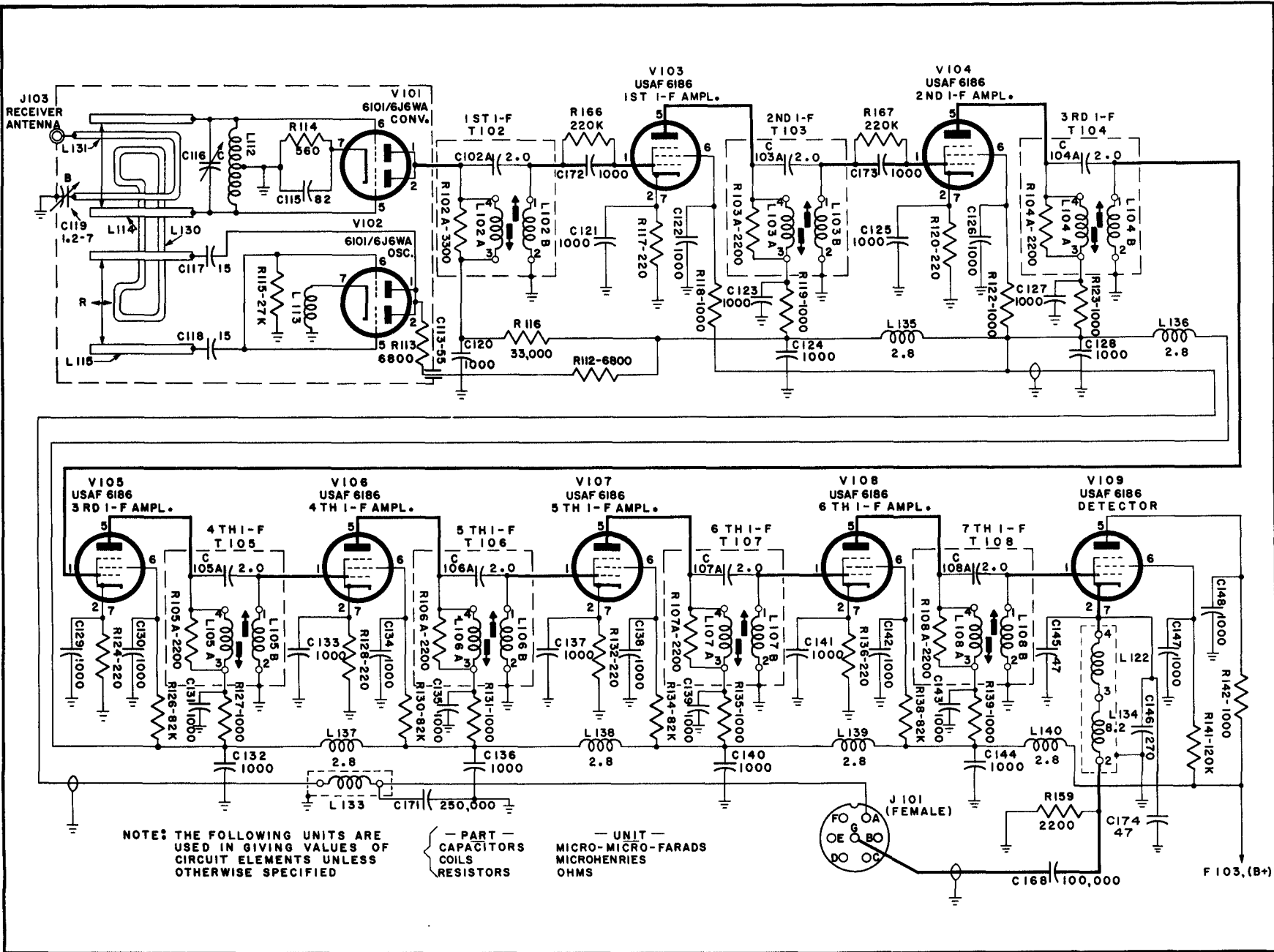
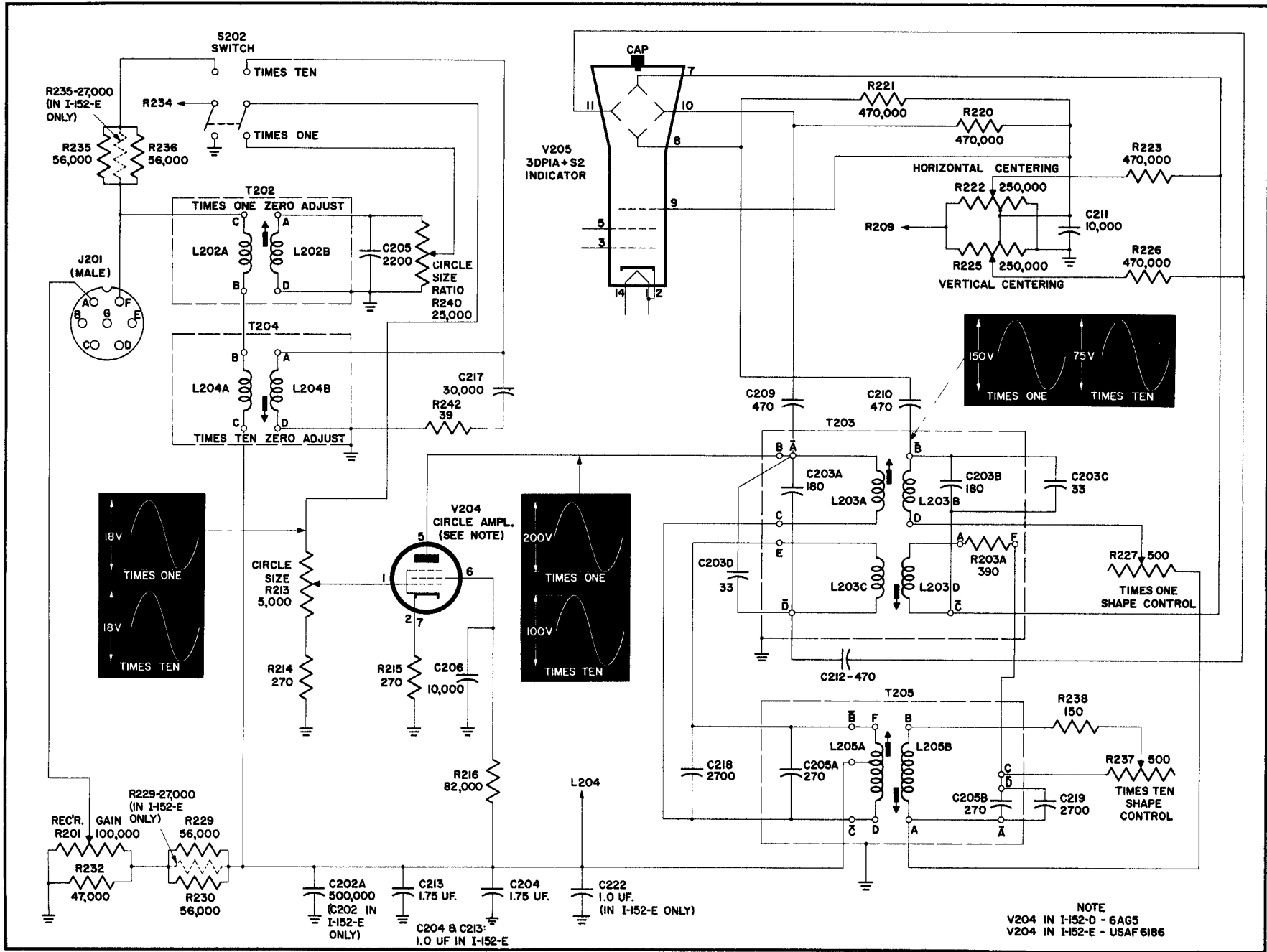


Figure 4-5. Receiver Circuit, BC-788-E

Figure 4-6. Circle-Forming Circuit, I-152-D or -E



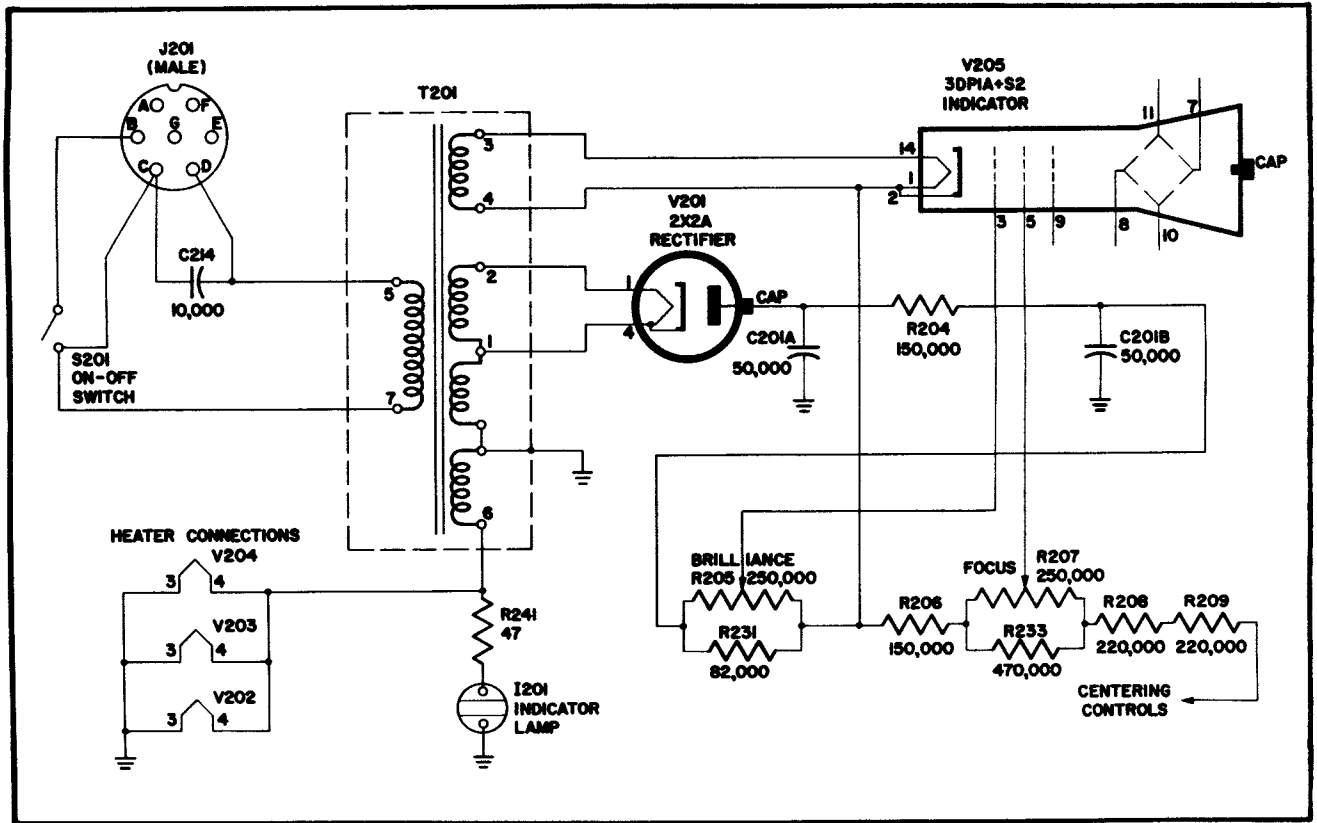


Figure 4-8. High-Voltage Power Supply, I-152-D or -E

aircraft form in effect a single half-wave dipole antenna with the individual elements spaced a half wavelength apart and the skin acting as a baffle.

Since this arrangement requires two units to give the effect of a single antenna, four are used in the complete installation.

SECTION V

ORGANIZATIONAL AND OPERATIONAL MAINTENANCE

5-1. MINOR REPAIR AND ADJUSTMENT.

WARNING

The operation of this equipment involves the use of high voltages that are dangerous to life. Before following any of the maintenance procedures outlined below, shut off the equipment.

5-2. FUSE REPLACEMENT. Radio Set SCR-718-D or -E contains two active fuses, F101 and F103, and three spare fuses, F104, F105, and F106. One additional spare fuse, F107, is provided in SCR-718-E. The line fuse, F101, is located on the front panel of Radio Receiver and Transmitter BC-788-D or -E. The other active fuse F103, which protects the B+ lead of the low-voltage power supply, is located on the BC-788-D or -E chassis. To replace this fuse, removal of the chassis is necessary. Chassis removal procedure is located in paragraph 5-4.

- a. Of the two fuse holders located on the front panel, the lower fuse is the active fuse.
- b. Remove this active fuse by rotating the cap one-quarter turn counterclockwise and slipping cap straight out.
- c. Replace this fuse (if blown) with the spare fuse, F104, located in the upper fuse holder. The additional spare line fuse, F107, is located in SCR-718-E on the back side of the front panel next to F101 and F104.

d. Turn the REC. GAIN control on Indicator I-152-D or -E to the ON position.

e. If the new fuse blows, shut off the equipment until the cause of trouble has been remedied.

f. Replacement of the active fuse on the chassis of BC-788-D or -E is identical to the replacement of the line fuse, with the exception of the spare fuse holder. Two spare fuses, F105 and F106, are located on the back side of the front panel.

5-3. REMOVAL OF ASSEMBLIES.

5-4. CHASSIS OF RADIO RECEIVER AND TRANSMITTER BC-788-D or -E.

- a. Slide the two inner snap clips located on the bottom of the front panel toward each other.
- b. Rotate the Dzus fastener on the back of the case one-quarter turn counterclockwise.
- c. Slide the chassis out of the case.

d. Reverse the above procedure to replace the chassis in the case.

5-5. CHASSIS OF INDICATOR I-152-D or -E.

- a. Rotate the dzus fastener on the back of the case one-quarter turn counterclockwise.
- b. Slide chassis out of case.
- c. Reverse the above procedure to replace the chassis in the case.

5-6. CATHODE-RAY TUBE REMOVAL.

- a. Remove the visor.
- b. Loosen the four round-head machine screws holding in place the escutcheon casting which forms the holder for the cathode-ray tube window. Loosen the screws until they are free from the front panel only. These are captive-type screws and need not be unscrewed from the escutcheon casting.
- c. Remove the escutcheon casting.
- d. Carefully remove the clip which is attached to the center of the tube face.
- e. Push the tube from the socket end through the hole in the tube socket.

CAUTION

Hold the tube face so that it does not fall out.

- f. Carefully remove the tube from its housing.

5-7. CATHODE-RAY TUBE REPLACEMENT.

- a. Slip tube back into its socket so that the pins and the keyway engage.
- b. Replace the escutcheon casting.
- c. Tighten the four round-head screws in the casting.
- d. Remove the four flat-head screws holding the transparent plate in place.
- e. Remove the transparent plate.
- f. Loosen the two screws in the clamp at the base end of the tube.
- g. Rotate the tube as necessary so that the zero mark on the face of the tube is vertical.

SECTION V

T.O. 12P5-3SCR718-22

Paragraphs 5-8 to 5-15

h. Slip the tube forward so that the tube is seated firmly against the rubber gasket at the front end of the tube.

i. Tighten the clamps at the socket end of the tube when the tube is properly positioned.

j. Replace the clip on the center of the face of the tube.

k. Replace the transparent plate.

l. Replace and tighten the four flat-head screws.

m. Turn on the equipment and check for proper operation of the replaced tube.

5-8. LUBRICATION.

5-9. No lubrication is required nor desired for Radio Set SCR-718-D or -E.

5-10. BENCH TEST SET-UP.

5-11. CIRCLE TRACE, LOOP SENSITIVITY AND LOBE WIDTH, AND ZERO ADJUSTMENT PROCEDURE. (See figure 5-1.) The following procedure outlines the steps necessary to properly connect the test equipment to the equipment under test for making the performance tests indicated in Tables 5-1 through 5-3 and Table 5-7.

a. Connect the Radio Receiver and Transmitter BC-788-D or -E to a primary power source of 105 to 125 volts AC at 400 to 2400 cps.

b. Connect Indicator I-152-D or -E and the Radio Receiver and Transmitter to Test Set TS-23/APN, using cords CA-102 and CA-103. Connect these interconnecting cables to their designated receptacles.

c. Rotate the TEST SWITCH of Test Set TS-23/APN to the NORMAL-B+ position.

d. Connect the TRANSMITTER ANTENNA receptacle on the radio receiver and transmitter to the A-LOW receptacle on Test Set TS-10C/APN using the eight-foot cord, CA-102.

e. Connect the jumper (CA-101) from the B-LOW receptacle to the C-HIGH receptacle lo-

cated on Test Set TS-10C/APN. (CA-101 is a 12-inch cord.)

f. Connect the RECEIVER ANTENNA receptacle on the radio receiver and transmitter to the end of the Attenuator away from the chain, using an eight-foot cord, CA-102. (This is not the cord referred to in paragraph 5-11d, one of these cords is part of the TS-10C/APN and the other cord is part of TS-23/APN.)

g. Connect the remaining Attenuator receptacle to the D-HIGH receptacle of Test Set TS-10C/APN using an 18- or 20-inch cord, CA-103.

h. Set Attenuator slide to read 65.

5-12. FREQUENCY, SIGNAL, AND POWER OUTPUT ADJUSTMENT. (See figure 5-2.) The following procedure outlines the steps necessary to properly connect the test equipment to the equipment under test for conducting the performance tests in Tables 5-4 through 5-6.

a. Connect Indicator I-152-D or -E to Radio Receiver and Transmitter BC-788-D or -E, using the interconnecting cables of Test Set TS-23/APN. Connect these interconnecting cables to their designated receptacles.

b. Connect the Radio Receiver and Transmitter to a primary power source of 105 to 125 volts AC at 400 to 2400 cps.

c. Set the SCALE switch on the indicator to the TIMES ONE position.

5-14. MINIMUM PERFORMANCE.

5-15. The procedure for determining the minimum acceptable performance of Radio Set SCR-718-D or -E is outlined below in Tables 5-1 through 5-7. Should proper performance not be met during these procedures, refer to the system trouble analysis tables, paragraph 5-24, to localize the trouble. More specific troubleshooting data may be found in Section VI. Before proceeding with any test, allow all equipments to warm up for at least three minutes. Refer to figure 1-4 for the location of externally adjustable controls. The complete procedure of Tables 5-1 through 5-7 should be followed in the sequence given, since each test depends for its validity upon some portion of those which have preceded.

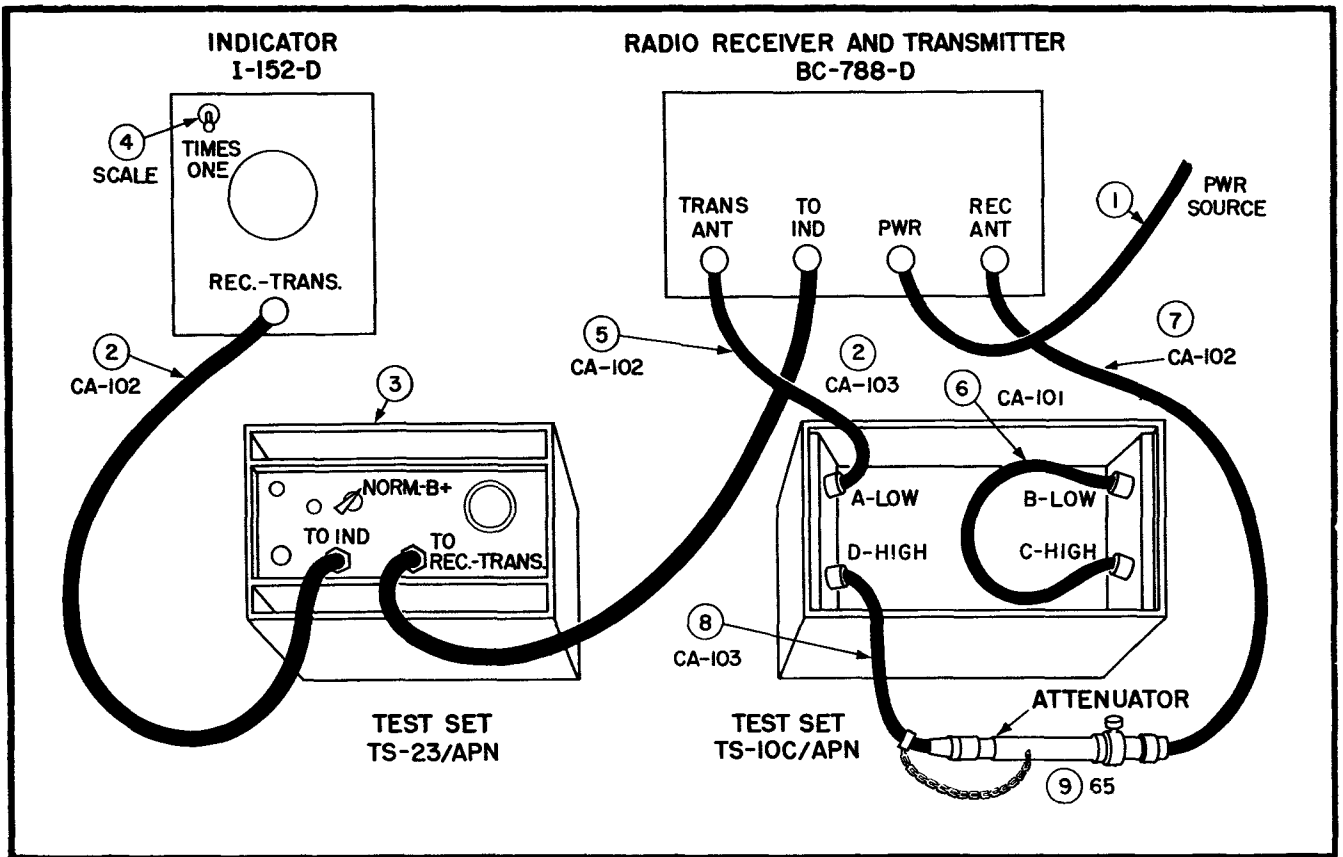


Figure 5-1. Bench Test Set-up Employing Test Set TS-23/APN and Test Set TS-10C/APN

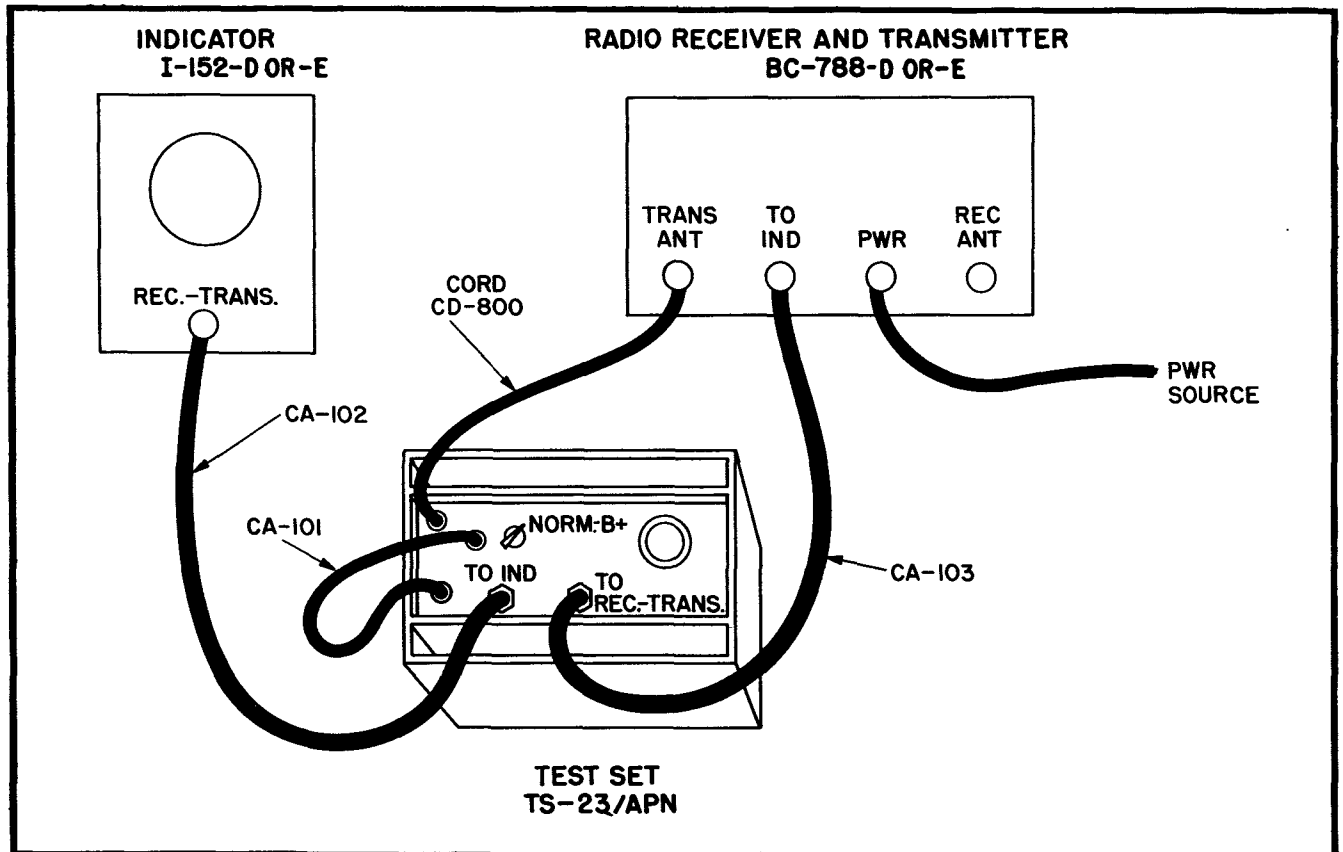


Figure 5-2. Bench Test Set-up Employing Test Set TS-23/APN

TABLE 5-1
CIRCLE TRACE, MINIMUM PERFORMANCE

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Test Sets TS-23/APN and TS-10 C/APN. TEST SWITCH to NORMAL - B+	Rotate REC. GAIN control on Indicator I-152-D or -E to ON position. Do not rotate farther than just enough to turn the equipment on.	Indicator lamp lights within about 30 seconds, a green circular trace appears on the cathode-ray tube screen of Indicator I-152-D or -E.	Proceed with Step 2.	Replace fuse F101. If fuse blows again or if indication is still abnormal, reject the set.
2	Visual Check	Test Sets TS-23/APN and TS-10 C/APN	Adjust input voltage so that the meter on TS-23/APN reads 320. Adjust CIRCLE SIZE control on face, and HORIZ. and VERT. CENTERING controls on underside of I-152-D or -E to make green circular trace coincide with black base circle of the calibrated scale on the cathode-ray tube screen.	Green circular trace coincides with black base circle so that it is barely visible around the edge of the calibrated scale.	Proceed with Step 3.	Reject the set.
3	Visual Check	Test Sets TS-23/APN and TS-10 C/APN	Adjust the FOCUS and BRIL. controls on the underside of I-152-D or -E to eliminate any blurry or fuzzy appearance of the trace.	Trace becomes clear and well-defined.	Proceed with Step 4.	Reject the set.
<p>NOTE</p> <p>Always check focus and brilliance with REC. GAIN control at or near minimum. Turning up the gain control will cause the circle to become fuzzy and difficult to focus properly because of noise or "grass".</p>						
4	Visual Check	Test Sets TS-23/APN and TS-10 C/APN	Set SCALE switch of I-152-D or -E to TIMES TEN position.	Lobe becomes narrower and circle trace becomes smaller, but remains circular.	Proceed with Step 5.	If circle trace does not become smaller, proceed with Step 5. If indication is otherwise abnormal, reject the set.
5	Visual Check	Test Sets TS-23/APN and TS-10 C/APN	With SCALE switch in TIMES TEN position, adjust the CIRCLE SIZE control, if necessary, to make the circle trace about 1/4 inch inside of the black reference circle.	Trace size adjusts to about 1/4 inch inside black reference circle.	Proceed with Step 6.	Adjust to the closest size possible to conform with normal, then proceed with Step 6.

TABLE 5-1 (Cont)

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
6	Visual Check	Test Sets TS-23/APN and TS-10C/APN	Return SCALE switch to TIMES ONE position and adjust CIRCLE SIZE RATIO control on top front of I-152-D or -E, if necessary, to make circle trace coincide with black reference circle. Do not move CIRCLE SIZE control while adjusting CIRCLE SIZE RATIO control.	Trace coincides with black reference circle as in Step 2.	Proceed with Step 7.	Repeat Steps 5 and 6. If indication is still abnormal, reject the set.
7	Visual Check	Test Sets TS-23/APN and TS-10C/APN	Set SCALE switch to TIMES TEN position.	Circle trace appears about 1/4 inch inside black reference circle.	Circle trace performance is acceptable.	Repeat Steps 2 through 7. If indication is still abnormal, reject the set.

TABLE 5-2
LOOP SENSITIVITY AND LOBE WIDTH, MINIMUM PERFORMANCE

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Test Sets TS-23/APN and TS-10C/APN. TEST SWITCH to NORMAL-B+.	Rotate REC. GAIN control on Indicator I-152-D or -E fully clockwise. SCALE switch to TIMES ONE position.	A delayed lobe appears at approximately 350-foot mark.	Proceed with Step 2.	If no lobe appears, reject the set. If delayed lobe is not at the 350-foot mark, recheck Test Equipment Connections, Paragraph 5-11, then proceed with Step 2.
2	Visual Check	Test Sets TS-23/APN and TS-10C/APN.	Rotate TIMES ONE ZERO ADJ. to center the lobe about the 500-foot mark on the indicator screen.	Lobe should be no greater than 250 feet wide at its base. Height of lobe should be approximately 1/4 inch.	Loop sensitivity is adequate.	Complete minimum performance tests, then make adjustments described in Final Sensitivity and Lobe Shape Check, Minimum Performance, Table 5-7.

TABLE 5-3
ZERO ADJUSTMENT, MINIMUM PERFORMANCE

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Test Sets TS-23/APN and TS-10C/APN. TEST SWITCH to NORMAL - B+.	SCALE switch on Indicator I-152-D or -E to TIMES ONE position. Rotate REC. GAIN control counterclockwise until the presence of noise or "grass" on the trace is at a minimum. Disconnect cord CA-102 from RECEIVER ANTENNA receptacle on Radio Receiver and Transmitter BC-788-D or -E. Rotate TIMES ONE ZERO ADJ. on indicator to move counterclockwise edge of lobe at least 150 feet to left and right of zero. Set the counterclockwise edge of the lobe exactly at zero, or to the left of zero by the amount of the residual delay, if known.	Lobe moves at least 150 feet to left and right of zero without appreciable change in circle size.	Proceed with Step 2.	Reject the set.
2	Visual Check	Test Sets TS-23/APN and TS-10C/APN.	SCALE switch to TIMES TEN position. Rotate TIMES TEN ZERO ADJ. to move lobe approximately 1/4 inch to left and right of zero. Set counterclockwise edge of lobe exactly at zero.	Lobe moves approximately 1/4 inch to left and right of zero without appreciable change in circle size.	Zero adjustment is satisfactory.	Reject the set.

TABLE 5-4
FREQUENCY, MINIMUM PERFORMANCE

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Test Set TS-23/APN. TEST SWITCH to POWER - FREQ. position. Cord CD-800 connected from WAVE-METER INPUT receptacle on Test Set to TRANSMITTER ANTENNA receptacle on BC-788-D or -E. WAVE METER OUTPUT, cord CA-101, connected to DETECTOR INPUT receptacle on Test Set.	REC. GAIN control of Indicator I-152-D or -E to ON position. Adjust transmitter tuning "T" adjustment on Radio Receiver and Transmitter BC-788-D or -E to obtain maximum reading of meter on Test Set.	Meter reading peaks at correct frequency, within the range of the "T" adjustment.	Frequency is satisfactory.	Reject the set.

TABLE 5-5. SIGNAL, MINIMUM PERFORMANCE

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Test Set TS-23/APN. TEST SWITCH to SIGNAL position. Cord CD-800 connected from DETECTOR INPUT receptacle on Test Set to TRANSMITTER ANTENNA receptacle on BC-788-D or -E.	REC. GAIN control of Indicator I-152-D or -E to ON position.	A normal lobe appears on indicator screen.	Signal is satisfactory.	Reject the set.

TABLE 5-6. POWER OUTPUT, MINIMUM PERFORMANCE

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Test Set TS-23/APN. TEST SWITCH to POWER - FREQ. position. Cord CD-800 connected from DETECTOR INPUT receptacle on Test Set to TRANSMITTER ANTENNA receptacle on BC-788-D or -E.	Rotate REC. GAIN control of Indicator I-152-D or -E to ON position.	Meter on Test Set reads 300 or above.	Power output is satisfactory.	Adjust transmitter antenna coupling "A" adjustment on BC-788-D or -E for maximum meter reading. If maximum remains under 300, complete minimum performance tests to determine overall sensitivity. If overall sensitivity is 65 db or above, power output reading of somewhat under 300 is acceptable. If power output is excessively low, reject the set.

TABLE 5-7. FINAL SENSITIVITY AND LOBE SHAPE CHECK, MINIMUM PERFORMANCE

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Test Sets TS-23/APN and TS-10C/APN. TEST SWITCH to NORMAL - B+. Adjust the Attenuator for a lobe height of 1/4 inch.	Rotate REC. GAIN control on Indicator I-152-D or -E fully clockwise. SCALE switch to TIMES ONE position. Adjust "R", "C" and "B" on Radio Receiver and Transmitter BC-788-D or -E to obtain maximum lobe height and minimum lobe width. Adjust REC. GAIN control so that noise just begins to show on the circle trace. Readjust Attenuator for 1/4 inch lobe height.	Attenuator reads 65 db or more.	Sensitivity is satisfactory.	Reject the set.

TABLE 5-8. INSPECTION SCHEDULE

Component	Inspection	Time
Receiver and Transmitter, BC-788-D or -E and Indicator I-152-D or -E	Mounting secure and shock mounts free to move.	Before each flight 100 hours
	Connectors and plugs have good mechanical and electrical contact.	Before each flight 100 hours
	After warming up for five minutes, circle trace and lobe are of proper size and shape, and REC. GAIN, BRIL., and FOCUS controls operate properly.	Before each flight 100 hours
	Wiring connections clean, mechanically secure, and free of corrosion.	100 hours
	Tubes test out good in a tube tester.	100 hours
	Fuses intact.	100 hours
	Knobs and screws secure.	100 hours
Receiver and Transmitter, BC-788-D or -E	Timing oscillator relay K101 functions properly.	100 hours
Antenna units	Mounting secure, antenna free of mechanical defects, insulators clean and intact.	100 hours
	Connectors have good mechanical and electrical contact.	100 hours

5-15. INSPECTION.

5-16. The inspection schedule for Radio Set SCR-718-D or -E is given in Table 5-8.

5-17. TEST POINTS.

5-18. A system of test-point identification by symbols is used throughout Sections V, VI, and VII. These symbols quickly point out the location and importance of each test point. In addition, in SCR-718-E, some test points are marked in the equipment itself by small red dots.

5-19. MAJOR TEST POINTS. Star-enclosed Arabic numerals, for example ①, ②, are used to designate points for localizing the trouble to an over-all function of the equipment, or to a power or voltage-distribution system of the equipment.

5-20. SECONDARY TEST POINTS. Encircled capital letters, for example, Ⓐ, Ⓑ, are used to designate test points for isolating the trouble to a group of circuits.

5-21. MINOR TEST POINTS. Capital letters followed by Arabic numerals and encircled, for example Ⓐ①, Ⓑ②, are used to designate test points for isolating the trouble to a specific circuit.

5-22. Normally, only major and secondary test points are used in Section V. Minor test points, as well as major and secondary test points, are used in Section VI; they also appear in schematic diagrams in Section VII for reference and identification purposes.

5-23. SYSTEM TROUBLE ANALYSIS TABLES.

5-24. Step-by-step trouble analysis procedures intended to localize trouble to a component or major function are contained in Tables 5-9 through 5-15. These procedures require use of the same test equipments and test set-ups as do the performance tests, but do not in themselves constitute a complete test procedure. They may be used as a supplement to the minimum performance tests if it is desired to isolate, in general, the defects which prevent the system from meeting the minimum performance standards.

5-25. Before attempting any form of maintenance on Radio Set SCR-718-D or -E, maintenance personnel should be thoroughly familiar with the basic principles and theory of operation of this equipment. A complete understanding of the equipment greatly reduces the time required to locate a trouble.

5-26. When trouble occurs in the equipment, check the obvious causes of trouble first, such as a blown

fuse, loose connections, damaged cables, or broken leads. Next, check the tubes. First, observe whether each tube is lighted, then test them in a reliable tube tester, or, better, in an equipment known to be operating properly. If the trouble cannot be corrected in this manner, proceed with the system trouble analysis. These tables localize troubles to a faulty component

or overall function of the equipment. After localizing the trouble, maintenance personnel may determine whether to substitute a good component for a faulty one, or to pursue further and repair the trouble using the more detailed information given in Section VI. Unless otherwise indicated, the measurement required is from the test point to ground.

TABLE 5-9
TRANSMITTER FUNCTION, SYSTEM TROUBLE ANALYSIS

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Indicator ID-98A/APN from Test Set TS-10C/APN	Remove coaxial cable from TRANSMITTER ANTENNA receptacle. Connect 6-in. piece of wire to center contact of TRANSMITTER ANTENNA receptacle. Hold test indicator parallel to and approx. 6 in. from this wire.	Test indicator lamp glows.	Transmitting-antenna and/or associated coaxial cables are defective.	Check wires C, F, and A of interconnecting cable for continuity, short circuits, or ground. Replace indicator and/or receiver-transmitter.

TABLE 5-10.
RECEIVER ANTENNA AND COAXIAL CABLE, SYSTEM TROUBLE ANALYSIS

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual Check	Indicator ID-98A/APN from Test Set TS-10C/APN	Transpose receiver and transmitter antenna cables. Hold test indicator parallel to and approx. 6 in. from the receiving antenna.	Test indicator lamp glows.	Replace indicator and/or receiver-transmitter.	Receiver antenna and/or associated coaxial cable are defective.

TABLE 5-11.
PRIMARY AC POWER DISTRIBUTION, SYSTEM TROUBLE ANALYSIS


Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Pins B and D of J101 	AC voltmeter (250-volt range)	Remove TS-23/APN cable from receiver-transmitter. Measure voltage across the test points.	115 ±10 volts	Proceed with step 2.	Recheck fuse F101. If indication is still abnormal, receiver-transmitter is defective.
2	Visual Check	None	Remove Connector from J102. Jumper B and C of J101. Replace Connector to J102.	Tubes in receiver-transmitter light.	Indicator is defective.	Receiver-transmitter is defective.

TABLE 5-12
B-PLUS DISTRIBUTION, SYSTEM TROUBLE ANALYSIS

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Pin F of J101 ★ 2	DC voltmeter (500-volt range)	Remove Connector from J102 and TS-23/APN cable from receiver-transmitter. Jumper B and C of J101. Replace Connector to J102, and measure voltage between test point and ground (pin E).	300 volts in SCR-718-D 315 volts in SCR-718-E	Indicator is defective.	Receiver-transmitter is defective.

TABLE 5-13
98-KC DISTRIBUTION, SYSTEM TROUBLE ANALYSIS

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Term. E T109 ★ 3	Oscilloscope such as AN/USM-24	Examine wave-form at test point.	98.35-kc sine-wave	Indicator is defective.	Receiver-transmitter is defective.

TABLE 5-14
RELAY FUNCTION, SYSTEM TROUBLE ANALYSIS

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Pin G of J101 ★ 4	Ohmmeter	Remove Connector from J102 and TS-23/APN from receiver-transmitter. Measure resistance at test point.	14K	Indicator is defective.	Receiver-transmitter is defective.

TABLE 5-15
TRANSMITTER AND RECEIVER FUNCTIONS, SYSTEM TROUBLE ANALYSIS

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual check	Test Set TS-23/APN; TEST SWITCH to POWER-FREQ.	Remove coaxial cable from TRANSMITTER ANTENNA receptacle. Connect coaxial cable CD-800 of TS-23/APN to TRANSMITTER ANTENNA receptacle and to DETECTOR INPUT receptacle (test set).	Meter of TS-23/APN indicates above blue line.	Proceed with step 2.	Receiver-transmitter is defective.
2	Visual check	Test Set TS-23/APN; TEST SWITCH to SIGNAL	No change in settings.	Reference pip appears on circular sweep.	Proceed with step 3.	Indicator is defective.

TABLE 5-15 (Continued)

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
3	Ⓐ Center term. of REC. GAIN (R201)	DC voltmeter (250-volt range)	Rotate REC. GAIN. Measure voltage at test point.	0 to 110 volts	Receiver-transmitter is defective.	Proceed with step 4.
4	Ⓐ Center term. of REC. GAIN (R201)	Ohmmeter	Remove TS-23/APN cable from indicator. Rotate REC. GAIN. Measure resistance at test point.	0 to 38K	Proceed with step 5.	Indicator is defective.
5	Ⓐ Center term. of R201 Ⓐ ₁ Pin F of J201	Ohmmeter	Rotate REC. GAIN. Measure resistance between test points.	30K to 65K	Receiver-transmitter is defective.	Indicator is defective.

SECTION VI
 FIELD AND FASRON MAINTENANCE

6-1. MINIMUM PERFORMANCE STANDARDS.

6-2. The minimum acceptable performance standards for Radio Set SCR-718-D or -E are identical to the minimum performance standards of Section V.

6-3. SYSTEMS TROUBLE ANALYSIS.

WARNING

The operation of this equipment involves the use of high voltages that are dangerous to life. Any of the trouble shooting procedures outlined below requiring the operation of the equipment for testing must be performed with extreme caution. Before replacing any part or assembly, shut off the equipment. All resistance measurements are taken with equipment shut off.

6-4. Table 6-1 provides a quick method of locating the specific trouble-shooting procedures of paragraphs 6-5 through 6-21. Tables 6-2 through 6-5, Trouble Isolation Procedures for Receiver and Transmitter BC-788-D or -E, and Tables 6-6 and 6-7, Trouble Isolation Procedures for Indicator I-152-D or -E, require use of the same test equipment and test set-ups as do the performance tests of Section V, but do not in themselves constitute complete test procedures. A bench test set-up as described in Section V, using components known to be good, should be available; the suspected defective component can be substituted into this set-up. The test points used are a development of those described

in paragraph 5-17. Performance tests should be made after all repairs.

6-5. PILOT LAMP DOES NOT LIGHT.

- a. Measure the voltage of the primary power source by reading the voltage across J102. This voltage should be 105 to 125 volts a-c.
- b. Check both fuses and replace if defective.
- c. Make a continuity check of the pilot lamp and replace if found to be defective.
- d. Measure the voltage across the ON-OFF switch (S201) and replace if defective. This voltage is the same as the voltage appearing across J102.
- e. If the fuse has blown after replacement, proceed as follows:
 - f. Measure the resistance across C149A and across C149B. These resistances should be from 45,000 to 100,000 ohms. Replace if defective.
 - g. Measure the resistance across C201A and C201B. Both resistances should be approximately one megohm. Replace if defective.
 - h. Energize BC-788-D independently of I-152-D by disconnecting the interconnecting cable and connecting terminals B and C of J101 with a jumper. If a new fuse does not blow when the equipment is turned on, the trouble is in I-152-D or -E. If the fuse does blow, the trouble is in BC-788-D or -E.
 - i. If the trouble has not been remedied, refer to the voltage, current and resistance measurements of figures 7-15 through 7-18, and completely check the faulty component.

TABLE 6-1. LOCATION OF SPECIFIC TROUBLE-SHOOTING PROCEDURES

SYMPTOM	PARAGRAPH LOCATION
Pilot lamp does not light	6-5
Fuse blows after replacement	6-5e
No circle trace on CRT screen	6-6
Circle trace too small	6-7
Circle trace off-center	6-8
Focus and brilliance unsatisfactory	6-9
Circle trace deformed	6-10
Circle trace too wide at best focus	6-11
No pulse - absence of lobe on CRT screen	6-12
Lobe too small at maximum sensitivity	6-13

SYMPTOM	PARAGRAPH LOCATION
Lobe fuzzy or unsatisfactorily formed	6-14
Lobe position off zero	6-15
Excessive change of circle size during zero adjustment	6-16
No circle with scale switch in TIMES TEN position	6-17
No noise indication on CRT screen with REC. GAIN control in maximum clockwise position	6-18
Power output low	6-19
Correct frequency not within range of "T" adjustment	6-20
Sensitivity low	6-21

6-6. NO CIRCLE TRACE APPEARS ON THE SCREEN OF V205.

a. Vary the BRIL. and CIRCLE SIZE (R205 and R213) controls to determine whether or not a circle trace is present.

b. If the circle trace appears, align as previously described in Section V. If the circle trace does not appear continue with this procedure.

c. Check the high voltage rectifier in a reliable tube tester and replace if defective.

d. Check the voltages at V205.

e. If the voltages at V205 are correct, replace V205.

f. If the voltages are not correct, check the voltages back from V205, and in particular, check the timing oscillator voltages.

6-7. CIRCLE TRACE TOO SMALL.

a. Advance CIRCLE SIZE control, R213, to its maximum position.

b. Check the voltages at the timing oscillator tube, V111.

c. Check the voltages at the circle amplifier tube, V204.

d. Test these tubes in a reliable tube tester and replace if defective.

e. Measure the oscillator voltage at pin F of J101 with an oscilloscope. This voltage should be between 12 and 15 volts peak to peak.

f. If the oscillator voltage is low, measure the circle amplifier (V204) grid voltage with an oscilloscope. This voltage should be between 2 and 12 volts peak to peak, depending upon the setting of R213, the CIRCLE SIZE control.

g. If this voltage is low, check the alignment of T109 by adjusting for maximum output.

h. Rotate the ZERO ADJ. for maximum voltage.

i. Measure the B+ voltage of the low-voltage power supply.

j. If this voltage is within limits, measure the voltage at terminal A on T203 with an oscilloscope. This voltage should be approximately 200 volts peak to peak.

k. Adjust the top core stud of T203 for maximum voltage.

6-8. CIRCLE TRACE OFF CENTER.

a. Adjust the HORIZ. and VERT. CENTERING (R222 and R225) controls to determine whether or not the circle trace can be centered.

b. If centering cannot be accomplished, replace the cathode-ray tube (V205) with a tube known to be in proper operating condition.

c. If centering is still impossible, perform a continuity and voltage check from each deflection plate back into the circuit until the faulty part is located.

6-9. FOCUS AND BRILLIANCE UNSATISFACTORY.

a. Adjust the FOCUS and BRIL. (R207 and R205) controls.

b. Check the voltages of the high-voltage power supply.

c. Check the voltages along the bleeder resistor network to ground. This includes R204, R205, R206, R207, R208 and R209.

d. Replace the cathode-ray tube V205, with a tube known to be in proper operating condition.

6-10. CIRCLE TRACE DEFORMED.

a. Re-align the equipment as described in paragraphs 6-34 through 6-36.

b. Measure the voltage on the radial electrode of V205.

c. Check the lead continuity from pins 7, 8, 10 and 11 of V205.

d. Replace V205 with a tube known to be in proper operating condition.

6-11. CIRCLE TRACE TOO WIDE AT BEST FOCUS POINT.

a. Check the filter capacitors of both the high-voltage and low-voltage supplies.

b. Measure the voltages at the pins of V205.

c. Replace V205 with a tube known to be in proper operating condition.

6-12. NO PULSE, AS INDICATED BY ABSENCE OF LOBE ON CATHODE-RAY TUBE SCREEN.

a. Check the transmitter with Test Set TS-23/APN as previously described in paragraphs 5-23 through 5-26.

b. Perform a voltage and resistance check of each tube socket pin throughout the transmitter.

c. Check each waveshape throughout the transmitter.

d. Align the transmitter section of BC-788-D or -E as described in paragraph 6-22.

e. Replace V114, the UHF output (oscillator) tube.

CAUTION

The equipment must be thoroughly cool before replacing V114. Replacement of V114 while the equipment is warmed up will result in permanent damage to V114.

f. Measure the voltage on the screen grid of each of the IF amplifiers and each of the video amplifiers.

g. Make a complete voltage check of the converter and oscillator.

h. Check the continuity from the cathode of the detector V109 to the grids of the video amplifiers V202 and V203. Also, check continuity from output of video amplifiers to radial electrode of V205.

i. Check the IF amplifier. (See Table 6-5 and voltages and resistances in figures 7-15 and 7-16.) If IF transformers are faulty, replace with pretuned and sealed spares, as explained in paragraph 6-31.

6-13. LOBE TOO SMALL AT MAXIMUM SENSITIVITY.

a. Check the operating frequency of the transmitter using Test Set TS-23/APN.

b. Align the receiver to the requirements of the transmitter, using Test Set TS-10C/APN. (See paragraph 6-30.)

c. Check V109, V202 and V203 in a reliable tube tester and replace any found to be defective.

d. Check the voltages appearing at the socket pins of these tubes.

e. Check the video peaking coil, L-204.

6-14. LOBE FUZZY OR UNSATISFACTORILY FORMED.

a. Follow the procedure of paragraph 6-12 described above.

b. Check V114. (Refer to CAUTION of paragraph 6-12.)

c. Check in accordance with paragraph 6-34.

6-15. LOBE POSITION OFF ZERO.

a. Adjust the ZERO ADJ. controls.

b. Check the peaking of the primary winding of T203.

6-16. EXCESSIVE CHANGE OF CIRCLE SIZE DURING ZERO ADJUSTMENT. Align Indicator I-152-D or -E. (See paragraph 6-34.)

6-17. NO CIRCLE WITH SCALE SWITCH IN TIMES TEN POSITION.

a. Check the relay K101 operation by operating the SCALE switch S202.

b. Check the relay for dirty or sticking contacts.

c. Trace the 9.8-kilocycle signal through V111 and V204 and associated circuits.

d. Check the circle voltage and frequency.

e. Tune T109A, T202A and T203A to resonance.

6-18. NO NOISE INDICATION ON CATHODE-RAY TUBE SCREEN WITH RECEIVER GAIN CONTROL IN MAXIMUM CLOCKWISE POSITION.

a. Check all DC and filament voltages.

b. Check all BC-788-D or -E tubes and I-152-D or -E video amplifier tubes.

c. Check effect of varying REC. GAIN control on screen voltages of IF amplifiers V103 and V104.

6-19. POWER OUTPUT LOW. See paragraph 6-12.

6-20. CORRECT FREQUENCY NOT WITHIN RANGE OF "T" ADJUSTMENT. Align the UHF output oscillator. (See paragraph 6-29.)

6-21. SENSITIVITY LOW. See paragraph 6-13.

TABLE 6-2
TROUBLE ISOLATION, RADIO RECEIVER AND TRANSMITTER BC-788-D OR -E,
LOW-VOLTAGE POWER SUPPLY

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual check	TS-23/APN with TEST SWITCH to NORMAL-B+	Power switch to ON. SCALE switch to TIMES ONE	Meter in TS-23/APN indicates 300 volts for BC-788-D, 315 volts for BC-788-E	Low-voltage power supply is normal	Replace F101. If indication remains abnormal proceed with step 2.

TABLE 6-2 (Continued)

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
2	Term. 1 of L132 ⑤	Ohmmeter	Power switch to OFF. Measure resistance at test point.	44000 ohms approximately	Trouble is in L132, V110, T101, and/or associated circuit wiring.	Trouble is in L132, V110, T101, C149, and/or associated circuit wiring; or in detail parts or circuit wiring concerned with B+ bus.
3	Term. 1 of L132 ⑤	Ohmmeter	Power switch to OFF. Remove F103. Measure resistance at test point, allowing at least 120 seconds for indication to reach normal.	100 megohms or more.	Trouble is in detail parts or circuit wiring concerned with B+ bus. In SCR-718-E, trouble may also be in C149B.	Trouble is in L132, V110, T101, C149A, and/or associated circuit wiring. In SCR-718-D, trouble may also be in C149B.

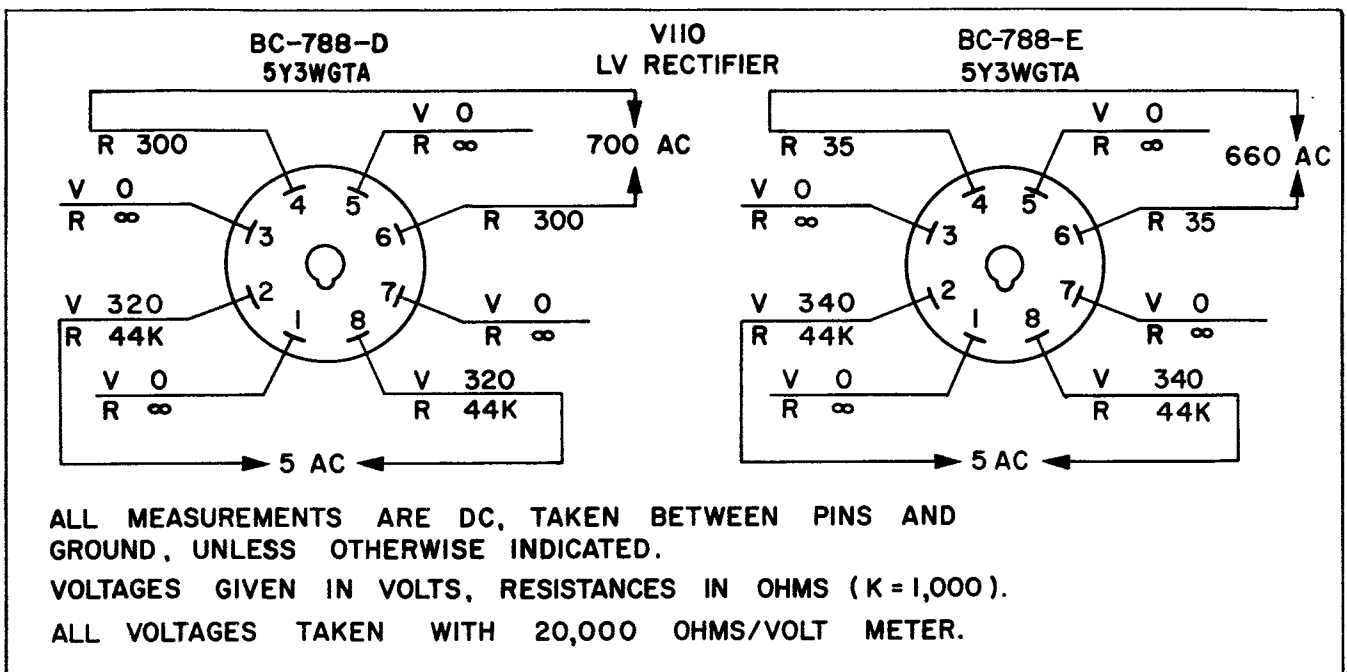
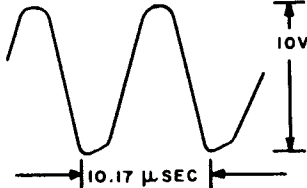
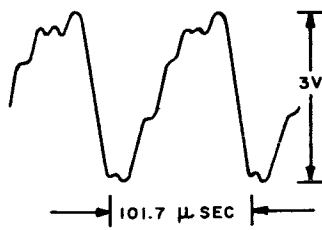


Figure 6-1. Tube-Socket Voltage and Resistance Measurements, Low-Voltage Power Supply

TABLE 6-3
TROUBLE ISOLATION, RADIO RECEIVER AND TRANSMITTER BC-788-D OR -E,
TIMING-OSCILLATOR CIRCUITS

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indications	If Indication Is Normal	If Indication Is Abnormal
1	Term. E of T109 ③	Oscilloscope, such as AN/USM-24	Power switch to ON. SCALE to TIMES ONE. Examine waveform at test point. Perform timing-oscillator adjustment, paragraph 6-23.	 <p>Use internal markers in oscilloscope for rough frequency check.</p>	Proceed with step 2.	If there is no indication, or if amplitude is abnormal, trouble is in V111, Y101, T109, and/or associated detail parts. If frequency appears to be abnormal, check to see that contacts of K101 are open. If relay contacts are normal, replace Y101. If indication remains abnormal, trouble is in detail parts of oscillator stage.
2	Term. E of T109 ③	Oscilloscope, such as AN/USM-24	SCALE to TIMES TEN. Examine waveform at test point. Perform timing-oscillator adjustment, paragraph 6-23.		Timing-oscillator circuits are functioning normally.	If amplitude is abnormal, trouble is in T109, T112, T175 and/or associated detail parts. If frequency stays the same as in step 1, trouble is in K101, T112, T175 and/or associated detail parts.

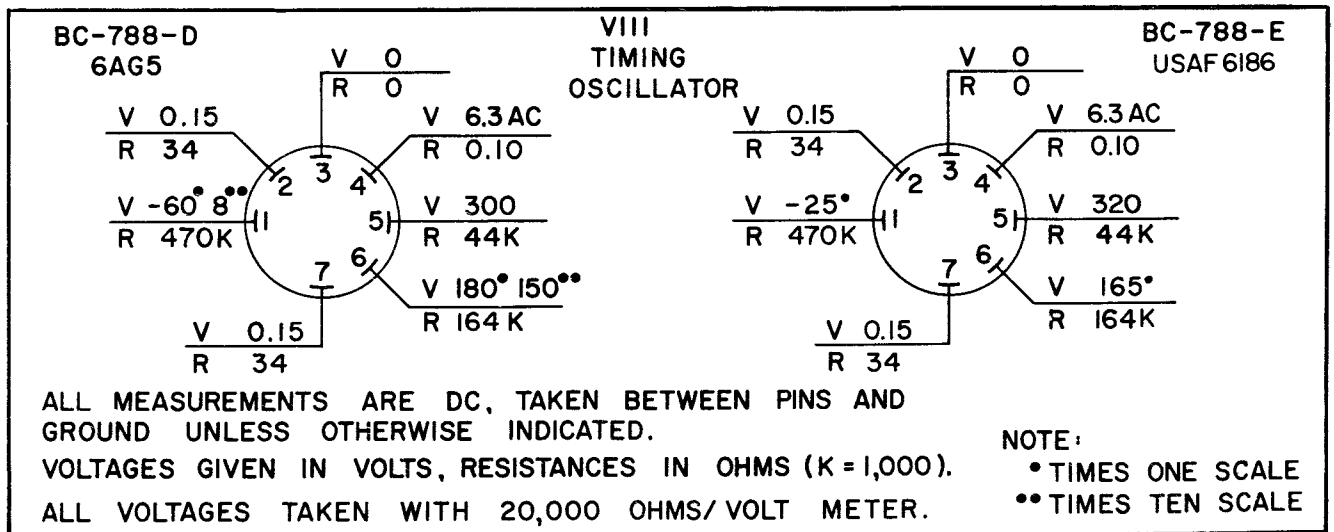


Figure 6-2. Tube-Socket Voltage and Resistance Measurements, Timing Oscillator

TABLE 6-4
TROUBLE ISOLATION, RADIO RECEIVER AND TRANSMITTER BC-788-D OR -E,
TRANSMITTER FUNCTION

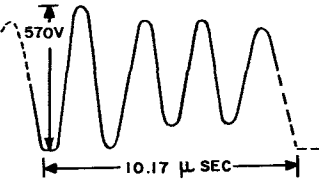
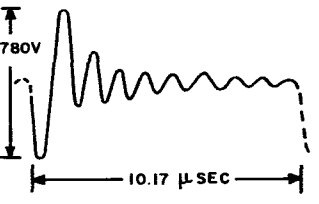
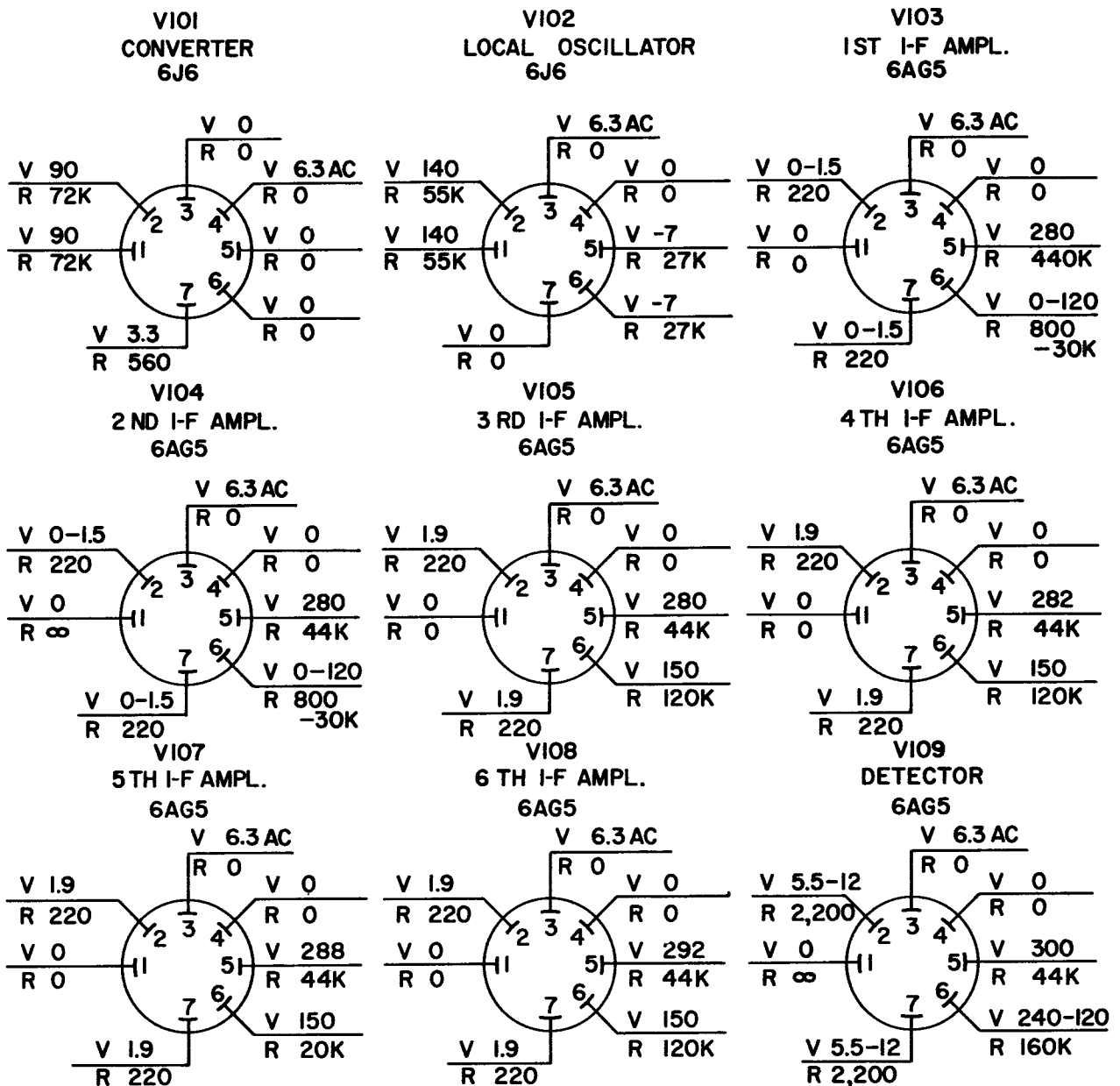
Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1 Part I	Visual Check	Test Set TS-23/APN	Power switch to ON. SCALE to TIMES ONE. Test the transmitter frequency as instructed in paragraph 6-29.	Maximum meter reading on TS-23/APN meter.	Proceed with Part II of this step.	Proceed with Step 2.
Part II			No change in settings. Test power output as directed in paragraph 6-29.	Meter of TS-23/APN indicates above blue line.	Proceed with Step 4.	
2	ⓑ Pin 5 of V112	Oscilloscope, such as AN/USM-24	No change in settings. Examine waveform at test point.	 <p>Recurrent train of damped oscillations, exactly four cycles in duration.</p>	Proceed with Step 3.	If timing is abnormal, proceed with clipper adjustment, as directed in paragraph 6-26. If timing can not be normalized, trouble is in T110 and/or associated detail parts. If amplitude is abnormal (low or zero), trouble is in V112, T110, and/or associated detail parts.
3	ⓑ Term. of C160	Oscilloscope, such as AN/USM-24	No change in settings. Examine waveform at test point.	 <p>Recurrent train of damped oscillations, exactly nine cycles in duration.</p>	Trouble is in V114, T111, and/or associated detail parts.	If timing is abnormal proceed with driver adjustment, paragraph 6-27. If timing can not be normalized, trouble is in T111 and/or associated detail parts. If amplitude is abnormal (low or zero), trouble is in V113, T111, and/or associated detail parts.

TABLE 6-5
TROUBLE ISOLATION, RADIO RECEIVER AND TRANSMITTER BC-788-D OR -E
RECEIVER FUNCTION

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual check	TS-10C/APN	Power switch to ON. SCALE switch to TIMES ONE. Measure loop sensitivity, paragraph 6-30.	SCR-718-D: 63 db minimum SCR-718-E: 66 db minimum	Receiver function is normal.	If receiver is insensitive, proceed with receiver tuning adjustments, paragraph 6-30. If receiver is still insensitive, check tubes V101 through V109 in a dynamic mutual-conductance tube checker, replacing all weak tubes. If receiver remains insensitive, proceed with step 3. If receiver is dead, check tubes V101 through V109 in a dynamic mutual-conductance tube checker, replacing all defective or weak tubes. If receiver is still dead, proceed with step 2.
2	① Pin 6 of V102	DC Voltmeter (10-volt range)	No change in settings. Measure voltage at test point.	Approx -6 volts	Proceed with step 3.	Trouble is in V102 and/or associated detail parts.
3	② High side of R159	Oscilloscope, such as AN/USM-24 and TS-10C/APN	No change in settings. Measure peak voltage at test point.	Single positive peak of approximately 6 volts.	Receiver function is normal.	Trouble is in T102 through T108 and/or associated detail parts. Replace T102 through T108 one by one with pretuned and sealed spares. Do not attempt to adjust tuning studs on any IF transformers.

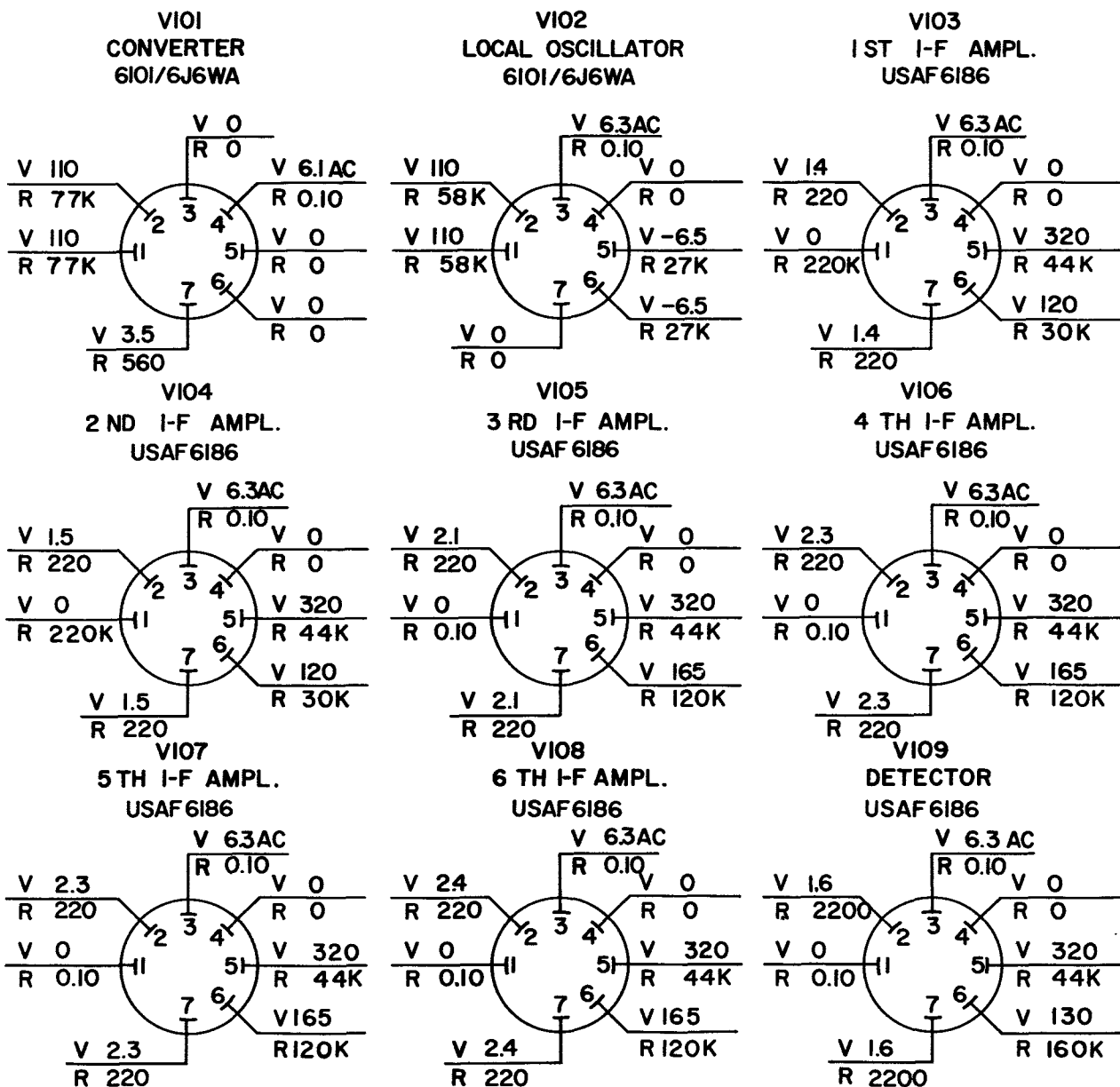


ALL MEASUREMENTS ARE DC, TAKEN BETWEEN PINS AND GROUND UNLESS OTHERWISE INDICATED.

VOLTAGES GIVEN IN VOLTS, RESISTANCES IN OHMS (K=1,000).

ALL VOLTAGES TAKEN WITH 20,000 OHMS/VOLT METER.

Figure 6-4. Tube Socket Voltage and Resistance Measurements
Receiver Function, Radio Receiver and Transmitter BC-788-D



USAF 6186 INTERCHANGEABLE WITH USAF 6186/6AG5WA.
 6101/6J6WA INTERCHANGEABLE WITH 6101.

ALL MEASUREMENTS ARE DC, TAKEN BETWEEN PINS AND
 GROUND UNLESS OTHERWISE INDICATED.

VOLTAGES GIVEN IN VOLTS, RESISTANCES IN OHMS (K=1,000).

ALL VOLTAGES TAKEN WITH 20,000 OHMS/VOLT METER.

Figure 6-5. Tube Socket Voltage and Resistance Measurements
 Receiver Function, Radio Receiver and Transmitter BC-788-E

TABLE 6-6
TROUBLE ISOLATION, INDICATOR I-152-D or -E, HIGH-VOLTAGE POWER SUPPLY

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual check	None	Turn power switch to ON.	Indicator lamp lights.	Proceed with step 2.	Replace indicator lamp. If indication remains abnormal, trouble is in S201, T201, and/or associated detail parts or circuit wiring. (Trouble in these circuits may cause fuse F101 in the receiver-transmitter to blow.)
2	ⓔ Cap of V201	DC voltmeter (5000-volt range)	Measure voltage at test point.	1700 ± 100 volts	High-voltage power supply is normal.	Proceed with step 3.
3	ⓔ Cap of V201	Ohmmeter	Turn power switch to OFF. Measure resistance at test point.	1.1 meg	Trouble is in V201, T201, and/or associated circuit wiring.	If resistance is low, trouble is in C201 and/or associated circuit wiring. If resistance is high, trouble is in voltage-divider resistors from plate of V201 to ground.

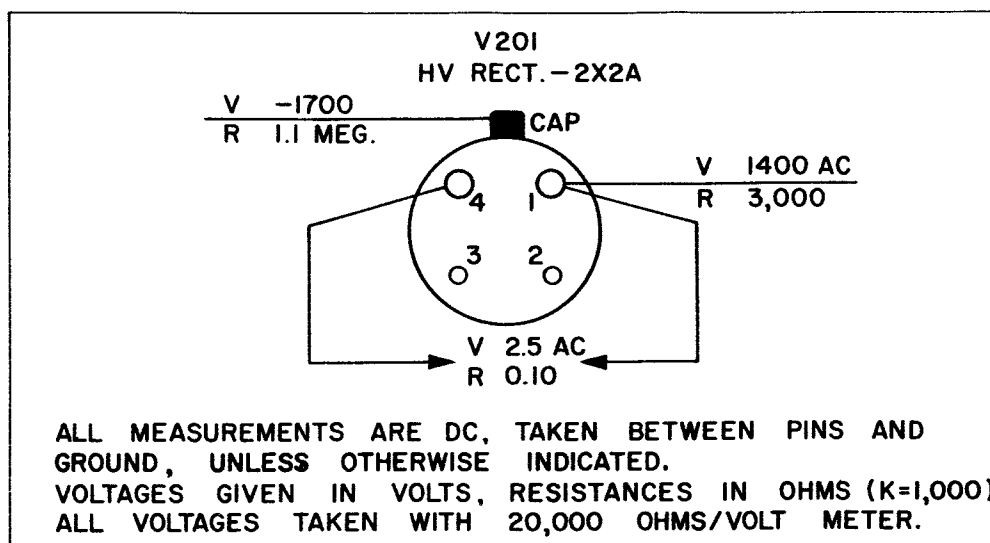


Figure 6-6. Tube Socket Voltage and Resistance Measurements, High-Voltage Power Supply

TABLE 6-7
TROUBLE ISOLATION, INDICATOR I-152-D OR -E, INDICATOR FUNCTION

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
1	Visual check	None	Turn power switch to ON. Adjust CIRCLE SIZE so that circular sweep is barely visible outside of calibrated scale on face of CRT. Adjust brilliance R205, focus R207, vertical centering R225, horizontal centering R222, as required.	Sharp, medium, brilliance, properly centered circular sweep.	Proceed with step 4.	If no trace is visible, proceed with step 2. If sweep is not exactly circular, proceed with shape adjustment (times one range), paragraph 6-10. If indication remains abnormal, proceed with step 3.
2	Visual check	None	CIRCLE SIZE maximum counterclockwise. Adjust horizontal centering R222, and brilliance R205 while observing CRT.	Dot or small circle appears, whose position varies as R222 is adjusted.	Proceed with step 3.	Trouble is in V205, and/or associated detail parts or circuit wiring.
3	⑤ Pin 1 of V204	Oscilloscope, such as AN/USM-24	CIRCLE SIZE and circle size ratio R240, turned maximum clockwise. Examine waveform at test point.	98.35-kc sine wave, approx 17 volts, peak to peak.	Trouble is in V204, T203, and/or associated detail parts or circuit wiring.	Trouble is in T202, S202, R240, R213, and/or associated detail parts or circuit wiring.
4	Visual check	None	SCALE to TIMES TEN.	Same as step 1, except sweep is approximately 1/4 inch inside of calibrated scale.	Proceed with step 6.	If no trace is visible, proceed with step 5. If presentation is not exactly circular, proceed with circle shape adjustment (times-ten range), paragraph 6-10. If indication remains abnormal, proceed with step 5. If sweep is not properly inside of scale, perform the circle-size adjustment, paragraph 6-7.

TABLE 6-7 (Continued)

Step	Test Point	Test Equipment and Instructions	Control Settings and Instructions	Normal Indication	If Indication Is Normal	If Indication Is Abnormal
5	⑤ Pin 1 of V204	Oscilloscope, such as AN/USM-24	CIRCLE SIZE to maximum clockwise.	9.8 kc sine wave, approx 12 volts, peak to peak.	Trouble is in T205, and/or associated detail parts or circuit wiring.	Trouble is in S202, T202, R235, R236, and/or associated circuit wiring.
6 Part I	Visual check	Test Set TS-23/APN, with TEST SWITCH at SIGNAL and	SCALE to TIMES ONE.	Height of pulse should be greater than 1/4 inch.	Proceed with part II of this step.	Trouble is in V202, V203, and/or associated detail parts or circuit wiring.
6 Part II		TRANSMITTER OUTPUT connected to DETECTOR INPUT of test set.	Remove V202.	Transmitter pulse shrinks to 3/4 former height.	Proceed with step 7.	If transmitter pulse disappears, trouble is in V203, and/or associated detail parts. If transmitter pulse does not diminish properly, trouble is in V202, and/or associated parts.
7	Visual check	Turn TEST SWITCH on TS-23/APN to NORMAL-B+	Replace V202. Advance REC. GAIN until the transmitter pulse appears.	(Left-hand or leading edge of pulse should be exactly at zero altitude.)	Proceed with step 8.	If no pulse appears, trouble is in R201, R229, R230, R232, and/or associated circuit wiring. If pulse is not on zero, proceed with zero adjustment (times-one range), Table 5-3.
8	Visual check	None	SCALE to TIMES TEN.	(Left-hand or leading edge of pulse should be exactly at zero altitude.)	The indicator function is normal.	Proceed with zero adjustment (times-ten range), Table 5-3.

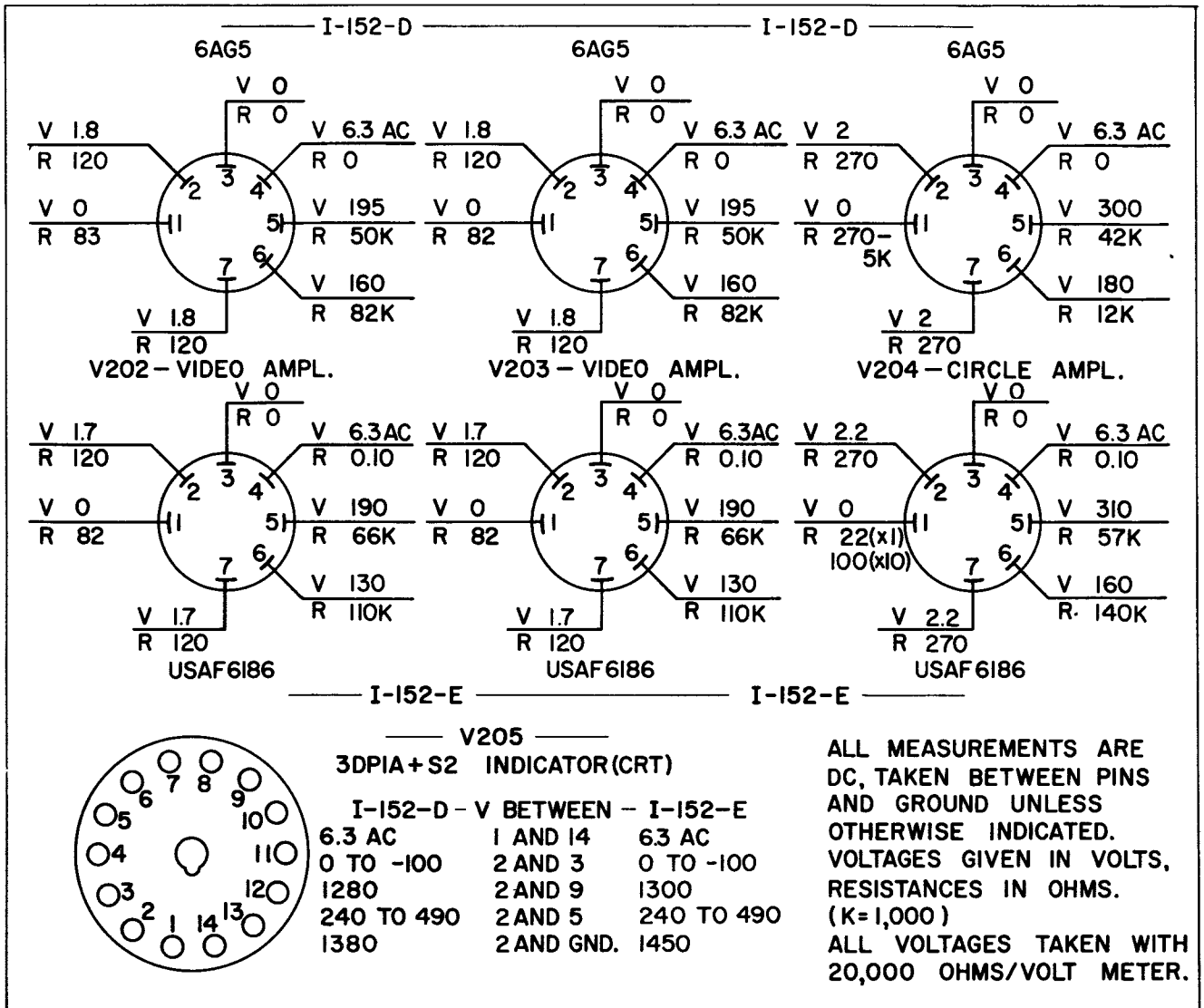


Figure 6-7. Tube Socket Voltage and Resistance Measurements, Indicator Function

6-22. BC-788-D OR -E ALIGNMENT PROCEDURES. (See figure 5-1.)

6-23. TIMING OSCILLATOR (98.356 KC, BC-788-D; 98.323 KC, BC-788-E).

- a. Set SCALE switch to TIMES ONE position.
- b. Adjust the bottom core of T112 for minimum circle size as indicated on the screen of V205.
- c. Adjust the bottom core of T109 for maximum circle size as indicated on the screen of V205. T175 used in the -E does not have an adjustable bottom core.

6-24. TIMING OSCILLATOR (9.83 KC), FIRST METHOD. Since the 9.83-KC oscillator is not crystal-controlled, its frequency must be checked by the use of an externally generated signal. This paragraph describes the method used if an audio signal generator is available. If such equipment is not available, use the alternate method discussed in paragraph 6-25.

a. Set the frequency of the signal generator to 49 KC and connect its output to the grid of tube V202; this point can be conveniently reached by connecting to one side of C216 which is terminal 3 on terminal board E210.

b. Set the SCALE switch to the TIMES ONE position.

c. Adjust the signal generator frequency until an almost stationary pattern of a double circle appears on the screen of V205. (The signal generator is now set to one-half the crystal-controlled timing oscillator frequency.)

d. Switch the altimeter to the TIMES TEN position and adjust the top core stud of T112 (T175 in the -E) until there is almost stationary pattern of five leaves.

e. Set the SCALE switch in the TIMES ONE position.

f. Adjust the signal generator frequency if necessary.

g. Recheck the TIMES TEN position of the SCALE switch.

Paragraphs 6-25 to 6-28

6-25. TIMING OSCILLATOR (9.83 KC), SECOND METHOD. If an audio signal generator is not available, an alternate method may be used to adjust the timing oscillator by the use of a second SCR-718-D or a second SCR-718-E.

NOTE

In this procedure an SCR-718-D cannot be used with an SCR-718-E.

a. Set the SCALE switch to the TIMES TEN position throughout this procedure.

b. Insert a six-inch length of wire into the RECEIVER ANTENNA receptacle, J103.

c. Set up and place in operation another Radio Set SCR-718-D or -E, known to be operating properly, in the near vicinity of the equipment being aligned.

d. Insert a six-inch length of wire into the TRANSMITTER ANTENNA receptacle, J104, of the second Radio Set.

e. Set the SCALE switch of the second Radio Set in the TIMES ONE position. (A wide ring of dimmer light, in addition to the normal trace, should appear on the screen of V205 of the altimeter being aligned, indicating that it is picking up the signals of the second altimeter.)

f. Carefully tune top core stud of T112 (9.83 KC oscillator grid coil) until an almost stationary pattern of ten pips, excluding the zero lobe, appears around the ring. (A good method of counting the pips is to count two at a time in opposite directions from the starting point.)

6-26. CLIPPER (400 KC).

a. Set the SCALE switch in TIMES ONE position.

b. Connect Test Set TS-23/APN to J104.

c. Adjust the core stud of T110 for maximum power output, as measured by TS-23/APN. Do not adjust the core beyond the point where power is lost on the TIMES TEN position. A compromise is desirable.

d. Using an oscilloscope, check the waveform at the grid of V113. A waveform having 4 to 5 peaks should appear.

e. Set the SCALE switch in the TIMES TEN position.

f. If a secondary lobe appears at approximately 8,000 feet, re-adjust T110 for minimum secondary lobe height. (This adjustment usually occurs with the core stud practically all the way out.) (See paragraph 6-28 for adjustment of T111, which also affects secondary lobe height.)

NOTE

The clipper stage is not particularly critical as to final adjustment.

6-27. DRIVER (900 KC), SCALE SWITCH IN TIMES ONE POSITION.

a. Set the SCALE switch in the TIMES ONE position.

b. Connect an oscilloscope to terminal "F" of T111 through a 5 uuf (or less) capacitor and return the low side of the oscilloscope to ground.

c. Adjust the core stud of T111 for 900 KC which will appear on the oscilloscope as nine cycles of a damped wave.

d. The first positive damped wave peak voltage should be between 400 and 450 volts.

e. The second peak must not exceed 28 percent of the first peak. This requirement is necessary in order that a secondary form of UHF oscillation in tube V114 be suppressed. The second, or false transmission may be detected, if present, by rotating the REC. GAIN control to maximum sensitivity position and inspecting the trace on the cathode-ray tube for a secondary lobe at approximately 600 feet clockwise from the zero lobe on the scale. (See figure 6-8 for example of secondary lobe.) Make the check with the correct antenna load by attaching Test Set TS-10C/APN or Test Set TS-23/APN.

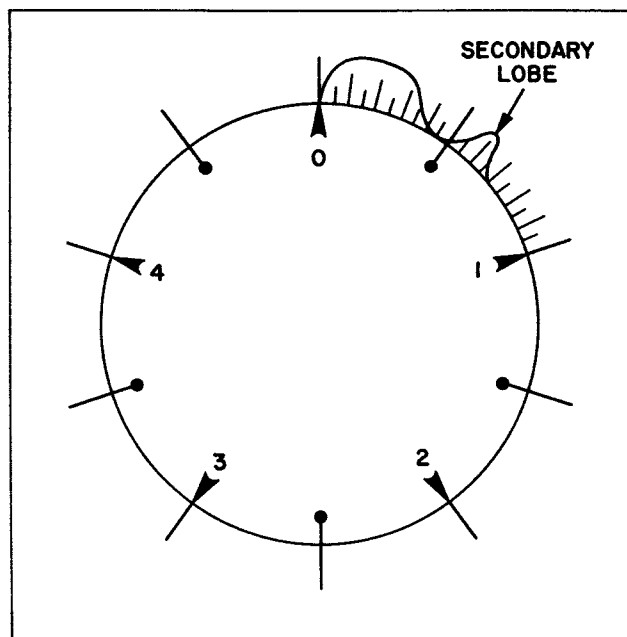


Figure 6-8. Indicator Showing Secondary Lobe

f. If a secondary lobe appears with the REC. GAIN control advanced to the maximum sensitivity position, turn the core stud of T111 inward to eliminate this secondary lobe.

NOTE

The driver frequency may be lowered somewhat by this action, but operation is still satisfactory.

6-28. DRIVER (900 KC), SCALE SWITCH IN TIMES TEN POSITION.

a. Set the SCALE switch in the TIMES TEN position.

b. Oscilloscope connections are the same as in paragraph 6-23.

c. Insert a six-inch length of wire in both antenna receptacles.

d. If a secondary lobe appears at approximately 8,000 feet clockwise from the zero lobe on the circular trace, adjust the core stud of T111 for minimum amplitude of secondary lobe.

e. Since this adjustment will also affect the TIMES ONE circle size, make a compromise adjustment between minimum secondary lobe height and correct circle size.

6-29. UHF OUTPUT OSCILLATOR (440 MC).

a. Connect interconnecting cord CA-102 of Test Set TS-23/APN to the TO REC. TRANS. receptacle on I-152-D or -E and cord CA-103 of TS-23/APN to the TO INDICATOR receptacle on BC-788-D or -E. (Locate TS-23/APN so that the indicator is to the left and the radio receiver and transmitter is to the right.)

b. Connect Radio Receiver and Transmitter BC-788-D or -E to a primary power source of 110 to 120 volts AC at 400 to 2400 cps. Turn the equipment on and allow proper warm-up time.

c. Turn TEST SWITCH of TS-23/APN to NORMAL-B+ position.

d. Adjust voltage of the primary power source until the voltmeter of TS-23/APN indicates 300 volts B+ for SCR-718-D or 315 volts B+ for SCR-718-E.

e. Turn TEST SWITCH of TS-23/APN to POWER-FREQ. position.

f. Connect jumper cord CA-101 of TS-23/APN to DETECTOR INPUT receptacle of TS-23/APN.

g. Connect antenna cord CD-800 of TS-23/APN to WAVEMETER INPUT receptacle of TS-23/APN and to TRANSMITTER ANTENNA receptacle of BC-788-D or -E.

h. Loosen screws and open covers for adjustment controls "T" and "A" on BC-788-D or -E.

i. Adjust UHF output (oscillator) V114 to the correct operating frequency by means of plate tank inductance L127 (marked "T"), and peaking antenna coupling C161 (marked "A") for maximum output as indicated on voltmeter of TS-23/APN.

NOTE

Adjustments "T" and "A" are reached from the front panel of BC-788-D or -E by a screw-driver. An auxiliary adjustment is provided for the position of antenna loop L129. This is preset during test by the manufacturer, and

should not normally require any change under service use. The adjustment is of the screw-driver type reached from the top of the chassis of BC-788-D and it provides means of loosening or tightening the coupling of antenna loop L129 to plate tank inductance L127. In order to observe the power output, relay K101 must be closed manually when the scale switch is in the TIMES TEN position, as the scale switch cannot actuate the relay while Test Set TS-23/APN is connected to the SCR-718-D or -E. (Only the open type relay can be manually closed; for the hermetically-sealed type relay, a jumper across terminals 1 and 2 of the relay must be used.)

j. Disconnect jumper cord from DETECTOR INPUT receptacle of TS-23/APN.

k. Disconnect antenna cord CD-800 of TS-23/APN from WAVEMETER INPUT of TS-23/APN and connect this cord to DETECTOR INPUT of TS-23/APN.

l. Adjust control "A" on BC-788-D or -E for maximum voltmeter reading on TS-23/APN. If voltmeter reading is below blue line, servicing of altimeter is required. If a peak is obtained for two different settings of control "A", the antenna loop, L129, may be too tightly coupled to the plate tank inductance, L127. If power output is low, the coupling may be too loose.

m. With all connections remaining the same, the transmitter pulse is now examined as indicated by the lobe on the cathode-ray tube screen. See figure 6-9 for examples of lobe shapes.

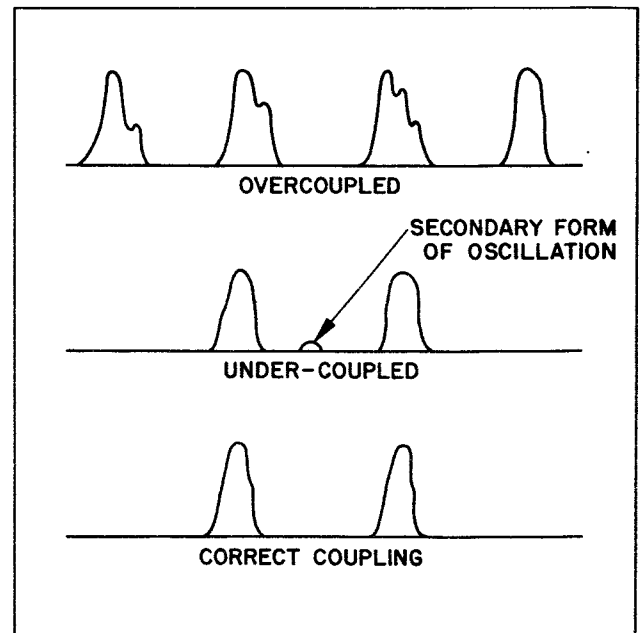


Figure 6-9. Examples of Lobe Shape

n. Touch up L127 and C161 (and L129, if necessary) to obtain correct coupling. (It will be noted that as the physical spacing between loop L129 and tank

L127 is decreased, the power output will increase up to a certain point. Beyond this point, the observed lobe shape may acquire two or more distinct peaks, the effect being dependent largely on the setting of adjustment C161. If the coupling is loose, that is, if L129 is spaced too far from L127, the loading on the oscillator is insufficient and the secondary form of oscillation may appear at approximately 600 feet on the scale of the cathode-ray tube of I-152-D or -E. If antenna loop L129 is properly positioned, varying of antenna coupling C161 should not introduce additional peaks.)

NOTE

Adjustments made individually on L129, L127 and C161 may cause slight maladjustments on each of the others; hence if realignment of one takes place, it is recommended that the others be rechecked for possible shifts.

6-30. RECEIVER SECTION OF RADIO RECEIVER AND TRANSMITTER BC-788-D OR -E, USING TEST SET TS-10C/APN. The preferable method for alignment of the receiver section is by use of the TS-10C/APN, which includes an attenuator and which permits the transfer of a delayed test pulse from the transmitter section to the receiver section, thus allowing the converter-oscillator portion of the receiver section to be tuned to the transmitter section output.

a. Connect TRANSMITTER ANTENNA receptacle of BC-788-D or -E to A-LOW receptacle on TS-10C/APN using one 8-foot cord, CA-102.

b. Connect jumper cord CA-101 of TS-10C/APN to B-LOW receptacle and to C-HIGH receptacle of TS-10C/APN.

c. Connect RECEIVER ANTENNA receptacle to Attenuator L101, on the side away from the chain, of TS-10C/APN using the second 8-foot cord CA-102 of TS-10C/APN.

d. Connect remaining Attenuator L101A receptacle to the D-HIGH receptacle of TS-10C/APN using cord CA-103 of TS-10C/APN.

e. Set the REC. GAIN of I-152-D or -E to one-half of its maximum clockwise position.

f. Adjust the Attenuator of TS-10C/APN to produce a normal size test lobe on the cathode-ray tube screen of the indicator.

g. Adjust L115 ("R" on BC-788-D or -E) until the narrowest test lobe is obtained.

h. Adjust C116 ("C" on BC-788-D or -E) for maximum test lobe height. If it is not possible to peak C116, move shorting bar on L114 as necessary.

i. Adjust C119 ("B" on BC-788-D or -E) for narrowest test lobe.

j. Adjust L131 (located on top side of BC-788-D or -E chassis) for narrowest test lobe.

k. Make these last four adjustments in the order listed. Since these adjustments are interdependent, make the sequence of four adjustments a minimum of two times.

6-31. Do not adjust the sealed preset IF transformers. If these transformers are found to be defective, replace them with spare transformers.

6-32. After the receiver section of BC-788-D or -E is aligned to the transmitter section of BC-788-D or -E, the overall sensitivity of the altimeter can be checked by carrying out the procedures of paragraph 5-11.

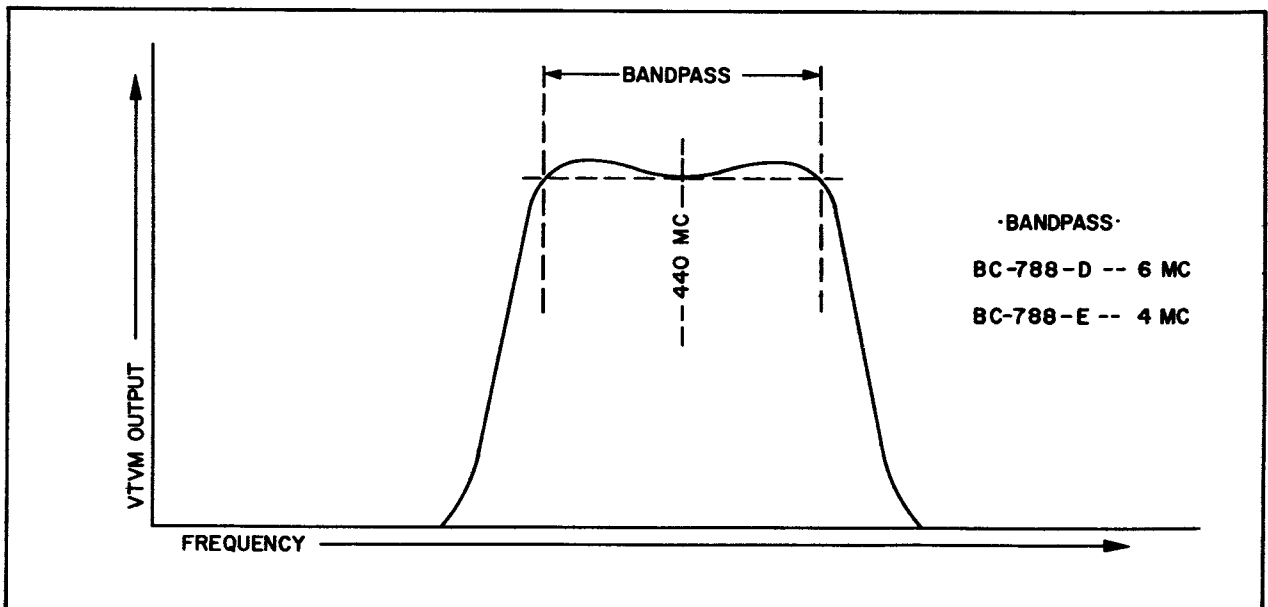


Figure 6-10. Curve Showing Ideal Conditions for Adjustment of L115.

6-33. I-152-D or -E ALIGNMENT PROCEDURES.
(See figure 5-2.)

6-34. ALIGNMENT OF I-152-D or -E WITH SCALE SWITCH IN TIMES ONE POSITION.

- a. Set the REC. GAIN control to minimum counter-clockwise position.
- b. Set the SCALE switch to the TIMES ONE position.
- c. Adjust the BRIL. and FOCUS controls (R205 and R207) for the brightest, sharpest circular trace on the screen of V205.
- d. Adjust the HORIZ. and VERT. CENTERING controls (R222 and R225) to center the trace with respect to the calibrated scale on the screen of V205.
- e. Adjust the primary (top core stud) of T203 for maximum size pattern on the screen of V205.
- f. Adjust the secondary (bottom core stud) of T203 until the two axes of the circular trace are vertical and horizontal.
- g. Adjust R227, shape control for the high-frequency or TIMES ONE position, so that the vertical and horizontal axes of the pattern are equal.
- h. Adjust the CIRCLE SIZE control so that the circle just begins to show around the edge of the black calibrated scale.
- i. Repeat steps e, f and g until the circle contains a minimum amount of distortion.
- j. Repeat step d until the circular trace is concentric with the scale.

NOTE

A slight retouching of BRIL. control and FOCUS control may be found desirable to secure satisfactory brilliance and focusing. The best operating position for BRIL. control occurs when a slight glow or a halo effect appears adjacent to and concentric with the circle being traced on the cathode-ray tube screen and when the trace is sufficiently fine for good readability.

k. Adjust REC. GAIN control until a lobe appears on the circle being traced. (To secure a lobe it may be necessary to insert a two-or three-inch piece of wire in both the TRANSMITTING ANTENNA and RECEIVING ANTENNA receptacles of BC-788-D or -E.) This lobe should be of average height, approximately 1/4 inch, as used in actual service.

l. Rotate the TIMES ONE ZERO ADJ. knob to check the range over which the reference lobe may be moved. The normal range over which the lobe may be moved is approximately ± 200 feet, measured on either side of zero on the scale, before excessive size changes occur in the circular trace.

m. If excessive size changes occur during adjustment, readjust the primary (top core stud) of T203, until the excessive size change is a minimum. Detuning of the primary of T203 to a slight extent is permissible, since no effect on performance results.

n. Rotate the TIMES ONE ZERO ADJ. control so that the leading edge of the reference lobe coincides with the zero calibration mark on the scale of V205, and if the residual delay of the installation is known, to the left of zero by the amount of residual delay. (Refer to paragraph 3-11 for further information on residual delay.) (It is not abnormal for the zero adjustment to shift somewhat during actual operation of the altimeter in the air.)

6-35. ALIGNMENT OF I-152-D OR -E WITH SCALE SWITCH IN TIMES TEN POSITION.

- a. Set the SCALE switch in the TIMES TEN position throughout this procedure.
- b. Adjust the top core stud of T205 for maximum circle amplitude.
- c. Adjust the bottom core stud of T205 for best circle shape.
- d. Adjust R237, shape control for the low-frequency or TIMES TEN position, so that the vertical and horizontal axes of the pattern are equal.
- e. Readjust the top core stud of T205 for proper zero lobe position, while checking the TIMES TEN ZERO ADJ. control for proper range. This range should be ± 1500 feet.

6-36. SUB-ASSEMBLY REMOVAL PROCEDURES.
(Additional removal procedures are contained in Section V.)

6-37. TRANSMITTER SECTION UHF OUTPUT SUB-ASSEMBLY.

- a. Remove the cover from the transmitter tuner by pulling up and off.
- b. Unsolder the two external leads from the outside of the tuner case.
- c. Remove the tube shield and tube from the top side of the tuner. (V114).
- d. Remove the two handles from the front panel of BC-788-D or -E.
- e. Remove the six screws holding the front panel to the chassis.
- f. Remove the four screws holding the tuner on the chassis.
- g. Lift the front panel off enough to allow the tuner to be removed.
- h. Carefully remove the tuner.

6-38. RECEIVER SECTION CONVERTER-OSCILLATOR SUB-ASSEMBLY.

- a. Remove the cover from the receiver tuning unit by pulling up and off.
- b. Unsolder the three external leads from the outside of the tuner case.
- c. Remove the lug holding the wire to the side of the tuner case.
- d. Remove the two tube shields and tubes from the top side of the tuner case. (V101, V102).
- e. Remove the two handles from the front panel of BC-788-D or -E.

f. Remove the six screws holding the front panel to the chassis.

g. Remove the three screws holding the tuner in place.

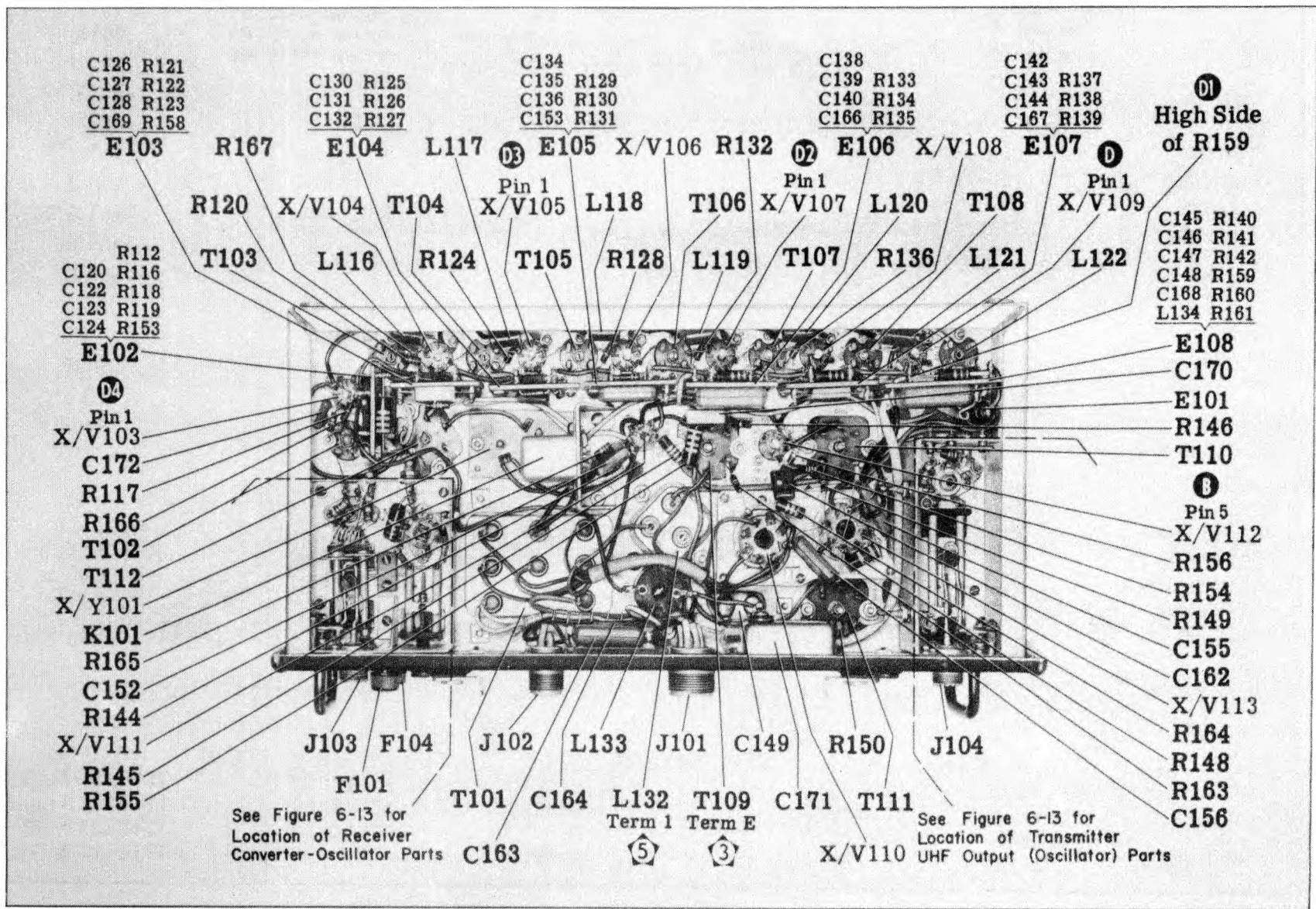
h. Lift the front panel off sufficiently to allow removal of the tuner.

i. Carefully remove the tuner.

6-39. LUBRICATION.

6-40. No lubrication is required nor desired for Radio Set SCR-718-D or -E.

Figure 6-11. Radio Receiver and Transmitter BC-788-D, Bottom View, Showing Location of Parts (Less Those of Receiver Converter-Oscillator and Transmitter UHF Output Oscillator Sections)



T.O. 12P5-3SCR718-22

SECTION VI

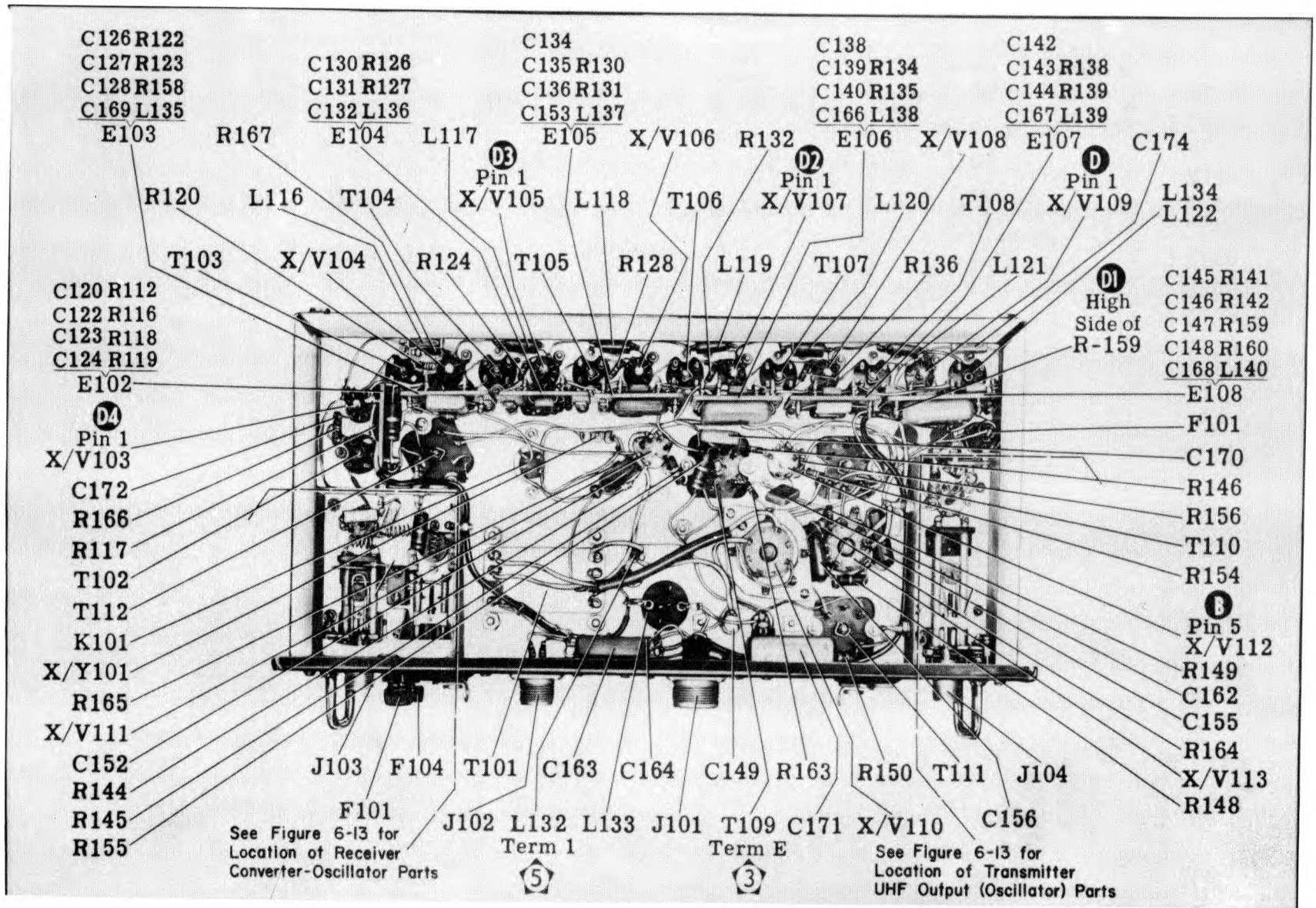


Figure 6-14. Radio Receiver and Transmitter BC-788-E, Bottom View, Showing Location of Parts (Less Those of Receiver Converter-Oscillator and Transmitter UHF Output Oscillator Sections)

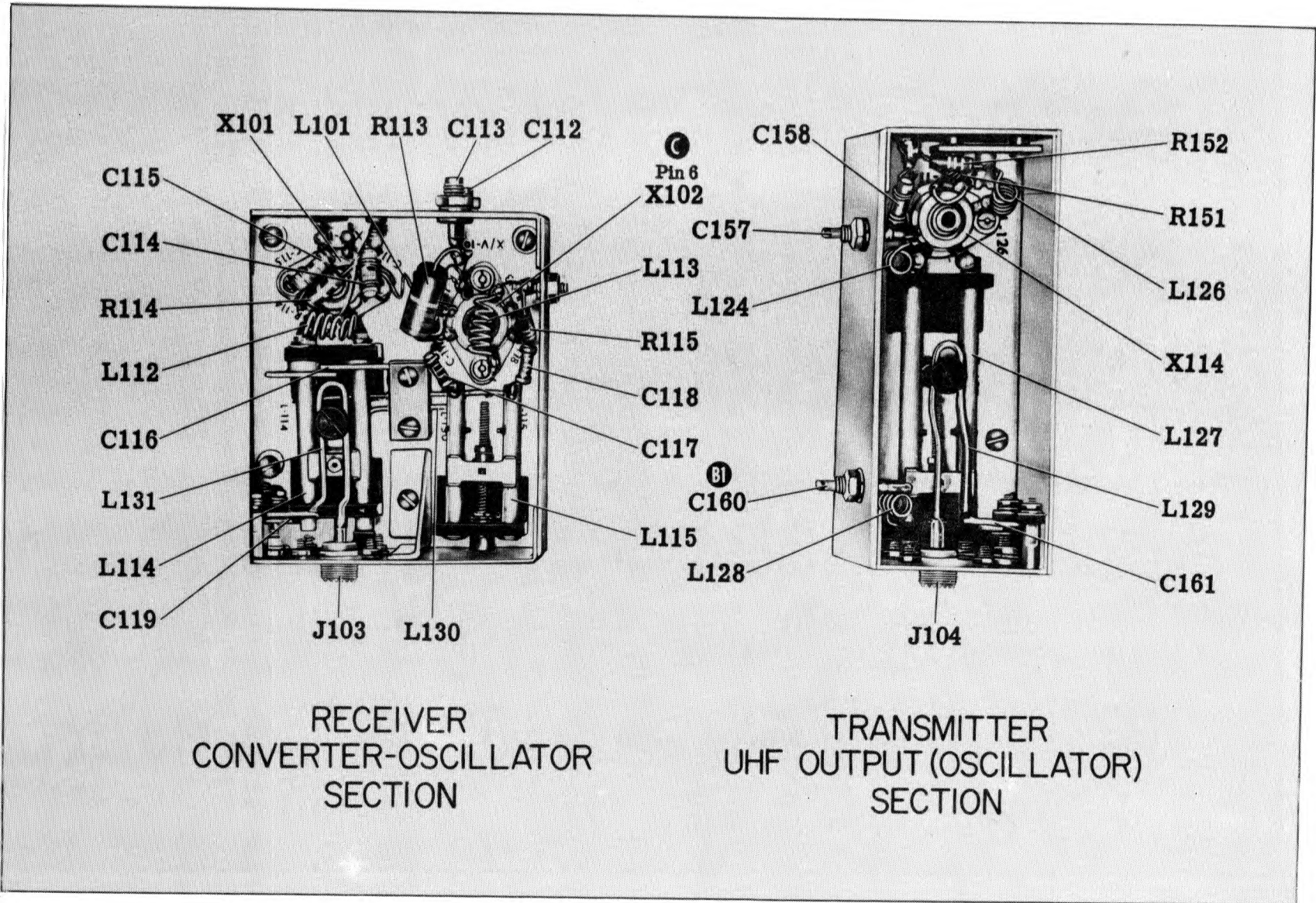


Figure 6-13. Receiver Converter-Oscillator and Transmitter UHF Output Oscillator Sections of Radio Receiver and Transmitter BC-788-D or -E, Bottom View, Showing Location of Parts

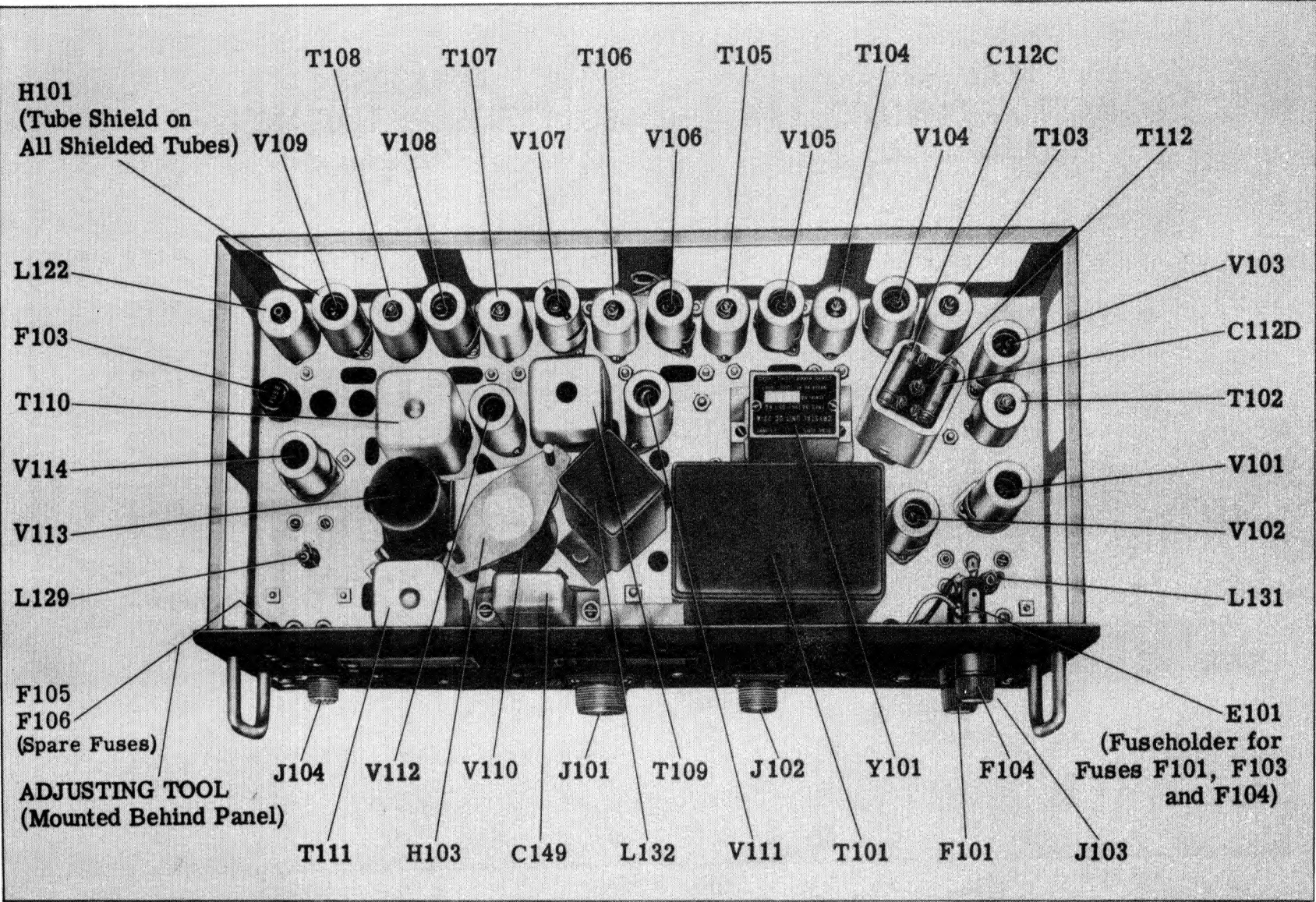
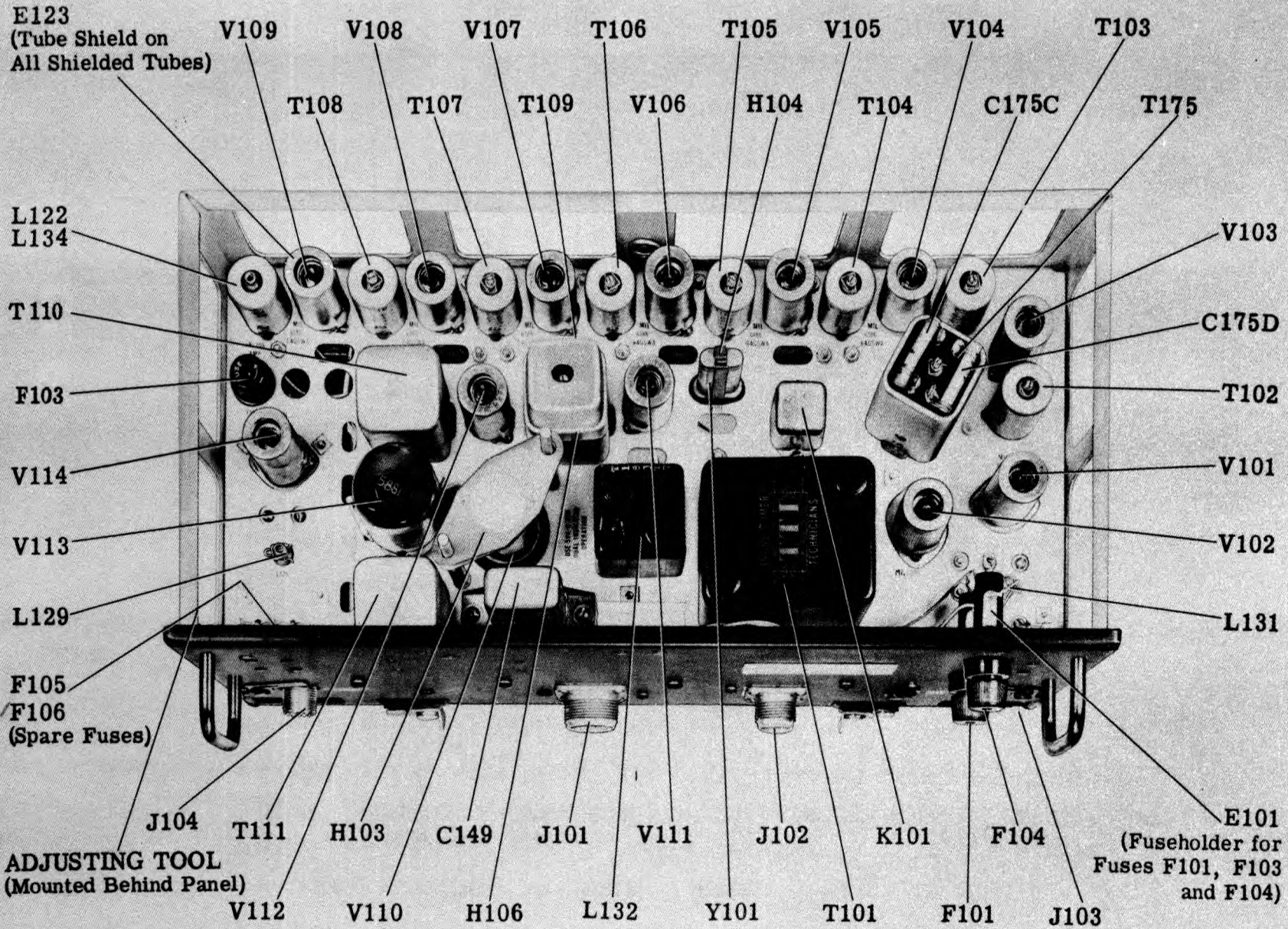


Figure 6-14. Radio Receiver and Transmitter BC-788-D, Top View, Showing Location of Parts

Figure 6-15. Radio Receiver and Transmitter BC-788-E, Top View, Showing Location of Parts



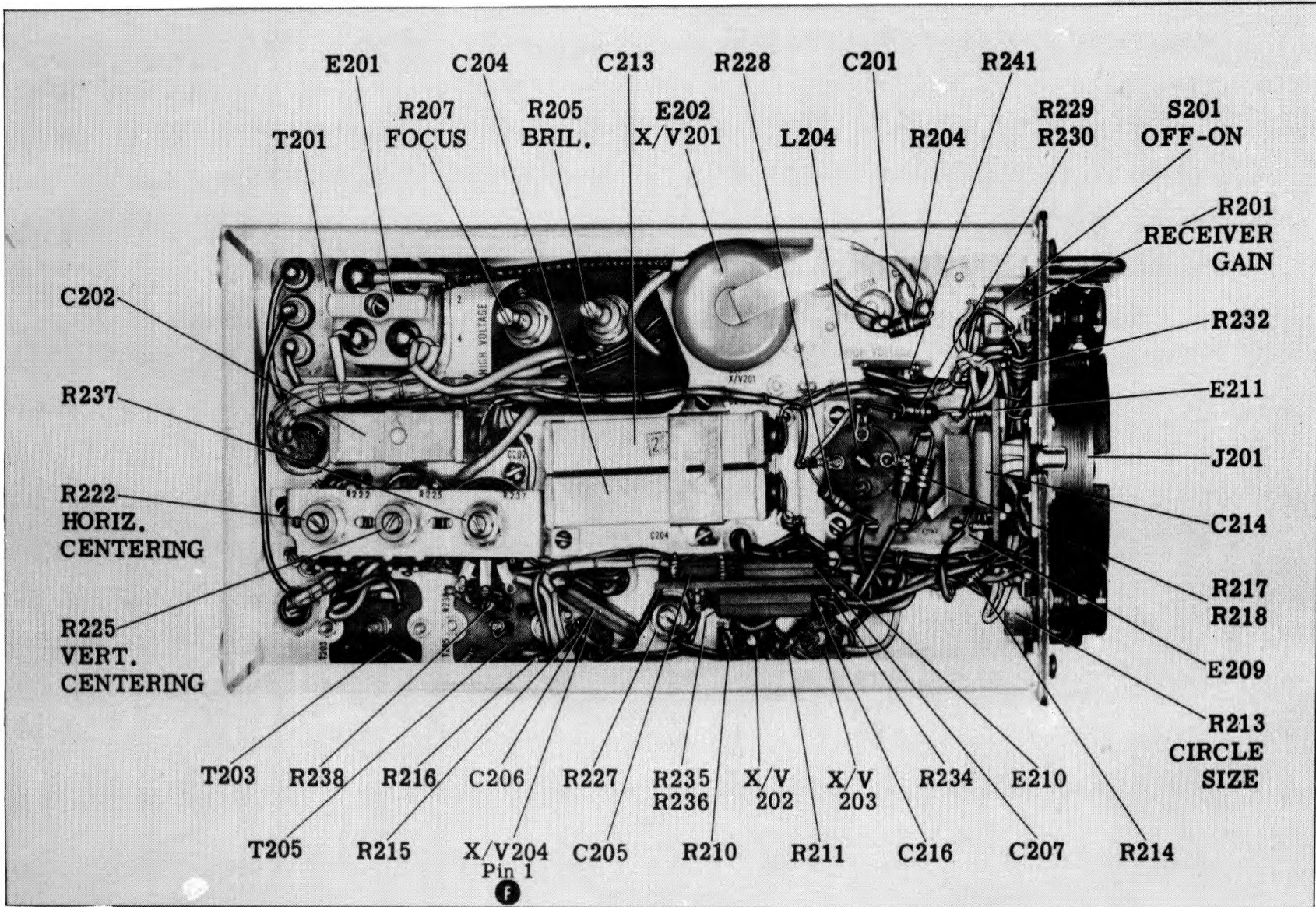


Figure 6-16. Indicator I-152-D, Bottom View, Showing Location of Parts

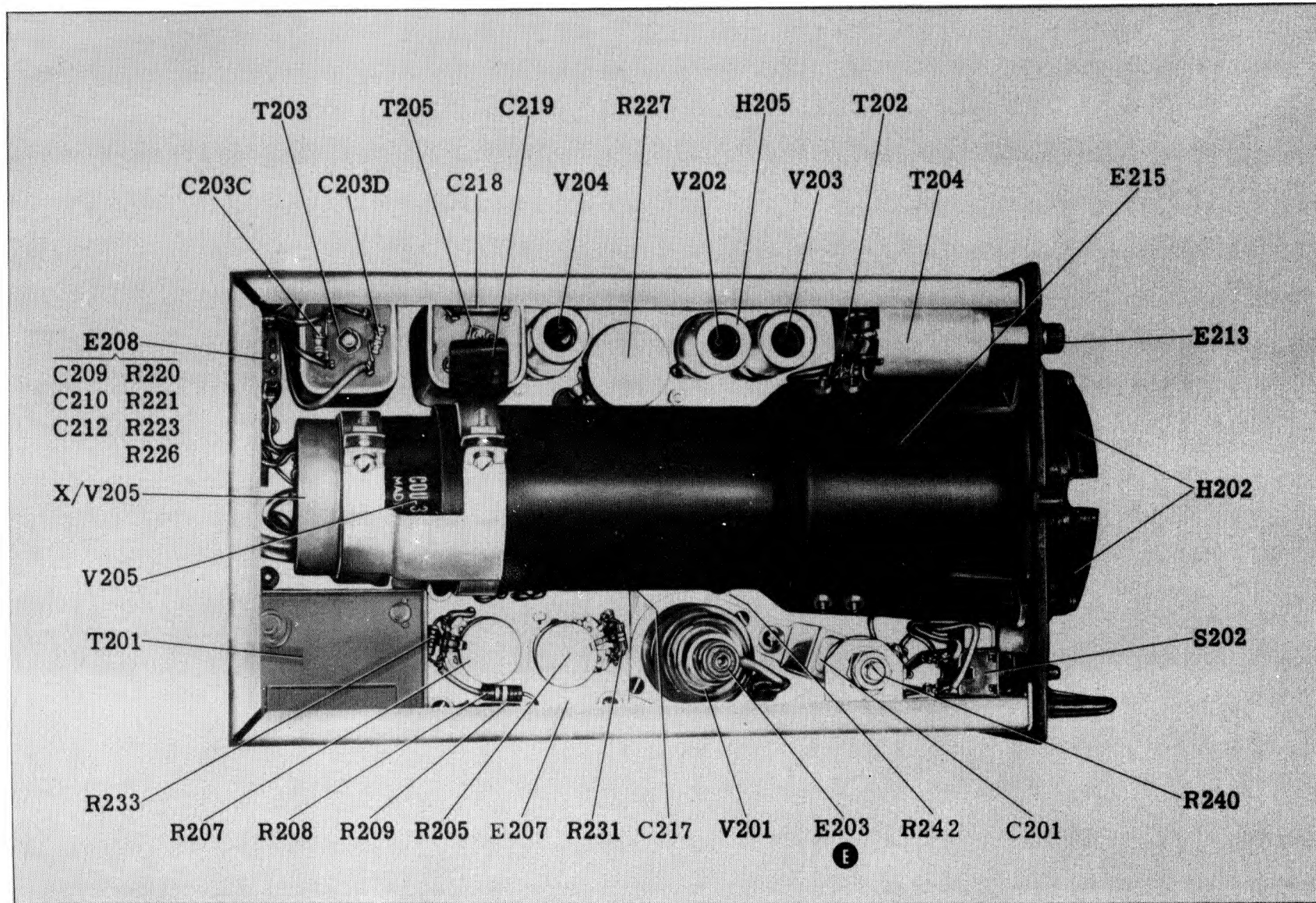


Figure 6-18. Indicator I-152-D, Top View, Showing Location of Parts

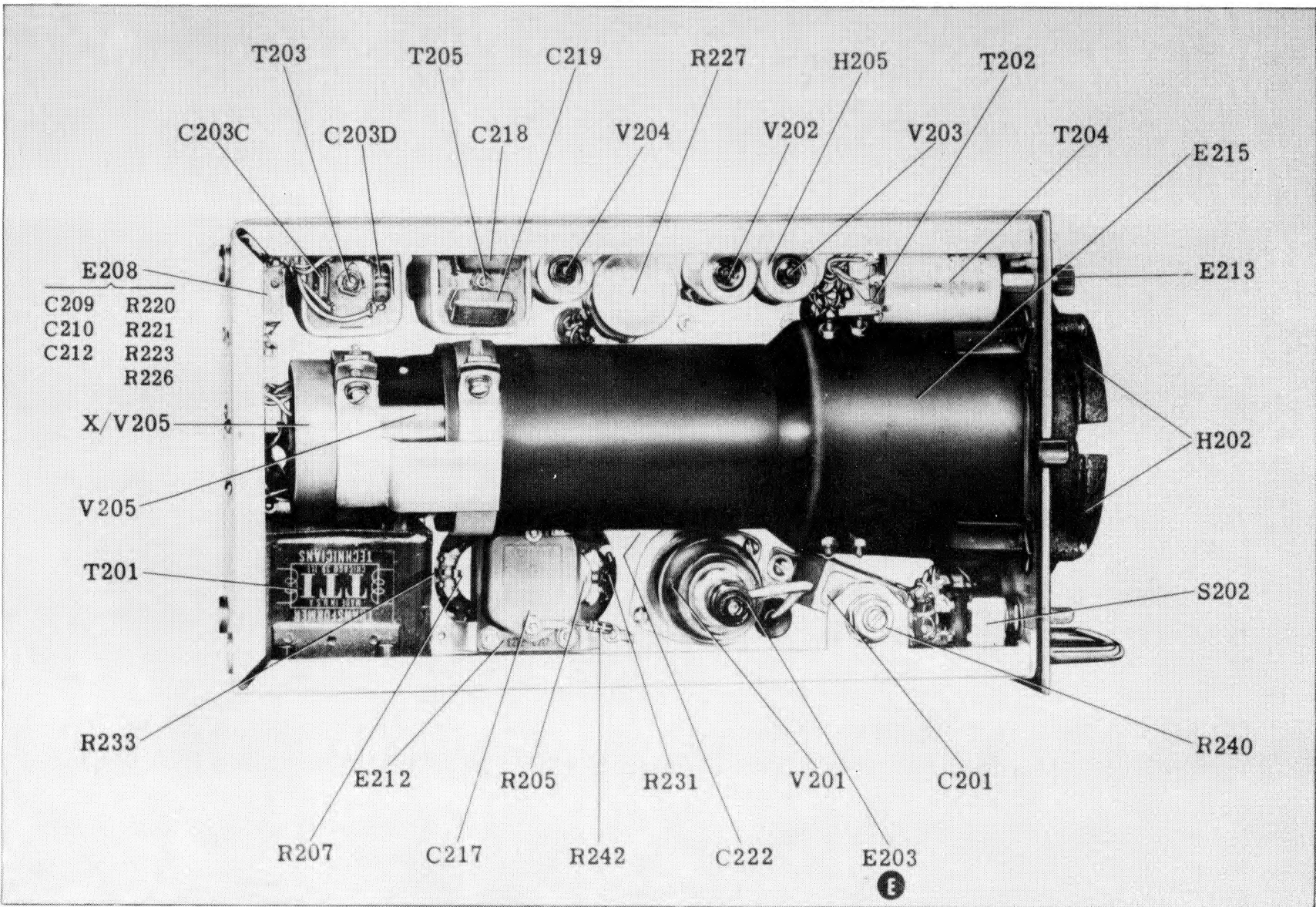


Figure 6-19. Indicator I-152-E, Top View, Showing Location of Parts

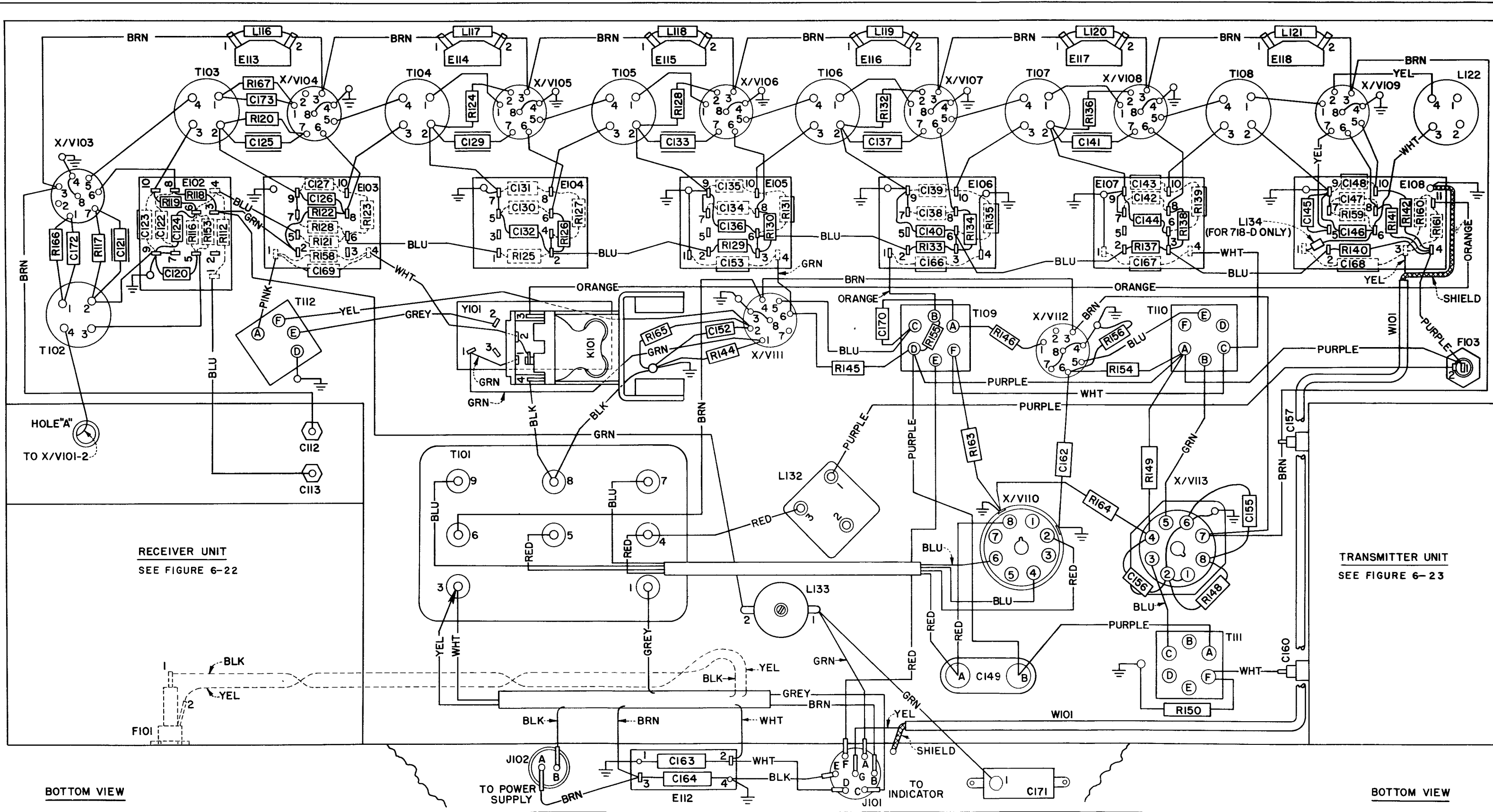


Figure 6-20. Practical Wiring Diagram, Radio Receiver and Transmitter BC-788-D

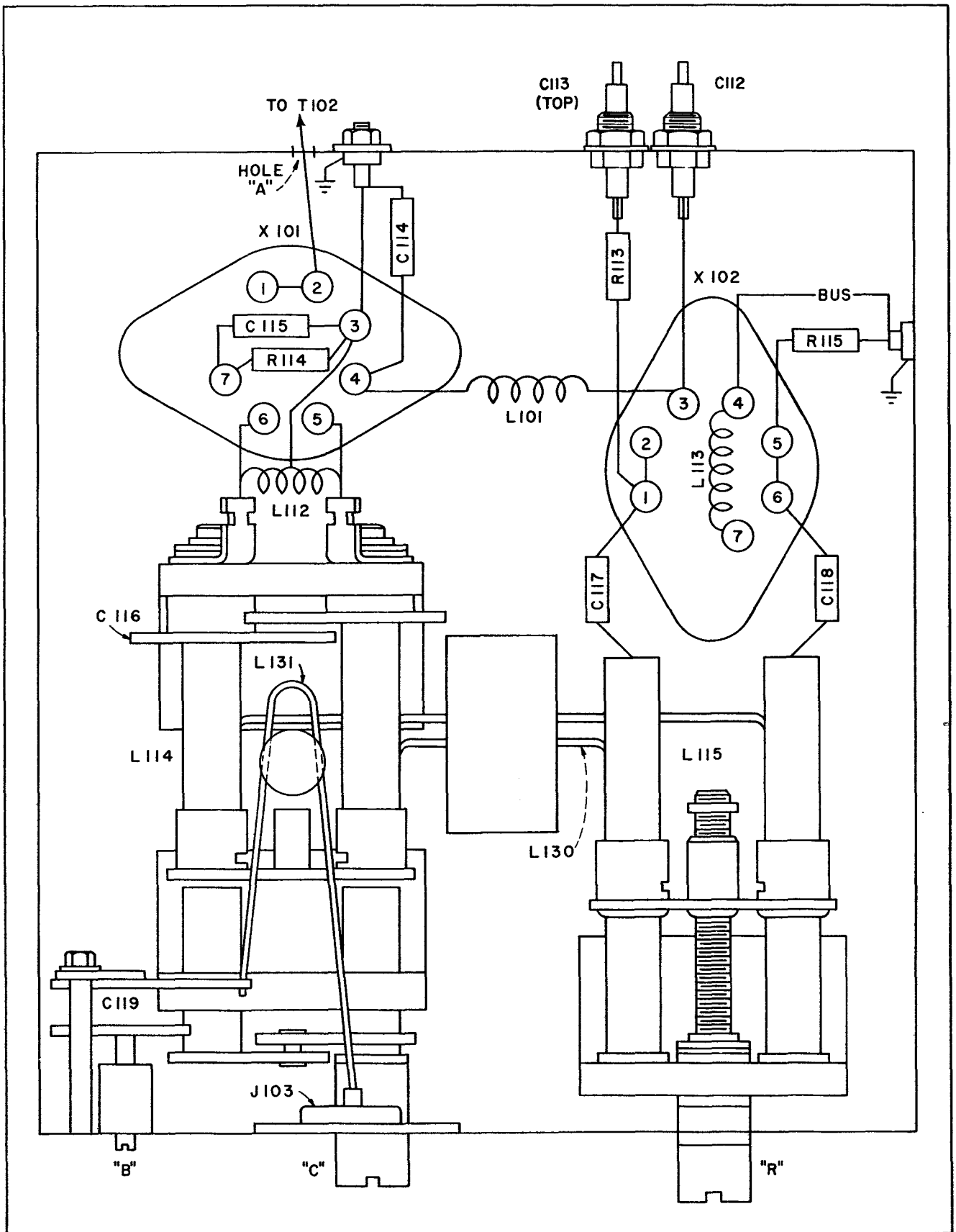


Figure 6-22. Practical Wiring Diagram, Receiver Converter-Oscillator Section of BC-788-D or -E, Bottom View (No top view necessary)

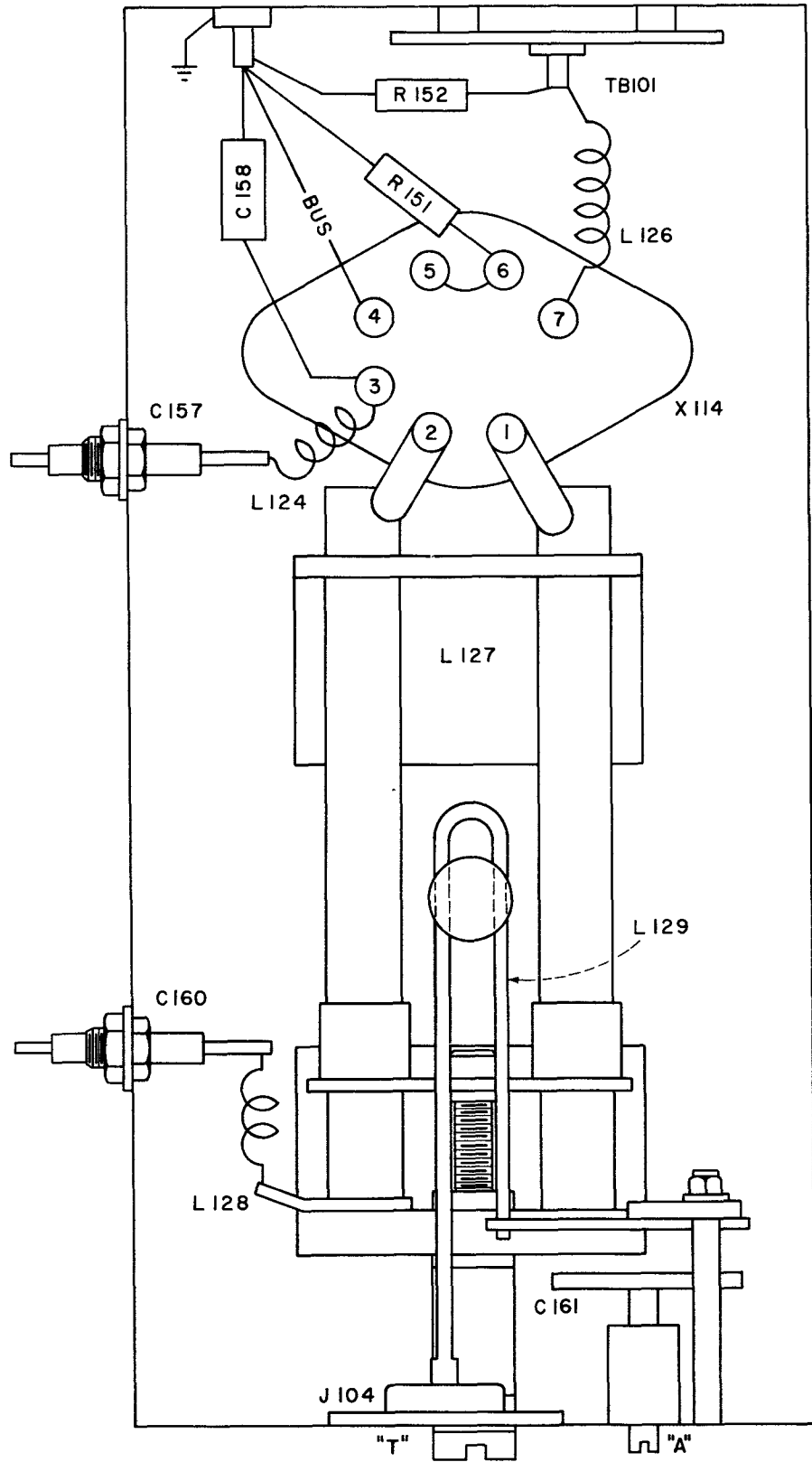


Figure 6-23. Practical Wiring Diagram, Transmitter UHF Output Section of BC-788-D or -E, Bottom View (No top view necessary)

SECTION VII

DIAGRAMS

7-1. GENERAL EXPLANATION

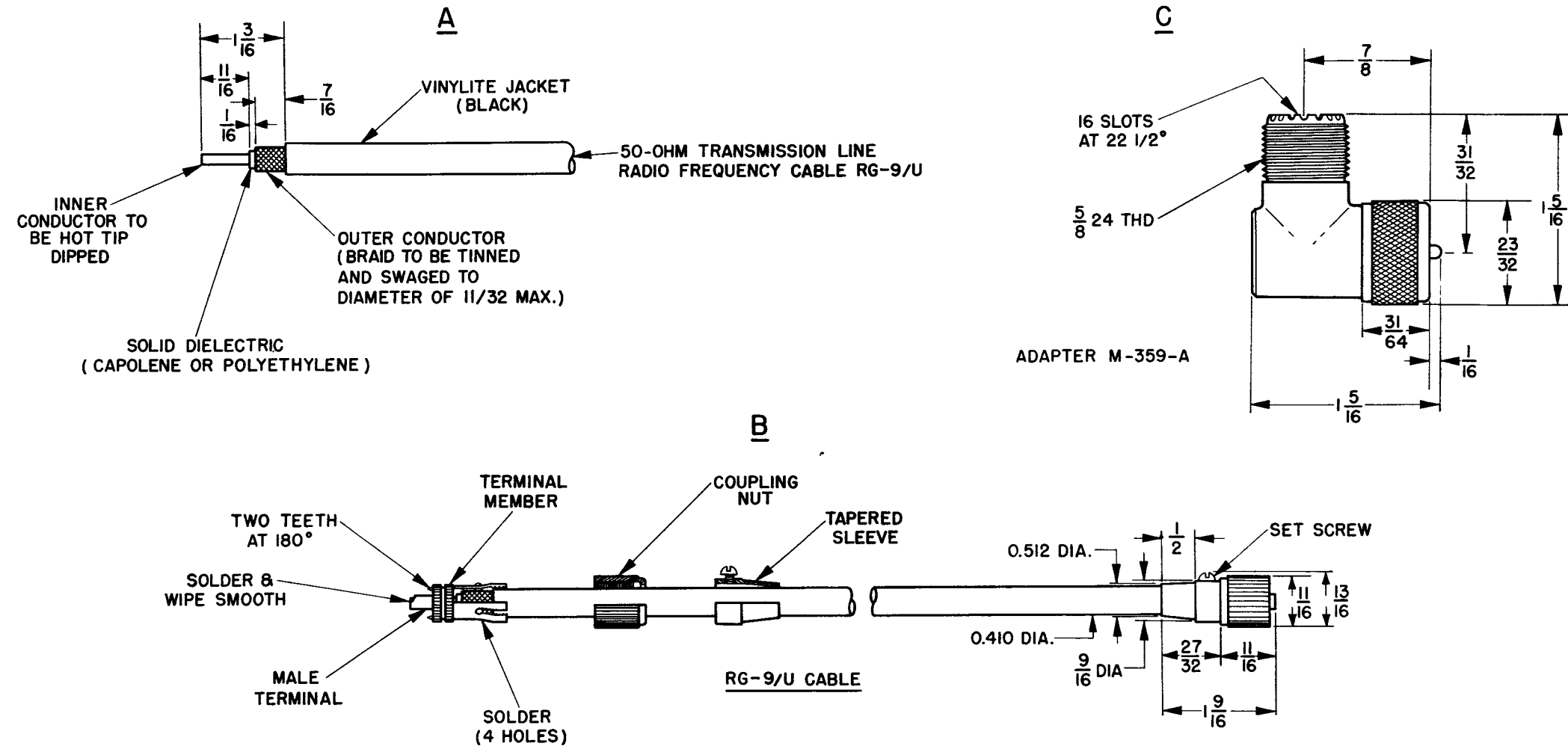
Procedures requiring their use are explained in detail in the text of the preceding sections. They should not ordinarily be referred to independently of the text.

7-2. This section contains diagrams required for reference purposes during actual maintenance work.

TABLE 7-1. INDEX OF DIAGRAMS

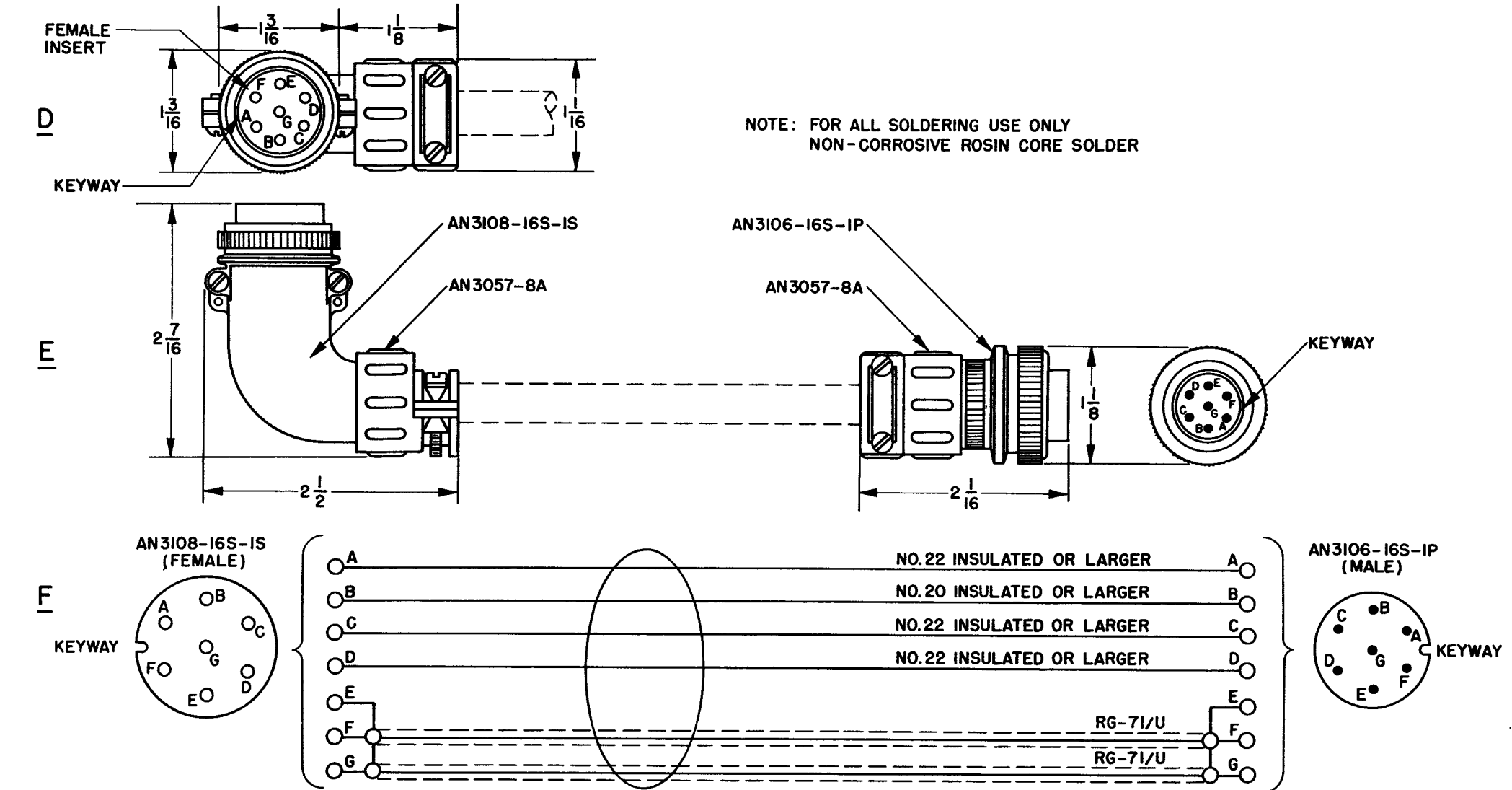
Figure Number	Title
7-1.	Cable Fabrication Diagram, Radio Set SCR-718-D
7-2.	Cable Fabrication Diagram, Radio Set SCR-718-E
7-3.	Outline Drawing, Radio Receiver and Transmitter BC-788-D or -E
7-4.	Outline Drawing, Indicator I-152-D or -E
7-5.	Outline Drawing, Antenna Assembly AS-333/AP or Antenna AT-505/AP
7-6.	Outline Drawing, Antenna AT-4/ARN-1 or AT-4A/ARN-1
7-7.	Interunit Cabling and Wiring Diagram, Radio Set SCR-718-D
7-8.	Interunit Cabling and Wiring Diagram, Radio Set SCR-718-E
7-9.	Interunit Cabling and Wiring Diagram, Radio Set SCR-718-D, Employing Auxiliary Indicator
7-10.	Interunit Cabling and Wiring Diagram, Radio Set SCR-718-E, Employing Auxiliary Indicator
7-11.	Schematic Diagram, Radio Receiver and Transmitter BC-788-D
7-12.	Schematic Diagram, Radio Receiver and Transmitter BC-788-E
7-13.	Schematic Diagram, Indicator I-152-D
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7-15.	Voltage and Resistance Measurements, Radio Receiver and Transmitter BC-788-D
7-16.	Voltage and Resistance Measurements, Radio Receiver and Transmitter BC-788-E
7-17.	Voltage and Resistance Measurements, Indicator I-152-D
7-18.	Voltage and Resistance Measurements, Indicator I-152-E

BC-788-D — AT-4/ARN-I (AS-333/AP) INTERCONNECTING CABLE FABRICATION



1. Cut bulk radio frequency cable RG-9/U to lengths required for the particular installation. Trim both ends of each cable as shown in sub-figure A. Hot tin dip inner conductor extensions and tin outer conductor braid to within 1/8 inch from vinylite jacket. Avoid surplus solder and excessive heating of copolene dielectric and vinylite jacket. Swage tinned braid, if necessary, to 11/32" diameter maximum.
2. Disassemble plugs by slipping tapered sleeve and coupling nut over each end of cables in the relation shown at left in sub-figure B.
3. Feed ends of cable into plug terminal members so that end of inner conductor is approximately flush with tip of hollow terminal and tinned braid extends slightly beyond the four soldering holes in the neck, as shown in sub-figure B. At least 1/4" of jacket should enter threaded portion of terminal member.
4. Using non-corrosive flux or resin core solder, carefully solder end of inner conductor to terminal tip and solder braid to neck of terminal member at four holes. Avoid excess solder and remove all solder on outer periphery of hollow pin terminal to prevent mating interference. Snip off conductor extension (if any) flush with tip of terminal.
5. Reassemble plugs as shown at right of sub-figure B. Draw tapered sleeve over slotted member and tighten setscrew firmly against solid metal portion of neck, after adjusting for minimum clearance which will allow coupling nut to turn freely.
6. The elbow adapters, sub-figure C, may if absolutely necessary, be interposed between transmission lines and receptacles J103 and J104 of receiver and transmitter and antenna receptacles, or transmission lines may be connected to receptacles directly. If adapters are to be used, couple female end of adapter to male plug at each end of transmission lines. Make sure that teeth at front rim of plugs are engaged with notches at rim of adapter before coupling nuts are firmly tightened.
7. A non-metallic band, sleeve or other suitable cable marker shall be installed at receiver and transmitter end of each antenna cable giving the residual delay of the antenna system and the length of the respective cable. The characters shall be legible and of a permanent nature.

BC-788-D — I-152-D INTERCONNECTING CABLE FABRICATION

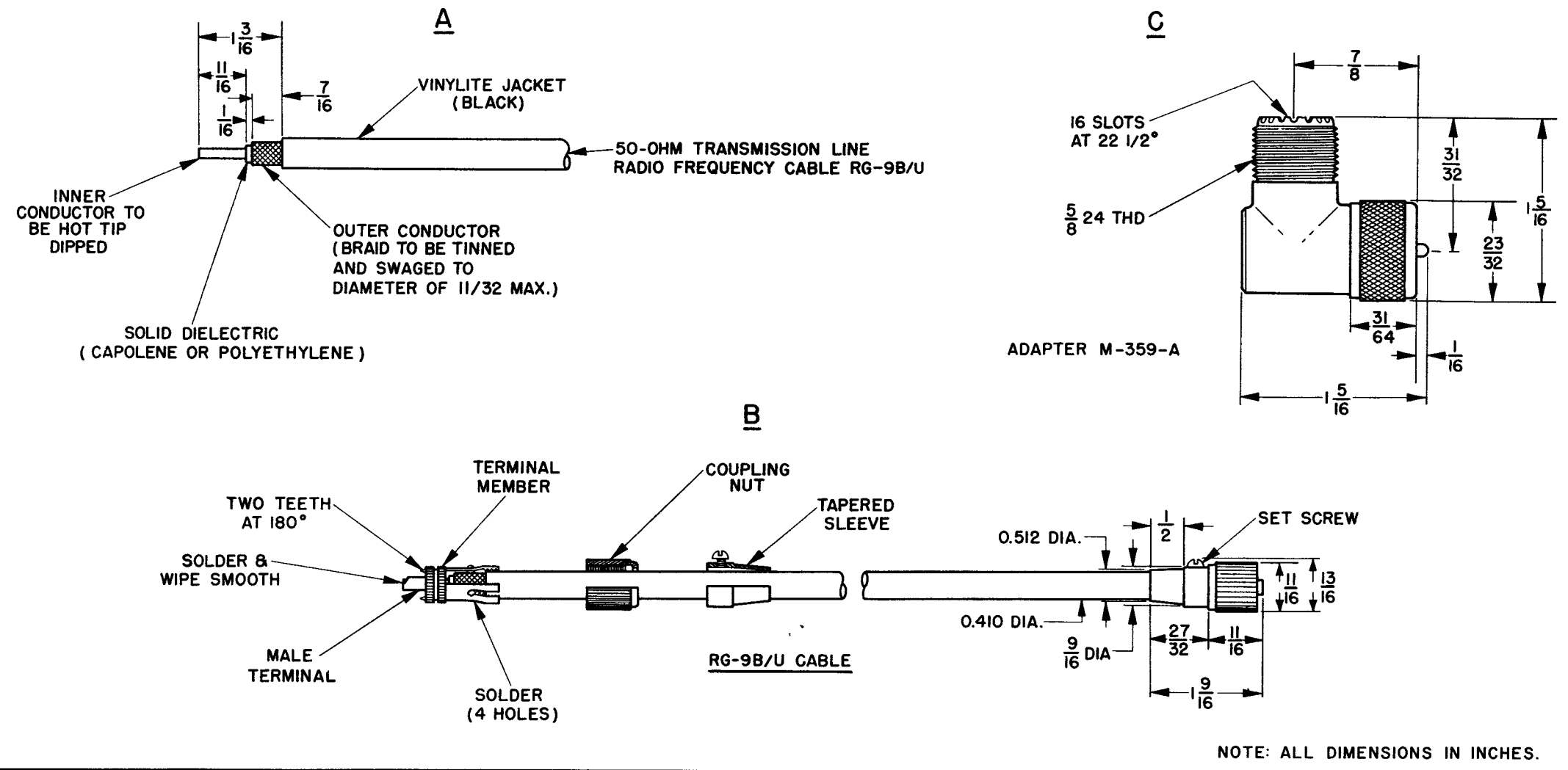


NOTE: FOR ALL SOLDERING USE ONLY NON-CORROSIVE ROSIN CORE SOLDER

1. Cut from stock 6 lengths of cable to the length required. Three of these lengths are to be insulated #22 or larger, one length to be insulated #20 or larger, and two lengths of RG-71/U.
2. Disassemble the plugs by removing the two screws holding the shell of the plug together.
3. Solder the #20, #22, and the inner conductor of the RG-71/U to the terminal on the insert using non-corrosive resin core solder.
4. A turn of braided shield shall be soldered to the braided shield of the RG Cable RG-71/U at a point inside the AN connector. One end of this braided shield shall connect to pin "E" and the other end shall extend back through the cable adapter AN3057-8A. This shall be done at both ends of RG Cable RG-71/U.
5. Reassemble by placing insert inside the shell halves and tighten the two screws. Place the cable clamp in position and tighten.

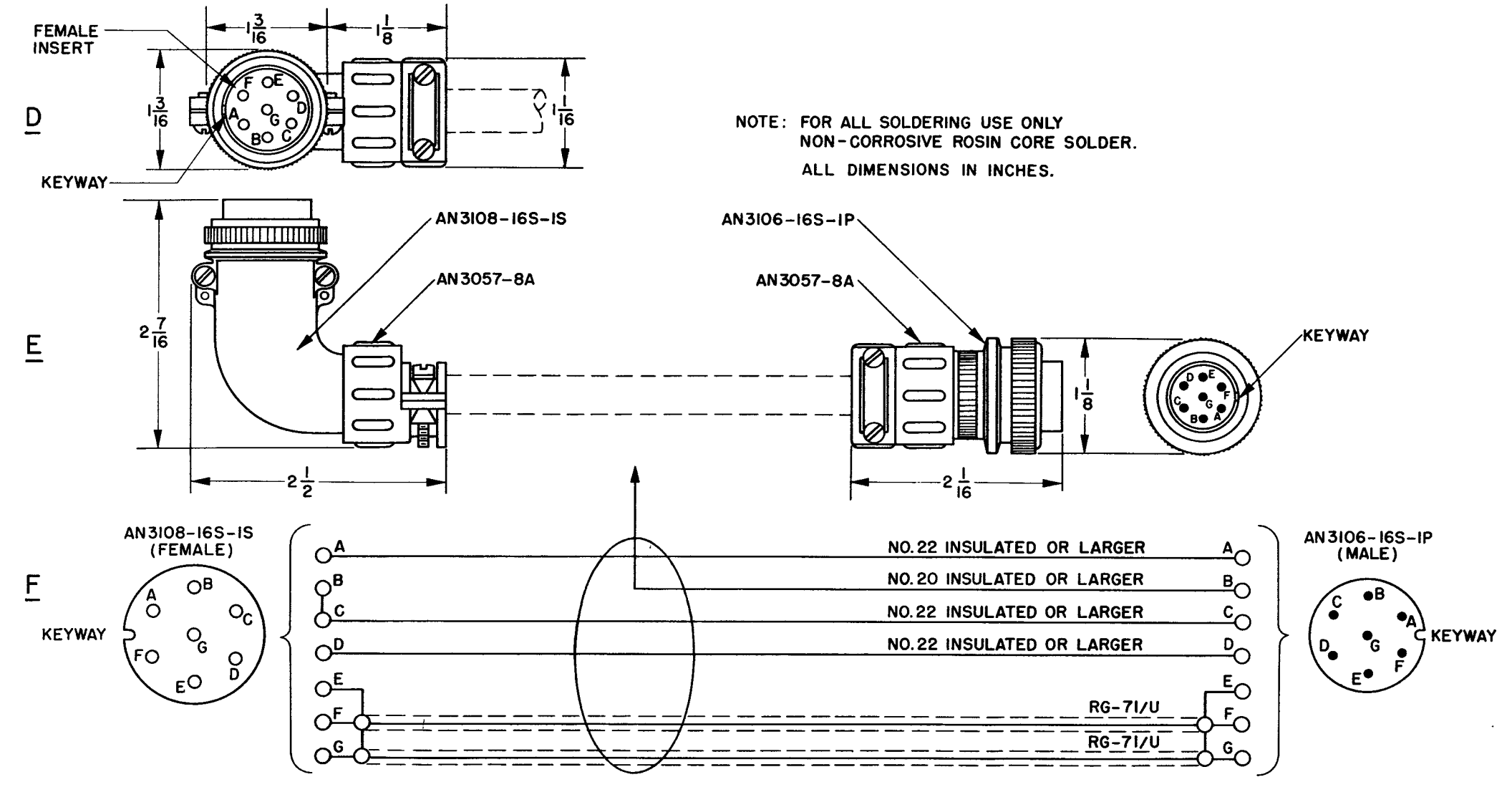
Figure 7-1. Cable Fabrication Diagram, Radio Set SCR-718-D

INTERCONNECTING CABLE FABRICATION BETWEEN BC-788-E AND ANTENNA.



1. Cut bulk radio frequency cable RG-9B/U to lengths required for the particular installation. Trim both ends of each cable as shown in sub-figure A. Hot tin dip inner conductor extensions and tin outer conductor braid to within 1/8 inch from vinylite jacket. Avoid surplus solder and excessive heating of copolene dielectric and vinylite jacket. Swage tinned braid, if necessary, to 11/32" diameter maximum.
2. Disassemble plugs by slipping tapered sleeve and coupling nut over each end of cables in the relation shown at left in sub-figure B.
3. Feed ends of cable into plug terminal members so that end of inner conductor is approximately flush with tip of hollow terminal and tinned braid extends slightly beyond the four soldering holes in the neck, as shown in sub-figure B. At least 1/4" of jacket should enter threaded portion of terminal member.
4. Using non-corrosive flux or resin core solder, carefully solder end of inner conductor to terminal tip and solder braid to neck of terminal member at four holes. Avoid excess solder and remove all solder on outer periphery of hollow pin terminal to prevent mating interference. Snip off conductor extension (if any) flush with tip of terminal.
5. Reassemble plugs as shown at right of sub-figure B. Draw tapered sleeve over slotted member and tighten setscrew firmly against solid metal portion of neck, after adjusting for minimum clearance which will allow coupling nut to turn freely.
6. The elbow adapters, sub-figure C, may if absolutely necessary, be interposed between transmission lines and receptacles J103 and J104 of receiver and transmitter and antenna receptacles, or transmission lines may be connected to receptacles directly. If adapters are to be used, couple female end of adapter to male plug at each end of transmission lines. Make sure that teeth at front rim of plugs are engaged with notches at rim of adapter before coupling nuts are firmly tightened.
7. A non-metallic band, sleeve or other suitable cable marker shall be installed at receiver and transmitter end of each antenna cable giving the residual delay of the antenna system and the length of the respective cable. The characters shall be legible and of a permanent nature.

INTERCONNECTING CABLE FABRICATION BETWEEN BC-788-E AND I-152-E.



1. Cut from stock 6 lengths of cable to the length required. Three of these lengths are to be insulated #22 or larger, one length to be insulated #20 or larger, and two lengths of RG-71/U.
2. Disassemble the plugs by removing the two screws holding the shell of the plug together.
3. Solder the #20, #22, and the inner conductor of the RG-71/U to the terminal on the insert using non-corrosive resin core solder.
4. A turn of braided shield shall be soldered to the braided shield of the RG Cable RG-71/U at a point inside the AN connector. One end of this braided shield shall connect to pin "E" and the other end shall extend back through the cable adapter AN3057-8A. This shall be done at both ends of RG Cable RG-71/U.
5. Reassemble by placing insert inside the shell halves and tighten the two screws. Place the cable clamp in position and tighten.

Figure 7-2. Cable Fabrication Diagram, Radio Set SCR-718-E

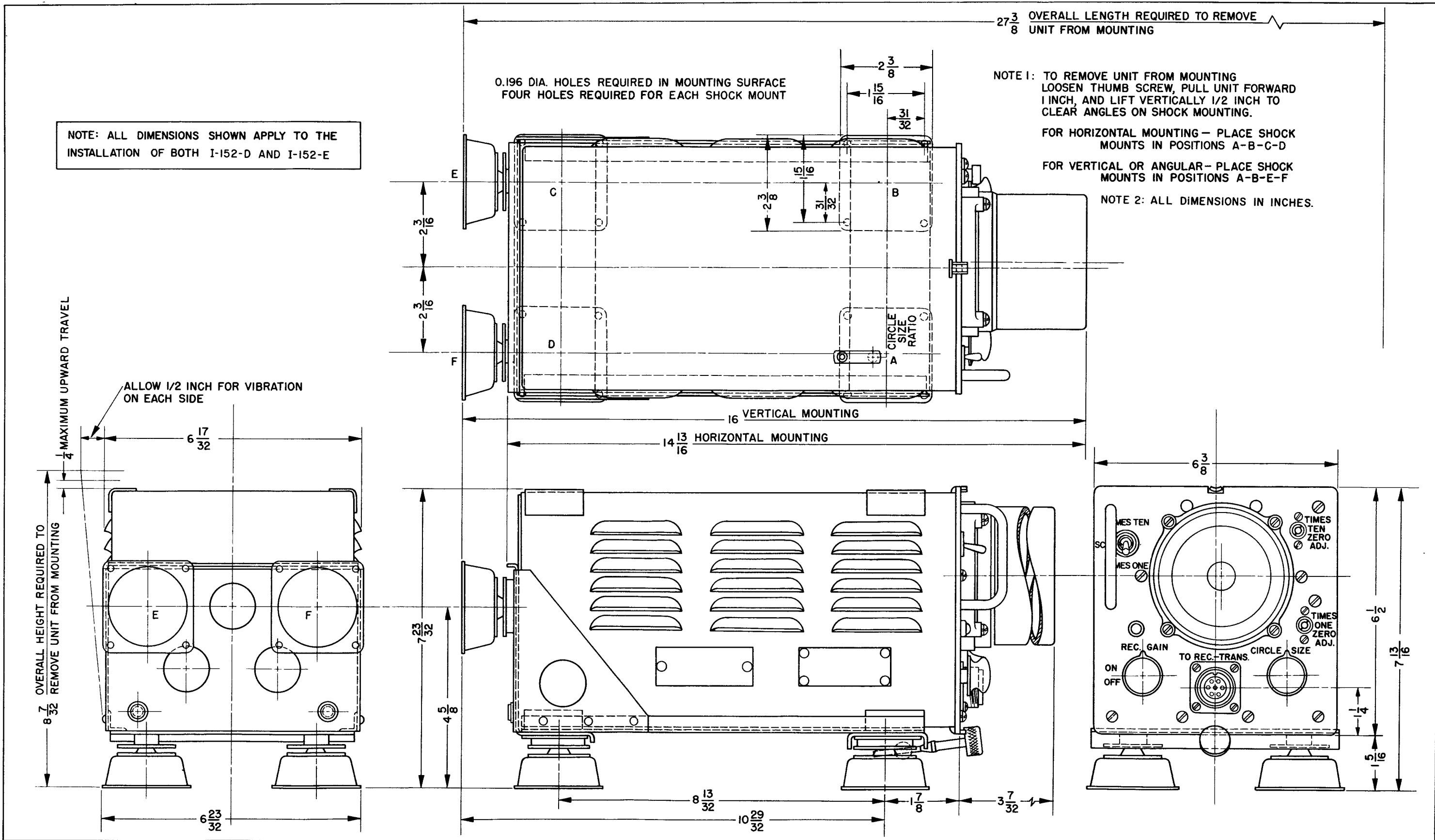
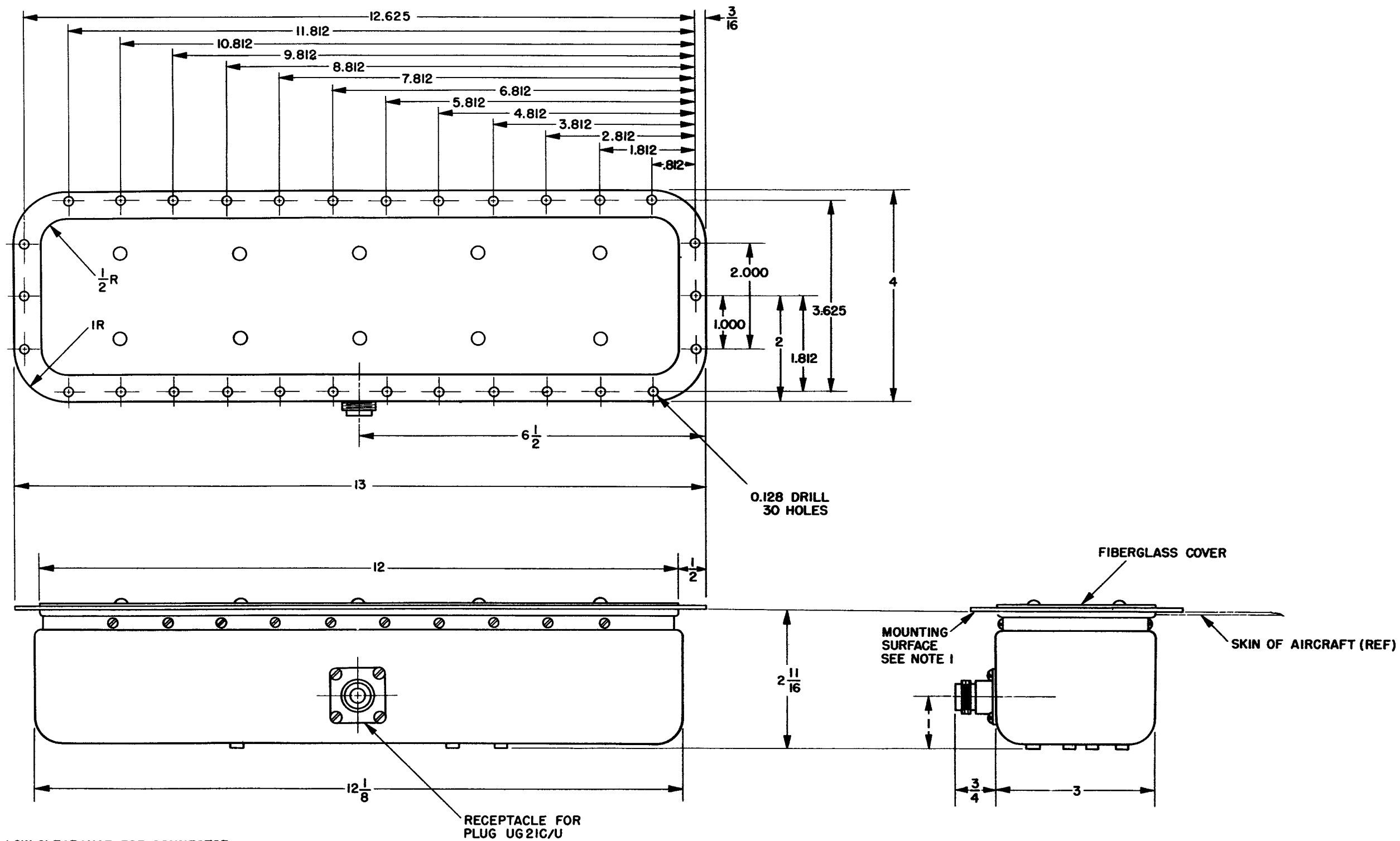


Figure 7-4. Outline Drawing, Indicator I-152-D or -E



2. ALLOW CLEARANCE FOR CONNECTOR AND ASSOCIATED WIRING.
1. REMOVE ANODIZED COATING FROM FLANGED SURFACE BEFORE INSTALLATION.

GENERAL NOTE: ALL DIMENSIONS SHOWN APPLY TO BOTH ANTENNA ASSEMBLY AS-333/AP AND ANTENNA AT-505/AP. CERTAIN OTHER DETAILS NOT PERTINENT TO INSTALLATION PROCEDURES ARE SHOWN ONLY AS THEY APPEAR IN AS-333/AP. ALL DIMENSIONS IN INCHES.

Figure 7-5. Outline Drawing, Antenna Assembly AS-333/AP or Antenna AT-505/AP

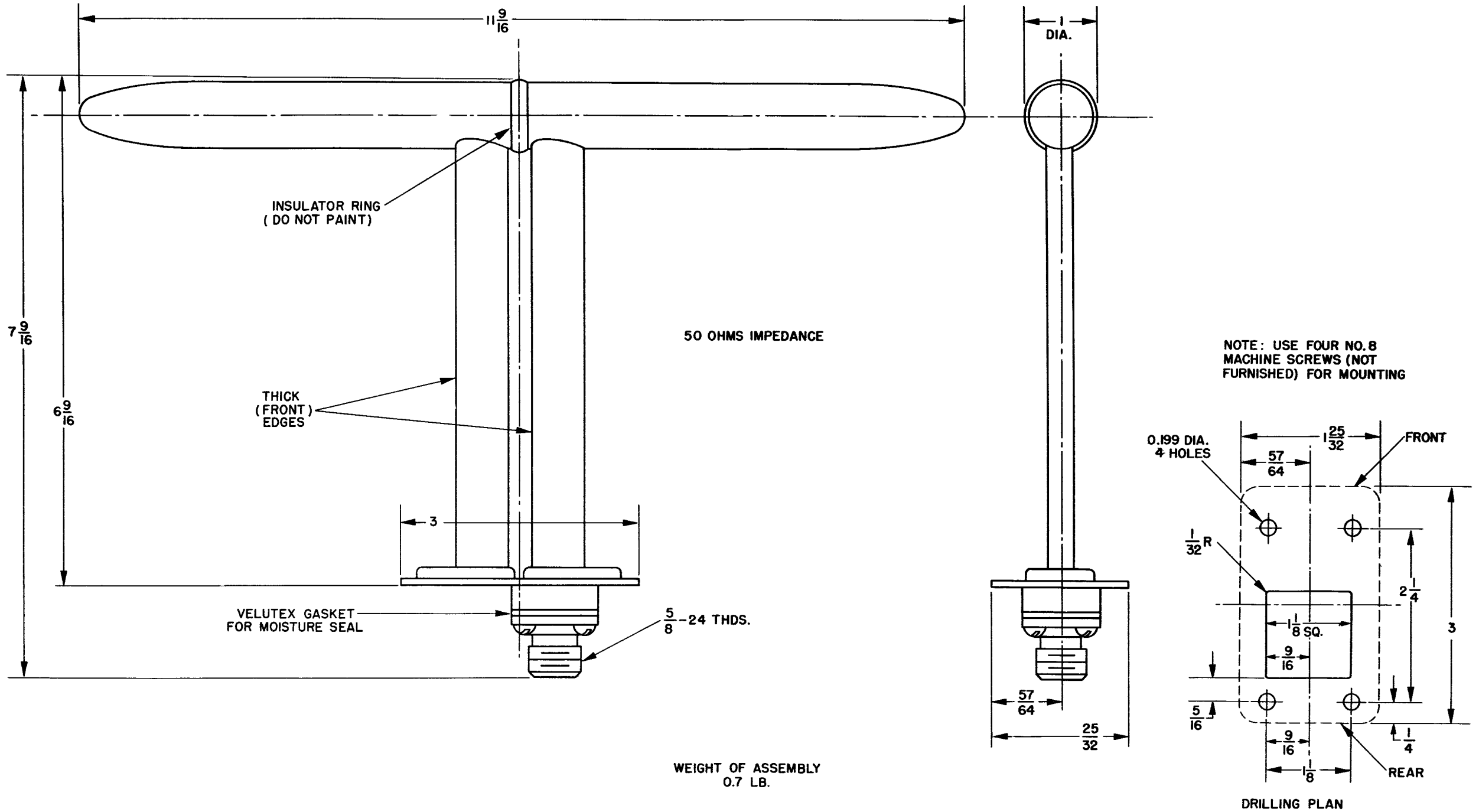


Figure 7-6. Outline Drawing, Antenna AT-4/ARN-1 or AT-4A/ARN-1

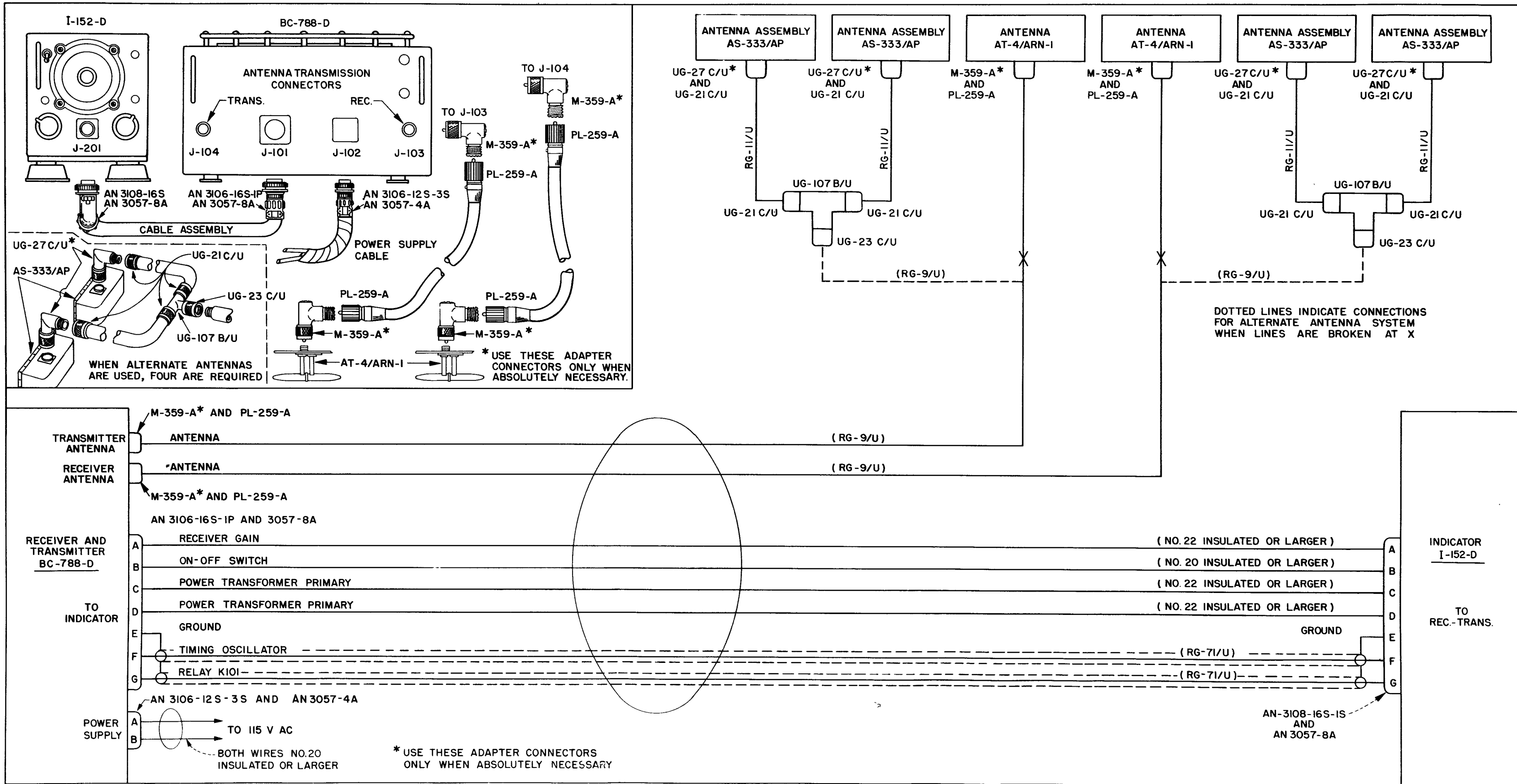


Figure 7-7. Interunit Cabling and Wiring Diagram, Radio Set SCR-718-D

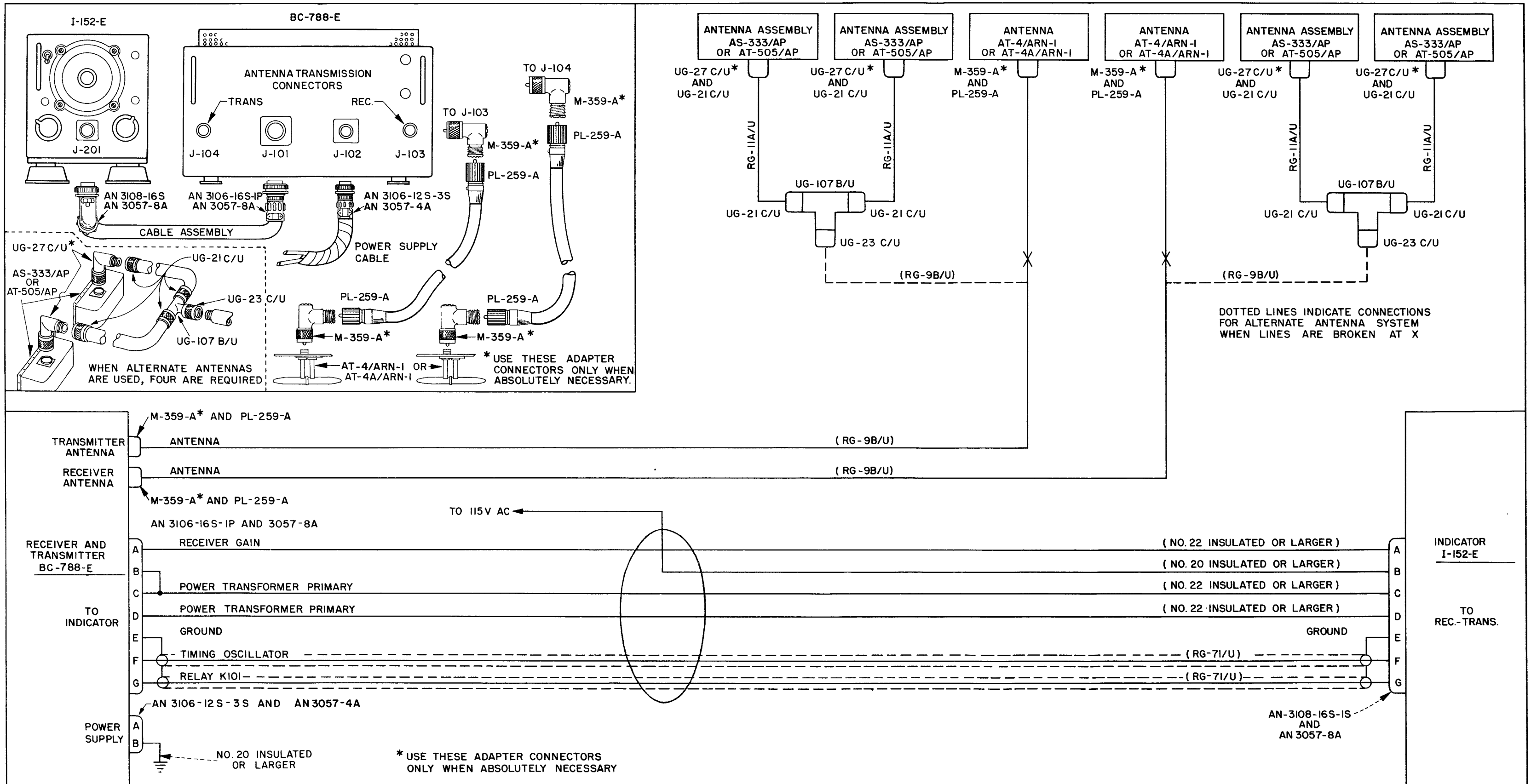


Figure 7-8. Interunit Cabling and Wiring Diagram, Radio Set SCR-718-E

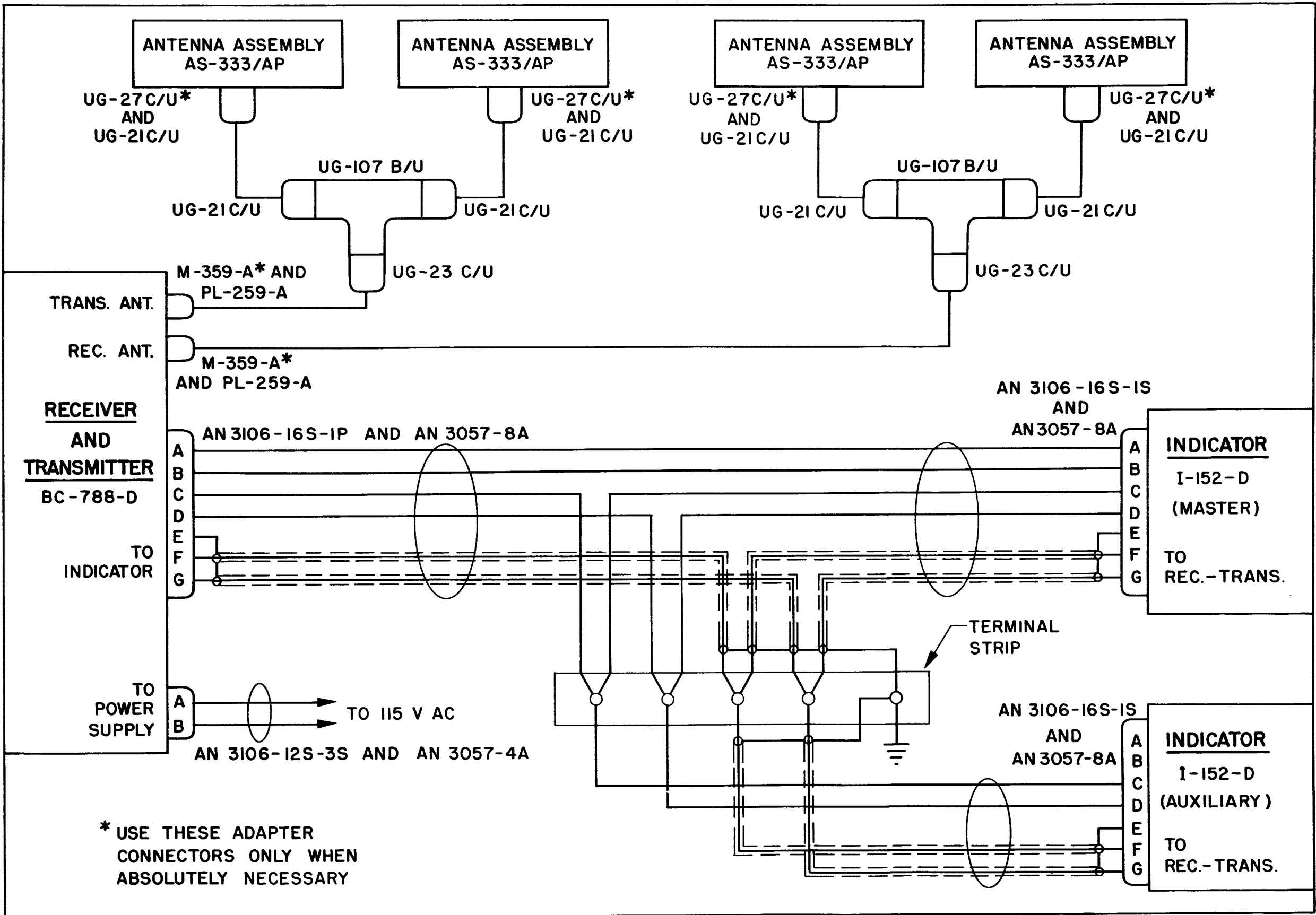


Figure 7-9. Interunit Cabling and Wiring Diagram, Radio Set SCR-718-D, Employing Auxiliary Indicator

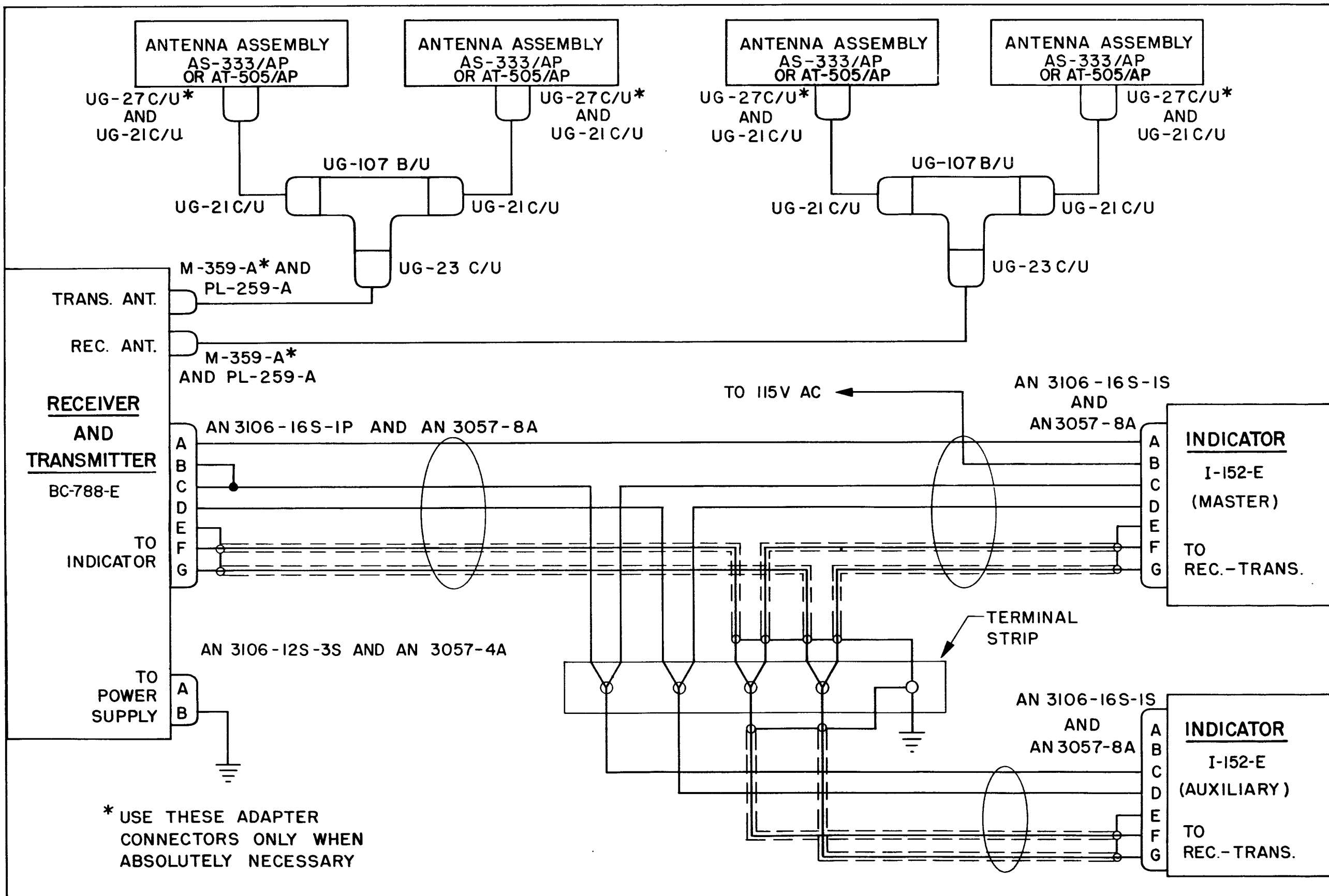
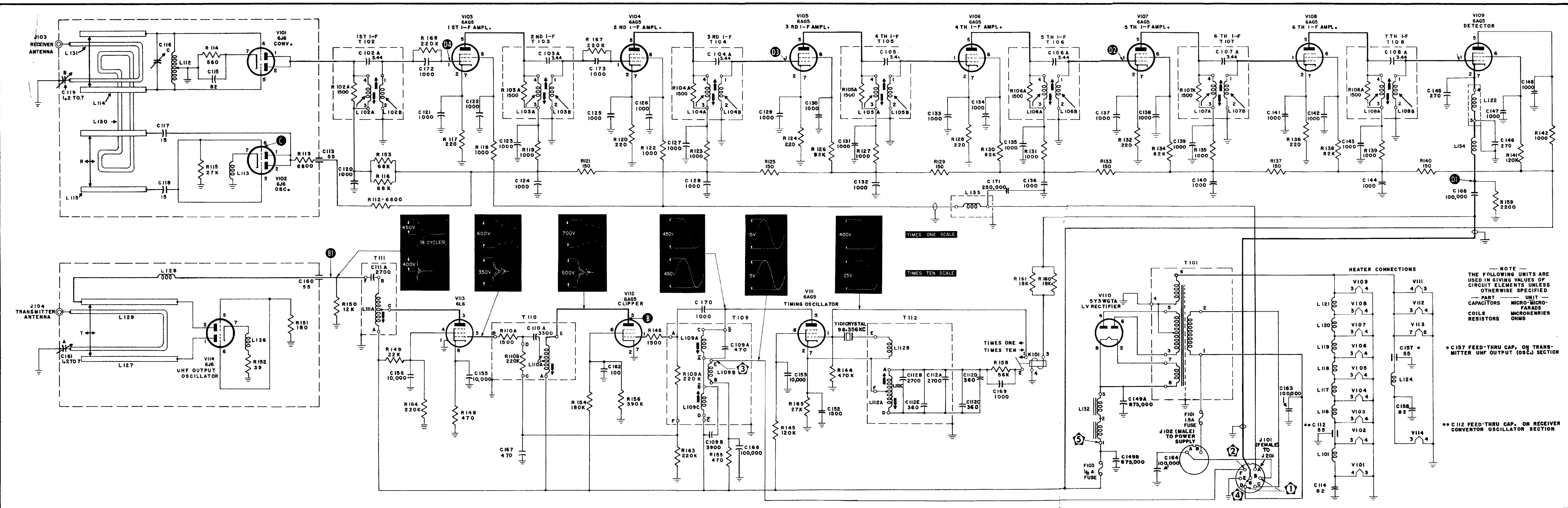


Figure 7-10. Interunit Cabling and Wiring Diagram, Radio Set SCR-718-E, Employing Auxiliary Indicator



NOTE — THE FOLLOWING UNITS ARE USED IN GIVING VALUES OF CIRCUIT ELEMENTS UNLESS OTHERWISE SPECIFIED

PART	UNIT
CAPACITORS	MICRO-FARADS
COILS	MICROHENRIES
RESISTORS	OHMS

• C157 FEED-THRU CAP. ON TRANSMITTER UHF OUTPUT (OSC.) SECTION

• C112 FEED-THRU CAP. ON RECEIVER CONVERTOR OSCILLATOR SECTION

Figure 7-11. Schematic Diagram, Radio Receiver and Transmitter BC-788-D

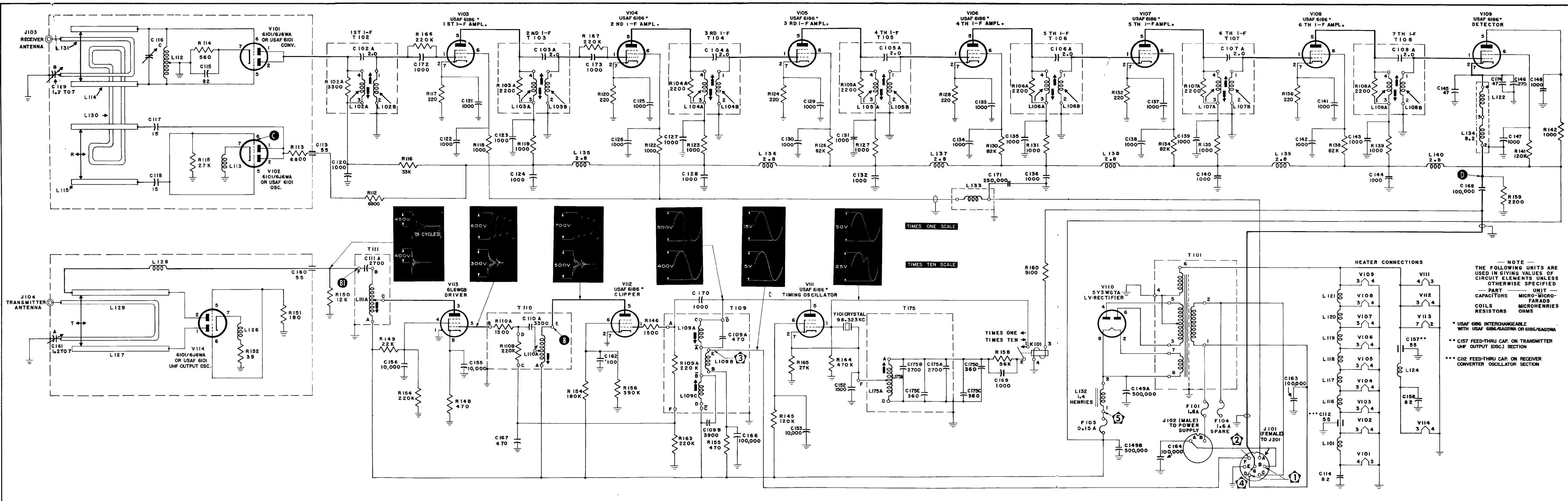
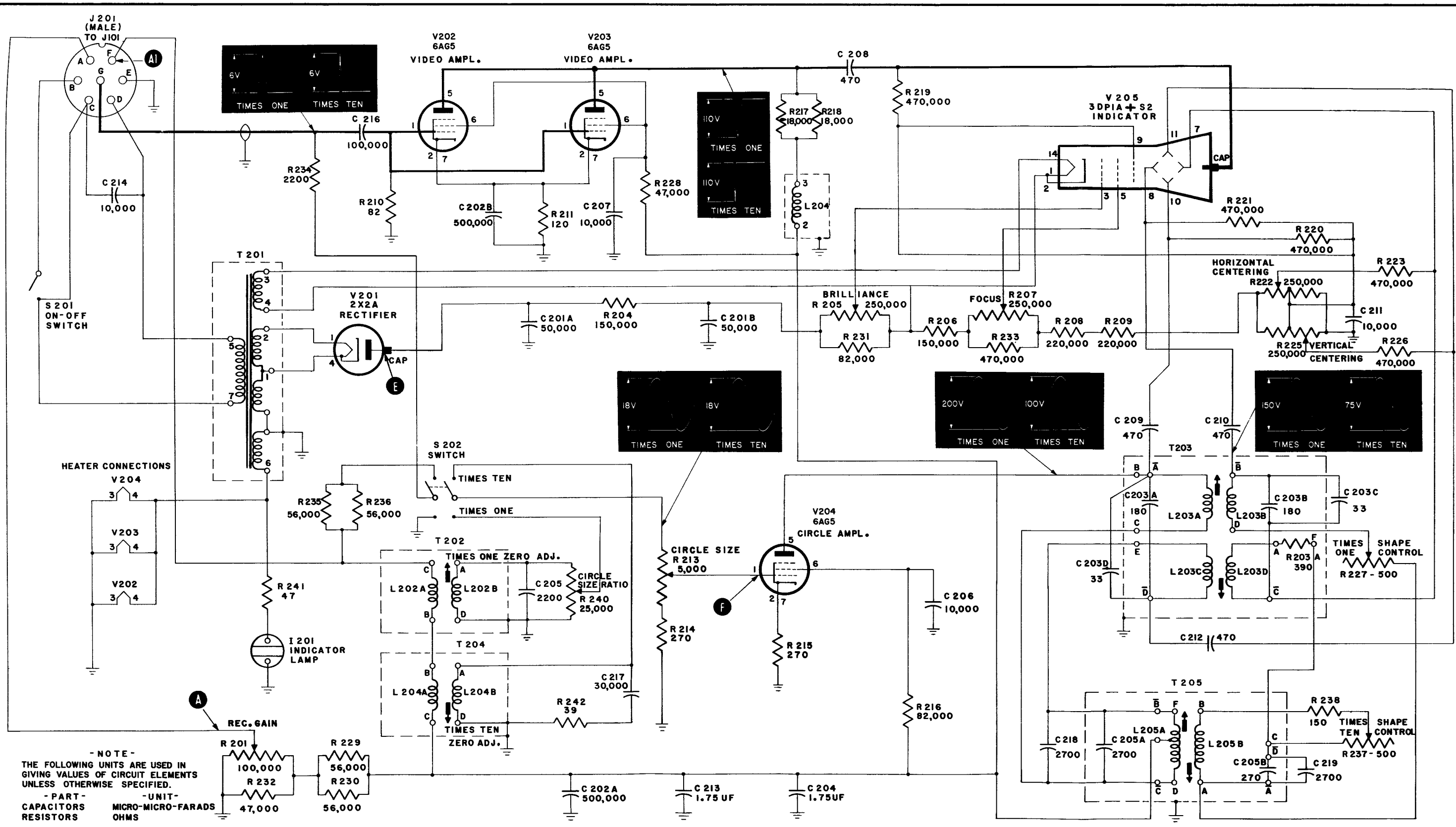


Figure 7-12. Schematic Diagram, Radio Receiver and Transmitter BC-788-E



- NOTE -
THE FOLLOWING UNITS ARE USED IN GIVING VALUES OF CIRCUIT ELEMENTS UNLESS OTHERWISE SPECIFIED.

- PART -
CAPACITORS
RESISTORS

- UNIT -
MICRO-MICRO-FARADS
OHMS

Figure 7-13. Schematic Diagram, Indicator I-152-D

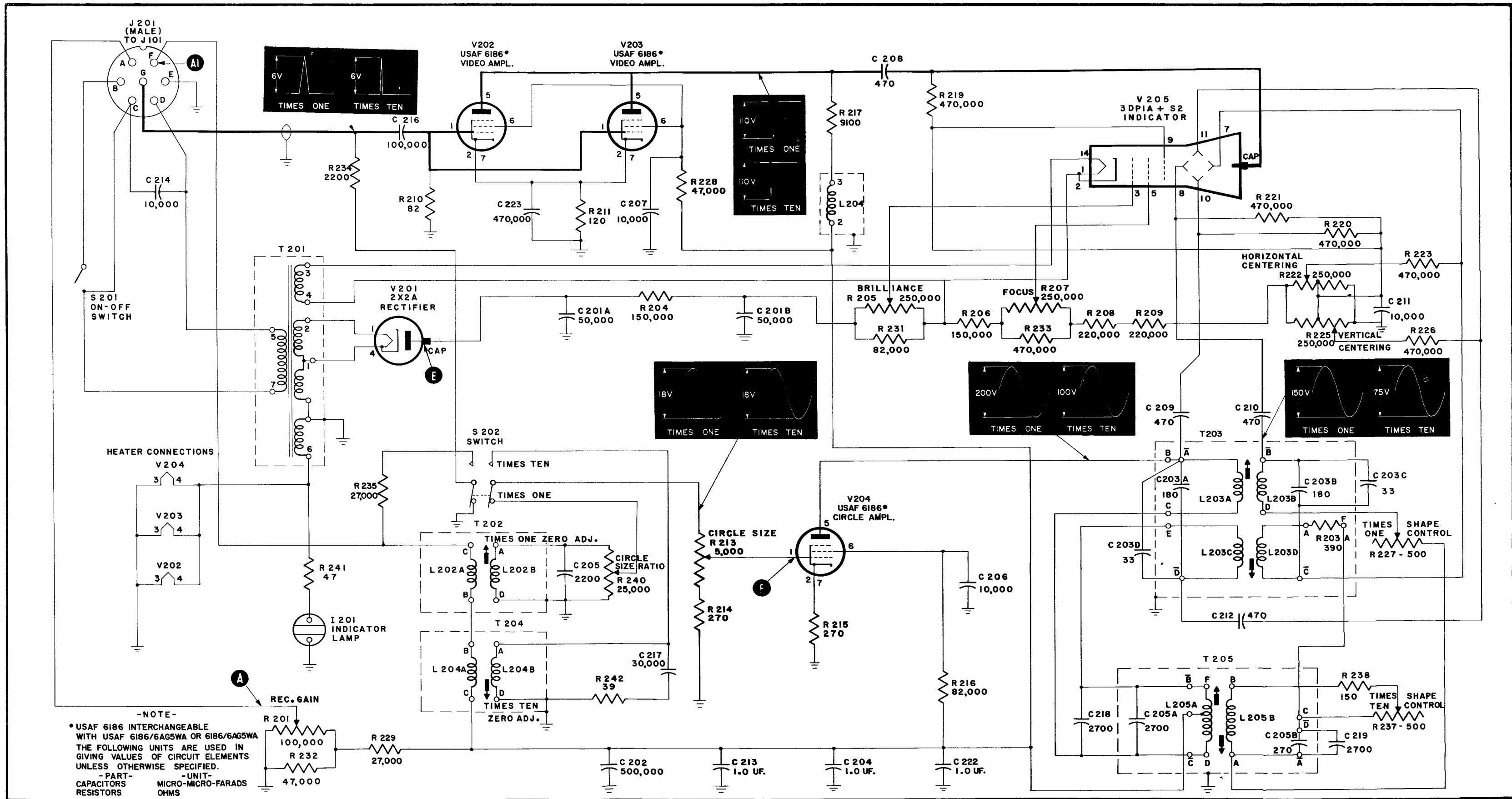
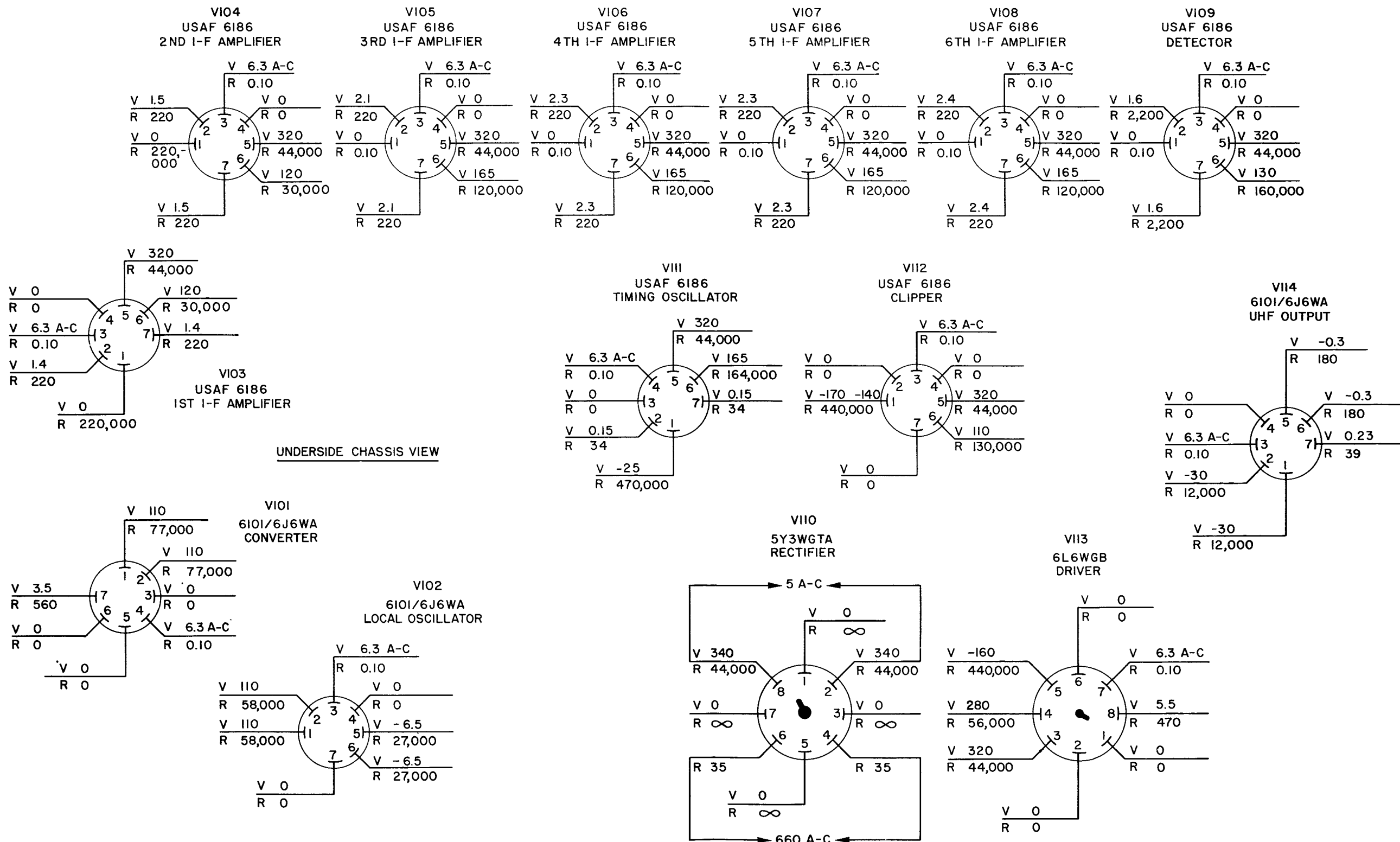
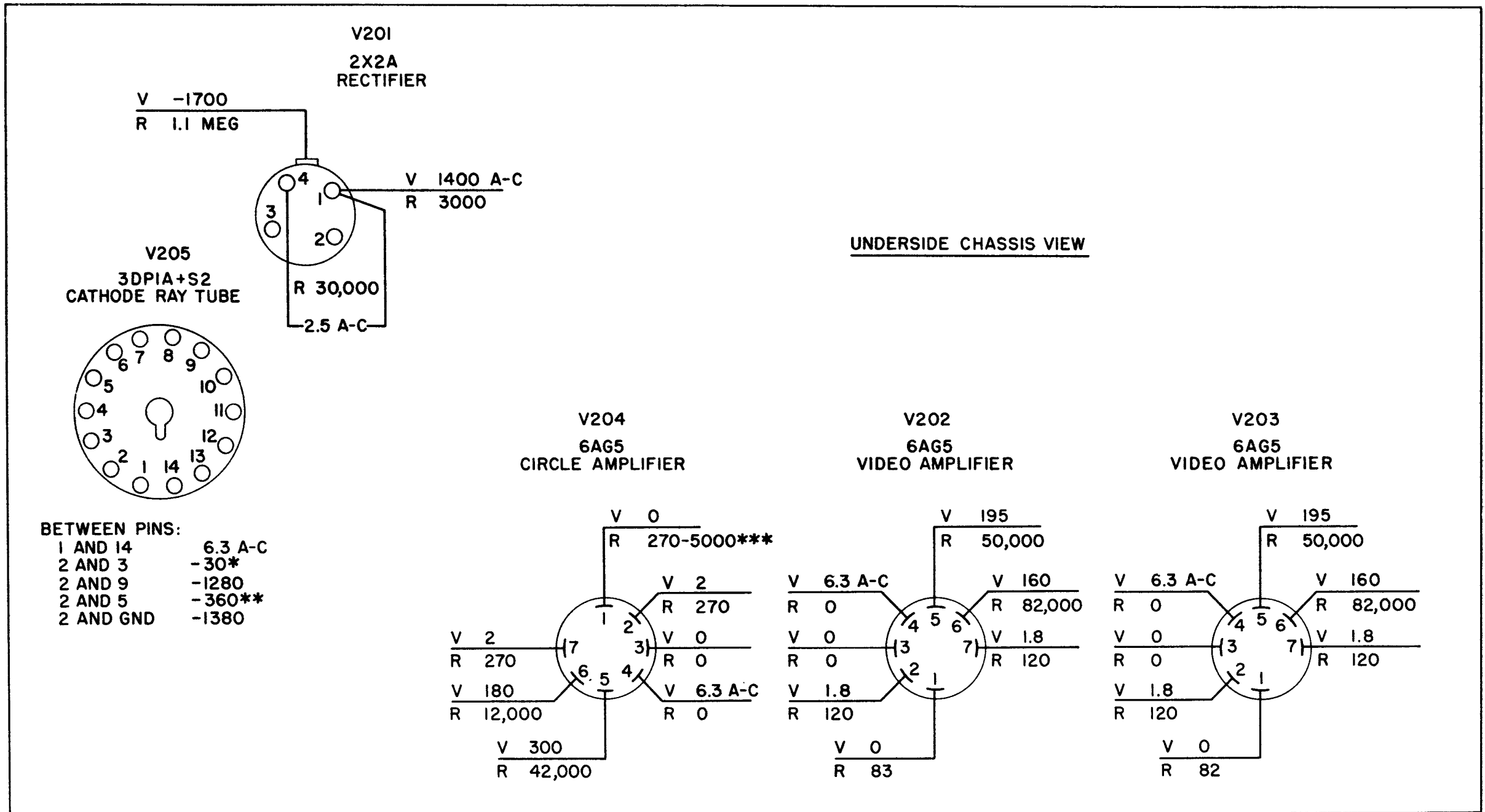


Figure 7-14. Schematic Diagram, Indicator I-152-E



** ACTUAL VALUE DEPENDS UPON SETTING OF RECEIVER GAIN CONTROLS
 ALL VOLTAGES ARE D-C UNLESS OTHERWISE INDICATED
 ALL VOLTAGE MEASUREMENTS TAKEN WITH 20,000 OHM/VOLT METER
 ALL VOLTAGE MEASUREMENTS TAKEN BETWEEN TUBE SOCKET PINS AND GROUND UNLESS OTHERWISE INDICATED

Figure 7-16. Voltage and Resistance Measurements, Radio Receiver and Transmitter BC-788-E



* VOLTAGE VARIES BETWEEN 0 AND 100 VOLTS, DEPENDING ON SETTING OF BRIL. CONTROL
(SHOULD NEVER BE OPERATED AT 0 VOLTS)

** VOLTAGE VARIES BETWEEN -240 AND -490 VOLTS, DEPENDING ON SETTING OF FOCUS CONTROL

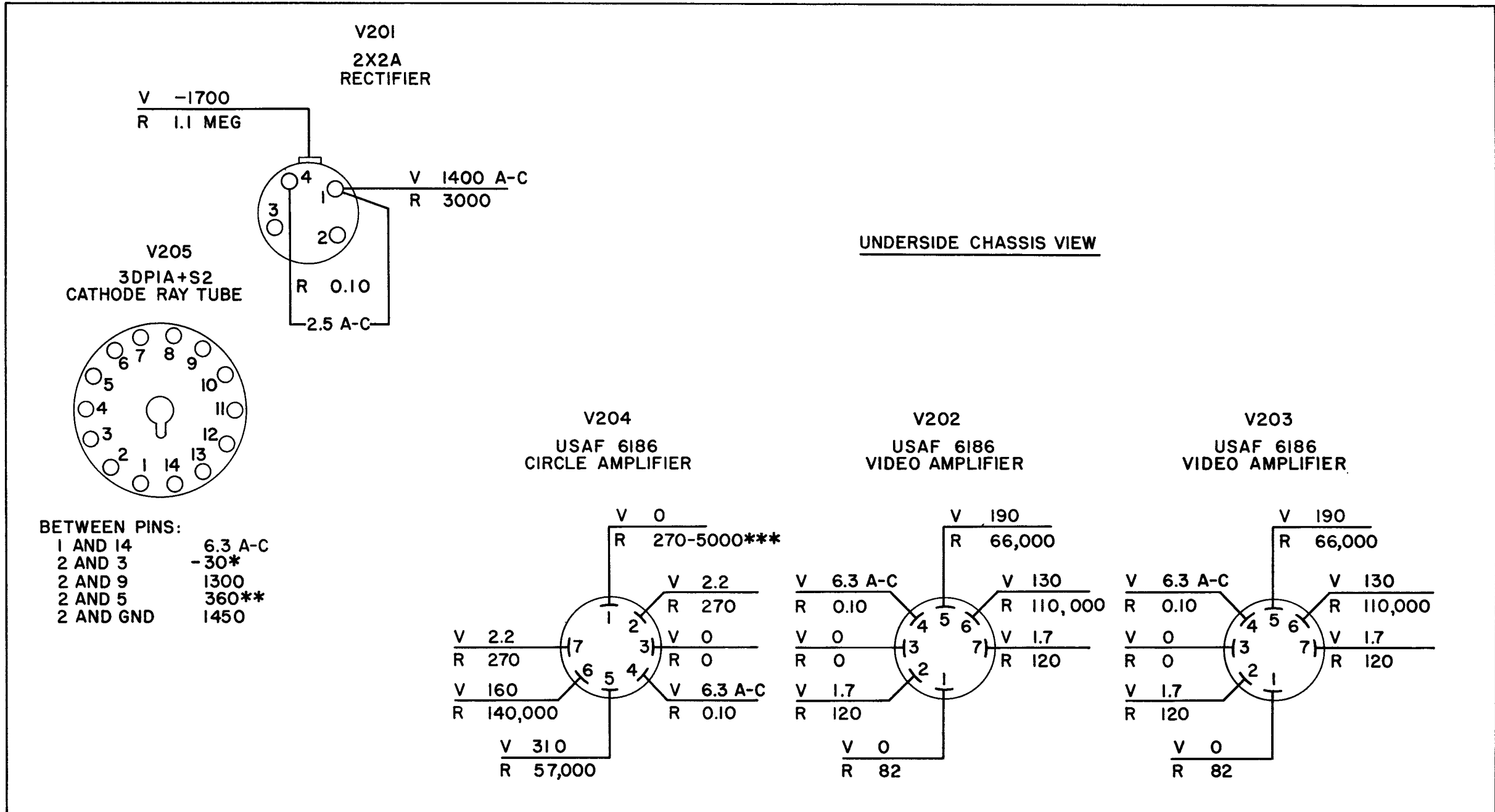
*** ACTUAL VALUE DEPENDS UPON SETTING OF CIRCLE SIZE CONTROL

ALL VOLTAGES ARE D-C UNLESS OTHERWISE INDICATED.

ALL VOLTAGE MEASUREMENTS TAKEN WITH 20,000 OHM/VOLT METER.

ALL VOLTAGE MEASUREMENTS TAKEN BETWEEN TUBE SOCKET PINS AND GROUND UNLESS OTHERWISE INDICATED.

Figure 7-17. Voltage and Resistance Measurements, Indicator I-152-D



* VOLTAGE VARIES BETWEEN 0 AND -100 VOLTS, DEPENDING ON SETTING OF BRIL. CONTROL (SHOULD NEVER BE OPERATED AT 0 VOLTS)

** VOLTAGE VARIES BETWEEN 240 AND 490 VOLTS, DEPENDING ON SETTING OF FOCUS CONTROL

*** ACTUAL VALUE DEPENDS UPON SETTING OF CIRCLE SIZE CONTROL

ALL VOLTAGES ARE D-C UNLESS OTHERWISE INDICATED.

ALL VOLTAGE MEASUREMENTS TAKEN WITH 20,000 OHM/VOLT METER.

ALL VOLTAGE MEASUREMENTS TAKEN BETWEEN TUBE SOCKET PINS AND GROUND UNLESS OTHERWISE INDICATED.

Figure 7-18. Voltage and Resistance Measurements, Indicator I-152-E

SECTION VIII
DIFFERENCE DATA SHEETS

Service instructions for the models included in this section are the same as the procedures for Radio Set SCR-718-D and Radio Set SCR-718-E except for the specific differences noted by the applicable Difference Data Sheet. Sections I through VII contain complete service instructions for Radio Set SCR-718-D manufactured under contract AF 33(600)-16687 and Radio Set SCR-718-E manufactured under contracts AF 33(600)-25024, AF 33(600)-27083, AF 33(600)-29711, and AF 33(600)-30067.

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Radio Set SCR-718-F	109

SECTION VIII
DIFFERENCE DATA SHEET

RADIO SET SCR-718-F

Contract AF 33(600)-29711 Supplemental Agreement No. 1

BC-788-F Serial No. AF55-1 through AF55-70
F-322/A Serial No. AF55-1 through AF55-70

Contract AF 33(600)-31120

BC-788-F Serial No. AF55-71 through AF55-182
F-322/A Serial No. AF55-71 through AF55-182

Contract AF 33(600)-35625

BC-788-F Serial No. AF57-183 through AF57-623
F-322/A Serial No. AF57-183 through AF57-623
MT-1745/A Serial No. AF57-1 through AF57-225
MT-1746/A Serial No. AF57-1 through AF57-225

The instructions contained in the preceding sections of this handbook apply except for the differences given in this data sheet.

SECTION I
DESCRIPTION AND LEADING PARTICULARS

1-2. Radio Set SCR-718-F is produced under contracts AF 33(600)-29711 Supplemental Agreement No. 1, AF 33(600)-31120 and AF 33(600)-35625.

1-4. For Radio Set SCR-718-F, the BC-788-F shown in Figure 1-1A is used.

1-5. The operational altitude of the various units which make up Radio Set SCR-718-F are as follows:

a. Radio Receiver and Transmitter BC-788-F, Serial No. AF 55-1 through AF 55-182, 60,000 feet.

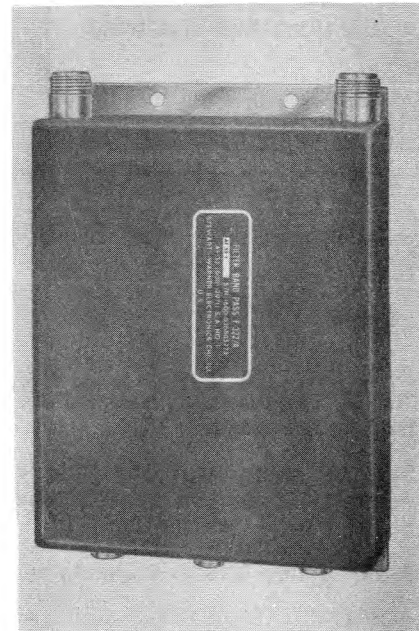
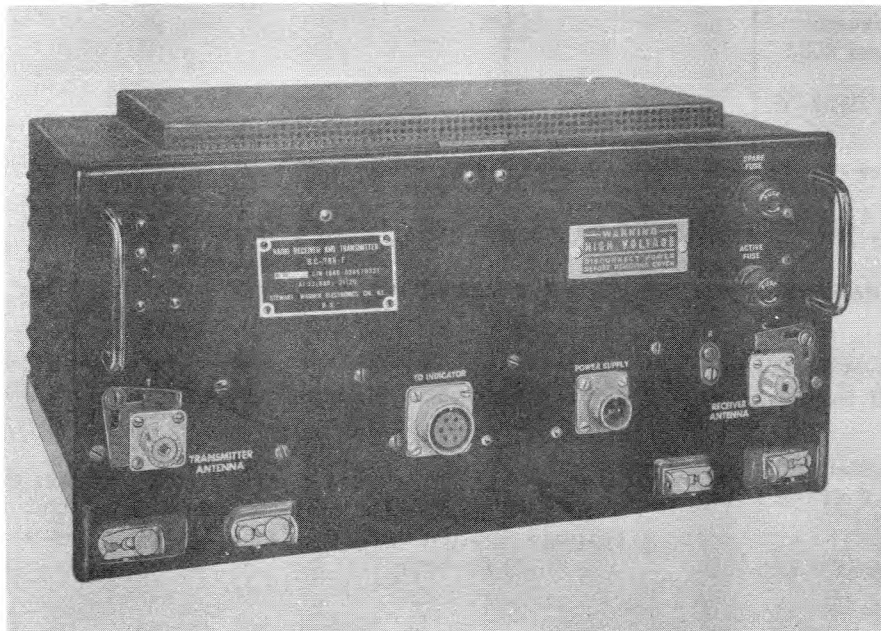


Figure 1-1A. Radio Receiver and Transmitter BC-788-F and Filter F-322/A Portion of Radio Set SCR-718-F
Revised 1 April 1958

b. Radio Receiver and Transmitter BC-788-F, Serial No. AF 57-183 through AF 57-623, 70,000 feet.

c. Indicator I-152-E, all units, (located in pressurized compartment only), 70,000 feet. If the indicator is not in a pressurized compartment the operational altitude of Radio Set SCR-718-F will be limited to 40,000 feet.

Figure 1-2. An additional two UG-21C/U connectors are required with Radio Set SCR-718-F.

1-7. Difference between SCR-718-D or -E and SCR-718-F.

1-8. Changes incorporated in the SCR-718-F are mainly to minimize the spurious radiations (noise) from the unit which interfere with other electronic equipment installed in the aircraft. Loop sensitivity

has been increased to aid in obtaining increased operational altitude. The changes most apparent to the maintenance technician are; 1) The new shield over tubes V101 and V102 on the top side of the BC-788-F chassis; 2) Two new filters FL101 and FL102 added to the 400-cycle power input line; 3) An external filter F-322/A which is placed between the antenna and the receiver section of the BC-788-F; and 4) Two new mounts MT-1745/A and MT-1746/A for the BC-788-F and the I-152-E, respectively. These mounts are supplied under Contract AF-33(600)-35625 and therefore are not available for all SCR-718-F systems. In the interim, mounting base MT-14/ARN-1 and FT-445-A may be used. However the old mounts should be replaced with the new mounts as they become available so that the "F" model on the new mounts will meet the requirements of high performance aircraft. Figure 7-6A prepared from AF drawings show the outline and dimensional characteristics of these mounts.

SECTION II

TEST EQUIPMENT AND SPECIAL TOOLS

2-6. a. When Filter F-322/A is to be used with the SCR-718-F, fabricate the antenna cable between RECEIVER ANTENNA jack (J103) and the antenna the same as is shown in Figure 7-2. The position of the filter in the aircraft will determine where the cable is

to be cut. Cut the antenna cable and add new connectors as shown in Figure 7-2A to the ends exposed by cut. The total length of all the antenna cables must not exceed 50 feet.

TABLE 2-1
TEST EQUIPMENT REQUIRED FOR MAINTENANCE

NAME	TYPE DESIGNATION	ALTERNATE	APPLICATION
GENERATOR, SIGNAL, Ultra-high frequency	Hewlett-Packard Model 608C		Filter performance check
RECEIVER, Ultra-high frequency	AN/URM-28		Filter performance check

SECTION III

PREPARATION FOR USE AND RESHIPMENT

3-6. Mounting base MT-1745/A is used for the BC-788-F. Use mounting base MT-14/ARN-1 if the above base is not available.

3-7. Mounting base MT-1746/A is used with Indicator I-152-E. Use mounting base FT-445-A if the above base is not available.

3-15. Filter F-322/A should be mounted in any con-

venient location between the antenna connector and receiver input jack. Refer to paragraph 2-6. a. for fabrication.

3-17. h. BC-788-F units supplied under Contract AF 33(600)-35625 have had the Dow-Corning No. 4 ignition sealing compound applied to the socket of the rectifier tube at the factory.

SECTION IV

THEORY OF OPERATION

4-6. As shown in Figure 4-2A, filters FL101 and FL 102 are used to prevent spurious radiations in the transmitter causing interference with other electronic equipment through the aircraft power line.

4-9A. In the SCR-718-F (see Figure 4-5A) the received signal is fed through a filter trap F-322/A. The desired 440-mc signal passes through, while a high impedance is provided to the undesired image frequency and local oscillator frequency. The local oscillator output is capacitively coupled through C179 to the converter control grid.

4-16A. FILTER F-322/A. (See Figure 1-1A.) This filter is a sealed non-reparable unit, 7 x 4-29/32 x 1-19/32 inches overall, and weighing approximately two

pounds. Internally there are three rigid quarter-wave lines shorted at one end. These shorted sections are connected in series between the external connectors. The ends opposite the short circuits are capacitively tuned to the exact quarter wave length before sealing. The three tuned circuits are physically spaced so that critical coupling occurs, producing a triple humped peak. The filter is designed to pass the transmitter frequency of 440 megacycles with little attenuation, attenuate the local oscillator frequency of 410 megacycles approximately 60 db thus preventing radiation from the receiver antenna and reduce the image frequency of 380 megacycles approximately 70 db. The bandpass at half power is 6 to 7 megacycles. For all practical purposes the filter is symmetrical and may be connected between the receiver antenna and J103 in either direction. (See Figures 7-2A, 7-8A and 7-10A.)

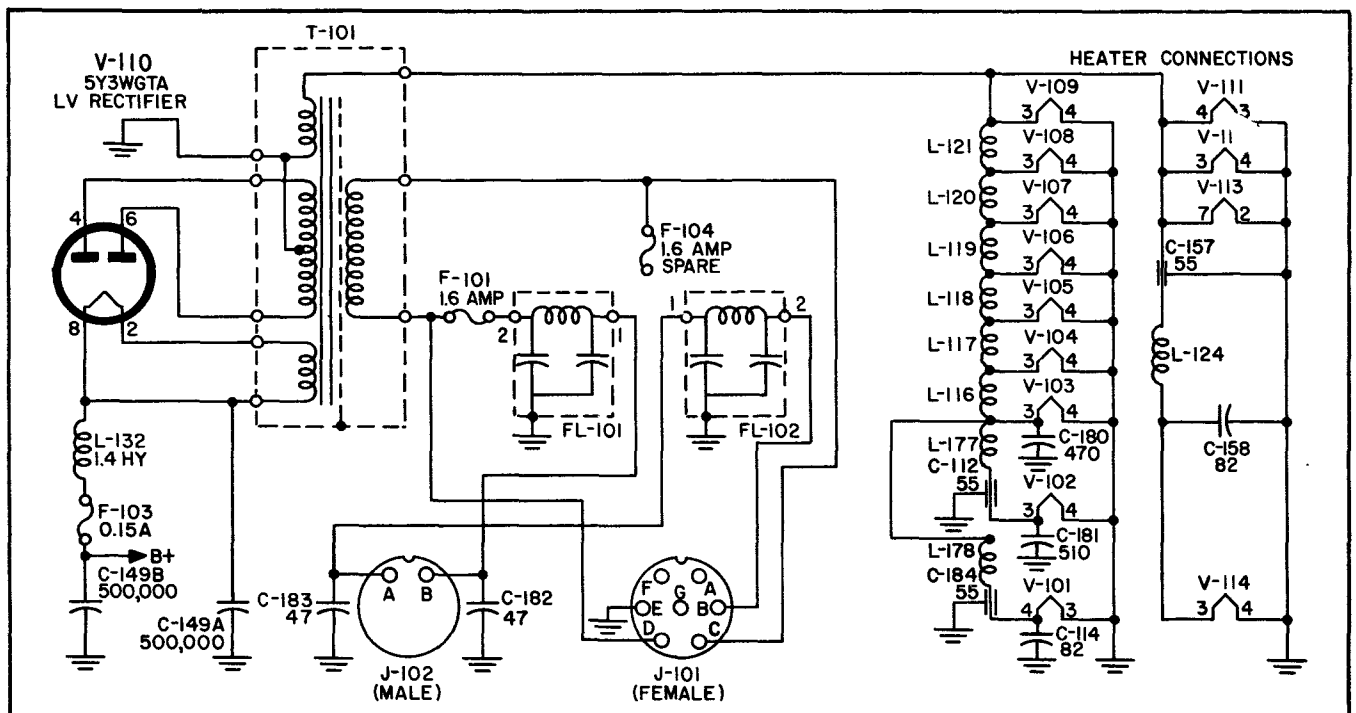


Figure 4-2A. Low-Voltage Power Supply, BC-788-F

SECTION V

ORGANIZATIONAL AND OPERATIONAL MAINTENANCE

5-12A. FILTER F-322/A PERFORMANCE CHECK.

a. Connect the signal generator to one side of the symmetrical filter and the uhf receiver to the other through coaxial cables of 50 ohms impedance (RG-9B/U cable with UG-21C/U connector at filter end). If necessary proper 50-ohm pads should be used to obtain proper impedance match with filter and test equipment.

b. Set the signal generator to 440 megacycles unmodulated.

c. Tune the uhf receiver to obtain a maximum indication on its output indicator while adjusting output of signal generator to get an average reading.

d. Remove the filter.

e. Connect the signal generator to the uhf receiver.

er by joining the two coaxial cables through an "N" type coupling (UG-29B/U).

f. Set the output of the signal generator to give the same standard indication on the uhf receiver that was obtained in step c. above.

g. The voltage ratio of the two signal generator output settings, expressed in db, is the attenuation of the filter.

h. Repeat steps a. through h. with signal generator set at 410 mc in step b., then 380 mc in step b.

i. Attenuations measured and calculated above should be as follows:

FREQUENCY	DB ATTENUATION
440 mc	2 maximum
410 mc	55 minimum
380 mc	65 minimum

SECTION VI

FIELD AND FASRON MAINTENANCE

Figure 6-3. For BC-788-F, Serial No.183 through 623, the V reading on V113, pin 4 is 310. The R reading is 28K.

TABLE 6-5. For the BC-788-F in step 1, the following are the "Normal Indications":

a. Serial No. AF55-1 through AF55-182, "73 db minimum".

b. Serial No. AF57-183 through AF57-623. "75 db minimum".

NOTE

The above readings are obtained with the line voltage at 115 volts and the BC-788-F equipped with an average set of tubes.

Figure 6-5. For the SCR-718-F, the R reading on V 101, pins 1 and 2 is 28K. V102, pins 1 and 2, is 14K.

6-26. In the BC-788-F, the core stud of T110 has been factory sealed since no alignment will ever be necessary. If abnormal operation occurs, replace tube V112, transformer T110 and/or associated parts.

6-30.c. For the SCR-718-F, fabricate two four-foot cables in place of CA-102 and insert Filter F-322/A.

6-37A. TRANSMITTER SECTION UHF OUTPUT SUB-ASSEMBLY BC-788-F.

a. Proceed with steps a., b., and c. in paragraph 6-37.

b. Unsolder the end of L129 which is attached to connector J104.

c. Remove the connector J104 from front panel of BC-788-F.

d. Remove the spacer behind the front panel and connector.

e. Remove the four screws holding the tuner in place.

f. Carefully remove the tuner as a unit.

6-38A. RECEIVER SECTION CONVERTER AND OSCILLATOR SUB-ASSEMBLY OF BC-788-F.

a. Remove the covers from the receiver tuning units by pulling up and off.

b. Remove the tube shields and tubes (V101, V102) from the top of the tuner case.

c. Unsolder the five external leads from the outside of the tuner case.

d. Unsolder the end of L131 which is attached to connector J103.

e. Remove connector J103 from front panel of BC-788-F.

f. Remove the spacer behind the front panel and connector.

g. Remove the two retaining clips on L131 from the top side of base subassembly.

h. Remove the six screws holding the tuners in place.

i. Carefully remove the tuners as a unit.

SECTION VII

DIAGRAMS

Figure 7-16. For the SCR-718-F, the resistance value at pins 1 and 2 of V101 is 28,000 ohms and at pins 1 and 2 of V102 it is 14,000 ohms.

For the SCR-718-F serial numbers 183 through 623, the readings at pin 4 of V113 are V 310 and R 28K.

TABLE 7-1. INDEX OF DIAGRAMS

Figure Number	Title
7-2A.	Cable Fabrication Diagram, Filter F-322/A
7-6A.	Outline Drawing, Mounting MT-1745/A and MT-1746/A
7-8A.	Interunit Cabling and Wiring Diagram, Radio Set SCR-718-F
7-10A.	Interunit Cabling and Wiring Diagram, Radio Set SCR-718-F, Employing Auxiliary Indicator
7-12A.	Schematic Diagram, Radio Receiver and Transmitter BC-788-F

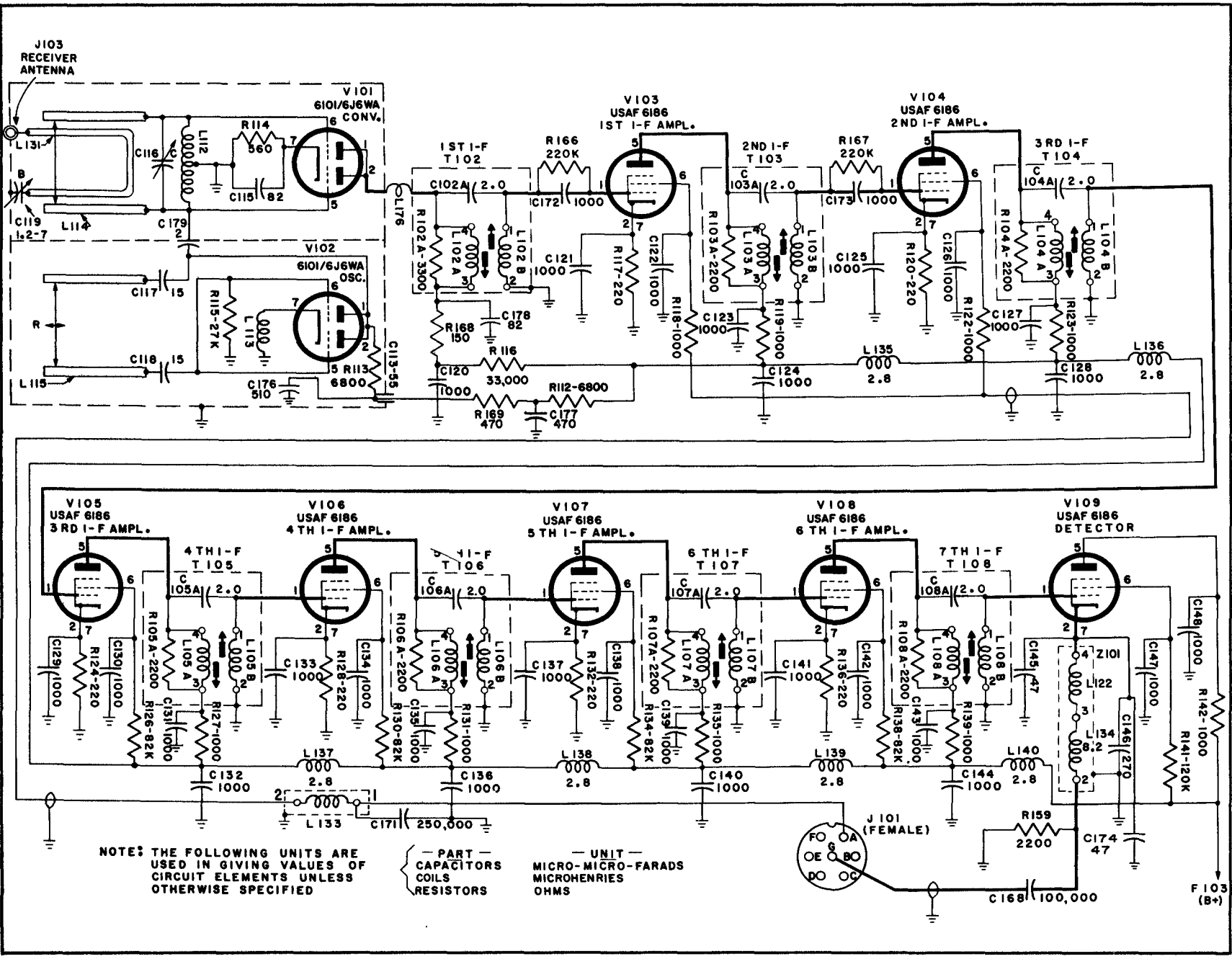
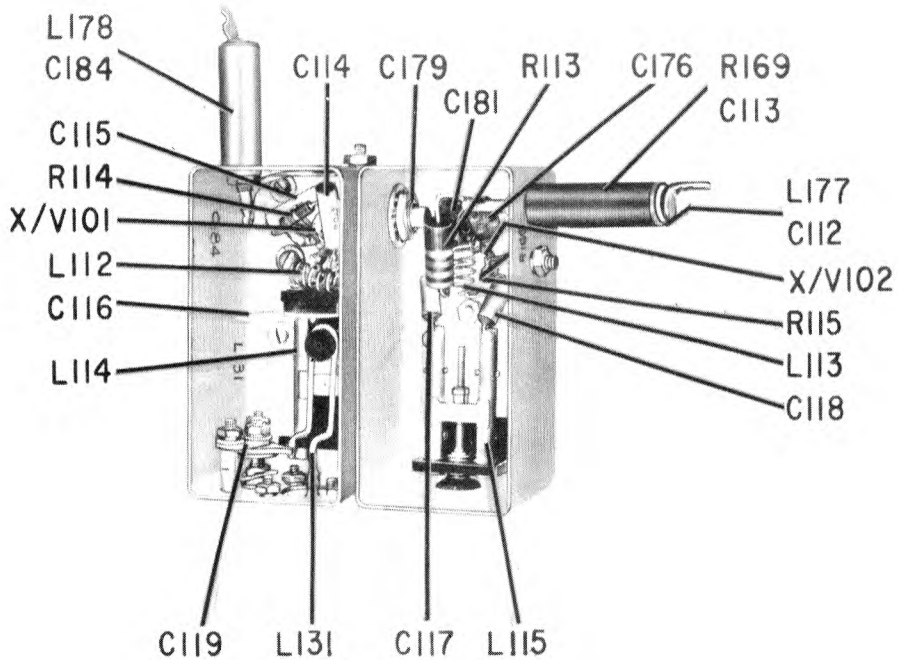
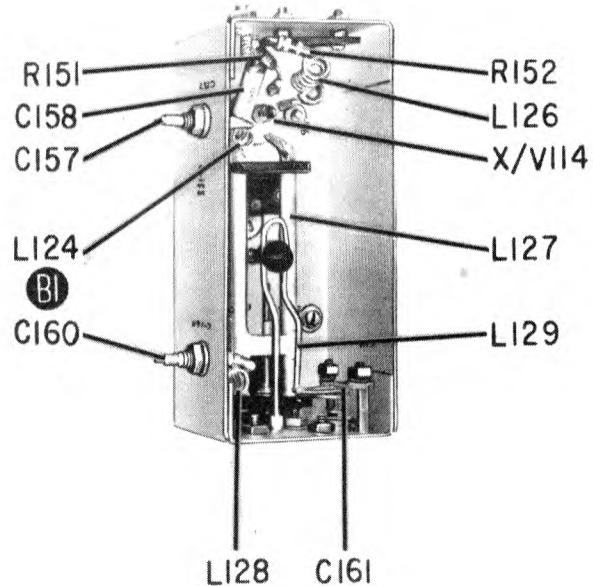


Figure 4-5A. Receiver Circuit BC-788-F



RECEIVER
CONVERTER AND OSCILLATOR
SECTIONS



TRANSMITTER
UHF OUT PUT (OSCILLATOR)
SECTION

Figure 6-13A. Receiver Converter-Oscillator and Transmitter UHF Output Oscillator Sections of Radio Receiver and Transmitter BC-788-F, Bottom View, Showing Location of Parts

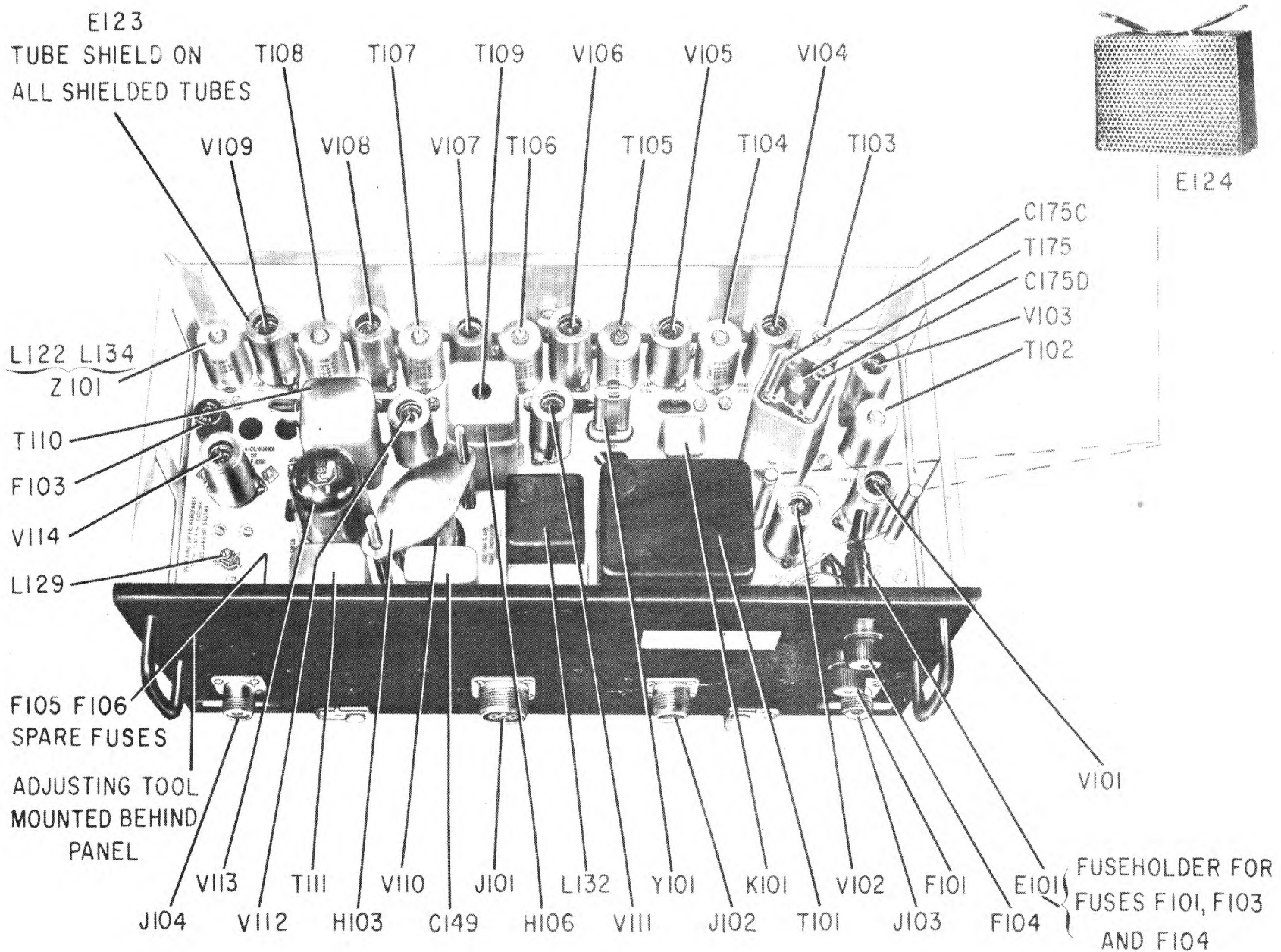


Figure 6-15A. Radio Receiver and Transmitter BC-788-F, Top View, Showing Location of Parts

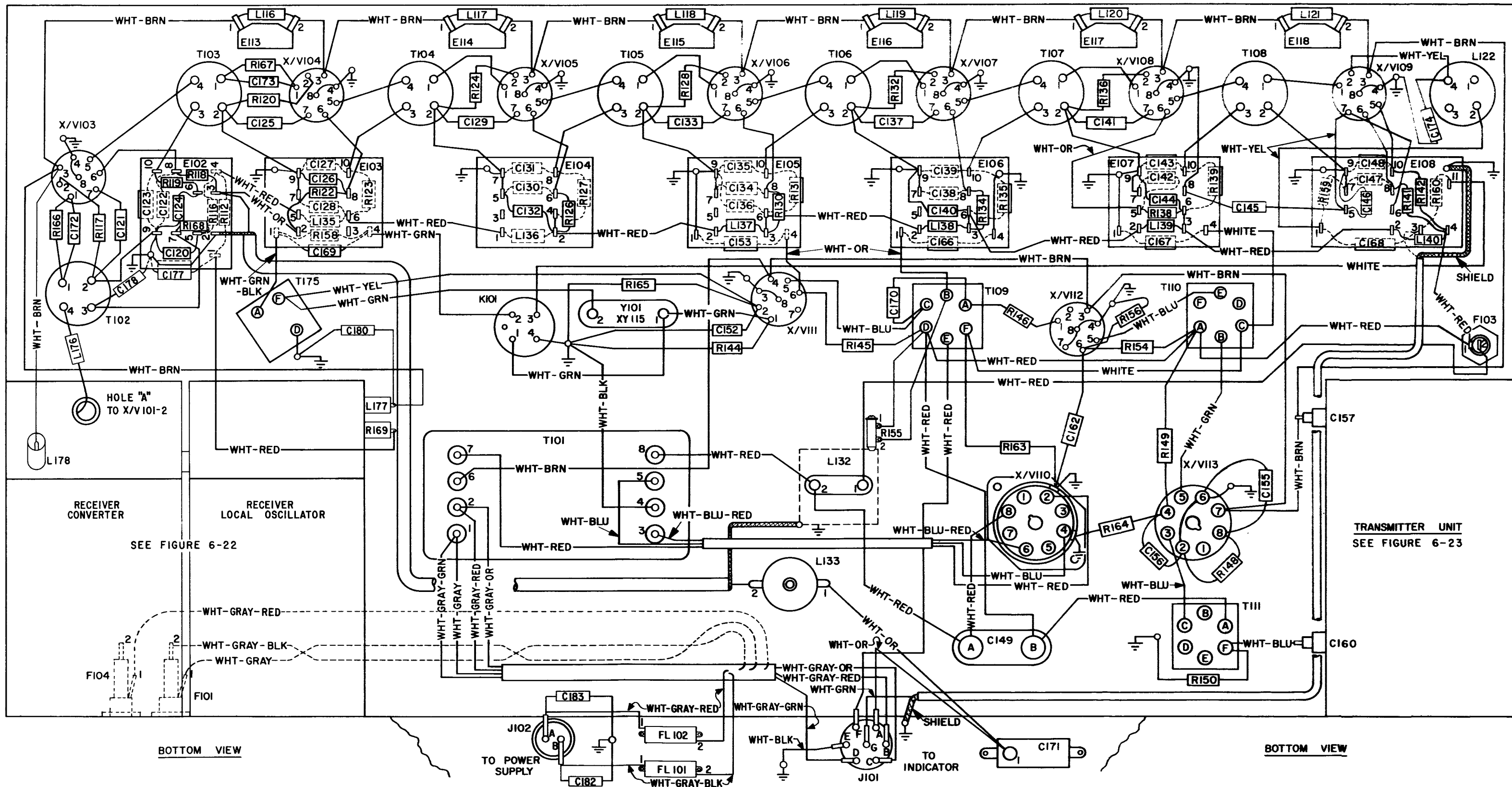


Figure 6-21A. Practical Wiring Diagram, Radio Receiver and Transmitter BC-788-F

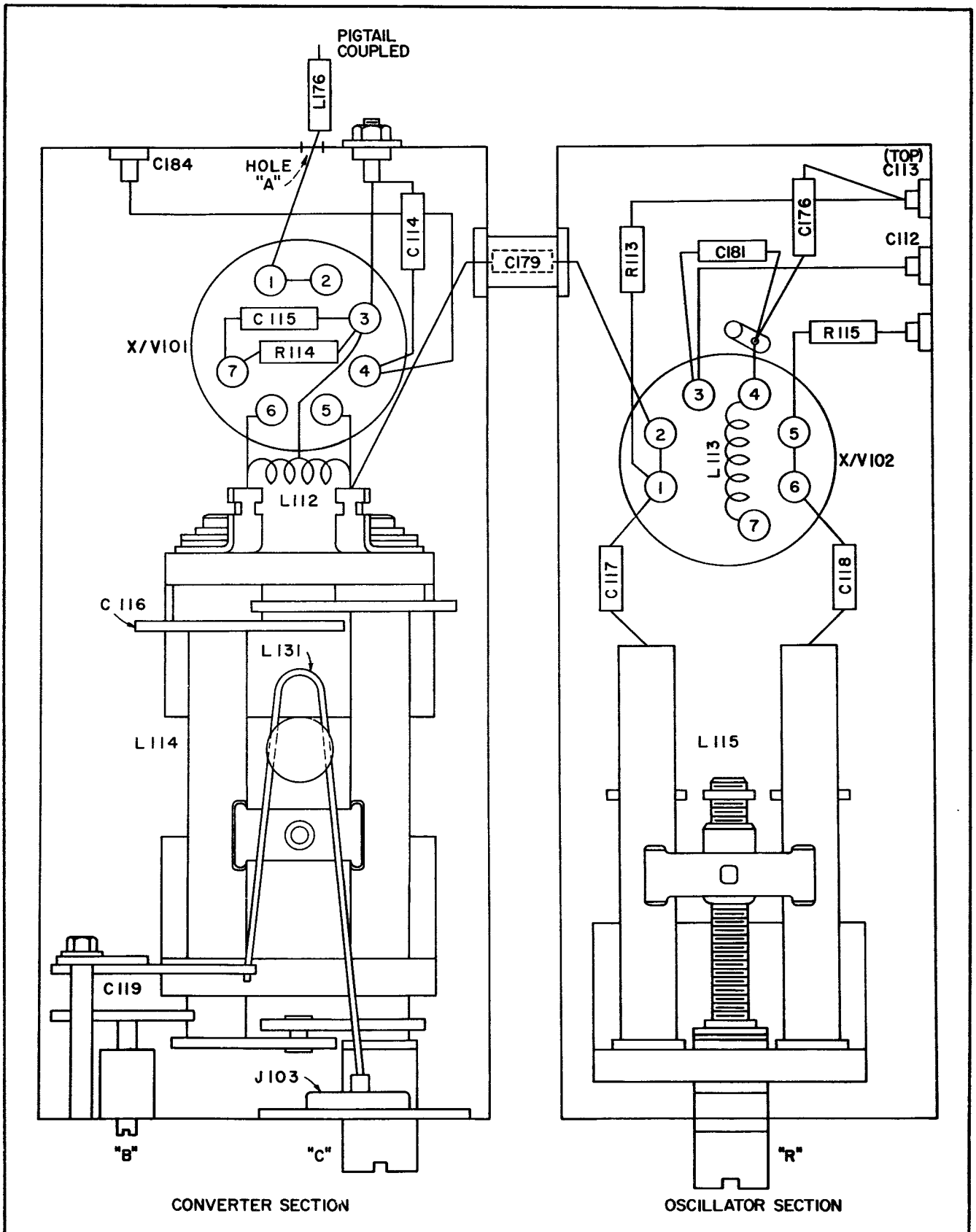


Figure 6-22A. Practical Wiring Diagram, Receiver Converter-Oscillator Section of BC-788-F, Bottom View (No Top View Necessary)

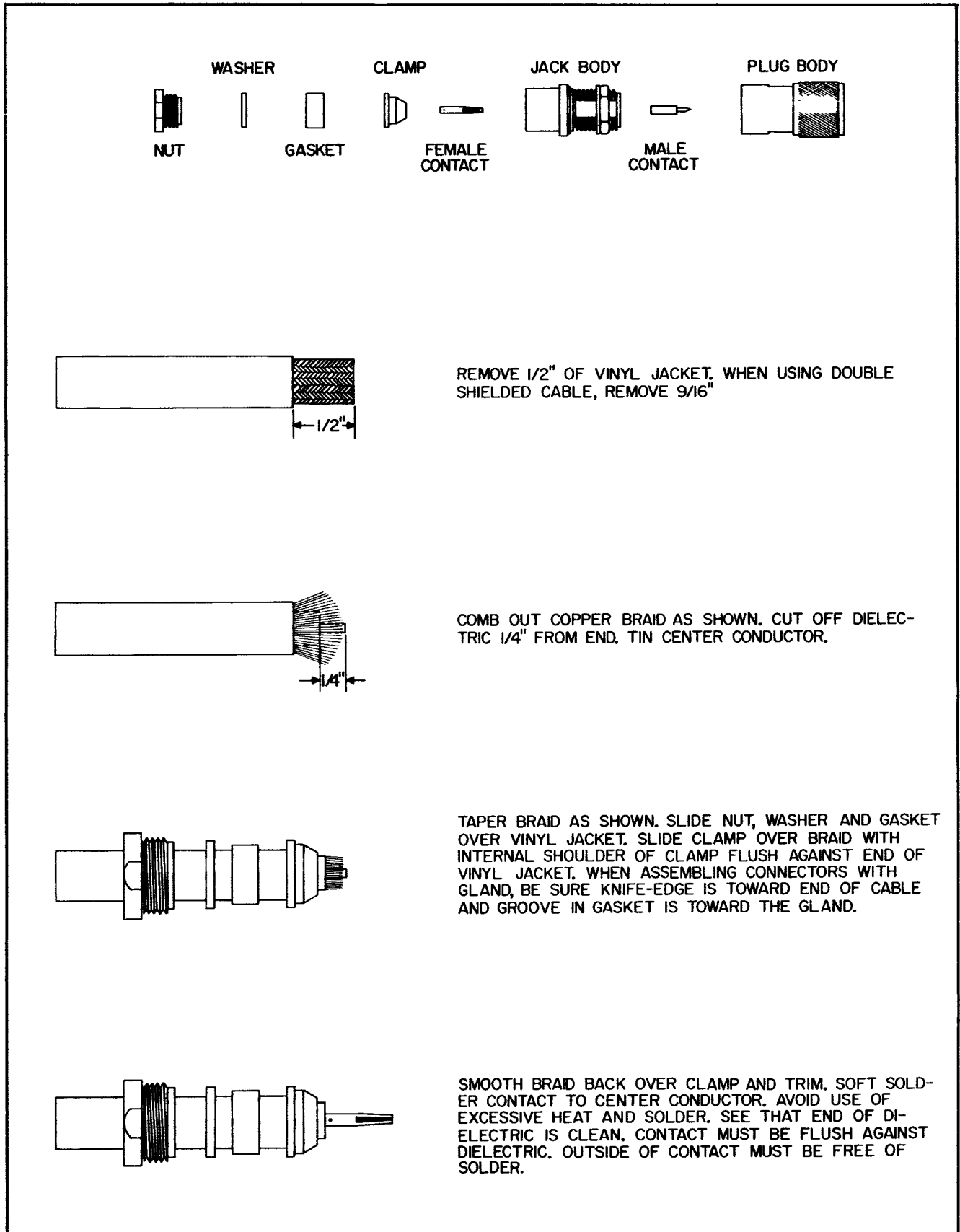
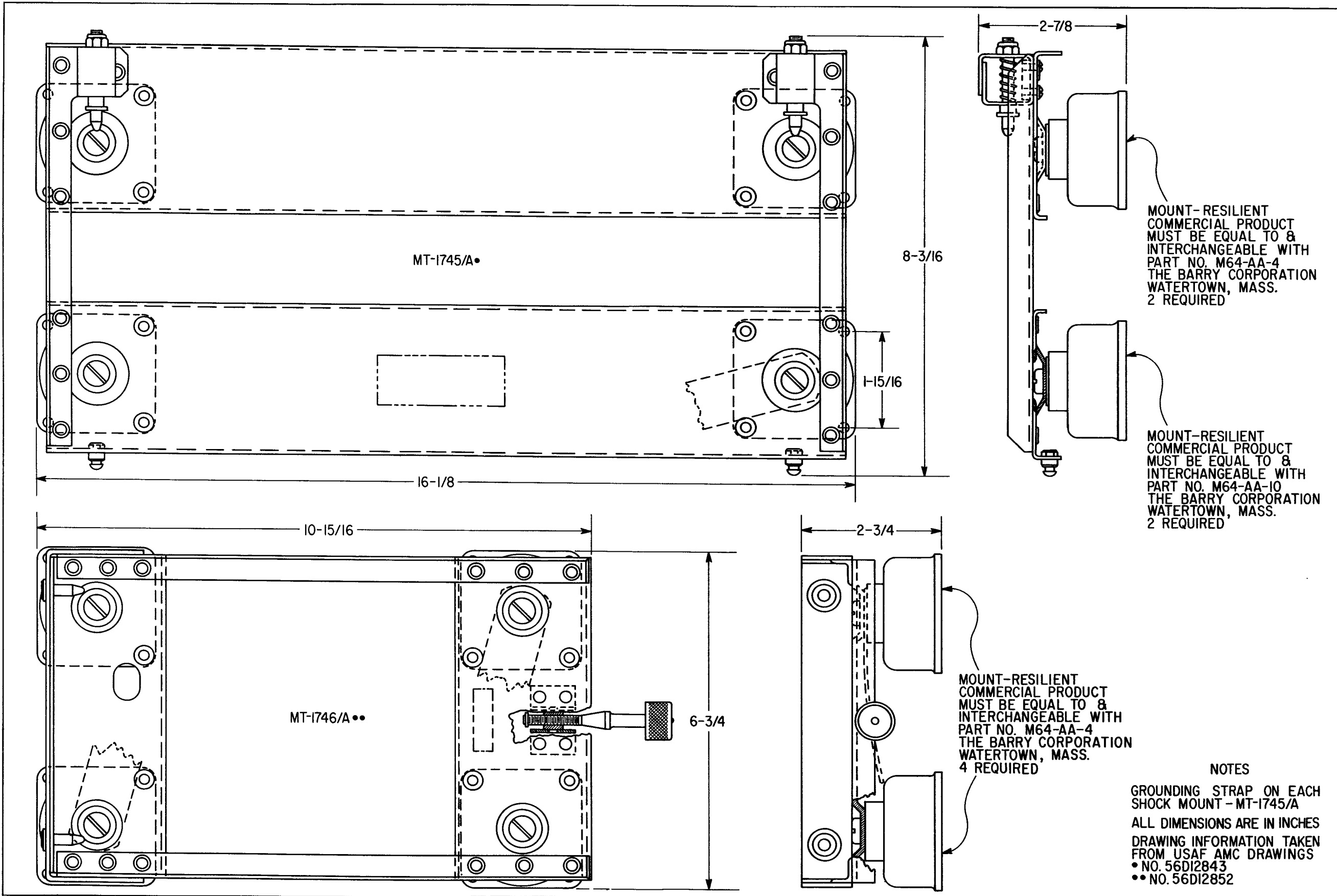


Figure 7-2A. Cable Fabrication Diagram, Filter F-322/A



MOUNT-RESILIENT
COMMERCIAL PRODUCT
MUST BE EQUAL TO &
INTERCHANGEABLE WITH
PART NO. M64-AA-4
THE BARRY CORPORATION
WATERTOWN, MASS.
2 REQUIRED

MOUNT-RESILIENT
COMMERCIAL PRODUCT
MUST BE EQUAL TO &
INTERCHANGEABLE WITH
PART NO. M64-AA-10
THE BARRY CORPORATION
WATERTOWN, MASS.
2 REQUIRED

MOUNT-RESILIENT
COMMERCIAL PRODUCT
MUST BE EQUAL TO &
INTERCHANGEABLE WITH
PART NO. M64-AA-4
THE BARRY CORPORATION
WATERTOWN, MASS.
4 REQUIRED

NOTES
GROUNDING STRAP ON EACH
SHOCK MOUNT - MT-1745/A
ALL DIMENSIONS ARE IN INCHES
DRAWING INFORMATION TAKEN
FROM USAF AMC DRAWINGS
• NO. 56D12843
•• NO. 56D12852

Figure 7-6A. Outline Drawing, Mounting MT-1745/A and MT-1746/A

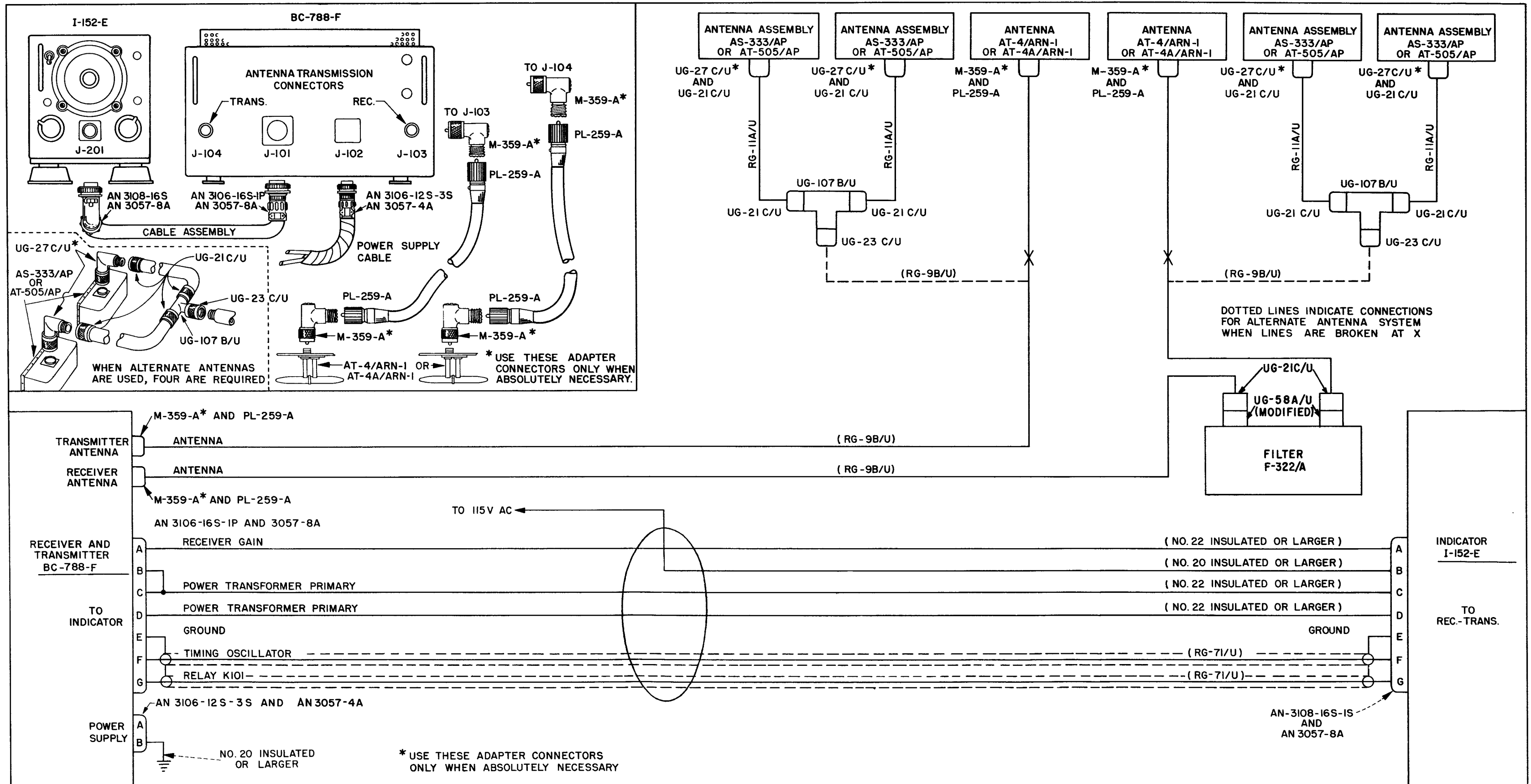


Figure 7-8A. Interunit Cabling and Wiring Diagram, Radio Set SCR-718-F

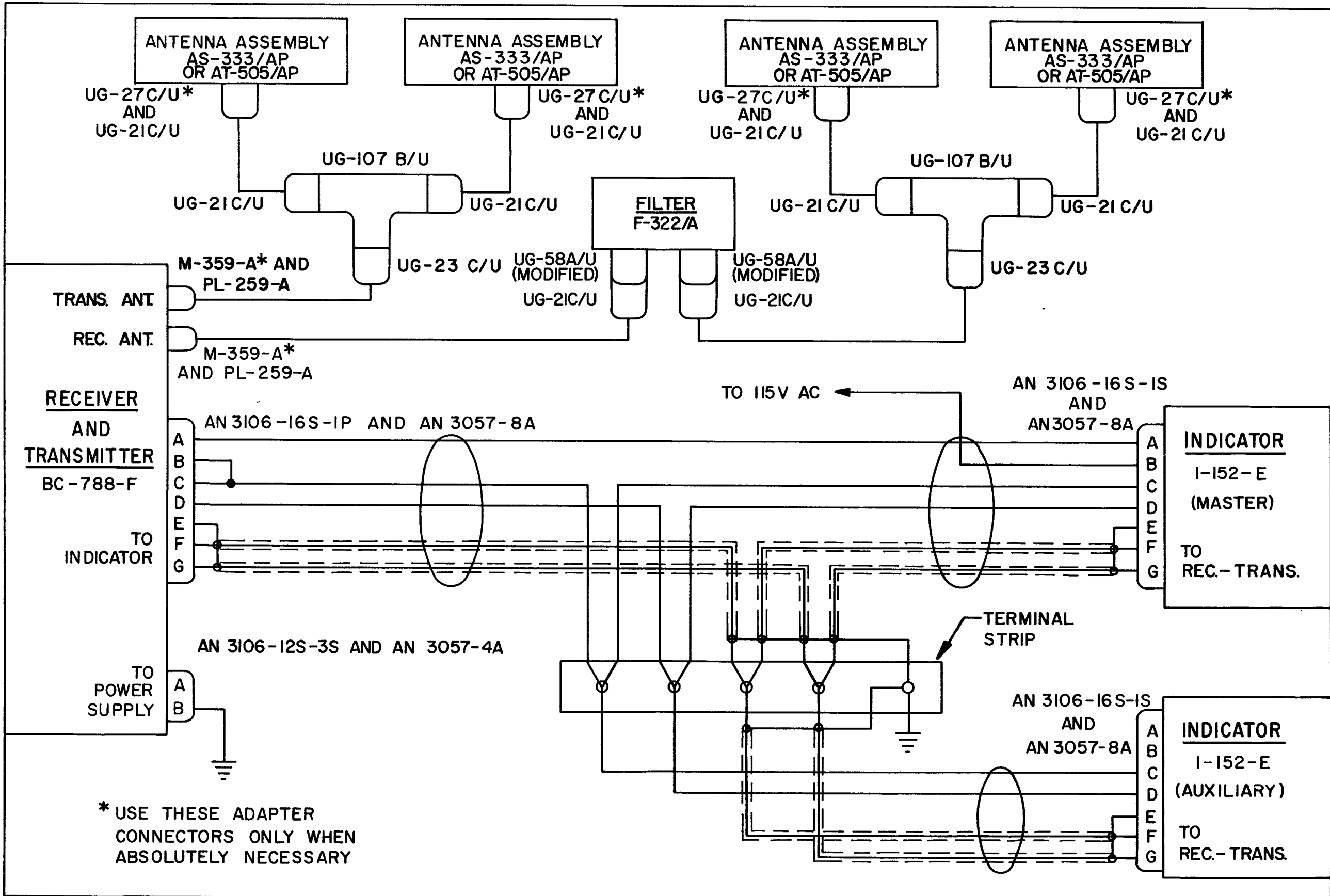


Figure 7-10A. Interunit Cabling and Wiring Diagram, Radio Set SCR-718-F, Employing Auxiliary Indicator

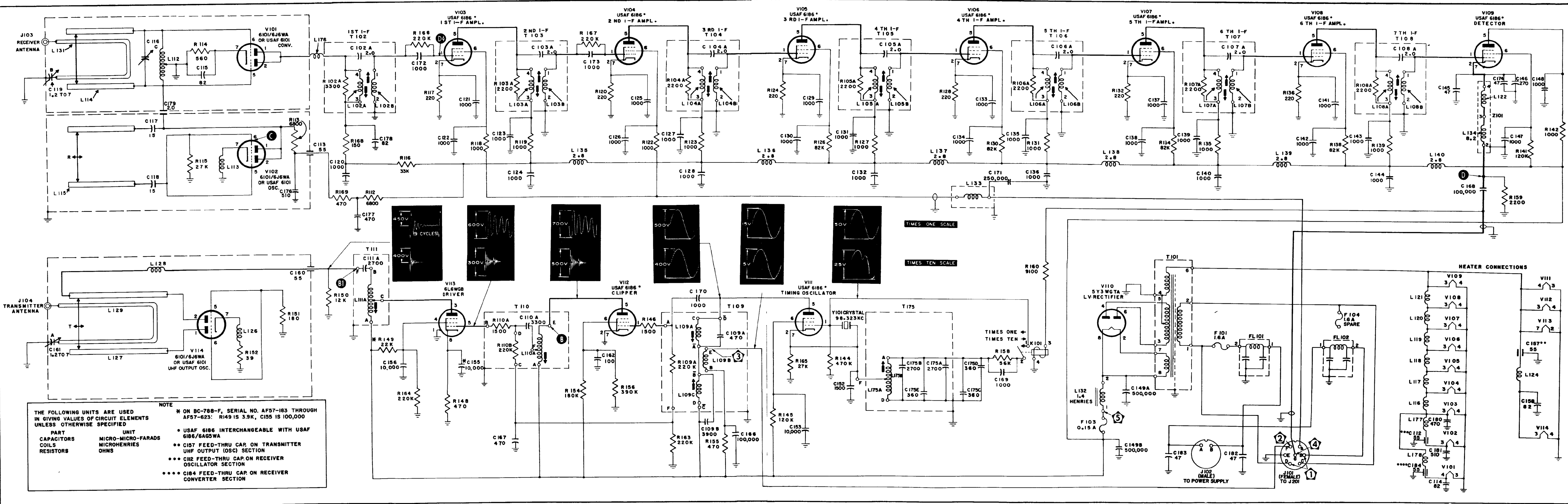


Figure 7-12A. Schematic Diagram, Radio Receiver and Transmitter BC-788-F

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