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AN 16-30ARR5-3
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On Loan

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HANDBOOK
OPERATING INSTRUCTIONS

RADIO RECEIVING SET
AN/ARR-5

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SAFETY NOTICE

This equipment employs high voltages which are dangerous and may be fatal if contacted by operating personnel. Extreme caution should be exercised when working with the equipment.

Destruction of Abandoned Materiel in the Combat Zone

In case it should become necessary to prevent the capture of this equipment and when ordered to do so, DESTROY IT SO THAT NO PART OF IT CAN BE SALVAGED, RECOGNIZED OR USED BY THE ENEMY. BURN ALL PAPERS AND BOOKS.

Means:-

1. Explosives, when provided.
2. Hammers, axes, sledges, machetes, or whatever heavy object is readily available.
3. Burning by means of incendiaries such as gasoline, oil, paper, or wood.
4. Grenades and shots from available arms.
5. Burying all debris or disposing of it in streams or other bodies of water, where possible and when time permits.

Procedure:-

1. Obliterate all identifying marks. Destroy nameplates and circuit labels.
2. Demolish all panels, castings, switch- and instrument-boards.
3. Destroy all controls, switches, relays, connections, and meters.
4. Rip out all wiring and cut interconnections of electrical equipment. Smash gas, oil and water-cooling systems in gas-engine generators, etc.
5. Smash every electrical or mechanical part, whether rotating, moving, or fixed.
6. Break up all operating instruments such as keys, phones, microphones, etc.
7. Destroy all classes of carrying cases, straps, containers, etc.
8. Bury or scatter all debris.

DESTROY EVERYTHING!



Unsatisfactory Report

For U. S. Army Air Force Personnel:-

In the event of malfunctioning, unsatisfactory design, or unsatisfactory installation of any of the component units of this equipment, or if the material contained in this book is considered inadequate or erroneous, an Unsatisfactory Report, AAF Form No. 54, or a report in similar form, shall be submitted in accordance with the provisions of Army Air Force Regulation No. 15-54 listing:

1. Station and organization.
2. Nameplate data (type number or complete nomenclature if nameplate is not attached to the equipment).
3. Date and nature of failure.
4. Airplane model and serial number.
5. Remedy used or proposed to prevent recurrence.
6. Handbook errors or inadequacies, if applicable.

For U. S. Navy Personnel:-

Report of failure of any part of this equipment during its guaranteed life shall be made on Form N. Aer. 4112, "Report of Unsatisfactory or Defective Material," or a report in similar form, and forwarded in accordance with the latest instructions of the Bureau of Aeronautics. In addition to other distribution required, one copy shall be furnished to the inspector of Naval Materiel (location to be specified) and the Bureau of Ships. Such reports of failure shall include:

1. Reporting activity.
2. Nameplate data.
3. Date placed in service.
4. Part which failed.
5. Nature and cause of failure.
6. Replacement needed (yes—no).
7. Remedy used or proposed to prevent recurrence.

For British Personnel:-

Form 1022 procedure shall be used when reporting failure of radio equipment.

SPECIAL NOTICE

Proper sequence for setting the equipment is outlined herein. Do not attempt to operate the equipment without first having read this manual completely.

**SECTION I
GENERAL DESCRIPTION****1. GENERAL.**

a. Radio Receiving Set AN/ARR-5 (fig. 1-1) is an airborne search receiver intended to locate enemy radar radio frequency channels and communications equipment operating in the frequency range 27.8 to 143 megacycles. It may operate in conjunction with Radar Indicator Assembly AN/APA-6 or AN/APA-11, Panoramic Adapter AN/APA-10, and Photographic Adapter AN/APA-7.

b. Radio Receiving Set AN/ARR-5 accepts either amplitude modulated or frequency modulated telephone signals and unmodulated continuous wave (c-w) code signals over the frequency range from 27.8 to 143 megacycles.

c. Adjustable sector motor-driven scanning is provided. The set's outlets provide 50 milliwatts of audio power for headsets (600 or 8000 ohms), video power for an oscilloscope and panoramic power for Panoramic Adapter AN/APA-10.

d. Radio Receiving Set AN/ARR-5 requires approximately 175 watts at either 80 or 115 volts, 400 to 2600 cps. The motor-drive for scanning requires less than 0.5 amperes at 24 volts d-c.

e. Radio Receiving Set AN/ARR-5 consists of the following major units (see fig. 1-1):

(1) Radio Receiver R-44/ARR-5.

(2) Mounting Base MT-171/U, which provides mounting facilities for the receiver.

(3) Rectifier Power Unit PP-32/AR, which supplies the necessary power for the receiver and can supply power to two additional receivers with approximately the same power requirements.

(4) Mounting Base MT-167/U, which provides a mounting for the rectifier power unit.

(5) Antenna Stub AT-38/APT or (Antenna Stub AT-38A/APT). The type of antenna used is not critical; any antenna approximately 30 inches in length is satisfactory.

(6) Antenna AT-190A/AP, which is 25 inches in length.

(7) Antenna Base AB-109B/AP, which is provided for mounting Antenna AT-190A/AP.

(8) Antenna Adapter MX-923/A, which is mounted on Antenna Base AB-109B/AP, and provides a termination for the radio-frequency cable from the receiver.

2. EQUIPMENT SUPPLIED.

The following table lists the equipment supplied.

Quantity per Equipment	Name of Unit	Army Designation	Navy Type Designation	Overall Dimensions	Weight (in pounds)
1	Antenna Stub	AT-38/APT or AT-38A/APT	AT-38/APT AT-38A/APT	29 $\frac{1}{2}$ in. long	6
1	Radio Receiver	R-44/ARR-5	R-44/ARR-5	21 $\frac{1}{4}$ in. long x 10 $\frac{1}{4}$ in. wide x 7 $\frac{3}{4}$ in. high	35
1	Mounting Base	MT-171/U	MT-171/U	22 $\frac{3}{4}$ in. long x 10 $\frac{3}{8}$ in. wide x 2 $\frac{1}{2}$ in. high	2.18
1	Rectifier Power Unit	PP-32/AR	PP-32/AR	21 in. long x 5 in. wide x 7 $\frac{3}{4}$ in. high	25
1	Mounting Base	MT-167/U	MT-167/U	22 $\frac{3}{4}$ in. long x 6 in. wide x 2 $\frac{1}{2}$ in. high	1.81
1	Plug	AN3106-22-4S	AN3106-22-4S	1 $\frac{19}{32}$ in. diameter	0.24
1	Plug	AN3106-22-5P	AN3106-22-5P	1 $\frac{19}{32}$ in. diameter x 2 $\frac{1}{8}$ in. long	0.14

Section I
Paragraph 1

AN 08-30ARR5-3

Quantity per Equipment	Name of Unit	Army Designation	Navy Type Designation	Overall Dimensions	Weight (in pounds)
1	Plug	AN3108-22-5S (PL-Q228)	AN3108-22-5S	1 ¹⁹ / ₃₂ in. diameter Right Angle 2 ¹ / ₃₂ in. x 1 ⁵ / ₁₆ in.	0.23
1	Plug	PL-259A		3/4 in. diameter x 1 1/2 in. long	0.05
1	Adapter	M-359A		2 ³ / ₃₂ in. diameter Right Angle 1 ⁷ / ₃₂ in. x 1 ³ / ₁₆ in.	0.076
3	Cable Clamp	AN3057-12 (M-293)	AN3057-12	1 ³ / ₈ in. diameter 1 ³ / ₁₆ in. long	0.061
1	Antenna	AT-190A/AP	AT-190A/AP	25 in. long	3.75
1	Adapter	MX-923/A	MX-923/A	5 in. long x 2 ¹ / ₈ in. wide x 2 ¹ / ₈ in. high	0.3
1	Antenna Base	AB-109B/AP	AB-109B/AP	7 in. long x 4 in. wide x 2 ⁵ / ₁₆ in. high	1.3

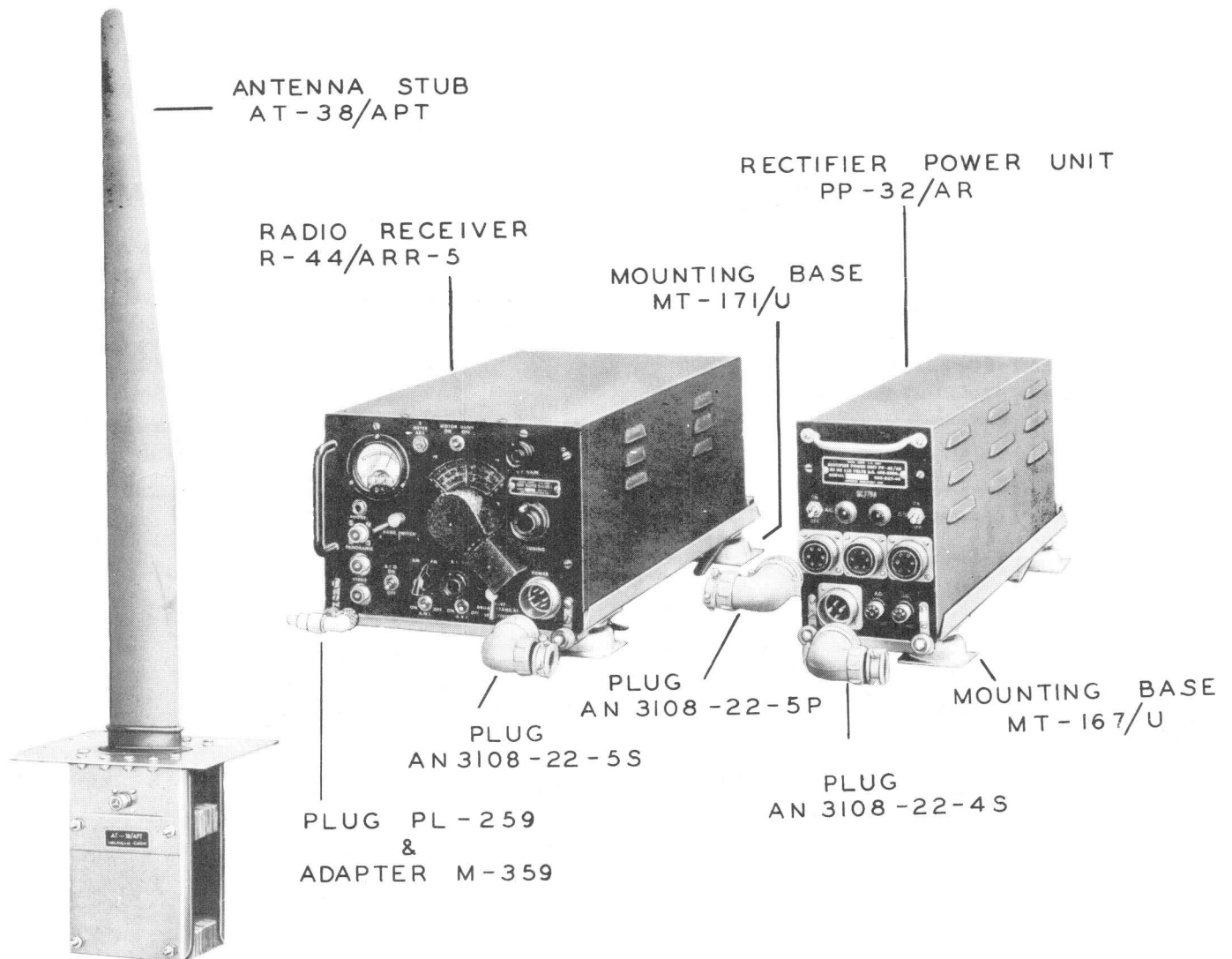


Figure 1-1. Radio Receiving Set AN/ARR-5—Major Components

3. EQUIPMENT REQUIRED BUT NOT SUPPLIED.

The following table lists the equipment required but not supplied.

<i>Quantity per Equipment</i>	<i>Name of Unit</i>	<i>Army Designation</i>	<i>Navy Type Designation</i>	<i>Required Characteristics</i>
As Required	Radio Frequency Cable	RG-8/U	RG-8/U	
1	Radio Frequency Plug	UG-21C/U	UG-21C/U	
1	Adapter	UG-27B/U	UG-27B/U	
1	Inverter			80 or 115-volt output, 400 to 2600 cps
1	Headset	H-23 or HS-33		600 or 8000 ohms
2	Circuit Breaker	MS-25005-5		
1	Plug	PJ-055		
1	Adapter	UG-213/U	UG-213/U	

SECTION II INSTALLATION AND ADJUSTMENT

1. INSTALLATION.

Carefully unpack and inspect the various components for any possible damage during shipment. Check to determine whether or not all necessary components were received. In case of damage or loss of components in shipment, file an unsatisfactory report form immediately.

a. ANTENNA STUB AT-38/APT.

(1) The location of the antenna will depend on the type of installation used for the particular airplane. In general the following precautions should be observed: (For outline dimensions, see fig. 5-1.)

(a) Place the antenna in the lower half of the airplane with no metal surfaces obstructing the view of the ground if possible.

(b) Locate the antenna at a point as free from reflecting surfaces as possible and away from such objects as Pitot tubes, wing surfaces, or other antennas.

(c) Locate it out of the line of fire of all guns mounted on the aircraft.

(d) Mount the antenna so that it clears obstructions which might tear it from its mounting, when the airplane is on the ground.

(2) Before the antenna is installed in any type of aircraft, determine whether vertically or horizontally polarized signals are to be received. This is determined by the antenna system of the enemy transmitting antennas when known. When receiving over short distances, erect the receiver antenna in the same plane as the transmitting antenna. For long-distance reception

the received signals are more often horizontally polarized, which dictates the use of a horizontal antenna.

b. ANTENNA AT-190A/AP.

(1) The general installation considerations affecting Antenna AT-190A/AP are the same as for Antenna Stub AT-38/APT (refer to par. 1a). See fig. 5-1A for outline dimensions of Antenna AT-190A/AP.

c. RADIO RECEIVER R-44/ARR-5 and RECTIFIER POWER UNIT PP-32/AR.

(1) Fasten Mounting Base MT-171/U for the receiver and Mounting Base MT-167/U for the rectifier power unit side by side within the aircraft (see figs. 5-2 and 5-3) so that:

(a) They will be relatively close to the antenna.

(b) They will be close to the power source.

(c) Ventilation will not be obstructed. (They should not be closer than two inches to the fuselage.)

(d) The front panels of the units are accessible.

(e) They will not obstruct the operation of any other equipment.

(2) After the receiver and rectifier power unit have been unpacked and before mounting, make sure that all tubes, especially the acorn tubes, are firmly located in their sockets. The receiver's acorn tubes can be reached by removing the covers of the r-f section and re-radiation suppressor section which are held in place by hex-head screws and thumbscrews. (See fig. 5-5.) There are four acorn tubes in all to check, three in the r-f section and one in the re-radiation suppressor. The acorn tubes are as follows: JAN-956 (V₁), JAN-956 (V₂), JAN-955 (V₃) and JAN-954 (V₄).

Note

Tube JAN-956 (V_1) is placed in socket with plate terminal projecting into r-f section.

(3) Place the receiver on Mounting Base MT-171/U and the rectifier power unit on Mounting Base MT-167/U and tighten the locking nuts at each side of the front panel securely. Tie down the nuts with safety wire.

(4) Cut Radio Frequency Cable RG-8/U to the right length and solder Plug PL-259A on the receiver end (in addition, use Adapter M-359A if a right-angle connection is desired) and solder Radio Frequency Plug UG-21C/U (use Adapter UG-27B/U when required) on the antenna end. (See figs. 5-4 and 5-7.)

Note

Cables used shall be according to Army-Navy Aeronautical Specifications AN-J-C-48a and wire shielded according to Specification 95-27273.

(5) Construct the interconnecting cable between the rectifier power supply and the receiver by connect-

ing similarly lettered terminals of two plugs AN3108-22-5S and AN3106-22-5P with suitable lengths of AN-18 wire for terminals B and E and AN-20 wire for the remaining terminals. Attach Cable Clamp M-293 to the plugs to take the strain from the connector's contacts. Connect plug AN3108-22-5S to the receptacle marked "POWER" on the receiver panel and plug AN3106-22-5P to any one of the three power outlet receptacles on the panel of the rectifier power supply. Safety wire the plug's ferrule.

WARNING

The voltages exposed inside the receiver and rectifier power units are high, and care must be taken so that the operator's hands do not contact any of the circuit connections during adjustment. *Do not insert plug AN3106-22-4S until all interconnecting cables have been installed and checked.*

(6) Connect the power wiring to plug AN3106-22-4S according to the following tabulation and attach Cable Clamp M-293 to the plug to take the strain from

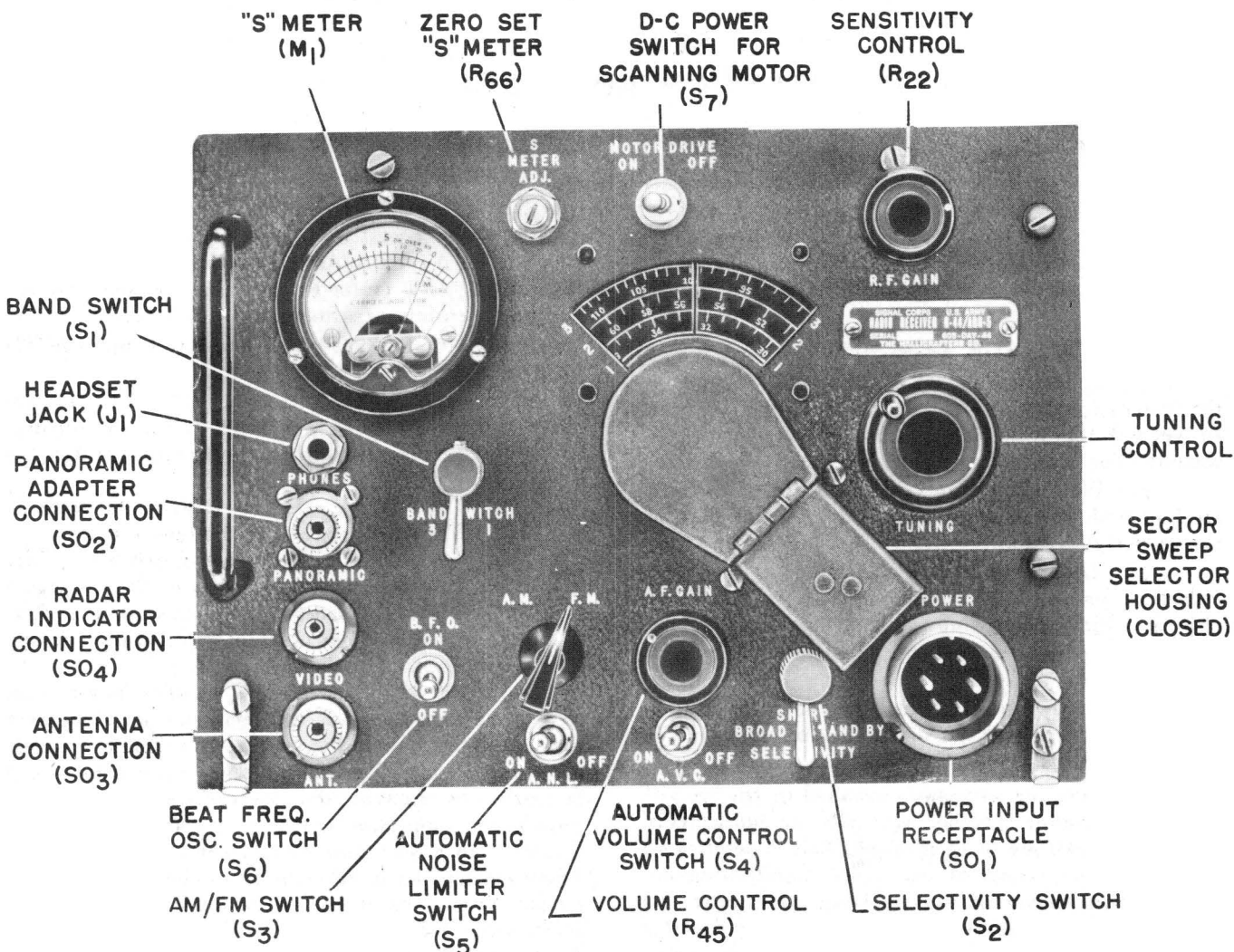


Figure 2-1. Radio Receiver R-44/ARR-5—Front View

the connector's contacts. Safety wire the plug's ferrule.

(a) Ungrounded (hot) a-c lead to terminal A. (Shielded wire AN-20.)

(b) Positive d-c lead to terminal B. (Wire AN-20.)

(c) Grounded (neutral) a-c lead to terminal C. (Wire AN-20.)

(d) Negative d-c lead (ground) to terminal D. (Wire AN-20.)

Note

In British installations using 80-volt a-c sources it will be necessary to change a primary connection on the power transformer from the 115-volt tap to the 80-volt tap. (See fig. 5-6.)

(7) Connect the other end of the ungrounded (hot) a-c lead to Circuit Breaker MS-25005-5 which leads to the 115-volt, 400 to 2600 cycles per second power-supply bus.

(8) Connect the other end of the positive d-c lead to Circuit Breaker MS-25005-5 which leads to the 28-volt, d-c power-supply bus.

(9) If Panoramic Adapter AN/APA-10 is to be used, connect Plug PL-259A (with Adapter M-359A) of the panoramic adapter cord to the receiver's receptacle (Socket SO-239) marked "PANORAMIC."

(10) If Radar Indicator Assembly AN/APA-6 or AN/APA-11 is to be used, connect Plug PL-259A (with Adapter M-359) of the analyzer cord to the receiver's receptacle (Socket SO-239) marked "VIDEO."

(11) Plug either Headset HS-23 or Headset HS-33 into the jack marked "PHONES."

(12) After checking over the wiring of the interconnecting cables, and setting the two power switches of the rectifier power supply at "OFF", insert plug AN3106-22-4S into the power input receptacle on the panel of the rectifier power supply. Safety wire the plug's ferrule.

2. AFTER-INSTALLATION CHECK.

a. GENERAL PRECAUTIONS.

(1) Before making adjustments inside the units, remove the power cord from the main supply receptacle on the panel of the rectifier power supply.

(2) Do not operate the motor driven scanning unit longer than necessary to accomplish a specific task. This precaution is to eliminate unnecessary wear on the gear drive.

(3) Do not probe around any wiring or components in the r-f section. Moving the components and wiring may change their inductance or capacity enough at these high frequencies to cause serious misalignment of the r-f stages. The receivers are prop-

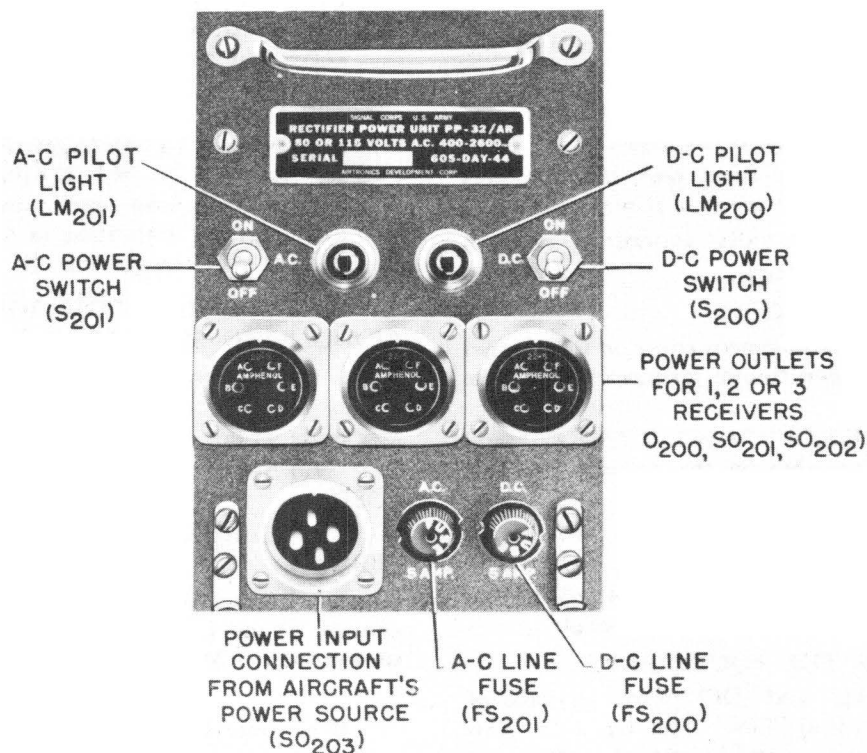


Figure 2-2. Rectifier Power Unit PP-32/AR—Front View

erly aligned before shipment and should not require realignment.

(4) The "AC" and "DC" power switches of the rectifier power unit should be set at "OFF" when the equipment is not in use.

b. PRELIMINARY CHECK.—Before operating this equipment check the following vital points in the installations to see that:

(1) The a-c power source of the aircraft is operating and has the correct voltage and frequency.

(2) The d-c power source of the aircraft is operating and has the correct voltage and polarity.

(3) The interconnecting cables between the rectifier power unit and the aircraft's power source, the rectifier power unit and the receiver, and the receiver and antenna are properly and securely wired. (If the panoramic adapter and radar indicator assembly are used, check their cables and see that each is connected to the correct outlet on the panel of the receiver.)

(4) All tubes are securely in place.

(5) The receiver and rectifier power unit are securely fastened to their mountings.

(6) There are no objects near the dust cover of the rectifier power unit which will obstruct the air flowing through the ventilator holes.

(7) The antenna and its cable receptacle are electrically and mechanically secure.

(8) The following components on the front panel of the receiver and rectifier power unit are in place and securely held.

(a) Power connectors (one on the receiver and two on the rectifier power unit).

(b) Antenna connector on the receiver.

(c) Sector adjustment mechanism cover.

(d) Two 5 ampere fuses and their holders located on the panel of the rectifier power unit.

(e) Panoramic and video connectors if used.

c. OPERATIONAL CHECK.

(1) PRELIMINARY STEPS:

(a) Open sector adjustment cover on front panel of the receiver and loosen thumb set screw; then close cover.

(b) Set the "B.F.O.," "A.N.L.," "A.V.C.," and the "Motor Drive" switches on the receiver panel at "OFF". (See fig. 2-1.)

(c) Set the "SELECTIVITY" switch at "STAND BY".

(d) Connect Headset HS-23 or HS-33 to the jack marked "PHONE" on the receiver panel.

(2) STARTING THE EQUIPMENT.

(a) Set the "AC" and "DC" power switches of the rectifier power unit at "ON". (See fig. 2-2.) This turns on the tube filaments and heaters of both power unit and receiver. Illumination of the pilot lights adjacent to these switches indicates that the circuit is

normal. The pilot light illuminating the receiver's tuning dial scale indicates that the filament current is reaching the receiver.

(3) CHECKING RECEPTION OF AMPLITUDE MODULATED SIGNALS.

(a) Set the "BAND SWITCH" at position "1", "2" or "3" depending upon the range of frequencies to be covered.

(b) Set the "A.M. F.M." switch at "A.M.".

(c) Turn the "R.F. GAIN" control clockwise as far as it will go.

(d) Set the "A.V.C." switch at "ON".

(e) Turn the "A.F. GAIN" control counter-clockwise as far as it will go.

(f) Set the "SELECTIVITY" switch at "BROAD". This puts the B-voltage on the tubes in the receiver.

(g) Turn the "A.F. GAIN" control clockwise until the noise level or signal level suits the operator.

(h) Tune for a signal with the "TUNING" control. Tune for maximum reading as indicated by the tuning meter (M.).

(i) If an excessive noise level is present in the headset it may be attenuated somewhat by setting the "SELECTIVITY" switch at "SHARP" or setting the "A.N.L." switch at "ON" or both.

Note

When receiving amplitude modulated signals the tuning meter indicates the strength of the carrier received. If no carrier is being received the tuning meter needle should swing to the left of its zero position. The "A.V.C." switch must be at "ON" or this meter will not operate. To obtain relative readings, it is best to leave the "R.F. GAIN" control in the extreme clockwise (maximum gain) position as changing the position of the "R.F. GAIN" control will change the "S" meter readings.

(4) CHECKING RECEPTION OF FREQUENCY MODULATED SIGNALS:

(a) Set the "A.M. F.M." switch at "F.M.".

(b) Leave the "R.F. GAIN" control turned clockwise as far as it will go.

(c) Set the "A.V.C." and "A.N.L." switches at "OFF".

(d) Leave the "SELECTIVITY" switch set at "BROAD".

(e) Tune for a signal with the "TUNING" control. Tune for zero reading as indicated by the tuning meter (M₁).

Note

When receiving frequency modulated signals the tuning meter will deflect to one side when approaching a carrier, swing back to center (zero position), and then to an equal deflec-

tion on the other side as the carrier is passed. It then returns to zero when the receiver is tuned beyond the carrier. The zero position of the pointer in the middle of the swing represents the current setting of the "TUNING" control for resonance. The zero position of the "S" meter is adjusted (using "S METER ADJ.") at the factory and should not need further adjustment. When receiving frequency modulated signals, keep the "SELECTIVITY" switch in its "BROAD" position, since the entire bandwidth of the i-f amplifier is required for best performance.

(5) CHECKING OF C-W CODE SIGNALS.

(a) Set up the controls as for reception of amplitude modulated signals given in section II, paragraph 2c (3).

(b) Set "A.V.C." switch at "OFF".

(c) Set "B.F.O." switch at "ON".

(d) Set the frequency of reception with the "TUNING" control. Tune for the 1000 cycle note.

Note

The "B.F.O." whistle may also be used to locate weak phone signals. Tune the signal in until zero beat is obtained then switch off the "B.F.O."

(6) CHECKING OPERATION FOR MOTOR-DRIVEN SCANNING.

(a) Select the frequency band to be scanned and set "BAND SWITCH."

(b) Open dust cover over sector sweep adjustment mechanism on front panel.

(c) Adjust cams to cover the sector of the total band and tighten down thumbscrew. (Refer to sec. III, par. 2c for adjustment details.)

(d) Set the "MOTOR DRIVE" switch on the front panel of the receiver at "ON." The sector sweep mechanism should start scanning, tripping the toggle switch and reversing the dial rotation at the end of each scanning run. Readjust the cam setting if necessary to sweep the desired frequency range exactly. If the d-c polarity is reversed, the scanning mechanism will not reverse automatically.

Note

The speed of scanning is believed to be about right when the set leaves the factory, however, the speed may be controlled over a two to one ratio by adjusting a rheostat inside the receiver unit. This rheostat is located on top and at the rear of the chassis.

(e) To avoid passing over a signal when scanning, it is desirable to have certain of the controls set as follows:

1. "R.F. GAIN" at maximum gain.
2. "A.F. GAIN" at maximum gain.
3. "SELECTIVITY" switch at "BROAD".

4. "A.N.L." switch set at "OFF."

(f) To shut off the scanning mechanism set the "MOTOR DRIVE" switch on the panel of the receiver at "OFF." Set both the "MOTOR DRIVE" switch and the "DC" power switch on the panel of the power unit at "OFF" when shutting down the scanning circuit completely.

(7) SHUTTING OFF THE EQUIPMENT.

(a) To remove the B-voltage from the receiver's tubes but to leave their filaments hot for instant use:

1. Set "SELECTIVITY" switch at "STANDBY."

(b) To turn off the equipment completely:

1. Turn "AC" switch of rectifier power unit to "OFF."

2. Turn "DC" switch of rectifier power unit to "OFF."

3. PRE-FLIGHT TEST.

a. GENERAL.

(1) After installation of the equipment in the airplane, a pre-flight test shall be made to make certain that the installation is in proper working condition.

(2) A Test Oscillator TS-47/APR, or Frequency Meter TS-174/U and Headset HS-33 will be required for the pre-flight test.

(3) An external primary power supply rated at 115 volts, 400 to 2600 cycles, ac, 200 watts output, and an external power supply rated at 28 volts, dc, 50 watts output, shall be provided to avoid running the airplane's engines on the ground.

b. TEST PROCEDURE.

(1) Connect the Test Oscillator TS-47/APR or Frequency Meter TS-147/U to a source of power, and place the test oscillator or frequency meter close to the antenna of Radio Receiver R-44/ARR-5.

(2) Adjust the test oscillator or frequency meter to a frequency in the receiver frequency range of 28 to 140 megacycles.

(3) Connect Headset HS-33 to the jack marked "PHONE" on the front panel of Radio Receiver R-44/ARR-5.

(4) Start Radio Receiver R-44/ARR-5 in accordance with the procedure outlined in sec. III, par. 1a, and set up the controls for reception of amplitude-modulated signals, as given in sec. II, par. 2c (3).

(5) Check for test-oscillator or frequency-meter signal while tuning the receiver.

(6) If no signal is received, proceed as follows:

(a) Connect test oscillator or frequency meter to antenna terminal of Radio Receiver R-44/ARR-5.

(b) Check for test-oscillator or frequency-meter signal while tuning the receiver.

(c) If the receiver operates properly, check the antenna and transmission line for defects.

(d) If the receiver is the cause of trouble, return the malfunctioning unit to the proper agency for repair.

SECTION III OPERATION

1. STARTING AND STOPPING THE EQUIPMENT.

a. TO START.

(1) Check to see that the "SELECTIVITY" switch is at "STANDBY" and the "MOTOR DRIVE" switch is set at "OFF" (receiver).

(2) Set the "AC" and "DC" power switches on the rectifier power unit at "ON" and allow at least 15 seconds for the equipment to warm up.

(3) Set the "SELECTIVITY" switch at either its "SHARP" or "BROAD" position. This turns on the receiver and the equipment is ready for use.

(4) If automatic scanning is desired, set the "MOTOR DRIVE" switch at "ON" after adjusting the sector sweep mechanism to cover the desired range. (Refer to sec. III, par. 2*c* for details.)

b. "STANDBY"—To put equipment in "STANDBY" position throw the switches in the following sequence:

(1) Set the "MOTOR DRIVE" switch at "OFF" (receiver).

(2) Set the "SELECTIVITY" switch at "STANDBY" (receiver).

c. TO STOP.

(3) From "STANDBY" position set the "AC" and "DC" power switches at "OFF" (rectifier power unit).

2. OPERATION.

a. For normal operation make the following adjustments at the panel of the receiver.

(1) Select the type of reception (f-m or a-m signal) with the "A.M. F.M." switch.

(2) Set the selectivity required with the "SELECTIVITY" switch. (Use "BROAD" setting for f-m reception and either position for a-m reception.)

(3) Select the frequency of reception by setting the "BAND SWITCH" and "TUNING" control.

(4) Adjust the "R.F. GAIN" and "A.F. GAIN" controls for the desired volume level. Keep the "R.F. GAIN" control turned up as high as the strength of the

carrier will permit, that is, at the point where the receiver doesn't block up or the noise level isn't too high.

(5) Turn the "B.F.O." switch to "ON" for c-w code reception.

b. In special cases the following controls may be used as follows:

(1) In cases of extreme background noises such as ignition noise, static, etc., when receiving a-m signals ("A.M. F.M." switch at "A.M.") set the "A.N.L." switch at "ON". The automatic noise limiter circuit will cut down this background noise in most cases.

(2) When receiving a-m signals that are varying greatly in intensity, hence requiring constant adjustment of the gain controls, it is more convenient to switch on the "A.V.C." switch. Set the "R.F. GAIN" control at maximum gain, and adjust the "A.F. GAIN" control for the desired volume. This automatic volume control switch provides an automatic control of the receiver volume within certain limits.

c. For automatic scanning the following adjustments are necessary:

(1) The thumbscrew on the sector cams should be loose when the automatic scanning device is not being used. The screw is fastened and will not drop off.

(2) Set the receiver to the lowest frequency in the sector to be covered.

(3) With the tripping arms hanging down swing the arm nearest the switch around until it rests against the reversing switch handle and tighten the thumbscrew slightly.

(4) Set the receiver to the highest frequency in the sector to be covered.

(5) Hold the tripping arm of the sector sweep cam that was just set, loosen the thumbscrew, swing the free tripping arm around to the reversing switch handle and then lock the sector sweep mechanism in place with the thumbscrew.

(6) Set the "MOTOR DRIVE" switch at "ON" and check the scanning range. Readjust slightly, if necessary to cover the range exactly.

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SECTION IV EMERGENCY OPERATION AND REPAIR

I. TROUBLE LOCATION AND REMEDY.

The following are symptoms of improper operation and their likely cause:

SYMPTOM	LIKELY CAUSE
(a) No signal or background noise.	(1) Aircraft power source is dead. (2) Cable plugs are loose in their sockets. (3) Broken wire in interconnecting cable. (Generally at the plug terminals.) (4) Tube failure in either the receiver or power unit. (5) Tube jarred loose from socket. (6) Burned-out fuses in the rectifier power unit. Replace fuses if necessary. Both fuses are rated at 5 amperes and are located on the front of the rectifier power unit. There are two spare fuses located inside the rectifier power unit adjacent to the tubes.

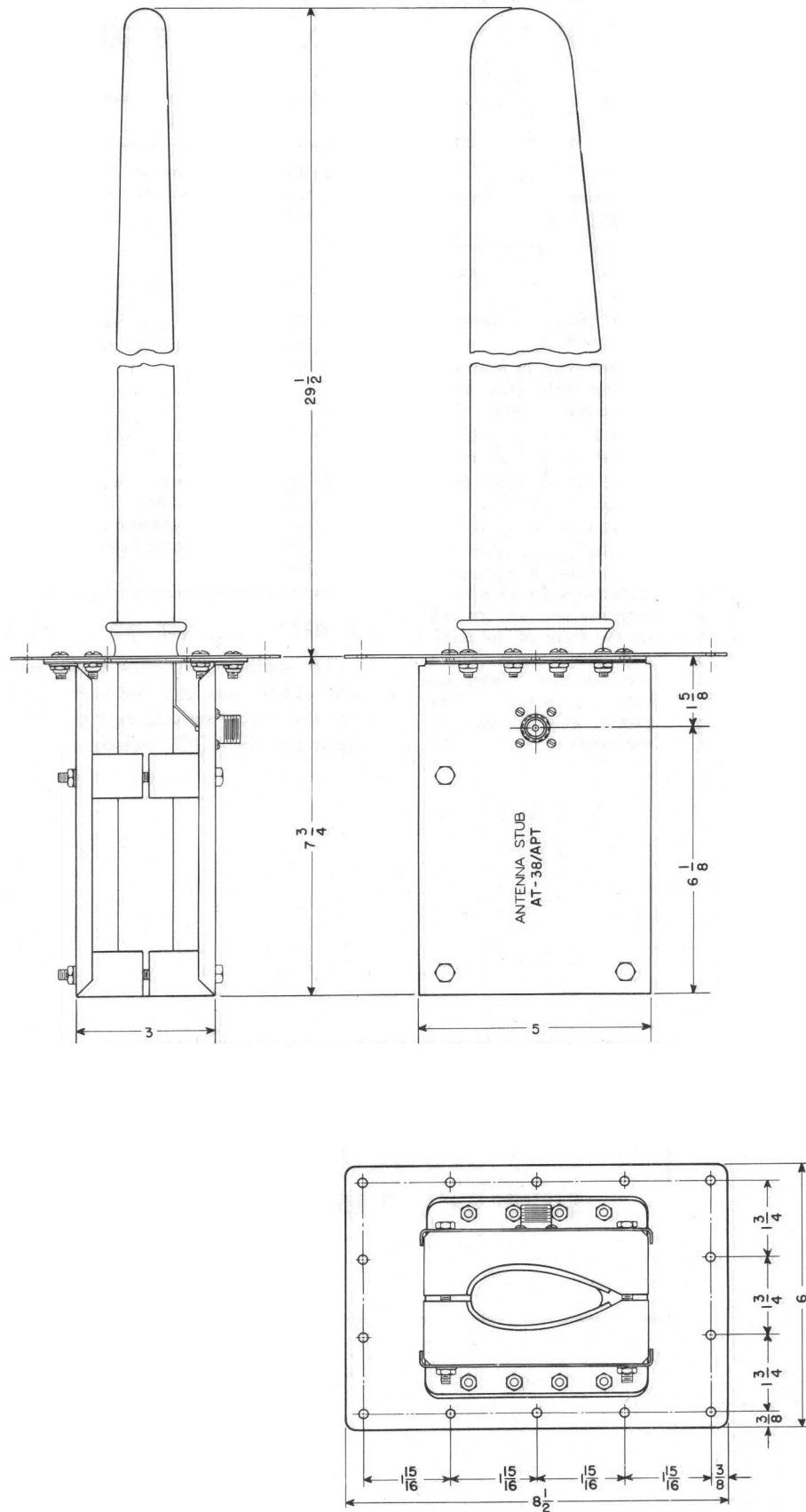
SYMPTOM	LIKELY CAUSE
(b) Background noise but weak signals or no signal.	(1) Antenna cable circuit open. (Usually at the plug terminals.) (2) Connections between antenna receptacle and antenna stub are broken.
(c) Receives signals spasmodically accompanied by excessive noise.	(1) Loose antenna connections. (2) Loose power cabling connections. (3) Tubes loose in sockets. (4) Defective tube.
(d) "B.F.O." switch set at "ON" but no 1000-cycle note for c-w reception as noted by listening in the headset.	(1) Defective B.F.O. tube (V_{12}). (2) "B.F.O" transformer detuned.

2. REPLACEMENT OF PILOT LIGHTS.

To replace the pilot light pull the jewels straight out. Then use the 6-8-volt lamps as the pilot light for the "AC" switch, and the 28-volt lamp as the pilot light for the "DC" switch.

SECTION V SUPPLEMENTARY DATA

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NOTE:—Antenna Stub AT-38A APT may be used, but mounting dimensions differ from those for Antenna Stub AT-38 APT.

Figure 5-1. Antenna Stub AT-38/APT—Outline Dimensions

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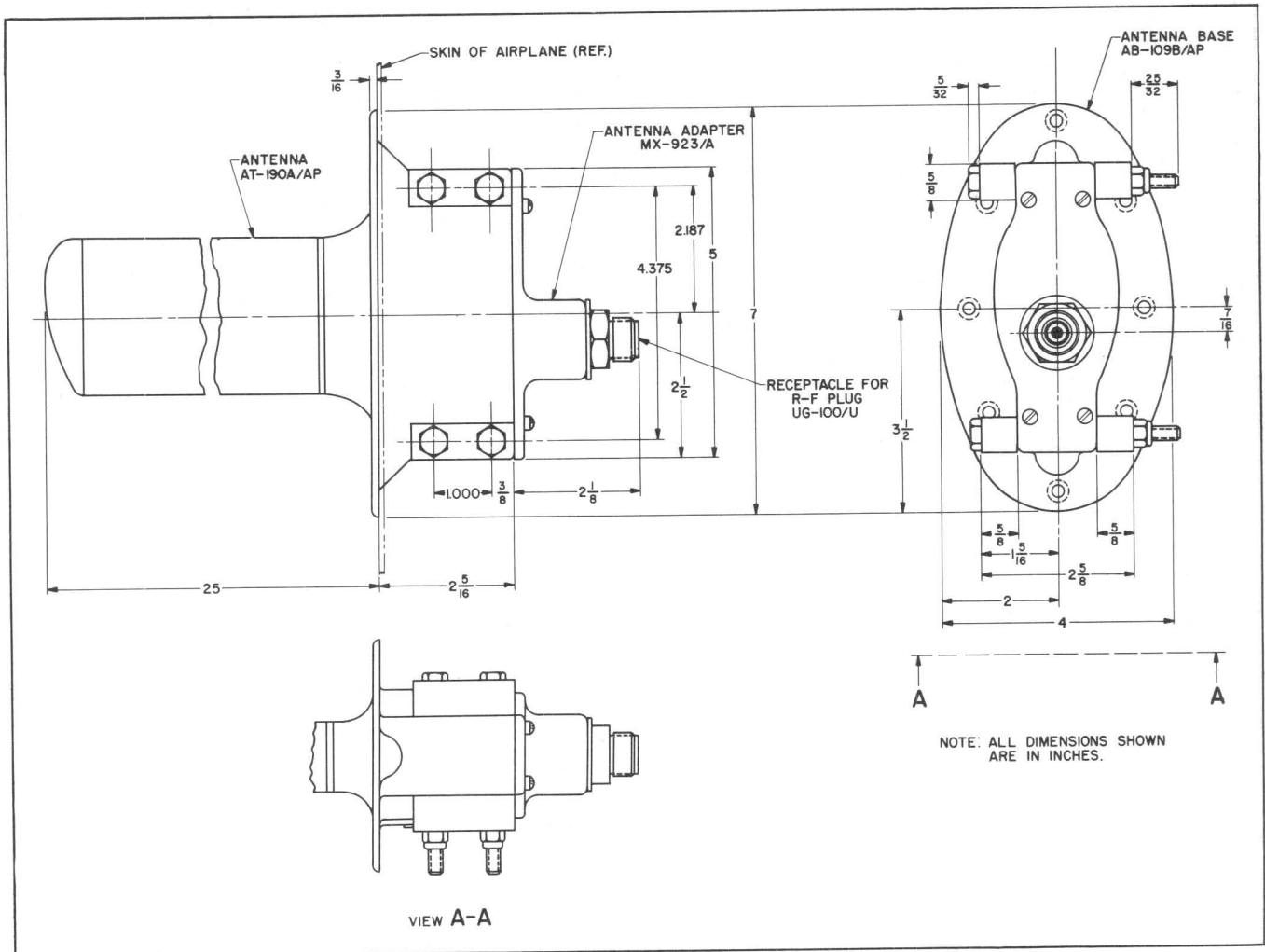


Figure 5-1A. Antenna AT-190A/AP—Outline Dimensions

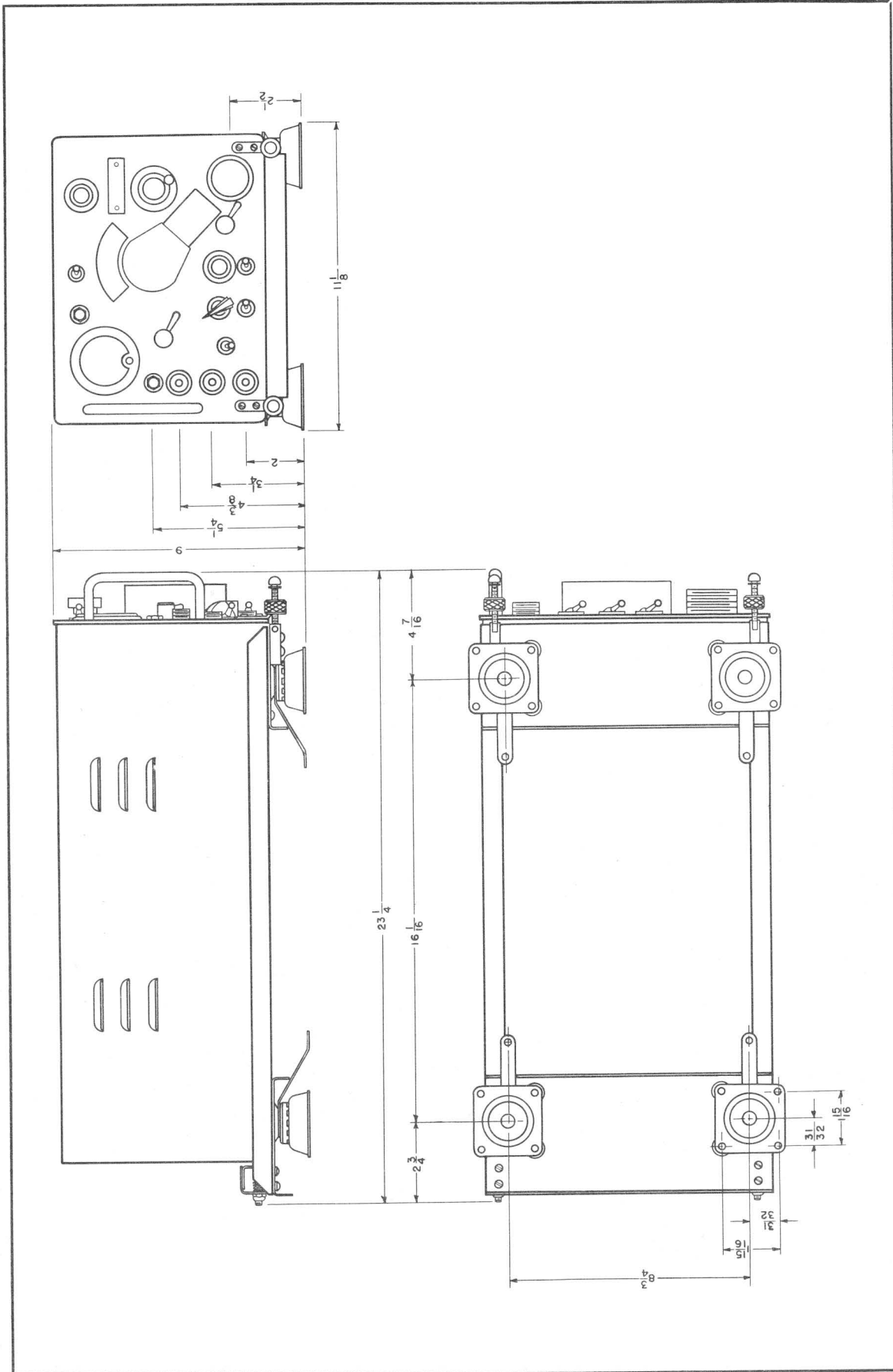


Figure 5-3. Radio Receiver R-44/ARR-5—Outline Dimensions

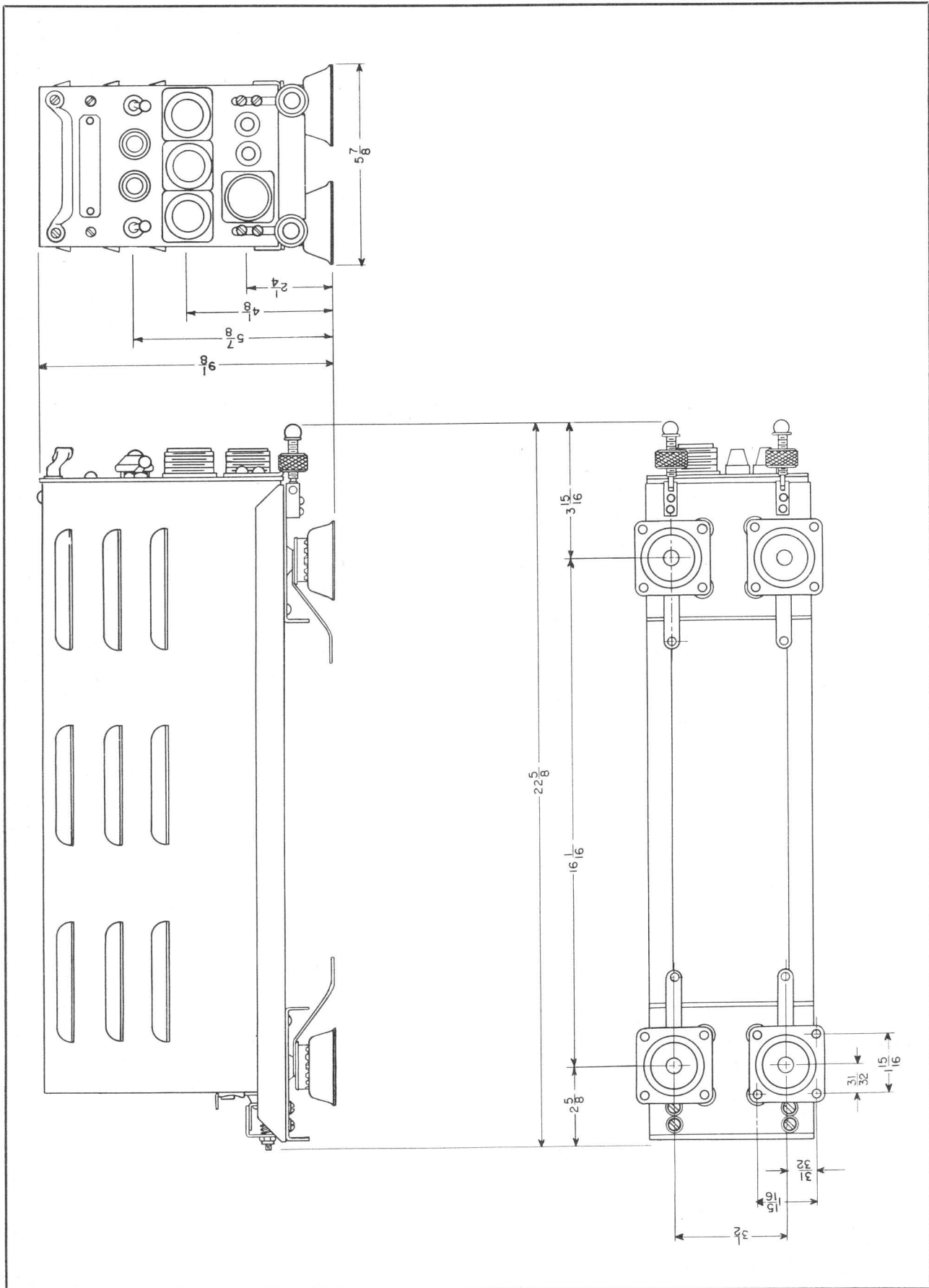
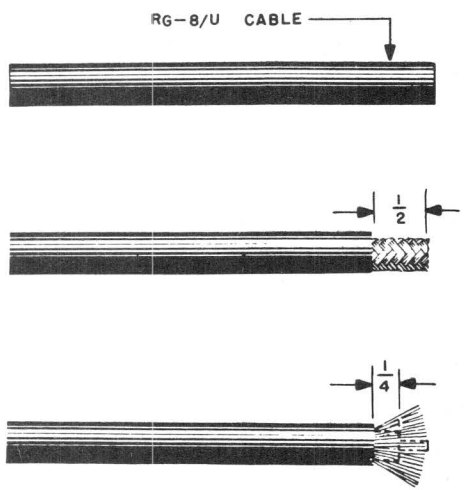


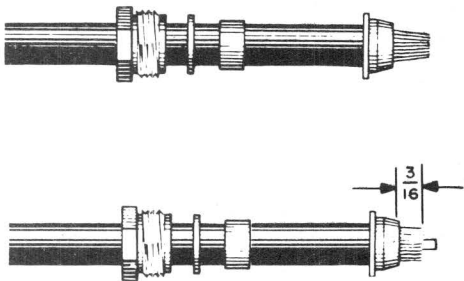
Figure 5-4. Rectifier Power Unit PP-32/AR—Outline Dimensions



Cut end of cable even.

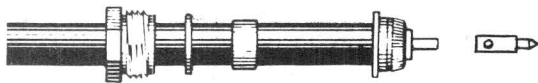
Remove vinyl jacket for $\frac{1}{2}$ inch. Do not nick braid.

Comb out copper braid as shown. Bare $\frac{1}{4}$ inch of center conductor. Do not nick conductor.

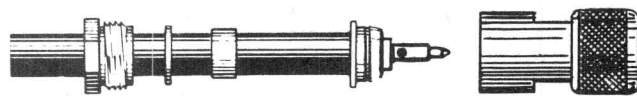


Taper braid as shown. Slide nut, washer, and gasket on vinyl jacket. Slide clamp on braid.

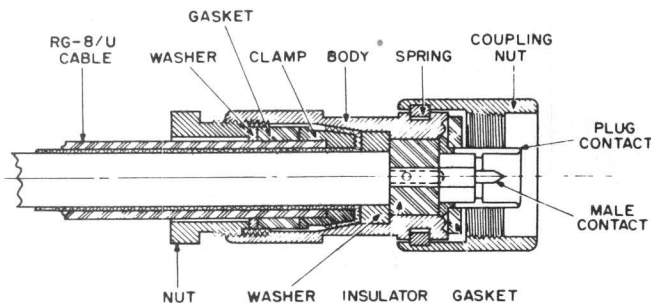
With clamp in place, trim braid as shown.



Fold copper braid on clamp. Tin center conductor, using minimum amount of heat.



Holding contact with pliers, soft-solder contact to center conductor. It is imperative that back end of contact be flush with polyethylene dielectric. Do not use excessive solder. Wipe clean. See that end of cable insulator is clean and free from solder, rosin, and foreign material.



Slide body into place carefully so that center conductor contact enters hole in insulator. Face of cable dielectric must fit flush against insulator. Properly tighten body and nut with wrenches.

Figure 5-4. Installation Instructions for Radio Frequency Plug UG-21C/U

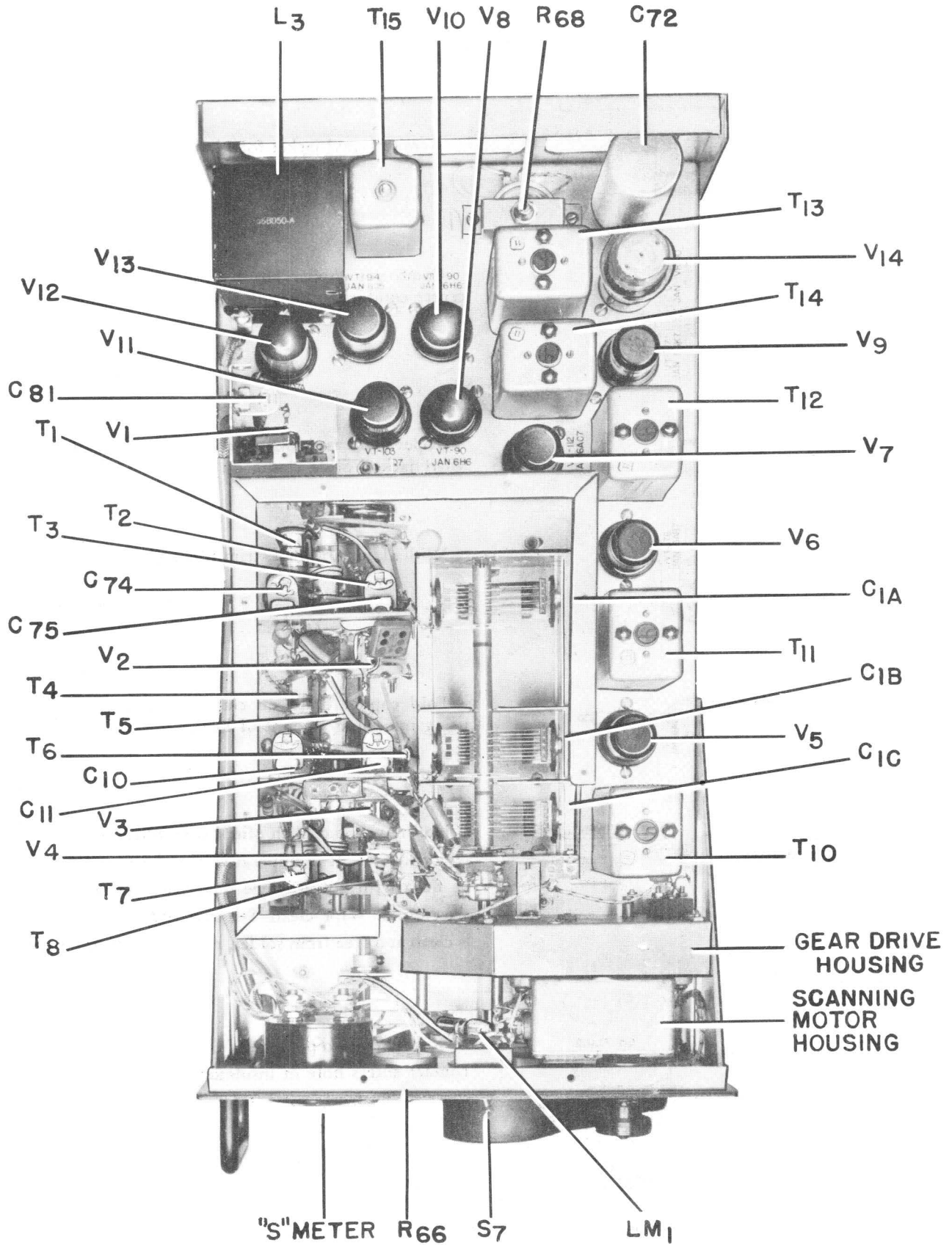


Figure 5-5. Radio Receiver R-44/AAR-5—Showing Location of Acorn Tubes

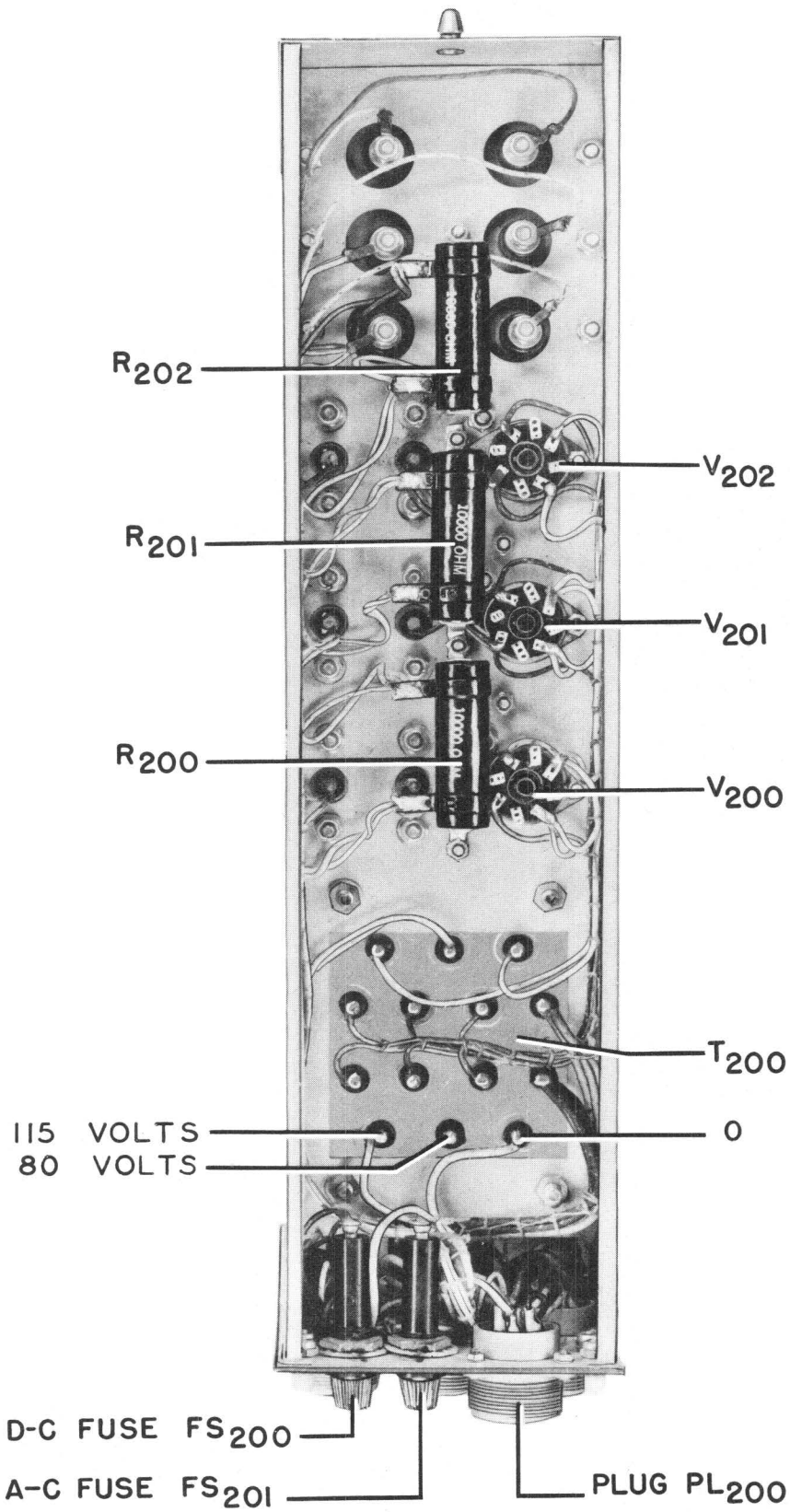


Figure 5-6. Rectifier Power Unit PP-32/AR—Showing 115-Volt and 80-Volt Connections

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WIRE TABLE I

General Notes listed on HIAD drawing No. AD 3501 shall apply to this drawing when applicable and/or as indicated on this drawing.

METHOD OF IDENTIFYING WIRES IN TABLE BELOW

(TR50A20)

Wire No.	Maximum Operating Voltage	Conducted Current, in Amperes	Maximum Allowable Voltage Drop, in Volts	Minimum Cable Size Permitted
50	0 (GND)	Note 3		20
51	0 (GND)	Note 3		20
52	6.3V AC	3.90	Table II	22
53	0 (GND)	0.55	Table II	20
54	28V DC	0.40	Table II	22
55	6.3V AC	3.90	Table II	22
56	270V DC	Note 3		22
57	115V AC	1.50	Table II	20
58	28V DC	0.50	Table II	20
59	115V AC	1.50	Table II	20
441	R-F Cable RG-8A/U	Note 3		

WIRE TABLE II

Circuit	Maximum Allowable Voltage Drop, in Volts
52 and 55	0.30
53, 54, and 58	1.00
57 and 59	2.50

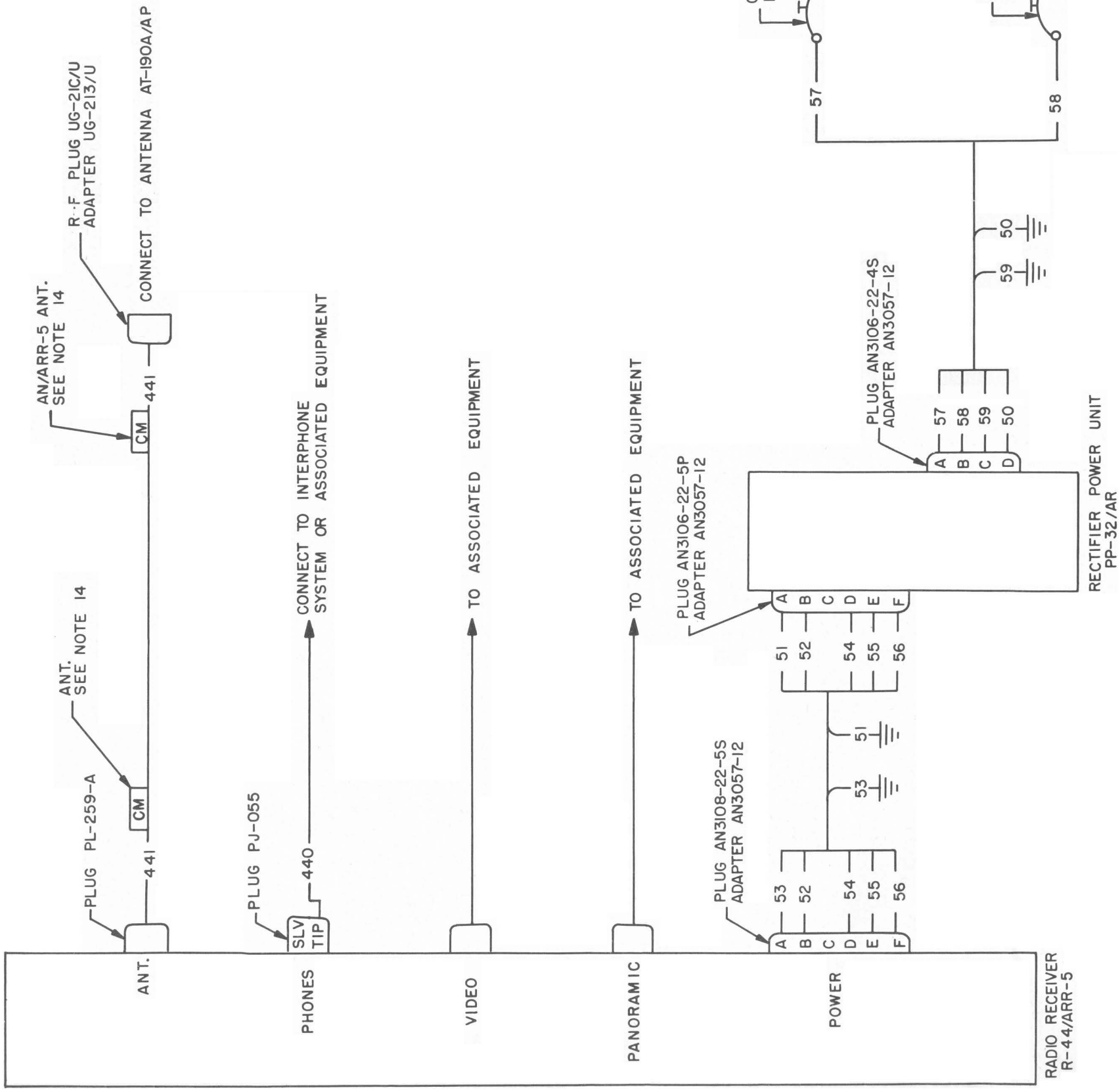


Figure 5-7. Radio Receiving Set AN/ARR-5—Wiring Diagram

Revised 20 May 1953