

NAVSHIPS 91626



TECHNICAL MANUAL

for

AUDIO FREQUENCY
AMPLIFIER

AM-215 B/U
AM-215 D/U

DYNAMIC ELECTRONICS, NEW YORK, INC.
GLENDALE, L. I., N. Y.

BUREAU OF SHIPS

NAVY DEPARTMENT



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From: Chief, Bureau of Ships
To: All Activities concerned with the Installation,
Operation, and Maintenance of the Subject Equipment
Subj: Technical Manual for Audio Frequency Amplifier
AM 215 B/U and AM 215 D/U, NAVSHIPS 91626

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2. When superseded by a later edition, this publication shall be destroyed.
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A. G. MUMMA
Chief of Bureau

RECORD OF CORRECTIONS MADE

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NOTE

UNLESS OTHERWISE INDICATED ALL REFERENCE IN THIS TECHNICAL MANUAL TO A. F. AMPLIFIER AM215B/U APPLIES EQUALLY TO AUDIO FREQUENCY AMPLIFIER AM215D/U.

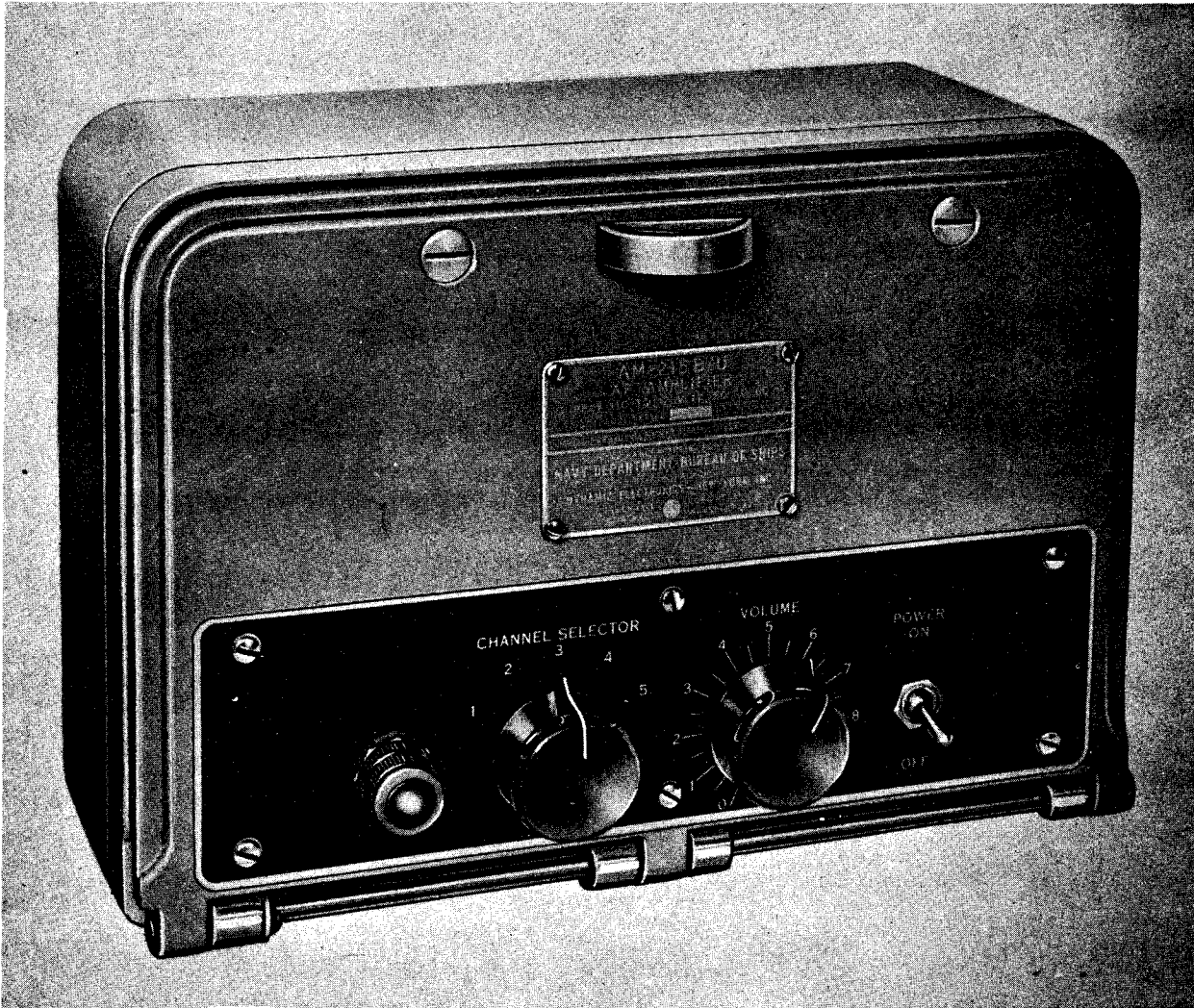


Figure 1-1. A.F. Amplifier AM-215B/U

SECTION 1

GENERAL DESCRIPTION

1. PURPOSE OF EQUIPMENT.

a. The A.F. Amplifier AM-215B/U (see figure 1-1) is a multiple input audio frequency amplifier designed for general communication work in conjunction with Naval electronic receiving equipment and associated loudspeaker units.

2. DESCRIPTION OF UNIT.

a. GENERAL.—The A.F. Amplifier AM-215B/U is a five tube, three stage audio frequency amplifier with push-pull output, incorporating inverse feedback. The power supply and amplifier are included in one compact unit.

b. CONTROLS.—The three controls for the unit are mounted on the front panel along with a shutter type pilot light. The controls are respectively: a POWER ON-OFF switch (S102); a VOLUME control knob (E103) operating the variable resistor (R107); and a CHANNEL SELECTOR knob (E104) operating the channel selector switch (S101). The channel selector switch has five positions and is used to select one of the five input channels as the source of audio power input for the amplifier. The shutter type pilot light is designated as I101 (See figure 4-1).

c. INPUTS.—Five 600 ohm input circuits are provided for connecting to sources of audio, such as radio receivers, or phono preamplifiers, etc. One input circuit at a time is connected to the input transformer (T101) by the input selector switch (S101) as desired. The other input circuits are each terminated in a 620 ohm resistor. A maximum of two watts continuous audio power may be fed into each input. A minimum of approximately six milliwatts is required to produce full audio power output of ten watts.

d. OUTPUT.—The maximum output of the amplifier is 10 watts with less than 10 per cent total harmonic distortion at nominal voltage rating. Two output impedances are provided, 600 ohms and 15 ohms, for feeding a conventional 600-ohm line or a 15-ohm speaker voice coil.

e. POWER SUPPLY.—The power supply is built on the same chassis with the amplifier. It operates from a 110/115/120 volt AC power source, of 50 to 60 cycles, and supplies all filament and plate power required by the amplifier.

f. CABINET.—The complete equipment is enclosed within an aluminum die and sand cast housing which is made up of two pieces riveted together. The front panel of the amplifier serves as the cover for the cabinet. The chassis is mounted to the rear side of the front panel, extending back from the panel at 90

degrees. The panel and chassis are also die cast aluminum. A neoprene gasket is placed around the grooved edge of the panel so that when the assembly is closed the unit is sealed and made "drip proof". The two fasteners at the top of the panel are used to secure the panel when shut. The panel is hinged at the bottom so that it and the chassis will swing out of the cabinet for adjusting and servicing. The tubes are accessible when the panel is opened approximately 60 degrees. When the panel is opened 180 degrees the chassis will be outside the cabinet, upside down and completely accessible for servicing the under chassis wiring (see figure 5-1). The exterior of the cabinet and panel are finished with a smooth Navy grey enamel. The chassis and interior of the cabinet are painted grey. The unit may be mounted from the rear, top, or bottom surface of the cabinet as described in Section 3, Installation.

3. REFERENCE DATA.

- a. NOMENCLATURE. A.F. Amplifier AM-215B/U.
- b. CONTRACT NUMBER AND DATE. NObsr-52347, 15 March 1951.
- c. CONTRACTOR. Dynamic Electronics, New York, Inc., 73-39 Woodhaven Blvd., Glendale, L. I., N. Y.
- d. COGNIZANT NAVAL INSPECTOR. Inspector of Naval Material, N. Y.
- e. NUMBER OF PACKAGES PER COMPLETE SHIPMENT OF EQUIPMENT. One Equipment.
- f. TOTAL CUBICAL CONTENTS. Equipment crated 0.85 cubic feet; uncrated 0.41 cubic feet.
- g. TOTAL WEIGHT. Equipment crated 28.3 pounds; uncrated 23.5 pounds.
- h. FREQUENCY RANGE. 250 to 4000 cps.
- i. POWER OUTPUT. 10 watts maximum at 10 percent total harmonic distortion, or less, at nominal voltage rating.
- j. OUTPUT IMPEDANCE. 600 ohms center tapped and 15 ohms.
- k. POWER GAIN. 32.2 db.
- l. AUDIO INPUT POWER. 2 watts maximum into each input; 6 milliwatts minimum for full power output.
- m. INPUT IMPEDANCE. 600 ohms each input, center tapped for balanced line operation if desired.
- n. POWER SOURCE REQUIRED FOR EQUIPMENT. 110/115/120 volts A.C., 50/60 cps, single phase, .57 amperes, 55 watts.
- o. POWER FACTOR OF EQUIPMENT. 84 percent.

p. EQUIPMENT LISTS. Tables 1-1 and 1-2 list the equipment supplied and the equipment required but not supplied on the contract.

q. SHIPPING DATA. Table 1-3 gives information on the equipment and equipment spare parts as packed for shipment.

r. EQUIPMENT SIMILARITIES. The A.F. Ampli-

fier AM-215B/U is similar to the AM-215A/U Amplifier mechanically and electrically, and the units are interchangeable. Both are designed for 5 input channels and a 600 ohm and a 15 ohm output.

s. ELECTRON TUBE COMPLEMENT. The tubes used in the equipment are listed in Table 1-4.

TABLE 1-1. EQUIPMENT SUPPLIED

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	OVER-ALL DIMENSIONS			VOLUME	WEIGHT
			HEIGHT	WIDTH	DEPTH		
1	A.F. Amplifier	AM-215B/U	8 $\frac{3}{8}$	12	7	0.41	23.5
2	Instruction Books	NAVSHIPS	11	8 $\frac{1}{2}$	—	—	—

TABLE 1-2. EQUIPMENT REQUIRED BUT NOT SUPPLIED

QUANTITY PER EQUIPMENT	NAME OF UNIT	NAVY TYPE DESIGNATION	REQUIRED USE	REQUIRED CHARACTERISTICS
1 to 5	Source of audio frequency, such as Navy radio receiver, or phono pre-amplifier, etc.		To supply a desired signal to the amplifier input	OUTPUT IMPEDANCE 600 ohms. OUTPUT POWER: 6 milliwatts minimum, 2 watts maximum
1 or more	Reproducers, such as LOUD SPEAKERS, HEADSETS, etc.		A.F. Reproduction	Must match amplifier 600 ohm or 15 ohm OUTPUT

TABLE 1-3. SHIPPING DATA

SHIPPING BOX NO.	CONTENTS		OVER-ALL DIMENSIONS			VOLUME	WEIGHT
	NAME	DESIGNATION	HEIGHT	WIDTH	DEPTH		
1	A.F. Amplifier	AM-215B/U	10 $\frac{3}{4}$	14 $\frac{3}{8}$	9 $\frac{1}{2}$	0.85	28.3

Dimensions are in inches; volume in cubic feet; weight in pounds.

TABLE 1-4. ELECTRON TUBE COMPLEMENT

SYMBOL	TYPE	FUNCTION
V101A/B	JAN12AU7	One triode as Voltage Amplifier One triode as Phase Inverter
V102	JAN6AQ5	Power Amplifier
V103	JAN6AQ5	Power Amplifier
V104	JAN6X4	Rectifier
V105	JAN6X4	Rectifier

SECTION 2

THEORY OF OPERATION

1. INTRODUCTION.

a. The A.F. Amplifier AM-215B/U is a straight-forward amplifier of advanced design incorporating a direct coupled stage, phase inversion, inverse feedback and push-pull output. A complete schematic of the amplifier is given in figure 7-4 and is referred to in the following text.

2. INPUTS.

a. Terminals are provided on a terminal board mounted on the interior of the cabinet for connecting five pairs of 600 ohm lines to the input of the amplifier. These are numbered 1 to 5 and respectively correspond to the numbering on the CHANNEL SELECTOR switch S101 (see figures 3-2 and 4-1).

b. The circuits of the CHANNEL SELECTOR switch S101 are arranged to connect one pair of input terminals at a time, respectively, to the primary of the input transformer T101; at the same time each of the other inputs is connected to a 620 ohm loading resistor to properly terminate the lines not connected to transformer T101.

c. The secondary winding of transformer T101 is loaded by R106 and R107. The capacitor C101 is a high frequency by-pass. This load is reflected to the input line by the primary winding as 600 ohms. The center tap on the primary winding is brought out to a terminal to provide for grounding, if required, when used with balanced input lines. There is a static shield between primary and secondary windings to eliminate electrostatic coupling and reduce spurious input noise.

d. The variable resistor R107 is the amplifier gain or volume control. It is operated by the VOLUME control knob E107 (see figure 4-1). The resistor R108 is the cathode bias and feedback for electron tube V101A.

3. DIRECT COUPLING.

a. The 12AU7 tube (V101A/B) is a double triode tube one half of which is used as a voltage amplifier and the other half used as a phase inverter. The plate (pin 1) of the voltage amplifier tube (V101A) is directly connected to the grid (pin 7) of the phase inverter tube (V101B), using R110 as a plate-load resistor. R110, being 470,000 ohms, produces a large voltage drop due to the plate current through it. This puts the grid of the phase inverter at a low positive voltage with respect to ground. The cathode current of the phase inverter flowing through the 51,000 ohm cathode resistor R111 results in a positive voltage on the cathode more positive than that on the grid, thus giving the triode its proper negative grid bias. The circuit is self equalizing and produces a satisfactory

grid bias on the phase inverter through every normal variation of operating voltage and tube condition.

4. PHASE INVERTER.

a. The phase inverter tube (V101B) is a paraphase amplifier. R112 in the plate circuit and R111 in the cathode circuit are equal and each produce the same amount of signal voltage drop, but the voltage across one is 180 deg. out of phase with the voltage across the other. This produces the signal source for the push-pull stage. C102 and C103 function as coupling capacitors. R113 and R114 are used as grid returns. R115 functions as the cathode bias resistor; and C105 functions as the cathode bypass capacitor.

5. OUTPUT.

a. The push-pull output stage (V102 and V103) is used to cancel even harmonic distortion and provide maximum power output. Two output impedances are provided on transformer T102; 15 ohms for a speaker voice coil and 600 ohms for a 600 ohm line. The 600 ohm output has a center tap brought out to a terminal for grounding when required in connection with a balanced output line. C104 is connected from V103 to ground to stabilize the amplifier by eliminating the generation of high frequencies in the plate circuit of V101B.

b. Inverse feedback from the plate of V102 to the cathode of the voltage amplifier is fed through R109. The inverse feedback voltage reduces distortion and improves output voltage regulation with respect to load. A change in load from 600 to 3000 ohms will cause a change in output voltage no greater than 2 db. However, this reduces the power output. Full power output at minimum rated power input can be obtained only by use of a correctly matching output load. Section 3, paragraph 4 discusses matching the output load impedance.

6. POWER SUPPLY.

a. The power supply furnishes all plate and filament power for the amplifier from an AC power source as specified. The rectifier tubes V104 and V105 are connected in a full-wave rectifier circuit with transformer T103. Two tubes are used to handle the current required by the amplifier. The filtering is done by C106, C107 and L101. Two fuses F101 and F102 are used in the line for protection against overload. The switch S102 is used to turn the POWER ON or OFF (see figure 4-1). The power transformer T103 provides from its secondary windings voltages of 535 volts and 6.3 volts for plate and filament power. L101 is used as a filter choke reactor.

SECTION 3 INSTALLATION

1. UNPACKING.

a. The A.F. Amplifier AM-215B/U is packed for domestic shipment in a fiberboard shipping box. The box should be opened at the top by cutting the tape that binds down the flaps and raising the flaps. Remove the packing list and the two instruction books from the packing above the unit. Pull out packing from around the unit to loosen it and lift from the box. Tear off the paper wrapping.

2. METHOD OF MOUNTING.

a. The A.F. Amplifier AM-215B/U may be mounted

by means of bolts through the top, back or bottom of the cabinet in the areas shown cross-hatched in figure 3-1. Input, output and power circuits may be brought into the cabinet by means of terminal tubes in any of these shaded areas when the clearance from the chassis is sufficient preferably at the top or near the top close to the connecting terminals.

b. All holes required for mounting bolts and terminal tubes are to be drilled in the cabinet by the installing activity to fit the needs of the particular installation. An example of a possible installation is shown in figure 3-2.

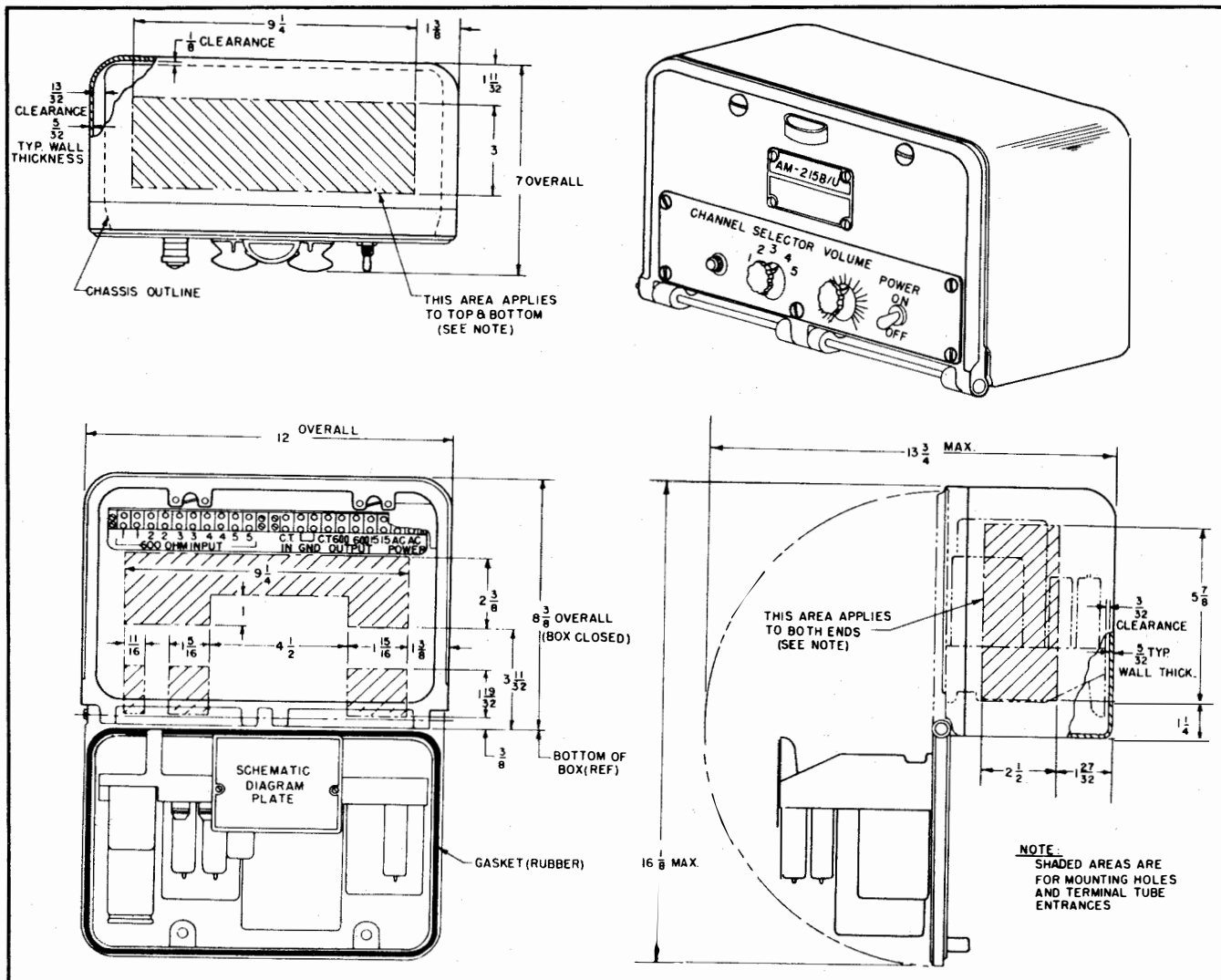


Figure 3-1. Outline and Installation Drawing for A.F. Amplifier AM-215B/U

3. INSTALLATION PROCEDURE.

a. Before drilling mounting holes in the assembly remove the unit from the cabinet as follows:

1. Release the two fasteners at the top of the panel by turning them counterclockwise and tip the unit out of the cabinet.

2. Take off the "CAUTION 110-120V" plate and disconnect the wires from the lower edge of the terminal strips, in the back of the cabinet, by loosening the screws which hold the spade lugs.

3. Remove the screws that hold the two cable clamps at each side of the cabinet.

4. Remove the cotter pin from the hinge pin and take out the hinge pin.

5. Remove the unit from the cabinet (see figure 3-3).

b. Drill the required holes in the area shown cross-hatched in figure 3-1, taking into consideration the clearance between the chassis and the cabinet. Be careful not to damage the terminal strips. Four 1/4" or 3/8" steel bolts should be used for mounting, placed as far apart as the cross-hatched area and other conditions will permit.

c. Mount the cabinet and connect the terminal tubes.

d. Pass the required leads through the terminal tubes and connect them to the top of the proper terminals, as marked, by soldering or by using the top screws.

CAUTION

DO NOT HANDLE ANY WIRES THAT ARE CARRYING POWER OR SIGNAL VOLTAGES. BE SURE ALL CIRCUITS ARE OFF.

e. Reassemble the hinge by inserting the hinge pin from the left side, screw the cable clamps in place and reconnect the amplifier wires to their corresponding terminals as marked. Replace "CAUTION 110-120V" plate.

f. Close the assembly and engage panel fasteners.

g. Complete all connections to power source, signal sources, and reproducers, or line load. The signal sources must be adjusted to deliver average power in the range of 6 milliwatts to 2 watts. Over 2 watts may damage the amplifier and less than 6 milliwatts may not give full output when required.

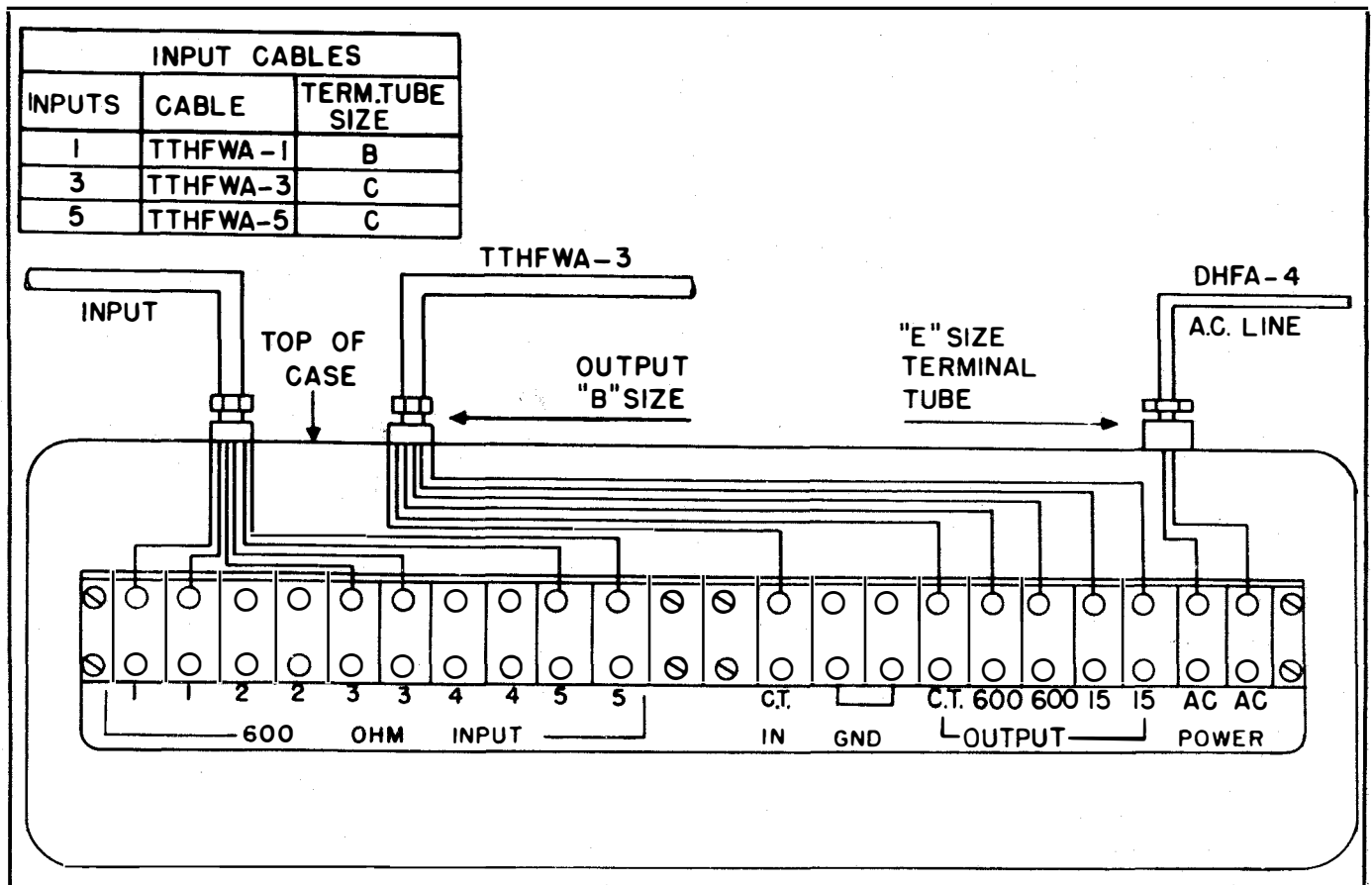


Figure 3-2. Typical Terminal Tubes and Cables for A.F. Amplifier AM-215B/U

4. MATCHING IMPEDANCES.

a. Each source of audio frequency should have a 600 ohm output impedance. Sources not having 600 ohm output must have their output adjusted to properly match the 600 ohm amplifier input, if they are to operate properly.

b. Full power output from the amplifier can be obtained only when the impedance of the load matches the amplifier output to which it is connected. Numerous combinations for correctly loading the amplifier are given in Table 3-1.

c. Considerable mismatching can be tolerated without excessive distortion, due to the action of the inverse feedback, but improper matching causes a loss in power output approximately proportional to the ratio of mismatch.

d. When two or more equal loads are connected the power will divide equally between them. When both the 600 and 15 ohm outputs are used simultaneously each should be connected to a load which is twice the impedance of the winding. This will properly load the amplifier and each load will receive half the power output.

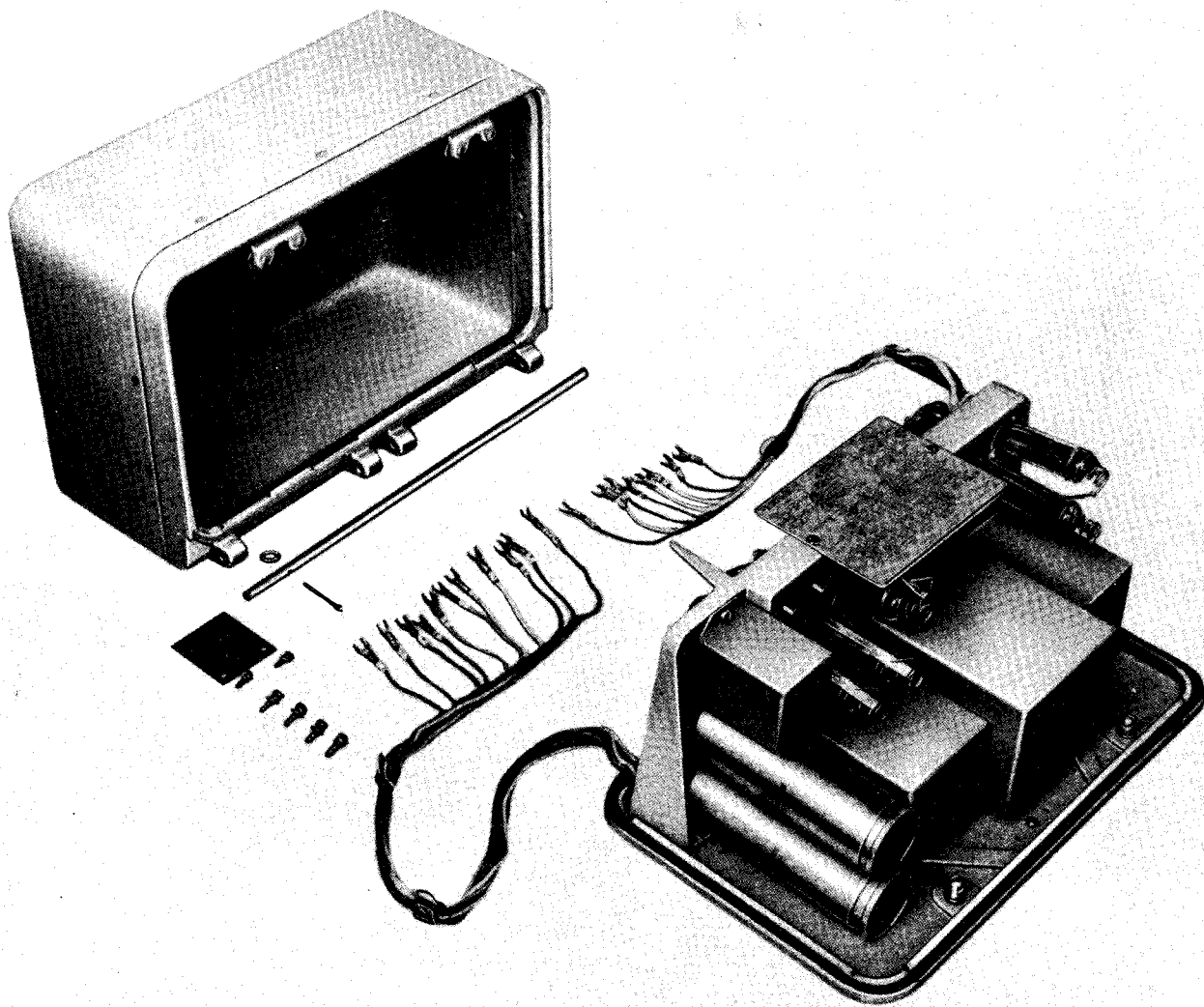


Figure 3-3. A.F. Amplifier AM-215B/U Removed from Case

5. ADJUSTING FOR LINE VOLTAGE.

a. It is important that the taps on the power transformer T103 be properly connected for the line voltage supplied to the amplifier. Excessive voltage will shorten tube and component life, and low voltage will reduce the maximum undistorted output. Primary terminals are provided on the bottom of transformer T103 for primary voltages as follows:

- Terminals 1 and 2—110 volts
- Terminals 1 and 3—115 volts
- Terminals 1 and 4—120 volts

The amplifier is wired at the factory for 115 volts.

b. Measure the line voltage and make certain that the primary leads are soldered to the terminals most nearly corresponding to the actual line voltage.

6. INSTALLATION CHECK.

a. With power source on, throw the POWER switch (S102) to ON. The pilot light (I101) should glow; turn the lens housing counterclockwise to make certain the shutter is open.

b. Operate all signal sources and turn the CHANNEL SELECTOR control knob (E104) to each of the five positions noting whether each signal is reproduced normally. Check the operation of the VOLUME control, (E103). (See figure 4-1.)

TABLE 3-1. OUTPUT LOAD MATCHING CHART

OUTPUT WINDING	SINGLE LOAD	SERIES LOADS	PARALLEL LOADS	SERIES PARALLEL LOADS
600	600	Two 300, Three 200, or Four 150	Two 1200, Three 1800, or Four 2400	Four 600
15	15	Two 7.5, Three 5, Four 3.75, or Five 3	Two 30, Three 45, Four 60, or Five 75	Four 15
600 and 15 COMBINATION	1200 and 30 RESPECTIVELY	Two 600 and Two 15 RESPECTIVELY	Two 2400 and Two 60 RESPECTIVELY	Two 2400 in parallel and Two 15 in series, or Two 600 in series and Two 60 in parallel

All values are in ohms.

SECTION 4 OPERATION

1. GENERAL METHOD.

a. The operating controls of the A.F. Amplifier AM-215B/U are shown in figure 4-1.

b. To turn the equipment "ON", first turn the VOLUME control knob (E103) to 1 or 2; then throw the POWER switch (S102) to ON. Illumination of the pilot light (I101) indicates the power is on when the

shutter is open. Rotate the lens housing of the pilot light to adjust the shutter for the desired brilliance. Turn the CHANNEL SELECTOR knob (E104) to the desired input channel and adjust the VOLUME control knob (E103) for the desired volume.

c. To turn the equipment "OFF", first turn VOLUME control knob (E103) to 0 then throw the POWER switch (S102) to OFF.

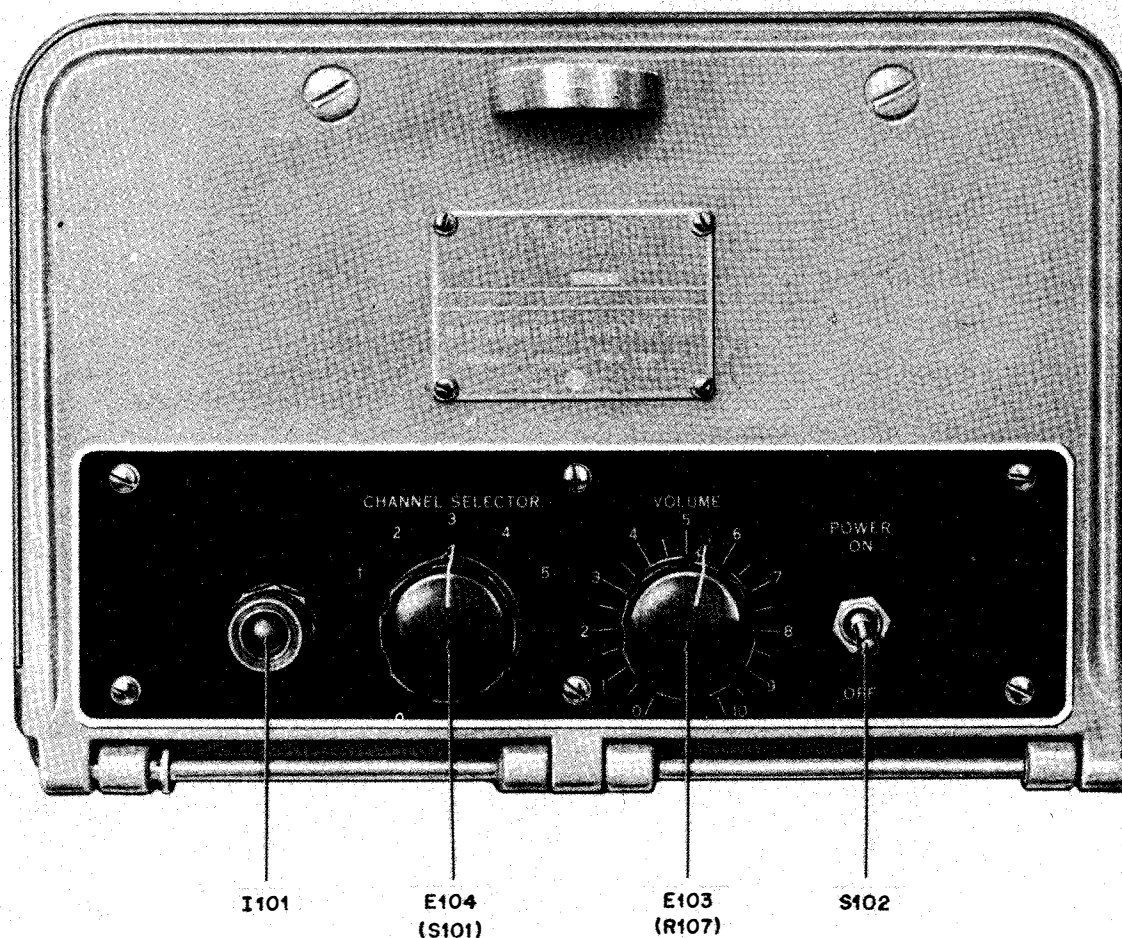


Figure 4-1. Operating Panel of A.F. Amplifier AM-215B/U

SECTION 5 OPERATOR'S MAINTENANCE

1. DAILY OPERATIONAL CHECK.

a. To insure proper operation of the A.F. Amplifier AM-215B/U, the equipment should be given a daily operational check. Turn on the amplifier, supply input signal and check the loudspeaker output, or other

reproducer output, for general quality and volume. Rotate the VOLUME control to check for normal, quiet, control of amplifier output. Adjust the pilot light for desired brilliance by rotating the lens housing. Check each active input for normal operation.

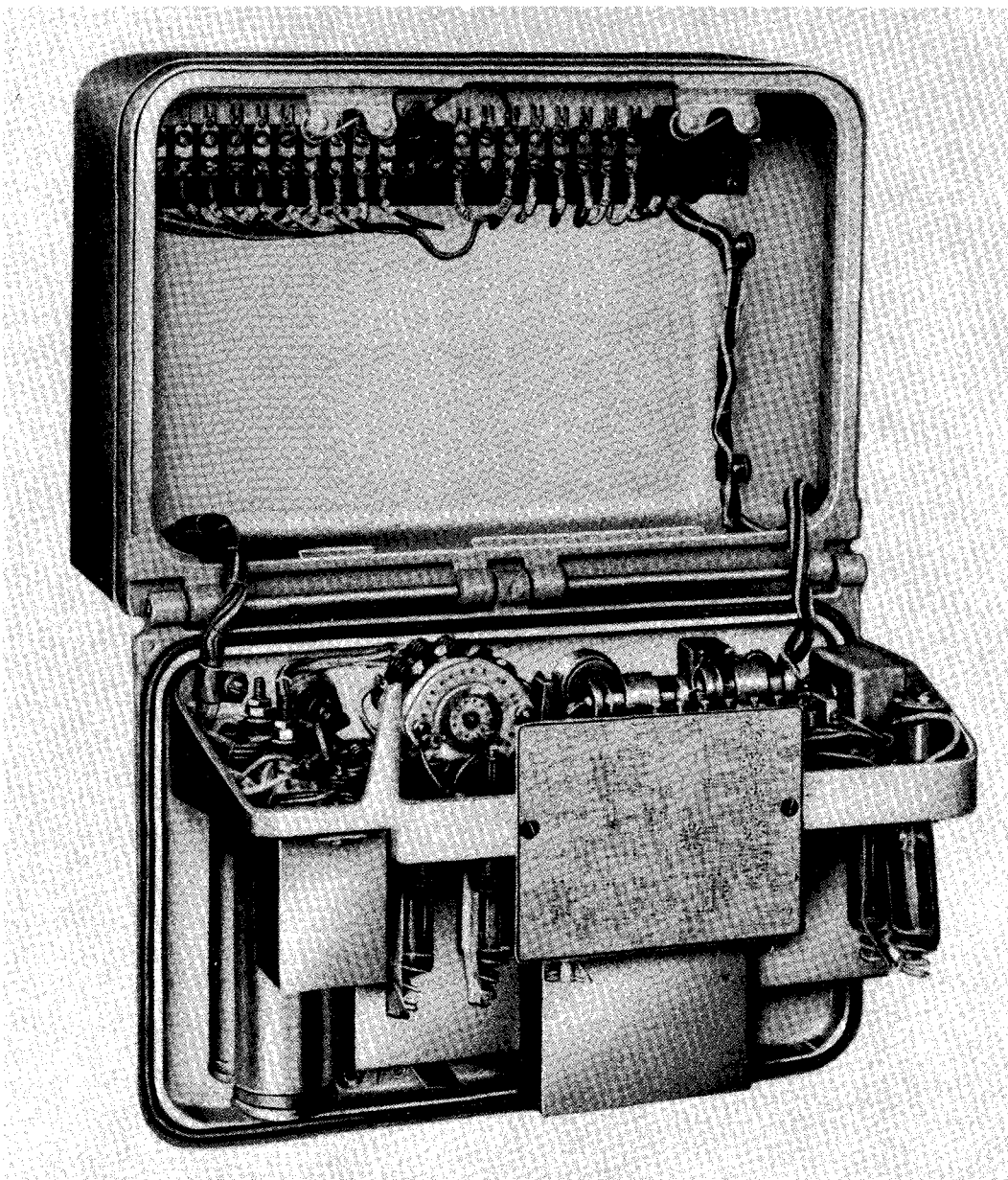


Figure 5-1. A.F. Amplifier AM-215B/U Open for Maintenance

2. EMERGENCY MAINTENANCE.

NOTICE TO OPERATORS

Operators shall not perform any of the following emergency maintenance procedures without proper authorization.

a. There are only three items which the operator should attempt to replace. These are the pilot lamp, fuses, and tubes. The procedure to be followed is given in Table 5-1 and the paragraphs below.

CAUTION

BE SURE THE POWER SWITCH IS IN OFF POSITION WHILE REPLACING TUBES OR FUSES OR DOING WORK INSIDE THE CABINET.

(1) **PILOT LAMP REPLACEMENT.**—To replace the pilot lamp, unscrew the lens-shutter counterclockwise, from the front of the panel. Release the lamp by pressing it in and turning counterclockwise. Insert the new lamp (Mazda 44) and lock it in place. Replace the lens-shutter.

WARNING

NEVER REPLACE A FUSE WITH ONE OF GREATER THAN 1 AMPERE RATING UNLESS CONTINUED OPERATION IS MORE IMPORTANT THAN PROBABLE DAMAGE. IF A FUSE BURNS OUT IMMEDIATELY AFTER REPLACEMENT, DO NOT REPLACE IT A SECOND TIME UNTIL THE CAUSE HAS BEEN CORRECTED.

(2) **FUSE REPLACEMENT.**—Open the assembly (see figure 5-1) by releasing the fasteners at the top of the panel with a quarter turn counterclockwise. Tip the panel out so that the top of the chassis is accessible. The fuses are plainly marked F101 and F102. Extract the fuse by turning the knurled fuse holder cap approximately an eighth turn counterclockwise and lifting both the cap and the fuse out of the holder. Pull the fuse out of the cap. Insert a new fuse in the cap and replace in holder. Use the SPARE FUSES which are held in clips on the chassis, and replenish from spare parts.

(3) **TUBE REPLACEMENT.**—To replace tubes open the assembly the same as for fuse replacement. First release the tube hold down spring. Then grasp the tube and pull straight up from the socket with a very slight rocking motion. Use only a slight rocking motion; excessive rocking will break off tube pins or damage the socket. When putting a tube into the socket, align the pins of the tube to correspond with the holes in the socket and press firmly into socket. Snap tube hold down spring into place over tube.

CAUTION

AFTER REPLACING TUBES, MAKE CERTAIN THAT ALL TUBE SHIELDS ARE SECURELY IN PLACE ON TOP OF THE TUBES BEFORE CLOSING THE ASSEMBLY.

Note

ALL TUBES OF A GIVEN TYPE SUPPLIED WITH THE EQUIPMENT SHALL BE CONSUMED PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK.

TABLE 5-1. OPERATOR'S EMERGENCY MAINTENANCE CHART

TROUBLE SYMPTOM	PROBABLE CAUSE	CORRECTION
POWER switch ON but pilot light does not indicate.	Pilot lamp (I101) burned out.	Replace pilot lamp from spares. See Par. 2a (1) PILOT LAMP REPLACEMENT.
	Fuse (F101 or F102) blown.	Replace with fuse or fuses from spares in unit or spare parts kit. See WARNING and Par. 2a (2) FUSE REPLACEMENT.
	AC power source not on.	Turn on power source, or report power failure.
POWER switch ON and pilot light glows but no signal output, or unsatisfactory output.	No input, or unsatisfactory input signal.	Try other inputs; check unsatisfactory input source; check input connections on terminal strips.
	Defective tubes.	Replace any tubes that do not light and then if necessary replace each of the other tubes one by one. See par. 2a (3) TUBE REPLACEMENT.

SECTION 6 PREVENTIVE MAINTENANCE

1. GENERAL PROCEDURE.

a. The periodic mechanical and electrical checks and maintenance procedure given in this section should be carefully followed in order to assure continuity of service at all times and the maintenance of the equipment at its peak performance.

b. Before proceeding with any preventive maintenance work Section 5 covering operator's maintenance and Section 7 covering corrective maintenance

should both be studied. The Note which follows should also be especially heeded.

Note

THE ATTENTION OF MAINTENANCE PERSONNEL IS INVITED TO THE REQUIREMENTS OF CHAPTER 67 OF THE BUREAU OF SHIPS MANUAL OF THE LATEST ISSUE.

TABLE 6-1. ROUTINE MAINTENANCE CHECK CHART

WHAT TO CHECK	HOW TO CHECK	PRECAUTIONS
<p>Daily</p> <ol style="list-style-type: none"> 1. Operational Check 2. Panel 3. Knobs 4. Toggle Switch 5. Cabinet 	<ol style="list-style-type: none"> <i>a.</i> Follow procedure given in Section 5. <i>b.</i> Visually inspect panel, chassis and cabinet for dirt and corrosion, broken or loose toggle switch and knobs, and loose or missing screws. <i>c.</i> Clean and repair as needed. If knobs are loose tighten with No. 8 Allen Wrench held in clip on chassis. 	<p>When cleaning follow method outlined in Section 6, par. 3.</p> <p>Do not tighten set screws in knobs, or other screws on panel beyond a firm hold.</p>
<p>Weekly</p> <ol style="list-style-type: none"> 1. Terminal Strip 2. Capacitors 3. Resistors 4. Switches 5. Transformers 6. Tubes 	<ol style="list-style-type: none"> <i>a.</i> Visually inspect all parts for damage and for loose, broken, or corroded connections. <i>b.</i> Replace damaged parts as needed. <i>c.</i> Tighten, repair, and clean all connections as needed. <i>d.</i> If any tubes are replaced make certain the power supply is checked and adjusted for high or low voltage (see Section 3, par. 5). 	<p>When cleaning follow method outlined in Section 6, par. 3.</p> <p>If any part must be replaced first test the new part to be sure it is in good condition.</p> <p>When resoldering connections be careful not to get any excess solder into the equipment. Be sure all screw and nut type connections are clean and tight.</p>
<p>Monthly</p> <ol style="list-style-type: none"> 1. Tubes 2. Finish of Cabinet Panel, Chassis, etc. 	<ol style="list-style-type: none"> <i>a.</i> Test all tubes monthly regardless of hours of operation. <i>b.</i> Replace all defective tubes. <i>c.</i> Visually inspect finish of cabinet, panel and chassis for rust and corrosion. <i>d.</i> If necessary refinish as instructed in par. 3 and 4. <i>e.</i> Visually inspect all wiring for cracked or deteriorated finish. <i>f.</i> Replace defective wiring. 	<p>Before removing or replacing tubes see Section 5, par. 2<i>a.</i>(3).</p> <p>Also check power supply as per Section 3, par. 5.</p> <p>When repainting follow instructions in Section 6, par. 3 and 4.</p>

2. ROUTINE CHECK CHART.

a. To accomplish the above mentioned ends a step-by-step procedure for preventive maintenance is given in Table 6-1 (Routine Maintenance Check Chart). This table shows What to Check, How to Check, and Precautions. The prescribed periods when checking should be done is indicated for each item (Daily, Weekly, Monthly, etc.)

3. CLEANING METHODS.

a. No special tools are required for preventive maintenance of the A.F. Amplifier AM-215B/U, but the following items should be on hand for routine cleaning and maintaining the equipment:

1. Brush, soft hair, paint type
2. Cloth, lint free
3. Crocus cloth
4. Solvent, dry cleaning type
5. Standard solvent (GS1-C-1326-67, for 5-gal. can)
6. Pliers, duck-bill type
7. Screwdriver, small (6 in)
8. Soldering iron (25 w or 100 w)
9. Solder
10. No. 8 hex wrench (supplied with equipment).

b. The A.F. Amplifier AM-215B/U is easily cleaned without disassembly. Wipe out all dust between parts with a clean dry cloth. Use a dry brush to remove dust

from terminal strips, switches, and wiring. Never use a damp or wet cloth to clean wiring.

c. If dirt or corrosion exists which cannot be removed with a cloth or brush, use a cloth slightly moistened with a dry cleaning solvent, then wipe thoroughly dry. Do not, however, use a solvent on electrical contacts; these should be cleaned with carbon tetrachloride and then wiped dry with a clean cloth.

d. For dirt and corrosion that cannot be removed with solvent use a crocus cloth. After cleaning with the crocus cloth, reclean with solvent and wipe dry. **NEVER USE STEEL WOOL TO CLEAN THE EQUIPMENT. MINUTE PARTICLES MAY ENTER THE ASSEMBLY AND CAUSE SHORTING OF CIRCUITS.**

4. PAINTING.

a. When the finish on the panel, or cabinet, has been badly scarred or damaged, rust or corrosion may be prevented by touching up the bared spots with paint. Use a #00 or #000 sandpaper to clean the surface down to the bare metal and obtain a bright smooth finish. **DO NOT USE STEEL WOOL.** Reference Bureau of Ships Manual Chapter 19 when painting or retouching electronic equipment.

5. LUBRICATION.

a. The A.F. Amplifier AM-215B/U requires no lubrication. *Under no circumstances should oil or grease be applied to this equipment.*

FAILURE REPORTS

A FAILURE REPORT must be filled out for the failure of any part of the equipment whether caused by defective or worn parts, improper operation, or external influences. It should be made on Failure Report, form NBS-383, which has been designed to simplify this requirement. The card must be filled out and forwarded to BUSHIPS in the franked envelope which is provided. Full instructions are to be found on each card.

Use great care in filling the card out to make certain it carries adequate information. For example, under "Circuit Symbol" use the proper circuit identification taken from the schematic drawings, such as T-803, in the case of a transformer, or R-207, for a resistor. Do not substitute brevity for clarity. Use the back of the card to completely describe the cause of failure and attach an extra piece of paper if necessary.

The purpose of this report is to inform BUSHIPS of the cause and rate of failures. The information is used by the Bureau in the design of future equipment and in the maintenance of adequate supplies to keep the present equipment going. The cards you send in, together with those from hundreds of other ships, furnish a store of information permitting the Bureau to keep in touch with the performance of the equipment of your ship and all other ships of the Navy.

This report is not a requisition. You must request the replacement of parts through your Officer-in-Charge in the usual manner.

Make certain you have a supply of Failure Report cards and envelopes on board. They may be obtained from the nearest District Printing and Publications Office.

FAILURE REPORT—ELECTRONIC EQUIPMENT
NAVSHIPS (NBS) 383 (REV. 8-45)
(FORMERLY NAVSHIPS (NBS) 383 AND NAVSHIPS (NBS) 384)

SHIP NUMBER AND NAME OR STATION _____

CHECK ONE: RADIO

EQUIPMENT MODEL DESIGNATION _____

TYPE NUMBER AND NAME OF MAJOR UNIT IN _____

THIS _____

TUBE TYPE, INCLUDING PREFIX LETTERS _____

TUBE MANUFACTURER _____

FAILURE OCCURRED IN:
 STORAGE OPERATING
 HANDLING OTHER (SPECIFY) _____
 INSTALLING

NATURE OF FAILURE AND REMARKS _____

NOTICE—Read notes on reverse side. Address forms and envelopes may be obtained from nearest BMO. DATE _____

NAME OF PERSON MAKING REPORT _____

ELECTRONIC EQUIPMENT FAILURE REPORT (SIG) NOTICE—Read notes on cover prior to preparing this form. *REPORT No. _____ DATE _____

NAVSHIPS (NBS) 383 (REV. 11-52)

ORGANIZATION PERFORMING MAINTENANCE _____ NAME AND RANK OF OFFICER ACCOUNTABLE FOR MAINTENANCE _____

EQUIPMENT INVOLVED
 Navy Army USMC JAN Commercial Other _____ (Specify)
 Radio Radar Sonar Wire Tool Test Power Sound Other _____ (Specify)

EQUIPMENT MODEL DESIGNATION _____ SERIAL NUMBER OF EQUIPMENT _____ NAME OF CONTRACTOR _____ CONTRACT NO. _____

TYPE NUMBER AND NAME OF MAJOR UNIT INVOLVED _____ SERIAL NUMBER OF UNIT _____ CONTRACT OR PO DATA OF UNIT _____ DATE EQUIPMENT RECEIVED _____

ITEM WHICH FAILED

THIS SIDE FOR TUBES		THIS SIDE FOR PARTS (NOTE 9)	
TUBE TYPE, INCLUDING PREFIX LETTERS _____	SERIAL NO. (NOTE 8) _____	NAME OF PART _____	CIRCUIT SYMBOL (eg R 134) _____
TUBE MANUFACTURER _____	CONTRACT NO. (NOTE 8) _____	SERIAL NO. _____	*CONTRACT DATA _____
FAILURE OCCURRED IN: <input type="checkbox"/> Storage <input type="checkbox"/> Operation <input type="checkbox"/> Handling <input type="checkbox"/> Other (Specify in remarks) _____ <input type="checkbox"/> Installing	GUARANTEED HOURS (NOTE 8) _____ ACTUAL HOURS _____	*CHECK-OFF OR TAG DATA (NOTE 9) _____	*DATE RECD. _____
NATURE OF FAILURE AND REMARKS (NOTE 4) (CONTINUE ON BACK) _____	DATE OF ACCEPTANCE (NOTE 8) _____ DATE OF FAILURE _____	*MANUFACTURER'S DATA (NOTE 9) _____	*NAVY STOCK NO. _____
	TYPE OF FAILURE (NOTE 7) _____	BRIEF DESCRIPTION AND CAUSE OF FAILURE, INCLUDING APPROXIMATE LIFE (CONTINUE ON BACK) _____	
	TUBE CIRCUIT SYMBOL V- _____		

CONCLUSION:
 Normal replacement Shortage Recondition Failure Transportation breakage Other _____ (Specify)

*NOT REQUIRED FOR REPORTS SUBMITTED BY NAVAL ACTIVITIES. 16 (458)-1 U. S. GOVERNMENT PRINTING OFFICE

Figure 7-1. Failure Report, Sample Form

SECTION 7 CORRECTIVE MAINTENANCE

1. FAILURE REPORTS.

a. Whenever corrective maintenance work is done a Failure Report must be made. Follow the instructions given in figure 7-1.

2. GENERAL PROCEDURE.

a. The following discussion is intended to aid in locating and correcting sources of trouble in the A.F.

Amplifier AM-215B/U in the most direct and efficient manner. When a trouble is not obvious, start first with simple tests and proceed with the purpose of localizing the trouble to one section or one stage of the amplifier, where a more detailed test can locate the exact part which is at fault. Analyze symptoms and try to select the tests that will most quickly reveal the cause of the trouble.

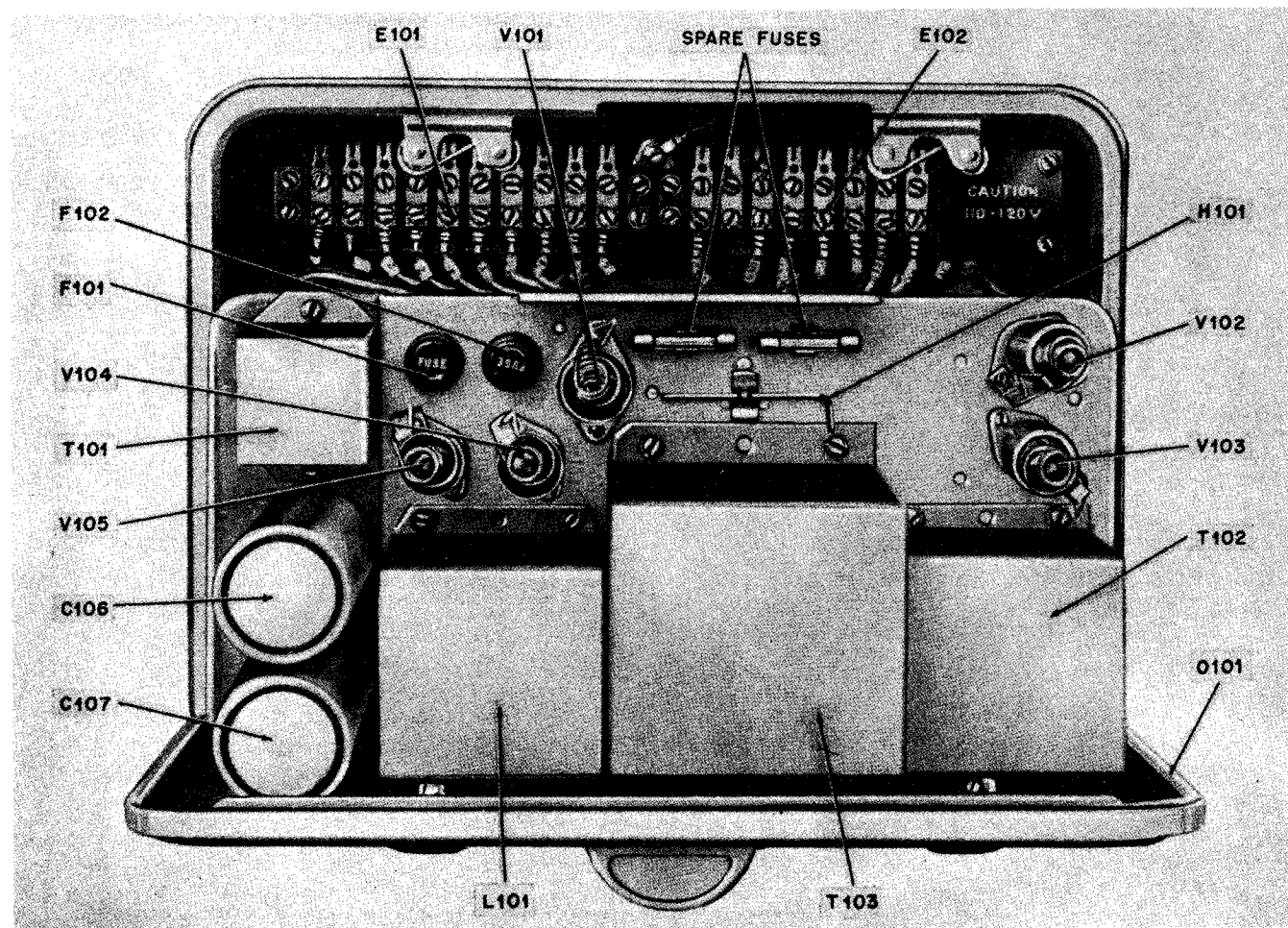


Figure 7-2. A.F. Amplifier AM-215B/U, Inside Top View

b. The A.F. Amplifier AM-215B/U is described in Section 1 and its various ratings are listed. Its operating principles are discussed in Section 2. Operator's maintenance is covered in Section 5, and preventive maintenance in Section 6. All these sections should be carefully studied and understood before any corrective maintenance work as given in this section is attempted.

Note

ALL TUBES OF A GIVEN TYPE SUPPLIED WITH THE EQUIPMENT SHALL BE CONSUMED PRIOR TO EMPLOYMENT OF TUBES FROM GENERAL STOCK.

c. The location of all parts in top and bottom views of A.F. Amplifier AM-215B/U are shown by figures 7-2 and 7-3. The schematic diagram of the A.F. Amplifier AM-215B/U is given in figure 7-4, and its practical wiring diagram by figure 7-5. Tube operating voltage and current, are given in Table 7-2. Tube characteristics data will be found in Table 7-3. Data covering operating voltages and non-operating resistances are listed in Table 7-4. In Tables 7-5 and 7-6 will be found information concerning transformer and reactor coil resistances and windings. All this information should be thoroughly studied before any corrective maintenance work is started. The parts list and applicable color codes given in Section 8 should also be consulted before corrective maintenance is undertaken.

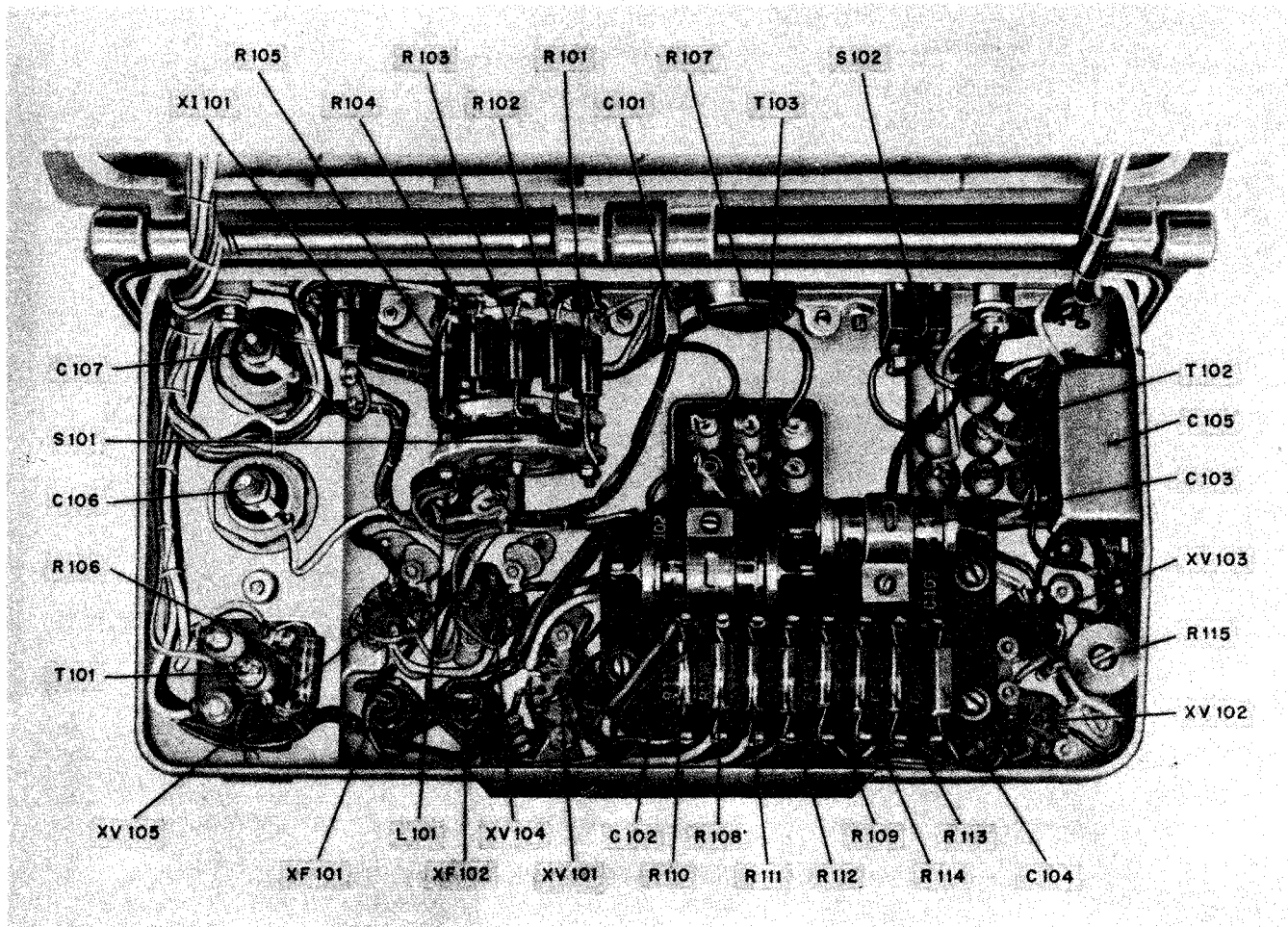


Figure 7-3. A.F. Amplifier AM-215B/U, Inside Bottom View

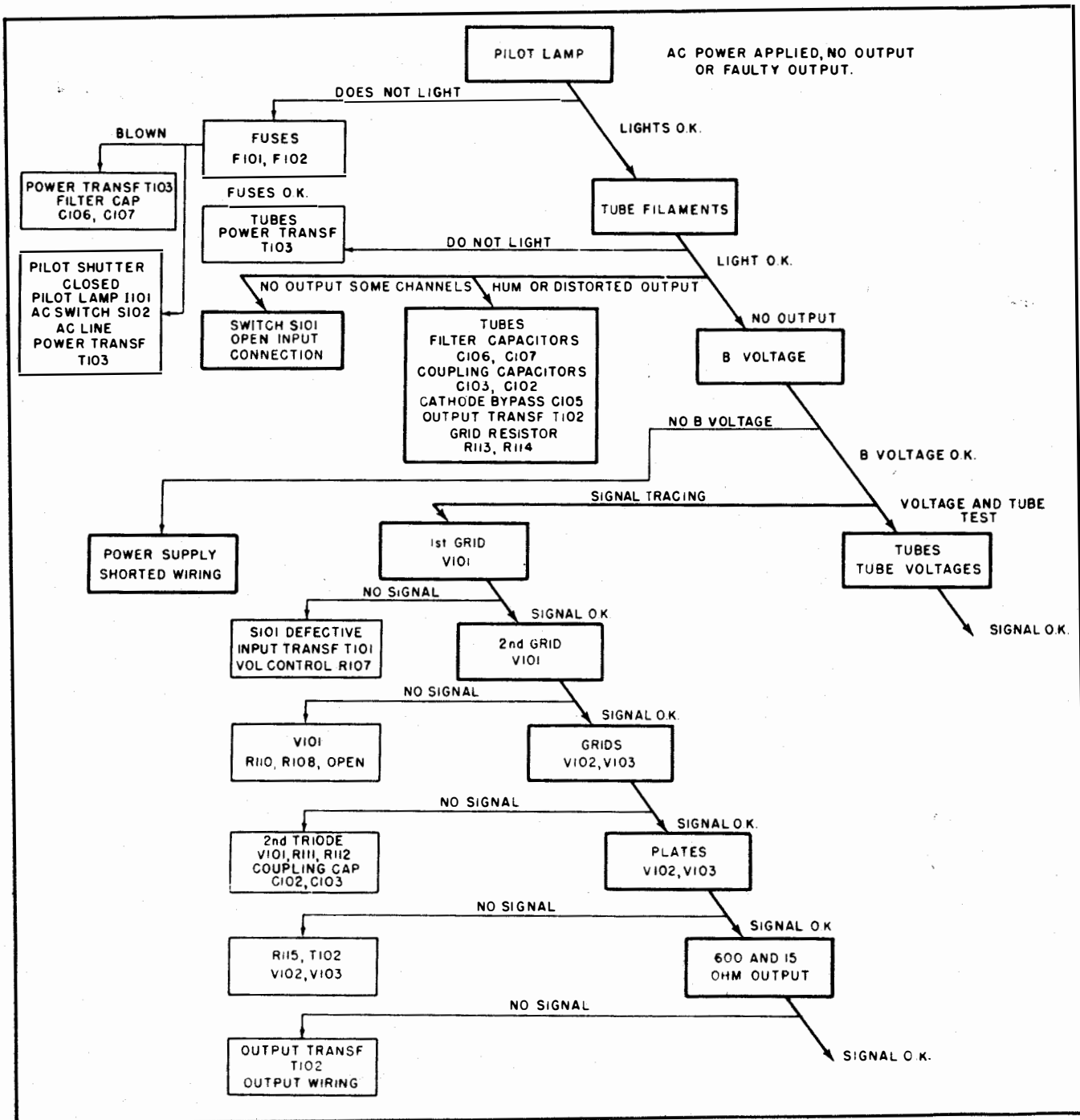


TABLE 7-1. TROUBLE SHOOTING CHART

3. TROUBLE SHOOTING CHART.

a. Complete listing in block form of possible symptoms of trouble and the probable causes is given in Table 7-1. Points of inspection or test are in the right hand blocks and trouble symptoms are listed on the lines leading to the left, with blocks of possible causes at the ends of these lines. The chart progresses from simple troubles and tests to the more complex, including signal tracing steps on the bottom half of the page.

b. Simple tests include operator's maintenance (see Section 5) and the upper blocks on the trouble shooting chart. Such tests as visual inspection, replacing of fuses and tubes, and trying other input channels can be made without instruments and will often correct the trouble or indicate its cause.

4. VOLTAGE AND RESISTANCE TESTS.

a. If simple tests as outlined above do not correct or reveal the cause of trouble, much can be learned from voltage and resistance tests. Data for these tests is given in Tables 7-4 and 7-5.

b. These tests should be made with a Multimeter, such as Multimeter TS-352, OE Series, or equivalent.

CAUTION

BE SURE AMPLIFIER IS TURNED OFF AND ALL CONDENSERS ARE DISCHARGED BEFORE MAKING OHM-METER TESTS. WHEN THE AMPLIFIER IS TURNED ON DO NOT CONTACT ANY TERMINALS OR WIRES WITH ANYTHING EXCEPT PROPERLY INSULATED TEST PRODS.

c. One of the principal voltages in the amplifier is the "B" voltage measured at the screen (pin 6) of V102, or V103, the power output tubes, or at capacitor C107. If this voltage is normal and the amplifier still is inoperative or operates improperly, proceed with a complete stage by stage voltage and resistance test; or use signal tracing methods.

5. SIGNAL TRACING.

a. EQUIPMENT REQUIRED.—If signal tracing is to be done, the following equipment will be required:

1. Audio oscillator, such as Navy Model LA-J Series, or equivalent.

2. Oscilloscope, such as Oscilloscope OS-8/U, Navy Models OBL or OBT Series, or equivalent.

3. Electron voltmeter, such as in Multimeter ME-25/U Series, or equivalent.

b. TEST PROCEDURE.—Set up the signal tracing test by first connecting a 600 ohm resistor of 20 watts

rating or higher to the 600 ohm output terminals—all other output loads disconnected. Connect the output of the audio oscillator to a vacant pair of input terminals. If all inputs are in use, disconnect one pair of input leads for this test. Turn the CHANNEL SELECTOR switch to the corresponding number. Adjust the audio oscillator to a frequency of 1000 cps and to an output that will produce 1.9 volts at the amplifier input, as measured by the AC part of the Multimeter. Set the VOLUME control to maximum. Follow the signal through the amplifier, stage by stage, as indicated in Table 7-1, using the Oscilloscope to indicate the presence or absence of signal and/or the character of the signal. Proper interpretation of the oscilloscope pattern will indicate the type and source of trouble. If necessary, follow the signal tracing by voltage and/or ohmmeter testing of the individual stage or part suspected.

c. GAIN AND POWER OUTPUT.—A normal amplifier will give full output with 1.9 volts or less applied to the input. Full output is indicated by 77.5 volts across the 600 ohm output load. With a sine wave input, the normal full output as viewed on the Oscilloscope will approximate a sine wave with the peaks slightly flattened.

d. HUM.—Common causes of hum are defective tubes, open or shorted capacitors or defective input grounding. Interchanging the output tubes, or replacing and interchanging, will frequently reduce hum originating in this stage. Hum sources can be readily located by signal tracing.

e. DISTORTION.—The cause of distortion is most easily isolated by signal tracing, while defective tubes, incorrect voltages, leaky condensers, etc. are causes that can be found by voltage or resistance tests or by the substitution of parts. Do not replace major parts unless sufficient testing has been done to prove that other parts are not at fault.

6. WINDING DATA.

a. Winding data for Transformers T101, T102, T103 and reactor L101 is given in Table 7-6. Additional data covering these components will be found in the Parts List, Table 8-2.

7. DRAWINGS.

a. A complete schematic diagram of the A.F. Amplifier AM-215B/U is given in figure 7-4.

b. A practical wiring diagram of the amplifier is given in figure 7-5.

TABLE 7-2. TUBE OPERATING VOLTAGES AND CURRENTS

CHASSIS POSITION	TUBE TYPE	FUNCTION	PLATE VOLTS	PLATE MA	SCREEN MA	CATHODE VOLTS	GRID VOLTS	HEATER VOLTS AC
V101A	12AU7	Voltage Amplifier	70	0.7	—	4.25	0	6.3
V101B	12AU7	Phase Inverter	175	1.4	—	77	70	6.3
V102	6AQ5	Power Amplifier	250	38	3	16.5	0	6.3
V103	6AQ5	Power Amplifier	250	38	3	16.5	0	6.3
V104	6X4	H V Rectifier	270AC	85	—	—	—	6.3
V105	6X4	H V Rectifier	270AC	85	—	—	—	6.3

All voltages measured to ground; electronic voltmeter for dc measurement; 1000 ohms per volt ac meter for ac measurement; zero signal.

TABLE 7-3. TUBE RATED CHARACTERISTICS DATA

TUBE TYPE	FILA- MENT VOLT- AGE (V) AC	FILA- MENT CUR- RENT (A) AC	PLATE VOLT- AGE (V)	GRID BIAS (V)	SCREEN VOLT- AGE (V)	PLATE CUR- RENT (MA)	SCREEN CUR- RENT (MA)	AC PLATE RESIST- ANCE (OHMS)	VOLT- AGE AMPLI- FICA- TION FAC- TOR (MU)	TRANSCON- DUCTANCE (MICROMHOS)		EMISSION	
										NOR- MAL	MINI- MUM	I _s (MA)	TEST VOLT
12AU7	6.3	.30	250*	8.5*	—	10.5*	—	7700*	17*	2200*	1750*	70	30
6AQ5	6.3	.45	250	-12.5	250	47	7	52,000	—	4100	3000	100	30
6X4	6.3	.60	—	—	—	—	—	—	—	—	—	140**	50**

* Each triode.

** Each diode.

For condenser-input filter: A-C plate voltage per plate (rms): 325 volts; D-C output current: 70 ma.

TABLE 7-4. OPERATING VOLTAGE DATA AND NON-OPERATING RESISTANCE DATA

TUBE TYPE	SOCKET PIN NUMBER																	
	1		2		3		4		5		6		7		8		9	
	Ohms	Volts	Ohms	Volts	Ohms	Volts	Ohms	Volts	Ohms	Volts	Ohms	Volts	Ohms	Volts	Ohms	Volts	Ohms	Volts
V101 12AU7	740K	77 DC	1600	0 DC	3300	4.9 DC	0	0 AC	0	0 AC	320K	192 DC	740K	77 DC	51K	85 DC	0	6.2 AC
V102 6AQ5	51K*	0 DC	200	15 DC	0	0 AC	0	6.3 AC	273K	275 DC	273K	280 DC	51K	0 DC	—	—	—	—
V103 6AQ5	51K	0 DC	200	15 DC	0	0 AC	0	6.3 AC	273K	275 DC	273K	280 DC	*51K	0 DC	—	—	—	—
V104 6X4	100	270 AC	—	—	0	0 AC	0	6.3 AC	—	—	100	270 AC	273K	300 DC	—	—	—	—
V105 6X4	100	270 AC	—	—	0	0 AC	0	6.3 AC	—	—	100	270 AC	273K	300 DC	—	—	—	—

VOLTAGE DATA: Equipment in normal operating condition, with no input; the voltages are normal values with a 20,000 ohm per volt DC meter, or a 1,000 ohm per volt AC meter, all measured to ground; scale selected to give a reading of not less than 1/3 full scale.

RESISTANCE DATA: AC power and input and output circuits disconnected; volume control at maximum; all resistances are normal values measured to ground except where noted.

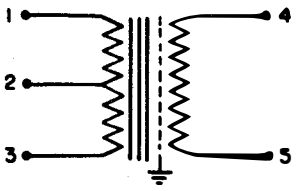
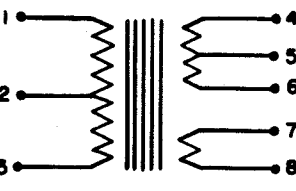
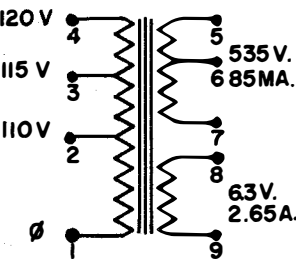
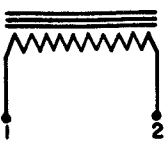
* Measures infinity with tube out of socket.

K = 1,000 ohms.

TABLE 7-5. RESISTANCES OF TRANSFORMERS AND REACTOR WINDINGS

SYMBOL	PRIMARY	SECONDARY No. 1	SECONDARY No. 2
T101	48.5 ohms, Term 1-3	505 ohms, Term 4-5	—
T102	260 ohms, Term 1-3	15.8 ohms, Term 4-6	0.93 ohms, Term 7-8
T103	8.4 ohms, Term 1-4	321 ohms, Term 5-7	0.185 ohms, Term 8-9
L101	280.3 ohms, Term 1-2	—	—

TABLE 7-6. WINDING DATA

DESIGNATION NUMBER	CREST TRANSF. NUMBER	DIAGRAM	WINDING	WIRE SIZE	TURNS	D-C RESIS. OHMS	IMP. RATIO	HIPOT A-C VOLTS	REMARKS
T101	76A1-6		Primary Term 1-3 ct Term 2 Secondary Term 4-5	No. 37PE No. 38PE	460 ct 2990	48.5 505	1 to 33.3	750 750	600 ohms impedance et 20,000 impedance ohms Electrostatic shield between primary and secondary; vacuum impregnated with No. 1 varnish.
T102	76AC-2		Primary Term 1-3 ct Term 2 Secondary Term 4-6 ct Term 5 Secondary Term 7-8	No. 35PE No. 28PE No. 23PE	2000 522 ct 84	260 15.8 0.93	16.7 to 1 667 to 1	1500 1500 1500	10,000 ohms impedance 600 ohms impedance 15 ohms impedance 50ma pri. DC current; vacuum impregnated with No. 1 varnish.
T103	76PF-73		Primary Term 104 taps at 2 and 3 Secondary HV-Term 5-7 ct Term 6 6.3V-Term 8-9	No. 25PE No. 33PE No. 19PE	545 taps at 522, 500 2600 ct 31	8.4 321 0.185		2000 2000 2000	0, 110, 115, 120 V; 50/60 cycles. 5.35 V at 85 ma. 6.3 V at 2.65 amps. Vacuum impregnated with No. 1 varnish.
L101	76CF-17		Single	No. 32PE	3900	280.3		1750	10 hy, 85 ma. Vacuum impregnated with No. 1 varnish.

ct—center tap.

NOTE

The purpose of this note is to indicate the extent to which "reliable" type tubes may be used in this equipment.

Serial No.'s 1087 through 1787 of the AM215B/U and all of the AM215D/U were supplied with "reliable" type tubes.

The following "reliable" type tubes will be supplied when the standard type tubes listed in this manual are requested from stock. To expedite handling of request, order by "reliable" tube number and Federal Stock number indicated in Section 8.

RELIABLE TUBE TYPE	STANDARD TUBE TYPE	CIRCUIT SYMBOLS AFFECTED
5814A	JAN12AU7	V101A/B
6005/6AQ5W	JAN6AQ5	V102, V103
6X4W	JAN6X4	V104, V105

In the event that the "reliable" tubes are not available, the "standard" tube type can be used as they are electrically and mechanically interchangeable.

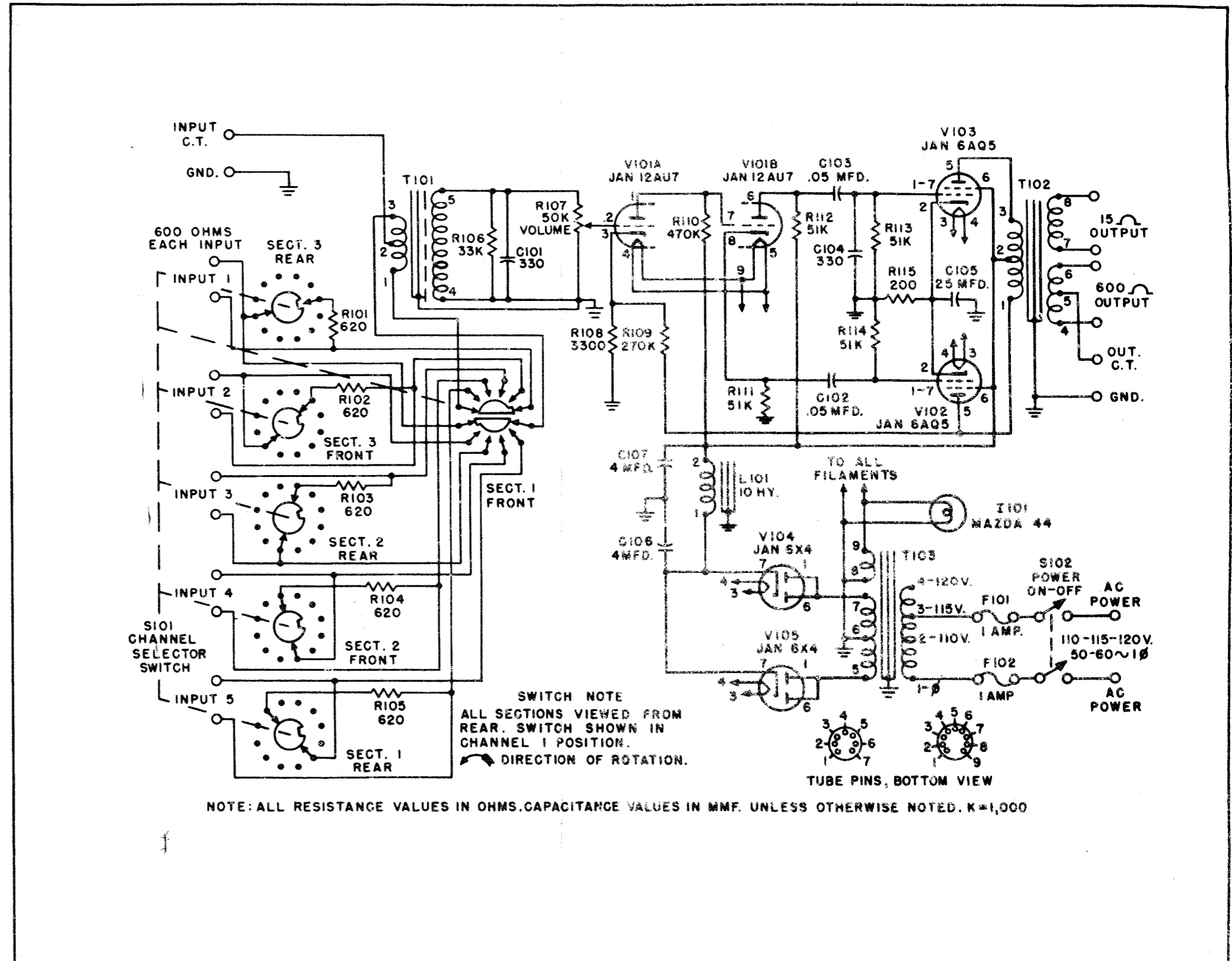


Figure 7-4. A.F. Amplifier AM-215B/U, Schematic Diagram

Figure 7-4. A.F. Amplifier AM-215B/U, Schematic Diagram

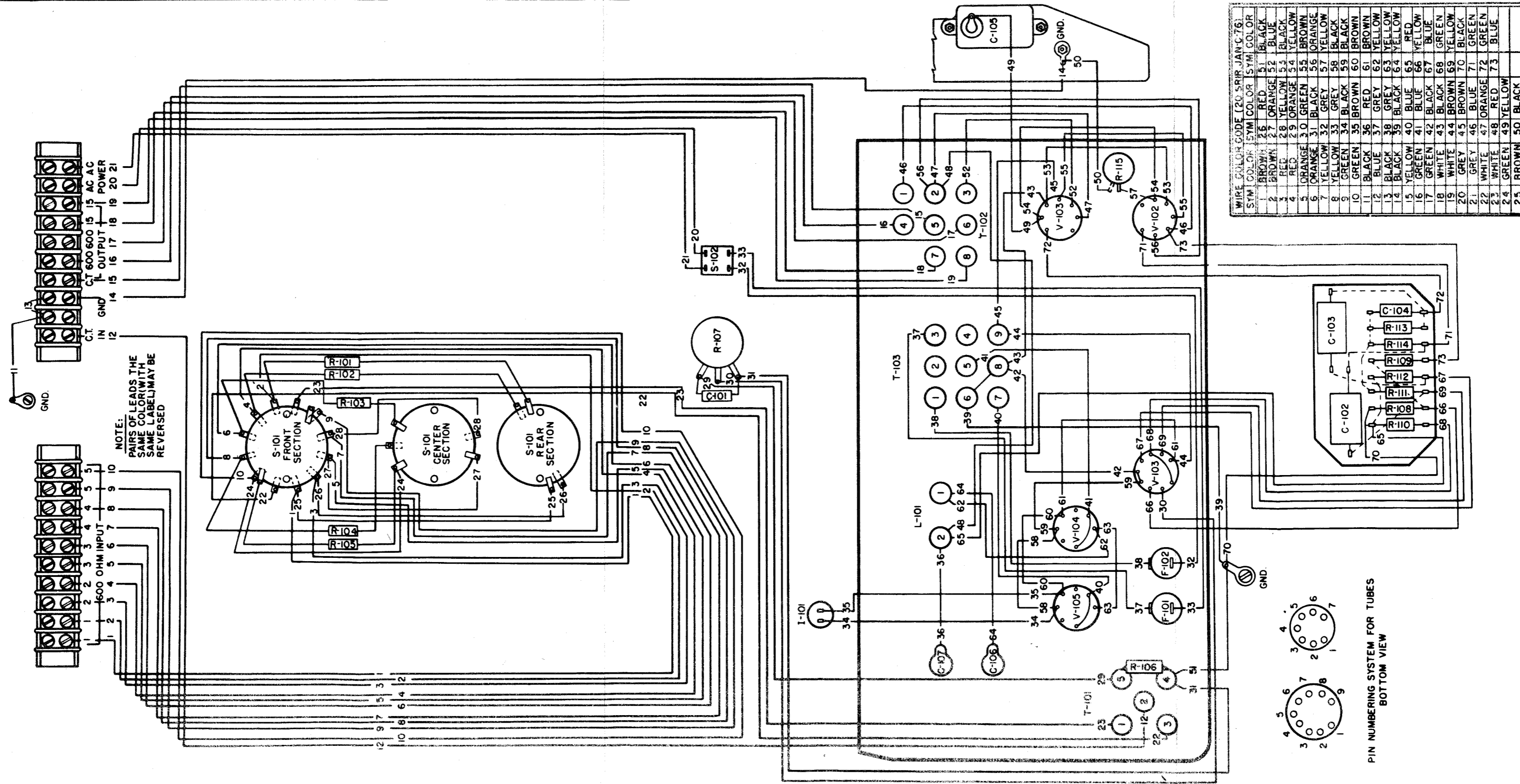


Figure 7-5. A.F. Amplifier AM-215B/U, Practical Wiring Diagram

Figure 7-5. A.F. Amplifier AM-215B/U, Practical Wiring Diagram

Figure 7-5. A.F. Amplifier AM-215B/U, Practical Wiring Diagram

**SECTION 8
PARTS LIST**

This section contains the following tables:

Table 8-1. List of Major Units.

Table 8-2. Maintenance Parts List.

Table 8-3. Stock Number Identification and Cross-Reference Parts List.

Table 8-4. List of Manufacturers.

TABLE 8-1. LIST OF MAJOR UNITS

SYMBOL GROUP	NAME OF MAJOR UNIT	NAVY TYPE	DESIGNATION
101-199	AF Amplifier		AM-215D/U

NOTES:

The following provide additional information about items listed in Table 8-2.

1. Procure on demand by nearest Naval Shore Supply Activity.
2. For replacement in all serial no.'s of AM215B/U order Federal Stock No. N5935-222-9820, Order Federal Stock No. shown in Table 8-3 for all Serial No.'s of AM215D/U. These sockets are not physically interchangeable but are electrically the same.
3. For replacement in all serial no.'s of AM215B/U order Federal Stock No. N5935-222-9835, Order Federal Stock No. shown in Table 8-3 for all Serial No.'s of AM215D/U. These sockets are not physically interchangeable but are electrically the same.

TABLE 8-2. MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
C101		CAPACITOR, fixed: mica, 330 mmf \pm 20%; 500 vdcw, Spec. MIL-C-5A, Type CM20B331M.	High Freq. Bypass
C102		CAPACITOR, fixed: paper, .05 mfd \pm 20%; 600 vdcw, Spec. MIL-C-25A, Type CP29A1DF503M.	Coupling
C103		Same as C102.	Coupling
C104		Same as C101.	Spurious Freq. Bypass
C105		CAPACITOR, fixed: electrolytic, 25 mfd, 50 vdcw, Spec. MIL-C-62, Type CE62C250G.	Cathode Bypass
C106		CAPACITOR, fixed: paper, 4 mfd, 600 vdcw, Spec. MIL-C-25A, Type CP40C2DF405V.	1st Filter
C107		Same as C106.	2nd Filter
E101		BOARD, terminal: general purposes; 10 terms.	Input Connector Board
E102		Same as E101.	Output Connector Board
E103		KNOB, round: 8 indents equal spaced $\frac{1}{4}$ " diam shaft; Navy Dwg. RE10F479A Type B.	Volume Control
E104		Same as E103.	Selector Switch
F101		FUSE, cartridge: non-renewable, ferrule type, rated 250 v, continuous 110% rating; blowing time 60 minutes for 135% load (1 amp) Navy Dwg RE28F120.	Line Fuse
F102		Same as F101.	Line Fuse
H101		WRENCH, angle: for #8 Allen socket head screw.	Knob Wrench
I101		LAMP, incandescent: 6-8 V, .25 amp; clear; miniature bayonet base; Mazda 44.	Pilot Lamp
L101		REACTOR, filter choke: 10 hy, 85 ma; 300 ohms DC resistance; 1750 v RMS test; Spec. MIL-T-27A.	Filter
O101		GASKET: panel (cover); neoprene.	Drip Proof Seal
O102		SPRING, tube; for holding tube in socket.	Holds V101
O103	1	SPRING, tube; for holding tube in socket.	Holds V102
O104		Same as O103.	Holds V103

8-2

CHANGE 1

8 Section
C101-O104

NAVSHIPS 91626
AM-215D/U

MAINTENANCE PARTS LIST

TABLE 8-2. MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
O105		Same as O103.	Holds V104
O106		Same as O103.	Holds V105
R101		RESISTOR, fixed: comp, 620 ohms \pm 5%, 2 watts, Spec. MIL-R-11A, Type RC40BF621J.	Input 1 Dummy Load
R102		Same as R101.	Input 2 Dummy Load
R103		Same as R101.	Input 3 Dummy Load
R104		Same as R101.	Input 4 Dummy Load
R105		Same as R101.	Input 5 Dummy Load
R106		RESISTOR, fixed: comp, 33K ohms \pm 5%, 2 watts, Spec. MIL-R-11A, Type RC40BF333J.	T101 Secondary Load
R107		RESISTOR, VARIABLE: comp; 50,000 ohm \pm 10%, 2 watts, Spec. MIL-R-94A, Type RV4ATR503C.	Volume Control
R108		RESISTOR, fixed: comp, 3300 ohms \pm 5%, 1 watt. Spec. MIL-R-11A, Type RC30BF332J.	Cathode Bias & Feedback
R109		RESISTOR, fixed: comp, 270K ohms \pm 5%, 1 watt. Spec. MIL-R-11A, Type RC30BF274J.	Inverse Feedback
R110		RESISTOR, fixed: comp, 470K ohms \pm 10%, 1 watt. Spec. MIL-R-11A, Type RC30BF474K.	Plate-grid, Common Coupling
R111		RESISTOR, fixed: comp, 51K ohms \pm 5%, 1 watt. Spec. MIL-R-11A, Type RC30BF513J.	Cathode Load
R112		Same as R111.	Plate Load
R113		Same as R111.	Grid Return
R114		Same as R111.	Grid Return
R115		RESISTOR, fixed: wire wound, 200 ohms \pm 5%, 7 watts. Spec. MIL-R-26C, Type RW30G201.	Cathode Bias

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MAINTENANCE PARTS LIST

NAVSHIPS 91626
AM-215D/U

Section 8
0105-R115

TABLE 8-2. MAINTENANCE PARTS LIST

REF. DESIG.	NOTES	NAME AND DESCRIPTION	LOCATING FUNCTION
S101		SWITCH, rotary: 7 pole 5 position: Navy Spec. 16C19 (RE), Type RS-33.	Channel Selector
S102		SWITCH, toggle: DPST, Spec. JAN-S-23, Type ST22K.	AC Power
T101		TRANSFORMER, AF: input type; pri impedance 600 ohms, CT, secd impedance 20,000 ohms, 750 v test; 1:6.5; turns ratio freq response 250 to 4000 cps \pm 1½ db; Spec. MIL-T-27A.	Input Line to Grid
T102		TRANSFORMER, AF: plate coupling type; pri 10,000 ohms impedance CT, secd #1-600 ohms impedance, CT, secd #2-15 ohms impedance, 50 ma pri DC current; 10 watts max oper level; turns ratio pri to secd #1 is 3.83 to 1, to secd #2-23.9:1; freq response 100 to 6,000 cps \pm 1 db; Spec. MIL-T-27A.	Output to Line or Voice Coil
T103		TRANSFORMER, power: pri 120v, 50/60 cps, single ph, tapped for 115 and 110 volt operation; 2 secd wnd; secd #1-535 v at 85 ma CT, secd #2-6.3v; @ 2.65 amp; Spec. MIL-T-27A.	Power Transformer
V101A/B		TUBE, electron: dual triode: 5814A, Spec. MIL-E-1C.	Voltage Amplifier and Phase Inverter
V102		TUBE, electron: pentode 6005/6AQ5W, Spec. MIL-E-1C.	Power Amplifier
V103		Same as V102.	Power Amplifier
V104		TUBE, electron: rectifier 6X4W, Spec. MIL-E-1C.	Rectifier
V105		Same as V104.	Rectifier
XF101		HOLDER, fuse: extractor post type for one 3AG cartridge fuse.	Line Fuse
XF102		Same as XF101.	Line Fuse
XI101		LIGHT, indicator: red frosted lens ½" diam; for miniature bayonet base, Mazda 44 bulb.	Power Indicator
XV101	2	SOCKET, tube: 9 contact miniature, Spec. JAN-28A, Type TS103P03.	For V101
XV102	3	SOCKET, tube: 7 contact miniature, Spec. JAN-28A, Type TS102P03.	For V102
XV103		Same as XV102.	For V103
XV104		Same as XV102.	For V104
XV105		Same as XV102.	For V105

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8 Section
S101-XV105

NAVSHIPS 91626
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MAINTENANCE PARTS LIST

TABLE 8-3. STOCK NUMBER IDENTIFICATION

REF. DESIG.	STOCK NUMBERS			
	FEDERAL	STANDARD NAVY	SIGNAL CORPS	U S A F
C101	N5910-160-1158	N16-C-29723-9756		
C102	N5910-161-6297	N16-C-44287-6665		
C105	N5910-160-2276	N16-19783-9804		
C106	N5910-120-1678	N16-C-49981-9983		
E101	N5940-171-0479	N17-B-77937-4747		
E103	N5355-669-8816	N16-K-700346-101		
F101	G5920-280-4465	G17-F-16302-80		
H101	G5120-224-2504	G41-W-2446		
I101	G6240-057-2887	G17-L-6305		
L101	N5950-156-2127	N16-R-29236-1886		
O101	N5330-245-1604	N17-G-167225-101		
O102	N5960-273-2450	N16-R-503580-208		
O103				
R101	N5905-279-2296	N16-R-49823-171		
R106	N5905-279-2675	N16-R-50417-171		
R107	N5905-174-5065	N16-R-87849-4417		
R108	N5905-299-2059	N16-R-50065-751		
R109	N5905-279-4302	N16-R-50740-751		
R110	N5905-299-1993	N16-R-50823-231		
R111	N5905-120-0167	N16-R-50497-751		
R115	N5905-100-4854	N16-R-65753-4406		
S101	N5930-248-6258	N17-S-65464-3893		
S102	N5930-050-2635	N17-S-73082-9028		
T101	N5950-222-6325	N17-T-61605-1551		
T102	N5950-231-4761	N17-T-65515-4538		
T103	N5950-193-8668	N17-T-73841-1631		
V101A/B	N5960-262-0210	N16-T-58241		
V102	N5960-248-3089	N16-T-56191-50		
V104	N5960-272-9182	N16-T-56840		
XF101	N5920-156-9233	N17-F-74267-5075		
XI101	N6210-233-5319	N17-L-76854-4068		
XV101	N5935-504-3328	N16-S-64063-6456		
XV102	N5935-501-5438	N16-S-62603-6446		

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MAINTENANCE PARTS LIST

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STOCK NUMBER CROSS REFERENCE

Section 8

TABLE 8-4. LIST OF MANUFACTURERS

ABBREVIATIONS	PREFIX	NAME	ADDRESS
1	AB	Allen-Bradley Co.	136 W. Greenfield Ave. Milwaukee 2, Wisc.
2	AHH	Arrow-Hart & Hegeman Electric Company	103 Hawthorn Street Hartford 6, Conn.
3	CMG	Cinch Mfg. Corp.	Chicago 24, Illinois
4	BUS	Bussman Mfg. Co.	2538 W. University St. St. Louis 7, Missouri
5	CLD	Cornell-Dubilier Elec. Corp.	South Plainfield, N. J.
6	DLC	Dial Light of America	900 Broadway New York City, New York
7	GE	General Electric	Schenectady 5, New York
8	HKS	The Hollo Krome Screw Corp.	Hartford, Conn.
9	IRC	International Resistance Co.	401 N. Broad St. Philadelphia, Pa.
10	KKE	Kulka Electronics Co., Inc.	30 South St. Mount Vernon, New York
11	MAL	P. R. Mallory and Co.	Indianapolis, Indiana
12	MRQ	Minor Rubber Co., Inc.	37 William St. Newark, New Jersey
13	MOI	Molded Insulation Co.	335 E. Price Street Philadelphia 44, Pa.
14	NAC	National Company, Inc.	61 Wheman Ave. Walden, Mass.
15	PYEL	Pyramid Electric Co.	1445 Hudson Blvd. North Bergen, New Jersey
16	SMO	Sangamo Electric Co.	Springfield, Ill.
17	STL	Stackpole Carbon Co.	St. Mary's, Pa.
18	SACN	Stanley Transformer Co.	Long Island City, N. Y.
19	SLE	Sylvania Electric Prod. Co.	Emporium, Pa.
20	TLMO	Tub-Lok Mfg. Co.	767 Loma Verde Ave. Palo Alto, Calif.
21	TSL	Tungsol Lamp Works	95 Eighth Ave. Newark 4, New Jersey

