NAVSHIPS 0965-008-4000

UNCLASSIFIED

TECHNICAL MANUAL
FOR
AUDIO FREQUENCY AMPLIFIER
AM-4453/U

TABET MANUFACTURING CO., INC.
1336 BALLENTINE BLVD.
NORFOLK, VIRGINIA, 23516

UNCLASSIFIED

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LIST OF ILLUSTRATIONS

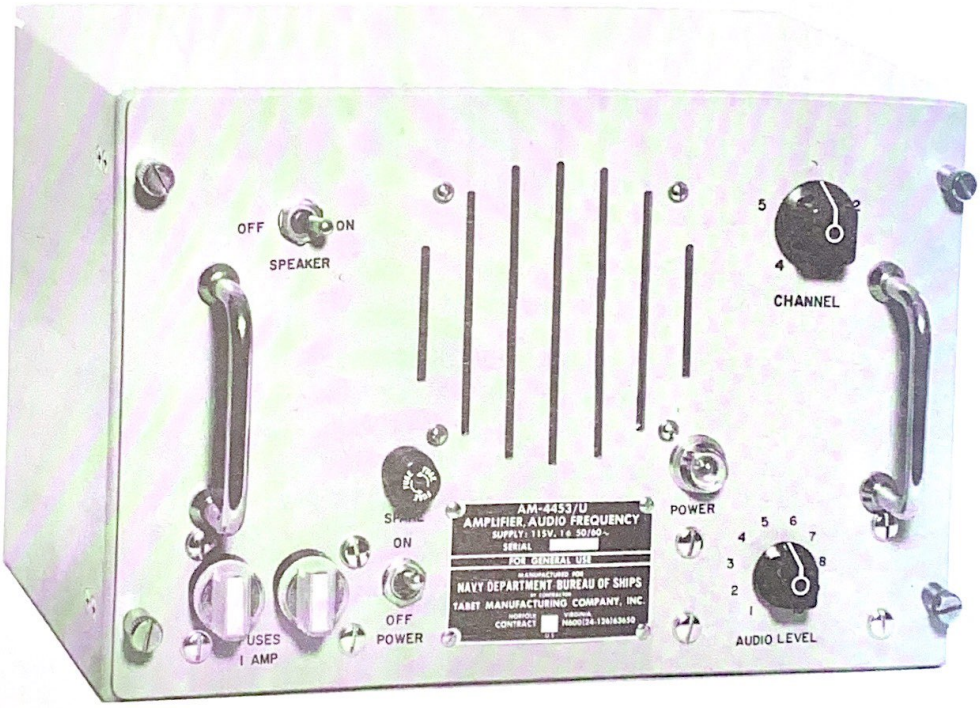


FIG. 1-1 AUDIO FREQUENCY AMPLIFIER AM-4453/U

SECTION I

GENERAL INFORMATION

1-1- PURPOSE

Audio Frequency Amplifier AM-4453/U is designed for general communication work in conjunction with electronic receiving equipment and associated loudspeaker units.

1-2 - DESCRIPTION

Audio Frequency Amplifier AM-4453/U is an all semi-conductor amplifier with the power supply on the same chassis. It consists of three transistors and two diodes.

The channel switch, power on-off switch and audio level control are located on the front panel along with two input power fuses, spare fuse, and power-on indicator lamp. See Figure 1-1.

1-3 - REFERENCE DATA

a. Amplifier, Audio Frequency AM-4453/U.
b. Manufacturer - Tabet Manufacturing Co., Inc., Norfolk, Va.
c. Overall Dimensions - 8 1/4" high x 12 1/4" wide x 7 1/4" deep.
d. Weight (Net) 22 1/2 lbs., (Boxed) 24 lbs.
e. Power Requirements - 110/115/125 volts, 50/60 cycles, .22 amperes, 25 watts.
f. Power Output - 10 watts.
g. Power Input - 2 watts maximum, .001 watts minimum for full power output.
h. Input Impedance - 600 ohms, center-tapped.
i. Out-put Impedance - 600 ohms, center-tapped; 16 ohms, center-tapped.
j. Frequency Range - 200 to 4,000 c.p.s. $\pm$ 3 DB.

SECTION II

INSTALLATION

2-1 - MOUNTING & CABLING

The unit may be either table mounted or bulk-head mounted. All holes required for mounting the unit are drilled by the installing activity. Suggested drilling for bulkhead mounting is four (4) 11/32" dia. holes on 10 1/4" horizontal by 6 1/4" vertical centers.

Before drilling the mounting holes in the assembly, remove the unit from the enclosure.

Drill the required holes for the cables in the top, sides, or back of the enclosure. The incoming power lines, incoming audio lines and output lines, are connected to the terminal boards TB-101, TB-201 and 202, and TB-301 respectively. See Figure 2-1.

The mounting space requirements and the clearance required for removal of the unit from the enclosure are shown on Figure 2-2.

2-2 - SWITCH STOP SELECTION

The five position channel selector switch, S-102, has adjustable stops to permit rotation as required. Stops may be adjusted for the required action as follows: With amplifier assembly removed from enclosure, loosen channel switch knob set screws and remove knob. Remove hexagon nut that holds switch assembly to panel and lay switch, shaft up, behind panel. Two 4-40 x 1/4 inch screws, and four tapped holes will be seen around the shaft bushing, in the bushing plate.

If five channel selection and continuous rotation, in either direction, is required, remove both screws.

To set the stops for any other required number of channel selections, leave the screw in, which is to the left of the shaft upper center-line, and move the other screw to the threaded hole corresponding to the highest channel number required, counting holes clockwise from the right of the shaft upper center-line. For example, if the stop is required for three channels, place screw in third hole clockwise from top.

No adjustments, other than those on the front panel, are required.

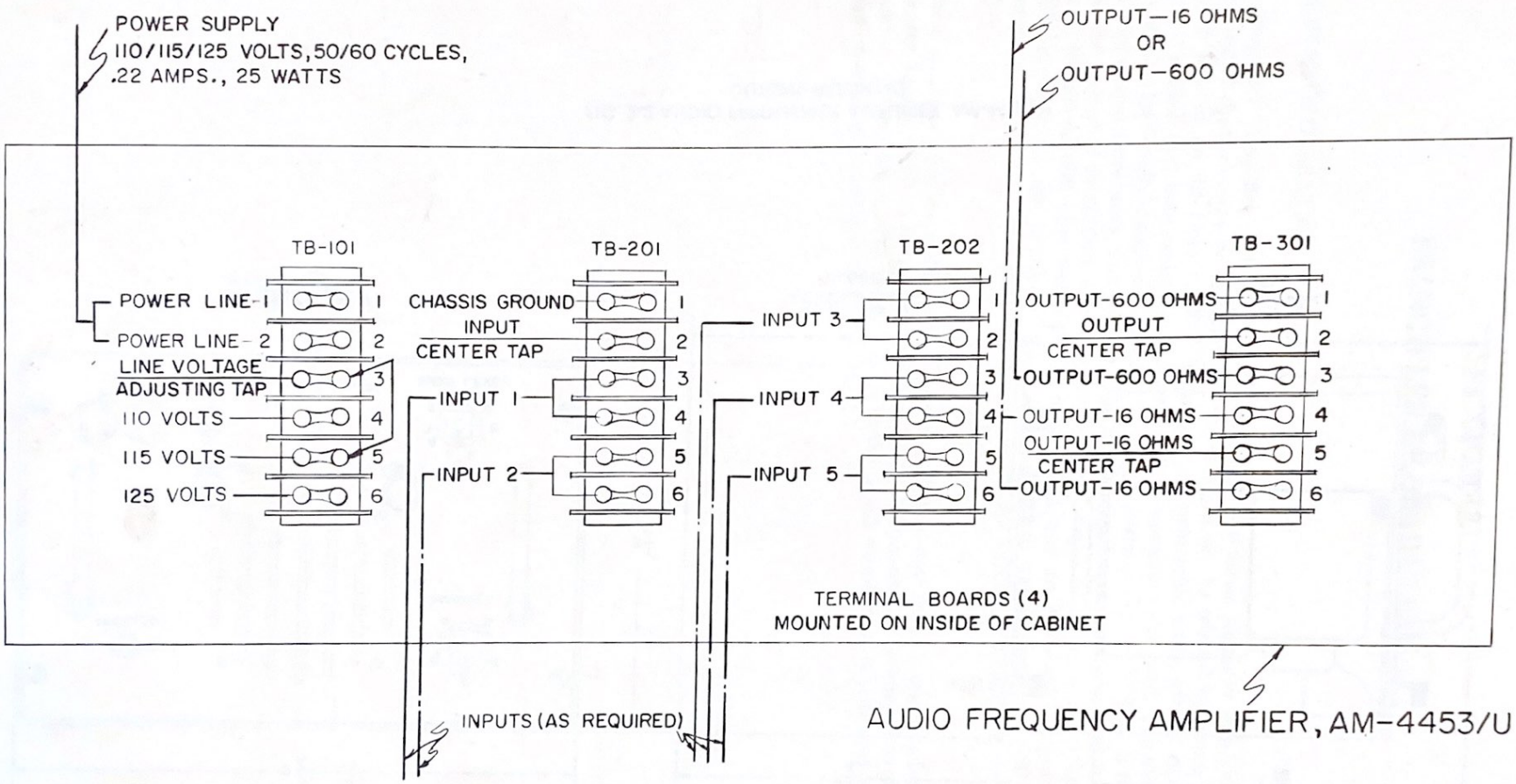


FIG. 2-1 AUDIO FREQUENCY AMPLIFIER AM-4453/U
CABLING DIAGRAM

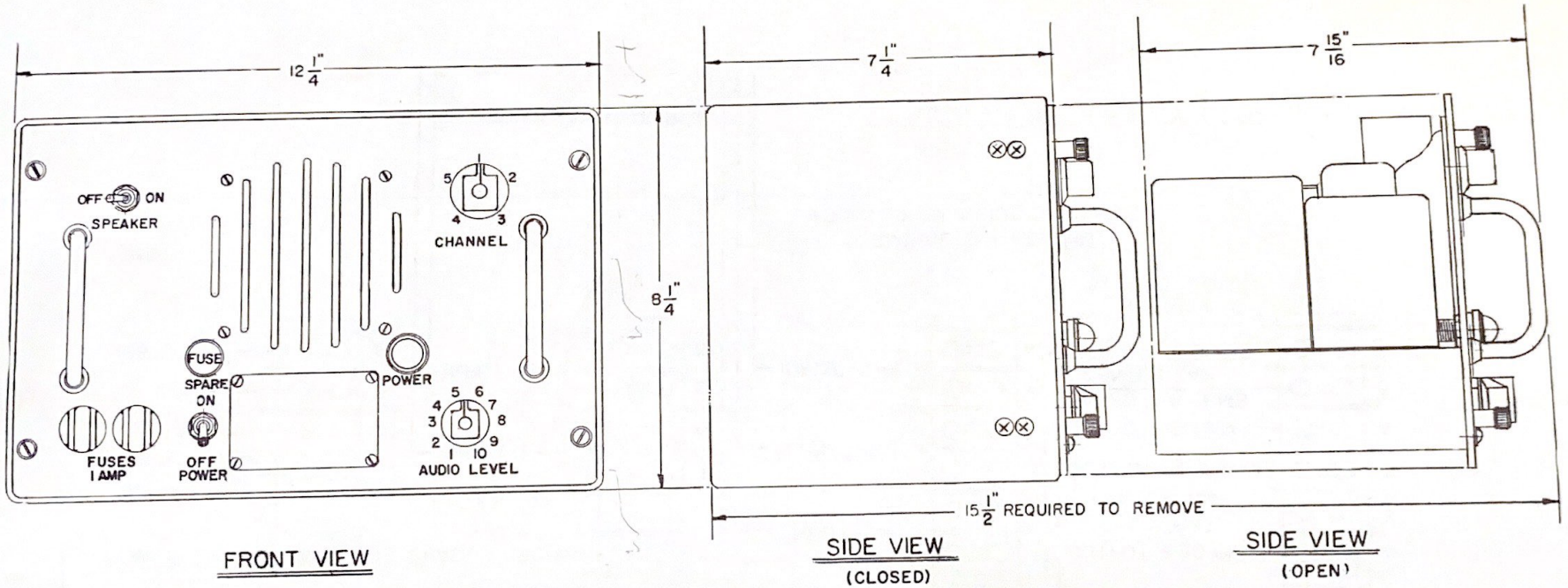


FIG. 2-2 AUDIO FREQUENCY AMPLIFIER, AM-4453/U
OUTLINE DRAWING

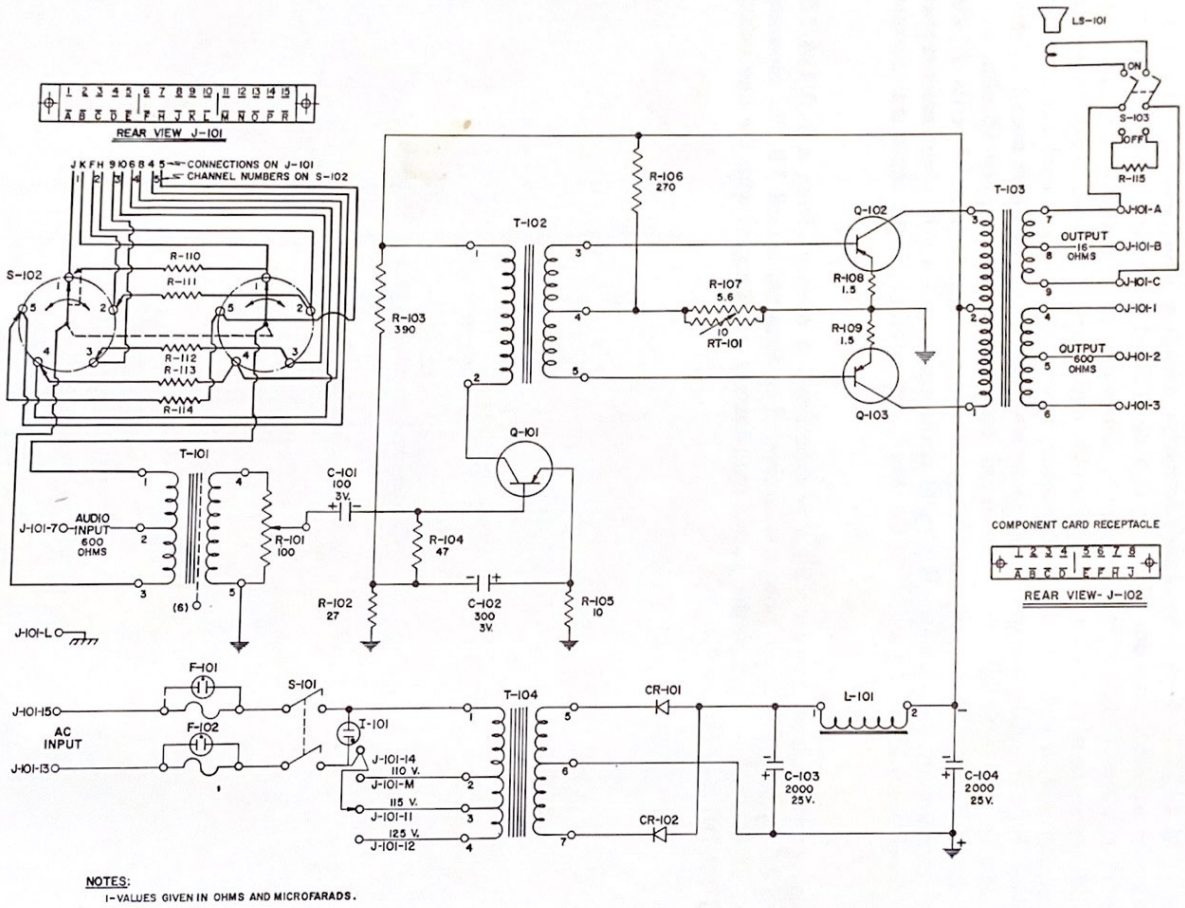
SECTION III

PRINCIPLES OF OPERATION

3-1 - PRINCIPLES OF OPERATION

Audio Frequency Amplifier AM-4453/U is a two stage transistor amplifier with push-pull output. Five audio input signal channels may be applied, any one of which can be selected by means of the five position channel switch located on the front panel. This switch is a removable wafer, printed circuit type having all contacts, rotor section and load resistors mounted on the removable wafer card. The load resistors provide a constant 600 ohm load to all channels not in use. The input transistor, type 2N1184B, is transformer coupled to the push-pull output transistors, type 2N174. The output stage is connected to the terminal board TB-301, mounted on the interior of the cabinet. The secondary has two output windings; a center-tapped 16 ohm winding and a center-tapped 600 ohm winding. The input audio lines are connected to terminal boards TB-201 and TB-202 mounted on the interior of the cabinet. The input transformer has a 600 ohm center-tapped primary winding. The audio level control is connected to the secondary winding of the input transformer. See figure 3-1.

The power supply is a full wave, double diode rectifer with a pi type filter. It operates from a 110/115/120 volt AC power source of 50 to 60 cycles. The input power is connected to terminal board TB-101 mounted on the interior of the cabinet. The input voltage to the power transformer is changed with the line voltage adjusting tap on terminal board TB-101. See Figure 2-1.



NOTES:
1-VALUES GIVEN IN OHMS AND MICROFARADS.

FIG. 3-1 AUDIO FREQUENCY AMPLIFIER, AM-4453/U
SCHEMATIC DIAGRAM

SECTION IV

MAINTENANCE AND REPAIR

4-1 - TROUBLE SHOOTING

The following information is intended to aid in locating and correcting trouble in Audio Frequency Amplifiers AM-4453/U.

Simple tests, such as checking to see that line power is present, testing for blown fuses and inoperative indicator lights should be done first. Visual inspection should be made to determine if there are any broken or disconnected wires or physically damaged parts.

If a fuse is found to be blown it should be replaced with the spare fuse. If a fuse blows upon replacement further tests must be made to find the cause of the fault.

Reference to the Trouble Shooting Chart Figure 4-2, the Schematic Diagram Figure 3-1 and the following should help in diagnosing most troubles.

When the initial tests have been made and it is suspected that trouble lies in the transistors, or their directly associated parts, a transistor component card, Symbol PC-101, that is know to be operating correctly, should be substituted for the suspected assembly. The transistor component card, PC-101, is removed by removing four screws that secure the heat sink members to the chassis, and pulling the complete card from its plug-in receptacle. Be sure to replace the four screws and seat them firmly before turning on the equipment to test the new card.

In the event a substitute replacement transistor card is not immediately available, the transistors and associated parts are removable for individual test or replacement.

To replace the transistors it is necessary to first remove the card as outlined above.

The following procedure should be followed for removing transistors from the card:

Transistor 2N1184B -

(a) Remove two plastic insulating screws holding the transistor clamp to the heat sink.

(b) Pull the transistor straight away from its socket. Be careful in this operation not to damage the mica shim that insulates the transistor from the heat sink.

(c) Replace in reverse order; lay the mica on the heat sink so the holes line up, insert a new transistor into the socket and press down firmly, replace the hold-down clamp and two insulating screws. DO NOT USE METALLIC SCREWS TO SECURE THE CLAMP.

Transistor 2N174 -

(a) Unsolder two wires, one from the emitter terminal and one from the base terminal, see Figure 4-1, for the location of the terminals on the transistor.

(b) Remove the 10-24 nut on the collector terminal, that secures the transistor to the card. Remove transistor by lifting it straight out which will pull the terminals through the holes in the card. Be careful not to damage the mica shim that insulates the transistor from the heat sink and do not lose the sleeves on the emitter and base terminal posts or the insulating ring on the collector terminal.

(c) Replace in reverse order; lay the mica on the heat sink so the holes line up, insert a new transistor seeing that its locating nub enters its mating hole in the heat sink. Be sure the emitter and base sleeves are completely up into the heat sink holes and that the insulating ring is around the collector terminal. Replace and tighten (moderately tight) the mounting nut and resolder the emitter and base wires. Use care not to overheat the transistor terminals in the soldering process. The use of heat sink clamps on the terminals is recommended.

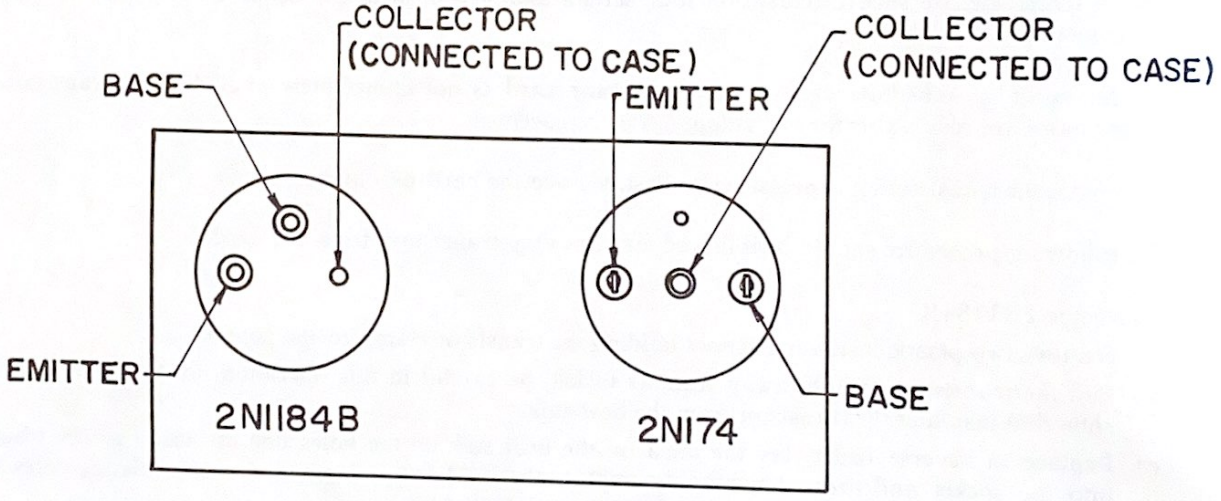


FIG. 4-1 TRANSISTOR BASE DIAGRAMS

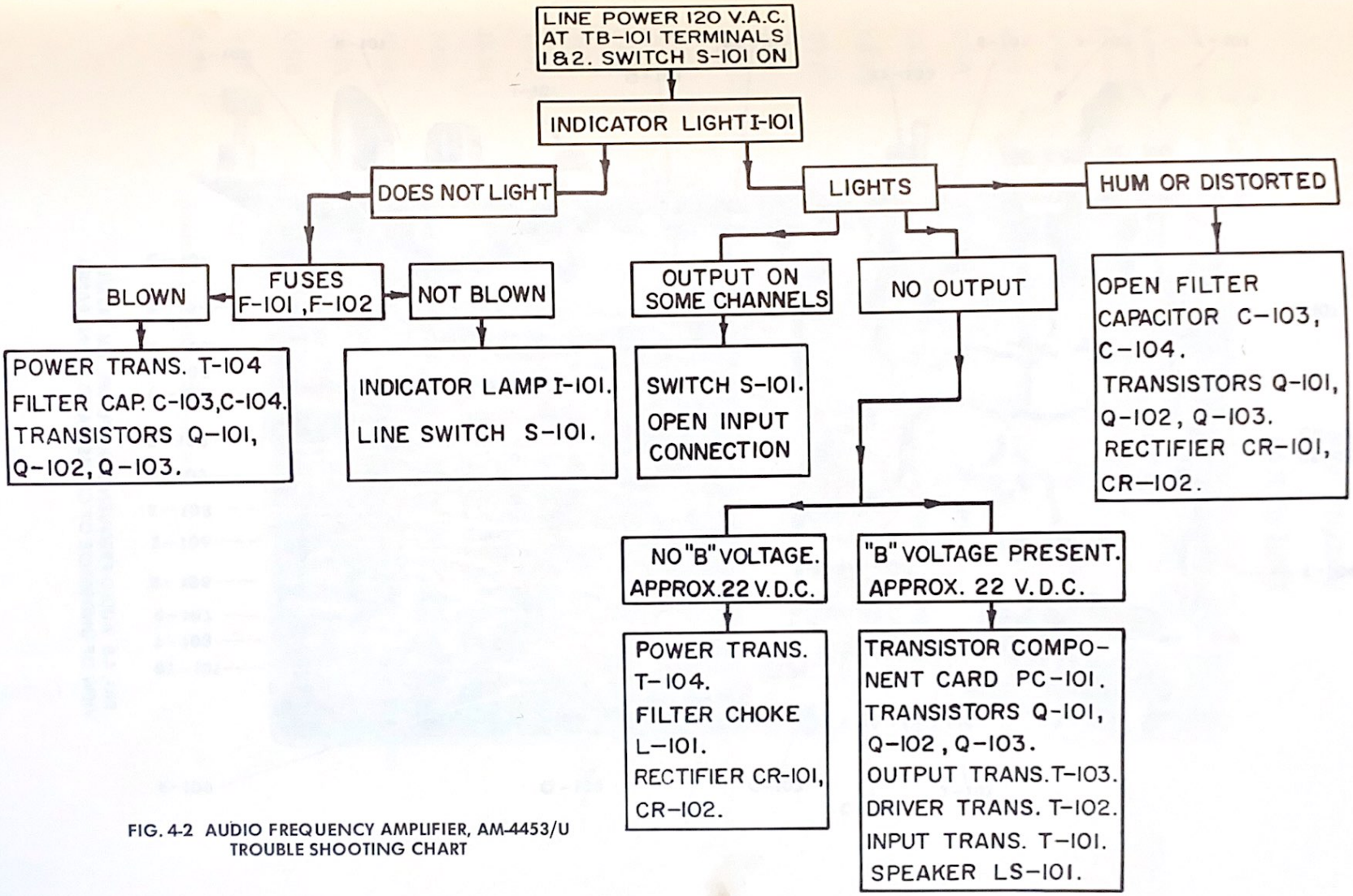


FIG. 4-2 AUDIO FREQUENCY AMPLIFIER, AM-4453/U TROUBLE SHOOTING CHART

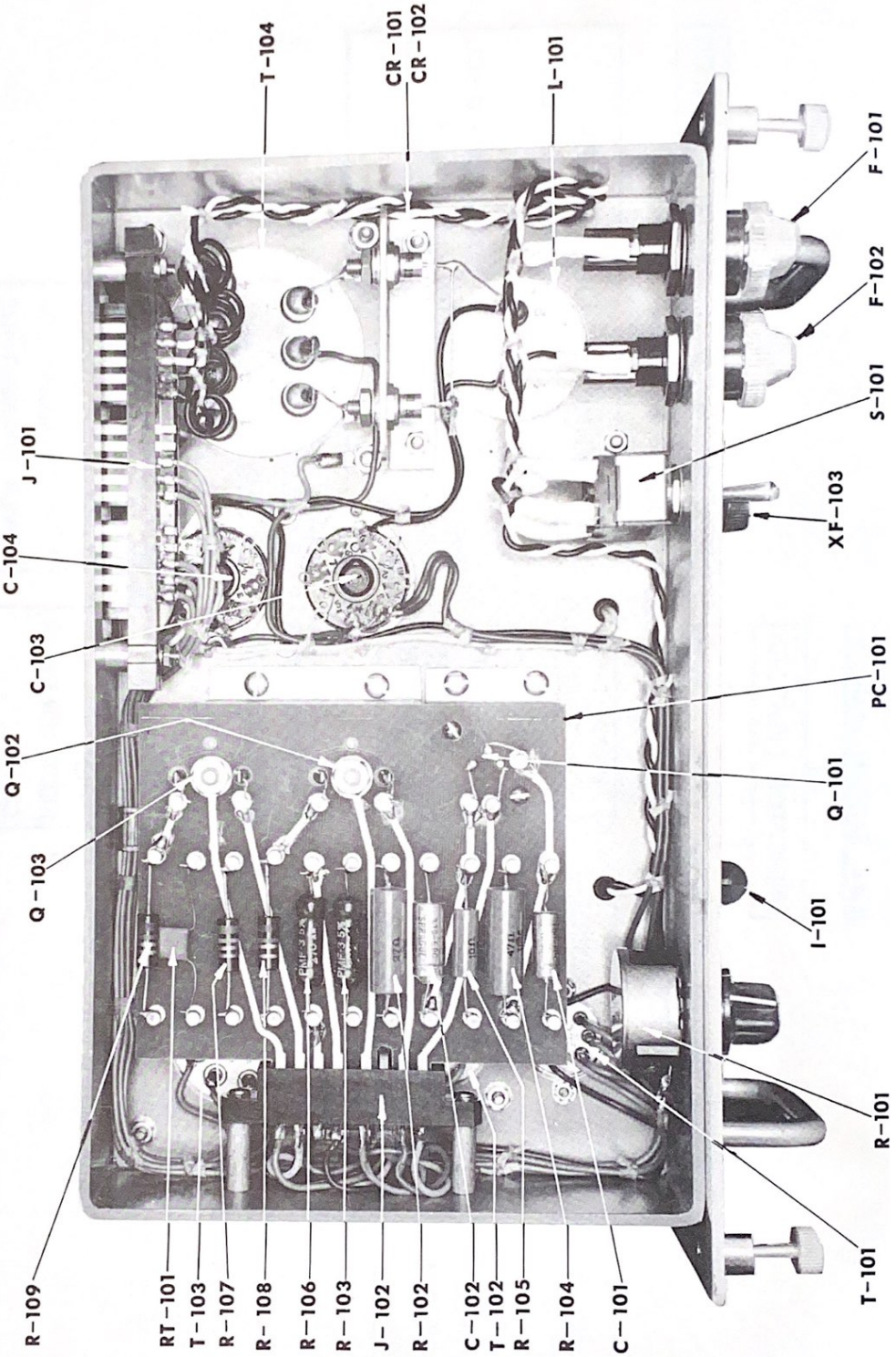


FIG. 4-3 AUDIO FREQUENCY AMPLIFIER, AM 4453/U
VIEW OF UNDERSIDE OF CHASSIS AND FRONT PANEL

SECTION V

PARTS LIST

5-1 - PARTS LIST

Reference Designation	Name and Description	Tabet Part Number
C-101	Capacitor, fixed; tantalum; 100 mf, ± 20%; 6 vdc.	R-325
C-102	Capacitor, fixed; tantalum; 330mf, ± 20%; 6 vdc.	R-326
C-103	Capacitor, fixed; electrolytic; 2,000 mf; 25 vdc.	R-304
C-104	Same as C-103.	R-304
CR-101	Rectifier, diode; type 1N1120.	R-303
CR-102	Same as CR-101.	R-303
DS-101	Lamp, neon; power indicator; NE51.	R-311
E-101	Knob.	R-316
F-101	Fuse, cartridge; 1 amp, 250 volt; type 3AB or 3AG.	R-305
F-102	Same as F-101.	R-305
J-101	Connector, Plug; 30 contacts; interconnects enclosure and cabinet.	R-319
J-102	Connector, Receptacle; 14 contacts; receptacle for printed circuit board.	R-320
L-101	Reactor; filter choke.	DN-286
LS-101	Loudspeaker, 5 inch, 16 ohms.	R-314
P-101	Connector, Receptacle; mates with J-101.	R-321
PC-101	Component Card, printed circuit. Complete with all components.	R-300
Q-101	Transistor; PNP; type 2N1184B.	R-301
Q-102	Transistor; PNP; type 2N174.	R-302
Q-103	Same as Q-102.	R-302
R-101	Resistor, Variable; 100 ohms.	R-312

PARTS LIST

Reference Designation	Name and Description	Tabet Part Number
R-102	Resistor, fixed; 27 ohms ± 1%; 1 watt.	R-327
R-103	Resistor, fixed; 470 ohms ± 5%; 3 watts.	R-328
R-104	Resistor, fixed; 47 ohms ± 1%; 1 watt.	R-329
R-105	Resistor, fixed; 10 ohms ± 1%; 1/2 watt.	R-330
R-106	Resistor, fixed; 270 ohms ± 5%; 3 watts.	R-331
R-107	Resistor, fixed; 5.6 ohms ± 5%; 1 watt.	R-335
R-108	Resistor, fixed; 1.5 ohms ± 5%; 1 watt.	R-332
R-109	Same as R-108.	R-332
R-110 thru R-114	Resistor, fixed; 600 ohms ± 5%; 2 watts; Part of SW-101.	R-333
R-115	Resistor, fixed; 16 ohms ± 5%; 2 watts.	R-299
RT-101	Resistor, Thermal; 10 ohms at 25 deg. C.	R-334
S-101	Switch, Toggle; D.P.S.T.	R-313
S-102	Switch, Channel; 5 position, 2 circuit.	R-298
S-103	Switch, toggle; D.P.D.T.	R-315
SW-101	Wafer, Channel Switch; Used with S-102. 5 position, 2 circuit, removable wafer card. Includes resistors R-110 through R-114.	R-323
T-101	Transformer, Audio Input: 600 ohm primary, center-tapped; 6 ohm secondary.	DH-283
T-102	Transformer, Audio Driver: 375 ohm primary; 450 ohm center-tapped secondary.	DH-284
T-103	Transformer, Audio Output; 20 ohm center-tapped primary; 600 ohm center-tapped secondary and 16 ohm center-tapped secondary.	DH-285
T-104	Transformer, Power; primary 110/115/125 volts, 50/60 cycles, secondary 32 volts center-tapped.	DS-282

PARTS LIST

Reference Designation	Name and Description	Tabet Part Number
TB-101	Terminal Board; 6 terminals; for input power connections.	R-339
TB-201 TB-202	Terminal Board; 6 terminals; for incoming audio and input transformer connections.	R-339
TB-301	Terminal Board; 6 terminals; for outgoing audio lines and output transformer connections.	R-339
XC-103	Socket, octal; for capacitor C-103.	R-337
XC-104	Same as XC-103; for capacitor C-104.	R-337
XDS-101	Holder, Indicator Lamp.	R-336
XF-101	Fuse Holder; Blown fuse indicator type.	R-317
XF-102	Same as XF-101.	R-317
XF-103	Fuse Holder for Spare Fuse	R-297