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UNCLASSIFIED

TECHNICAL MANUAL
for
APPENDIX
DUAL DIVERSITY
RADIO RECEIVER
MODELS DDR-5A & DDR-5B



THE TECHNICAL MATERIEL CORPORATION
MAMARONECK, N. Y. OTTAWA, CANADA

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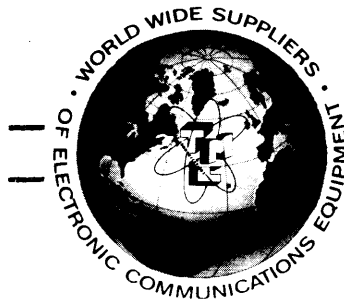
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C O M M U N I C A T I O N S E N G I N E E R S

700 FENIMORE ROAD

MAMARONECK, N. Y.

Warranty

The Technical Materiel Corporation, hereinafter referred to as TMC, warrants the equipment (except electron tubes,* fuses, lamps, batteries and articles made of glass or other fragile or other expendable materials) purchased hereunder to be free from defect in materials and workmanship under normal use and service, when used for the purposes for which the same is designed, for a period of one year from the date of delivery F.O.B. factory. TMC further warrants that the equipment will perform in a manner equal to or better than published technical specifications as amended by any additions or corrections thereto accompanying the formal equipment offer.

TMC will replace or repair any such defective items, F.O.B. factory, which may fail within the stated warranty period, PROVIDED:

1. That any claim of defect under this warranty is made within sixty (60) days after discovery thereof and that inspection by TMC, if required, indicates the validity of such claim to TMC's satisfaction.
2. That the defect is not the result of damage incurred in shipment from or to the factory.
3. That the equipment has not been altered in any way either as to design or use whether by replacement parts not supplied or approved by TMC, or otherwise.
4. That any equipment or accessories furnished but not manufactured by TMC, or not of TMC design shall be subject only to such adjustments as TMC may obtain from the supplier thereof.

* Electron tubes* furnished by TMC, but manufactured by others, bear only the warranty given by such other manufacturers. Electron tube warranty claims should be made directly to the manufacturer of such tubes.

TMC's obligation under this warranty is limited to the repair or replacement of defective parts with the exceptions noted above.

At TMC's option any defective part or equipment which fails within the warranty period shall be returned to TMC's factory for inspection, properly packed with shipping charges prepaid. No parts or equipment shall be returned to TMC, unless a return authorization is issued by TMC.

No warranties, express or implied, other than those specifically set forth herein shall be applicable to any equipment manufactured or furnished by TMC and the foregoing warranty shall constitute the Buyers sole right and remedy. In no event does TMC assume any liability for consequential damages, or for loss, damage or expense directly or indirectly arising from the use of TMC Products, or any inability to use them either separately or in combination with other equipment or materials or from any other cause.

*Electron tubes also include semi-conductor devices.

PROCEDURE FOR RETURN OF MATERIAL OR EQUIPMENT

Should it be necessary to return equipment or material for repair or replacement, whether within warranty or otherwise, a return authorization must be obtained from TMC prior to shipment. The request for return authorization should include the following information:

1. Model Number of Equipment.
2. Serial Number of Equipment.
3. TMC Part Number.
4. Nature of defect or cause of failure.
5. The contract or purchase order under which equipment was delivered.

PROCEDURE FOR ORDERING REPLACEMENT PARTS

When ordering replacement parts, the following information must be included in the order as applicable:

1. Quantity Required.
2. TMC Part Number.
3. Equipment in which used by TMC or Military Model Number.
4. Brief Description of the Item.
5. The *Crystal Frequency* if the order includes crystals.

PROCEDURE IN THE EVENT OF DAMAGE INCURRED IN SHIPMENT

TMC's Warranty specifically excludes damage incurred in shipment to or from the factory. In the event equipment is received in damaged condition, the carrier should be notified immediately. Claims for such damage should be filed with the carrier involved and not with TMC.

All correspondence pertaining to Warranty Claims, return, repair, or replacement and all material or equipment returned for repair or replacement, within Warranty or otherwise, should be addressed as follows:

THE TECHNICAL MATERIEL CORPORATION
Engineering Services Department
700 Fenimore Road
Mamaroneck, New York

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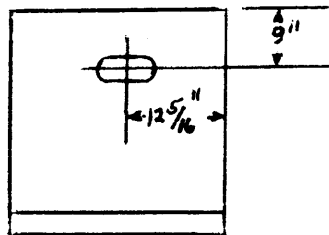
Manual affected: Appendix for Dual Diversity Radio IN -3001 H

Receiver Models DDR-5A & DDR-5B

Page 2-3. Figure 2-4.

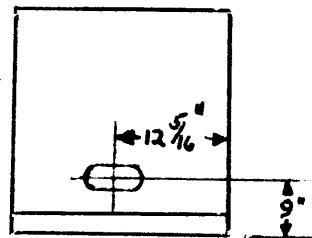
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THE TECHNICAL MATERIEL CORP., 700 Fenimore Road, Mamaroneck, New York

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TABLE OF CONTENTS

Paragraph	Page	Paragraph	Page
SECTION 1 — GENERAL INFORMATION		SECTION 4 — TROUBLESHOOTING	
1-1	1-0	4-1	4-1
1-2	1-0	4-2	4-1
1-3	1-1	4-3	4-1
		4-4	4-1
		4-5	4-1
		4-6	4-2
SECTION 2 — INSTALLATION		SECTION 5 — MAINTENANCE	
2-1	2-0	5-1	5-0
2-2	2-0	5-2	5-0
2-3	2-0	SECTION 6 — PARTS LIST	
SECTION 3 — OPERATOR'S SECTION		6-1	6-1
3-1	3-1	SECTION 7 — SCHEMATIC DIAGRAMS	
3-2	3-1	7-1	7-0
3-3	3-2		

LIST OF ILLUSTRATIONS

Figure		Page	Figure		Page
SECTION 2 — INSTALLATION			SECTION 7 — SCHEMATIC DIAGRAMS		
2-1	HSP-2, Interconnection Diagram . .	2-0	7-1	Power Panel, HPP-1, Schematic Diagram	7-0
2-2	HSS-1, Interconnection Diagram . .	2-1	7-2	Speaker Panel, HSS-1, Schematic Diagram	7-0
2-3	HPP-1, Interconnection Diagram . .	2-2	7-3	Audio Switch Panel, HSP-2, Schematic Diagram	7-1/7-2
2-4	RAK-21B1, Dimensional Drawing . .	2-3			
2-5	RAK-22A1, Dimensional Drawing . .	2-4			
SECTION 3 — OPERATOR'S SECTION					
3-1	HSP-2, Front Panel Operating Controls	3-1			

LIST OF TABLES

Table	Page	Table	Page
SECTION 2 — INSTALLATION		SECTION 4 — TROUBLESHOOTING	
2-1	Unit Interconnections	2-2	4-1 Troubleshooting Based on Normal Indications
SECTION 3 — OPERATOR'S SECTION		4-2	
3-1	Operating Controls for HSP-2	SECTION 6 — PARTS LIST	
3-2	HSP-2 Operating Chart	6-1	HPP-1
			HSP-2
			HSS-1
			RAK-21B1
			RAK-22A1

SECTION I

GENERAL INFORMATION

1-1. INTRODUCTION.

This manual contains technical information pertaining to the equipment racks and accessory panel units used in the TMC Models DDR-5A and DDR-5B receivers.

The units covered in this manual are:

- a. Equipment Rack RAK-22A1 (dual rack, DDR-5A).
- b. Equipment Rack RAK-21B1 (single rack, DDR-5B).
- c. Power Panel HPP-1.
- d. Audio Switch Panel HSP-2.
- e. Speaker Panel HSS-1.

1-2. DESCRIPTION OF EQUIPMENT.

a. EQUIPMENT RACK RAK-22A1. - The RAK-22A1 is a dual rack providing an enclosure for the various units comprising the DDR-5A. The RAK-22A1 contains two front panel access doors and cable access holes are conveniently located on both sides of the rack for installation flexibility. All power and signal connections between the units are made within the rack.

Due to its design and construction, the RAK-22A1 acts as a shield to prevent radiation leaks from the installed components.

The RAK-22A1 contains a squirrel-cage type, positive filtered, forced-air cooling system, employing washable air filters.

b. EQUIPMENT RACK RAK-21B1. - The RAK-21B1 is a single rack providing an enclosure for the various units comprising the DDR-5B. The RAK-22B1 contains a front panel access door and cable access holes are conveniently located on both sides

of the rack for installation flexibility. All power and signal connections between the units are made within the rack.

Due to its design and construction, the RAK-21B1 acts as a shield to prevent radiation leaks from the installed components.

The RAK-21B1 contains a squirrel-cage type, positive filtered, forced-air cooling system, employing washable air filters.

c. POWER PANEL HPP-1. - The HPP-1 is an auxiliary panel containing two individually fused utility outlets. These outlets provide 115 or 230 vac (depending upon input power source) for external test equipment. Both utility outlets and their associated fuses are mounted on the front panel for greater accessibility.

d. AUDIO SWITCH PANEL HSP-2. - The HSP-2 is an audio switch panel capable of performing three basic functions:

(1) It enables the operator to switch either channel A or B of a receiver to speaker panel HSS-1 for audio monitoring purposes.

(2) It provides a filtered audio output of both channels to be coupled to the cabinet terminal strip (A-3083 for DDR-5A and A-3063 for DDR-5B) for connection to any suitable teletype or facsimile converter unit.

(3) It provides an AGC combining network. With the AGC switch in the COMBINED position, signal fading is minimized.

e. SPEAKER PANEL HSS-1. - The HSS-1 is a rack mounted speaker panel containing a single 4-inch PM speaker. The HSS-1 is used to monitor the audio outputs of the selected receiver channel, controlled by the HSP-2.

1-3. ELECTRICAL AND MECHANICAL CHARACTERISTICS.

SPEAKER PANEL HSS-1

Speaker Size	4 in.
Impedance	3.2 ohms
Output Power	Approx. 4 watts
Dimensions (panel)	5-1/4 in. high x 19 in. wide x 2-1/2 in. deep
Weight (speaker and panel)	3 lbs.

POWER PANEL HPP-1

AC Receptacles	2
Fuses	2
Dimensions	4-1/2 in. high x 19 in. wide x 3-1/2 in. deep
Weight	3 lbs.

AUDIO SWITCH PANEL HSP-2

Dimensions	10-3/4 in. high x 19 in. wide x 3-1/2 in. deep
Weight	6 lbs.

EQUIPMENT RACK RAK-22A

Dimensions	69 in. high x 47-3/8 in. wide x 30-3/8 in. deep
Weight (including cables, slides, and units normally supplied with rack)	660 lbs.

EQUIPMENT RACK RAK-21B1

Dimensions	69 in. high x 24-5/8 in. wide x 29-15/6 in. deep
Weight (including cables, slides, and units normally supplied with rack)	350 lbs.

SECTION 2 INSTALLATION

2-1. INITIAL INSPECTION.

Each piece of equipment has been thoroughly inspected and tested at the factory before shipment. Upon receipt, unpack the equipment carefully and inspect each item for possible signs of damage. Inspect all packing material for parts which may have been shipped as loose items.

With respect to damage to the equipment for which the carrier is liable, The Technical Materiel Corporation will assist in describing methods of repair and the furnishing of replacement parts.

2-2. MECHANICAL INSTALLATION.

All the component and accessory units used in the DDR-5A and DDR-5B receivers are mounted on standard 19 inch rack panels designed to be mounted in the RAK-21B1 and RAK-22A1 equipment racks.

To mount a unit, simply place the unit in the rack and screw the front panel to the frame.

Figures 2-4 and 2-5 are outline drawings of the racks.

2-3. ELECTRICAL INSTALLATION.

Table 2-1 lists the interconnections of the accessory units. Figures 2-1 through 2-3 present the interconnection diagrams.

Electrical installation of RAK-21B1 and RAK-22A1 are made through the cable access holes conveniently spaced along the sides and rear of the racks. These cable access holes have been conveniently spaced for greater installation flexibility.

a. The main power connection for RAK-22A1 is made through the bottom-center cable access hole

NOTE: FOR COMPLETE INTERCONNECTION LAYOUT, REFER TO APPLICABLE SYSTEM INTERCONNECTION DIAGRAM.

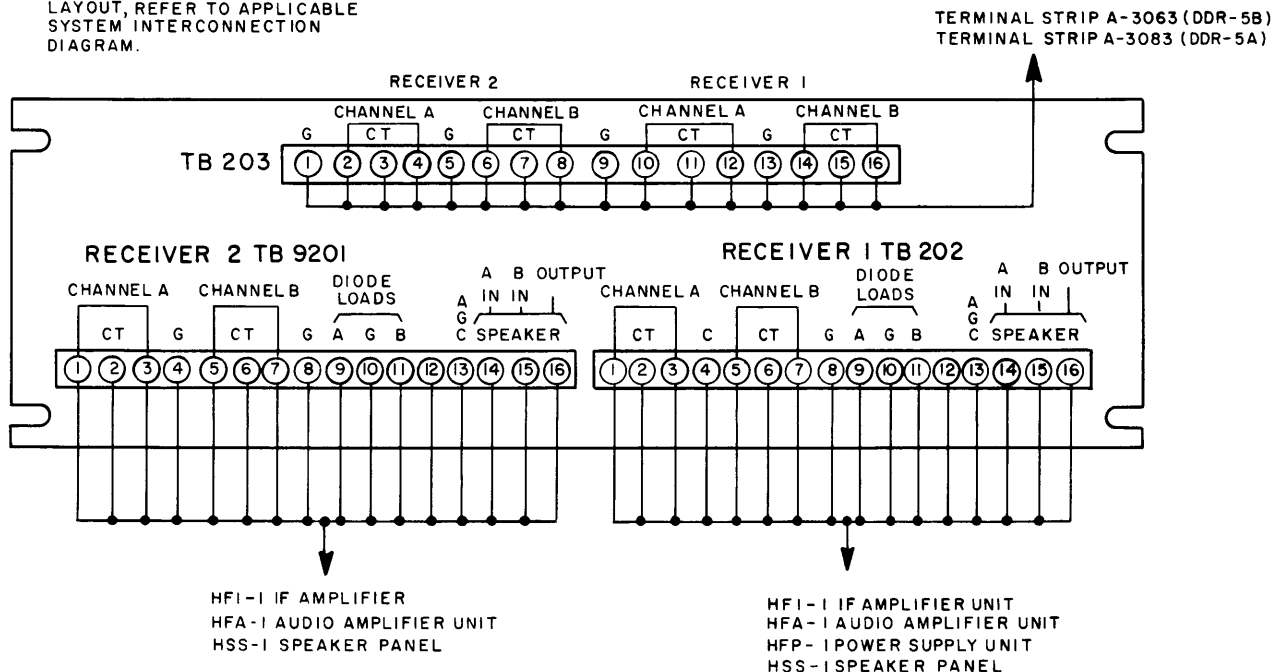


Figure 2-1. HSP-2, Interconnection Diagram

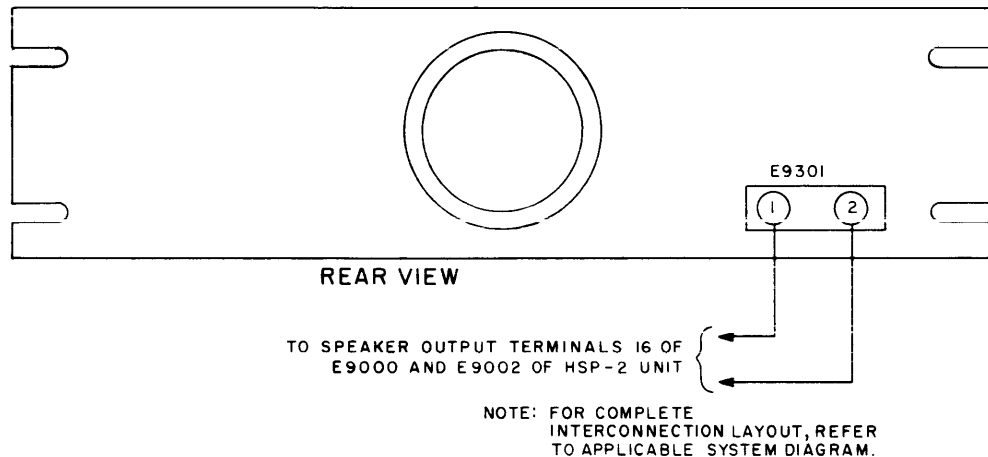


Figure 2-2. HSS-1, Interconnection Diagram

by means of a shielded cable. To install the power cable, proceed as follows:

- (1) Remove four screws holding line filters AF-103 in place at rear of cabinet.
- (2) Position filter so that cover can be removed.
- (3) Remove cover and connect three-wire power cable. The white and black leads are connected to line lugs and green lead is connected to ground lug.
- (4) Connect power cable to external primary power source (115 vac or 230 vac, 60 cps, single phase).
- (5) With a suitable voltmeter, check voltage within rack.

Antenna and audio connections are made to terminal strip A-3083, located approximately 15 inches above the floor at the left inside corner of the cabinet as viewed from the rear. Refer to Section 2 of DDR-5A System Manual for further details.

b. The main power connection for RAK-21B1 is made through the cable access hole on either side of the rack by means of a shielded cable. To install the power cable, proceed as follows:

- (1) Remove cable access hole cover.
- (2) Feed power cable through access hole and connect white and black leads to line lugs. Connect green lead to ground lug.
- (3) Connect power cable to external primary power source (115 vac or 230 vac, 60 cps, single phase).
- (4) With a suitable voltmeter, check voltage within rack.

Antenna and audio connections are made to terminal strip A-3068, located approximately 15 inches above the floor on the right inside corner of the cabinet as viewed from the rear. Refer to Section 2 of DDR-5B System Manual for further details.

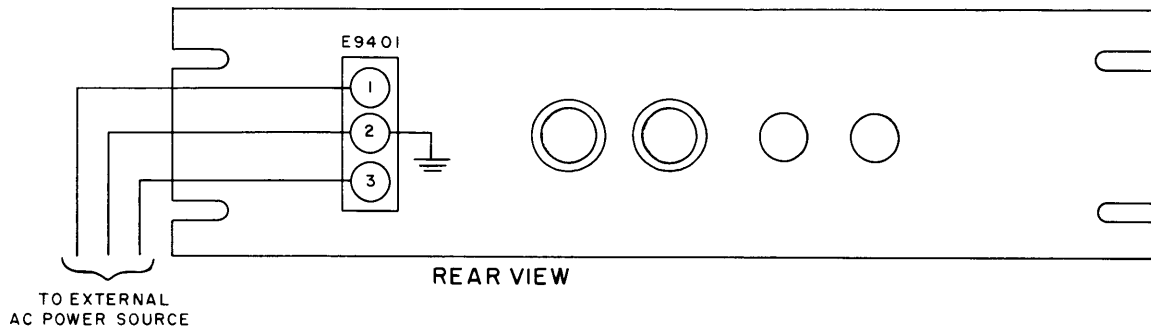


Figure 2-3. HPP-1, Interconnection Diagram

TABLE 2-1. UNIT INTERCONNECTIONS

SIGNAL	CONNECTION
HSP-2 AUDIO SWITCH PANEL	
RCVR 1, Channel A input	Terminals 10 and 12 on E9001
RCVR 1, Channel B input	Terminals 14 and 16 on E9001
RCVR 1, Channel A output	Terminals 1 and 3 on E9000
RCVR 1, Channel B output	Terminals 5 and 7 on E9000
RCVR 1, AGC	Terminal 13 on E9000
RCVR 1, Channel A audio input	Terminal 14 on E9000
RCVR 1, Channel B audio input	Terminal 15 on E9000
RCVR 1, Channel A or B audio output to speaker	Terminal 16 on E9000
RCVR 1, Diode Loads, A and B	Terminals 9 and 11 on E9000
RCVR 2, Channel A input	Terminals 2 and 4 on E9001
RCVR 2, Channel B input	Terminals 6 and 8 on E9001
RCVR 2, Channel A output	Terminals 1 and 3 on E9002
RCVR 2, Channel B output	Terminals 5 and 7 on E9002
RCVR 2, AGC	Terminal 13 on E9002
RCVR 2, Channel A audio input	Terminal 14 on E9002
RCVR 2, Channel B audio input	Terminal 15 on E9002
RCVR 2, Diode Loads, A and B	Terminals 9 and 11 on E9002
RCVR 2, Channel A or B audio output to speaker	Terminal 16 on E9002
HSS-1 SPEAKER PANEL	
Audio input from HFA-1 unit	Terminals 1 and 2 on E9301
HPP-1 POWER PANEL	
A-C voltage source	Terminals 1 and 3 on E9401

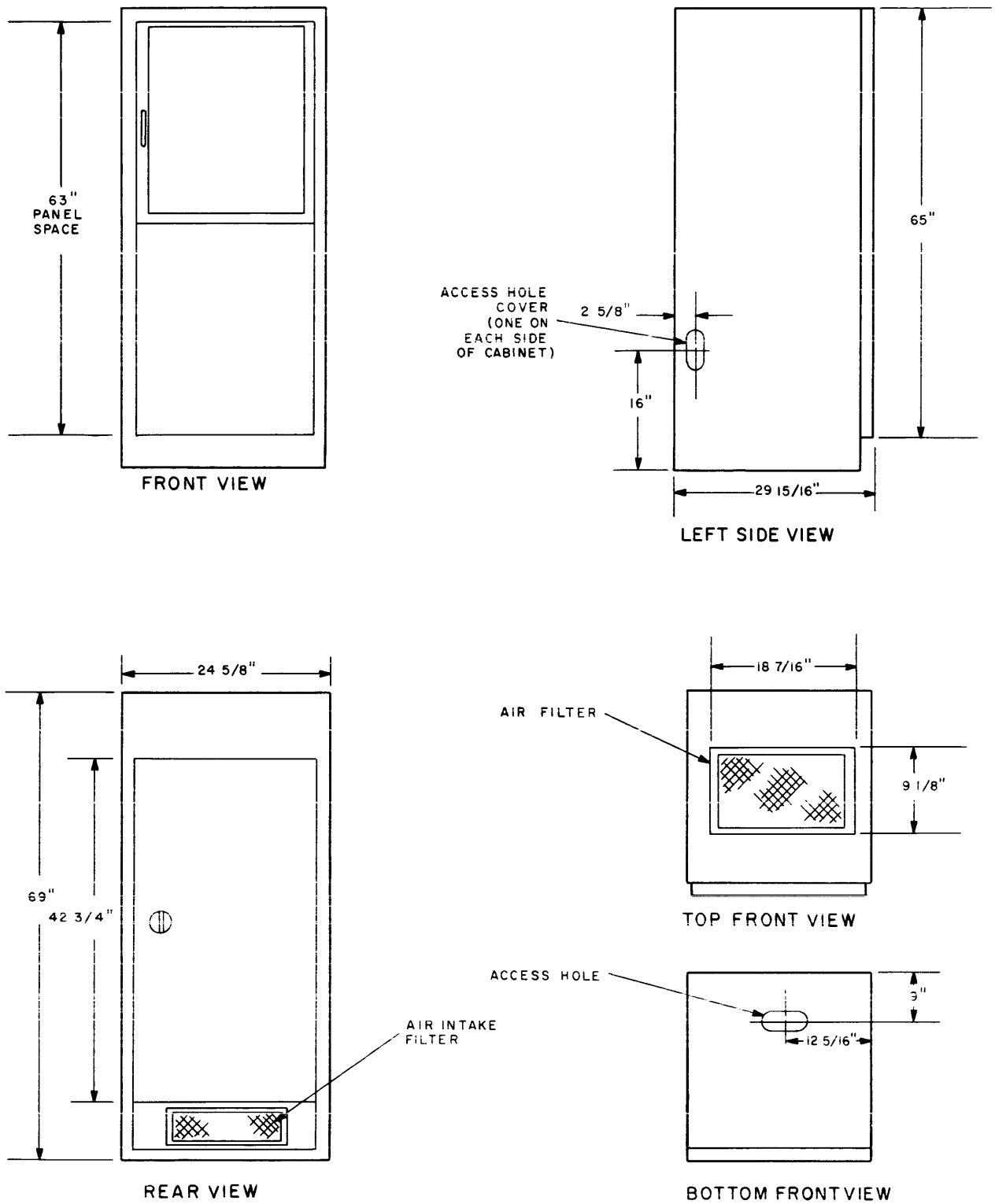


Figure 2-4. RAK-21B1, Dimensional Drawing

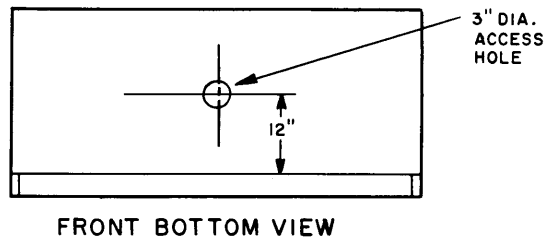
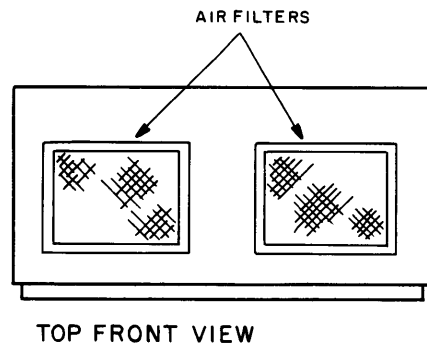
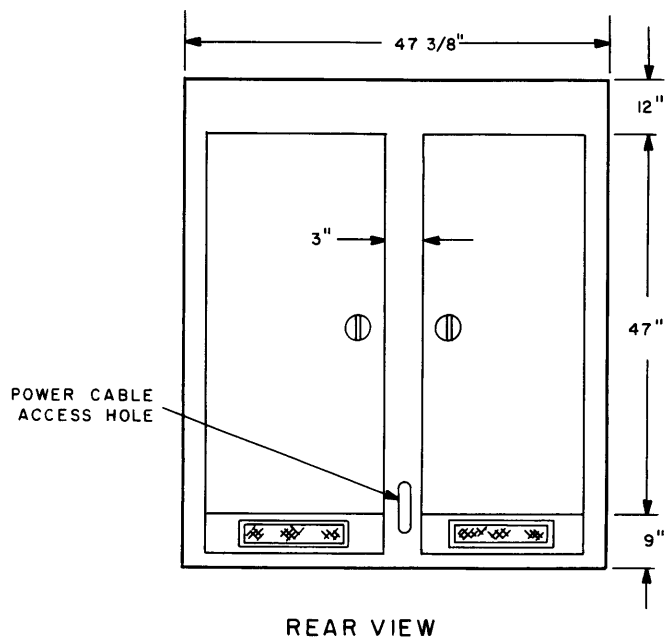
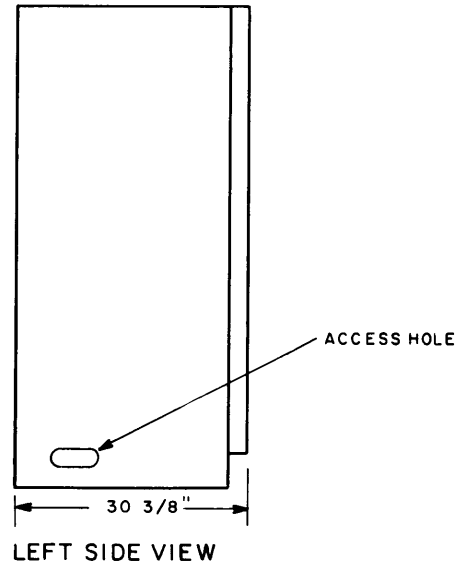
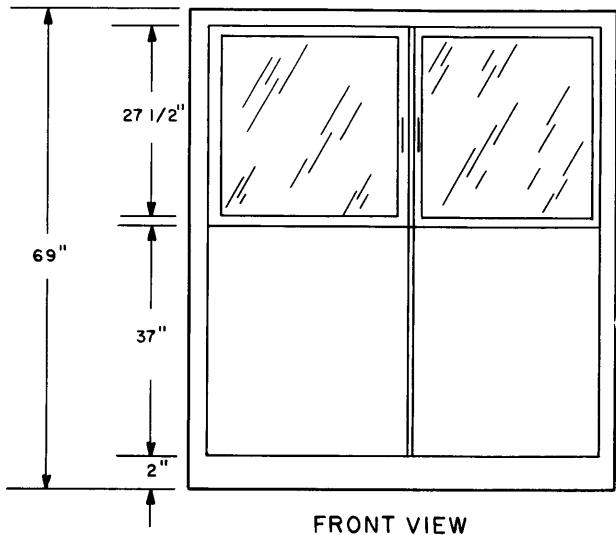


Figure 2-5. RAK-22A1, Dimensional Drawing

SECTION 3 OPERATOR'S SECTION

3-1. GENERAL.

Operation of the accessory units covered in this manual have been designed for simplicity and versatility. The necessary operating controls of the HSP-2 are functionally grouped on the front panel. The ac utility outlets of the HPP-1 and their associated fuses are also mounted on the front panel for greater accessibility.

The HSS-1, HPP-1, RAK-21B1 and RAK-22A1 have no operating controls.

3-2. OPERATOR'S INSTRUCTIONS.

Since none of the accessory units contain vacuum tubes, warm-up is not required.

Table 3-1 lists the operating controls of the HSP-2 (see figure 3-1).

Table 3-2 is an operating chart for the HSP-2, to be used in conjunction with figure 3-1 and Table 3-1.

TABLE 3-1. OPERATING CONTROLS FOR HSP-2

ITEM	CONTROL	REFERENCE DESIGNATION
1	RECEIVER 1 SPEAKER CHANNEL selector switch	S9202
2	RECEIVER 1 SPEAKER VOLUME control	R9201
3	RECEIVER 2 SPEAKER CHANNEL selector switch	S9203
4	RECEIVER 2 SPEAKER VOLUME control	R9202
5	AGC SEPARATE/COMBINED switch	S9201

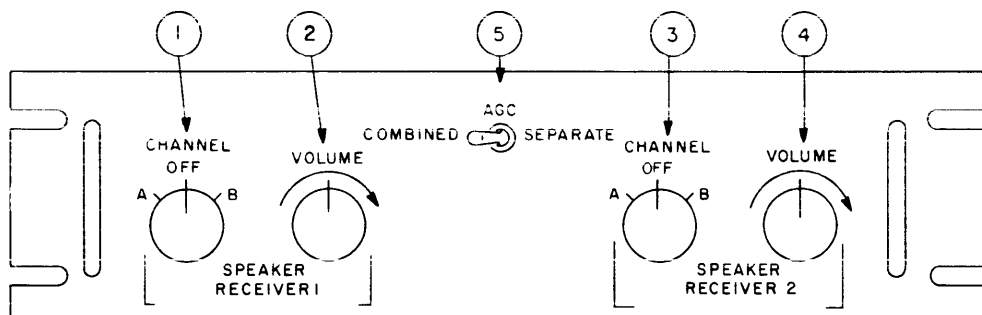


Figure 3-1. HSP-2, Front Panel Operating Controls

TABLE 3-2. HSP-2 OPERATING CHART

STEP	CONTROL	OPERATION	PURPOSE
1	AGC SEPARATE COMBINED toggle switch	SEPARATE position, single receiver reception	The two AGC signals are kept separate.
		COMBINED position, dual receiver diversity reception	The two AGC signals are combined, minimizing fading.
2	RECEIVER 1 SPEAKER CHANNEL selector switch	OFF position	Disconnects audio from receiver 1 to HSS-1
		A position	Connects channel A audio of receiver 1 to HSS-1
		B position	Connects channel B audio of receiver 1 to HSS-1
3	RECEIVER 1 SPEAKER VOLUME attenuator	Set to desired audio level of HSS-1	Varies audio signal level of receiver 1 to HSS-1
4	RECEIVER 2 SPEAKER CHANNEL selector switch	OFF position	Disconnects audio from receiver 2 to HSS-1
		A position	Connects channel A audio of receiver 2 to HSS-1
		B position	Connects channel B audio of receiver 2 to HSS-1
5	RECEIVER 2 SPEAKER VOLUME attenuator	Set to desired audio level of HSS-1	Varies audio signal level of receiver 2 to HSS-1

3-3. OPERATOR'S MAINTENANCE.

The operator should note the general settings of panel switches, condition of fuses and interconnecting cable connections.

All interconnecting cables should be securely connected and inspected for fraying. Equipment cleanliness should also be observed.

SECTION 4 TROUBLESHOOTING

4-1. INTRODUCTION.

This section explains how to locate and diagnose equipment troubles and maladjustments. As an aid in troubleshooting, this section contains a table for troubleshooting, based on types of operation, covering the various accessory units mentioned in this manual. Use of the schematic diagrams and inter-connecting diagrams is advisable.

4-2. TROUBLESHOOTING TECHNIQUES.

When a piece of equipment has been working satisfactorily and suddenly fails, the cause of failure may be apparent either because of circumstances occurring at the time of failure or because of symptoms analogous to past failures. In this case, it is not necessary to follow a lengthy and orderly course of troubleshooting in order to localize and isolate the faulty part.

A second shortcut in troubleshooting is to ascertain that all fuses and operating voltages are normal. This may eliminate further investigation.

A third shortcut is to examine the equipment section for burned elements, charring, corrosion, arcing, excessive heat, dirt, dampness, etc.

4-3. TROUBLESHOOTING BASED ON NORMAL INDICATIONS.

Table 4-1 is designed to localize a trouble by means of normal operating indications. When performing the action listed in the PRELIMINARY ACTION column, the indication given in the NORMAL INDICATION column should be observed. If a normal indication is not observed, perform the procedure given in the REMEDY column. When performing the given remedy procedures, it is advisable to refer to the applicable schematic diagram of the unit or circuit in question.

4-4. TROUBLESHOOTING AUDIO SWITCH PANEL HSP-2.

a. CIRCUIT ANALYSIS. - The HSP-2 has three purposes: to provide a network which would allow one speaker to be used for both channels of a single receiver, to provide an r-f filter line, which grounds stray r-f currents inherent to external equipment, and to provide a control for combined or separate agc.

The dual channel inputs are coupled from rack terminal A3083 or A3063 to TB9203 on the HSP-2. From here, each line is filtered through a T-network and subsequently coupled to terminal boards E9201 and E9202. Capacitors C9201 through C9212

and inductors L9201 through L9212 and L9215 through L9226 make up the T-networks.

A network, composed primarily of a switch and volume control, allows a single speaker to be used for any particular channel. With the RECEIVER 1 SPEAKER CHANNEL selector in the A position, the channel A input is coupled from TB9202 through S9202 and RECEIVER 1 SPEAKER VOLUME control R9201 to the speaker output terminal on TB9202. From this terminal the signals are coupled to the HSS-1. RECEIVER 1 SPEAKER VOLUME control R9201 can be varied to adjust the audio level at the speaker. With S9202 in the OFF position, both the channel A and B audio outputs are disconnected, and with the switch in the B position, the channel B audio is fed to the speaker.

With receiver 2, the operation is identical. The RECEIVER 2 SPEAKER CHANNEL selector is placed in the desired position and RECEIVER 2 SPEAKER VOLUME control R9202 is used to adjust the audio level at the speaker.

An AGC switch is provided for both receivers 1 and 2. These switches allow the AGC to be combined should the units be used for diversity reception. For normal operation, the AGC switch is placed in the SEPARATE position. When combined AGC is needed, S9201 is placed in the COMBINED position.

b. TEST DATA. - Since one function of the HSP-2 is to couple and filter dual-channel audio signals from both receivers, a loss of signal in this unit could mean that a shorted capacitor or open inductor is responsible. Check the defective line for continuity only after determining the fact that a signal exists at the input of the defective line.

If no output exists in either or both channels of receiver 1 and the trouble has been traced to the HSP-2, check RECEIVER 1 SPEAKER CHANNEL switch S9202, RECEIVER 1 SPEAKER VOLUME control R9201 and the associated circuitry.

If no output exists in either or both channels of receiver 2 and the trouble has been traced to the HSP-2, check RECEIVER 2 SPEAKER CHANNEL switch S9203, RECEIVER 2 SPEAKER VOLUME control R9202 and the associated circuitry.

4-5. TROUBLESHOOTING POWER PANEL HPP-1.

Trouble in the HPP-1 can usually be traced to two causes: burned out fuses and broken cabling and connections. The fuses are mounted on the front panel and are very easily removed. Note that when replacing a fuse, make sure the proper amperage

fuse is used. Check the cabling and connections with a vtvm if loose or broken cabling or connections are indicated.

4-6. TROUBLESHOOTING SPEAKER PANEL HSS-1.

Trouble in the HSS-1 usually presents itself in two ways; either as a distorted output or as no output.

The first step to take in troubleshooting the HSS-1 is to make sure that there is an audio signal at TB9301. This can be checked by a vtvm. If no signals are present at TB9301, trace the signal to other units in the system. Next check the speaker itself for a broken cone or loose connections.

TABLE 4-1. TROUBLESHOOTING BASED ON NORMAL INDICATIONS

PRELIMINARY ACTION	NORMAL INDICATION	REMEDY
AUDIO SWITCH PANEL HSP-2		
AGC toggle switch in the COMBINED position (diversity reception).	Stable audio output from HSS-1.	<p>If normal indication is not obtained, perform the following steps:</p> <p>(1) Check for proper AGC signal inputs from receivers at AGC input terminals.</p> <p>(2) Check condition of AGC combining toggle switch S9201.</p> <p>(3) Check L9213, L9214 and C9213.</p>
AGC toggle switch in the SEPARATE position (single receiver reception).	Stable audio output from HSS-1.	<p>If normal indication is not obtained, perform the following steps:</p> <p>(1) Check for proper AGC signal input from receiver at AGC input terminals.</p>
RECEIVER 1 or 2 SPEAKER CHANNEL selector switch in OFF position.	No audio output of particular receiver at HSS-1.	<p>If normal indication is not obtained, perform the following steps:</p> <p>(1) Check condition of selector switch for shorted contacts.</p>
RECEIVER 1 or 2 SPEAKER CHANNEL selector switch in position A or B.	Audio output of selected channel and receiver at HSS-1.	<p>If normal indication is not obtained, perform the following steps:</p> <p>(1) Check for proper receiver input signal and connection at input terminal.</p> <p>(2) Check condition of selector switch for open or broken contacts or wires.</p> <p>(3) Check condition of speaker connections and HSP-2 output connections.</p>

TABLE 4-1. TROUBLESHOOTING BASED ON NORMAL INDICATIONS (CONT'D)

PRELIMINARY ACTION	NORMAL INDICATION	REMEDY
<p>RECEIVER 1 or 2 SPEAKER VOLUME control.</p>	<p>Linear attenuation of audio signal as volume control is varied.</p>	<p>If normal indication is not obtained, perform the following steps:</p> <p>(1) Check condition of volume control with ohmmeter, observing meter indication as control is varied.</p> <p>(2) Check for broken or loose connections.</p>
<p>SPEAKER PANEL HSS-1</p>		
<p>RECEIVER 1 or 2 SPEAKER CHANNEL selector switch in A or B position.</p>	<p>Audio reproduction of selected receiver and channel of HSP-2.</p>	<p>If normal indication is not obtained, perform the following steps:</p> <p>(1) Check speaker connections to and from HSP-2.</p> <p>(2) Check speaker for torn cone.</p> <p>(3) Check speaker spider and voice coil.</p>
<p>POWER PANEL HPP-1</p>		
<p>With a suitable voltmeter, check voltage at the front panel convenience outlets.</p>	<p>115 vac (if primary power is 115 vac).</p> <p>230 vac (if primary power is 230 vac).</p>	<p>If normal indication is not obtained, perform the following steps:</p> <p>(1) Check condition of fuses, observing for condition and proper value.</p> <p>(2) Check primary power at terminals of E9401.</p> <p>(3) Check condition and connection of internal wiring.</p>

SECTION 5 MAINTENANCE

5-1. INTRODUCTION.

Maintenance is divided into two categories: operator's maintenance and preventive maintenance. The operator's maintenance, normally carried out by the operator as he works with the equipment, is in Section 3 of this manual. Preventive maintenance procedures are given in this section.

It is recommended that all maintenance be carried out by a competent technician familiar with troubleshooting techniques. If the trouble cannot be corrected by following the procedures in this section and Section 5, it is recommended that the unit be returned to the Technical Materiel Corporation for servicing.

5-2. PREVENTIVE MAINTENANCE.

In order to prevent failure of the equipment due to corrosion, tube failure, dust, or other destructive elements, it is suggested that a schedule of preven-

tive maintenance be set up and adhered to. At periodic intervals (at least every six months) the equipment should be removed from the rack for cleaning and inspection. All accessible covers should be removed and the wiring and all components inspected for dirt, corrosion, charring, discoloring or grease. Dust may be removed with a soft brush. Remove dirt or grease from electrical parts with trichlorethylene or carbon tetrachloride. Remove dirt or grease from other parts with any good dry cleaning fluid.

WARNING

When using carbon tetrachloride make certain that adequate ventilation exists. Avoid prolonged contact with skin.

The rack should be inspected for frayed cables, loose connections, signs of overheating, etc. The blowers should be checked for bent blades, motor overheating, etc.

SECTION 6 PARTS LIST

6-1. INTRODUCTION.

Reference designations have been assigned to identify all maintenance parts of the equipment. They are used for marking the equipment (adjacent to the part they identify) and are included on drawings, diagrams and in the parts list. The letters of a reference designation indicate the kind of part (generic group) such as resistor, amplifier, electron tubes, etc. The number differentiates between parts of the same generic group. Parts of the same first major unit are numbered from 1 to 199; parts of the second 201 to 299, etc. Sockets associated with a particular plug-in device, such as electron tube or fuse, are identified by a reference designation which

includes the reference designation of the plug-in device. For example, the socket for fuse F7 is designated XF7. The parts for each major unit are grouped together. Column 1 lists the reference series of each major unit, followed by the reference designations of the various parts in alphabetical and numerical order. Column 2 gives the name and describes the various parts. Major part assemblies are listed in their entirety; subparts of a major assembly are listed in alphabetical and numerical order with reference to their major assemblies.

Column 3 indicates how the part is used within a major component. Column 4 lists The Technical Materiel Corporation part numbers.

HPP-1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
F9401	FUSE, CARTRIDGE: 250 v, 10 amp; 1-1/4 in. long by 1/4 in. dia; medium time lag. (FOR 115 V OPERATION)	Utility Line Fuse	FU-103-10
F9402	Same as F9401	Utility Line Fuse	
F9401	FUSE, CARTRIDGE: 250 v, 5 amp; 1-1/4 in. long by 1/4 in. dia; medium time lag. (FOR 230 V OPERATION)	Utility Line Fuse	FU-103-5
F9402	Same as F9401	Utility Line Fuse	
J9401	CONNECTOR, RECEPTACLE, ELECTRICAL: 3 contacts, 2 flat, straight male contacts; 1 U shaped male grounding contact; rated 250 v, 10 amps and 125 v, 15 amps	Utility AC Outlets	JJ-173
J9402	Same as J9401	Utility AC Outlets	
TB9401	TERMINAL BOARD: barrier type; three double screw terminals; 6-32 thd; phenolic body	Input AC Connection	TM-102-3
XF9401	FUSEHOLDER: extractor post type; for 1/4 x 1-1/4 in. fuse; neon indicator lamp and 220k ohm resistor; clear octagonal lens; 100-250 volts, 20 amps	F9401 Holder	FH-104-2
XF9402	Same as XF9401	F9402 Holder	

PARTS LIST (CONT'D)

HSP-2

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
C9201	CAPACITOR, FIXED, MICA DIELECTRIC: 510 uuf; $\pm 5\%$; 500 vdcw.	Bypass	CM15C511J
C9202	Same as C9201	Bypass	
C9203	Same as C9201	Bypass	
C9204	Same as C9201	Bypass	
C9205	Same as C9201	Bypass	
C9206	Same as C9201	Bypass	
C9207	Same as C9201	Bypass	
C9208	Same as C9201	Bypass	
C9209	Same as C9201	Bypass	
C9210	Same as C9201	Bypass	
C9211	Same as C9201	Bypass	
C9212	Same as C9201	Bypass	
C9213	Same as C9201	Bypass	
L9201	COIL, RADIO FREQUENCY: 10.0 uh, $\pm 10\%$; 0.30 ohms dc resistance; molded case.	RF Choke	CL-270-10
L9202	Same as L9201	RF Choke	
L9203	Same as L9201	RF Choke	
L9204	Same as L9201	RF Choke	
L9205	Same as L9201	RF Choke	
L9206	Same as L9201	RF Choke	
L9207	Same as L9201	RF Choke	
L9208	Same as L9201	RF Choke	
L9209	Same as L9201	RF Choke	
L9210	Same as L9201	RF Choke	
L9211	Same as L9201	RF Choke	
L9212	Same as L9201	RF Choke	
L9213	Same as L9201	RF Choke	
L9214	Same as L9201	RF Choke	
L9215	Same as L9201	RF Choke	
L9216	Same as L9201	RF Choke	

PARTS LIST (CONT'D)

HSP-2

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
L9217	Same as L9201	RF Choke	
L9218	Same as L9201	RF Choke	
L9219	Same as L9201	RF Choke	
L9220	Same as L9201	RF Choke	
L9221	Same as L9201	RF Choke	
L9222	Same as L9201	RF Choke	
L9223	Same as L9201	RF Choke	
L9224	Same as L9201	RF Choke	
L9225	Same as L9201	RF Choke	
L9226	Same as L9201	RF Choke	
R9201	ATTENUATOR, VARIABLE: resistive type; input impedance 4 ohms; output impedance 4 ohms; 4 watts continuous rating; 0 to 31 db attenuating; continuously variable.	Volume Control	RV-107-T4
R9202	Same as R9201	Volume Control	
R9203	RESISTOR, FIXED, WIREWOUND: 5 ohms; $\pm 5\%$; 5 watts.	Load	RW-107-5
R9204	Same as R9203	Load	
R9205	Same as R9203	Load	
R9206	Same as R9203	Load	
S9201	SWITCH, TOGGLE: DPDT; 125 v, 6 amps; bat lever.	AGC Selector	ST-103-1-62
S9202	SWITCH, ROTARY: 1 section, 3 position; nonshorting contacts; 1 amp, 28 volts dc or 5 amps, 110 volts ac.	Output Channel Selector	SW-148
S9203	Same as S9202	Output Channel Selector	
TB9201	TERMINAL BOARD: barrier type; sixteen single screw terminal and feedthru solder lugs, 6-32 thd; phenolic body.	Input Rec. 2 Term.	TM-100-16
TB9202	Same as TB9201	Input Rec. 2 Term.	
TB9203	Same as TB9201	Output Term.	

PARTS LIST (CONT'D)

HSS-1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
E9301	TERMINAL, BOARD: barrier type; two double screw terminals, 6-32 thd; phenolic body.	Input Board	600-A2
LS9301	LOUDSPEAKER, PERMANENT MAGNET: impedance 3-4 ohms; input wattage, 2 watts; overall dimensions 2" x 4-1/8" x 4/8".	Audio Output	ST-113

PARTS LIST (CONT'D)

RAK-21B1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
B9000	FAN, CENTRIFICAL: dual blades, 115/230 vac, 60 cps, 500 cfm; o/a dim. 7-29/32" x 14-1/2" x 7-11/64"	Rack Cooling	BL-112
C9000	CAPACITOR, FIXED, PAPER DIELECTRIC: 4 uuf, ±10%; 370 wvac.	Starting Capacitor	CP113-1
CP9000	ADAPTER, CONNECTOR: RF type; 1 female coaxial contact; straight type; series QDS to BNC.	Antenna Input Jack	JJ-213
CP9001	ADAPTER, CONNECTOR: RF type; 1 male and 1 female coaxial contact each end; straight type; series QDS to BNC; (supplied as a loose item.)	Antenna Input Adapter for BNC Type Termination	SA-105
E9000	TERMINAL BOARD: fanning type; 16 terminals; angle type, left end feed.	Audio Input to HSP-2, (REC 1)	TM-105-16AL
E9001	Same as E9000	Audio Outputs of HSP-2	
FL9000	FILTER, RADIO INTERFERENCE: 0 thru 400 cps; 250 volts AC/600 volts DC; 20 amps. max; attenuation 60 DB min., from 150 kc thru 10 kmc; hermetically sealed steel case, o/a dim. 3" x 3" x 16-1/2"	RF Filter for AC Line	AF-103
MP9000	FILTER, AIR CONDITIONING: replaceable type; filtering medium, steel mesh; steel frame; capacity 640 CFM; o/a dim. 16-1/4" x 6" x 1/2"	Air Filter	AD-103-11
MP9001	FILTER, AIR CONDITIONING: replaceable type; filtering medium, steel mesh; steel frame; capacity 640 CFM; o/a dim. 16-7/8" x 7-5/8" x 1/2"	Air Filter	AD-103-5
MP9002	NOT USED		
MP9003	NOT USED		
MP9004	SPRING, RETRACTING, ASSEMBLY: o/a dim. 1-1/2" x 2-1/2" x 3-3/4"; spring torque 1.56 lbs. x inch; cable load 2 lbs.	Cable Retraction	AS-116
MP9005	SPRING, RETRACTING: o/a dim. 1-1/4" x 2-1/2" x 3-3/4"; spring torque 1.56 lbs. x inch cable load 2 lbs.	Cable Retraction	SP-137-2
MP9006	Same as MP9005	Cable Retraction	
MP9007	Same as MP9005	Cable Retraction	
MP9008	Same as MP9005	Cable Retraction	
MP9009	Same as MP9005	Cable Retraction	
MP9010	Same as MP9005	Cable Retraction	

PARTS LIST (CONT'D)

RAK-21B1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
MP9011	Same as MP9005	Cable Retraction	
P9000	CONNECTOR, PLUG, ELECTRICAL: 2 female contacts; polarized; w/cable clamp; 10 amps, 250 volts; 15 amps, 125 volts	P/O W9000 Blower Input	PL-176
P9001	CONNECTOR, PLUG, ELECTRICAL: 2 half-round male contacts; polarized; w/cable clamp; 10 amps, 250 volts; 15 amps, 125 volts, twist lock type	P/O W9001 AC Input	PL-177
P9002	Same as P9001 (supplied as loose item)	AC Plug	
P9003	Same as P9001 (supplied as loose item)	AC Plug	
P9004	CONNECTOR, PLUG, ELECTRICAL: 24 round no. 20 male contacts; straight type	P/O W9002 Power Connect	PL-212-3
P9005	CONNECTOR, PLUG, ELECTRICAL: 14 round no. 16 female contacts; straight type	P/O W9002 Power Connect	PL-212-2
P9006	CONNECTOR, PLUG, ELECTRICAL: 14 round no. 16 male contacts; straight type	P/O W9003 Power Connect	PL-212-1
P9007	Same as P9005	P/O W9003 Power Connect	
P9008	Same as P9006	P/O W9004 Power Connect	
P9009	Same as P9005	P/O W9004 Power Connect	
P9010	Same as P9006	P/O W9004 Power Connect	
P9011	Same as P9005	P/O W9004 Power Connect	
P9012	Same as P9006	P/O W9005 Power Connect	
P9013	Same as P9005	P/O W9005 Power Connect	
P9014	Same as P9006	P/O W9006 Audio Connect	
P9015	Same as P9005	P/O W9006 Audio Connect	
P9016	CONNECTOR, PLUG, ELECTRICAL: RF type; 1 male contact; straight type	P/O W9011 Antenna Connect	PL-169
P9017	Same as P9016	P/O W9011 Antenna Connect	
P9018	Same as P9016	P/O W9012 Antenna Connect	

PARTS LIST (CONT'D)

RAK-21B1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
P9019	Same as P9016	P/O W9012 Audio Connect	
P9020	Same as P9016	P/O W9013 Audio Connect	
P9021	Same as P9016	P/O W9013 Audio Connect	
P9022	Same as P9016	P/O W9014 Audio Connect	
P9023	Same as P9016	P/O W9014 Audio Connect	
P9024	Same as P9016	P/O W9015 Audio Connect	
P9025	Same as P9016	P/O W9015 Audio Connect	
P9026	Same as P9016	P/O W9016 250 KC Connect	
P9027	Same as P9016	P/O W9016 250 DC Connect	
P9028	Same as P9016	P/O W9017 250 KC Connect	
P9029	Same as P9016	P/O W9017 250 KC Connect	
P9030	Same as P9016	P/O W9018 250 KC Connect	
P9031	Same as P9016	P/O W9018 250 KC Connect	
P9032	Same as P9016	P/O W9019 250 KC Connect	
P9033	Same as P9016	P/O W9019 250 KC Connect	
P9034	Same as P9016	P/O W9020 250 KC Connect	
P9035	Same as P9016	P/O W9020 250 KC Connect	
P9036	Same as P9016	P/O W9021 250 KC Connect	
P9037	Same as P9016	P/O W9021 250 KC Connect	
P9038	Same as P9016	P/O W9022 250 KC Connect	

PARTS LIST (CONT'D)

RAK-21B1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
P9039	Same as P9016	P/O W9022 250 KC Connect	
P9040	Same as P9016	P/O W9023 2 MC Connect	
P9041	Same as P9016	P/O W9023 2 MC Connect	
P9042	Same as P9016	P/O W9024 2 MC Connect	
P9043	Same as P9016	P/O W9024 2 MC Connect	
P9044	Same as P9016	P/O W9025 1.75 Connect	
P9045	Same as P9016	P/O W9025 1.75 Connect	
P9046	Same as P9016	P/O W9026 Audio Frequency Connect	
P9047	Same as P9016	P/O W9026 Audio Frequency Connect	
P9048	Same as P9016	P/O W9027 HFO Connect	
P9049	Same as P9016	P/O W9027 HFO Connect	
P9050	Same as P9016	P/O W9028 OSC Connect	
P9051	Same as P9016	P/O W9028 OSC Connect	
P9052	Same as P9016	P/O W9029 2 MC Connect	
P9053	Same as P9016	P/O W9029 2 MC Connect	
P9054	Same as P9016	P/O W9030 250 KC Connect	
P9055	Same as P9016	P/O W9030 250 KC Connect	
P9056	CONNECTOR, PLUG, ELECTRICAL: RF type; 1 round male coaxial contact; straight type; QDS to QDS series; (supplied as loose item)	Antenna Input Plug	PL-149
P9057	CONNECTOR, PLUG, ELECTRICAL: RF type; 1 round male coaxial contact; straight type; series BNC to BNC; (supplied as loose item)	Antenna Input Plug	UG-260/U

PARTS LIST (CONT'D)

RAK-21B1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
TB9000	TERMINAL BOARD: barrier type; 5 double screw terminals, 6-32 thd; phenolic body	Blower Input Terminals	TM-102-5
TB9001	TERMINAL BOARD: barrier type; 16 single screw terminals and feedthru solder lugs, 6-32 thd; phenolic body	System Audio Outputs	TM-100-16
W9000	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of, 72" of 3 conductor rubber insulated wire; PL-176 at one end, symbol no. P9000; 3 terminal lugs at other end	AC Input to HFP-1	CA-696-1
W9001	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of 54" of 2 conductor rubber insulated wire; 1 connector symbol no., P9001; 2 terminal lugs	AC Input to Blower	CA-706-1
W9002	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, 76" of various color insulated stranded cable, MIL, type MWC wire; one each of connectors PL-212-2, PL-212-3; symbol no's., P9004, P9005	Power Interconnect	CA-686-1
W9003	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, 76" of various color insulated stranded cable, MIL type MWC wire; one each of connectors, PL-212-1, PL-212-2; symbol no's., P9006, P9007	Power Interconnect	CA-687-1
W9004	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, various lengths and colors of insulated stranded cable, MIL type MWC wire; two each of connectors, PL-212-1, P-212-2; symbol no's., P9008, P9009, P9010, P9011	Power Interconnect	CA-704
W9005	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, 76" of various color insulated stranded cable, MIL type MCW wire; one each of connectors, PL-212-1, PL-212-2; symbol no's., P9012, P9013	Power Interconnect	CA-687-2
W9006	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of various lengths and colors of insulated stranded cable, MIL type MWC wire; one each of connectors, PL-212-1, PL-212-2; symbol no's., P9014, P9015; and terminal board TM-105-16AL, symbol no. E9000	Power and Audio Interconnect	CA-703
W9007	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of 60" 3 conductors, rubber insulated cable; 3 terminal lugs at each end	AC Input to HPP-1	CA-718

PARTS LIST (CONT'D)

RAK-21B1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
W9008	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, 36' of various color insulated stranded wire cable; MIL type MWC wire; one terminal board TM-105-16AL	Audio Output	CA-705-2
W9009	LEAD, ELECTRICAL: consists of, 54" size 10 AWG wire; 1 terminal lug	Ground	CA-412-30-54.00
W9010	Same as W9009	Ground	
W9011	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 97" RF cable RG-174/U; two PL-169 connectors; symbol no's., P9016, P9017	Antenna Input	CA-480-3-97
W9012	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 72" of RF cable RG-174/U; two PL-169 connectors; symbol no's., P9018, P9019	Audio Interconnect Ch. "A"	CA-480-3-72
W9013	Same as W9012. Symbol no's., P9020, P9021	Audio Interconnect Ch. "A"	
W9014	Same as W9012. Symbol no's., P9022, P9023	Audio Interconnect Ch. "B"	
W9015	Same as W9012. Symbol no's., P9024, P9025	Audio Interconnect Ch. "B"	
W9016	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 140" of RF cable RG-174/U; two PL-169 connectors; symbol no's., P9026, P9027	250 KC to Det.	CA-480-3-140
W9017	Same as W9011. Symbol no's., P9028, P9029	250 KC or RCC Output to Product Det.	
W9018	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 112" of RF cable RG-174/U; two PL-169 connectors; symbol no's., P9030, P9031	250 KC IF Output Ch. "B"	CA-480-3-112
W9019	Same as W9018. Symbol no's., P9032, P9033	250 KC IC Output Ch. "A"	
W9020	Same as W9011. Symbol no's., P9034, P9035	250 KC IF Output Ch. "B"	
W9021	Same as W9011. Symbol no's., P9036, P9037	250 KC IF Output Ch. "B"	
W9022	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 90" of RF cable RG-174/U; two PL-169 connectors; symbol no's., P9038, P9039	250 KC IF Output Ch. "B"	CA-480-3-90
W9023	Same as W9022. Symbol no's., P9040, P9041	2 MC Converter Inj.	

PARTS LIST (CONT'D)

RAK-21B1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
W9024	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 128" of RF cable RG-174/U; two PL-169 connectors; symbol no's., P9042, P9043	2 MC Converter Inj.	CA-480-3-128
W9025	Same as W9018 Symbol no's., P9044, P9045	1.75 MC IF Output	
W9026	Same as W9016 Symbol no's., P9046, P9047	Audio Frequency Synch Tone	
W9027	Same as W9018 Symbol no's., P9048, P9049	HFO Output	
W9028	Same as W9024 Symbol no's., P9050, P9051	Osc. Control Voltage	
W9029	Same as W9024 Symbol no's., P9052, P9053	2 MC Output	
W9030	Same as W9018 Symbol no's., P9054, P9055	250 KC Output	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
B9000	FAN, CENTRIFICAL: dual blade	Rack Cooling	BL-112
B9001	Same as B9000	Rack Cooling	
C9000			
C9001	Same as C9000		
CP9000	ADAPTER, CONNECTOR: RF type; one female coaxial contact; straight type; series QDS to BNC	Output	JJ-213
CP9001	ADAPTER, CONNECTOR: RF type; one female and one male contact; straight type; series QDS to BNC	Output	SA-105
CP9002	Same as CP9000	Antenna Termination	
CP9003	Same as CP9001	Antenna Termination	
E9000	TERMINAL BOARD: fanning type; 16 terminals; angle type, left end feed (P/O W9006)	HSP Channel Connect	TM-105-16AL
E9001	Same as E9000 (P/O W9008)	HSP Receiver	
E9002	Same as E9000 (P/O W9037)	HSP Channel Connect	
FL9000	FILTER, RADIO INTERFERENCE: 0 thru 400 cps; 250 volts AC/600 volts DC; 20 amps max; attenuation, 60 db min, from 150 KC turn 10 KCM; hermetically sealed steel case, 3" x 3" x 16-1/2"	Line Filter	AF-103
MP9000	FILTER, AIR CONDITIONING: replaceable type; filtering medium, steel mesh; steel frame; capacity 640 CFM; o/a dim. 16-1/4" x 6"	Air Intake	AD-103-11
MP9001	FILTER, AIR CONDITIONING: replaceable type; filtering medium, steel mesh; steel frame, capacity 640 CFM; o/a dim. 16-7/8" x 7-5/8" x 1/2"	Air Exhaust	AD-103-5
MP9002	Same as MP9000	Air Intake	
MP9003	Same as MP9001	Air Exhaust	
MP9004	SPRING, RETRACTING: o/a dim. 1-1/4" x 2-1/2" x 3-3/4"; spring torque 1.56 lbs. x inch cable load 2 lbs.		AS-116
MP9005	SPRING, RETRACTING: o/a dim. 1-1/4" x 2-1/2" x 3-3/4"; spring torque 1.56 lbs. x inch cable load 2 lbs.		SP-137-2

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
MP9006	Same as MP9005	Cable Retraction	
MP9007	Same as MP9005	Cable Retraction	
MP9008	Same as MP9005	Cable Retraction	
MP9009	Same as MP9005	Cable Retraction	
MP9010	Same as MP9005	Cable Retraction	
MP9011	Same as MP9005	Cable Retraction	
MP9012	Same as MP9004	Cable Retraction	
MP9013	Same as MP9005	Cable Retraction	
MP9014	Same as MP9005	Cable Retraction	
MP9015	Same as MP9005	Cable Retraction	
MP9016	Same as MP9005	Cable Retraction	
MP9017	Same as MP9005	Cable Retraction	
MP9018	Same as MP9005	Cable Retraction	
P9000	CONNECTOR, PLUG, ELECTRICAL: two female contacts; polarized; w/cable clamp; 10 amps, 250 volts, 15 amps, 125 volts. (P/O W9000)	AC Plug	PL-176
P9001	CONNECTOR, PLUG, ELECTRICAL: two half round male contacts; polarized; w/cable clamp; 10 amps, 250 volts, 15 amps, 125 volts; twist lock type, (P/O P9001)	AC Plug	PL-177
P9002	Same as P9001 (supplied as loose items)	AC Plug	
P9003	Same as P9001 (supplied as loose items)	AC Plug	
P9004	CONNECTOR, PLUG, ELECTRICAL: 24 round no. 20 male contacts; straight type	Power	PL-212-3
P9005	CONNECTOR, PLUG, ELECTRICAL: 14 round no. 16 female contacts; straight type	Power	PL-212-2
P9006	CONNECTOR, PLUG, ELECTRICAL: 14 round no. 16 male contacts; straight type	Power	PL-212-1
P9007	Same as P9005	Power	
P9008	Same as P9006 (P/O W9004)	Power	
P9009	Same as P9005 (P/O W9004)	Power	
P9010	Same as P9005 (P/O W9004)	Power	
P9011	Same as P9005 (P/O W9004)	Power	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
P9012	Same as P9006 (P/O W9005)	Power	PL-169
P9013	Same as P9005 (P/O W9005)	Power	
P9014	Same as P9006 (P/O W9006)	Power	
P9015	Same as P9005 (P/O W9006)	Power	
P9016	CONNECTOR, PLUG, ELECTRICAL: RF type; one male contact; straight type (P/O W9011)	Antenna	
P9017	Same as P9016 (P/O W9011)	Antenna	
P9018	Same as P9016 (P/O W9012)	Audio	
P9019	Same as P9016 (P/O W9012)	Audio	
P9020	Same as P9016 (P/O W9013)	Audio	
P9021	Same as P9016 (P/O W9013)	Audio	
P9022	Same as P9016 (P/O W9014)	Audio	
P9023	Same as P9016 (P/O W9014)	Audio	
P9024	Same as P9016 (P/O W9015)	Audio	
P9025	Same as P9016 (P/O W9015)	Audio	
P9026	Same as P9016 (P/O W9016)	250 KC	
P9027	Same as P9016 (P/O W9016)	250 KC	
P9028	Same as P9016 (P/O W9017)	250 KC	
P9029	Same as P9016 (P/O W9017)	250 KC	
P9030	Same as P9016 (P/O W9018)	250 KC, IF	
P9031	Same as P9016 (P/O W9018)	250 KC, IF	
P9032	Same as P9016 (P/O W9019)	250 KC, IF	
P9033	Same as P9016 (P/O W9019)	250 KC, IF	
P9034	Same as P9016 (P/O W9020)	250 KC, IF	
P9035	Same as P9016 (P/O W9020)	250 KC, IF	
P9036	Same as P9016 (P/O W9021)	250 KC	
P9037	Same as P9016 (P/O W9021)	250 KC	
P9038	Same as P9016 (P/O W9022)	250 KC, IF	
P9039	Same as P9016 (P/O W9022)	250 KC, IF	
P9040	Same as P9016 (P/O W9023)	2 MC	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
P9041	Same as P9016 (P/O W9023)	2 MC	
P9042	Same as P9016 (P/O W9024)	2 MC	
P9043	Same as P9016 (P/O W9024)	2 MC	
P9044	Same as P9016 (P/O W9025)	1.75 MC	
P9045	Same as P9016 (P/O W9025)	1/75 MC	
P9046	Same as P9016 (P/O W9026)	Audio	
P9047	Same as P9016 (P/O W9026)	Audio	
P9048	Same as P9016 (P/O W9027)	HFO	
P9049	Same as P9016 (P/O W9027)	HFO	
P9050	Same as P9016 (P/O W9028)	OSC Voltage	
P9051	Same as P9016 (P/O W9028)	OSC Voltage	
P9052	Same as P9016 (P/O W9029)	2 MC Output	
P9053	Same as P9016 (P/O W9029)	2 MC Output	
P9054	Same as P9016 (P/O W9030)	250 KC Output	
P9055	Same as P9016 (P/O W9030)	250 KC Output	
P9056	CONNECTOR, PLUG, ELECTRICAL: RF type; one round male coaxial contact; straight type; series QDS to QDS. (supplied as loose item)	RF	PL-149
P9057	CONNECTOR, PLUG, ELECTRICAL: RF type; one male coaxial contact; straight type; series BNC to BNC (supplied as loose item)	RF	UG-260/U
P9058	Same as P9002 (Supplied as loose item)	RF	
P9059	Same as P9056 (Supplied as loose item)	RF	
P9060	Same as P9057 (Supplied as loose item)	RF	
P9061	Same as P9000 (P/O W9031)	AC	
P9062	Same as P9001 (P/O W9032)	AC	
P9063	Same as P9004 (P/O W9033)	Power	
P9064	Same as P9005 (P/O W9033)	Power	
P9065	Same as P9006 (P/O W9034)	Power	
P9066	Same as P9005 (P/O W9034)	Power	
P9067	Same as P9006 (P/O W9035)	Power	
P9068	Same as P9005 (P/O W9035)	Power	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
P9069	Same as P9006 (P/O W9035)	Power	PL-100
P9070	Same as P9005 (P/O W9035)	Power	
P9071	Same as P9006 (P/O W9036)	Power	
P9072	Same as P9005 (P/O W9036)	Power	
P9073	Same as P9006 (P/O W9037)	Power	
P9074	Same as P9005 (P/O W9037)	Power	
P9075	Same as P9001 (P/O W9038)	AC	
P9076	CONNECTOR, PLUG, ELECTRICAL: twist lock type; two half round female contacts, straight type; w/cable clamp. (P/O W9038)	AC	
P9077	Same as P9016 (P/O W9041)	RF	
P9078	Same as P9016 (P/O W9041)	RF	
P9079	Same as P9016 (P/O W9042)	RF	
P9080	Same as P9016 (P/O W9042)	RF	
P9081	Same as P9016 (P/O W9043)	RF	
P9082	Same as P9016 (P/O W9043)	RF	
P9083	Same as P9016 (P/O W9044)	RF	
P9084	Same as P9016 (P/O W9044)	RF	
P9085	Same as P9016 (P/O W9045)	RF	
P9086	Same as P9016 (P/O W9045)	RF	
P9087	Same as P9016 (P/O W9046)	RF	
P9088	Same as P9016 (P/O W9046)	RF	
P9089	Same as P9016 (P/O W9047)	RF	
P9090	Same as P9016 (P/O W9047)	RF	
P9091	Same as P9016 (P/O W9048)	RF	
P9092	Same as P9016 (P/O W9048)	RF	
P9093	Same as P9016 (P/O W9049)	RF	
P9094	Same as P9016 (P/O W9049)	RF	
P9095	Same as P9016 (P/O W9050)	RF	
P9096	Same as P9016 (P/O W9050)	RF	
P9097	Same as P9016 (P/O W9051)	RF	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
P9098	Same as P9016 (P/O W9051)	RF	
P9099	Same as P9016 (P/O W9052)	RF	
P9100	Same as P9016 (P/O W9052)	RF	
P9101	Same as P9016 (P/O W9053)	RF	
P9102	Same as P9016 (P/O W9053)	RF	
P9103	Same as P9016 (P/O W9054)	RF	
P9104	Same as P9016 (P/O W9054)	RF	
P9105	Same as P9016 (P/O W9055)	RF	
P9106	Same as P9016 (P/O W9055)	RF	
P9107	Same as P9016 (P/O W9056)	RF	
P9108	Same as P9016 (P/O W9056)	RF	
P9109	Same as P9016 (P/O W9057)	RF	
P9110	Same as P9016 (P/O W9057)	RF	
P9111	Same as P9016 (P/O W9058)	RF	
P9112	Same as P9016 (P/O W9058)	RF	
P9113	Same as P9016 (P/O W9059)	RF	
P9114	Same as P9016 (P/O W9059)	RF	
P9115	Same as P9016 (P/O W9060)	RF	
P9116	Same as P9016 (P/O W9060)	RF	
P9117	Same as P9016 (P/O W9061)	RF	
P9118	Same as P9016 (P/O W9061)	RF	
P9119	Same as P9016 (P/O W9062)	RF	
P9120	Same as P9016 (P/O W9062)	RF	
TB9000	TERMINAL BOARD: barrier type; 5 double screw terminals, 6-32 thd; phenolic body	Blower Connect	TM-102-5
TB9001	TERMINAL BOARD: barrier type; 16 single screw terminals and feedthru solder lugs, 6-32 thd; phenolic body	Receiver Inter-connect	TM-100-16
TB9002	Same as TB9000	Blower Connect	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
W9000	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of, one connector, symbol no. P9000; three terminal lugs; 72" of three no. 16 AWG conductors, rubber cover	AF-103 to HFP	CA-696-1
W9001	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of, one connector, symbol no. P9001; two terminal lugs; 54" of two no. 20 AWG conductors; rubber cover	AX-390 to HFP	CA-706-1
W9002	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, 68" of various colored insulated stranded cable, MIL type MCW wire, one each of connectors, PL-212-2, PL-212-3, symbols P9004, P9005	HFP to HFA	CA-686-1
W9003	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, 76" of various colored insulated stranded cable, MIL type MWC wire; one each of connectors, PL-212-1, PL-212-2, symbols P9006, P9007	HFP to HNF	CA-687-1
W9004	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL BRANCHED: consists of various lengths and colors of insulated stranded cable, MIL type MWC wire; two connectors, PL-212-1, PL-212-2, symbol no's., P9008, P9009, P9010, P9011	HFP to HFS and HFR	CA-704
W9005	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: consists of, 81" of various colors of insulated stranded cable, MIL type MWC wire; two connectors, PL-212-1, PL-212-2, symbol no's., P9012, P9013	HFP to AFC	CA-687-2
W9006	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL, BRANCHED: consists of, various lengths and colors of insulated stranded cable, MIL type MWC wire; two connectors; PL-212-1, PL-212-2; symbol no's., P9014, P9015	HFP to HFA, HFI, HSP, HSS	CA-703
W9007	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of, 6 terminal lugs; 66" of 6 size 16 AWG conductors; rubber cover	HFP to AF-103	CA-718
W9008	CABLE ASSEMBLY, POWER, ELECTRICAL: consists of, 100" of various colored insulated wire; MIL type MWC; one terminal board TM-105-16AL; symbol no. E9001	HSP to A-3083	CA-705-1
W9009	LEAD, ELECTRICAL: consists of, 54" of braided wire; two terminal lugs	HFR to Ground	CA-412-34-54.00
W9010	Same as W9009	HFS to Ground	
W9011	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 160" of RF cable, RG-174/U; and two PL-169 connectors, symbol no's., P9016 P9017	HFR to A-3083 Output	CA-480-3-160

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
W9012	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 72" of RF cable, RG-174/U; and two PL-169 connectors, symbol no's., P9018, P9019	HFA to HAF, Channel A	CA-480-3-72
W9013	Same as W9012. Consists of P9020, P9021	HFA to HAF, Channel A	
W9014	Same as W9012. Consists of P9022, P9023	HFA to HAF, Channel B	
W9015	Same as W9012. Consists of P9024, P9025	HFA to HAF, Channel B	
W9016	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 140" of RF cable, RG-174/U; and two PL-169 connectors, symbol no's., P9026, P9027	HFS to HFA, 250 KC	CA-480-3-140
W9017	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 97" of RF cable, RG-174/U; and two PL-169 connectors, symbol no's., P9028, P9029	AFC to HFA, 250 KC	CA-480-3-97
W9018	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 112" of RF cable, RG-174/U; and two connectors PL-169, symbol no's., P9030, P9031	HFI to HFA, 250 KC Ch. B	CA-480-3-112
W9019	Same as W9018. Consists of P9032, P9033	HFI to HFA 250 KC, Ch. A	
W9020	Same as W9017. Consists of P9034, P9035	HFI to HNF 250 KC, Ch. A,B	
W9021	Same as W9017. Consists of P9036, P9037	HNF to HFI 250 KC, Ch. A,B	
W9022	CABLE ASSEMBLY, RADIO FREQUENCY: consists of, 90" of RF cable, RG-174/U; and two connectors PL-169, symbol no's., P9038, P9039	HFI to AFC, 250 KC, Ch. A,B	
W9023	Same as W9022. Consists of P9040, P9041	HFI to AFC, 2 MC Converter	
W9024	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 128" of RF cable, RG-174/U; and two connectors PL-169, symbol no's., P9042, P9043	HFS to HFI, 2 MC Converter	CA-480-3-128
W9025	Same as W9018. Consists of P9044, P9045	HFR to HFI, 1.75 MC	
W9026	Same as W9016. Consists of P9046, P9047	HFS to HFA, AF Sync. Tone	
W9027	Same as W9018. Consists of P9048, P9049	HFR to HFS, HFO output	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
W9028	Same as W9024. Consists of P9050, P9051	HFS to HFR, Osc. Control	
W9029	Same as W9024. Consists of P9052, P9053	HFS to HFR, 2 MC Output	
W9030	Same as W9018. Consists of P9054, P9055	HFS to HFR, 250 KC Output	
W9031	Same as W9000. Consists of P9061	AF-103 to HFP	
W9032	Same as W9001. Consists of P9062	AX-390 to HFP	
W9033	Same as W9002. Consists of P9063, P9064	HFP to HFA	
W9034	Same as W9003. Consists of P9065, P9066	HFP to HNF	
W9035	Same as W9004. Consists of P9067, P9068, P9069, P9070	HFP to HFS and HFR	
W9036	Same as W9005. Consists of P9071, P9072	HFP to AFC	
W9037	Same as W9006. Consists of E9002, P9037, P9074	HFP to HFA, HFI, HSP, HSS	
W9038	CABLE ASSEMBLY, POWER ELECTRICAL: consists of two connectors, one male and one female, symbol no's., P9075, P9076; 112" of three size 18 AWG conductors	DVM to HFP	CA-701-1
W9039	Same as W9009	HFR to Ground	
W9040	Same as W9009	HFS to Ground	
W9041	Same as W9018. Consists of P9077, P9078	HFR to A-3083 Output	
W9042	Same as W9012. Consists of P9079, P9080	HFA to HAF, Channel A	
W9043	Same as W9012. Consists of P9081, P9082	HFA to HAF, Channel A	
W9044	Same as W9012. Consists of P9083, P9084	HFA to HAF, Channel B	
W9045	Same as W9012. Consists of P9085, P9086	HFA to HAF, Channel B	
W9046	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 170" of RF cable, RG-174/U; and two connectors PL-169, symbol no's., P9087, P9088	HFS to HFA, 250 KC	CA-480-3-170
W9047	Same as W9017. Consists of P9089, P9090	AFC to HFA, 250 KC	
W9048	Same as W9018. Consists of P9091, P9092	HFI to HFA, 250 KC, Ch. B	

PARTS LIST (CONT'D)

RAK-22A1

SYM	DESCRIPTION	FUNCTION	TMC PART NO.
W9049	Same as W9018. Consists of P9093, P9094	HFI to HFA, 250 KC, Ch. A	CA-480-3-150
W9050	Same as W9017. Consists of P9095, P9096	HFI to HNF, 250 KC, Ch. A, B	
W9051	Same as W9017. Consists of P9097, P9098	HFN to HFI, 250 KC, Ch. A, B	
W9052	Same as W9022. Consists of P9099, P9100	HFI to AFC, 250 KC, Ch. A, B	
W9053	Same as W9022. Consists of P9101, P9102	HFI to AFC, 2 MC Converter	
W9054	CABLE ASSEMBLY, RADIO FREQUENCY: consists of 150" of RF cable, RG-174/U; and two connectors PL-169, symbol no's., P9103, P9104	HFS to HFI, 2 MC Converter	
W9055	Same as W9018. Consists of P9105, P9106	HFR to HFI, 1.75 MC	
W9056	Same as W9016. Consists of P9107, P9108	HFS to HFR, 2 MC Output	
W9057	Same as W9016. Consists of P9109, P9110	HFS to HFR, 250 KC Output	
W9058	Same as W9054. Consists of P9111, P9112	HFR to HFR, Isol. Amp. Out	
W9059	Same as W9054. Consists of P9113, P9114	HFA to DVM, IF Out, Ch. A	
W9060	Same as W9054. Consists of P9115, P9116	HFA to DVM, IF Out, Ch. B	
W9061	Same as W9016. Consists of P9117, P9118	HFA to DVM, IF Out, Ch. A	
W9062	Same as W9016. Consists of P9119, P9120	HFA to DVM, IF Out, Ch. B	
W9063	LEAD, ELECTRICAL: consists of 34" of braided wire; two terminal lugs	AFC-3 to Ground	
W9064	Same as W9063	AFC-3 to Ground	

SECTION 7 SCHEMATIC DIAGRAMS

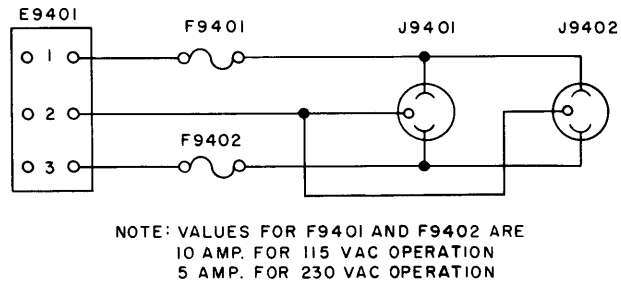


Figure 7-1. Power Panel, HPP-1, Schematic Diagram

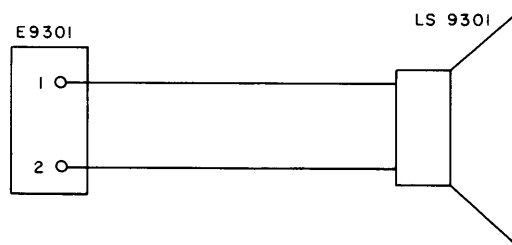


Figure 7-2. Speaker Panel, HSS-1, Schematic Diagram

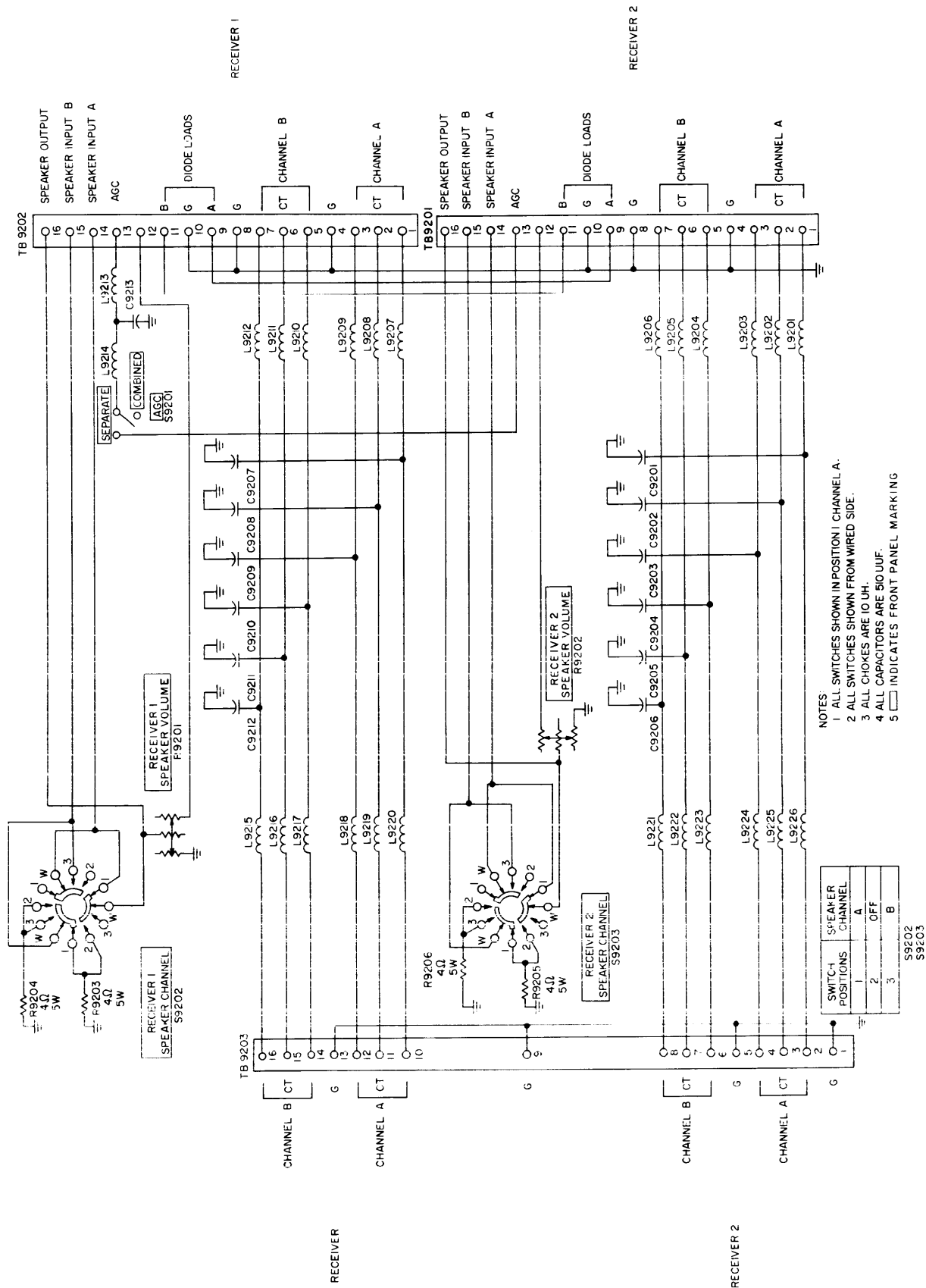


Figure 7-3. Audio Switch Panel, HSP-2, Schematic Diagram