

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

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OPERATOR AND ORGANIZATION MAINTENANCE MANUAL  
INCLUDING REPAIR PARTS AND SPECIAL TOOL LISTS

RECEIVING SET,

RADIO

AN/FRR-79

(NSN 5820-00-937-2887)

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This copy is a reprint which includes current pages from Changes 1 through 4. The title was changed by Change 4.

**WARNING**

Be careful when working on the 115- or 230-volt ac connections. Serious injury or DEATH may result from contact with these terminals.

## **WARNINGS**

### **DANGEROUS CHEMICALS ARE USED IN NICKEL-CADMIUM BATTERIES**

The electrolyte used in nickel-cadmium batteries contains potassium hydroxide (KOH), which is a caustic chemical agent. Serious and deep burns of body tissue will result if the electrolyte comes in contact with the eyes or any part of the body. Use rubber gloves, rubber apron, and protective goggles when handling the electrolyte. If accidental contact with the electrolyte is made, use **ONLY** clean water and immediately (seconds count) flush contaminated areas. Continue flushing with large quantities of clean water for at least 15 minutes. Seek medical attention without delay.

### **EXPLOSIVE GASES ARE GENERATED BY NICKEL-CADMIUM BATTERIES**

Hydrogen and oxygen gases are generated in explosive proportions while the nickel-cadmium battery is being charged. Charge the nickel-cadmium battery in a well-ventilated area to reduce concentrations of explosive gases. Turn off the battery charger before connecting or disconnecting the nickel-cadmium battery to prevent arcing. Do not use matches or an open flame in the charging area. Arcs, flames, or sparks in the charging area will ignite the gases and cause an explosion. The battery box cover must be removed and the battery case vent plug (if used) must be open when charging.

### **DO NOT MIX SULPHURIC ACID AND KOH**

The electrolyte used in nickel-cadmium batteries reacts violently to the sulphuric acid used in the more common lead-acid types of batteries. **DO NOT** add sulphuric and electrolyte to the battery; the mixing of the acid and KOH electrolytes will cause a violent reaction which could result in the splattering of the mixture into the eyes and onto the skin.

### **ADEQUATE VENTILATION IS NECESSARY**

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

TECHNICAL MANUAL

No. 11-5820-601-12



HEADQUARTERS  
DEPARTMENT OF THE ARMY  
WASHINGTON, D.C., 27December 1968

**Operator's and Organizational Maintenance Manual**

**RECEIVING SET, RADIO AN/FRR-79**

**(NSN 5820-00-937-2887)**

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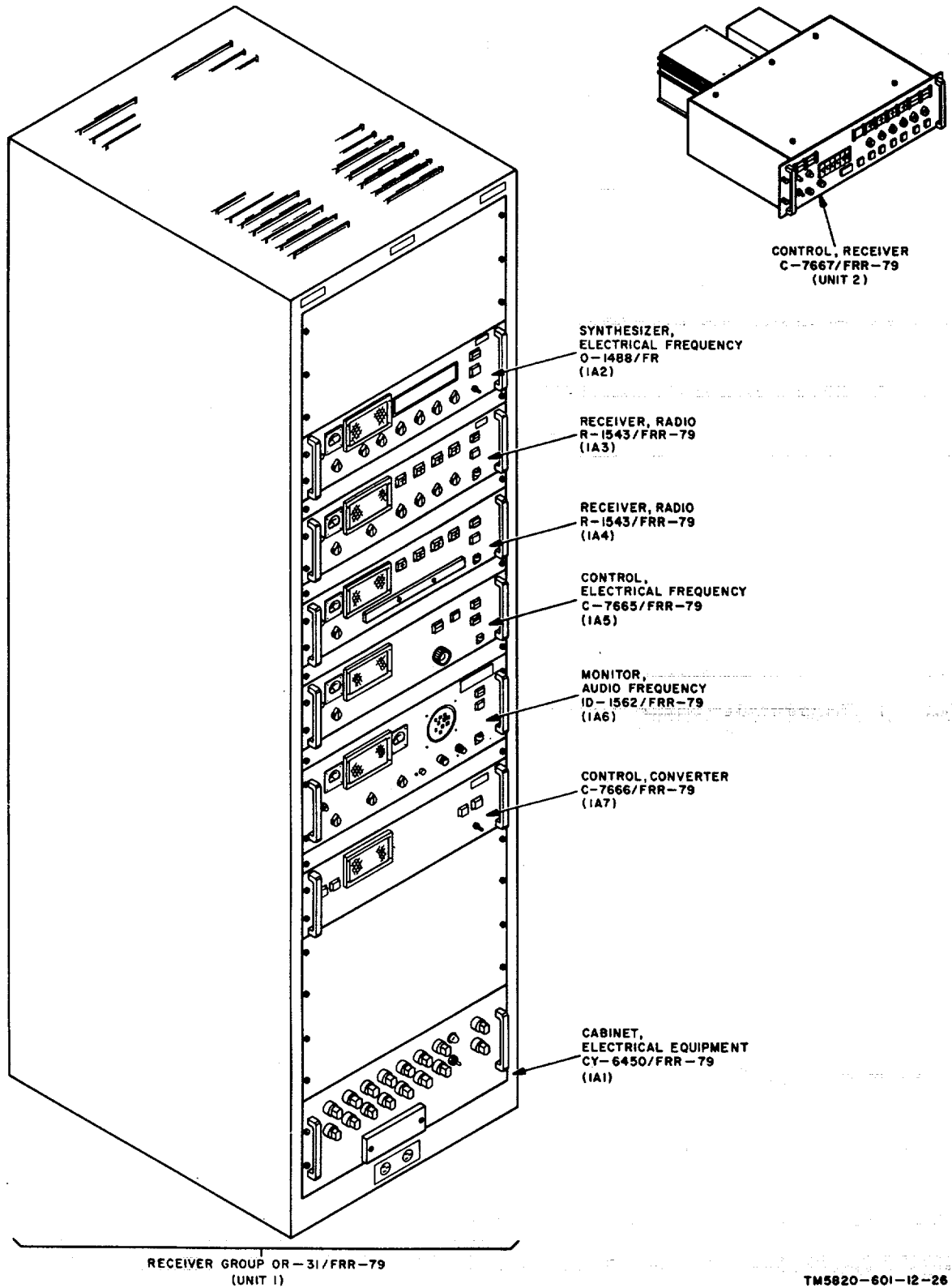


Figure 1-1. Receiving Set, Radio AN/FRR-79.

## CHAPTER 1

## INTRODUCTION

## Section I. GENERAL

**1-1. Scope**

This manual describes Receiving Set, Radio AN/FRR-79 (fig. 1-1), and covers its installation, operation, and operator and organizational maintenance for the equipment. It includes cleaning and inspection of the equipment and replacement of running spares available to operator and organizational maintenance personnel.

**1-2. Indexes of Publications**

*a. DA Pam 310-4.* Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

*b. DA Pam 310-7.* Refer to the latest issue of DA Pam 310-7 to determine if there are modification work orders (MWO's) pertaining to the equipment.

**1-3. Maintenance Forms, Records, and Reports**

*a. Reports of Maintenance and Unsatisfactory Equipment.* Department of the Army forms and procedures used for equipment maintenance will be those described by TM 38-750, The Army Maintenance Management System.

*b. Report of Packaging and Handling Deficiencies.* Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A and DLAR 4145.8.

*c. Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 351) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610..19C and DLAR 4500.15.

**1-3.1 Reporting Errors and Recommending Improvements**

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

**1-3.2. Reporting Equipment Improvement Recommendations (EIR)**

If your AN/FRR-79 needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to Commander, US Army Communications and Electronics Materiel Readiness Command, AT-TN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703. We'll send you a reply.

**1-3.3 Administrative Storage**

Before and after administrative storage (1 to 45days), perform the procedures in paragraph 6-2.

## Section II. DESCRIPTION AND DATA

**1-4. Purpose and Use**

*a. Purpose.* Receiving Set, Radio AN/FRR-79 (receiving set) is a self-contained, high frequency, remote or local controlled, independent sideband receiving system. It is intended for general purpose, fixed ground station operation. The receiving set is used in conjunction with other communications equipment (telephone, teletypewriter, facsimile, and data) normally provided at a communications or signal center, and receives transmissions in the frequency range from 2 to 29.9999 Megahertz (MHz) containing up to four separate intelligence channels, or up to 64 separate data channels. Space diversity operation, utilizing two antennas, is used.

*b. Use (fig. 1-2).* Receiving Set, Radio AN/FRR-79 is used as the link between a distant compatible transmitter and station communications equipment.

*(1) Transmitting station.* Four independent 3-kilohertz (KHz) wide audio channels containing voice or data signals are converted to a frequency-multiplexed, amplitude-modulated RF signal in the

frequency range from 2 to 29.9999 MHz. The modulated radio frequency (RF) signal is amplified and applied to a transmitting antenna. The antenna radiates the RF signal to the receiving station.

(2) *Receiving station.* A typical receiving station which uses Receiving Set, Radio AN/FRR-79 consists of Receiver Group OR-31/FRR-79, unit 1, being fed by two separate high frequency (HF) broadband rhombic antennas spaced a minimum of two wavelengths apart. Control, Receiver C-7667/FRR-79, unit 2, located at a remote site, is connected to the OR-31/FRR-79 through a full duplex control data circuit. The received RF signals are fed to the OR-31/FRR-79 from the station antennas, and simultaneously applied to Receiver, Radio R-

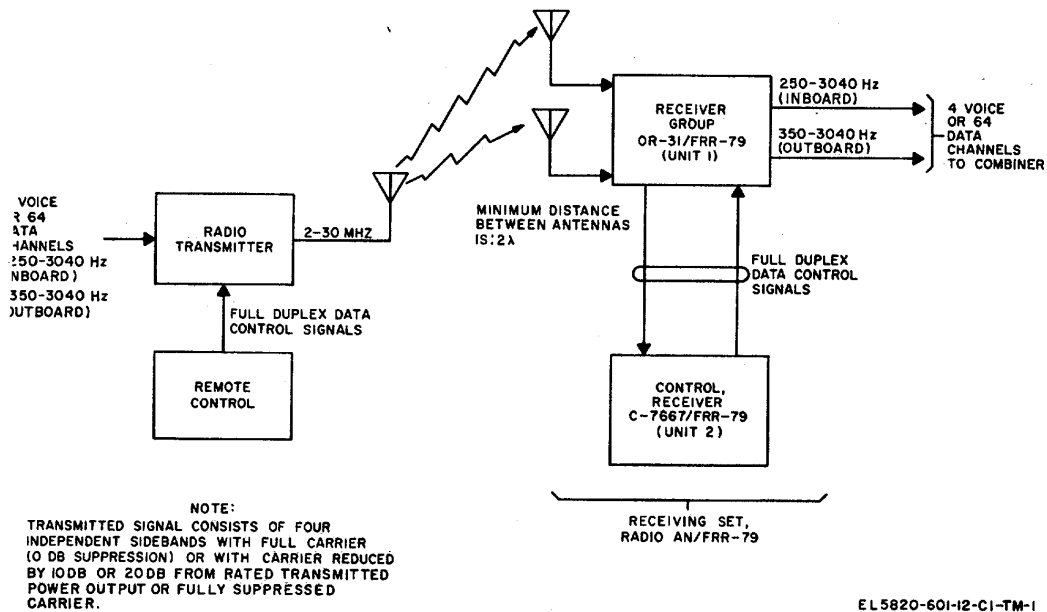


Figure 1-2. Receiving Set, Radio AN/FRR-79, system tie-n.

1543/FRR-79 (main and diversity receivers) in Cabinet, Electrical Equipment CY-6450/FRR-79. Synthesizer, Electrical Frequency 0-1488/FR, a highly stable synthesizer, is used to tune the main and diversity receivers and provide them with carrier reinsertion demodulation frequencies. Control, Electrical Frequency C-7665/FRR-79 compensates for a drifting signal, provided the transmitted carrier is not suppressed more than 20 decibels (db) from the sideband signal. The OR-31/FRR-79 is equipped with Monitor, Audio Frequency ID-1562/FRR-79 which provides audible and metered outputs from any of the four channel pairs (four channels each from the main and diversity receivers). The audio outputs of the OR-31/FRR-79 are routed to an external combiner through station interconnecting cables. The OR-31/FRR-79 can be remotely operated by Control, Receiver C-7667/FRR-79. From a remote position, the operator can perform many of the functions normally available to the operator of the CY-6450/FRR-79.

**1-5. Technical Characteristics**

*a. Receiving Set, Radio AN/FRR-79.*

Frequency range .....2 to 29.9999 MHz.  
Frequency selection ....By selection of synthesizer frequency only.

Tuning.....	10 seconds maximum (auto mode).
RF input impedance ....	50 ohms.
Input vswr .....	2.5 to 1 maximum.
Audio output tolerance and range.....	±0.5 db over range of 250 to 3, 040 Hz for channels A1 and B1, and 350 to 3, 040 Hz for channels A2 and B2 variable from -30 to +10 dbm.
Spurious response tolerance .....	10 db (minimum) below output reference level at 0.5-microvolt sensitivity (10 db S + N/M).
Image rejection .....	100 db (minimum) referred to 1 microvolt.
IF rejection .....	100 db (minimum) referred to 1 microvolt.
Overall intermodulation distortion (2nd and 3rd harmonics, and higher) .....	55 db (minimum) below reference audio output (1, 000 Hz at 0 dbm) with two equal amplitude RF signals at the input. R-1543/FRR-79 meets requirement with any input from 2 to 200, 000 microvolts when tuned from 2 to 29.9999 MHz.



Output noise quieting .....	At maximum R-1543/FRR-79 sensitivity, and with signal plus noise-to-noise ratio at output of 10 db, output signal-to-noise ratio increases linearly with linear increase of input signal until signal plus noise-to-noise ratio is at least 60 db. Linearity is 90%.	Primary power requirements.....	115 or 230 volts + 10 percent, 47.5 to 440 Hz at 600 volt-amperes (maximum).
Channel age time constants:		IF frequency stability:	
Vfct .....	20-millisecond attack time; 100 millisecond release time.	Short term .....	+ 1 part in 108 from 1 microsecond to 24 hours on all frequencies.
Analog voice .....	40-millisecond attack time; 2-second release time.	Long term .....	5 parts in 108 for 7 days on all frequencies.
High-speed data ..	200-millisecond attack and release time.	External frequency .....	1 MHz at 1 volt rms. Harmonic and spurious
Age range .....	Output does not vary more than + 1.0 db, while input varies 120 db (minimum) down from	output.....	10 db (min) below maximum sensitivity.
Sensitivity .....	0.5 microvolt for 19-db signal + noise-to-noise ratio.	Afc excursion range .....	+ 2 kHz.
Audio output impedance .....	600 ohms balanced with return loss of 26 db from 370 to 3,040 Hz.	Afc tracking rate .....	100 Hz/sec <sup>2</sup> .
Audio output level .....	0 dbm (nominal).	Afc translation error .....	Less than + 2 Hz.
Audio output range .....	Controllable from + 10 to - 30 dbm.	Afc capture range .....	+ 55 Hz.
Audio output balance .....	Each audio output is balanced with respect to ground so that longitudinal currents are suppressed at least 40 db at any output level from + 10 to - 30 dbm.	<i>b. Full Duplex Control Data Circuit.</i>	
Number of audio channels .....	4 each for main and diversity receivers.	Control data transmission rate .....	75-baud, nine-unit, seven-level, start-stop telegraph signals.
Audio output response characteristics:		Type .....	60 or 20 ma (strap-selected) neutral telegraph loop.
Overall R-1543/FRR-79 pass-band .....	12 KHz (approx).	External loop supply battery .....	130 volts dc, nominal (150 volts de maximum). Loop keying output
Channel band-pass .....	2, 790 + 10 Hz for A1 and B1 channels. 2, 690 + 10 Hz for A2 and B2 channels.	impedance .....	260 ohms + 10% in mark condition; 100K ohms minimum in space condition.
		Input impedance .....	200 ohms maximum.
		Command control lines .....	Multiple parallel-output lines provide R-1543/FRR-79 control signals derived from commands stored in R-1543/FRR-79 control memory. Control line states are normally changed only by control commands from C-7667/FRR-79.
		R-1543/FRR-79 status lines .....	Multiple parallel-input lines provide R-1543/FRR-79 status data to R--1543/FRR-79 control.

**1-6. Items Comprising an Operable Receiving Set, Radio AN/FRR-79**

FSN	QTY	<i>Nomenclature, part no., and mfr code</i>
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NOTE

The part number is followed by the applicable five digit Federal supply code for manufacturers or distributor or Government agency, etc., which is identified in SB 708-42.

5820-998-6088	1	CABINET, ELECTRICAL EQUIPMENT CY 6450/GRR-79: p/n 20006 510A3-1; 97983 (This item is nonexpandable)
5820-998-6090	1	CONTROL CONVERTER C 7666/FRR-79: p/n 20006-200A1-1 (This item is nonexpandable)

<i>FSN</i>	<i>QTY</i>	<i>Nomenclature, part no., and mfr code</i>
5820-998-6094	1	CONTROL, ELECTRICAL FREQUENCY C-7665/FRR79: p/n 20006-100A4-1; 97983 (This item is nonexpendable)
5820-998-6092	1	CONTROL, RECEIVER C-7667/FRR79: p/n 20006-200A4-1 (This item is nonexpendable)
5820-886-1668	1	MONITOR, AUDIO FREQUENCY ID-1562/FRR-79: p/n 20006-100A3-1; 97983 (This item is nonexpendable)
5820-998-6095	1	RECEIVER GROUP OR31/FRR-79: p/n 20006-700A2; 97983 (This item is nonexpendable)
5820-998-6097	2	RECEIVER, RADIO R-1543/FRR-79: p/n 20006-100A1-1 (This item is nonexpendable)
5820-883-8319	1	SYNTHESIZER, ELECTRONIC FREQUENCY 0-1488/FR; p/n 20006-900A1-1; 97983 (This item is nonexpendable)

**1-6.1. Components and Dimensions**

The components and dimensions of Receiving Set, Radio AN/FRR-79 (figs. 1-3 through 1-8) are listed in the chart below.

<i>Quantity</i>	<i>Item</i>	<i>Dimensions (in.)</i>			<i>Weight (lb)</i>
		<i>Height</i>	<i>Depth</i>	<i>Width</i>	
1	Receiver Group OR-31/FRR-79.....	84	28	22 3/8	600
1	Cabinet, Electrical Equipment CY-6450/FRR-79.....	84	28	22 3/8	325
1	Synthesizer, Electrical Frequency 0-1488/FR.....	5 1/4	21 1/2	19	0
2	Receiver, Radio R-1543/FRR-79.....	5 1/4	20 1/2	19	50
1	Control, Electrical Frequency C-7665/FRR-79.....	5 1/4	20 1/2	19	30
1	Monitor, Audio Frequency ID-1562/FRR-79.....	7	20 1/2	19	0
	Control Converter C-7666/FRR-79.....	5 1/4	20 1/2	19	30
	Control, Receiver C-7667/FRR79.....	5 1/4	20 1/2	19	26

**1-7. Common Names**

(fig. 1-1)

A list of the common names assigned to the components of Receiving Set, Radio AN/FRR-79 is given in the chart below.

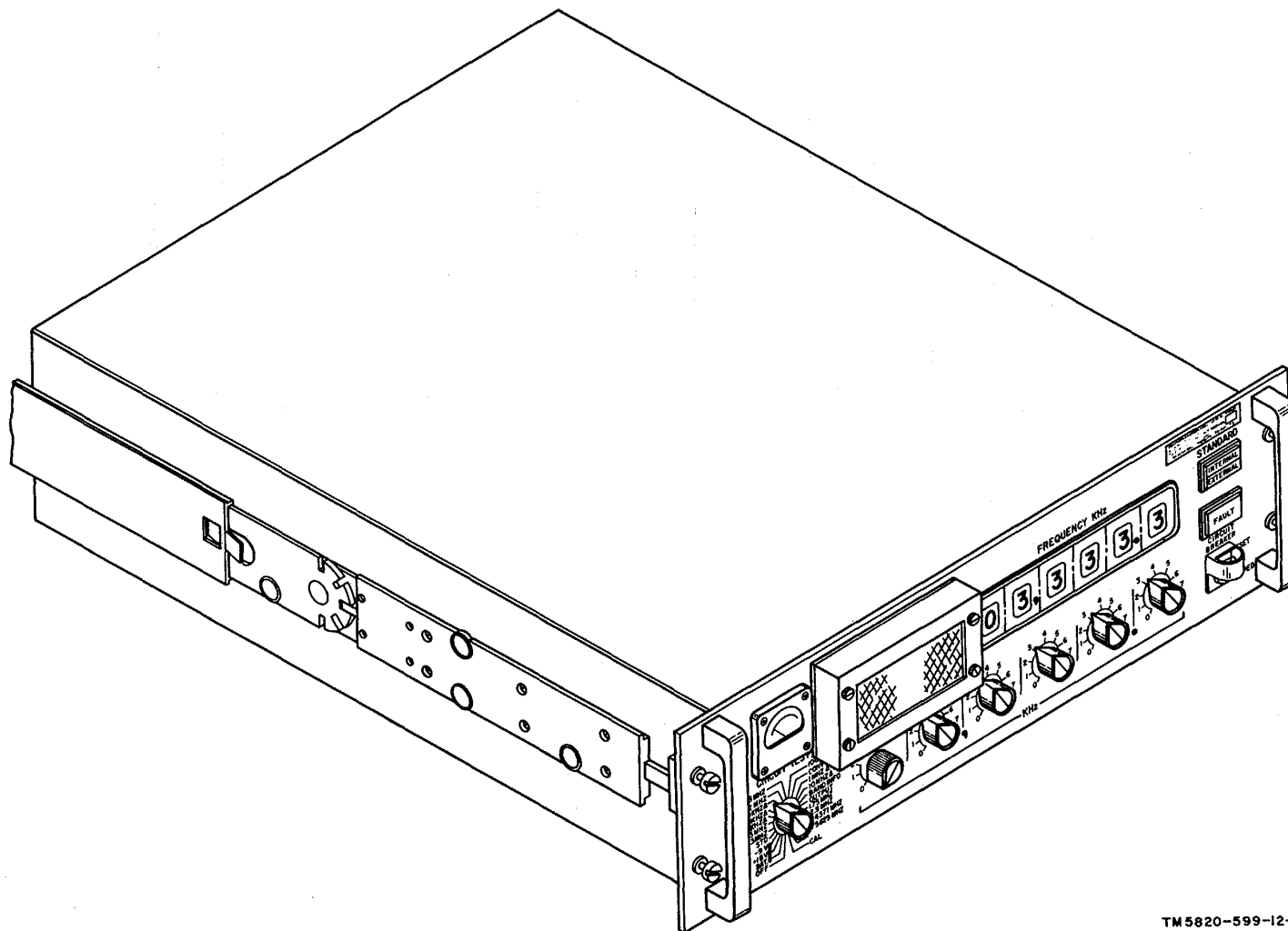
<i>Reference designation</i>	<i>Nomenclature</i>	<i>Common name</i>
1.....	Receiver Group OR-31/FRR-79.....	Receiver group.
1A1.....	Cabinet, Electrical Equipment CY-6450/FRR-79..	Electrical equipment cabinet.
1A2.....	Synthesizer, Electrical Frequency 0-1488-FR.....	Synthesizer.
1A3, 1A4.....	Receiver, Radio R-1543/FRR79.....	Main receiver or diversity receiver.
1A5.....	Control, Electrical Frequency C-7665/FRR-79....	Automatic frequency control.
1A6.....	Monitor, Audio Frequency ID-1562/FRR79.....	Audio monitor.
1A7.....	Control, Converter C-7666/FRR-79.....	Control converter.
2.....	Control, Receiver C-7667/FRR-79.....	Remote control.

**1-8. Description of Receiving Set, Radio AN/FRR-79**

(fig. 1-10)

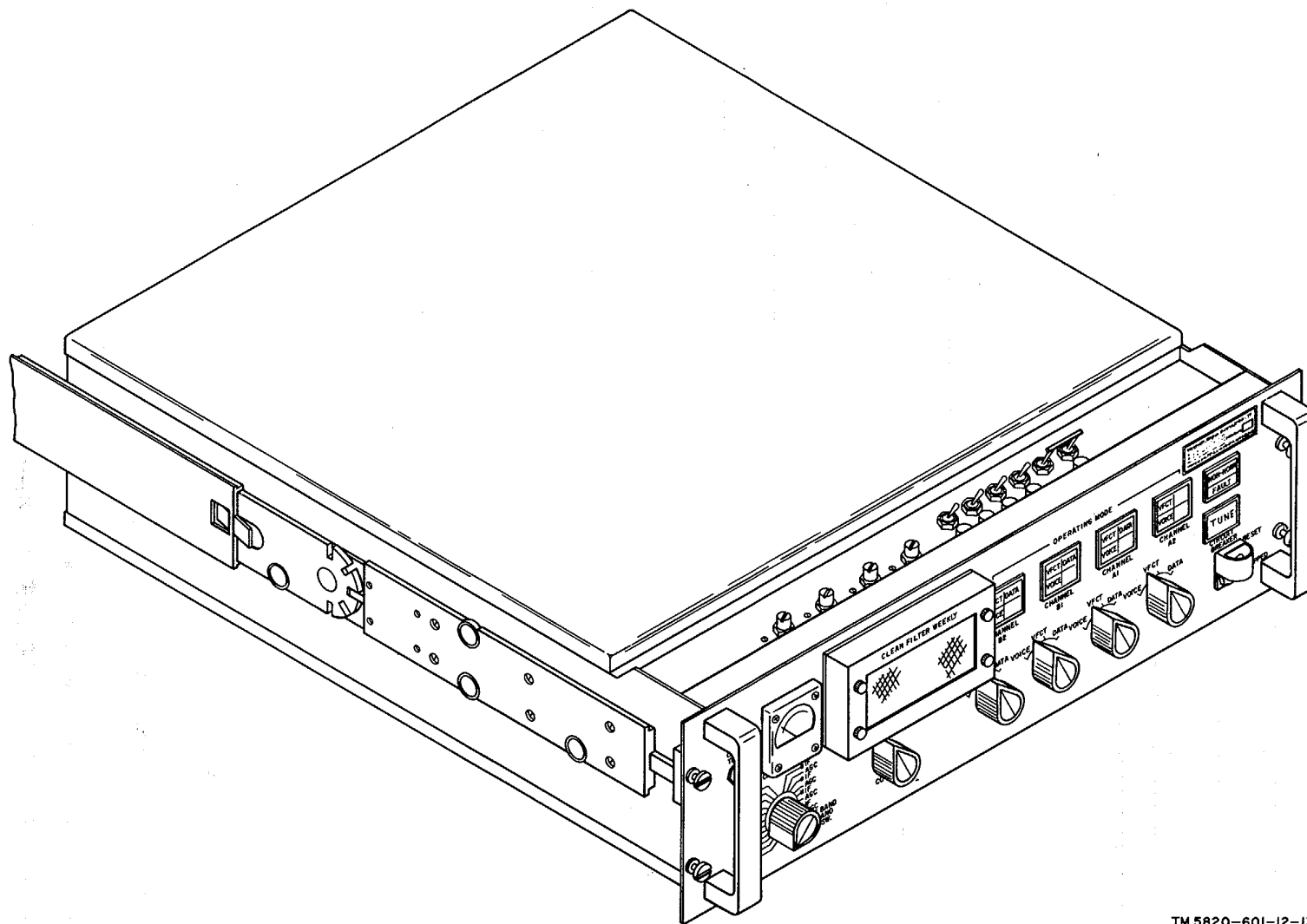
a. Receiving Set, Radio AN/FRR-79 comprises two units: Receiver Group OR-31/FRR-79 (receiver group, unit 1) and Control, Receiver C-7667/FRR-79 (remote control, unit 2). The receiver group consists of six major components and three minor components which are housed in Cabinet, Electrical Equipment CY-6450/FRR-79. The remote control consists of a single chassis assembly with a front control panel and protective cover (fig. 1-8). When used, the remote control is connected to the receiver group through a full duplex control data circuit, and provides the remote operator with capability to control and monitor operation of the receiver group.

b. The functional relationship of the units and components of the receiving set are shown in figure 1-10. The RF signals from the main and diversity antennas are connected to the receiver group at the data distribution panel at the rear of the electrical equipment cabinet (fig. 1-12). The received signals are fed through antenna protectors and routed to the



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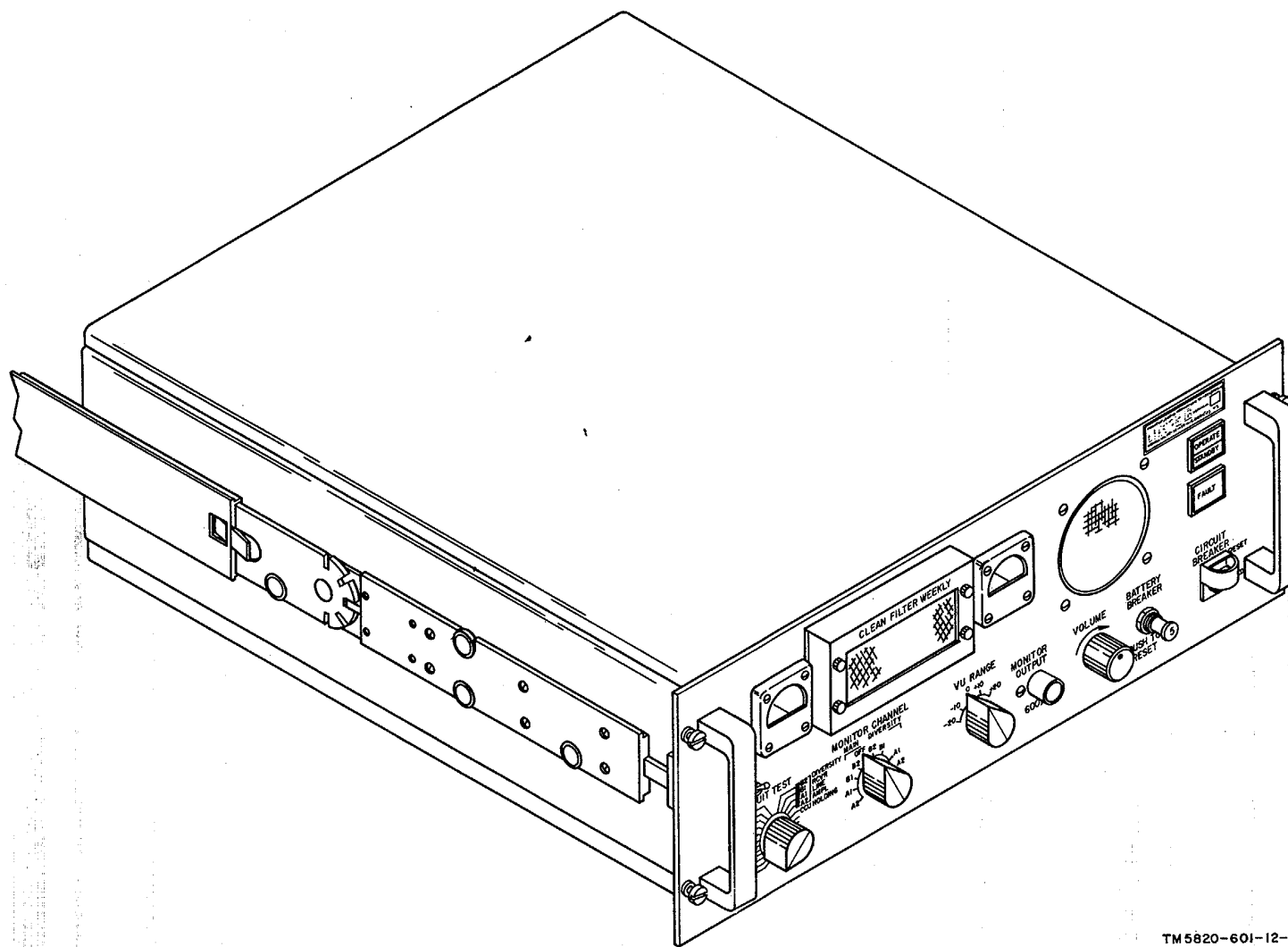
Figure 1-3. Synthesizer, Electrical Frequency 0-1488/FR.



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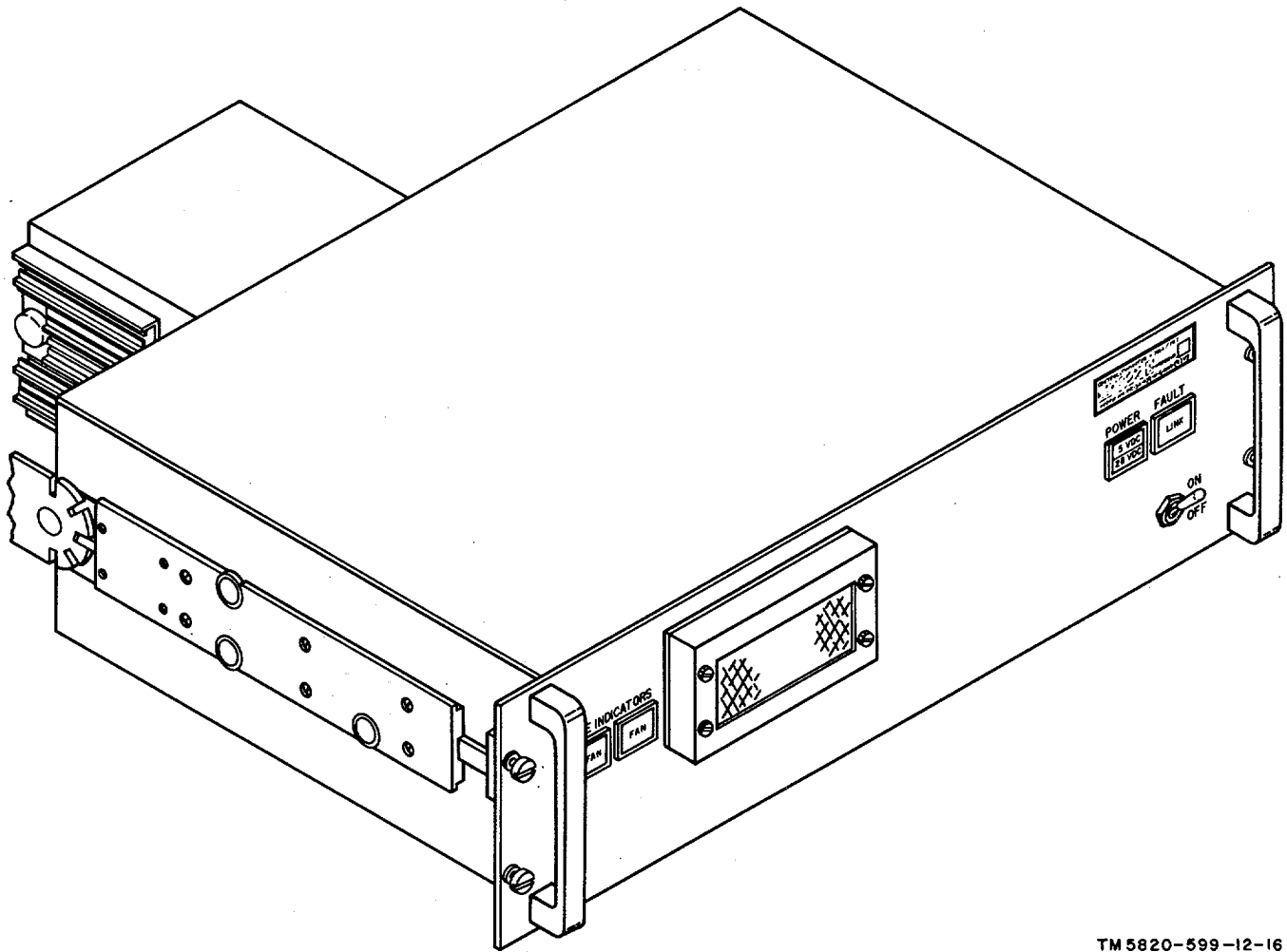
Figure 1-4. Receiver, Radio R-1543/FRR-79.





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Figure 1-6. Monitor, Audio Frequency ID-1562/FRR-79.



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Figure 1-7. Control Converter C-7666/FRR-79.

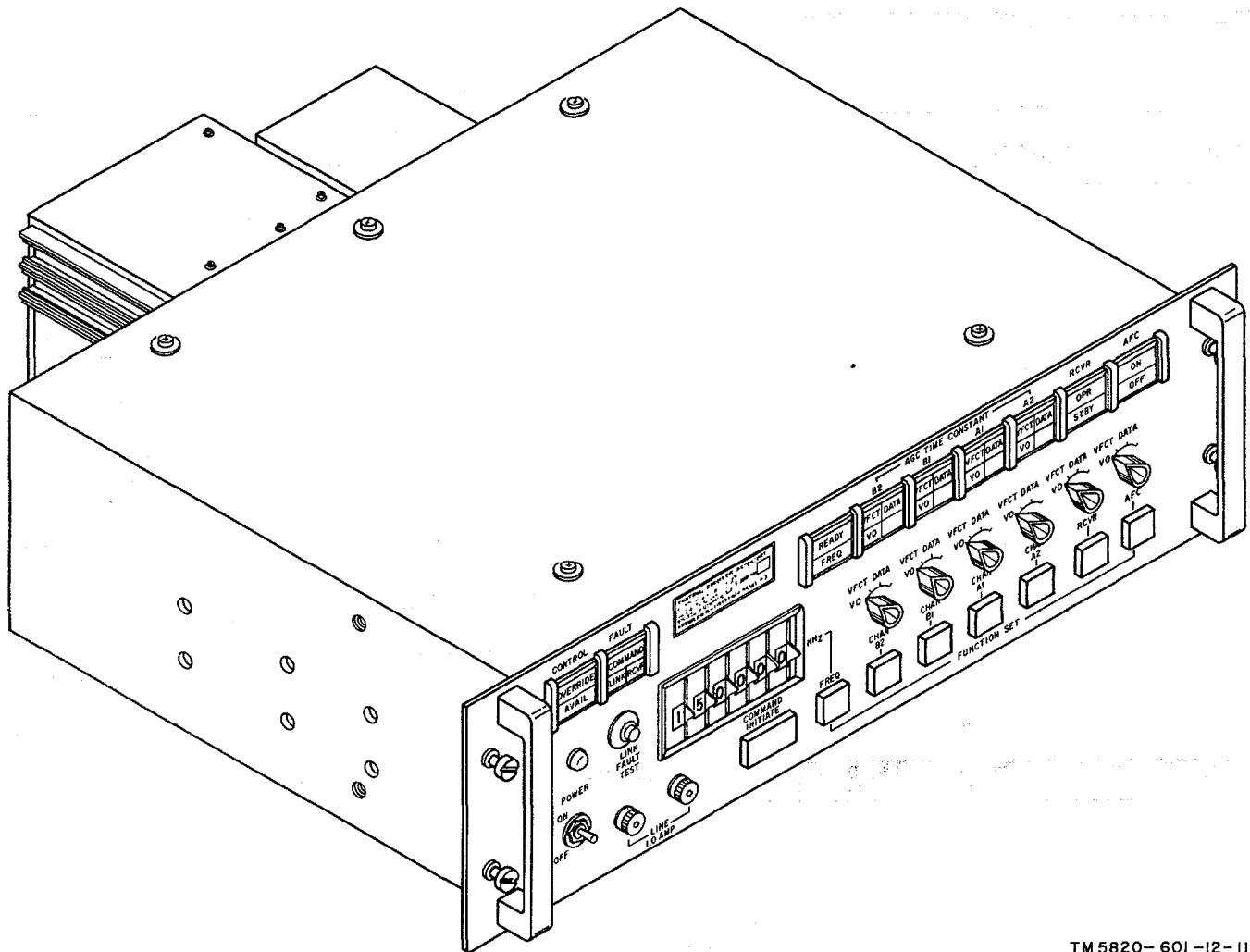
main receiver and diversity receiver. In each receiver, the RF signal is demodulated, separated into four independent audio channels, and amplified and fed to the audio monitor. The audio monitor provides amplification for all channels (four each from the main and diversity receivers) and facilities to permit the audible and visual monitoring of individual channels. The audio monitor also provides for manual operate-standby power control of the equipment, and supplies standby or emergency power to the major components of the receiver group. The four main and four diversity audio channel signals are routed from the audio monitor to terminal boards on the data distribution panel (fig. 1-12). The data distribution panel is the interface between the receiver group and the station facilities control.

#### 1-9. Description of Receiver Group OR-31/FRR-79

*a. Electrical Equipment Cabinet* (fig. 1-11). The steel electrical equipment cabinet weighs approximately 200 pounds without components, and is equipped with mounting rails to accept standard 19-inch panel assemblies. A removable door is flush with the rear of the electrical equipment cabinet and is secured by a latch. The top of the electrical equipment cabinet is louvered and serves as an air exhaust.

#### WARNING

The electrical equipment cabinet must be secured to the building floor by mounting bolts. Failure to do so may cause the electrical equipment cabinet



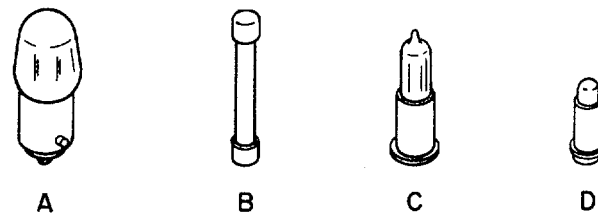
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Figure 1-8. Control, Receiver C-7667/FRR-79.

to overturn if all components are extended on their slides at the same time.

Four holes, at each corner of the baseplate, are used to accommodate mounting hardware. A 6- by 12-inch cutout is provided in the electrical equipment cabinet baseplate to permit entry of interconnecting cables. Cables can also enter the electrical equipment cabinet through holes at the top or rear (below the access door), depending on installation requirements; the preferred method is to run cables through the bottom plate. All major components of the receiver group, including the synthesizer, main and diversity receivers, automatic frequency control, audio monitor, and control converter, are mounted on ball bearing-type tiltable slides. Each component can be withdrawn from the front of the electrical equipment cabinet by loosening the four captive fasteners on the front panel and pulling forward. The component may be completely removed by disconnecting all cables and the retractor link, and by depressing the V-latch located on each side of the securing slides (fig. 1-11). A cable retractor at each mounting position supports the cables during withdrawal of the component from the electrical equipment cabinet. The 1 7/8-inch filler panels, located between component front panels, should be removed before removal.





## LEGEND:

- A. LAMP, GLOW, 5240-682-3411.
- B. FUSE, CARTRIDGE, 5920-296-1517.
- C. LAMP, GLOW, 8EC4
- D. LAMP, INCANDESCENT, 6240-155-7857,  
6240-155-7836, 6240-940-7070.

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Figure 1-9. Running spares.

ing any component. Each component, except the audio monitor, may be tilted upward 45° and 90° and downward 45° and 90°. The audio monitor contains the battery pack which may lose electrolyte if the component is tilted in either direction while the battery is venting. The power distribution panel, located at the bottom of the electrical equipment cabinet, is not slide-mounted and is not normally removed during maintenance of the equipment. The interior of the power distribution panel can be reached by removing a cover plate located below the electrical equipment cabinet rear door. The panels above the synthesizer and the power distribution panel are blank. Two other components, the data distribution panel and the RF distribution panel, are permanent fixtures attached to the vertical mounting rails at the rear of the electrical equipment cabinet (fig. 1-12).

b. *Synthesizer* (fig. 1-3 and 1-10). The synthesizer generates variable injection frequencies needed to tune the main and diversity receivers. Six selector switches are used to select any receiver frequency within the range from 2 to 29.9999 MHz in 100-Hertz (Hz) steps and supplies fixed carrier reinsertion frequencies used by the main and diversity receivers to produce four independent audio channels. The synthesizer also supplies highly accurate, fixed-reference frequencies utilized by Control, Electrical Frequency C-7665/FRR79. The synthesizer permits either local or remote frequency selection. Local frequency selection is accomplished directly from the synthesizer front panel. Remote frequency selection is accomplished by commands initiated at the remote control (fig. 1-10) and fed to the control converter. The control converter command determines the variable output frequency of the synthesizer. A visual readout of the selected frequency is provided immediately above the switches. A 24-position circuit test switch on the synthesizer front panel is used to monitor synthesizer performance and evaluate various circuit parameters as indicated on a circuit test meter. The synthesizer has provisions for using an external frequency standard in place of the internal unit. A front panel indicator switch provides a visual indication of the standard in use, and enables the operator to select the internal or external standard. All local operator controls are located on the front panel. Input and output connections are made at the rear panel. Access to the top and bottom of the chassis is obtained through removable top and bottom covers. The synthesizer subassemblies are of modular or printed circuit board construction utilizing solid-state design. The subassemblies

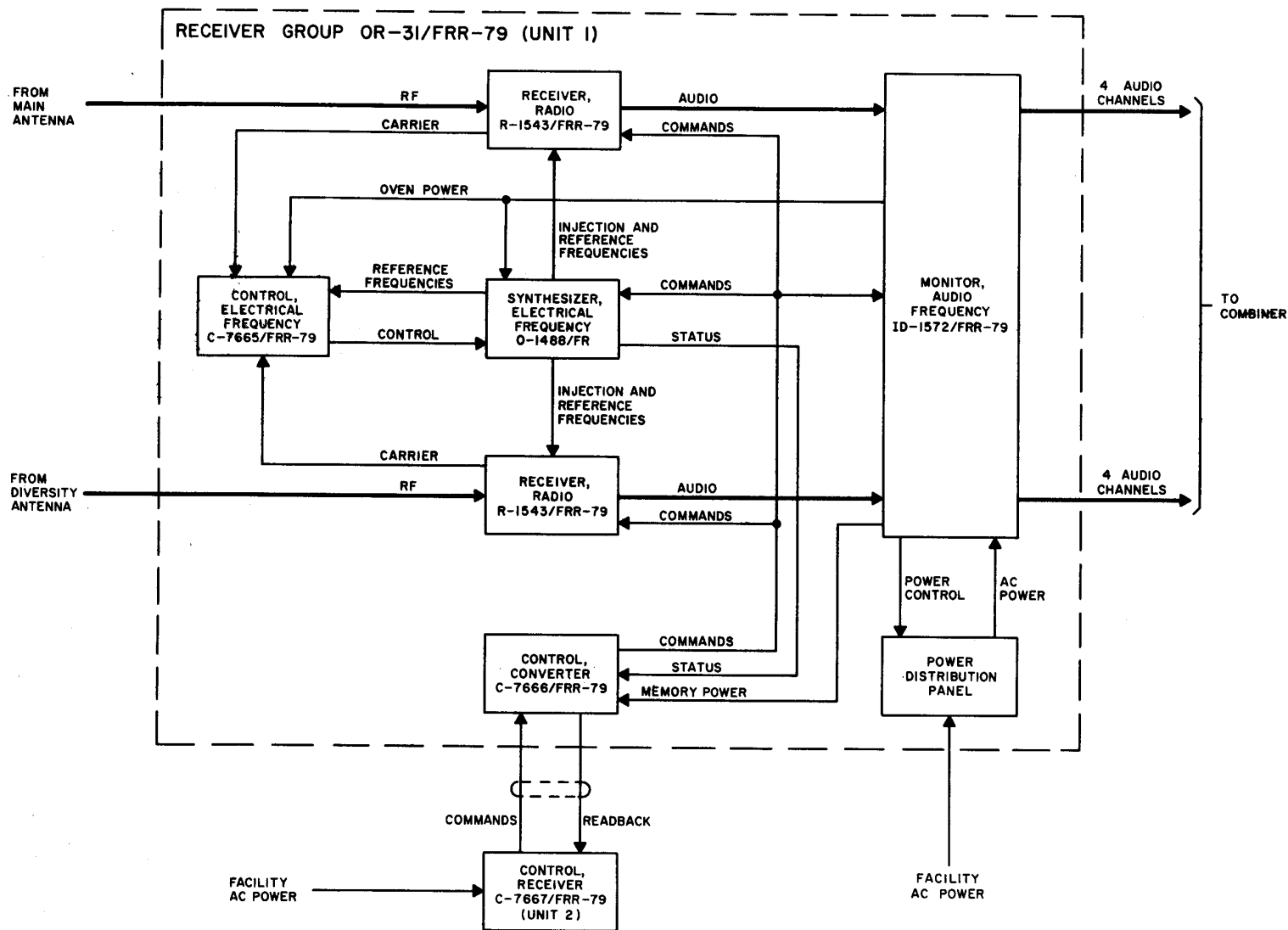


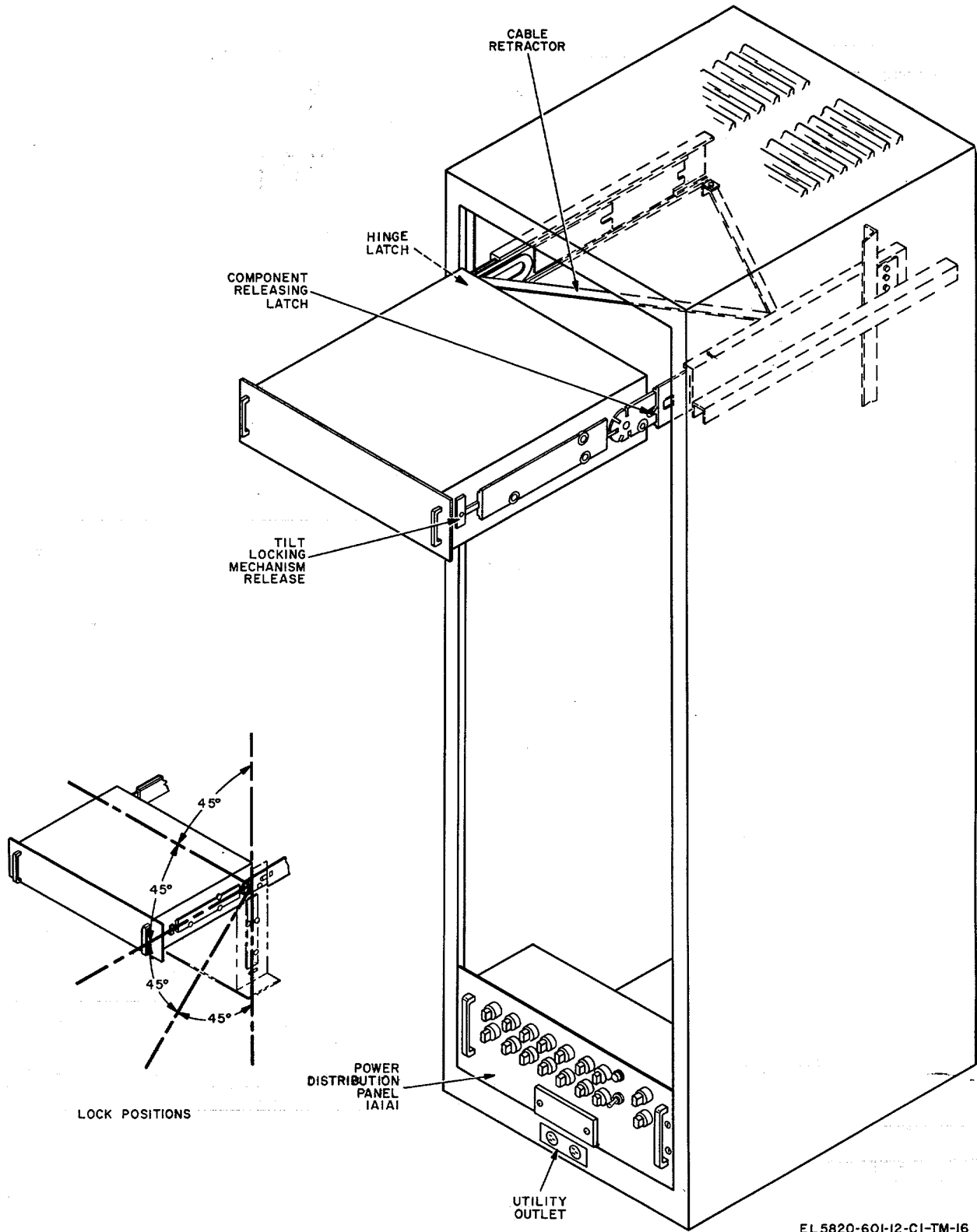
Figure 1-10. Receiving Set, Radio AN/FRR-79, block diagram

are either plug-in or bolt-on types with coaxial connectors. The synthesizer has a forced air cooling system which consists of a blower motor and a filter. The filter is removable and is located on the front panel. A wire-mesh, polyurethane-type filter is used, which requires only periodic maintenance.

c. *Main and Diversity Receivers* (fig. 1-4). The main and diversity receivers are physically and electrically identical, except for the addition of a cover over five switches on the diversity receiver. The functions performed by these switches are accomplished by their counterparts on the main receiver. The covered switches are not used during normal equipment operation. The selection of the local or remote mode of operation and automatic gain control (agc) time constant for both receivers is made at the main receiver only. All other functions, including application of power or circuit testing, are accomplished individually at each receiver. A display of the selected agc time constant for each channel is provided on the main and diversity receivers. Fault or abnormal conditions are also displayed on the respective receivers. The modules and the internal circuits can be reached by removing the top and bottom protective covers. The modules are removable from the top chassis assembly by removing the attaching hardware and the coaxial connectors. Input and output connections to the main and diversity receivers are made at the rear panel. Each receiver has its own forced air cooling system employing a blower motor and a front panel replaceable filter. Internal maintenance controls are located on the top chassis immediately behind the front panel assembly. These controls can be reached by partially withdrawing the receiver from the electrical equipment cabinet.

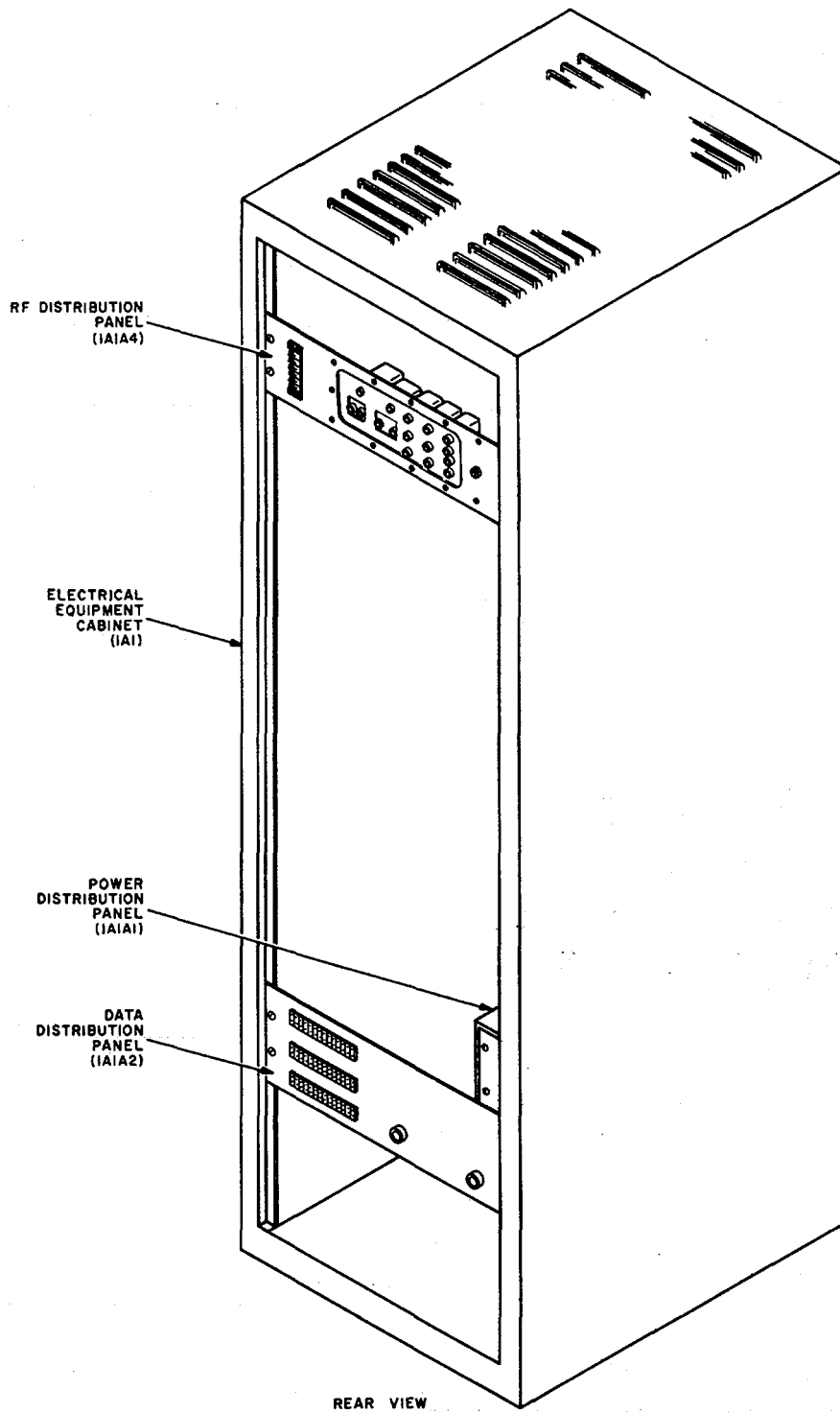
d. *Automatic Frequency Control*. The automatic frequency control, when activated, compensates for frequency drift of a received signal, provided a carrier is transmitted. The output of this component, 22 MHz  $\pm$  2 KHz, is applied to the synthesizer to generate the variable injection frequency needed to tune the main and diversity receivers. A sample of the received 1.75-MHz carrier signal is taken from the main or diversity receiver and compared in the automatic frequency control to a 1.75-MHz fixed-reference frequency supplied by the synthesizer. When the received signal is exactly the same frequency as the frequency to which the main or diversity receiver is tuned, the output of the automatic frequency control is maintained at 22 MHz. Any deviation (up to  $\pm$  2KHz) of the carrier from the synthesizer 1.75-MHz fixed-reference frequency will produce a corresponding deviation in frequency of the 22-MHz output of the automatic frequency control. This frequency deviation will cause the synthesizer to maintain the main or diversity receiver tuning at the actual received frequency. All local operator controls are on the front panel. A circuit breaker provides protection for the alternating current (ac) power line to the component. Both the local and remote operators have the option to select automatic frequency control circuitry. The local operator also has the capability to search for an incoming carrier that may have deviated from its assigned frequency. A fine tune control on the automatic frequency control allows the operator to manually tune the receiving set to  $\pm$  2 KHz of the frequency selected on the synthesizer. The automatic frequency control utilizes modular construction for all subassemblies. The subassemblies and internal circuitry can be reached by removing the top and bottom covers. The modules can be removed by removing the mounting hardware and the coaxial connectors. A 24-position circuit test switch on the front panel is used to monitor critical circuit parameters. A forced air cooling system is included in this component. Input and output connections are made at the rear panel.

e. *Audio Monitor* (fig. 1-6). The audio monitor is comprised of power control circuits, line amplifiers and equalizers for each of the eight audio channels (four channel pairs), and metering circuits. A front panel mounted speaker permits the audio, selected from one of eight channels, to be monitored aurally. A 600-ohm headset may be used in place of the speaker through a telephone jack. The output level of any channel may be measured on a front panel volume unit (vu) meter. The application of prime power to the major compo-



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Figure 1-11. Cabinet, Electrical Equipment CY-6450/  
FRR-79, front view.



TM 5820-601-12-18

Figure 1-12. Cabinet, Electrical Equipment CY-6450/FRR-79, rear view.

nents of the electrical equipment cabinet is controlled by a front panel switch. The audio monitor is continuously connected to prime power. An 18-volt battery and a battery charger are used to provide power for the synthesizer frequency standard oven and the control converter memory. Channel selection for the audio or metered outputs is controlled by a selector switch. All chassis-mounted subassemblies are of modular construction. The modules can be reached by removing the covers. A 24-position selector test switch is used to monitor power audio amplifier circuits, and control converter memory drain.

*f. Remote Control Subsystem.* The remote control subsystem consists of the control converter and the remote control which are interconnected through the full duplex control data circuit. One loop provides serial transfer of control data from the remote control (fig. 1-8) to the control converter (fig. 1-7); the other loop provides serial transfer or readback data from the control converter to the remote control. Interface between the remote control and the control converter is established at the data distribution panel (fig.1-12).

(1) *Control converter* (fig. 1-7). The control converter is composed primarily of printed circuit cards and plug-in modules mounted within the chassis. A cover is provided for both the top and bottom of the component. The only operator control on the front panel is a power switch. A pair of indicators, used in conjunction with the ac power circuit to internal blowers, light to indicate a blown fuse. A second pair of indicators is used for power and link fault indication. In addition to performing remote control functions, the control converter constantly monitors the status of the receiver group, and sends status messages to the remote control each time a status change occurs. The status messages control the remote control front panel indicators which continuously display the operating status of the receiving set. When the remote control subsystem is not performing control or status functions, it transmits a link check message over the full duplex control data circuit and interconnects the remote control with the control converter. The link check messages verify the integrity of the two telegraph loops, comprising the full duplex control data circuit, at 15-second intervals. Failure of either loop causes link fault indicators on the remote control and the control converter to light.

(2) *Remote control* (fig. 1-8). The remote control provides the remote operator with complete control of the receiving set from a position away from the receiver group electrical equipment cabinet. The remote control can be mounted in a standard 19-inch rack or in any other convenient location. The interior of the unit can be reached by removing the protective covers. The printed circuit modules are mounted in card slots and interconnected by wiring between the mating chassis-mounted connectors. Ac power must be supplied at the remote location. Direct current (dc) power is provided by 5-volt and 28-volt power supplies. Input and output signals, ac power, and control connections are made through connectors on the rear apron of the remote control. The remote control has a forced air cooling system which is similar to that used in the components of the receiver group. The control and display functions of the remote control are given in (a) and (b) below.

(a) *Remote control functions.*

1. Change the diversity receiver frequency from 02, 000.0 to 29, 999.9 KHz in increments of 100 Hz.
2. Set channel B2, B1, A1, or A2 age time constant for voice (VO), voice frequency carrier telegraph (VFCT), data, or an unassigned spare position.
3. Set the diversity receiver to operate or standby.
4. Set the diversity receiver automatic frequency control to on or off.

(b) *Remote display indications.*

1. Main and diversity receivers ready for traffic.
2. Main and diversity receivers in operate or standby.
3. Automatic frequency control on or off.
4. Main and diversity receivers channel age time constants.
5. Frequency readout accuracy.
6. Remote control manual override or available.
7. Main and diversity receivers summary fault.
8. Remote control command fault.
9. Remote control data link fault.

*g. RF Distribution Panel* (fig. 1-12). The RF distribution panel is bolted to the vertical mounting rails at the rear portion of the electrical equipment cabinet immediately above the synthesizer. This panel consists of five hybrids (1A1A1 through 1A1A5), terminal board TB1, and AN type connectors. Hybrids 1A1A1, 1A1A2, and

1A1A3 are passive dividers that provide coupling and isolation for the fixed frequency carrier injection signals (1.743710, 1.756290, and 1.75 MHz) fed from the synthesizer to the main and diversity receivers. Hybrid 1A1A3 provides an additional 1.75-MHz signal to the automatic frequency control. Hybrids 1A1A4 and 1A1A5 are amplifier hybrid assemblies that route synthesizer local oscillator and variable frequency oscillator signals (130, 140, and 150 MHz; and 151.75 to 161.7499 MHz) to the main and diversity receivers. Power required to operate the active hybrids is fed to terminal board TB1 from the audio monitor through the electrical equipment harness. An external 1-MHz frequency standard, when used is routed from its source directly through an N-type connector on the RF distribution panel to the synthesizer.

*h. Data Distribution Panel (fig. 1-12).* The data distribution panel is bolted to the bottom portion of the vertical mounting rails at the rear of the electrical equipment cabinet. This panel is composed of three terminal boards (TB1, TB2, and TB3) and two antenna protectors, one each for the main receiver and the diversity receiver. Terminal board TB1 has several functions: It interconnects the remote control with the control converter in the electrical equipment cabinet, it routes power from the audio monitor to the antenna protectors, and it connects the antenna relay return lines from the antenna protectors to their respective receivers. Terminal boards TB2 and TB3 provide audio output connections from the main and diversity receivers to external terminal equipment in the facilities control. The antenna protectors disconnect the main and diversity receivers from the antennas when the receiving set is off, and during a main and diversity receivers tuning cycle. These devices protect the main and diversity receivers from stray incoming signals that may damage front end circuitry during a deenergized condition; they also prevent oscillations that exist in the main and diversity receivers preselectors during the tuning cycle from feeding back into the antennas. The antenna protectors are sealed units which contain a relay, a resistance-capacitance network, and a low-pass filter. The electrical connection from each receiver to its respective antenna is made when the relay is energized. The relay is energized only during normal operation.

*i. Power Distribution Panel (fig. 1-11).* The power distribution panel occupies the bottom level in the electrical equipment cabinet. This panel routes main ac power from the external prime power source to the synthesizer, the main and diversity receivers, the automatic frequency control, the audio monitor, and the control converter. Input ac power for the electrical equipment cabinet is connected to terminal board TB1 inside the rear panel of the power distribution panel. The front panel consists of a main ac power switch, a main power indicator, and 16 indicating fuseholders. The main input power circuit is protected by two 10-ampere fuses. A pair of 3-ampere fuses is used in conjunction with each of the six ac supply circuits which feed the major components of the receiver group. A pair of 10-ampere fuses protects the ac output to the utility outlet at the front of the electrical equipment cabinet. The fuse-fault indicator assemblies provide a visual indication of a blown fuse. A spare fuseholder which contains two 10-ampere fuses and four 3-ampere fuses is located on the front panel. The fuses can be reached by removing a protective cover. During standby, ac power is supplied to only the audio monitor and the control converter. The audio monitor (fig.1-6) uses a battery/battery charger circuit to supply standby dc power to energize the crystal oven in the synthesizer and control converter memory circuits. A + 18-volt regulated power supply maintains the crystal oven in the automatic frequency control. During a prime power failure, the audio monitor continues to supply dc power to the synthesizer oven and the control converter memory by use of the battery. During operation, each component of the receiver group is energized by its own internal power supply. All component power supplies operate from the ac power provided by the power distribution panel (fig.1-11). The remote control contains internal power supplies, and obtains its input power from the prime power source at the remote location.

*j. Fault Interlock Circuit.* The receiver group uses a fault interlock circuit to alert the operator to an equipment malfunction. Fault lamps on the synthesizer, the main and diversity receivers, the automatic frequency control, and the audio monitor light to indicate the presence of a failure. A fault indication results when the power supply outputs of the individual major components drop below the useable level, or if any of the following conditions occur:

- (1) Loss of prime ac power.
- (2) Loss of synthesizer outputs (fixed or variable frequency oscillator (VFO) injection).

- (3) Band selection failure.
- (4) Overload.
- (5) Tune fault.

k. *Receiving Set Component Interface.* The components of the receiving set are normally installed in an environmentally controlled, fixed station facility. The required power, audio, RF, and control interface cables (not supplied) are fabricated to the individual installation site floor plan and cable routing distribution frame. Primary power cables (not supplied) are routed from the existing fixed-station power distribution panel to the receiving set. RF transmission lines from the main and diversity antennas (not supplied) are connected to the receiving set at the data distribution panel. All required interconnecting cables are fabricated to the individual installation site floor plan and cable routing requirements.

#### **1-10. Additional Equipment Required for Operation**

The following equipment is not supplied as part of Receiving Set, Radio AN/FRR-79 but is required for use with it.

a. *Power Source.* An alternating current power source, capable of supplying 115 or 230 volts + 10 percent, 47.5 to 440 Hz at 600 volt-amperes, is required to operate the equipment contained in the electrical equipment cabinet. An ac power source of 115 or 230 volts +10 percent, 47.5 to 440 Hz at 60 volt-amperes is required to operate the remote control.

b. *Communications Antenna.* A high frequency (HF) antenna, such as a broadband rhombic or log periodic antenna matched to an impedance of 50 ohms over a frequency range of 2 to 30 MHz, is required. Separate antennas are required for the main and diversity receivers. The spacing between antennas should be at least two wavelengths. A matching balun transformer may be needed for each antenna to insure that the receivers terminate into a 50-ohm load over the entire operating frequency range.



## CHAPTER 2

### INSTALLATION

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*Note.* Installation of this equipment should be performed by a communication equipment maintenance technician.

#### Section I. SERVICE UPON RECEIPT OF EQUIPMENT

##### 2-1. Siting

(fig. 2-1 and 2-2)

*a. Local.* The following facilities for the electrical equipment cabinet and remote control unit 2 must be provided at the local installation site:

- (1) Floor loading and space requirements as shown in figures 2-1 and 2-2.
- (2) A source of primary ac power: 115 or 230 volts  $\pm$  10 percent, 47.5 to 440 Hz at 600 volt-amperes (maximum).
- (3) Cable trays suitable for supporting and routing primary power, audio, control data, signal, and RF cables to and from existing station facilities.

*b. Electrical Equipment Cabinet.* Plan the location of the electrical equipment cabinet carefully. Locate the cabinet as close as possible to equipment with which it will be associated. Select a location that will not subject the equipment to excessive heat, dust, or humidity. The overall weight of the electrical equipment cabinet is approximately 600 pounds with all components installed. However, more than half of the weight is taken up by the major components all of which, with the exception of the power distribution panel 1A1A1, data distribution panel 1A1A2 and RF distribution panel 1A1A4 are mounted on slides and can be extended from the cabinet. For that reason, the cabinet *must* be bolted to the building floor. Four mounting holes are drilled in the cabinet bottom mounting plate to accommodate facility supplied mounting hardware. Floor loading must be adequate to with stand the cabinet weight and provide a more than marginal safety factor. The receiving set will operate locally at the front of the electrical equipment cabinet and serviced both from the front and rear. The minimum clearances specified in figure 2-1 should provide enough room to perform these functions. However, make certain that the front clearance is also free of protrusion of adjacent equipment or building structures. This is especially significant since the major components will be removed and installed from the front of the electrical equipment cabinet. Backing into a protrusion during a removal operation may cause personal injury and damage to the equipment.

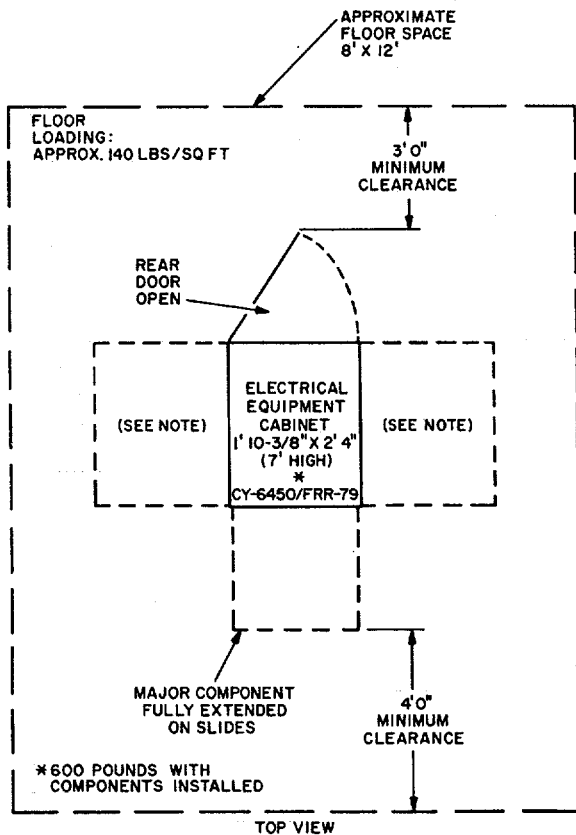
*c. Remote Control (Unit 2).* (fig. 2-2) The remote control may be mounted in a standard 19-inch equipment rack or a console: The remote station installation site must provide the following facilities.

- (1) Floor loading and space requirements as shown in figure 2-1 and 2-2.
- (2) A source of three wire, single phase. 115/230, 47.5 to 440 Hzvac primary power capable of providing 60 watts.
- (3) A 20 ma or 60 ma neutral full duplex control data loop.
- (4) A 130-volt dc full duplex control data loop battery supply.

##### 2-2. Unloading and Placement

To assure proper placement of the equipment for installation, proceed as follows:

- a.* Unload equipment near the installation site.
- b.* Place the individual crates as close to their final position as possible. Sufficient space must be allowed around each crate to provide for unpacking.



NOTE:  
 CABINET MAYBE PLACED  
 ADJACENT TO OTHER  
 EQUIPMENT RACKS.  
 TM5820o-601-I- 20

Figure 2-1. Electrical equipment cabinet, floor plan.

**2-3. Unpacking**

a. *General.* Locate the crate containing the electrical equipment cabinet as close to the final installation site as possible. A forklift capable of handling 2000 pounds should be used to position the crate for unpacking. Once the packing material is removed, a hoist lift can be employed to place the equipment in the exact position. Due to the light weight and size of the remote control, it can be carried to the installation site by hand.

b. *Packing Data.* When packed for shipment, the components of the receiver set are packed

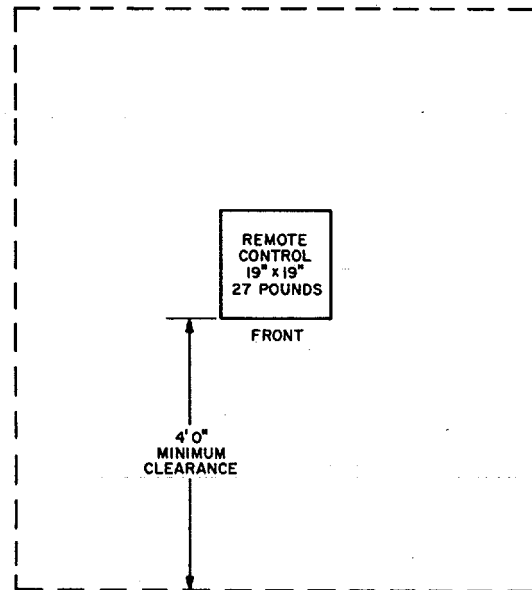


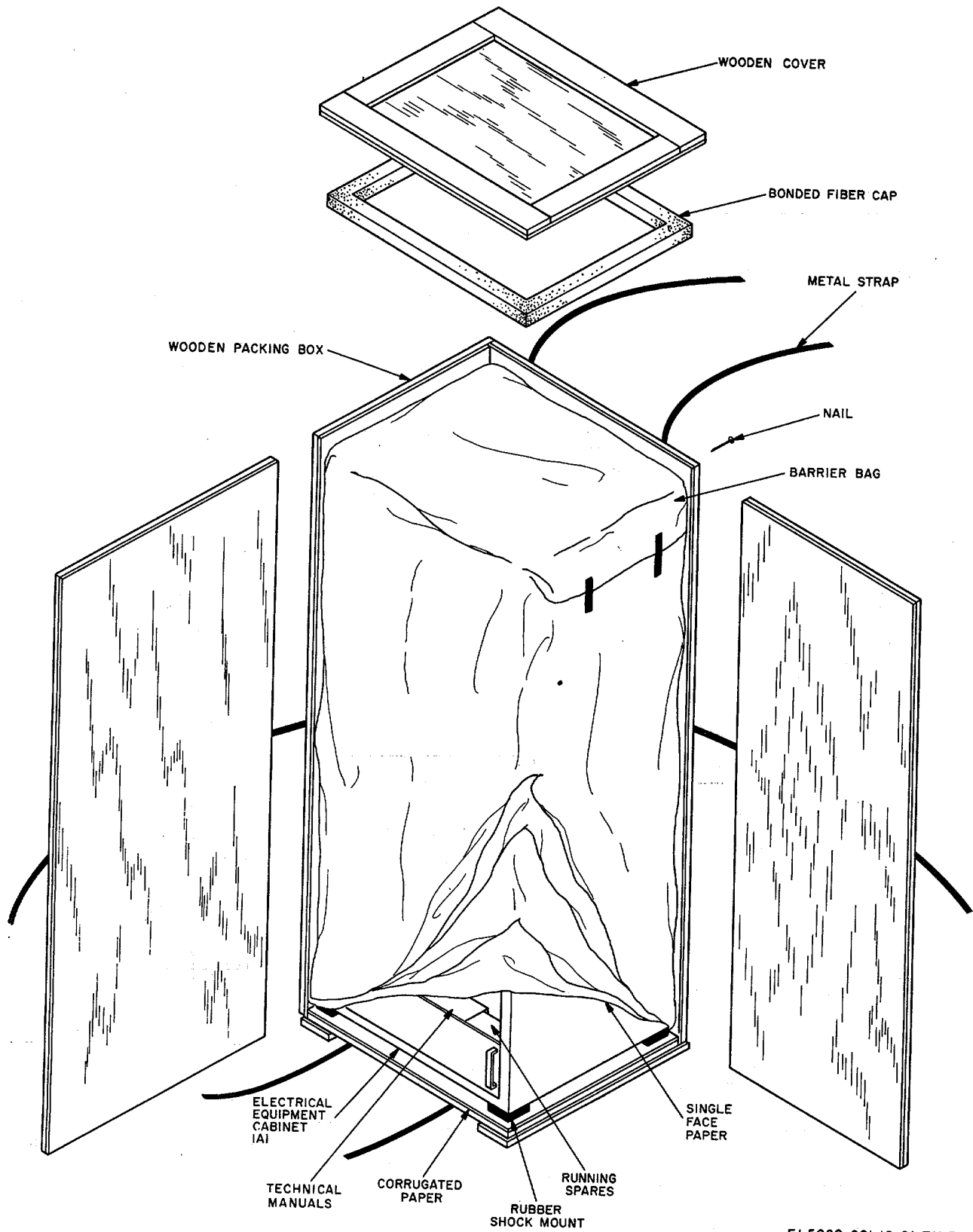
Figure 2-2. Remote control, floor plan.

in three wooden boxes. The electrical equipment cabinet is placed in a moisture proof barrier bag and packed in a wooden packing box. The packing arrangement for this equipment is shown in figure 2-3. Each receiver group component and remote control are packaged separately. A typical packaging diagram is shown in figure 2-4. The following table provides packing data for the three wooden boxes.

c. *Removing Contents.* Use the following procedure to remove the contents from the wooden crates:

(1) *Unpacking electrical equipment cabinet 1A11* (fig. 2-3). Perform procedures below when unpacking the electrical equipment cabinet.

- (a) Clip metal strap from the outside of the wooden packing box.
- (b) Remove the nails that secure the top and sides of the wooden packing box using a nailpuller.
- (c) Lift off wooden cover and remove bonded fiber cap.
- (d) Remove the barrier bag, single face paper, and desiccant.



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Figure 2-3. Packing of electrical equipment cabinet.

Change 1 2-3

Contents	Case	Dimensions (in est)	Volume (cu ft)	Weight (est lb)
	1 of 3			
Electrical Equipment Cabinet CY-6450/FRR-79.....		36 x 29 x 90/4	56	466
One box which holds eight smaller boxes.....		23 x 28 x 84		325
Eight boxes containing lamps and fuses.....		12 x 6 x 6		
	2 of 3			
Control Converter C-7666/FRR-79.....		2 x 1 x 3		
1 box (inner).....		561/8 x 481/8 x 273/8	44	476
1 box (outer).....		19 x 19 x 5\$		30
Main Receiver R-1543/FRR-79.....		24 x 20 x 18		
1 box (inner).....		25 x 21 x 19		
1 box (outer).....		20½ x 19 x 51/4		50
Diversity Receiver R-1543/FRR-79.....		24 x 20 x 18		
1 box (inner).....		25 x 21 x 19		
1 box (outer).....		20% x 19 x 5¼		50
Automatic Frequency Control C-7665/FRR/79.....		24 x 20 x 18		
1 box (inner).....		25 x 21 x 19		
1 box (outer).....		19 x 19 x 51/4		30
	3 of 3			
Audio Monitor 1D-1562/FRR79.....		53 3/4 x 37 x 281/2	28	400
1 box (inner).....		19 x 19 x 7		70
1 box (outer).....		24 x 20 x 18		
RF Distribution Panel 20006-505A1.....		25 x 21 x 19		
1 box (inner).....		21 1/4 x 61/2 x 81/4		20
1 box (outer).....		21 5/8 x 61/4 x 9		
Synthesizer C-1488/FR.....		21 1/2x 19 x 51/4		70
1 box (inner).....		28 1/4x 201/2 x 81/4		
1 box (outer).....		28 3/4 x 201/2 x 91/4		
Remote Control C-7667/FRR-79.....		19 x 19 x 51/4		30
1 box (inner).....		25 1/4 x 21 7/8 x 81/		
1 box (outer).....		26 1/4 x 223/8 x 91/4		

(e) Remove the unit from the skid by removing four mounting bolts.

(f) Remove running spares, technical manuals, and battery package from cabinet.

(2) Unpacking receiver components and remote control unit (fig. 2-4). Perform procedures below when unpacking a component:

**NOTE**

Unpacking procedure is the same for all the components. However, a minimum of two men and a forklift are required to unpack and lift any components over 50 pounds.

- (a) Clip metal straps, remove nails and then wooden cover and bonded fiber top cushion.
- (b) Lift outer carton from wooden packing box. Bonded fiber cushioning may remain in the wooden packing box.
- (c) Open the outer carton and moisture water-proof barrier within the outer carton.
- (d) Remove the inner carton.
- (e) Open the inner carton and remove the corrugated filler and desiccant.
- (f) Remove the component.

**2-4. Checking Unpacked Equipment**

- a. Inspect the equipment for damage incurred during shipment as follows:
  - (1) Examine all equipment for visible signs of damage.
  - (2) Check all controls for binding, broken knobs, or bentshafts.
  - (3) Check meters and indicator lamps for cracked or broken glass.
  - (4) Check that fuses are properly seated in their holders and that all circuit breakers are tripped.
  - (5) Check that cable harnesses and slide assemblies operate smoothly with no binds.

**NOTE**

If the equipment has been damaged, follow the procedure outlined in paragraph-3b.

**WARNING**

Do not slide or mount any components into the electrical equipment cabinet until installation procedures (para 2-6)

have been completed. *To do so may cause the cabinet to tip over.*

(6) Inspect battery for signs of damage to its case or to the terminals.

b. See that the equipment is complete by checking the equipment against the basic issue item list. Report all discrepancies in accordance with TM 38-750. Shortages of a minor assembly or part that does not affect proper functioning of the equipment, should not prevent use.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear on the front panel near the nomenclature plate. Check to see whether the MWO number (if any) and appropriate notation concerning the modification have been entered in the manual.

**NOTE**

Current MWO's applicable to equipment are listed in DA Pam 310-7.

**2-5. Tools and Materials Required for Installation**

Tools, test equipment, and materials required for installation of the receiving set are listed below. The use of each item is also listed.

a. *Tools.*

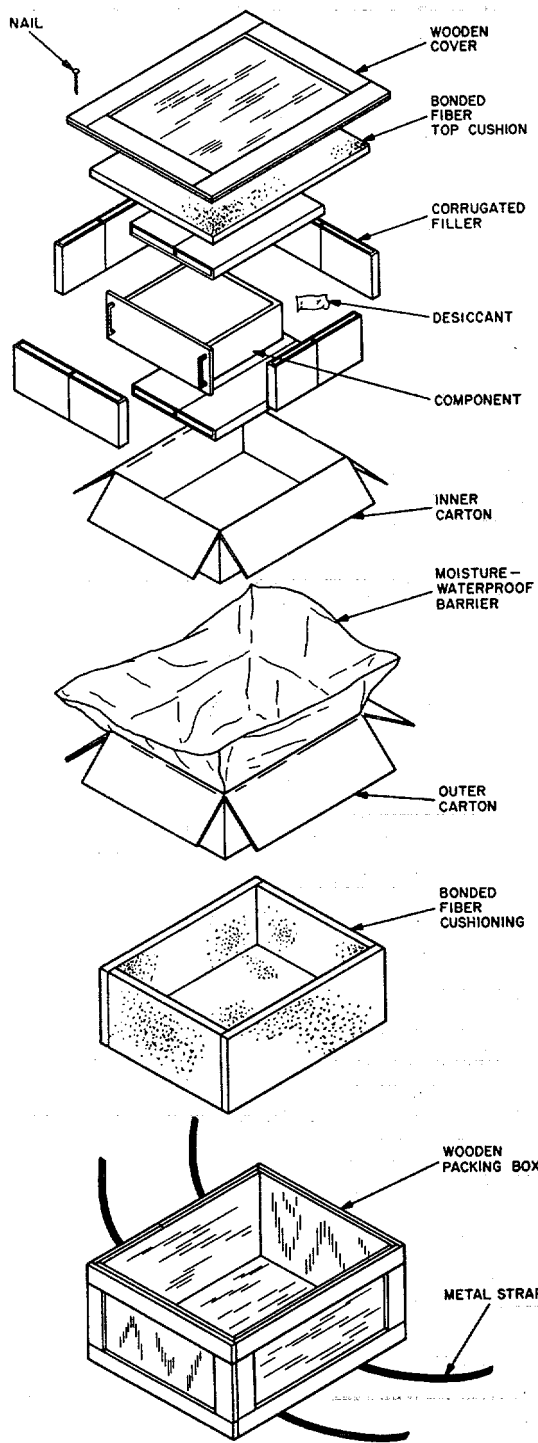
Quantity	Item	Use
1 set .....	End wrenches 1/4" to 1 1/4" standard length	Installation of equipment.
1 set .....	Socket wrenches 1/4" to 1 1/4" with 1/2" drive.	Installation of equipment.
1 set .....	Standard electrician tool kit no. TK 105/G	Installation of interface cables.
1 .....	Forklift truck, 2,000-pound capacity	Unloading and positioning equipment.
1 .....	Hoist; 2,000-pound capacity	Unloading and positioning equipment.
1 set .....	Allen wrenches 1/8" to 1/4"	Installation of primary power cables and adjustment of parts.
1 .....	Tool, special	Removal of protective cover from terminal strips..
<b>b. Test Equipment.</b>		
<b>c. Materials.</b>		
Quantity	Item	Use
4 .....	3/8" hex head bolt and threaded expansion anchor.	For securing electrical equipment cabinet to building floor.
4 .....	3/8" ID, flat washer	Same as above.
4 .....	3/8, ID, lock washer	Same as above.
4 .....	3/8" ID, flat washer 3 in. OD	Same as above.
4 .....	6-32x5/8 screws, lock washers, and flat washers (equipment cabinet shipped with hardware mounted in position).	To mount RF distribution panel in electrical equipment cabinet.
Length as required.....	1 1/2-inch-diameter rigid conduit (BX) with three 14 AWG conductors (single conductor).	To provide ac power to electrical equipment cabinet.
Length as required.....	Cable assembly. Fabricate as shown in figure 2-21.	1 MHz external standard.
Length as required.....	Cable assembly. Fabricate as shown in figure 2-20.	Station RF main and diversity antenna interface to electrical equipment cabinet.
Length as required	No. 22 AWG (2 shielded conductors) equipment cabinet.	Station audio interface to electrical equipment cabinet.
Length as required.....	No. 22 AWG (4 shielded conductors)	Station full duplex control data interface to electrical equipment cabinet.
Length as required.....	No. 22 AWG (4 shielded conductors). Fabricate as shown in figure 216.	Remote station full duplex control data interface to remote control.
Length as required.....	No. 16 AWG stranded (3 conductors). Fabricate as shown in figure 2-18.	To provide ac power to remote control unit.
Amount as required.....	Distilled or deionized water	To activate battery pack.

**26. Installation of Electrical Equipment Cabinet**

a. General. Use the following procedures to position the electrical equipment cabinet, secure it to the building floor and to connect the primary ac source cable.

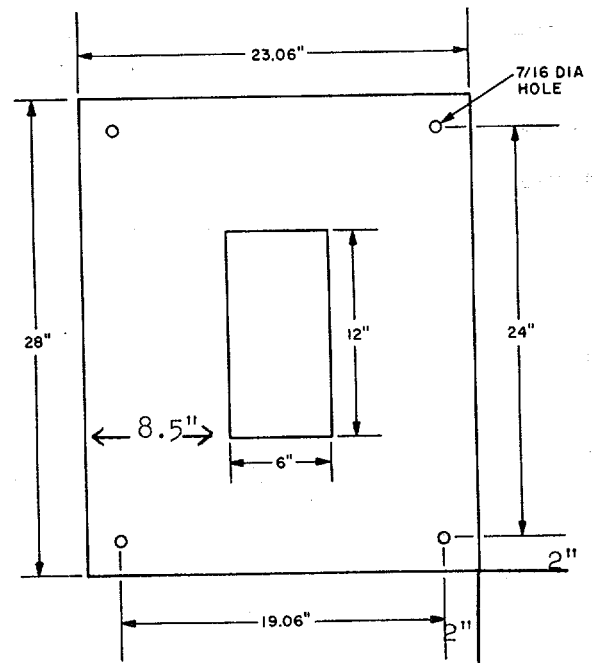
b. Electrical Equipment Cabinet Positioning and Bolt-Down. Position and bolt-down the electrical equipment cabinet as follows:

- (1) Refer to installation site drawings for cabinet location specifications.
- (2) Refer to figure 2-5 for electrical equipment cabinet template.
- (3) Using a hoist or forklift truck, place cabinet near its permanent position.
- (4) Remove rear access door and panel from cabinet by pulling down on spring loaded pin (upper right-hand corner).
- (5) To facilitate installation of cabinet the power distribution panel 1A1A1 may be removed as follows:
  - (a) Disconnect connector W2P1 at the rear of the power distribution panel (fig. 1-12).
  - (b) Remove the screw securing utility outlet cover to outlet (fig. 1-11).
  - (c) Remove the two screws holding utility outlet power box to electrical equipment cabinet.
  - (d) Remove the four captive screws securing power distribution panel to mounting



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Figure 2-4. Packaging of component, typical.

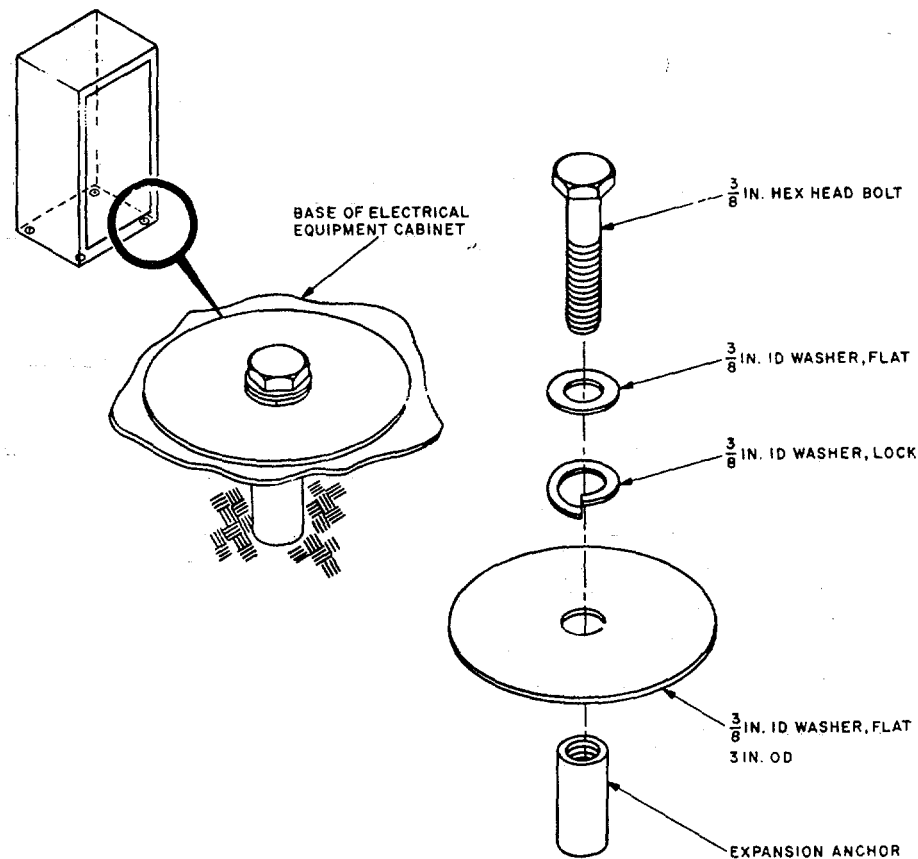


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Figure 2-5. Electrical equipment cabinet, base template

rails to completely free panel. Carefully remove from cabinet. -:

- (6) Using the dimensions shown on figure 2-5, prepare an actual size template out of stiff cardboard or similar material. Make certain that holes are spaced accurately.
- (7) Place fabricated template on the floor in the exact area to be occupied by the electrical equipment cabinet. Drill four 7/16-inch holes to a depth equivalent to the length of a 3/8-inch threaded expansion anchor.
- (8) Insert a 3/8-inch threaded expansion anchor into each hole as shown in figure 26.
- (9) Using hoist or forklift, position cabinet such that cabinet holes in base plate are in alignment with inserted expansion anchors.
- (10) Place a 3/8-inch flat washer, 3/8-inch lock washer, and a 3/8-inch ID, 3-inch OD flat washer on a 3/8-inch hex head bolt as shown in figure 26.
- (11) Insert bolt with washer arrangement into one expansion anchor and tighten. Repeat for three remaining expansion anchors.



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Figure 2-6. Electrical equipment cabinet mounting diagram.

(12) Locate power distribution panel near electrical equipment cabinet so that exact required ac power cable length can be determined.

(13) Remove the 14 screws securing the cover to the rear of the power distribution panel, and remove cover (fig. 2-7).

**Warning:** Make sure that station ac power to electrical equipment cabinet is not on during the following procedure.

(14) Loosen the clamping screw on the BX clamp and slip the station BX cable through with enough slack so that the three conductors reach TB1 (fig. 2-7).

(15) Connect the two hot conductors to TB1-1, and TB1-3. (The color code of the BX conductors may vary from station to station.) Connect the neutral conductor to TB1-2. Tighten the clamping screw.

(16) Replace the cover on the rear of the power distribution panel and replace the component in the electrical equipment cabinet. Reconnect connector W2P1 to J1 and secure utility outlet.

(17) Make sure that the proper value fuses are inserted in the fuse holders on the power distribution panel. The following table shows the value of fuses and its related circuit. See figure 3-7 for fuse locations.



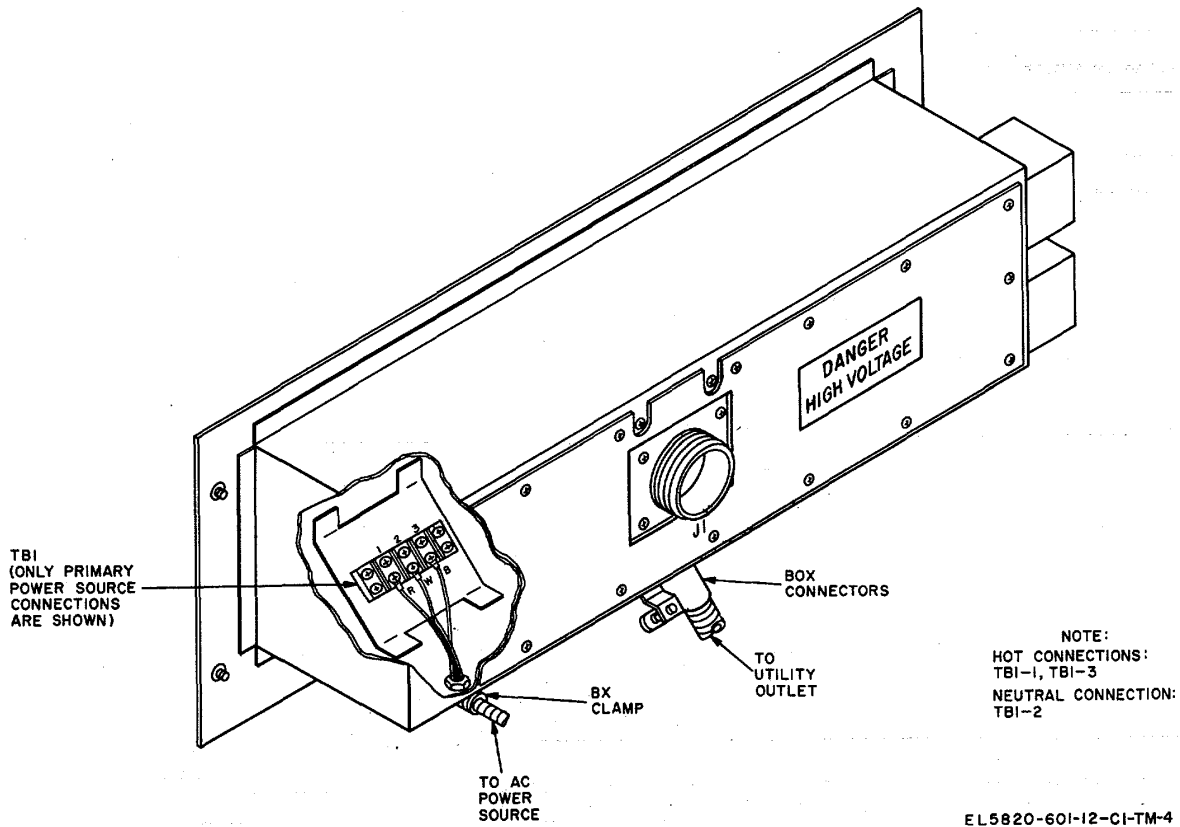


Figure 2-7. Power distribution panel, primary power connections.

Component	Fuse symbol	Rating (amp)
Ac line fuses on power distribution 1A1A1 panel.		
Synthesizer.....	F9, F10	3
Main receiver.....	FS, F6	3
Diversity receiver.....	F7, F8	3
Audio monitor.....	F3, F4	3
Control converter.....	F13, F14	3
Automatic frequency control.....	F11, F12	3
Utility.....	F15, F16	10
Receiver group main power.....	F1, F2	10

**2-7. Component Primary 115/230-Volt Power Strapping**

Prior to installing the major components into the electrical equipment cabinet, check the primary power available for receiver set operation. If the power available is 115 volts ac, no modifications are necessary since the equipment, with the possible exception of the control converter, is initially set up for 115-volt operation. However, if 230-volt operation is desired, the power supply in each component must be modified as follows:

- a. Remove the bottom cover of the components listed below, then remove cover of the component power supply.
  - (1) 1A2A21 in the synthesizer (fig. 2-8).
  - (2) 1A3A15 in the main receiver (fig. 2-9).
  - (3) 1A4A15 in the diversity receiver (fig. 2-9).
  - (4) 1A5A10 in the automatic frequency control (fig. 2-10).
  - (5) 1A5A10 in the audio monitor (fig. 2-11).
  - (6) Locate terminal block TB1 on each power supply using figures 2-8 through 2-11. Note that TB1-1 is strapped to TB1-2 and that TB1-3 is strapped to TB1-4. This strapping is for 115-volt operation only.

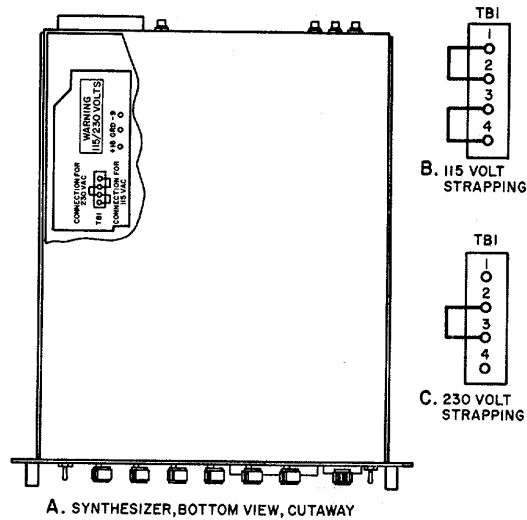


Figure 2-8. Synthesizer, 115/280 volt strapping.

(7) To strap for 230-volt operation, remove all existing straps and restrap as shown.

b. To strap on the control converter for 230 volt operation (fig. 2-12), remove the two screws securing protective cover on terminal board TB1. Remove cover.

**NOTE**

Use special wrench to remove the two protective cover screws. Avoid use of pliers on surface of screws as this will cause burns and can create a safety hazard.

- (1) Remove the five jumper connecting terminals 1 and 3, 2 and 4, 5 and 7, 8 and 11, and 9 and 10. These connections are for 115-volt operation only.
- (2) Connect terminals 2 to 3, 6 to 7, 8 to 12, 9 to 11.
- (3) Replace the terminal board cover and retaining screws.

c. Replace all bottom covers.

**2-8. Strapping Control Converter for 20/60MA Full Duplex Central Data Loop Operation**

The control converter is shipped strapped for 20-ma full duplex control data loop operation. If 20-ma operation is required, no strapping is required. However, facilities are provided which allow for 60-ma full duplex control data operation if required. If after examination of the station full duplex control data loop current characteristics, it is determined that 60-ma operation is required, perform a through e below. If control converter is strapped for 60-ma full duplex control data loop operation, and it is desired to strap the control converter for 20-ma full duplex control data loop operation, perform f through i below.

- a. Remove top cover by turning the screw-type fasteners two turns counterclockwise, and lift the top cover off.
- b. Locate and remove line isolation receive module card 1A7A13 from card slot A13 (fig. 2-12) and locate eyelets E1, E2, and E3 as shown in figure 2-13.
- c. Unsolder and remove connections between eyelets E1 and E2.
- d. Using a short piece of insulated wire, make strapping connection between eyelets E2 and E3. The stripped ends of the connecting wire should be passed through the eyelets before soldering; the wire should be as short as possible and should lie flat against the printed wiring card. After soldering, clip off the stripped ends of the wire if they are protruding from the opposite side of the card.
- e. After completing the strapping procedure, insert printed wiring card into slot A13 and press until card mates with connector at bottom of slot. Replace and secure control converter cover.
- f. Perform a and b above.
- g. Unsolder and remove connection between eyelets E2 and E3.
- h. Using a short piece of insulated wire, make strapping connection between eyelets E1 and E3.
- i. After completing the strapping procedure, insert printed wiring card into slot A13 and press in until card is mated with the connector at the bottom of the slot. Replace and secure control converter top cover.

**2-9. Receiver Group Component Installation**

The receiver group components are installed into the electrical equipment cabinet from bottom up. Note the position of each component in figure 1-1. Perform a through h below as a

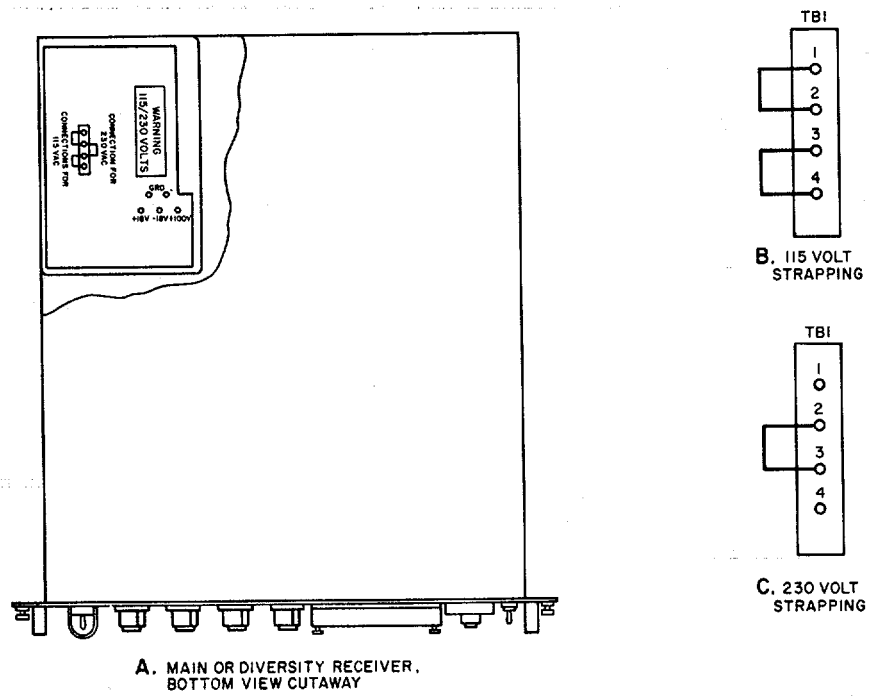


Figure 2-9. Main and diversity receivers, 115/230-volt strapping.

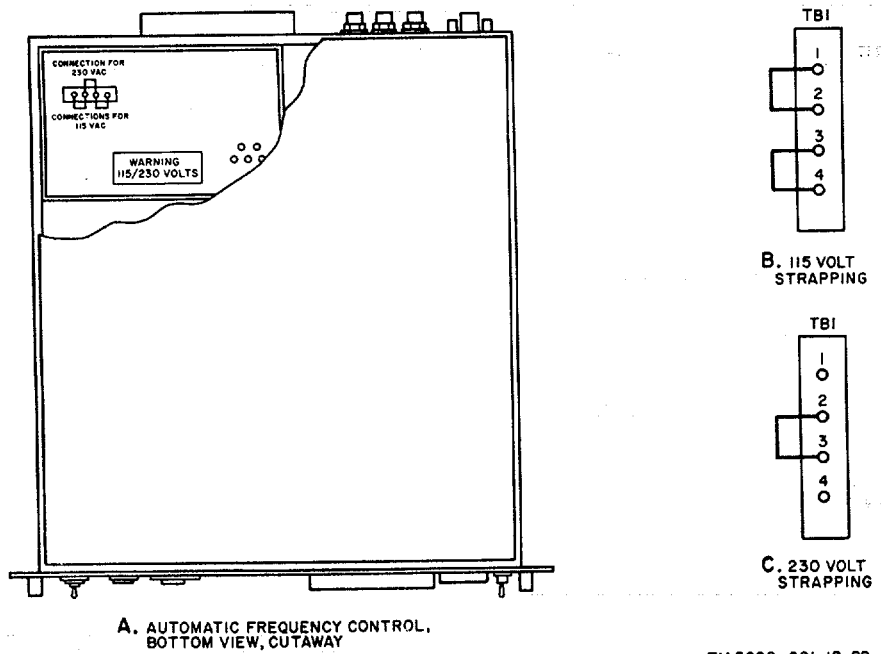
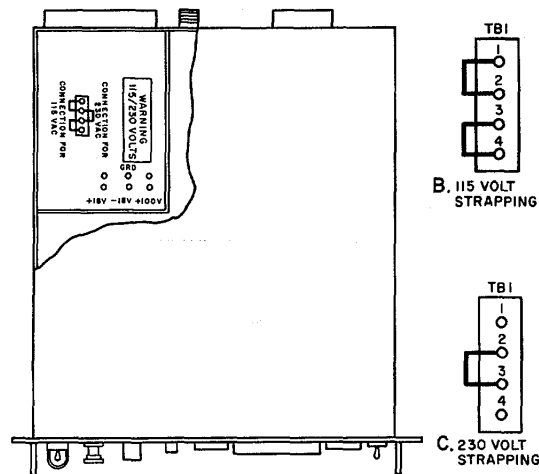


Figure 2-10. Automatic frequency control, 115-230-volt strapping.



**A. AUDIO MONITOR, BOTTOM VIEW, CUTAWAY**

*Figure 2-11. Audio monitor, 115/230-volt strapping*

general procedure for the installation of slide mounted components. Perform procedure j for installation of the RF distribution panel 1A1A4

**NOTE**

If necessary, remove all filler panels. Do not install the filler panels, which will occupy the area between the major component front panels, before all major components are placed in the electrical equipment cabinet.

- a. Remove all material (tape, string, etc.) used to secure the slides, cable retractors, and cables during shipment.

**CAUTION**

Make certain that cabinet is securely mounted to floor and that the slides and cable retractors operate freely without binding. If binding occurs, check for damage or other causes of improper movement.

- b. Place all switches to the deactivated position.
- c. Withdraw the left and right mounting slides from the cabinet until they are locked in their fully extended position.
- d. Place the component on the mounting slides and slide the component slowly into the cabinet until stops are engaged.
- e. From the rear of the cabinet, reach in and connect (using the pin) the cable carrier hinged bracket to the rear of the component.
- f. Using the cording diagram (fig. 6-1), connect the cable connectors and tagged wires from the cable harness to the rear of the components.

**CAUTION**

Never attempt to rotate a drawer without first disengaging tilt locks. Pull on both tilt lock mechanism releases (fig. 1-11).

- g. After the cable retractor and cable connections are in place, check the tilting action of the component (fig. 1-11).

**CAUTION**

If component cannot be tilted to all positions, except for audio monitor 1A6, check for binding resulting from tangled cables, wires, or improper retractor operation.

- h. Press the release buttons on each -side of the mounting slides. This will release the stops and allow the component to slide against the cabinet frame.
- i. Lock the component in place by rotating the four captive fasteners, at each corner of the front panel, clockwise.
- j. Using four screws, mount RF distribution panel on the rear vertical rails approximately 6 inches from the top. Connect cables to RF panel as outlined in figure 6-1.
- k. After all components are installed, mount the filler panels in the slots between the component front panels. Secure by use of the captive fasteners.

**CAUTION**

When removing a component from the electrical equipment cabinet, remove the filler panels above and below the component front panel. Failure to do so may damage the component.

**2-10. Activation of Battery Pack 1 A6A9** The battery pack (fig. 2-14) is shipped with the electrolyte in the battery in a dry state (paste). Perform the following procedures to activate the battery.

**NOTE**

The battery is shipped in a package normally enclosed with the technical

manual and spares (fig. 2-3) and should be inserted into its holder in the equipment prior to performing the following steps.

**WARNING**

The battery electrolyte is very caustic and will harm the eyes and skin. Use all precautions necessary to avoid contacting it. To neutralize, apply 3-percent boric acid solution and wash with water.

- a. On the audio monitor (fig. 2-11), remove the top cover by loosening the cover fasteners.
- b. Unscrew six captive mounting screws holding battery in place.

**WARNING**

Make certain the MAIN POWER switch on the power distribution panel is in the OFF position before performing any additional servicing of the battery pack.

- c. Disconnect power connector J3 by turning it counterclockwise and pulling straight up, then lift out the battery.
- d. Remove battery pack cover by removing the six retaining screws.
- e. Unscrew filler caps on cells.

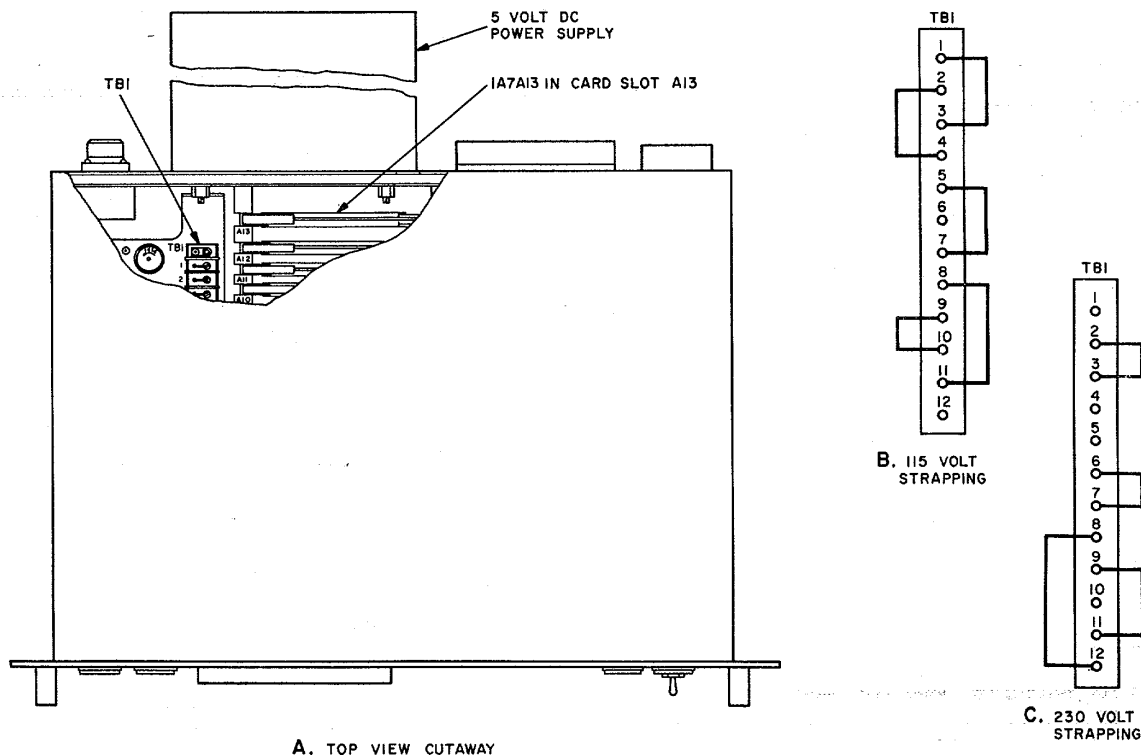
**CAUTION**

Use only pure distilled or deionized water in the following step. Do not use a filling implement which might have been contaminated by contact with acid from other batteries.

- f. Fill cells to LEVEL line with distilled water.
- g. Replace battery pack in audio monitor by performing steps b through e in reverse.

**CAUTION**

Do not overtighten the vent screws. If electrolyte is discolored or cloudy, refer to higher category of maintenance.



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Figure 2-12. Control, converter- 115/230-volt strapping diagram.

**WARNING**

The battery pack must be in an upright position while charging. Tilting may result in spillage of the electrolyte due to venting action of cells. To neutralize spilled electrolyte, use 3-percent boric acid solution immediately.

- h.* With power applied to equipment (standby or operate condition), charge battery for at least 24 hours.
- i.* After 24 hours, place CIRCUIT TEST switch at BAT VOLT. Meter should read in the green area approximately 21.5 vdc.
- j.* Check electrolyte level. If necessary add distilled water to bring electrolyte to 1/8 inch below LEVEL line.

**NOTE**

Refer to TM 11-6140-203-15-1, TM 116140-203-15-2 and TM 11-6140-203-15-3 for additional information on the type of battery used in this set.

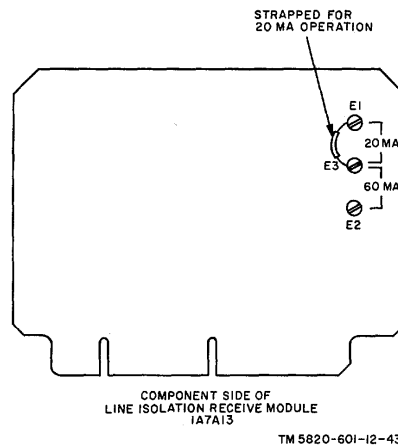


Figure 2-13. Control converter 20/60ma full duplex control data loop strapping.

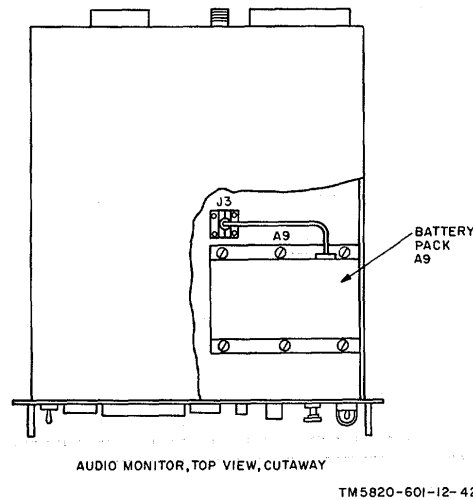


Figure 2-14. Audio monitor, top view.

## 2-11. Installation of Remote Control

a. *General.* The remote control is shipped with all modules in place and intraconnected. The installation of the remote control requires the performance of the following tasks:

- (1) Loop current strapping.
- (2) Positioning and securing within the housing. Housing is not supplied as part of this equipment.
- (3) Installation of full duplex control data station interface lines.
- (4) Installation of primary power station interface cable.

b. *20/60 Ma Full Duplex Control Data Loop Strapping.* Prior to interfacing the station full duplex control data facilities with the remote control perform the following procedures:

*Note.* As supplied, the remote control is strapped for 20 ma full duplex control data loop operation.

- (1) Determine from station maintenance personnel or station records the current characteristics of the control data loops assigned.
- (2) If full duplex control data loop characteristics as determined in b(1) above is 20 ma, proceed with d below.

*Note.* Refer to (4) below for 20 ma strapping procedure if required.

- (3) If full duplex control data loop characteristics as determined in b(1) above is 60ma, proceed as follows:

- (a) Refer to figure 2-13 and figure 2-5.
- (b) Remove remote control top cover by turning each (10) screw-type fasteners two turns counterclockwise, and lifting the top cover off.
- (c) Remove line isolation receive printed wiring module from card slot 2A12 (fig. 2-15) and locate eyelets E1, E2, and E3 as shown in figure 2-13 for card 1A7A13.
- (d) Unsolder and remove connection between eyelets E1 and E3.
- (e) Use a short piece of insulated wire to make strapping connection between eyelets E2 and E3. The stripped ends of the connecting wire should be passed through the eyelets before soldering; the wire should be short as possible and should lie flat against the printed wiring card. After soldering, clip off the stripped ends of the wire if they are protruding from the opposite side of the card.

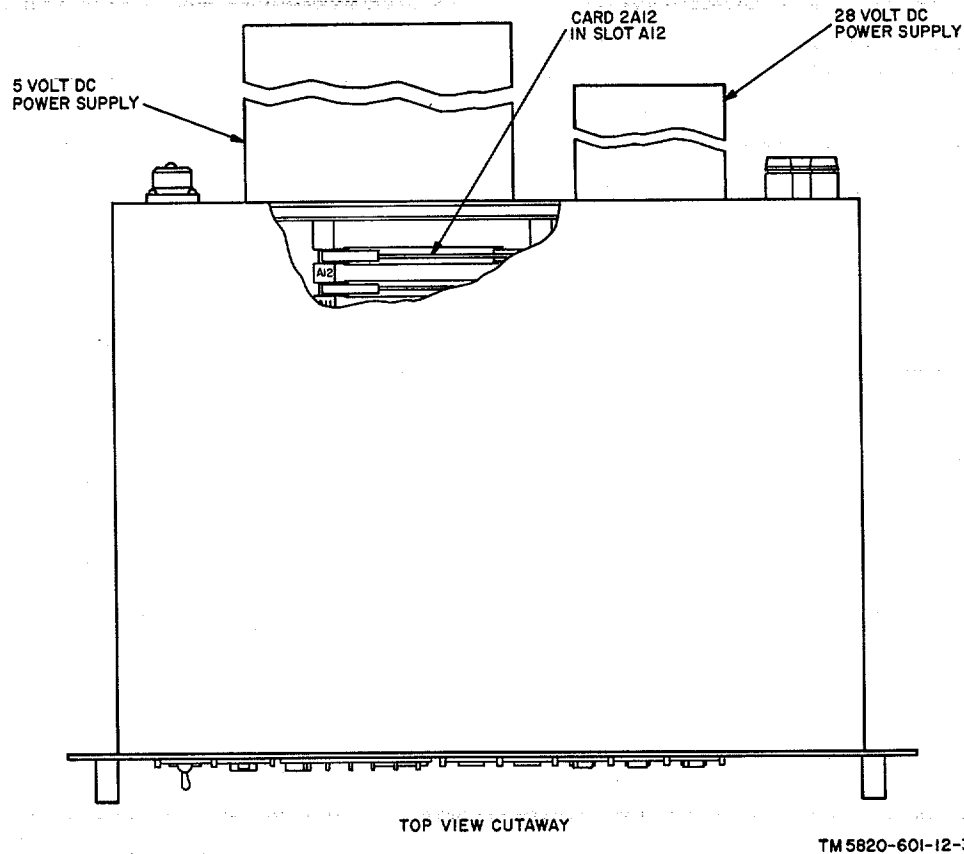


Figure 2-15. Remote control, top view.

(4) To strap for 20 ma full duplex control data loop current operation, remove remote control top cover as described in (3) (b) above and proceed as follows:

- (a) Remove line isolation receive relay printed wiring module from card slot 2A12 (fig. 2-15) and locate eyelets E1, E2 and E3 as shown in figure 2-13.
  - (b) Unsolder and remove connection between eyelets E2 and E3.
  - (c) Use a short piece of insulated wire to make strapping connection between eyelets E1 and E3.
  - (5) After completing the strapping procedure specified in either (3) or (4) above, insert printed wiring card into slot 2A12, and press in until card is mated with the connector at the bottom of the slot. Replace and secure remote control top cover.
- c. *Positioning and Securing.* To position and secure the remote control, proceed as follows:
- (1) Refer to installation site station drawings for remote control location requirements.
  - (2) Install remote control in standard 19 inch equipment rack or console, which is provided at the installation site.
  - (3) Secure remote control to rack or console using four front panel captive screws.
- d. *Full Duplex Control Data Line Connections.* Two pairs of control data lines must be connected between the station dc distribution frame and the remote control. One pair (positive and negative in) provide data input to the remote control from the station full duplex control data facilities. The other pair (positive and negative out) provide data output from the remote control to the station- control data



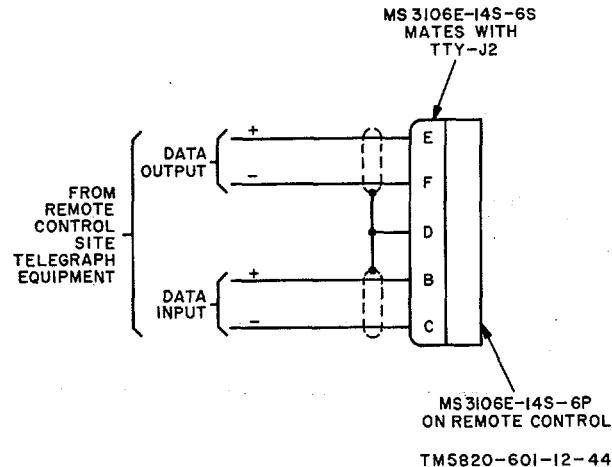


Figure 2-16. Remote control, control data plug wiring.

facilities. Perform the following procedure to connect the two pairs of control data lines:

- (1) Route two pairs of control data lines to the remote control. Refer to station drawings for routing and wire size requirements. Terminate wires in a type MS3106E-14S-6S connector at remote control end.
- (2) Assign and tag each wire pair with termination designator (positive and negative in and positive and negative out).
- (3) Refer to figure 2-16. Make connections to the control data loop wires as specified in (a) through (d) below.
  - (a) Connect the receiver loop (data input) positive in conductor to plug pin B.
  - (b) Connect the receive loop negative in conductor to plug pin C.
  - (c) Connect the send loop (data output) positive out conductor to plug pin E.
  - (d) Connect the send loop negative out conductor to plug pin F.
  - (e) Assemble plug and terminate shields as shown.
  - (f) Refer to figure 217. Insert the control data plug into the control data receptacle, TTY J2. Tighten the plugs knurled locking ring to secure the plug to the receptacle.

e. **Primary Power Connection.** To connect the 115/230 vac primary power to the remote control proceed as follows:

**Warning: Disconnect and tag existing station power distribution panel circuit breaker used for 115/230 vac primary power source. Serious injury or death may result from contact with these wires.**

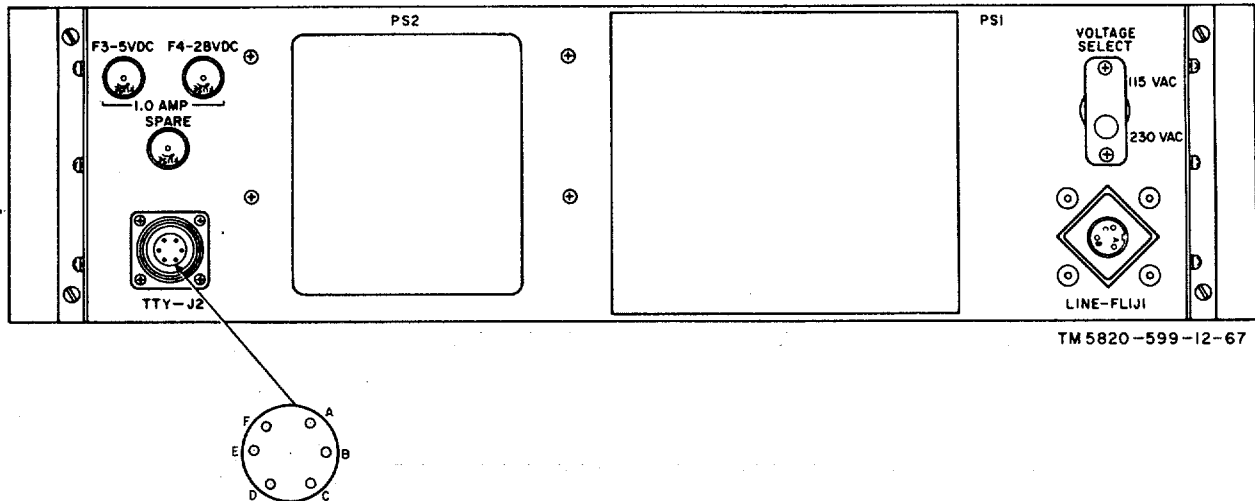
- (1) Route three no. 16 AWG wires from the station distribution panel to the remote control. Refer to station drawings for routing requirements.
- (2) Refer to figure 2-18 and make connections to the plug assembly as follows:
  - (a) Connect the main ac conductor to plug pins A and C.
  - (b) Connect the ground conductor to plug pin B and assemble the plug as shown in figure 2-18.
- (3) Determine from station maintenance personnel, station records or through measurement the voltage level being provided for powering the remote control.
- (4) Refer to figure 2-17 and set the VOLTAGE SELECT 115 VAC/230 VAC switch to either 115 VAC or 230 VAC, as determined in (3) above.
- (5) Insert the ac power plug into receptacle, FLIJ1 (fig. 2-17): tighten the plug's knurled locking ring to secure the plug in the receptacle.
- (6) Prior to power turn on, check for one amp rating for fuses F1 and F2 (fig. 3-5) and F3 and F4 (fig. 2-17).

## 2-12. Station Interface Cabling

Station interface cabling consists of connecting station audio lines, full duplex control data lines, 1 MHz standard and antenna feedin lines to the electrical equipment cabinet. The specially provided opening in the cabinet base is recommended for cable entry.

a. **Audio Lines.** Eight shielded pairs of audio lines must be connected from the station audio distribution frame to the data distribution panel 1AIA2. Four pair each from the main and diversity terminals. Perform the following procedure to install the audio lines:

- (1) Route four pairs of audio lines from the main station audio distribution frame to the electrical equipment cabinet. Refer to station drawings for routing requirements.



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Figure 2-17. Remote control, rear view.

- (2) Assign and tag each wire pair with channel termination designator (A1, B1, A2 or B2).
- (3) Route the four pair of audio lines through the opening in the base of the electrical equipment cabinet.
- (4) Connect the four pair of audio lines to data distribution panel 1A1A2 terminal board TB2 (fig. 2-19) as follows. An adjacent terminal has been provided for making a shield ground connection.

Audio channel	Terminal Board TBR main receiver terminals	Shield terminals
A1	1 and 2	3
A2	7 and 8	9
B1	4 and 5	6
B2	10 and 11	12

- (5) Route four pairs of audio lines from the diversity terminals on the station audio distribution frame to the electrical equipment cabinet. Refer to station drawings for routing requirements.
- (6) Assign and tag each wire pair with channel termination designator (A1, B1, A2, or B2).
- (7) Route the four pair of audio lines through the opening in the base of the electrical equipment cabinet.
- (8) Connect the four pair of audio lines to data distribution panel 1A1A2 terminal board TB3 (fig. 2-19) as follows. An adjacent terminal has been provided for making a shield ground connection:

Audio channel	Terminal board TB3 diversity receiver terminal	Shield terminals
A1	1 and 2	3
A2	7 and 8	9
B1	4 and 5	6
B2	10 and 11	12

b. **Data Lines.** Two pairs of control data lines must be connected between the station dc distribution frame and the data distribution panel. One pair (positive and negative data in) provide data input to the receiver group from the full duplex control data facilities. The other pair (positive and negative data out) provide data output from the receiver group to the control data facilities. Perform the following procedure to install the two pairs of control data lines:

- (1) Route two pairs of control data lines to the electrical equipment cabinet. Refer to station drawings for routing and wire size requirements.
- (2) Assign and tag each wire pair with termination designator (positive and negative data in) (positive and negative data out).
- (3) Route the two pairs of control data lines through opening incabinet base (optional) to the data distribution panel.

(4) Connect the two pair of control data lines to data distribution panel terminal board TB1 (fig. 2-8) as follows. A common terminal has been provided for making a shield ground connection.

Control data line	Terminal board TBI terminal	Shield terminals
+ DATA IN	9	11
- DATA IN	10	11
+ DATA OUT	12	11
- DATA OUT	13	11

c. *Main and Diversity Antenna Cables.* Two coaxial cables must be connected between the station antenna patch panel and the data distribution panel for the main and diversity antenna inputs. These connections are made at connectors AIJ1 (main) and A2J1 (diversity) using standard type N connectors. Refer to figure 2-20 for fabrication data.

d. *1MHz Frequency Standard Cable.* A coaxial cable must be connected between the station 1 MHz standard and the RF distribution panel connector J1. Refer to figure 2-21 for fabrication data.

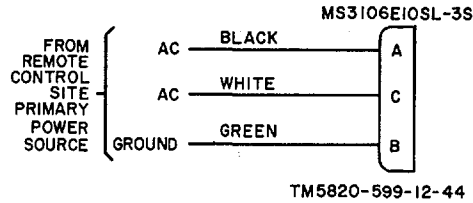


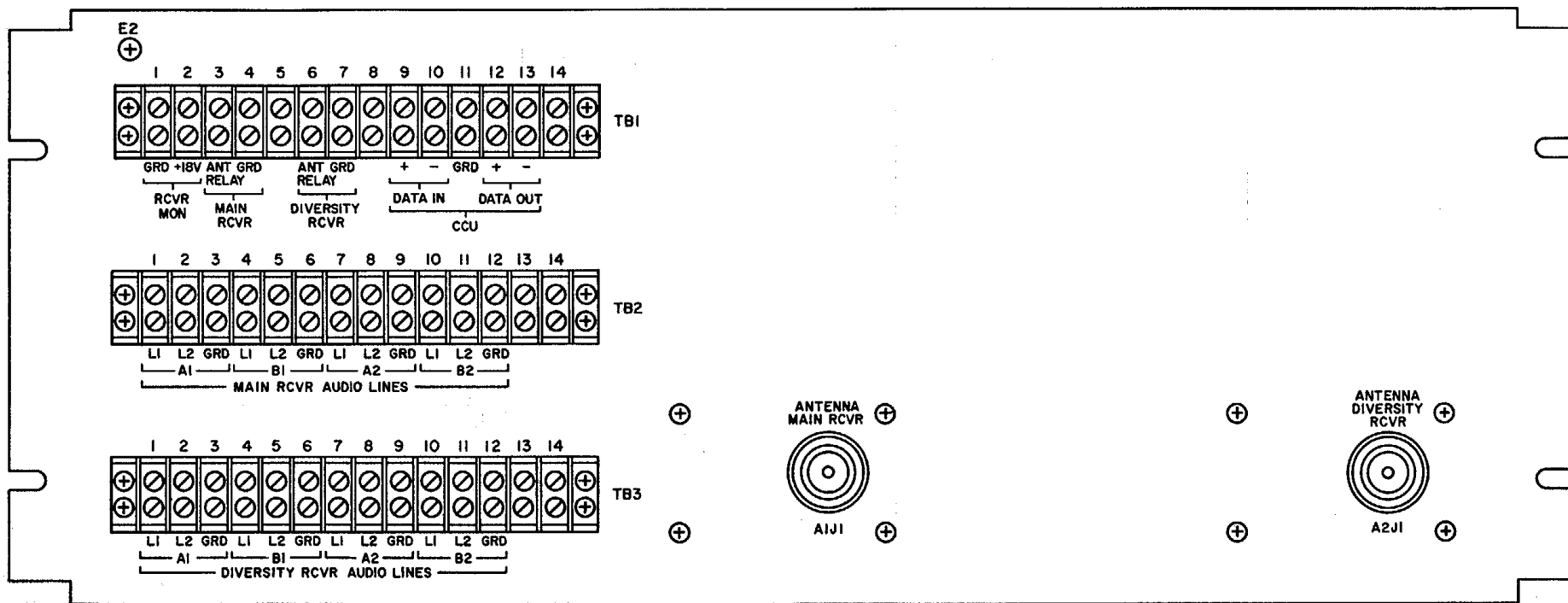
Figure 2-18. Remote control, ac power plug wiring.

## Section II. INITIAL ADJUSTMENT OF EQUIPMENT

### 2-13. Extent of Initial Adjustment

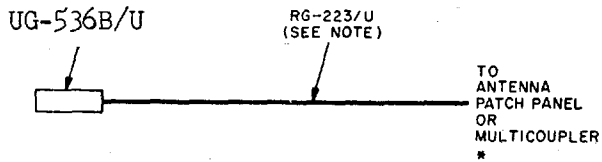
Initial adjustments are not required on the receiving set. Before the receiving set can be used for routine operation, the procedures indicated in table below must be performed. To use the table perform the item given in the item column in the order indicated in the sequence column. Refer to *Procedure* column for specific instructions and to *Reference* column for reference to other sections of the manual.

Sequence No.	Item	Procedure	Reference
<i>Local Operation:</i>			
1	Preliminary starting .....	Perform preliminary starting procedure.....	Paragraph 3-10
2	Starting .....	Perform starting procedures- .....	Paragraph 3-11
3	Operation.....	Perform local operating procedures.....	Paragraph 3-12
4	Standby or stopping operation.....	Perform local or stopping procedures.....	Paragraph 16a
<i>Remote Operation:</i>			
5	Preliminary remote starting .....	Perform preliminary starting procedure.....	Paragraph 3-10
6	Starting .....	Perform starting procedures .....	Paragraph 3-13
7	Operation.....	Perform remote operating procedures.....	Paragraph 3-13
8	Standby or stopping operation.....	Perform remote standby or stopping procedures.	Paragraph 3-16b



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Figure 2-19. Data distribution panel.

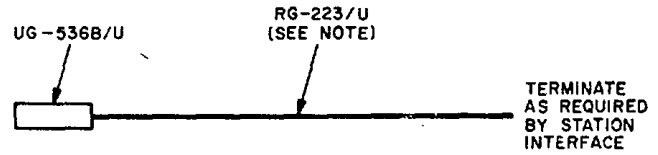


NOTE:  
LENGTH OF CABLE AS REQUIRED  
AT INSTALLATION SITE.

# IF A MULTICOUPLER IS USED, ITS  
PERFORMANCE MUST BE EQUAL TO  
OR BETTER THAN THE FRONT END  
PERFORMANCE OF THE RECEIVER  
IN ORDER TO REALIZE OPTIMUM  
system PERFORMANCE.

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Figure 2-20. Main and diversity antenna cable assemblies.



NOTE:  
LENGTH OF CABLE AS REQUIRED  
AT INSTALLATION SITE. TM5820-601-12-45

Figure 2-21. 1 MHz external standard cable assembly.

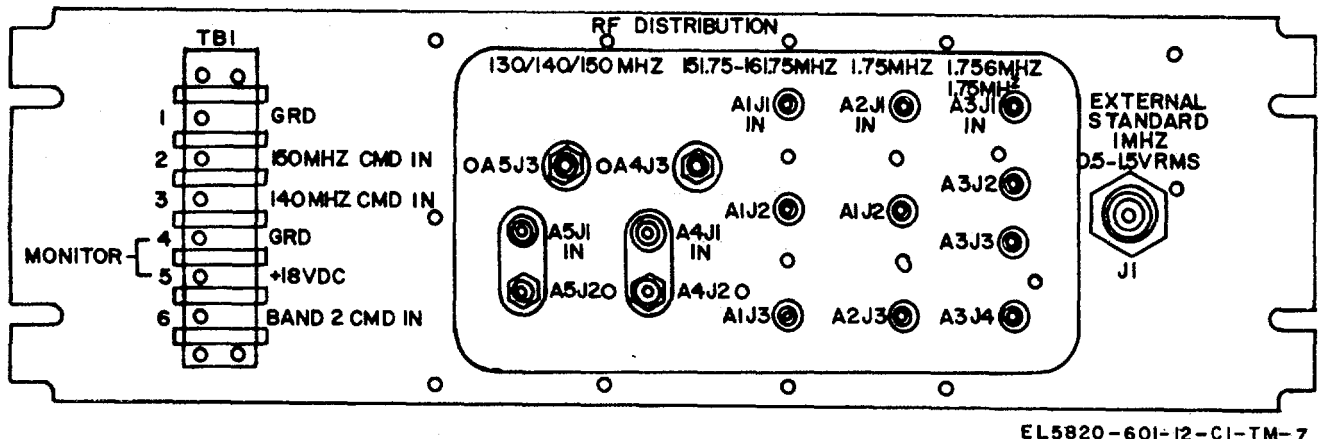


Figure 2-22. Rf distribution panel, connector identification.

CHAPTER 3

OPERATING INSTRUCTIONS

Section I. OPERATOR'S CONTROLS AND INDICATORS

*Note.* This section covers only controls and indicators used by the operator. Controls used by maintenance personnel are covered in instructions for the appropriate category of maintenance.

**3-1. Receiving Set, Radio AN/FRR-79, Controls and Indicators**

Paragraphs 3-2 through 3-8 describe the front panel controls and indicators used by the operator. In the local mode of operation, the receiving set is operated at the receiver group from the front panel of the synthesizer, main receiver, automatic frequency control, and audio monitor. Several functions of the diversity receiver are controlled from the main receiver, such as remote-local control and channel operating mode selection; therefore, the corresponding switches on the diversity receiver are not accessible and are not used during normal operating conditions.

*Note.* Pushbutton switches and indicators on the front panels can be identified as follows: the edges of the indicators are gray and match the color of the front panel. The pushbutton switch edges are black.

**3-2. Synthesizer Controls and Indicators**

The synthesizer controls and indicators are listed in the chart below.

*Note.* The green CIRCUIT TEST switch positions indicate that respective readings must be within the green portion of the CIRCUIT TEST meter scale.

Control or indicator	Function
LAMP TEST switch.....	When operated, causes all front panel indicator lamps to light.
CIRCUIT TEST meter.....	Provides go no-go indication in green area or metered level for each switch position of CIRCUIT TEST switch.
CIRCUIT TEST switch.....	Connects CIRCUIT TEST meter to any one of 23 internal test points in synthesizer. For each following switch position, a meter indication at a specific value or in green area signifies that circuit or signal under test is proper.
	<i>Sw pos</i>
OFF .....	<i>Causes meter to read</i> Meter disconnected.
BAT .....	+ 18 volts supplied from audio monitor.
+ 18V .....	+ 18 volts supplied by internal synthesizer power supply 1A2A21.
.....	- 9 volts supplied by internal synthesizer power -supply 1A2A21.
- 9V .....	Output level of 1-MHz standard.
STD .....	2.3-MHz output level of fixed frequency generator 1A2A7.
2.3 MHz .....	23-MHz output level of fixed frequency generator 1A2A7.
28 MHz .....	Output level of frequency mixer and divider 1A2A6.
0.1 KHE◇ .....	Output level of frequency mixer and divider 1A2AS.
1 KHz◇ .....	Output level of frequency mixer and divider 1A2A4.
10 KHz◇ .....	

Control or indicator

Function

	<i>Sw pos</i>	<i>Causes meter to read</i>
	22 MHz .....	22-MHz output level of fixed frequency generator 1A2A7.
	4.75 MHz .....	Output level of 4.75-MHz signal from fixed frequency generator 1A2A7.
	100 KHzA.....	Output level of 100-KHz interpolation frequency mixer 1A2A2.
	CONV-VHF.....	Output level of frequency converter 1A2A2.
	1 MHz ◊.....	Output level of 1-MHz interpolation frequency mixer 1A2A1.
	10 MHz ◊.....	Output level of 10-MHz signal from frequency multiplier 1A2A i8.
	BAND INFO .....	Indicates band relay is energized.
	OUTPUT.....	Measures JF00 (151.75-161.75 Output ) level of 1.75 MHz - generator 1A2A20.
	1.75 MHz .....	
	2.9 MHz .....	Output level of 2.9-MHz signal from fixed frequency generator 1A2A7.
	1.74371 MHz .....	Output level of 1.74371-MHz signal from offset carrier generator 1A2A14.
	1.75629 MHz .....	Output level of 1.75629-MHz signal from offset carrier generator 1A2A14.
	CAL.....	Calibration of CIRCUIT TEST meters.
KHz selector switches (six).....		Select receiving set operating frequency during local mode only.
FREQUENCY KHz digital readout indicators (white).....		Displays six numerals which represent receiving set frequency.
STANDARD INTERNAL-EXTERNAL indicator switch (green/yellow).		Selects internal or external frequency standard and provides visual indication of selection.
FAULT indicator (red).....		Lights to indicate internal fault in synthesizer.
CIRCUIT BREAKER.....		Applies primary power and provides overload protection when in RESET position. Removes primary power when in TRIPPED (or off) position.

**3-3. R-1543/FRR-79 Controls and Indicators (fig. 3-2)**

The controls and indicators applicable to both the main and diversity receivers are listed in the chart below.

**Notes.**

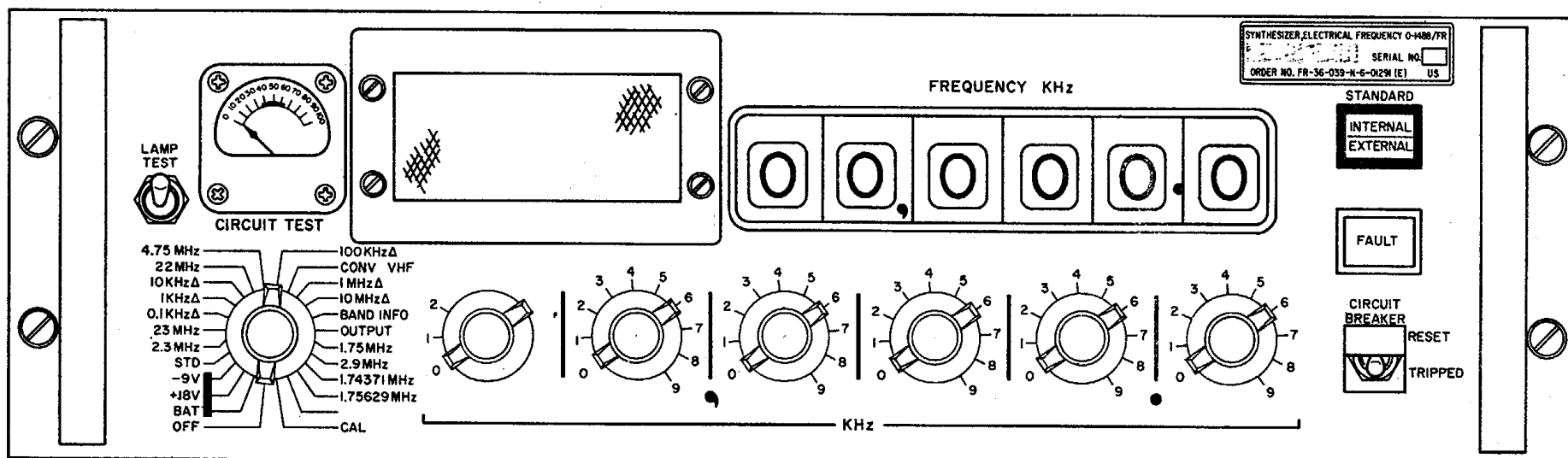
1. The reference designations listed in the chart are for the main receiver (1A3); however, the data provided also applies to the diversity receiver (1A4).
2. The green CIRCUIT TEST switch positions indicate that their respective readings must be within the green portion of the CIRCUIT TEST meter scale.
3. In addition to the controls and indicators listed, there are controls located at the top of the receiver. These controls are set prior to equipment shipment, but may require adjustment due to changing of operating conditions or aging of components. Higher category maintenance personnel will perform these adjustments.

Control

Function

LAMP TEST switch.....	When operated, causes all front panel indicator lamps to light.
CIRCUIT TEST meter.....	Provides go no-go indication in-green area dr a metered level for each switch position of CIRCUIT TEST switch.





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Figure 3-1. Synthesizer, controls and indicator.

*Control or indicator*  
 CIRCUIT TEST switch.....

*Function*  
 Connects CIRCUIT TEST meter to internal test points in R-1534/FRR-79. For each following switch position, a meter indication at a specific value or an indication in green areas signifies that circuit or signal under test is normal.

<i>Sw pos</i>	<i>Causes meter to read</i>
OFF.....	Meter disconnected.
+ 18V.....	+ 18-volt output from receiver power supply 1A3A15.
- 18V.....	18-volt output from receiver power supply 1A3A15.
IF HYB.....	Current drawn by IF hybrid A3.
RF HF.....	Current drawn by amplifier in HF mixer 1A3A20.
RF VHF.....	Current drawn by VHF mixer 1A3A16.
RF VFO.....	Signal level of detected 151.75- to 161.75-MHz signal.
RF LO.....	Signal level of detected 130-, 140-, or 150-MHz signal.
RF AGC.....	Level of age voltage in HF gain equalizer 1A3A21.
B2 IF.....	9-volt reference point in IF amplifier 1A3A10.
B2 AGC.....	Age voltage of IF amplifier 1A3A10.
B1 IF.....	9-volt reference point of IF amplifier of 1A3A12.
B1 AGC.....	Age voltage of IF amplifier 1A3A12.
A1 IF.....	9-volt reference of IF amplifier 1A3A9.
A1 AGC.....	AGC voltage of IF amplifier 1A3A9.
A2 IF.....	9-volt reference of IF amplifier 1A3A11.
A2 AGC.....	Age voltage of IF amplifier 1A3A11.
ANT BAND.....	Band information for bands, 1, 2, and 3. Meter reading is approximately 10 for band 1, 20 for band 2, and 30 for band 3.
LO BAND.....	Band information for bands A, B, and C. Meter reading is approximately 10 for band A, 20 for band B, and 30 for band C.
DISC SW.....	Indicates operation of discriminator relay during tune cycle.

LOCAL-REMOTE CONTROL switch.....

In LOCAL position, places control of receiving set operation at front panels of electrical equipment cabinet. In REMOTE position, local controls are disabled and receiving set is operated from the remote control.

OPERATING MODE indicators (four) (green) -.....

Provide visual display of selected operating channel age time constants.

OPERATING MODE selector switches (four).....

Select one of three available time constants for VOICE, VFCT, or DATA. Fourth position is vacant for system expansion.

<i>Control or indicator</i>
NON-NORM/FAULT indicator (yellow/red).....
TUNE indicator switch (yellow).....
CIRCUIT BREAKER.....

<i>Function</i>
NON-NORM lamp lights when R-1543/FRR-79 is not fully set for remote operation. FAULT lamp lights when R-1543/FRR-79 failure occurs.
Disables automatic frequency control circuits (if activated) and reinitiates receiver pre-selector tuning cycle. The need to press the TUNE switch will normally arise when the frequency selection operation exceeds 20 seconds, which lights the FAULT and TUNE indicator light momentarily, the lamp will extinguish when the tune cycle is completed and the receiver will be tuned to the selected frequency. A momentary flashing of the TUNE lamp during a frequency change is a normal condition. If the TUNE and FAULT lamps remain on after approximately 10 seconds, a tuning fault has occurred. The TUNE switch should be pressed once again. If the fault remains, corrective action is required.
Applies primary power and provides overload protection when in RESET position. In TRIPPED position, removes primary power.

**NOTE**

The green CIRCUIT TEST switch positions indicate that respective readings must be within the green portion of the CIRCUIT TEST meter scale.

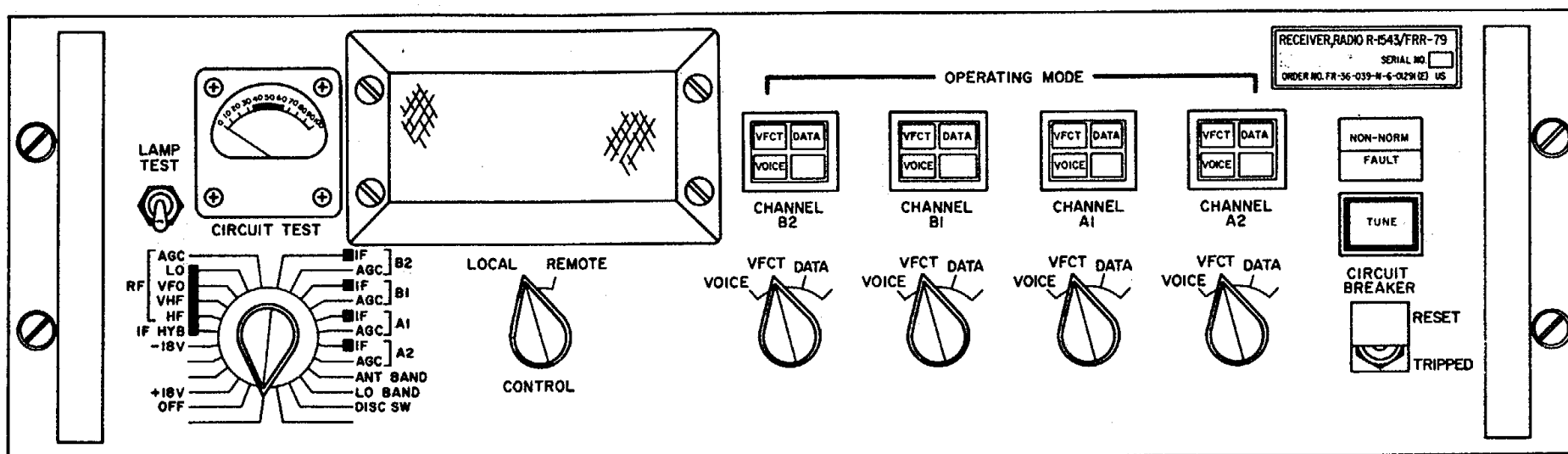
**3-4. Automatic Frequency Control, Controls and Indicators**  
(fig. 3-3)

The controls and indicators for the automatic frequency control are listed in the chart below.

<i>Control or indicator</i>
LAMP TEST switch.....
CIRCUIT TEST Meter.....
CIRCUIT TEST switch.....

<i>Function</i>
When operated, causes all front panel indicator lamps to light.
Provides go-no-go indication in the green area or metered level for each switch position of CIRCUIT TEST switch.
Connects CIRCUIT TEST meter to internal test points in automatic frequency control. Unless otherwise noted, meter indication as a specific value, or indication in green area, for each switch position signifies that signal or circuit under test is normal.

<i>Sw pos</i>	<i>Causes meter to read</i>
OFF.....	Meter disconnected.
CARRIER .....	Detected carrier signal in loop phase detector 1A5A39.
OVEN.....	Current drawn by oven in variable RF oscillator 1A5A31.
1MHz PH DET .....	Output of phase detector in automatic calibration unit 1A5A2.
VCO BIAS.....	Bias voltage on varicap in variable RF oscillator 1A5A31.
LOCAL DET.....	Carrier signal in signal detector 1A5A38.
LOCAL OCS.....	Output of 1.75-MHz local oscillator in signal detector 1A538.
IF AMPL.....	Current drawn by IF carrier amplifier 1A5A13.
1 MHz.....	1-MHz signal in automatic calibration unit 1A5A2.



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Figure 3-2. R-1543/FRR-79, typical, controls and indicators.

<i>Control or indicator</i>	<i>Function</i>
	<i>SV Pos Causes meter to read</i>
21 MHz.....	21-MHz signal in automatic calibration unit 1A5A2.
22 MHz.....	22-MHz signal in automatic calibration unit 1A5A2.
1.75 MHz.....	1.75-MHz reference signal in loop phase detector 1A5A39.
-18 V.....	-18-volt output of automatic frequency control power supply 1A5A10.
+18 V.....	+18-volt output of automatic frequency control power supply 1A5A10.
+18 V STANDBY.....	+18-volts supplied to afc oven.
SERVO-DRIVER.....	Voltage on servo motor in servo assembly 1A5A4.
DET RELAY.....	Phase lock of local oscillator to incoming signal. 0 reading indicates phase lock is accomplished. Center reading indicates phase lock is not accomplished.
RESET RELAY.....	0 when 22-MHz variable RF oscillator in automatic calibration unit is reset by 1-MHz reference signal from synthesizer.
TIMER RELAY.....	Time delay for resetting variable RF oscillator 1A5A31. Meter reading in green area occurs during reset time delay only.
MEMORY RELAY.....	Position of servo assembly. 0 reading indicates servo is disconnected, any meter deflection indicates that servo is connected.
FINE TUNE switch (yellow).....	Enables FINE TUNE control on front panel of automatic frequency control. Overrides afc if afc on is selected.
FINE TUNE control.....	When enabled by FINE TUNE switch, can be used to manually fine tune MAIN receiver to an incoming signal -1 KHz (nominal) about frequency selected at synthesizer.
AFC ON-CARR FAIL indicator switch (green/yellow).	When pressed during local operation, activates automatic frequency control circuits; AFC ON lamp lights to indicate automatic frequency control is selected; CARR FAIL lamp lights when carrier fades, or drifts in frequency outside capture range of afc circuit.
MAIN-DIVERSITY indicator switch..... (green/green).	Selects 1.75-MHz received carrier from main or diversity receiver for use in automatic frequency control.
FAULT indicator (red).....	Indicates a malfunction in AFC power supply.
CIRCUIT BREAKER.....	Protects against, power supply overload.

**3-5. Audio Monitor Controls and Indicators** (fig. 3-4)

The controls and indicators for the audio monitor are listed in the chart below.

*Note.* The green CIRCUIT TEST switch positions indicate that their respective readings must be within the green portion of the CIRCUIT TEST meter scale.

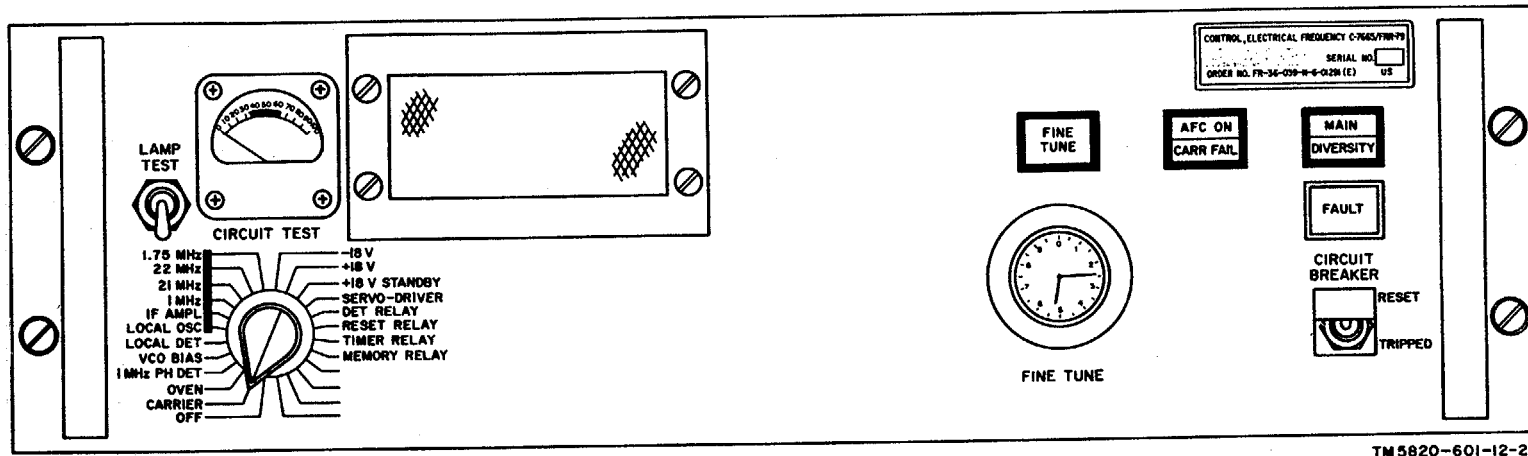


Figure 3-3. Automatic frequency control, controls and indicators.



*Control or indicator*

*Function*

circuits in audio monitor and control converter. Standby power is applied to crystal oven in automatic frequency control and synthesizer, and to memory circuit in control converter. In OPERATE position, power is applied to all components of receiver group.

- CIRCUIT BREAKER..... Protects against power supply overload. Switch has protective cover to prevent inadvertent operation while receiving sets activated. Placing CIRCUIT BREAKER at TRIPPED during standby condition removes primary power from the audio monitor and applies power to all major components of the receiver group except for the control converter.
- MONITOR OUTPUT 6000 jack..... Enables monitoring of audio by a headset from front panel of audio monitor of any line selected by use of MONITOR CHANNEL MAIN-DIVERSITY switch.

**3-6. Remote Control, Controls and Indicators**  
(fig. 3-5)

The controls and indicators for the remote control-are listed in the chart below.

**NOTE**

The seven FUNCTION SET push-button

switches are the locking type and are mechanically interlocked so that only one may be pressed at a time. Pressing a FUNCTION SET push-button switch locks it in its depressed position, and releases other FUNCTION SET push-button switches previously pressed.

*Control or indicator*

*Function*

- POWER ON-OFF switch..... Controls operating power to remote control.
- POWER indicator (green)..... Lights when POWER ON-OFF switch is set to ON to indicate that operating power is applied to remote control.
- CONTROL OVERRIDE indicator (yellow)..... Lights when main receiver LOCAL-REMOTE switch is set to LOCAL to indicate that local control mode is selected at main receiver.
- CONTROL AVAIL indicator (green)..... Lights when LOCAL-REMOTE switch is set to REMOTE to indicate that remote control mode is selected at MAIN receiver.
- READY-FREQ indicator:  
READY (green)..... Lights to indicate that tuning is complete, and receiving set is ready to handle traffic.
- FREQ (green)..... Lights to indicate execution of remote control frequency change command to frequency displayed on six FREQ KHz thumbwheel switches. Changing setting of any FREQ KHz thumbwheel switch turns off RED indicator.
- COMMAND INITIATE push-button switch (momentary contact). When momentarily pressed, initiates execution of a single selected remote control command determined by remote control front panel switch settings.
- FUNCTION SET FREQ push-button switch..... When locked in depressed position, selects a frequency change command to new frequency determined by setting of six FREQ KHz thumbwheel switches. COMMAND INITIATE push-button switch must be momentarily pressed to execute command.



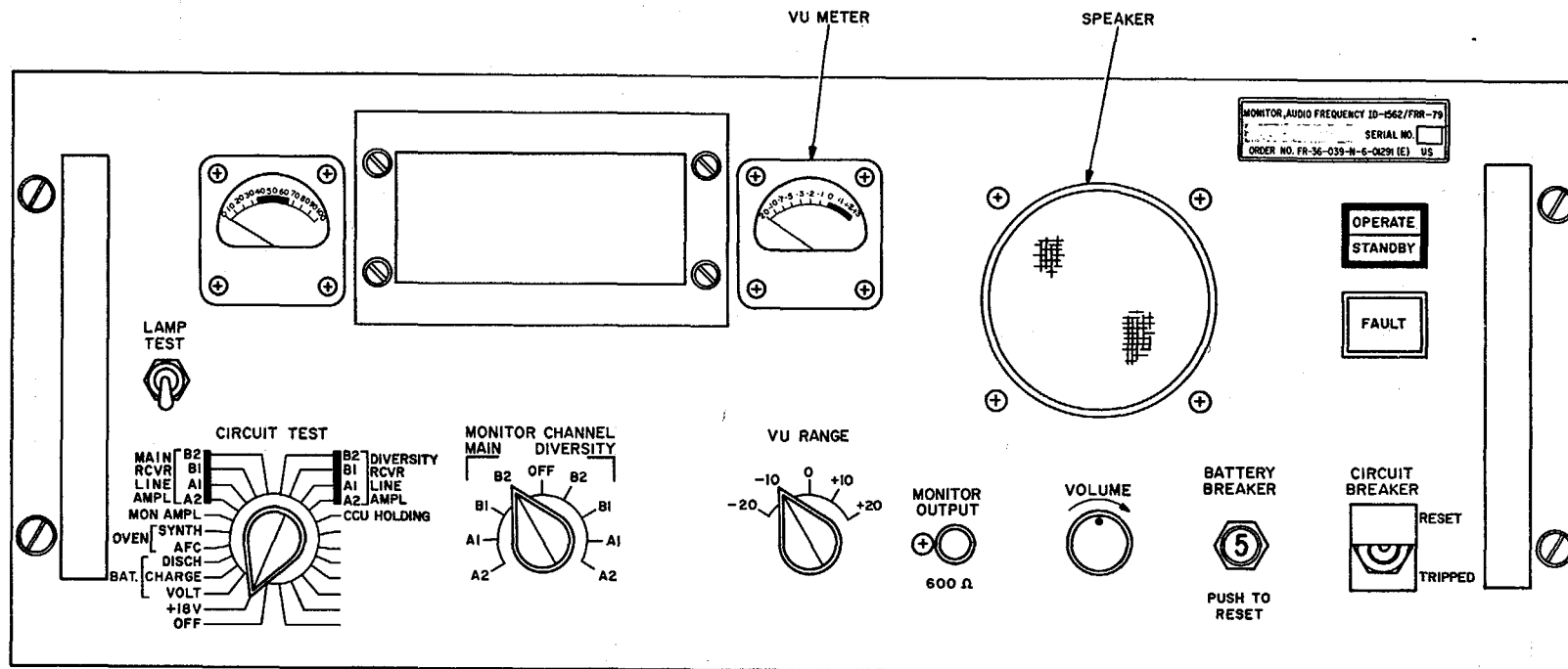


Figure 3-4. Audio monitor, controls and indicators.

<i>Control or indicator</i>	<i>Function</i>
FREQ KHz thumbwheel switches (six).....	Provides means to enter desired frequency into remote control. Each thumbwheel switch represents one of six decimal frequency digits. The frequency is read in KHz directly from the switches. Maximum selectable frequency is 29999.9 KHz; minimum selectable frequency is 2,000.0 KHz.
FUNCTION SET CHAN B2 push-button switch	When locked in depressed position, selects one of three channel B2 age time constant commands, as determined by setting of CHAN B2 VO-VFCT-DATA switch. COMMAND INITIATE push-button switch must be momentarily pressed to execute command. (A spare position is provided for future expansion.)
CHAN B2 VO-VFCT-DATA switch.....	Provides means to enter a VO, VFCT, or DATA age time constant command for channel B2 into remote control. AGC TIME CONSTANTS B2 VO-VFCT-DATA VO, VFCT, or DATA indicator lights to indicate that the last indicator (white).channel B2 age time constant remote control command is executed.
FUNCTION SET CHAN B1 push-button switch	When locked in depressed position, selects one of three channel B1 age time constant commands, as determined by setting of CHAN B1 VO-VFCT-DATA switch. COMMAND INITIATE push-button switch must be momentarily pressed to execute command.
CHAN B1 VO-VFCT-DATA rotary switch.....	Provides means to enter a VO (voice), VFCT, or DATA age time constant command for channel B1 into remote control.
AGC TIME CONSTANTS B1 VO-VFCT-DATA (white).	VO, VFCT, or DATA indicator lights to indicate that the last indicator channel B1 age time constant remote control command is executed.
FUNCTION SET CHAN A1 push-button switch	When locked in depressed position, selects one of three channel A1 age time constant commands, as determined by setting of CHAN A1 VO-VFCT-DATA switch. COMMAND INITIATE push-button switch must be momentarily pressed to execute command.
CHAN A1 VO-VFCT-DATA switch.....	Provides means to enter a VO (voice), VFCT, or DATA age time constant command for channel A1 into remote control.
AGC TIME CONSTANTS A1 VO-VFCT-DATA (white).	VO, VFCT, or DATA indicator lights to indicate that the last indicator channel A1 age time constant remote control command is executed.
FUNCTION SET CHAN A2 push-button switch	When locked in depressed position, selects one of three channel A2 time constant commands, as determined by setting of CHAN A2 VO-VFCT-DATA switch. COMMAND INITIATE push-button switch must be momentarily pressed to execute command.
CHAN A2 VO-VFCT DATA switch.....	Provides means to enter a VO (voice), VFCT, or DATA agc time constant command for channel A2 into remote control.
AGC TIME CONSTANTS A2 VO-VFCT-DATA (white).	VO, VFCT, or DATA indicator lights to indicate that the last indicator channel A2 age time constant remote control command is executed.
FUNCTION SET RCVR push-button switch.....	When locked in depressed position, selects either a R-1543/ FRR-79 operate or a R-1543/FRR-79 standby command, as determined by RCVR OPR-STBY switch setting. COMMAND INITIATE push-button switch must be momentarily pressed to execute command.
RCVR OPR-STBY switch.....	Provides means to enter either R-1543/FRR-79 operate or R 1543/FRR-79 standby command into remote control.
RCVR OPR-STBY indicator (green/yellow).....	Either RCVR OPR or RCVR STBY indicator lights to indicate whether receiving set was set to operate mode or standby mode, respectively, by last remote control command executed.

<i>Control or indicator</i>	<i>Function</i>
FUNCTION SET AFC push-button switch	When locked in depressed position, selects either afc-on or afc-off command, as determined by setting of AFC ON-OFF switch.
momentarily AFC ON-OFF switch	COMMAND INITIATE push-button switch must be pressed to execute command.
AFC ON-OFF indicator (green/yellow)	Provides means to enter either afc-on or afc-off command into command into remote control.
FAULT COMMAND indicator (red)	Either AFC ON indicator or AFC OFF indicator lights to indicate whether afc was set to on or off, respectively, by last afc remote control command executed.
FAULT RCVR indicator (red)	Lights to indicate incorrect response to remote control command initiated at remote control (15-second delay).
FAULT LINK indicator (red)	Lights to indicate that summary fault condition has occurred in receiving set.
LINK FAULT TEST push-button switch (momentary control)	Lights to indicate that fault exists in either or both of telegraph loops interconnecting remote control and control converter.
	Provides means to clear a link fault condition registered in remote control and control converter if their interconnecting telegraph loops are both in operating condition.
<b>3-7. Control Converter, Controls and Indicators</b> (fig. 3-6)	The controls and indicators for the control converter are listed in the chart below.

<i>Control or indicator</i>	<i>Function</i>
POWER 5VDC-28VDC indicator (green/green)	Lights when power is applied to 5- and 28-volt power supplies in remote control.
FAN fuse indicators (two) (red)	Light to indicate that fuse in blower motor circuit has blown.
Power ON-OFF switch ....	Controls operating power to remote control.
FAULT LINK indicator (red)	Lights to indicate that fault exists in either or both of telegraph loops interconnecting remote control and control converter.
	Control converter FAULT LINK indicator can be extinguished by pressing remote control LINK FAULT TEST switch (only if both telegraph loops are in operating condition).

**3-8. Power Distribution Panel, Controls and Indicators** (fig. 3-7)      The controls and indicators for the power distribution panel are listed in the chart below.

<i>Control or indicator</i>	<i>Function</i>
MAIN POWER ON-OFF switch	Applies 115 or 230 volts ac, 47.5 to 440 Hz to the following components in the electrical equipment cabinet: synthesizer, main and diversity receivers, automatic frequency control, audio monitor, and control converter. The remote control obtains its power from remote position power source and not from power distribution panel.
RECEIVER GROUP MAIN POWER indicator (amber).	Lights when MAIN POWER ON-OFF switch is placed at ON.
MAIN POWER 10 AMP fuse-indicators (amber)	Two 10-ampere fuses and associated indicators, one for each side of ac line. Indicators light when fuse blows, indicating overload condition.
SYNTHESIZER 3 AMP fuse-indicators (amber)	Two 3-ampere fuses and associated indicators, one for each side of line, that supply primary power to synthesizer.
MAIN RECEIVER 3 AMP fuse-indicators (amber)	Two 3-ampere fuses and associated indicators, one for each side of ac line, that supply primary power to main receiver.

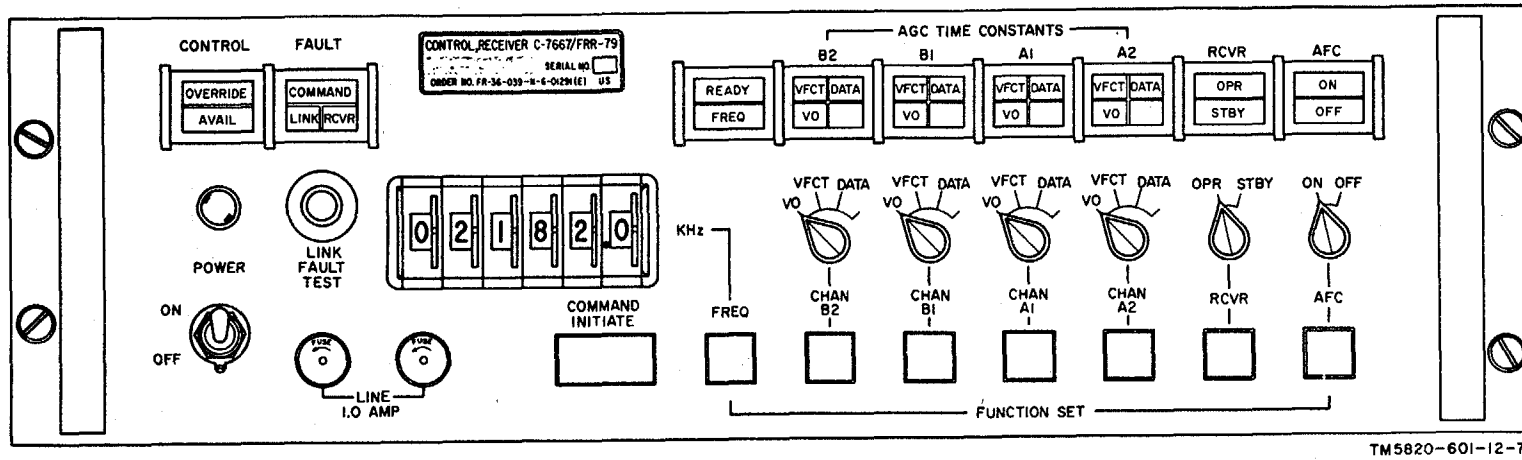
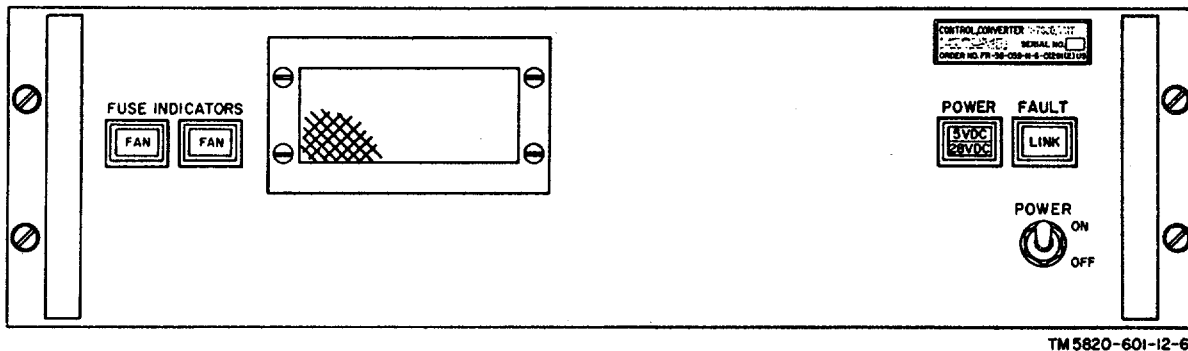


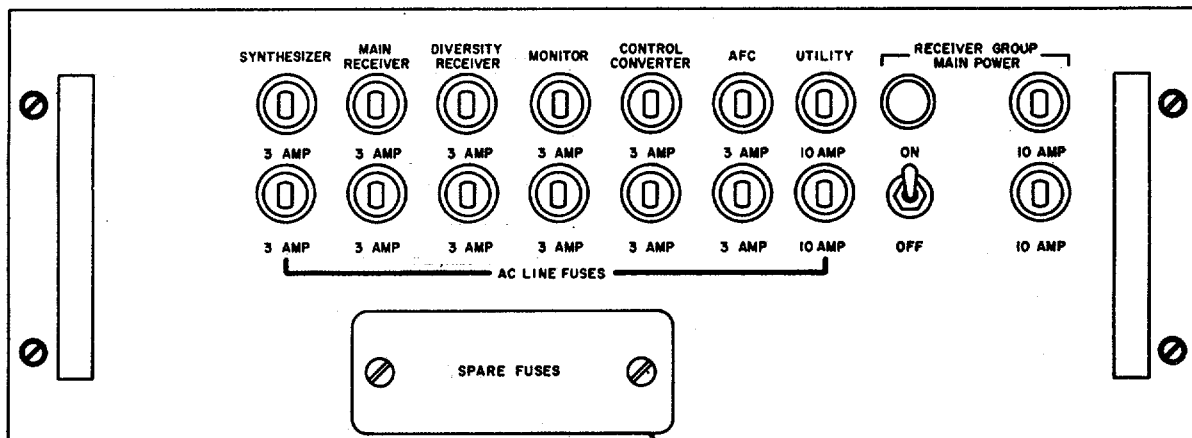
Figure 3-5. Remote control, controls and indicators.



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Figure 3-6. Control converter, controls and indicators.

Control or indicator	Function
UTILITY 10 AMP fuse-indicators (amber)	Two 10-ampere fuses and associated indicators that supply primary power to UTILITY outlet at front of electrical equipment cabinet.
DIVERSITY RECEIVER 3 AMP fuse-indicators (amber)	Two 3-ampere fuses and associated indicators, one for each side of ac line, that supply primary power to diversity receiver.
MONITOR 3 AMP fuse-indicators (amber)	Two 3-ampere fuses and associated indicators, one for each inside of ac line, that supply primary power to audio monitor.
CONTROL CONVERTER-3 AMP-fuse-indicators (amber)	Two 3-ampere fuses and associated indicators, one for each side of ac line, that supply primary power to control converter.
AFC 3 AMP fuse-indicators (amber)	Two 3-ampere fuses and associated indicators, one for each side of ac line, that supply primary power to automatic frequency control.



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Figure 3-7. Power distribution panel, controls and indicators.

## Section II. OPERATION UNDER USUAL CONDITIONS

### 3-9. Modes of Operation

a. The receiver group can be operated locally (from the front panels of the receiver group at the electrical equipment cabinet) or remotely (from the remote control located away from the electrical equipment cabinet). In either mode, the receiving set can receive voice, multichannel teletypewriter, facsimile, data, or keyed continuous wave. Both the local and remote operators have the capability to tune the equipment, change age time constants, operate with or without automatic frequency control, monitor fault and status conditions, and energize receiver group components. Only the local operator, however, can manually fine tune the equipment for a drifting carrier, and monitor audio both visually and aurally.

b. To operate the equipment locally, perform the following procedures:

- (1) Preliminary starting procedure (para 3-10).
- (2) Starting procedure (para 3-11).
- (3) Local operating procedure (para 3-12).
- (4) Stopping procedure (3-16).

c. To operate the equipment remotely, perform the following procedures:

- (1) Preliminary starting procedure (para 3-10).
- (2) Starting procedure (para 3-11).
- (3) Remote operating procedure (para 3-13).
- (4) Changing remote control commands (para 3-14).
- (5) Remote fault condition reset (para 3-15).
- (6) Stopping procedure (para 3-16).

### 3-10. Preliminary Starting Procedure

Perform the following preliminary starting procedure at the receiver group electrical equipment cabinet:

*Note.* Before proceeding, make sure that the power distribution panel MAIN POWER ON-OFF switch (fig. 3-7) is set to OFF.

a. Set the synthesizer (fig. 3-1) switches as follows:

- (1) CIRCUIT BREAKER to TRIPPED.
- (2) KHz selector switches to 02,000.0.
- (3) CIRCUIT TEST switch to OFF.

b. Set the main receiver (fig. 3-2), controls and switches as follows:

- (1) CIRCUIT BREAKER to TRIPPED.
- (2) OPERATING MODE selector switches to VOICE.
- (3) LOCAL-REMOTE CONTROL switch to LOCAL.
- (4) CIRCUIT TEST switch to OFF.

c. Set the diversity receiver (fig. 3-2) switches as follows:

- (1) Check that front panel control cover is in place.
- (2) CIRCUIT BREAKER to TRIPPED.
- (3) CIRCUIT TEST switch to OFF.

d. Set the automatic frequency control (fig. 3-3) switches as follows:

- (1) CIRCUIT BREAKER to Tripped.
- (2) CIRCUIT TEST switch to OFF.

e. Set the audio monitor (fig. 3-4) switches as follows:

- (1) CIRCUIT BREAKER to TRIPPED.
- (2) BATTERY BREAKER PUSH TO RESET switch pulled out.
- (3) VU RANGE switch to 0.
- (4) MONITOR CHANNEL MAIN-DI-VERSITY switch to off position.
- (5) CIRCUIT TEST switch to OFF.

f. Set the control converter (fig. 3-6) POWER switch to OFF.

g. Set the remote control (fig. 3-5) switches as follows:

- (1) POWER ON-OFF switch to OFF.
- (2) RCVR OPR-STBY switch to STBY.
- (3) AFC ON-OFF switch to OFF.

### 3-11. Starting Procedure

*Note.* If an abnormal indication is obtained during the starting procedure, refer to paragraph 4-10 for corrective measures.

With the controls set as outlined in the preliminary starting procedure (para 3-10), perform the procedures given in a through below.

a. Set the power distribution panel (fig. 3-7) MAIN ON-OFF POWER switch to ON.

The RECEIVER GROUP MAIN POWER indicator should light.

- b. Set the audio monitor CIRCUIT BREAKER to RESET. The STANDBY indicator in the OPERATE-STANDBY indicator switch should light. If the OPERATE indicator lights, press the OPERATE-STANDBY indicator switch to STANDBY: the STANDBY indicator should light. Check to see that all FAULT indicators are off.
- c. Press the BATTERY BREAKER PUSH TO RESET switch.
- d. Set the CIRCUIT BREAKER switches on the synthesizer (fig. 3-1), the main and diversity receivers (fig. 3-2), the automatic frequency control (fig. 3-3), and the control converter (fig. 3-6) to RESET.
- e. On the control converter, observe that the FAULT LINK and POWER 5VDC and 28VDC lamps light.
- f. Allow the equipment to warm up for 1 hour.
- g. Set the audio monitor (fig. 3-4) OPERATE/STANDBY indicator switch to OPERATE. The OPERATE lamp should light. On the main receiver, the NON-NORM lamp and the four OPERATING MODE VOICE channel indicator lamps should also light. On the diversity receiver the four OPERATING MODE VOICE channel indicator lamps should also light.

#### NOTE

At the initial turn on of power (using the internal frequency standard), the WAULT lamp on the synthesizer may light due to insufficient warm up time for the frequency standard. After approximately 15 minutes, the lamp should extinguish.

- h. On the automatic frequency control, if the FINE TUNE indicator switch comes on, press it. Observe that either the MAIN or DIVERSITY indicator switch is on, if the AFC ON indicator switch comes on, press it.
- i. If the FAULT indicator lamp lights when at EXTERNAL, place CIRCUIT TEST switch at STD and check for indication of 1 MHz external signal. If the internal frequency standard is desired and the EXTERNAL lamp is lighted, press the INTERNAL/EXTERNAL indicator switch. The INTERNAL lamp should then light.

### 3-12. Local Operating Procedure

To operate the receiving set locally, start the equipment (para 3-10 and 3-11) and proceed as follows:

- a. On the main receiver, select the desired agc time constants by setting the OPERATING MODE selector switches to VCFT or DATA, or leave them in VOICE. The selected mode for each channel will be displayed by the OPERATING MODE indicators on both the main and diversity receivers.
- b. On the synthesizer, set the KHz switches to the desired operating frequency. The FREQUENCY KHz readout indicators will display the selected frequency.

#### NOTE

If the selection of frequency exceeds 20 seconds, the TUNE and FAULT indicators on the main and diversity receivers will come on. Press the TUNE indicator switch to initiate the tuning cycle again. Observe that the TUNE and FAULT indicator lamps go off after approximately 8 seconds.

- c. To monitor audio, rotate the MONITOR CHANNEL switch on the audio monitor to the position corresponding to the main receiver or diversity receiver channel to be monitored. Adjust the VOLUME CONTROL and the Vu range for the desired audio level.

- d. To monitor audio by use of a headset, insert the male plug of the headset into the MONITOR OUTPUT telephone jack on the audio monitor.

#### NOTE

The headset and the front panel speaker cannot be used simultaneously. Plugging a headset into the MONITOR OUTPUT jack opens the circuit to the speaker. Conversely, the speaker is energized only when the headset is removed from the MONITOR OUTPUT jack.

- e. If it is desirable or necessary to tune the receiving set manually to a frequency between the fixed 100Hz increments available at the synthesizer, proceed as follows:

- (1) Set the synthesizer to the nearest 100 Hz increment.
- (2) Press the FINE TUNE switch on the automatic frequency control. (This enables the FINE TUNE control.)
- (3) Monitor the audio using the audio monitor front panel speaker or a headset as described in steps d and e.
- (4) Vary the FINE TUNE control on the automatic frequency control until the proper au

dio output is obtained. It may be necessary to occasionally vary the control to compensate for drift of the incoming carrier signal.

f. Activate or deactivate the automatic frequency control as follows:

**NOTE**

Prior to operating the automatic frequency control, observe that the FINE TUNE indicator switch lamp is off, if not press switch and observe that lamp goes off. Also observe that either the MAIN or DIVERSITY indicator switch lamp is on.

(1) To activate the automatic frequency control, check the AFC ON/CARR FAIL indicator switch on the front panel (fig. 33). If the AFC ON lamp is off, press the switch. The AFC ON lamp should light indicating that the automatic frequency control is activated.

(2) If automatic frequency control is not desired and the AFC ON lamp came on during the starting procedure, press the switch. The lamp will go off. If the AFC ON lamp remained off during the starting procedure, no further action is required.

### 3-13. Remote Operating Procedure

**NOTE**

The two control data loops interconnecting the remote control and the control converter must be in operation to perform any remote control functions.

a. At the receiver group electrical equipment cabinet, perform the preliminary starting procedure (para 3-10) and starting procedure (para 3-11).

**NOTE**

For initial equipment operation, manually trip and then reset both the BATTERY BREAKER and CIRCUIT BREAKER on the audio monitor.

b. On the control converter, check that the POWER switch is set to ON. The 5 VDC/28 VDC POWER lamps and FAULT LINK indicator will light.

c. On the main receiver, set the LOCAL/ REMOTE CONTROL switch to REMOTE. The following displays should appear:

(1) FREQUENCY KHz digital readout indicators will display 00000.0 KHz on the synthesizer.

(2) The FAULT lamps on all front panels will light with the exception of the automatic frequency control and the audio monitor. (3) The VFCT indicator section of the four OPERATING MODE indicators on the receivers will light.

(4) The OPERATE lamp in the OPERATE/STANDBY indicator switch on the audio monitor will remain lit.

(5) The AFC ON lamp in the AFC ON/ CARR FAIL indicator switch on the automatic frequency control, if initially lit will go off.

d. On the remote control, set the POWER switch to ON and wait 20 seconds. The lamps in the POWER, FAULT-LINK, and CONTROL avail indicators will light; all other indicator lamps will remain off.

e. Momentarily press the LINK FAULT TEST switch. The following indications will appear:

(1) The FAULT LINK lamp will go off and the FAULT RCVR lamp will light (the FAULT COMMAND lamp will remain off).

(2) The CONTROL AVAIL lamp will light and the CONTROL OVERRIDE lamp will remain off.

(3) All other remote control indicators will remain off until further remote operator action.

**NOTE**

The lamp in the FAULT LINK indicator on the control converter will also go off when the LINK TEST switch is pressed.

f. Set the RCVR OPR/STBY switch to OPR.

g. Press the FUNCTION SET RCVR push-button switch to its locked-in position.

h. Momentarily press the COMMAND INITIATE push-button switch; the OPR lamp in the RCVR OPR-STBY indicator should light.

i. Set the CHAN B2 VO-VFCT-DATA switch to VO, VFCT, or DATA as desired.

i. Press the FUNCTION SET CHAN B2 push-button switch to its locked-in position.

k. Momentarily press the COMMAND INITIATE push-button switch. The AGC TIME CONSTANTS B2 VO-VFCT-DATA indicator will light in accordance with the CHAN B2 VO-VFCT-DATA switch setting.

l. Set the CHAN B1 VO-VFCT-DATA switch to VO, VFCT, or DATA as desired.



- m. Press the FUNCTION SET CHAN B1 push-button switch to its locked-in position.
- n. Momentarily press the COMMAND INITIATE push-button switch. The AGC TIME CONSTANTS B1 VO-VFCT-DATA indicator will light in accordance with the CHAN B1 VOVFCT-DATA switch setting.
- o. Set the CHAN AI VO-VFCT-DATA switch to VO, VFCT, or DATA as desired.
- p. Press the FUNCTION SET CHAN AI push-button switch to its locked-in position.
- q. Momentarily press the COMMAND INITIATE push-button switch. The AGC TIME CONSTANTS AI VO-VFCT-DATA indicators will light in accordance with the CHAN AI VOVFCT-DATA switch setting.
- r. Set the CHAN A2 VO-VFCT-DATA switch to VO, VFCT, or DATA as desired.
- s. Press the FUNCTION SET CHAN A2 push-button switch to its locked-in position.
- t. Momentarily press the COMMAND INITIATE push-button switch. The AGC TIME CONSTANTS A2 VO-VFCT-DATA indicator will light in accordance with the CHAN A2 VOVFCT-DATA switch setting.
- u. Set the desired operating frequency, using the six FREQ KHz thumbwheel switches.
- v. Press the FUNCTION SET FREQ push-button switch to its locked-in position.
- w. Momentarily press the COMMAND INITIATE push-button switch. The FREQ lamp in the READY-FREQ indicator will light within 2 seconds and the lamp FAULT RCVR indicator will extinguish. The READY lamp in the READY FREQ indicator will light within 10 seconds to indicate that the receiving set is ready to handle traffic.
- x. If the afc-on mode is desired, set the AFC ON-OFF switch to ON to activate automatic frequency control circuits.
- y. Press the FUNCTION SET AFC push-button switch to its locked-in position.
- z. Momentarily press the COMMAND INITIATE push-button switch. The AFC ON-OFF indicator will light in accordance with the AFC ON-OFF switch setting.

### 3-14. Changing Remote Control Commands

To change frequency or agc time constants, or remove automatic frequency control by use of the remote control, perform the procedures given in a, b, and c below.

a. *Frequency Change.* Change the frequency as follows:

- (1) Set the desired frequency, from 02000.0 to 29999.9 KHz, using the six FREQ KHz thumbwheel switches. The FREQ lamp in the READY/ FREQ indicator will go off with the first change in any FREQ KHz thumbwheel switches.
- (2) Press the FUNCTION SET FREQ switch to its locked-in position.
- (3) Momentarily press the COMMAND INITIATE switch. The READY lamp in the READY/FREQ indicator, if initially lit, will go off. (If the FREQ KHz switches were initially at the desired setting, and were not changed in step (1) above, the FREQ lamp will go off with the READY lamp, instead of a change in FREQ KHz switch settings.)
- (4) The FREQ lamp will light within 2 seconds. The READY lamp will then light within 10 seconds, indicating that the receiving set is ready for traffic at the new frequency.

b. *Agc Time Constant Change.* The agc time constant may be changed for any of the four channels (B2, B1, AI, or A2) from the remote control as follows:

- (1) Set the CHAN VO-VFCT-DATA switch for the desired channel (B1, B2, B3, AI, or A2) VO, VFCT, or DATA.
- (2) Press the FUNCTION SET CHAN switch for the desired channel (B2, B1, AI, or A2) to its locked-in position.
- (3) Momentarily press the COMMAND INITIATE push-button switch. The initially lit lamp in the AGC TIME CONSTANTS VO- VFCT-DATA indicator for the selected channel (B2, B1, AI, or A2) will extinguish, and the VO, VFCT, or DATA indicator will light in accordance with the CHAN VO-VFCT-DATA switch setting.

c. *Afc ON-OFF Change.* Set the automatic frequency control either ON or OFF from the remote control as follows:

- (1) Set the AFC ON-OFF switch to the position corresponding to the desired automatic frequency control condition.
- (2) Press the FUNCTION SET AFC push-button switch to its locked-in position.
- (3) Momentarily press the COMMAND

initiate push-button switch. The lamp initially lit in the AFC ON-OFF indicator (para 3-12f) will extinguish, and the ON or OFF lamp will light in accordance with the AFC ON-OFF switch setting.

### 3-15. Remote Control Fault Condition Reset

The remote control subsystem command fault and link fault conditions may be reset from the remote control as follows:

*a. Command Fault Reset.* The command fault condition may be cleared, and the FAULT COMMAND indicator turned off, by momentarily pressing the COMMAND INITIATE push-button switch to re-initiate the command in which the fault occurred. If this action does not turn off the FAULT COMMAND indicator, refer to paragraphs 4-9 and 4-10.

*b. Link Fault Reset.* The link fault condition may be cleared and the FAULT LINK indicator on the remote control turned off by momentarily pressing the remote control LINK FAULT TEST switch. If this action does not turn off the FAULT LINK lamp, corrective maintenance is required. Refer to paragraphs 4-9 and 4-10.

### 3-16. Stopping Procedure

The entire receiving set may be placed in standby or shutdown as follows. Use the procedure in a (local) or b (remote) depending on existing equipment of operation.

*a. Local Mode of Operation.* With the receiving set in the local mode, perform the following steps at the receiver group:

(1) To place the receiving set in standby, press the OPERATE/STANDBY indicator switch on the audio monitor. The OPERATE lamp will go off and the STANDBY lamp will light.

#### NOTE

Standby is the normal nonoperating condition for the equipment. During standby the crystal ovens are kept energized by the audio monitor battery pack to maintain crystal stability. If the equipment is shutdown, at least 1 hour of warm-up time is required.

(2) To shut down the receiving set, place the MAIN POWER switch on the power distribution panel to OFF and pull out the BATTERY BREAKER switch on the audio monitor. This removes primary power from all components of the receiving set except the remote control.

*b. Remote Mode of Operation.* Starting with the equipment in the remote mode, place the receiving set in standby or shut down the equipment as follows:

(1) On the remote control, set the RCVR OPR/STBY switch to STBY.

(2) Press the FUNCTION SET RCVR switch to its locked-in position.

(3) Momentarily press the COMMAND INITIATE switch. The RCVR OPR lamp will go off and the RCVR STBY lamp will light, signifying that the receiving set is now in standby.

(4) To shut down the remote control subsystem, return the control of the receiving set to the local operator by setting the LOCAL/REMOTE CONTROL switch on the main receiver to LOCAL (fig. 3-2).

(5) On the remote control place POWER ON/OFF switch at OFF. Observe that all indicator lamps go off.

(6) On the control converter observe that the FAULT-LINK lamp comes on when power is removed from remote control. Set the POWER switch to OFF. The POWER +5 VDC, +28 VDC and FAULT-LINK lamps will go off.

#### NOTE

If desired, frequency and channel AGC time constants may be set into the receivers prior to setting the LOCAL/ REMOTE switch to the LOCAL position. All other local control operations must be performed with this switch in the LOCAL position.

(7) On the remote control, observe that the FAULT LINK and CONTROL OVERRIDE lamps are lit and that all other remote control indicators (except the POWER lamp) are off.

(8) Set the POWER switch on the remote control to off. All lamps will go off.

#### NOTE

The receiving set is now in standby and in the local mode of operation. To shut down the receiving set, follow the procedure given in paragraph 3-16a(2) above.

## CHAPTER 4

OPERATOR'S MAINTENANCE INSTRUCTIONS

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**4-1. Scope of Operator's Maintenance**

The maintenance duties assigned to the operator of Receiving Set, Radio AN/FRR-79 are listed below together with a reference to the paragraphs covering the specific maintenance function. The duties include performing preventive and corrective maintenance and do not require the use of tools or test equipment.

- a. Operator's daily preventive maintenance checks and services chart (para 4-5).
- b. Operator's weekly preventive maintenance checks and services chart (para 4-6).
- c. Cleaning (para 4-7).
- d. Remote control command checkout (para 4-8).
- e. Troubleshooting (para 4-9 and 4-10).
- f. Repairs and adjustments (para 4-11).

**WARNING**

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

**4-2. Materials Required**

The following materials are required for operator's maintenance.

- a. TRICHLOROTRIFLUOROETHANE NSN 6850-00-105-3084.
- b. Brush.
- c. Lint-free cloth (FSN 8305-267-3015).
- d. No. 00 or 000 sandpaper.
- e. Detergent.

**4-3. Operator's Preventive Maintenance**

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, reduce downtime, and assure that the equipment is serviceable.

a. *Systematic Care.* The procedures given in paragraphs 4-4 through 4-7 cover routine systematic care and cleaning essential to the proper upkeep of the equipment.

b. *Preventive Maintenance Checks and Services.* The preventive maintenance checks and services charts (para 4-5 and 4-6) outline functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat-serviceable condition; that is, in good general (physical) condition and in good operation condition. To assist operators in maintaining combat serviceability, the chart indicates what to check, how to check, and what the normal conditions are; *the References* column lists the paragraphs that contain detailed maintenance procedures. If a defect is observed, refer to the troubleshooting chart (para 4-10). Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

**4-4. Operator's Preventive Maintenance Checks and Services Period**

Daily and weekly preventive maintenance checks and services must be performed on the AN/FRR-79.

a. The operator's daily preventive maintenance checks and services chart (para 4-5) specifies the checks which must be made on a daily basis.

b. The operator's weekly preventive maintenance checks and services chart (para 4-6) specifies the checks which must be made during scheduled downtime weekly preventive maintenance periods.

**4-5. Operator's Daily Preventive Maintenance Checks and Services Chart**

<i>Sequence</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
1	Cables and connections (entering and leaving equipment).	Check all cables for evidence of chafing, cracking, or excessive strain. Check all electrical connectors for dents, cracks, or chips.	Refer to higher category of maintenance for replacement
2	Exterior surfaces	Clean exterior surfaces of electrical equipment cabinet and each major component front panel. Clean meter glasses and window covering synthesizer digital readout indicators.	Paragraph 4-7.
3	Knobs, dials, and switches	Observe mechanical action of each knob, dial, and switch for smoothness and freedom from external or internal binding.	Paragraph 4-11.
4	Fuses	Check power distribution panel fuse-indicator. All fuse-indicators should be off when MAIN ON-OFF POWER switch is set to ON.	Paragraph 4-10.
5	Blowers	Place hand in front of filters on synthesizer, main and diversity receivers, automatic frequency control, and audio monitor. Be sure that there is an adequate flow of air.	Paragraph 4-10.
6	Lamps	On front panels of major components, press LAMP TEST switch. Be sure that all indicator lamps light.	Paragraph 4-10.
7	Synthesizer circuit	Rotate synthesizer CIRCUIT TEST switch to each position marked green, and note that CIRCUIT TEST meter indication is in green area.	Paragraph 4-10.
8	Main and diversity receiver circuits.	Rotate main and diversity receivers CIRCUIT TEST switches to each position marked green, and note that corresponding CIRCUIT TEST meter indication is in green area.	Paragraph 4-10.
9	Automatic frequency control circuit.	Rotate automatic frequency control CIRCUIT TEST switch to each position marked green, and note that corresponding CIRCUIT TEST meter indication is in green area.	Paragraph 4-10.
10	Audio monitor circuit	Rotate audio monitor CIRCUIT TEST switch to each position marked green, and note that corresponding CIRCUIT TEST meter indication is in green area.	Paragraph 4-10.

**4-6. Operator's Weekly Preventive Maintenance Checks and Services Chart**

<i>Sequence No</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>Reference</i>
1	Local frequency selection	On synthesizer, rotate each KHz selector switch through all positions, and note that associated FREQUENCY KHz digital readout indicator provides proper readouts.	Refer to higher category-of maintenance-
2	Local age time constant selection	On the main receiver, rotate each OPERATING MODE selector switch through all four positions, and note that associated OPERATING MODE indicators on both main and diversity receivers provide proper displays.	Refer to higher category-of maintenance

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
3	Remote frequency selection	Tune receiving set to various frequencies from remote control; note frequency readings on synthesizer.	Paragraph 4-8.
4	Remote agc time constant selection	Select age time constants from remote control note indications on main and diversity receivers OPERATING MODE indicators.	Paragraph 4-8.

#### 4-7. Cleaning

All exterior surfaces of the equipment should be free of dirt, grease, and fungus. Perform the following procedures as specified in the preventive maintenance checks and services charts.

- a. Remove moisture and loose dirt with a clean, soft cloth.

##### WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLO- ROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

##### CAUTION

Do not use the Trichlorotrifluoroethane on the plastic windows which cover the synthesizer digital readout indicators; the windows will become damaged.

- b. Remove grease, fungus, and ground-in dirt from the exterior surfaces of the electrical equipment cabinet and the remote control with a cloth dampened (not wet) with Trichlorotrifluoroethane. Wipe surfaces dry with a clean, dry, lint-free cloth.

##### CAUTION

Do not press on the meter faces; excessive pressure can break the meter face and cause damage to the meter movement.

- c. Clean the front panel and controls; use a clean, soft cloth. If dirt is difficult to remove, dampen the cloth in water; if necessary, use a mild detergent.

d. To preserve the appearance of the equipment and reduce corrosion, retouch painted surfaces where paint has been gouged or scraped off. Before repainting a defective area, use Trichlorotrifluoroethane to remove dirt, dust, grease, and other foreign matter. Use #00 or #000 sandpaper (FSN 5350-271-7939) and Trichlorotrifluoroethane to clean the surface down to the bare metal. Use a clean, soft cloth to remove loose dust and metal particles. Brush two thin coats of paint on the bare metal. Refer to the applicable cleaning and refinishing practices specified in TM 43-0139 and TB 43-0118.

e. Remove the air filter elements from the electrical equipment cabinet front panels. Clean dirty filter elements by brushing off loose dirt with a dry brush, or vacuum if a vacuum cleaner is available. Soak each element in water which contains a mild detergent. Dry elements thoroughly before replacing.

#### 4-8. Remote Control Command Checkout

Use the procedures given below to check the ability of the remote control, to change the operating frequency and time constant of the receiver group.

##### NOTE

**If the results obtained in the procedures are not correct, refer to the higher category of maintenance.**

- a. Establish communication with the remote control site.
- b. Place the receiving set in the remote mode in accordance with the preliminary starting procedure (para 3-10) and the starting procedure (para 3-11).
- c. Instruct the remote operator to tune the receiving set to 11,111.1 KHz from the remote control (para 3-13). Check to see that the synthesizer FREQUENCY KHz digital readout indicators display 11,111.1 KHz.
- d. Instruct the remote operator to tune the receiving set to each of the frequencies listed below, using procedures given in paragraph 3-14a Check to see that equivalent frequencies are displayed on the synthesizer.

- (1) 22,222.2 KHz.
- (2) 3,333.3 KHz.
- (3) 4,444.4 KHz.
- (4) 5,555.5 KHz.

- (5) 6,666.6 KHz.
- (6) 7,777.7 KHz.
- (7) 8,888.8 KHz.
- (8) 9,999.9 KHz.

e. Instruct the remote operator to select the age time constants for voice (para 3-13). Check to see that the main and diversity receivers OPERATING MODE indicators display VOICE.

f. Instruct the remote control operator to select vfct and data age time constants using procedures given in paragraph 3-14b. Check to see that the proper display appears on the main and diversity receivers.

g. Instruct the remote operator to place the receiving set in the afc-on and afc-off conditions (para 3-13x and 3-14c). Check to see that the automatic frequency control AFC ON-CARR FAIL indicator displays the proper indication.

**4-9. Operator Troubleshooting**

Operator troubleshooting is confined to localizing the trouble to a defective major component, or to such exterior items as panel lamps, fuses, knobs, improper mating of connectors, or defective cables or connectors. Operator troubleshooting of the receiving set is based on the daily and weekly operational checks specified in the operator's preventive maintenance checks and services charts (para 4-5 and 4-6). To troubleshoot the equipment, perform all the checks in sequence in the operator's daily and weekly preventive maintenance checks and services charts. When an abnormal indication or result is obtained, note the reference in the *References* column and perform the corrective measures indicated in the operator's troubleshooting chart (para 4-10). If the corrective measures do not eliminate the malfunction, a higher category maintenance repair is required.

**4-10. Operator's Troubleshooting Chart**

<i>No.</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measure</i>
1	Starting procedure cannot be accomplished.	Defective control or component in receiver group.	Refer to higher category maintenance
2	Power distribution panel fuse-indicator lights.	Blown fuse	Paragraph 4-11.
3	Equipment cannot be placed in operational status.	Defective control or component in receiver group.	Refer to higher category maintenance-
4	No air movement felt at air intake on front panel of components.	a. Obstruction at air intake or outlet.  b. Dirty air filter----- c. If FANS fuse-indicator is Lighted, fuse in control converter is blown. d. Defective blower motor, or associated circuit.	a. Remove filter element and check for obstruction. Check for obstruction at air outlet at rear of components chassis. b. Clean air filter. c. Replace fuse (para 4-11).  d. Refer to higher category maintenance.
5	Lamp on front panel of major component does not light when LAMP TEST switch is pressed and power is applied to major component.	a. Defective lamp ----- b. Defective lampholder assembly	a. Replace lamp (para 4-11). b. Refer to higher category maintenance.
6	Synthesizer circuit tests produce out-of-green-area in TEST meter.	Defective synthesizer -----	Refer to higher category maintenance.
7	Main receiver or diversity receiver circuit tests produce out-of-green-area indication on CIRCUIT TEST meter.	Defective receiver -----	Refer to higher category maintenance.

<i>Item No.</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Checks and corrective measures</i>
8	Automatic frequency control circuit tests produce out-of-green-area indication on CIRCUIT TEST meter.	Defective automatic frequency control.	Refer to higher category maintenance.
9	Audio monitor circuit tests produce out-of-green-area indication of CIRCUIT TEST meter.	Defective audio monitor	Refer to higher category maintenance.
10	Local operation cannot be accomplished.	Defective control, indicator, or component in receiver group.	Refer to higher category maintenance.
11	Remote operation cannot be accomplished.	Defective remote control, or control converter.	Refer to higher category maintenance.

#### 4-11. Operator Repairs and Adjustments

##### a. Replacement of Indicator Lamps.

#### NOTE

This procedure is applicable to all indicators and indicator switch assemblies, except the main and diversity receivers OPERATING MODE indicator assemblies. To remove the OPERATING MODE indicator assemblies, pull them forward until a indent is felt. Rotate the OPERATING MODE indicator assemblies 90° counterclockwise and remove them from the front panel.

- (1) Grasp indicator assembly by inserting fingernails into slots provided on sides of indicator assembly and pull forward.
- (2) With the fingernails, grasp the lamp by the flange and pull forward, and rotate assembly 90° to release.
- (3) Insert a new lamp into the socket and apply slight pressure to seat the lamp properly.
- (4) Insert the indicator assembly into the chassis socket and apply slight pressure until locking detent is felt (or heard) falling into position, then rotate assembly 90° clockwise and press in.

##### b. Replacement of Control Knobs.

- (1) Mentally record the pointer position of the control knob to be replaced.
- (2) With an Allen Wrench, loosen the two Set screw and remove the knob from the shaft by pulling it forward.
- (3) Position a new knob on the shaft with the pointer oriented to its original position.
- (4) With the Allen Wrench, tighten the two Set screw.

c. *Replacement of Fuses.* There are 16 fuse indicators on the power distribution panel. If the indicator lamp lights, the associated fuse is blown. Replace a blown fuse as follows:

- (1) Turn the fuse-indicator counterclockwise and remove the fuse holder from the front panel.
- (2) Remove and discard the blown fuse from the fuse holder.
- (3) Remove the two screws which secure the spare fuse cover. Select a fuse with the same current rating from the spare fuse panel.
- (4) Insert the replacement fuse in the fuse holder' and reinsert the fuse holder into the fuse indicator.
- (5) Replace the spare fuse cover.

#### CAUTION

If the fuse-indicator lights after replacement of a fuse, an overload condition is evident. Refer to a higher category of maintenance for corrective action.

CHAPTER 5

ORGANIZATIONAL MAINTENANCE

Section I. GENERAL

5-1. Scope of Organizational Maintenance

a This chapter contains instructions covering organizational maintenance procedures for Receiving Set, Radio AN/FRR-79 which are performed in addition to the operator's preventive maintenance (para 4-1 through 4-11).

b. Organizational maintenance consists of the following:

- (1) Monthly preventive maintenance checks and services (para 5-3 and 5-4).
- (2) Quarterly preventive maintenance checks and services (para 5-5 and 5-6).
- (3) Troubleshooting (para 5-12, 5-13, and 5-14).
- (4) Battery pack inspection and testing (para 5-11).
- (5) Replacement of spare fuses and lamps.

**WARNING**

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

5-2. Tools, Materials, and Test Equipment Required

The tools, materials, and test equipment required for organizational maintenance are as follows:

- a. *Tools.* Tool Kit, Radio Repair TK-115/G.
- b. *Materials.*
  - (1) TRICHLOROTRIFLUOROETHANE NSN 6850-00-105-3084.
  - (2) Cleaning cloth (FSN 8305-267-3015).
- c. *Test Equipment.* None.

5-3. Organizational Monthly Preventive Maintenance

Perform the maintenance checks and services listed in the organizational monthly preventive maintenance checks and services chart (para 5-4) once each month. A month is defined as approximately 30 calendar days of 8-hour-per-day operation. If the equipment is operated 16 hours a day, the monthly preventive maintenance checks and services should be performed at 15-day intervals. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. Equipment maintained in a standby (ready for immediate operation) condition must have monthly preventive maintenance checks and services performed on it. Equipment in limited storage (requires service before operation) does not require monthly preventive maintenance. All deficiencies or shortcomings will be recorded in accordance with the requirements of TM 38-750.

5-4. Organizational Monthly Preventive Maintenance Checks and Services Chart

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
1	Audio monitor battery pack	Partially withdrawn audio monitor from electrical equipment cabinet. Perform the battery inspection and testing procedure.	Paragraph 5-11.
2	Cables and connectors	Open rear door of electrical equipment cabinet and inspect all interconnecting cables, connectors, and wiring harness for signs of deterioration, chafing, or excessive strain.	Refer to higher category maintenance
3	Component mounting slides	Slide out each receiver group component in electrical equipment cabinet. Slides should operate smoothly without excessive noise or binding.	Refer to higher category maintenance
4	Air filters	Check to see that all air filters are in	Paragraph 4-7e.



<i>Sequence No</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
5	Main or diversity receiver preselector sensitivity. <i>Note.</i> This procedure is to be used to maintain main or diversity receiver sensitivity.	place and clean. Replace and/or clean air filters as necessary. a. Perform the local operating procedure and establish that the main or diversity receiver will tune at some frequency between 2 and 4.999 MHz. b. Depress the TUNE switch for 15 seconds at the frequency selected. c. Repeat steps a and b above at a frequency between 5 and 11.999 MHz. d. Repeat steps a and b above at a frequency between 12 and 29.999 MHz.	Paragraph 3-12.

**5-5. Organizational Quarterly Preventive Maintenance**

Quarterly preventive maintenance check and services are required on the AN/FRT-79. The monthly checks and services (para 5-4) constitute a part of the quarterly maintenance and must be performed concurrently. Record all deficiencies in accordance with the requirements of TM 38-750.

**NOTE**

If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing equipment operation. All of the checks- and services should be performed only when the equipment is shut down.

**5-6. Organizational Quarterly Preventive Maintenance Checks and Services Chart**

<i>Sequence No</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
1	Completeness	Check to see that equipment is complete	Appendix B.
2	Installation	Check to see that equipment is properly installed.	Paragraph 2-9.
3	Preservation	Check all surfaces for evidence of fungus. Remove rust and corrosion and spot-paint bare spots.	Paragraph 4-7.
4	Publications	Check to see that all publications are complete, serviceable, and current.	DA Pam 310-4.
5	Modifications	Check DA Pam 310-7 to determine if new applicable MWO's have been published. ALL URGENT MWO's must be applied immediately. ALL ROUTINE MWO's must be scheduled.	TM 38-750, DA Pam 310-7.
6	Mounting	washers are correctly tightened. Check to see that all bolts, nuts, and	Refer to higher category washers are correctly
7	Cable harnesses and retractors	maintenence. for cracked, bent, or broken slides and retractors. Open rear door of electrical equipment cabinet and check to see that cable harnesses are properly bound and clamped in place. Check cable insulation for cracking, fraying, or other evidence of damage. Check to see that cable retractors, work smoothly without binding	Refer to higher category maintenance.
8	Component top and bottom covers and check maintenance	Individually pull out each component on its top and bottom covers. Covers should be mounted securely.	Refer to higher category electrical equipment cabinet

<i>Sequence No.</i>	<i>Item to be inspected</i>	<i>Procedure</i>	<i>References</i>
9	Visual inspection	Inspect all receiver group components, as-  evidence of damage or deterioration. Check for blackened resistors, charred insulation, leaky electrolytic capacitors, etc. Replace all damaged or deteriorated assemblies and parts.	Refer to higher assemblies, and parts for category maintenance
10	Starting procedure .	Perform starting procedure	Paragraphs 3-10 and 3-11.
11	Local operating procedure	Perform local operating procedure	Paragraph 3-12.
12	Remote operating procedure	Perform remote operating procedure	Paragraph 3-13 and 3-14.
13	Synthesizer circuit tests	Perform synthesizer circuit tests using CIRCUIT TEST switch and CIRCUIT TEST meter.	Paragraph 5-7.
14	Main and diversity receiver circuit tests.	Perform main and diversity receiver circuit tests using respective CIRCUIT TEST switch and CIRCUIT TEST meter	Paragraph 5-8.
15	Automatic frequency control tests	Perform automatic frequency control circuit tests using CIRCUIT TEST switch and CIRCUIT TEST meter.	Paragraph 5-9.
16	Audio monitor circuit tests	Perform audio monitor circuit tests using CIRCUIT TEST switch and CIRCUIT TEST meter.	Paragraph 5-10.
17	Battery pack	Perform battery pack inspection and testing	Paragraph 5-11.
18	Spare parts	Check all spare parts (operator and organizational) for general condition and method of storage. There should be no evidence of overstock, and all shortages must be on valid requisitions.	Appendix B.

**5-7. Synthesizer Circuit Tests**

To perform synthesizer circuit tests, set the CIRCUIT TEST switch to OFF; then rotate the CIRCUIT TEST switch clockwise to each position listed in the chart below and note whether the CIRCUIT TEST meter indication obtained differs from that listed in the chart. If a meter indication is out of tolerance, refer to a higher category of maintenance.

<i>CIRCUIT TEST switch position</i>	<i>CIRCUIT TEST meter indication</i>
BAT	Green area
+ 18V	50 t 6
- 9V	50 ± 6
STD	50 S 10
2.3 MHz	20 min.
23 MHz	20 min.
0.1 kHz	20 min.
1 KHZA	20 min.
10 kHz	20 min.
22 MHz	20 min.
4.75 MHz	20 min.
100 KHz	20 min.
CONV-VHF	20 min.
1 MHz	20 min.
10 MHz	20 min.
BAND INFO	50 t 10
OUTPUT	20 min.
1.75 MHz	30 to 80
2.9 MHz	50 + 20
1.74371 MHz	50 ± 20
1.75629 MHz	50 ±20
Blank	-
CAL	Set to 10X

**5-8. R-1534/FRR-79 Circuit Tests**

To perform main or diversity receiver circuit tests, set the CIRCUIT TEST switch to OFF, then rotate the CIRCUIT TEST switch clockwise to each position listed in chart below and note whether the CIRCUIT TEST meter indication obtained differs from that listed in the chart. If a meter indication; is out of tolerance, refer to a higher category of maintenance.

<i>CIRCUIT TEST switch position</i>	<i>CIRCUIT TEST meter indication</i>
+ 18V	50 ± 6
- 18V	50 + 6
IF HYB	Green area
RF HF	Green area (typ) to 90 (max)
RF VHF	Green area
RF VFO	Green area
RF LO	Green area
RF AGC	0 (no signal)

<i>CIRCUIT TEST switch position</i>	<i>CIRCUIT TEST meter indication</i>
B2 IF	Green area
B2 AGC	0 to 20 (no signal) 0 to 70 (signal)
B1 IF	Green area
B1 AGC	0 to 20 (no signal) 0 to 70 (signal)
A1 IF	Green area
A1 AGC	0 to 20 (no signal) 0 to 70 (signal)
A2 IF	Green area
A2 AGC	0 to 20 (no signal) 0 to 70 (signal)
<b>Note.</b> Wait 30 seconds for reading to stabilize in the following tests.	
ANT BAND	10 ± 4 (synthesizer 2 to 4.9999 MHz). 20 ± 4 (synthesizer 5 to 11.9999 MHz). 30 ± 4 (synthesizer 12 to 29.9999 MHz).
LO BAND	10 ± 4 (synthesizer 2 to 9.9999 MHz). 20 ± 4 (synthesizer 10 to 19.9999 MHz). 30 ± 4 (synthesizer 20 to 29.9999 MHz).
DISC SW	Momentary meter deflection during time cycle.

**5-9. Automatic Frequency Control Circuit Tests**

To perform automatic frequency control circuit tests, set the CIRCUIT TEST switch to OFF; then rotate the CIRCUIT TEST switch clockwise to each position listed in chart below and note whether the CIRCUIT TEST meter indication obtained differs from that listed in the chart. If a meter indication is out of tolerance, refer to a higher category of maintenance repair.

**NOTE**

The meter indications listed are for nonreceived-signal condition only.

<i>CIRCUIT TEST switch position</i>	<i>CIRCUIT TEST meter indication</i>
CARRIER	Random (40 maximum)
OVEN	Green area
1.MHz PH DET	To random
VCO BIAS	Green area
LOCAL DET	Random (40 maximum)
LOCAL OSC	Green area
IF AMPL	Green area
1 MHz	Green area
21 MHz	Green area
22 MHz	Green area
1.75 MHz	Green area
- 18 V	50 ± 6
+ 18 V	50 ± 6
+ 18 V STDBY	Green area
SERVO DRIVER	Green area
DET RELAY	Green area
RESET RELAY	Green area
TIMER RELAY	0
MEMORY RELAY	0

**5-10. Audio Monitor Circuit Tests**

To perform audio monitor circuit tests, set the CIRCUIT TEST switch to OFF; then rotate the CIRCUIT TEST switch clockwise through each position listed in the chart below and note whether the CIRCUIT TEST meter indication obtained differs from that listed in the chart. If a meter indication is out of tolerance, refer to a higher category of maintenance.

<i>CIRCUIT TEST switch position</i>	<i>CIRCUIT TEST meter indication</i>
+ 18 V -----	50 ± 6
BAT VOLT -----	Green area (50 nominal) (after 30-minute charge)
BAT CHG .... ----	-20 to 80
BAT DISCH -----	20 to 80
OVEN AFC ...	0 (operate)
20 to 100 (standby)	
OVEN SYNTH -----	20 to 100
MON AMPL -----	1 to 50
MAIN RCVR LINE AMPL A2.	Green area (50 nominal)
MAIN RCVR LINE AMPL A1.	Green area (50 nominal)
MAIN RCVR LINE AMPL B1.	Green area (50 nominal)
MAIN RCVR LINE AMPL B2.	Green area (50 nominal)
DIVERSITY RCVR LINE AMPL B2.	Green area (50 nominal)
DIVERSITY RCVR LINE AMPL B1.	Green area (50 nominal)
DIVERSITY RCVR LINE AMPL A1.	Green area (50 nominal)
DIVERSITY RCVR LINE AMPL A2.	Green area (50 nominal)
CCU HOLDING -----	50 nominal

**5-11. Battery Pack Inspection and Testing**

*a. Battery Pack Inspection.***WARNING**

The battery electrolyte is very caustic; avoid contact with the eyes and skin. To neutralize spilled electrolyte, apply 3- percent boric acid solution and wash with water.

- (1) Slide the audio monitor out of the electrical equipment cabinet until the locks are engaged.
  - (2) Remove the audio monitor top cover by loosening the cover fasteners.
  - (3) Check the level and general condition of the electrolyte through the view ports on each side of the battery pack. If electrolyte level is low, perform the following procedures:
- (a) Unscrew the six captive mounting screws which hold the battery in place.

**WARNING**

Be sure that the power distribution panel MAIN POWER ON-OFF switch is set OFF before performing any additional servicing of the battery pack.

- (b) Lift out the battery and disconnect the battery power connector by turning it counter clockwise and pulling it straight up.
- (c) Remove the battery pack cover by removing the six retaining screws.
- (d) Unscrew the filling cap on the cells which display low electrolyte level.
- (e) Fill the cells within 1/8 inch of level line with distilled water.
- (f) Replace the battery pack in the audio monitor by performing the procedures given in (a) through (d) above in reverse.

**CAUTION**

Do not overtighten the filling caps. (4) If the electrolyte is discolored or cloudy, refer to higher category of maintenance.

**WARNING**

The battery pack must be in an upright position while charging. Tilting may result in spillage of the electrolyte. To neutralize spilled electrolyte, apply 3-per- cent boric acid solution immediately; otherwise, the electrolyte may damage the audio monitor chassis.

*b. Battery Pack Testing.* Test the battery pack as follows:

- (1) With the power distribution panel MAIN POWER ON-OFF switch set to OFF, set the audio monitor CIRCUIT TEST switch to BAT DISCH.
  - (2) Observe the audio monitor CIRCUIT TEST meter; it should indicate between 20 to 80. If the reading is out of tolerance, refer to a higher category of maintenance repair.
  - (3) Set the power distribution panel MAIN POWER ON-OFF switch to ON.
  - (4) Set the audio monitor CIRCUIT TEST switch to BAT CHARGE.
  - (5) Observe audio monitor CIRCUIT TEST meter; it should indicate approximately 20 to 100. If the reading is out of tolerance, perform the procedures given below.
- (a) Set the audio monitor CIRCUIT TEST switch to BAT VOLT.
  - (b) The audio monitor CIRCUIT TEST meter should indicate 50 10; if it does not, refer to a higher category of maintenance repair.

**Section II. ORGANIZATIONAL TROUBLESHOOTING****5-12. General**

Organizational troubleshooting of the receiving set is based on the operational checks specified in the quarterly preventive maintenance checks and services chart. To troubleshoot the equipment, perform the functions, starting with sequence number 10, in the quarterly preventive maintenance checks and services chart (para 5-6) and proceed until an abnormal condition or result is obtained. When an abnormal condition or result is obtained, refer to the troubleshooting charts (para 4-10 and 5-14).

**5-13. Sectionalizing Fault to Major Component**

The receiving set uses a fault interlock circuit which alerts the local and remote operators to specific equipment malfunctions. The FAULT portion of the NON-NORM/FAULT indicator on the main and diversity receivers, and the FAULT indicators on the synthesizer, automatic frequency control, and audio monitor light when a specific type of failure is present in the associated component. In standby, the audio monitor FAULT indicator will light only during a stand- by power failure. When the receiving set is placed in the operate condition, the fault alarm interlock circuit will respond to a fault, and the FAULT indicator on the defective major component will light. A fault indication results when the power supply outputs of individual major components drop below a usable level, or when any of the following occurs:

- a. Loss of primary power.
- b. Loss of synthesizer outputs (fixed LO or variable local oscillation injection).
- c. Band selection failure.
- d. Overload (evidenced by a tripped circuit breaker). A fault indication requires that

rective action be initiated. During local and remote operation, the trouble can be isolated to a main component by noting which FAULT indicator has lighted.

- e. Failure to tune 20 seconds.

**5-14. Organizational Troubleshooting Chart**

<i>Item No.</i>	<i>Trouble symptom</i>	<i>Probable trouble</i>	<i>Cheeks and corrective measures</i>
1	RECEIVER GROUP MAIN POWER indicator does not light when MAIN POWER ON-OFF switch is set to ON.	Defective lamp DS1, blown fuse F1 or F2 (accompanied by lighted fuse-indicator) in power distribution panel, failure in prime power.	Replace lamp DS1, or fuse F1 or F2. If power lamp remains off, refer to higher category maintenance.
2	Starting procedure cannot be performed successfully.	Defective component or circuit indicated by component FAULT indicator.	Refer to higher category maintenance

## CHAPTER 6

## SHIPMENT, LIMITED STORAGE, AND DEMOLITION TO PREVENT ENEMY USE

## Section I. SHIPMENT AND LIMITED STORAGE

## 6-1. Disassembly of Equipment

Disassembly and repackaging of the equipment for shipment or limited storage is normally performed by organizational personnel. The following procedure is recommended.

**Warning: Serious injury or DEATH may result from contact with ac line voltage. Be sure that the main ac circuit breakers are open.**

- a. *Removing Station Power Distribution Panel Circuit Breaker Connections.* Disconnect and tag station power distribution panel circuit breakers used for 115- or 230-volt ac prime power source.
- b. *Prime Power Disconnect.* Remove and tag the three station prime power connection wires from TB1 in the power distribution panel (fig. 2-7).
- c. *Main and Diversity Antenna Cables Disconnect.* Remove the two antenna cables from the data distribution panel at the rear of the electrical equipment cabinet (fig. 2-19).
- d. *1 MHz Frequently Standard Disconnect.* Remove the 1 MHz frequency standard coaxial plug from jack J1 on RF distribution panel.
- e. *Full Duplex Control Data Lines Disconnect.* Remove both pairs of control data lines from the data distribution panel by disconnecting the wires from terminal 9 through 13 of terminal board TB1 (fig. 2-19).
- f. *Audio Lines Disconnect.* Remove the eight audio lines from the data distribution panel by disconnecting the lines from terminals 9 through 13 of terminal board TB1 (fig. 2-19).
- g. *Removal of Battery Pack.* Remove the battery pack from the audio monitor as follows.
  - (1) Loosen the four" captive screws from the front panel of the audio monitor and slide the audio Monitor forward.
  - (2) Remove the audio monitor top cover by removing its securing screws.
    - (i) Loosen the four captive screws which hold the battery pack in place and lift the battery from the chassis.
  - (4) Disconnect the battery pack cable from jack J3.
  - (5) Replace the audio monitor top cover and secure the mounting screws.
  - (6) Slide the audio monitor back into the electrical equipment cabinet assembly and tighten the four front panel captive screws.
- h. *Removal of Electrical Equipment Cabinet From Site.* Perform the following procedure to remove the Electrical equipment cabinet assembly from the site (fig. 2-5 and 24):
  - (1) Use the information contained in paragraph 2-6 to remove the synthesizer (1A2), main receiver (1A3), diversity receiver (1A4), automatic frequency control (1A5), audio monitor (1A6), and control converter (1A7, from the cabinet assembly (1A1).
  - (2) Release electrical equipment cabinet from its mounting by removing the four anchoring bolts and washers.
  - (3) Lift and remove cabinet using hoist or forklift of 2000 pounds minimum capacity.
- i. *Removal of Remote Control Unit Prime Power and Control Data Connections.*

**Warning: Disconnect and tag station power distribution panel circuit breaker used for 115/230 vac prime power source. Serious injury or death may result from contact with ac line voltage.**

- (i) Remove 115/230 vac power plug from jack FL1J1 on the remote control unit (fig. 217).

- (2) Disconnect the two control data line pairs by removing plug from jack TTY J2.
- j. *Removal of Remote Control Unit From Site.* Loosen the four captive screws at the remote control unit front panel and remove remote control unit from equipment rack or console.

**6-2. Repackaging for Shipment and Limited Storage**

- a. Equipment that is to be removed from service for periods exceeding approximately 2 weeks, or equipment that is to be shipped for use by other personnel or activities, is normally repacked by organizational personnel. Use the materials listed in c below and pack the equipment in accordance with the information referenced in d below.
- b. If the AN/FRR-79 is to be transported over short distances under control of the using unit for immediate reuse:
  - (1) Disconnect the receiving group and the remote control (para 6-1) 115/230 vac power, and data connections.
  - (2) Use a hoist or forklift with a minimum capacity of 2,000 pounds to set the equipment cabinet into a wooden box 89 inches high, 35 inches deep, and 29 inches wide; (3) Use rags or crumpled paper for padding to protect all front panel controls and indicators against damage during transit.
  - (4) Protect the remote control unit during transit (2) above.
  - (5) Place the remote control into a wooden box 22 inches deep, 22 inches wide, and 8 inches high.

**Caution: Use extreme care in lifting and transporting the receiving set.**

- c. The following materials are required for packing Receiving Set, Radio AN/FRR-79. Consult SB 38-100 for stock numbers of materials. Figures 23 and 2-4 show the materials required for packing the AN/FRR-79.

<i>Material</i>	<i>Quantity</i>
Metal strapping .....	200 feet
Wooden packing boxes and covers.	9 boxes and covers
Cardboard boxes	19 boxes
Bonded fiber top cushion	9 cushions
Moisture-waterproof barrier	200 square feet
Corrugated filler.....	100 square feet
Dessicant.....	10 cloth containers
Nails.....	3 pounds
Skid.....	1 (for cabinet assembly)
Bolts.....	4 (for skid)

*d. Packing Instructions.*

- (1) Reverse the procedures given in chapter 2 when repackaging Control, Receiver C-7667/FRR-79.
- (2) Reverse the procedures given in chapter 2 when repackaging the Receiver Group OR-31/FRR-79.

**Section II. DEMOLITION OF MATERIEL TO PREVENT ENEMY USE**

**6-3. Authority of Demolition**

Demolition of the equipment will be accomplished only upon the order of the commander. The destruction procedures given in paragraph 6-5 will be used to prevent further use of the equipment.

**6-4. Priorities for Destruction**

When lack of time prevents complete destruction of the AN/FRR-79, destroy its essential components. The priority number in the following chart shall be used to determine the priority of destruction of essential components.

<i>Priority number</i>	<i>Major component</i>
1	Synthesizer
2	Receivers
3	Automatic frequency control
4	Audio monitor
5	Control converter
6	Remote control unit
7	Equipment cabinet assembly

**6-5. Methods of Destruction**

Use any of the methods given below to destroy the equipment. The time available will be the major factor for the method used. The tactical situation will also determine in what way the destruction order will be carried out.

a. *Smash.* Smash the tuning indicators, the dials, the meter, the modules, the printed circuit cards, the coils, the transformers, and the spare parts; use sledges, axes, hammers, crowbars, or any other heavy tools available to smash the interior of the equipment.

b. *Cut.* Cut all the cords and cables in a number of places; slash the interior wiring and cabling. Use axes, machetes, and similar tools to cut the cabling, the cording, and the wiring.

**Warning:** Be extremely careful with explosives and incendiary devices. Use these items only when the need is urgent.

c. *Burn.* Burn as much of the equipment as is flammable; use gasoline, oil, or flamethrowers. Burn the technical manuals first. Pour gasoline on the cut cables and on the internal wiring and ignite it.

d. *Explode.* If explosives are necessary, use firearms, grenades, or TNT.

e. *Dispose.* Bury or scatter the destroyed parts in slit trenches or foxholes, or throw them into streams.

Figure 6-1. Receiver group cording diagram. (Located in back of manual)



## APPENDIX A

## REFERENCES

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Following is a list of publications available to the operator and organizational maintenance personnel of Receiving Set, Radio AN/FRR-79.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
TB SIG 355-1	Depot Inspection Standard for Repaired Signal Equipment.
TB SIG 355-2	Depot Inspection Standard for Refinishing Repaired Signal Equipment.
TB SIG 355-3	Depot Inspection Standard for Moisture and Fungus Resistant Treatment.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-5820-601-34P	Direct Support and General Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Receiving Set, Radio AN/FR-t9 (NN 5820-00-00-937-2887).
TM 11-6140-203-15-1	Operator, Organizational, Direct Support, General Support, and Depot Maintenance Manual: Aircraft and Non-aircraft Nickel-Cadmium Batteries (General).
TM 38-750	The Army Maintenance Management System (TAMMS).

## APPENDIX C

## MAINTENANCE ALLOCATION

## Section I. INTRODUCTION

**C-1. General.**

This appendix provides a summary of the maintenance operations for AN/FRR-79. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

**C-2. Maintenance Function.**

Maintenance functions will be limited to and defined as follows:

- a. *Inspect.* To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.
- b. *Test.* To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.
- c. *Service.* Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.
- d. *Adjust.* To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.
- e. *Align.* To adjust specified variable elements of an item to bring about optimum or desired performance.
- f. *Calibrate.* To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.
- g. *Install.* The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.
- h. *Replace.* The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.
- i. *Repair.* The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.
- j. *Overhaul.* That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
- k. *Rebuild* Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipments/components.

**C-3. Column Entries.**

- a. *Column 1, Group Number.* Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.
- b. *Column 2, Component/Assembly.* Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.
- c. *Column 3, Maintenance Functions.* Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.
- d. *Column 4, Maintenance Category.* Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance.

If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "work time" figures will be shown for each category. The number of task-hours specified by the "work time" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to be a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

C-Operator/Crew  
 O-Organizational  
 F-Direct Support  
 H-General Support  
 D-Depot

*e. Column 5, Tools and Equipment.* Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

*f. Column 6, Remarks.* Column 6 contains an alphabetic code which leads to the remark in Section IV, Remarks, which is pertinent to the item opposite the particular code.

#### **C-4. Tool and Test Equipment Requirements (Sect. III).**

*a. Tool or Test Equipment Reference Code.* The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

*b. Maintenance Category.* The codes in this column indicate the maintenance category allocated the tool or test equipment.

*c. Nomenclature.* This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

*d. National/NATO Stock Number.* This column lists the National/NATO stock number of the specific tool or test equipment.

*e. Tool Number.* This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

#### **C-5. Remarks (Sect. IV).**

*a. Reference Code.* This code refers to the appropriate item in section II, column 6.

*b. Remarks.* This column provides the required explanatory information necessary to clarify items appearing in section II.

SECTION II MAINTENANCE ALLOCATION CHART  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) Group NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	RECEIVING SET, RADIO AN/FRR-79	Inspect Test Test  Test Service  Adjust Repair Repair  Overhaul		0.1 0.2	1.0			BITE 1,2,3,5, 6,8 17,L1 15,18,21, 22,23,28  39 1,2,3,5, 6,8,15,L1    120.0	
01 0101	RECEIVER GROUP OR-31/FRR-79 CABINET, ELECTRICAL EQUIPMENT CY-6450/FRR-79 (1A1)								
010101	PANEL, POWER DISTRIBUTION (1A1A1)								
010102	PANEL, DATA DISTRIBUTION (1A1A2)								
01010201	ANTENNA PROTECTOR (1A1A2A1 AND 1A1A2A2)	Inspect Test		0.1	0.3			2,3,39, 40,41	
		Replace Repair			0.2		0.6	39,40 2,3,39, 40,41	
0010103 01010301	PANEL1 RF DISTRIBUTION (1A1A4) AMPLIFIER, HYBRID (1A1A4A4)	Inspect Test  Test  Adjust  Replace Repair  Repair			0.1 0.4			1,3,7,16, 32,34 1,2,7,16, 32,34 1,2,7,16, 32,34 39,40 1,2,7,16, 32,34,39, 40,41 1,2,7,16, 32,34,39, 40,41	
0101030101	ELECTRONIC COMPONENT ASSEMBLY (1A1A4A4A1 AND 1A1A4A4A2)								
0101030102	ELECTRONIC COMPONENT ASSEMBLY (1A1A4A4A3 AMPLIFIER, HYBRID (1A1A4AS)	Inspect Test  Adjust  Replace Repair			0.1			1,2,7,16, 32,34 1,2,7,16, 32,34 39,40 1,2,7,16, 32,34,39, 40,41	
0101030201	ELECTRONIC COMPONENT ASSEMBLY (1A1A4A5A1 AND 1A1A4A5A2)								
0101030202	ELECTRONIC COMPONENT ASSEMBLY (1A1A4A5A3)								
0102 010201	RECEIVER, RADIO R1543/FRR-79 (1A3 AND 1A4) NETWORK, HYBRID CIRCUIT (1A3A3 AND 1A4A3)	Inspect  Test  Adjust Replace Repair			0.1			1,2,3,5, 8,25,31, L12 2,3,L12 39 1,2,3,5, 8,25,31, 39,40,41, L12	

SECTION II MAINTENANCE ALLOCATION CHART - CONTINUED  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
01020101	CIRCUIT CARD ASSEMBLY (1A3A3A1 AND 1A4A3A1) SELECTOR, AUTOMATIC GAIN CONTROL (1A3A8 AND 1A4A8)	Inspect Test Replace Repair			0.1		0.4	6 39 6,39,40, 41	
010202					0.2		0.7		
01020201									
010203	CIRCUIT CARD ASSEMBLY (1A3A8A1 AND 1A4A8A1) AMPLIFIER, INTERMEDIATE FREQUENCY (1A3A9 THRU 1A3A12) (1A4A9 THRU 1A4A12)	Inspect Test  Adjust Adjust  Replace Repair			0.1		0.5	1 thru 5, 7,8,10, 15,18,36 36, L12 1 thru 5, 7,8,10, 15,18,36, L12 39 1 thru 5, 7,8,10, 15,18,36, 39,40,41, L12	
01020301					0.3		0.4		
0102030101									
0102030102	CIRCUIT CARD ASSEMBLY (1A3A9 THRU 1A3A12A1) (1A4A9A1 THRU 1A4A12A) PHOTOELECTRIC CELL (1A3A9A1A1 THRU 1A3A12A1A1) (1A4A9A1A1 THRU 1A4A12A1A1) PHOTOELECTRIC CELL HOUSING ASSEMBLY (1A3A9A1A2 THRU 1A3A12A1A2) (1A4A9A1A2 THRU 1A4A12A1A2) POWER SUPPLY (1A3A15 AND 1A4A15) CIRCUIT CARD ASSEMBLY (1A3A15A1 AND 1A4A15A1)	Inspect Test  Adjust  Replace Repair			0.1		0.3	4,6,7,14, L2 4,6,7,14, L2 39 4,6,7,14, 39,40,41, L2	
010204							0.3		
01020401									0.9
01020402	CIRCUIT CARD ASSEMBLY (1A3A15A2 AND 1A4A15A2)	Inspect Test  Adjust  Replace Repair			0.1		0.3	4,6,7,14, L2 4,6,7,14, L2 39 4,6,7,14, 39,40,41, L2	
							0.3		
									0.9
01020403	ELECTRONIC COMPONENT ASSEMBLY (1A3A15A4 AND 1A4A15A4) MIXER STAGE, VHF (1A3A16 AND 1A4A16)	Inspect Test  Adjust  Replace Repair			0.1		0.5	2,3,6,7, 8,16,18, 28,32,33 2,3,6,7, 8,16,18, 28,32,33 39 2,3,6,7, 8,16,18, L8,32,33, 37,39,40, 41	
010205							0.4		
									1.0
01020501	CIRCUIT CARD ASSEMBLY (1A3A16A1 AND 1A4A16A1)								

SECTION II MAINTENANCE ALLOCATION CHART- CONTINUED  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
010206	MIXER STAGE, HIGH FREQUENCY (1A3A20 AND 1A4A20)	Inspect Test			0.1		0.5	1,3,7,15, 16,20,26, 32,33,37	
		Adjust				0.5	1,3,7,15, 16,20,26, 32,33,37		
		Replace Repair			0.3	0.9	39 1,3,7,15, 20,26,32, 33,37,39, 40,41		
01020601	CIRCUIT CARD ASSEMBLY (1A3A20AI AND 1A4A20A1)								
01020602	CIRCUIT CARD ASSEMBLY (1A3A20AR1 AND 1A4A20AR1)								
01020603	CIRCUIT CARD ASSEMBLY (1A3A20AR2 AND 1A4A20AR2)								
010207	EQUALIZER, HIGH FREQUENCY (1A3A21 AND 1A4A21)	Inspect Test			0.1		0.4	2,3,4,7, 8,28,33, L12	
		Adjust				0.4	2,3,4,7, 8,28,33, L12		
		Replace Repair			0.2 0.6		39 2,3,4,7, 8,28,33, 39,40,41, L12		
01020701	CIRCUIT CARD ASSEMBLY (1A3A21A1 AND 1A4A21A1)								
0102070101	LIGHT COUPLER, AMPLIFIER (1A3A21A1A1 AND 1A4A21 A A)								
0102070102	PHOTOELECTRIC CELL (1A3A21A1A2 AND 1A4A21A1A2)								
010208	ALARM, MONITOR (1A3A29 AND 1A4A29)	Inspect			0.1			6 39 6,39,40, 41	
		Test				0.3			
		Replace Repair			0.2	0.6			
01020801	CIRCUIT CARD ASSEMBLY (1A3A29A1 AND 1A4A29A1)								
010209	RADIO RECEIVER, SUBASSEMBLY (1A3A35 AND 1A4A35)								
01020901	CIRCUIT CARD ASSEMBLY (1A3A35A1 AND 1A4A35A1)								
01020902	RADIO RECEIVER SUBASSEMBLY (1A3A35A2 AND 1A4A35A2)								
0102090201	SWITCH, ROTARY (1A3A35A2A1 AND 1A4A35A2A1)								
01020903	FILTER ASSEMBLY (1A3A35A32 AND 1A4A35A32)	Inspect Test			0.1		0.2	1,3,8,10, 16,28,L12 39	
		Replace Repair			0.2	0.5	1,3,8,10, 16,28,39, 40,41,L12		
01020904	CIRCUIT CARD ASSEMBLY (1A3A35A39 AND 1A4A35A39)								
01020905	FILTER ASSEMBLY (1A3A35A46 AND 1A4A35A46)								
0102090501	FILTER ASSEMBLY (1A3A35A46A1 AND 1A4A35A46A1)								

SECTION II MAINTENANCE ALLOCATION CHART - CONTINUED  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) Group NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
010210	PRESELECTOR, RADIO FREQUENCY (1A3A37 AND 1A4A37)	Inspect Test			0.1			2,3,8,32,33	
		Align					0.4	2,3,8,32,33	
		Replace Repair			0.3		0.8	39 2,3,5,32,33,39,40,41	
01021001	PRESELECTOR SUBASSEMBLY (1A3A37A1 AND 1A4A37A1)								
0102100101	CIRCUIT CARD ASSEMBLY (1A3A37A1A1 AND 1A4A37A1A1)								
0102100102	CIRCUIT CARD ASSEMBLY (1A3A37A1A2 AND 1A4A37A1A2)								
0102100103	CIRCUIT CARD ASSEMBLY (1A3A37A1A3 AND 1A4A37A1A3)								
0102100104	PRESELECTOR SUBASSEMBLY (1A3A37A1A4 AND 1A4A37A1A4)								
0102100105	CIRCUIT CARD ASSEMBLY (1A3A37A1Z AND 1A4A37A171)								
010211	FILTER ASSEMBLY, Electrical BANDPASS (1A3FL18 AND 1A4FL18)	Inspect Test			0.1			1,3,R,10,16,28,L12	
		Align					0.4	1,3,8,10,16,28,L12	
		Replace Repair			0.2		0.7	39 1,3,8,10,6,28,L12 40,41,L12	
01021101	ELECTRONIC COMPONENT ASSEMBLY (1A3FL18A1 AND 1A4FL18A1)								
0103	CONTROL, ELECTRONIC FREQUENCY (1A5)								
010301	ELECTRONIC FREQUENCY SUBCHASSIS (1A5A1)								
01030101	ELECTRONIC FREQUENCY SUBCHASSIS (1A5A1A1)								
0103010101	SWITCH, PUSH MAIN DIVERSITY (1A5A1A1)								
0103010102	LIGHT INDICATOR, FAULT (1A5A1A2)								
0103010103	SWITCH, PUSH (1A5A1A3)								
0103010104	SWITCH, PUSH, FINE TUNE (1A5A1A4)								
0103010105	SWITCH, ROTARY, CIRCUIT TESTER (1A5A1A5)								
01030102	FILTER ASSEMBLY (1A5A1FL2)	Inspect Test			0.1			1,3,8,10,16,28,L12	
		Replace Repair			0.3		0.5	39 1,3,8,10,16,28,39,40,41,L12	
010302	CALIBRATOR, FREQUENCY (1A5A2)	Inspect Test			0.1			1,7,L1	
		Align					0.4	1,7,L1	
		Replace Repair			0.2		0.7	39 1,7,39,40,41,L1	
01030201	CIRCUIT CARD ASSEMBLY (1A5A2A1)								
010303	MONITOR, RADIO FREQUENCY (1A5A4)	Inspect Test			0.1			10,L1	
		Adjust					0.4	10,L1	
		Replace Repair			0.2		0.5	39 10,39,40,41,L1	

SECTION II MAINTENANCE ALLOCATION CHART - CONTINUED  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS	
			C	O	F	H	D			
01030301 010304	CIRCUIT CARD ASSEMBLY (1A5A4A1) CONTROL, ELECTRICAL FREQUENCY 1A5A5)	Inspect Test Adjust Replace Repair			0.1			0.3 0.3	L1 L1 39	
01030401 010305	CIRCUIT CARD ASSEMBLY (1A5ASA1) AMPLIFIER, I.F. (1A5A13)	Inspect Test  Align  Replace Repair			0.1			0.4  0.4	1,2,3,7,; 32,33,38, L1 1,2,3,7, 32,33,38, L1 39	
01030501 010306	CIRCUIT CARD ASSEMBLY (1A5A13A1) ALARM MONITOR (1A5A29)	Inspect Test Replace Repair			0.1 0.2			0.3 0.6	L1 39 39,40,41, L1	
01030601 010307	CIRCUIT CARD ASSEMBLY (1A5A29A1) OSCILLATOR, RADIO FREQUENCY (1A5A31)	Inspect Test  Adjust  Replace Repair			0.4			0.3 0.3	1,3,24, 28,L1 1,3,24, 28,L1 39	
01030701 01030702	CIRCUIT CARD ASSEMBLY (1A5A31A1) ELECTRONIC COMPONENT ASSEMBLY (1A5A31A2)									
01030703 010308	CIRCUIT CARD ASSEMBLY (1A5A31A3) DETECTOR, RADIO FREQUENCY (1A5A38)	Inspect  Test Adjust Replace Repair			0.1			0.3 0.3 0.5	1,7,10 1,7,10 39 1,7,10, 39,40,41	
01030801 010309	CIRCUIT CARD ASSEMBLY (1A5A38A1) DETECTOR, RADIO FREQUENCY (1A5A39)	Inspect  Test Adjust Replace Repair			0.4			0.3 0.3 0.6	1,7,10,L1 1,7,10,L1 39 1,7,10, 39,40,41, L1	
01030901 010310	CIRCUIT CARD ASSEMBLY (1A5A39A1) POWER SUPPLY (1ASPS1)	Test Test  Adjust  Repair Replace Repair			0.1  0.3 0.5 0.3			0.3  0.5	5,6,12, 14 5,6,39, L2 4,6,7,39 39 4,6,7,39, 40,41	



SECTION II MAINTENANCE ALLOCATION CHART - CONTINUED  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
01031001	CIRCUIT CARD ASSEMBLY (1A5PS1A1)	Inspect Test Replace Repair			0.1 0.2 0.5			4,6,7,14, 39 4,6,7,14, 39,40,41, L2	
01031002	CIRCUIT CARD ASSEMBLY (1A5P51A2)	Inspect Test Replace Repair			0.1 0.2			4,6,7,14, L2 39 4,6,7,14, 39,40,41, L2	
01031003	ELECTRONIC COMPONENT ASSEMBLY (1ASPS1A3)								
0104	MONITOR, RADIO FREQUENCY ID-1562/FRR-79 (1A6)								
010401	POWER SUPPLY (1A6A10)								
01040101	CIRCUIT CARD ASSEMBLY (1A6A10A1)	Inspect Test Align Replace Repair			0.1 0.1			6,12,14 6,12,14 39 6,12,14, 39,40,41	
01040102	CIRCUIT CARD ASSEMBLY (1A6A10A2)	Inspect Test Align Replace Repair			0.1 0.2			6,12,14 6,12,14 39 6,12,14, 39,40,41	
01040103	ELECTRONIC COMPONENT ASSEMBLY (1A6A10A4)								
010402	AMPLIFIER, MONITOR (1A6A11)	Inspect Test Adjust Replace Repair			0.1 0.2			4,6,7 4,6,7 39 4,6,7,39, 40,41	
01040201	CIRCUIT CARD ASSEMBLY (1A6A11A1)								
010403	AUDIO FREQUENCY SUBASSEMBLY (1A6A20)								
01040301	AUDIO FREQUENCY SUBASSEMBLY (1A6A20A10)								
0104030101	SWITCH, ROTARY (1A6A20A0DA1)								
0104030102	SWITCH, ROTARY (1A6A20A10A2)								
0104030103	SWITCH, PUSH, OPERATE STANDBY (1A6A20A10A3)								
01040302	ATTENUATOR, VARIABLE (1A6A20AT1 THRU 1A6A20ATR)								
01040303	CIRCUIT CARD ASSEMBLY (1A6A20A40)	Inspect Test Replace Repair			0.1 0.2			6,12,14 39 6,12,14, 39,40,41	
0105	CONTROL, CONVERTER C-7666/FRR-79 (1A7)								
010501	CIRCUIT CARD ASSEMBLY (1A7A1)	Inspect Test Replace Repair			0.1 0.2			7,L3,L8 39 7,39,40, 41,L3,L8	
010502	CIRCUIT CARD ASSEMBLY (1A7A2)	Inspect Test Replace Repair			0.1 0.2			7,L3,L8 39 7,39,40, 41,L3,L8	

SECTION II MAINTENANCE ALLOCATION CHART - CONTINUED  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
010503	CIRCUIT CARD ASSEMBLY (1A7A3)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010504	CIRCUIT CARD ASSEMBLY (1A7A4)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010505	CIRCUIT CARD ASSEMBLY (1A7A6)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L1,L8 39 7,39,40, 41,L3,L8
010506	CIRCUIT CARD ASSEMBLY (1A7A7)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010507	CIRCUIT CARD ASSEMBLY (1A7A8)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010508	CIRCUIT CARD ASSEMBLY (1A7A9)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010509	CIRCUIT CARD ASSEMBLY (1A7A12)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010510	CIRCUIT CARD ASSEMBLY (1A7A13)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010511	CIRCUIT CARD ASSEMBLY (1A7A15)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010512	CIRCUIT CARD ASSEMBLY (1A7A16)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010513	CIRCUIT CARD ASSEMBLY (1A7A17)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, L3,L8
010514	CIRCUIT CARD ASSEMBLY (1A7A18)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010515	CIRCUIT CARD ASSEMBLY (1A7A21)	Inspect Test Replace Repair			0.1 0.2			0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8

SECTION II MAINTENANCE ALLOCATION CHART - CONTINUED  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
010516	CIRCUIT CARD ASSEMBLY (1A7A24)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010517	CIRCUIT CARD ASSEMBLY (1A7A25)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L3,L8 39 7,39,40, 41,L3,L8
010518	CIRCUIT CARD ASSEMBLY (1A7A26)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L3,L8 39 7,19,40, 41,L3,L8
010519 01051901 01051902 0106	CONVERTER SUBASSEMBLY (1A1A27) CONVERTER SUBASSEMBLY (1A1A27AT) PANEL, FUSE (1A7A27A2) SYNTHESIZER, ELECTRICAL FREQUENCY 0-1488/FR 20006-900A1-1 (1A2) SEE TM 11-5820-598-T2 (RADIO SET AN/FRT-76)								
02	CONTROL, RECEIVER C-7667/FRR-79	Inspect Test Service Adjust Repair Repair Overhaul		0.1 0.1 0.1	0.3 0.3 0.7			6,7 6,7 39 6,7,30, 39 40,41	
0201 020101	REMOTE CONTROL SUBASSEMBLY (2A25) REMOTE CONTROL SUBASSEMBLY (2A25A1)							10.1	
0202	CIRCUIT CARD ASSEMBLY (2A10)	Inspect Test Replace Repair			0.1 0.2			0.3 1.1	7,L14 39,40 7,39,40, 41,L14
0203	CIRCUIT CARD ASSEMBLY (2A4)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L14 39,40 7,39,40, 41,L14
0204	CIRCUIT CARD ASSEMBLY (2A21)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L14 39,40 7,39,40, 41,L14
0205	CIRCUIT CARD ASSEMBLY (2A9)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L14 39,40 7,39,40, 41,L14
0206	CIRCUIT CARD ASSEMBLY (2A7)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L14 39,40 7,39,40, 41,L14
0207	CIRCUIT CARD ASSEMBLY (2A11)	Inspect Test Replace Repair			0.1 0.2			0.3 0.3 1.0	7,L14 39,40 7,39,40, 41,L14

SECTION II MAINTENANCE ALLOCATION CHART  
FOR  
RECEIVING SET, RADIO Af1/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0208	CIRCUIT CARD ASSEMBLY (2A6)	Inspect			0.1			7,L14 39,40 7,19,40, 41 ,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0209	CIRCUIT CARD ASSEMBLY (2A23)	Inspect			0,1			1,L14 39,40 7,19,40, 41 ,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0210	CIRCUIT CARD ASSEMBLY (2A8)	Inspect			0.1			7,L14 39,40 7,19,40, 41 ,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0211	CIRCUIT CARD ASSEMBLY (2A2)	Inspect			0.1			7,L14 39,40 7,39,40, 41 ,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0212	CIRCUIT CARD ASSEMBLY (2A20)	Inspect			0.1			7,L14 39,40 7,39,40, 41,L14	
		Test					0.3		
		Replace Repair			0.2.		1.0		
0213	CIRCUIT CARD ASSEMBLY (2A3)	Inspect			0.1			7,L14 39,40 79,40 41,L14	
		Test					0.3		
		Replace Repair			0,2		1,0		
0214	CIRCUIT CARD ASSEMBLY (2A1S5 AND 2A16)	Inspect			0.1			7,L14 39,40 7,39,40, 41,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0215	CIRCUIT CARD ASSEMBLY (2A24)	Inspect			0.1			7,L14 39,40 7,39,40, 41,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0216	CIRCUIT CARD ASSEMBLY (2A5)	Inspect			0.1			7,L14 39,40 7,39,40, 41,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0217	CIRCUIT CARD ASSEMBLY (2A12)	Inspect			0.1			7,L14 39,40 7,39,40, 41,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		
0218	CIRCUIT CARD ASSEMBLY (2A19)	Inspect			0.1			7,L14 39,40 7,39,40, 41,L14	
		Test					0,3		
		Replace Repair			0.2		1.0		
0219	CIRCUIT CARD ASSEMBLY (2A14)	Inspect			0.1			7,L14 39,40 7,39,40, 41,L14	
		Test					0.3		
		Replace Repair			0.2		1.0		

SECTION II MAINTENANCE ALLOCATION CHART  
FOR  
RECEIVING SET, RADIO AN/FRR-79

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0220	CIRCUIT CARD ASSEMBLY- (2A22)	Inspect Test Replace Repair			0.1  0.2			0.3  1.0	7,L14 39,40 7,39,40, 41,L14
0221	CIRCUIT CARD ASSEMBLY (2A17 AND 2A18)	Inspect Test Replace Repair			0.1  0.2			0.3  1.0	7,L14 39,40 7,39,40, 41,L14

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS  
FOR  
RECEIVING SET, RADIO AN/FRR-79

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F,D	COUNTER, ELECTRONIC ANIUSM-207	6625-00-911-6368	
2	F,D	GENERATOR, SIGNAL AN/GRM-50	6625-00-003-3238	
3	O,F,D	VOLTMETER, ELECTRONIC AN/GRM-145	6625-00-973-3986	
4	F,D	VOLTHETER ME-30(E)/U	6625-00-420-9354	
5	F,D	SPECTRUM ANALYZER TS-1830/U	6625-00-845-7183	
6	F,D	MULTIMETER AN/USH-120	6625-00-019-0815	
7	F,D	OSCILLOSCOPE, TELTRONIX 564 W/PLUGINS 3A4 & 386		
8	O,F,D	ATTENUATOR CN-796/U	5985-00-831-5991	
9	DELETED			
10	D	MULTITESTER ME-268/U	6625-00-646-9409	
11	DELETED			
12	D	RANDOM NOISE GENERATOR GR-1390B		
13	DELETED			
14	O,D	VARIAC GR-W5MT	5950-00-688-5722	
15	O,F,D	FREQUENCY SYNTHESIZER AN/USM-194		
16	O,F,D	SIGNAL GENERATOR AN/USM-44A	6625-00-539-9685	
17	O,H,D	FREQUENCY STANDARD HP-5065A		
18	O,D	HYBRID NETWORK ANZAC HCK-7750		
19	O,H,D	METER, FREQUENCY AN/URM-115A		
20	D	SELECTIVE VOLTMETER RHODE & SCHWARZ 1521VSVH		
21	O,D	MEASURING SET, DELAY & ATTE. WANDEL & GOTTERMAN'		
22	O,D	MEASURING SET, DELAY & ATTEN WANDEL & GOTTERMANN		
23	O,D	PEN, RECORDER HP-136A		
24	D	DIGITAL RECORDER SYSTRON DONNER 5103 W/OPTIONS C101 & C102		
25	D	MIXER, COAXIAL CV-2343		
26	D	DIRECTIONAL COUPLER CU-1404/U		
27	DELETED			
28	O,D	NOISE & FIELD INTENSITY MURER SINGER METERICS NF-105A W/8A-1OSA, T-A/NF-1OSA, T-1/NF-1OSA		
29	O,H,D	RMS VOLTMETER BALLANTINE 320A		
30	F,D	POWER STAT (VARIAC) SUPERIOR 1156 DU-6Y		
31	D	RX METER HP-250B		
32	F,D	SWEEP GENERATOR TELONIC SM-2000 W/PLUG-IN UNIT SH-1H		
33	D	LOGARITHMIC AMPLIFIER KAY 1025B		
34	F,D	CRYSTAL DETECTOR TELONIC XD-8A		
35	DELETED			
36	F,D	MEGA-SWITCH KAY MODEL KMC-255B		
37	D	POWER AMPLIFIER HP-230A		
38	D	OSCILLATOR WAVETEK MODEL 130		
39	O,F,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G	5180-00-605-0079	
40	F,D	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-610-8177	

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS - CONTINUED  
 FOR  
 RECEIVING SET, RADIO AN/FRR-79

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
41	F,D	REPAIR KIT MK-772/U	5999-00-757-7042	
L1	F,D	TEST SET, RADIO TS-3206/FRM LITCOM 4700		
L2	F,D	TEST SET, POWER SUPPLY TS-3203/FR11 LITCON 4740		
L3	F,D	DIGITAL DATA SET TS-3204/FRH LITCOH 4200		
L4	DELETED			
L5	DELETED			
L6	DELETED			
L7	F,D	SYNTHESIZER TEST SET LITCOM 4603C		
L8	F,D	RECEIVER RCU TEST SET LITCOM 4699A		
L9	F,D	RECEIVER CCU TEST SET LITCOM 4698A		
L10	DELETED			
L11	DELETED			
L12	D	TEST SET RADIO TS-3209/FRM LITCOM 7700	6625-00-444-1081	
L13	D	TEST SET, FREQUENCY SYNTHESIZER TS-3210/FRH LITCOM 7900	6625-00-167-7401	
L14	D	DIGITAL DATA TEST SET TS-3208/FRM LITCOH 7200	6625-00-167-7411	
<p>NOTE                      The National Stock Numbers that are missing from this list have been requested and will be added by a change to the list upon receipt.</p>				

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	REPLACE FUSES, KNOBS AND SCREW/PLUG-OUT LAHPS.



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NG: State AG (3).

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For explanation of abbreviations used, see AR. 320-50.

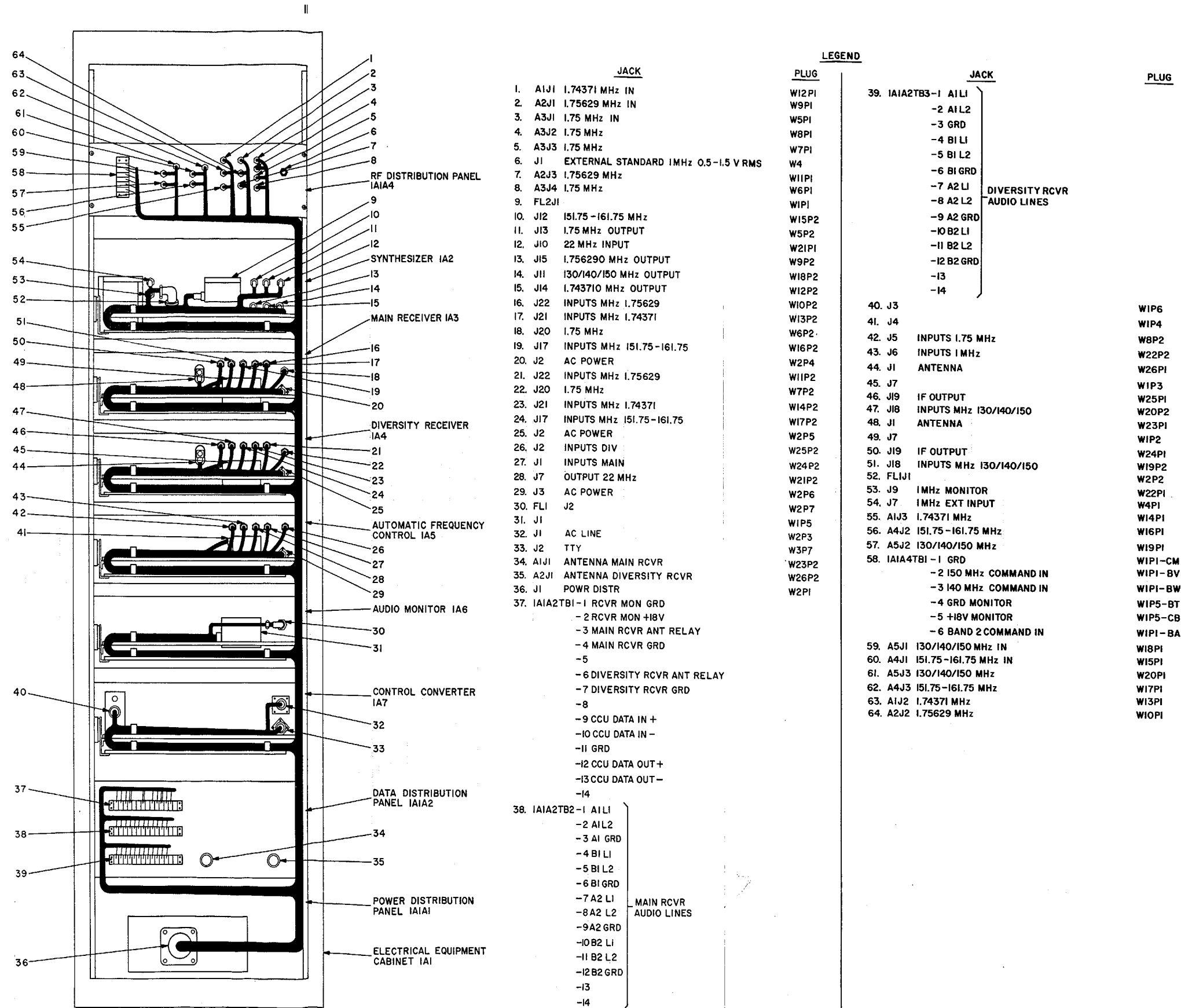


Figure 6-1. Receiver group cording diagram.

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