

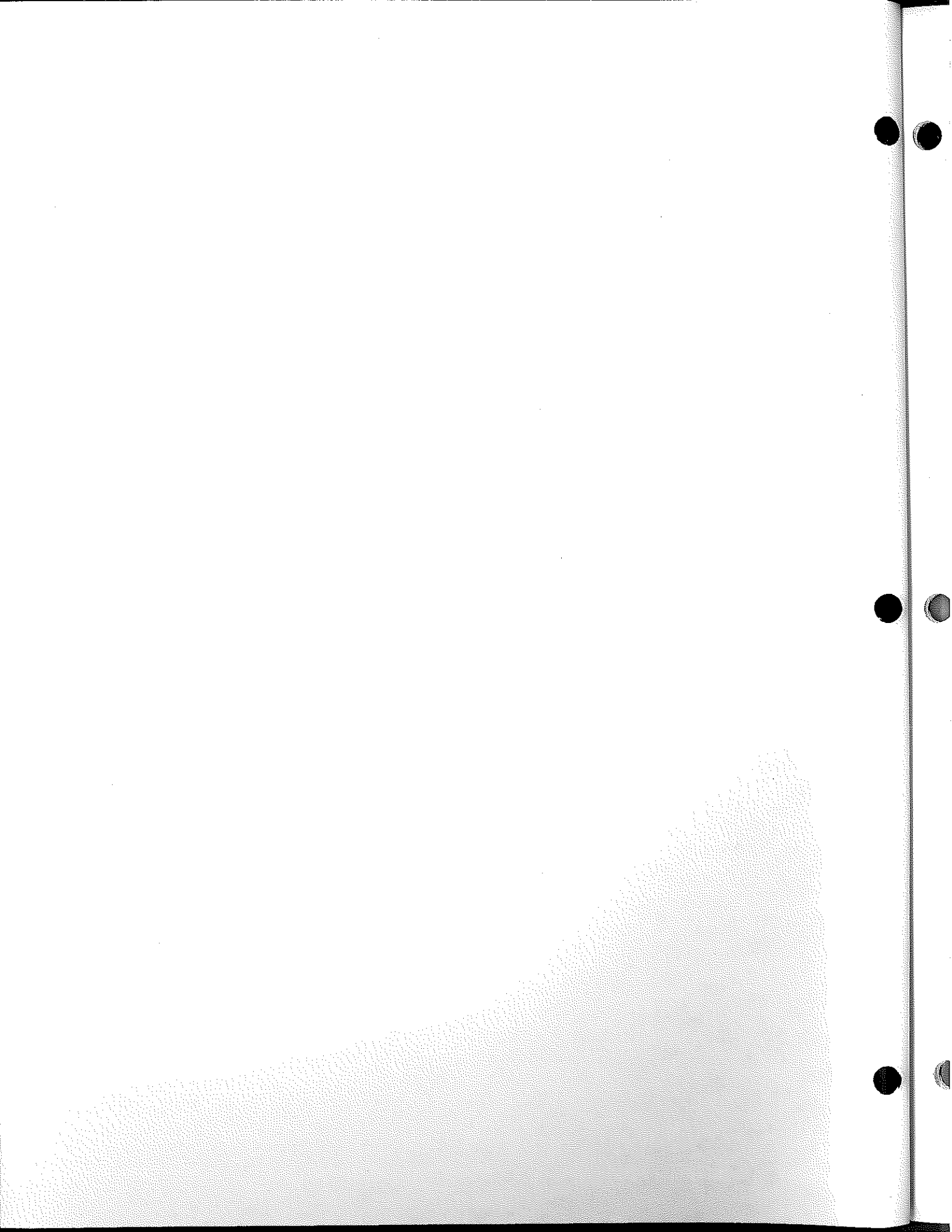
**AM-1077  
RF POWER AMPLIFIER  
OPERATOR'S MANUAL**

**TRANSWORLD**®  
for communications

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## One Year Limited Warranty and Remedies

Datron World Communications Inc. (DWC) warrants that its equipment is free from defects in design, materials and workmanship for a period of 12 months from the date of installation of the equipment, but in no event later than 15 months from the date of shipment. If the equipment does not provide satisfactory service due to defects covered by this warranty, DWC will, at its option, replace or repair the equipment free of charge.

Should it be impractical to return the equipment for repair, DWC will provide replacements for defective parts contained in the equipment for a period of 12 months from the date of installation of the equipment, but in no event later than 15 months from the date of shipment.

This warranty is limited to the original purchaser and is not transferable. Repair service performed by DWC is warranted for the balance of the original warranty or 90 days, whichever is longer.

**Exclusive Warranty:** There are no other warranties beyond the warranty as contained herein. No agent, employee, or representative of DWC has any authority to bind DWC to any affirmation, representation, or warranty concerning the equipment or its parts that is not in conformity with the warranties contained herein. EXCEPT AS EXPRESSLY SET FORTH ABOVE, NO OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, ARE MADE WITH RESPECT TO THE EQUIPMENT OR THE PARTS CONTAINED THEREIN, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND DWC EXPRESSLY DISCLAIMS ALL WARRANTIES NOT STATED HEREIN.

**Limitations of Warranty:** This warranty does not cover:

- Physical damage to the equipment or its parts that does not involve defects in design, material or workmanship, including damage by impact, liquids, temperature, or gases.
- Damage to the equipment or its parts caused by lighting, static discharge, voltage transients, or application of incorrect supply voltages.
- Defects or failures caused by unauthorized attempts to repair or modify the equipment.
- Defects or failures caused by Buyer abuse or misuse.

**Return of Equipment - Domestic:** To obtain performance of any obligation under this warranty, the equipment must be returned freight prepaid to the Customer Service Department. Datron World Communications Inc., 304 Enterprise Street, Escondido, California 92029. The equipment must be packed securely. DWC shall not be responsible for any damage incurred in transit. A letter containing the following information must be included with the equipment.

- a. Model, serial number and date of installation;
- b. Name of dealer or supplier of the equipment;
- c. Detailed explanation of problem;
- d. Return shipping instructions; and
- e. Telephone or fax number where buyer may be contacted.

DWC will return the equipment prepaid by United Parcel Service, Parcel Post, or truck. If alternate shipping is specified by Buyer, freight charges will be made collect.

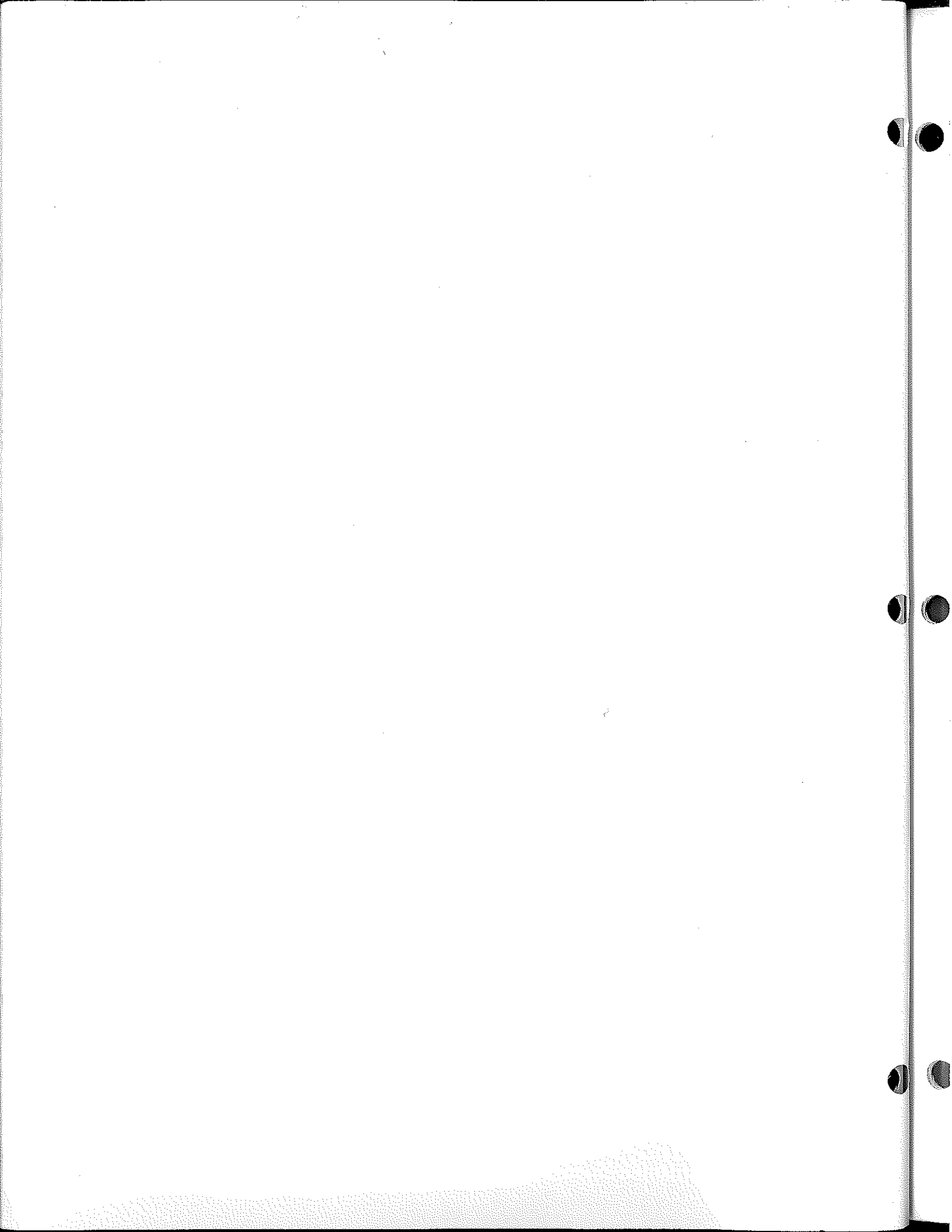
**Return of Equipment - International:** Contact DWC or your local Representative for specific instructions. Do not return equipment without authorization. It is usually not possible to clear equipment through U.S. Customs without the correct documentation. If equipment is returned without authorization, Buyer is responsible for all taxes, customs duties, clearance charges, and other associated costs.

**Parts Replacement:** The following instructions for the supply of replacement parts must be followed:

- a. Return the parts prepaid to "Parts Replacement" Datron World Communications Inc., 304 Enterprise Street, Escondido, California 92029; and
- b. Include a letter with the following information:
  1. part number;
  2. serial number and model of equipment; and
  3. date of installation.

Parts returned without this information will not be replaced. In the event of a dispute over the age of the replacement part, components date-coded over 24 months previously will be considered out of warranty.

**Remedies:** Buyer's sole remedies and the entire liability of DWC are set forth above. In no event will DWC be liable to buyer or any other person for any damages, including any incidental or consequential damages, expenses, lost profits, lost savings, or other damages arising out of use of or inability to use the equipment. 1/96



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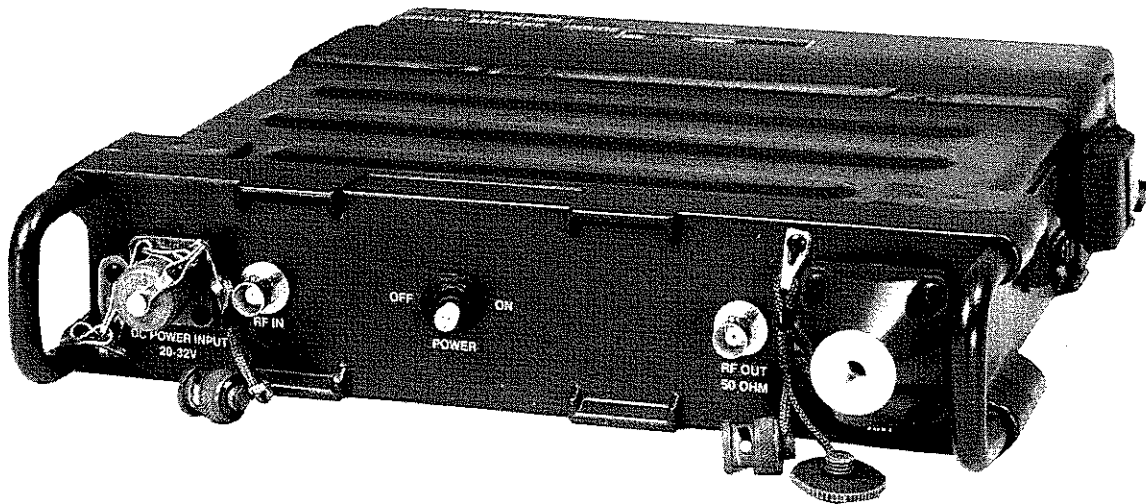


FIGURE 1-1.  
AM-1077 RF Power Amplifier.

# CHAPTER 1

## INTRODUCTION AND TECHNICAL SPECIFICATIONS

### 1-1. GENERAL

This manual describes RF Power Amplifier AM-1077 and covers its installation, operation and organizational maintenance. It also provides detailed information on the service and repair of the amplifier. Full technical information is given including schematic diagrams, circuit descriptions, theory of operation, and test and alignment procedures. The manual also contains detailed parts lists.

### 1-2. DESCRIPTION

The AM-1077 is a 30 to 88-MHz RF power amplifier designed to boost the output power of the PRC1077 transceiver to 50 W.

Although primarily designed for mobile service, the AM-1077 can also be used in a portable configuration. The AN/PRC-77 or equivalent transceiver may be substituted for the PRC1077 in either installation.

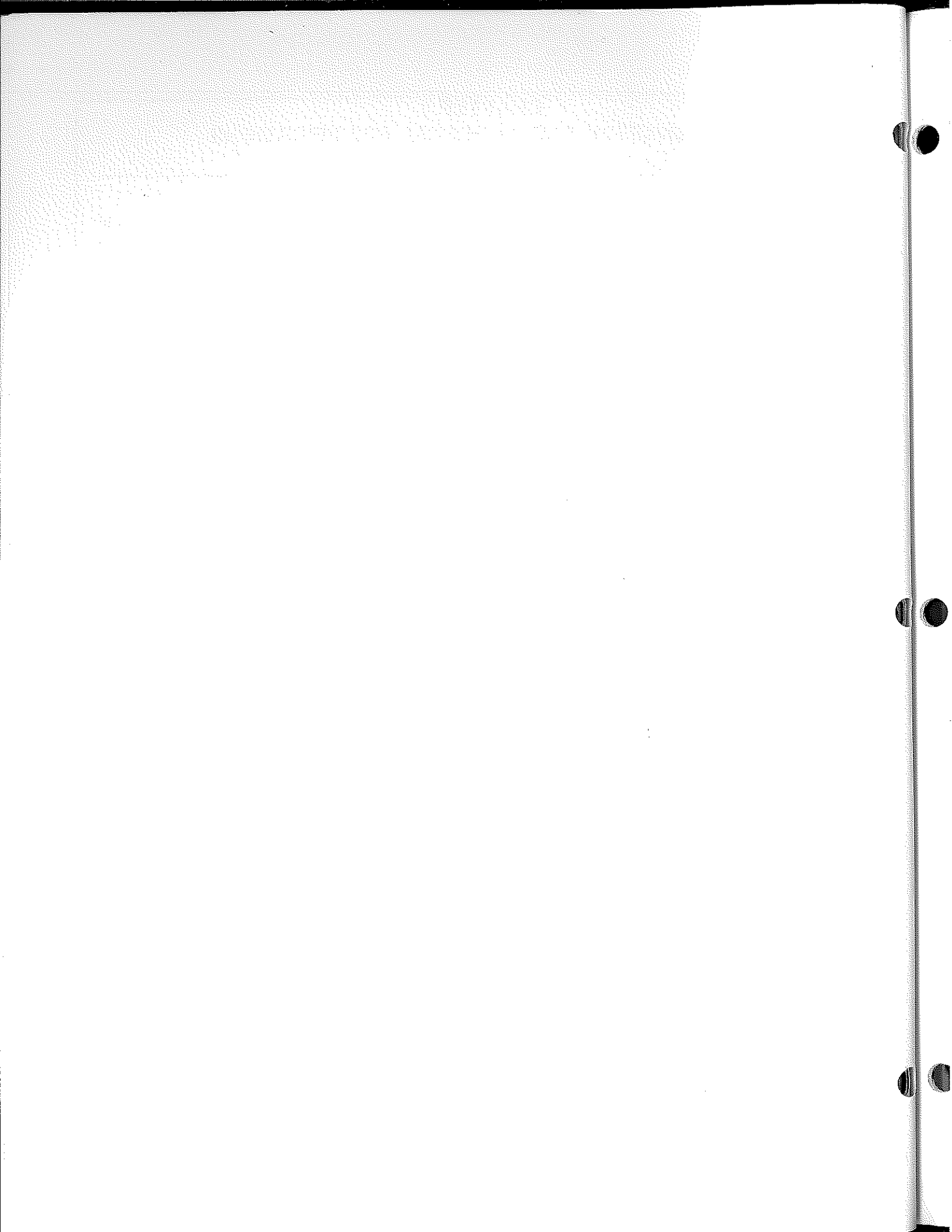
When turned on, the amplifier automatically reacts to RF input signals to provide PTT keying and filter band switching as well as RF power amplification. The only connection between the transceiver and the amplifier is the RF coaxial cable; no separate control cable is needed. Only one manual control, an on/off switch located on the front panel, is used. All connections are made at the front panel except for an auxiliary power plug which is located at the rear. The unit is lightweight, ruggedly built, shock resistant and moisture proof. In the manpack configuration, the AM-1077 operates with a 10-foot whip antenna when the optional AM-1077ATU antenna tuner is installed.

### 1-3. TECHNICAL CHARACTERISTICS

Technical characteristics for the AM-1077 amplifier are as shown in Table 1-1.

**TABLE 1-1.**  
**Technical Characteristics.**

<b><u>ELECTRICAL SPECIFICATIONS</u></b>	
Frequency Range	30-88 MHz
Power Output	50 W, $\pm 1$ dB
Duty Cycle	Continuous to 90° C heat sink temperature; amplifier is automatically bypassed when heat sink temperature exceeds 90° C.
Input RF Power	2-5 W; 2 W will provide 50-W output. RF overdrive up to 5 W will not damage amplifier.
Primary Power	28 Vdc @ 7 A, nominal.
Harmonic Suppression	-55 dB, typical; 50 dB, minimum.
Output Protection	Amplifier protected against open and short circuit at antenna terminals.
Connectors:	
a) Input RF	BNC; 50 $\Omega$ , 2-5 W.
b) Output RF	BNC; 50 $\Omega$ , 50 W.
c) Output Whip Antenna	Whip antenna support for AB-591/PRC Antenna Base.
d) Input dc Power	Front Panel (2-pin) or rear of case (3-pin).
Switch-Circuit Breaker	10 Amp
Antenna Tuning Capability	Optional internal tuner (AM-1077ATU) will match 10-ft. whip antenna. 50- $\Omega$ output port automatically disconnected when whip antenna is installed.
<b><u>MECHANICAL SPECIFICATIONS</u></b>	
Size	2.4" high x 11" wide x 11" deep (including handles and power supply adapter); 9.125" deep without power supply adapter.
Weight	8 lbs. (3.63 kg)
Mounting	Tied to PRC1077.
<b><u>ENVIRONMENTAL SPECIFICATIONS</u></b>	
Operating Temperature	-40° C to 60° C ambient
Storage Temperature	-55 to 85° C
Shock, Vibration, Humidity, Salt Spray, Immersion	Per applicable test conditions and methods of MIL-STD-810D.





## CHAPTER 2 INSTALLATION

### 2-1. UNPACKING

The AM-1077 is packed in a heavy-duty, corrugated cardboard carton. The carton and packing materials should be retained in case the equipment is reshipped.

### 2-2. INSPECTION

Inspect the equipment for possible damage during shipment. Check all accessories against the packing list.

### 2-3. COMPATIBLE EQUIPMENTS

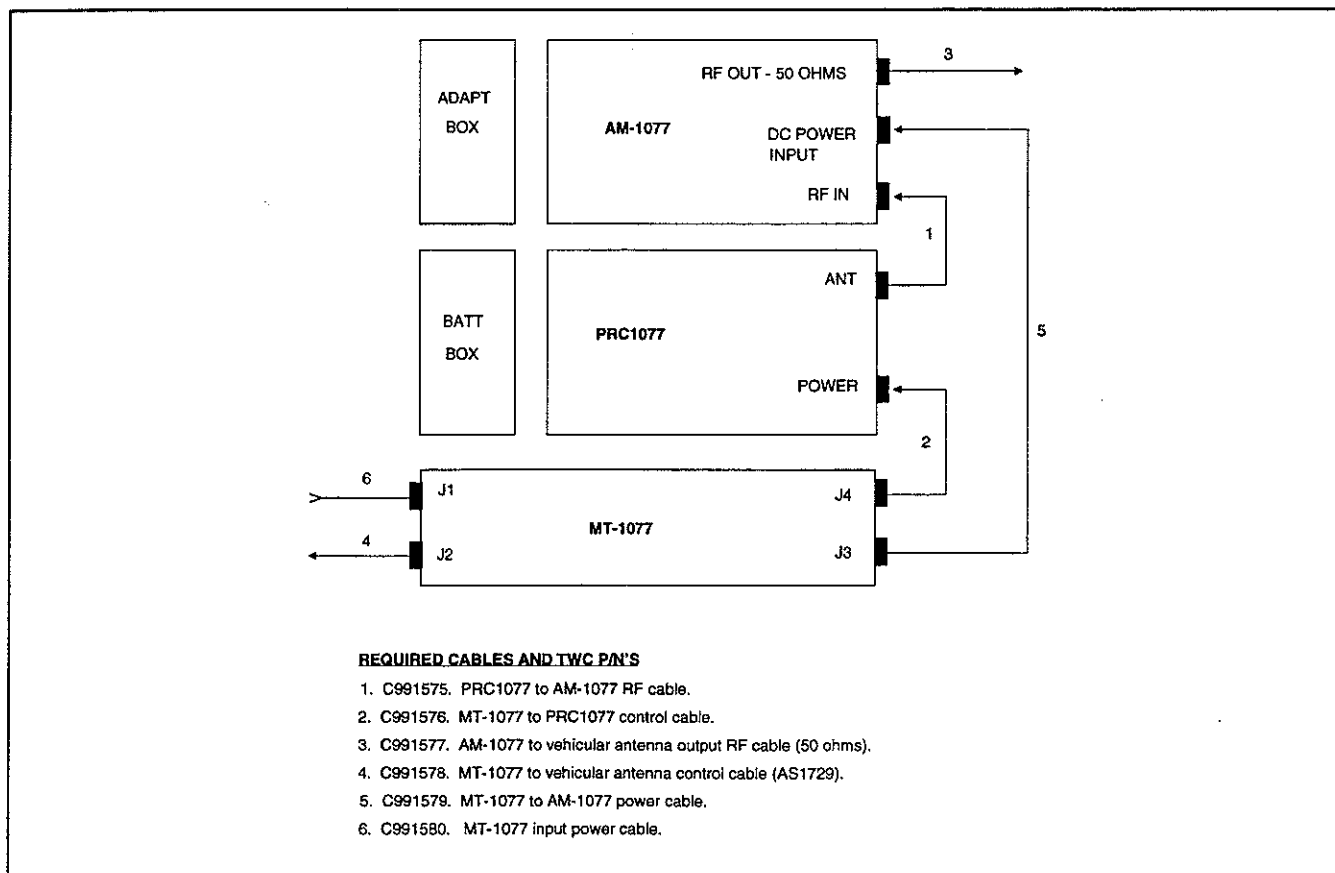
The AM-1077 is electrically and mechanically compatible with the following equipments:

1. TWC PRC1077 transceiver.
2. AN/PRC-77 transceiver.
3. TWC MT-1077 mobile mount.
4. U.S. Army OA3633 mobile mount.
5. B & W Elektronik AS SF281 power supply.
6. U.S. Army AS1729 vehicular antenna.
7. AB-591/PRC antenna base.
8. AT-271 antenna.

The AM-1077 is designed as an RF power booster for TWC's PRC1077 transceiver, but will work equally well with any 30 to 88-MHz exciter capable of outputting a minimum of 2 W into 50 ohms. The only inputs to the amplifier are the RF and + 24-Vdc power lines. The AM-1077 requires no dc control lines or logic switched levels for operation, but rather incorporates a frequency counter and internal control circuitry to provide harmonic filter bandswitching, PTT relay actuation and sequencing, automatic gain leveling for constant RF power output, and power detection for protection against bad load VSWR's. The AM-1077ATU version of the amplifier incorporates an internal automatic antenna tuner, which allows it to be used in a portable configuration with a 10-ft vertical whip antenna.

### 2-4. MOBILE INSTALLATION (VRC1077-50)

A block diagram of the basic VRC1077-50 mobile system is shown in Figure 2-1. (Note that the AN/PRC-77 can be substituted for the PRC1077 in this system if desired.)



**FIGURE 2-1.**  
**VRC1077-50 Mobile System.**

The figure also shows the necessary connecting cables and their TWC part numbers.

### 2-5. MOBILE SYSTEM (VRC1077-50M)

A block diagram of a mobile system using the AM-1077 in a standard military MT1029/OA3633 vehicular mount is shown in Figure 2-2. Interconnecting cables and their TWC part numbers are included.

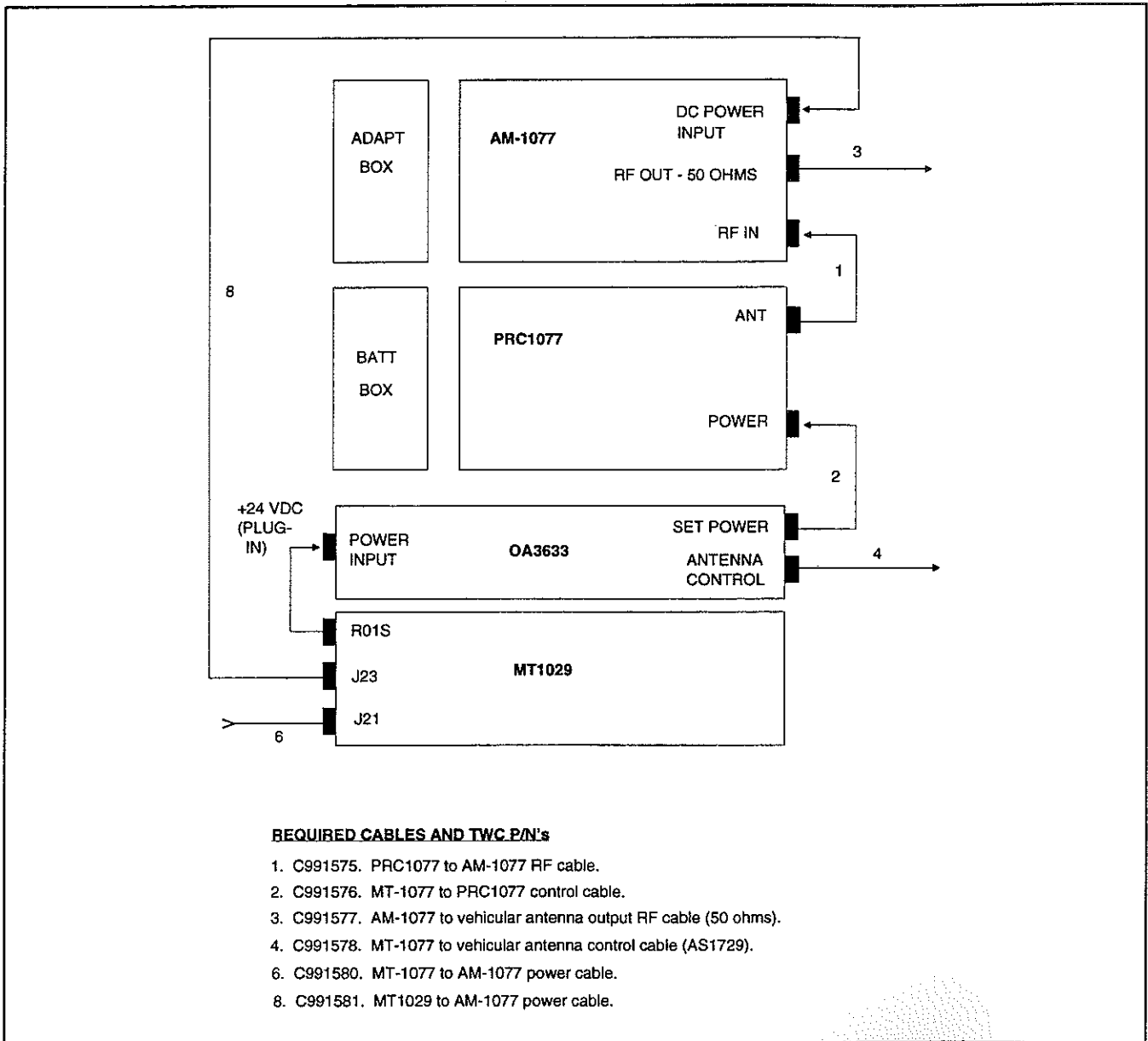
### 2-6 MOBILE/PORTABLE SYSTEM (PRC1077-50)

The AM-1077 can be used in a portable system as depicted in Figure 2-3. Primary power can be obtained from any convenient + 24-Vdc source, and the dc power for the transceiver is provided by an attached power adapter (such as the TWC PS1077 power supply) which con-

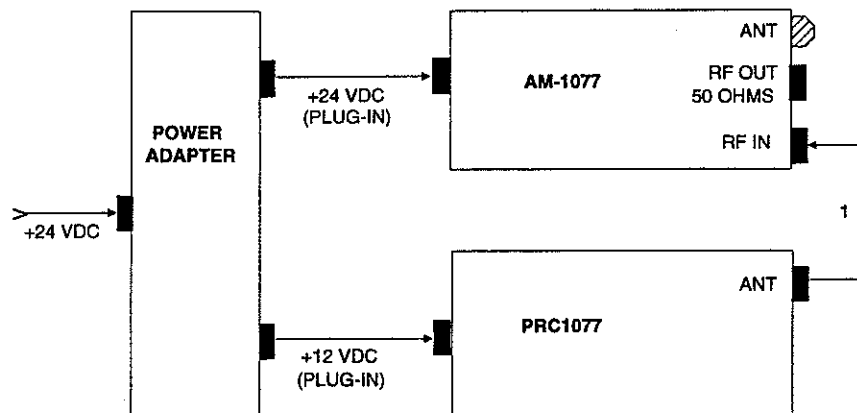
tains a 24/12-Vdc converter. The RF output from the AM-1077 can be either from the "RF-out, 50-ohms" port to a 50-ohm antenna, or from the whip antenna mount connected to a 10-ft vertical whip antenna (such as the AT-271B 10-ft antenna mounted on the AB-591 flexible antenna support). The AM-1077 must be the AM-1077ATU version of the amplifier with the automatic antenna tuner incorporated inside it in order to work with the whip antenna. (NOTE: Both the whip antenna and a 50-ohm antenna cannot be connected at the same time).

### 2-7 DC INPUT POWER CONNECTIONS

J1 is the dc input power connector for the AM-1077. Table 2-1 shows the pin-outs for J1.



**FIGURE 2-2.**  
**VRC1077-50M Mobile System.**



**REQUIRED CABLES AND TWC P/N's**

1. C991647. PRC1077 to AM-1077 RF cable, with right angle connectors, or  
C991575: PRC1077 to AM-1077 RF cable, with straight connectors

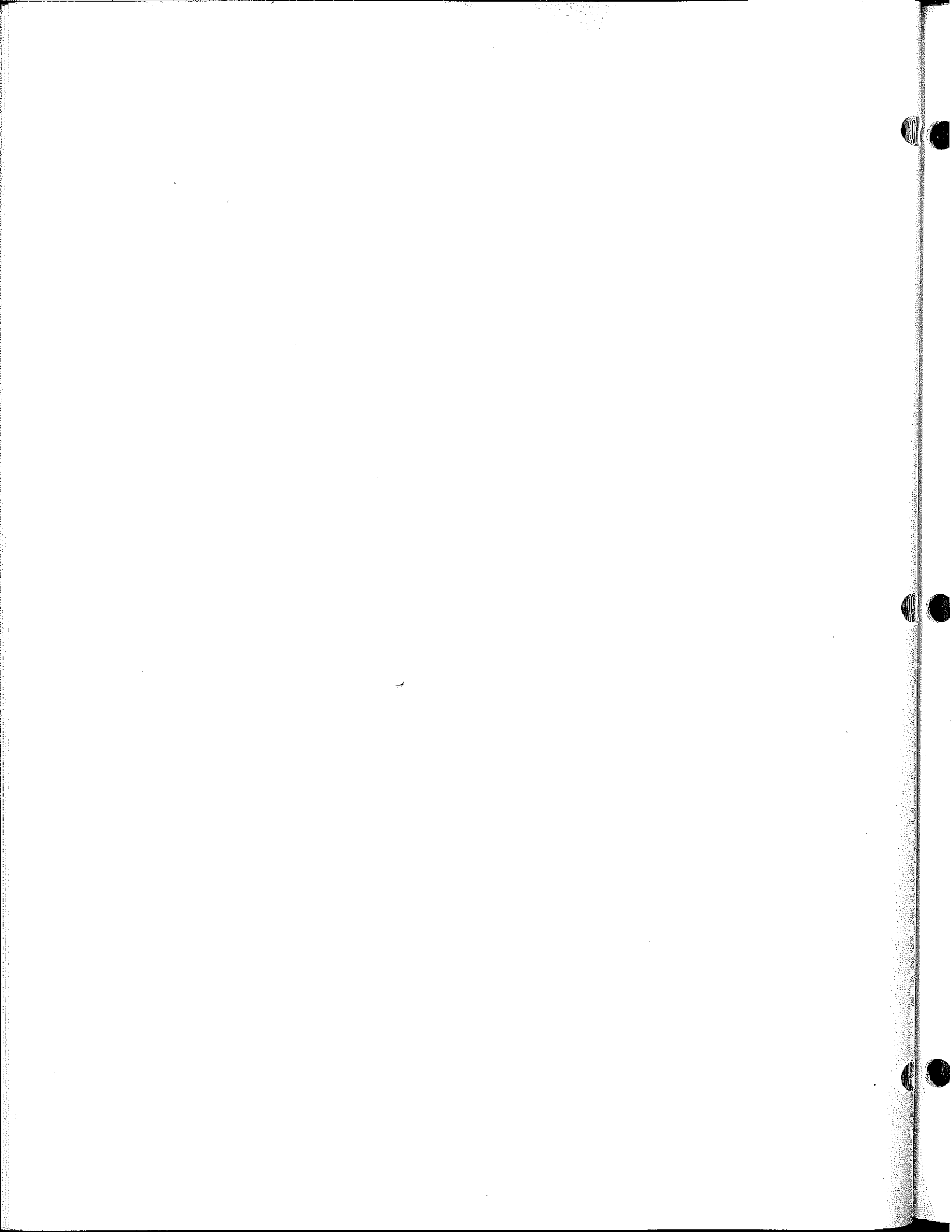
**RF OUTPUT**

If a 50-ohm antenna is used, then RF output cable C991577 is required. If a 10-ft. whip antenna is used, then a proper mounting support (e.g., AB-591) or a lead-in wire is needed.

**FIGURE 2-3.**  
**PRC1077-50 Mobile/Portable System.**

**TABLE 2-1.**  
**AM-1077 (J1) Connector Pin-outs and System Equipment Connections.**

<u>Pins on AM-1077 (J1 - Dc Power Input)</u>	<u>Description</u>	<u>Pins on MT-1077(J3)</u>	<u>Pins on MT1029</u>
A	Ground	A	A
B	+24 Vdc	B	B



## CHAPTER 3 OPERATING INSTRUCTIONS

### 3-1. CONTROLS AND CONNECTORS

All controls and connectors are as listed in Table 3-1 and are shown in Figure 3-1.

The AM-1077 has a single off/on power control which provides full user control of the amplifier. In the off position, power is removed from the amplifier. In the on position, the amplifier circuits are active and output power is as specified in section 1-3.

### 3-2. OPERATION

The AM-1077 is normally operated by following the operational procedure for the companion transceiver plus the selection of "OFF" or "ON" on the amplifier panel.

#### 3-2.1. RECEIVER - TRANSMITTER

See Operator's Manual TW-PRC1077-TM1 for operation of transceiver PRC1077.

### 3-2.2. MOBILE MOUNT

See Operator's Manual TW-MT-1077-TM1 for description of TWC Mobile Mount MT-1077. In the vehicular installation using the MT-1077, the AS1729 antenna control switch (J2) should be turned to the proper band position, and the power breaker/switch should be activated.

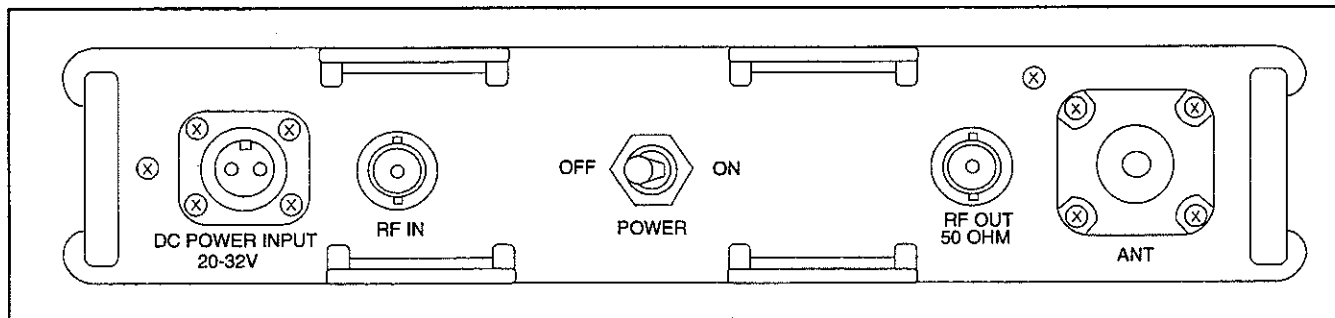
### 3-2.3. AMPLIFIER

The AM-1077 can be configured in a number of ways depending on whether the AM-1077ATU option is installed. The configurations are described as follows:

- 1) **AM-1077 without Internal Automatic Antenna Tuner:** When the amplifier is ordered without the internal antenna tuner, the jumpers on the tuner/control PCB are preset at the factory so that the RF is always routed directly to the 50-ohm output port (see Figure 6-5). The wire between the normally-closed position of switch S1 (S1-

**TABLE 3-1.**  
**Amplifier AM-1077 Controls and Connectors.**

CONTROL OR CONNECTOR	SWITCH POSITION	FUNCTION
Power Switch	OFF	Turns off power to amplifier.
	ON	Selects 50-W power level.
RF IN Connector		Input connection for RF drive signal.
RF OUT, 50 Ohm Connector		Output connector for a nominal 50-vehicular antenna.
DC Power Input Connector		Connection for input 20-32 Vdc power source.
Antenna Mount (ANT)		Base for 10-ft whip antenna.
Power plug (in rear of unit)		Connection for 28-Vdc power source.



**FIGURE 3-1.**  
**AM-1077 Front Panel.**

N.C.) and plug-in pin connector L5 is physically removed, ensuring that relay K9 is always in the de-energized condition whether or not a whip antenna is plugged into the front-panel antenna mount (J4). Under these conditions, the whip antenna port can never be used. The 50-ohm output port (J3) can be used for both high-power (50-W) operation and low-power (transceiver output-amplifier power switch off) operation without changing the antenna cable back and forth between the amplifier and transceiver.

2) **AM-1077ATU with Internal Automatic Antenna Tuner:** When the antenna-tuner version is ordered and factory installed, the jumpers on the tuner/control PCB are preset so that the RF is routed directly to the whip antenna port (J4) *when the whip is physically inserted*. The latter is the normally de-energized condition of relay K9 and allows for the minimum current drain under normal operating conditions. It also permits both high- and low-power operation of the system without having to change the whip between the amplifier and transceiver mounts.

If the antenna is removed, then relay K9 becomes energized and the RF is routed to the 50-ohm output port (J4), which allows the use of a broadband antenna with the sys-

tem. However, in this configuration, the cable leading to the broadband antenna must be changed between the amplifier port (J4) and the transceiver RF output port if it is desired to have both high- and low-output operation.

Operation of the amplifier in either of the above configurations is as easy as turning the front-panel power switch "ON" for high-power operation or "OFF" for low-power operation. ^

#### NOTE

As mentioned above, if the amplifier is the AM-1077ATU version and the 10-foot whip antenna is being used, it can remain on the amplifier "ANT" terminal even in low-power mode (with the AM-1077 power switch off). In this condition the input RF is routed directly to the amplifier internal antenna-tuner input. *Whenever a frequency is changed, however, the amplifier must be turned on and the PTT keyed on the companion transceiver for a second.* The amplifier can then be turned off and the system operated in low power (i.e., transceiver RF output) at that particular frequency. The momentary "power-on/key-down" allows the amplifier antenna tuner to tune up at the new operating frequency.

# CHAPTER 4 MAINTENANCE

## 4-1. GENERAL

This chapter discusses basic operator's maintenance. No special tools or test equipment are required.

## 4-2. PREVENTIVE MAINTENANCE

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

The procedures given in paragraphs 4-3 and 4-4 cover systematic care essential to proper upkeep and operation of the equipment. The cleaning operations (Para. 4-3) should be performed daily when the equipment is in use and weekly when the equipment is in standby condition. The other items must be checked before the equipment is placed in operation, during operation and after shutdown.

The preventive maintenance checks and service charts (Para. 4-3 and 4-4) outline functions to be performed at specific intervals. These checks and services are designed to maintain the equipment in good condition. If a defect cannot be remedied by the operator, a higher category maintenance or repair is required.

## 4-3. PREVENTIVE MAINTENANCE CHECKLIST

This preventive maintenance schedule is for the AM-1077 only, and in no way alters the preventive maintenance instructions for the companion transceiver.

1. Completeness. Check to see that the equipment is complete with all accessories.
2. Cleanliness. Check to see that equipment is clean and free of dirt, dust, corrosion, grease and fungus. Remove fungus, grease and ground-in dirt using a cloth dampened with trichlorethylene. Remove dust and dirt from connectors and clean the panel using a soft clean cloth.
3. Preservation. Check surfaces for evidence of rust or corrosion; remove and spot paint bare surfaces. When the paint on the amplifier has been damaged, prevent corrosion by touching up the damaged area(s). Use solvent (SD) and #0000 sandpaper to clean the surface until the exposed bare metal is bright and smooth. Then paint using a small brush per specification. To reletter any markings that have been damaged, use a small stiff wire to scratch out the engraved area, scraping until all loose paint is

removed. Use solvent (SD) to wash out engraved letters, dry with lint-free cloth, and refill letters using white paint per specification.

4. Publications. Check to see that all publications are complete, serviceable, and current.

5. Gaskets. Check gaskets for moisture, oil saturation, and brittle, broken, cracked, loose, pinched, mismatched, or missing sections.

6. Mountings. Check to ensure that all hardware (nuts, bolts, washers, etc.) are correctly positioned and properly tightened.

7. Connections. Check to be sure that all plugs and receptacles are clean, intact, and that all connections are tight and properly connected.

8. Controls. Check to see that the mechanical action of all controls are smooth and free of all internal binding.

## 4-4. OPERATIONAL MAINTENANCE

The first thing to do if the amplifier is not operating properly is to determine whether the trouble is in the power source, the antenna, the companion transceiver, the interconnecting cables or the amplifier itself.

Many faults that appear related to the amplifier may be found by an inspection of the complete system:

1. Cables connected wrong. Check applicable system hook-up diagram.
2. Worn, broken, or disconnected cables or plugs. Check cables for continuity and shorts.
3. Grounded or broken antenna or antenna cable.
4. Defective transceiver.
5. Low supply voltage. Measure input dc to amplifier.
6. Incorrect setting of transceiver controls.

If the transceiver operates satisfactorily on its own, and all cables check out, the AM-1077 amplifier is probably defective and should be referred to the next higher maintenance level.

