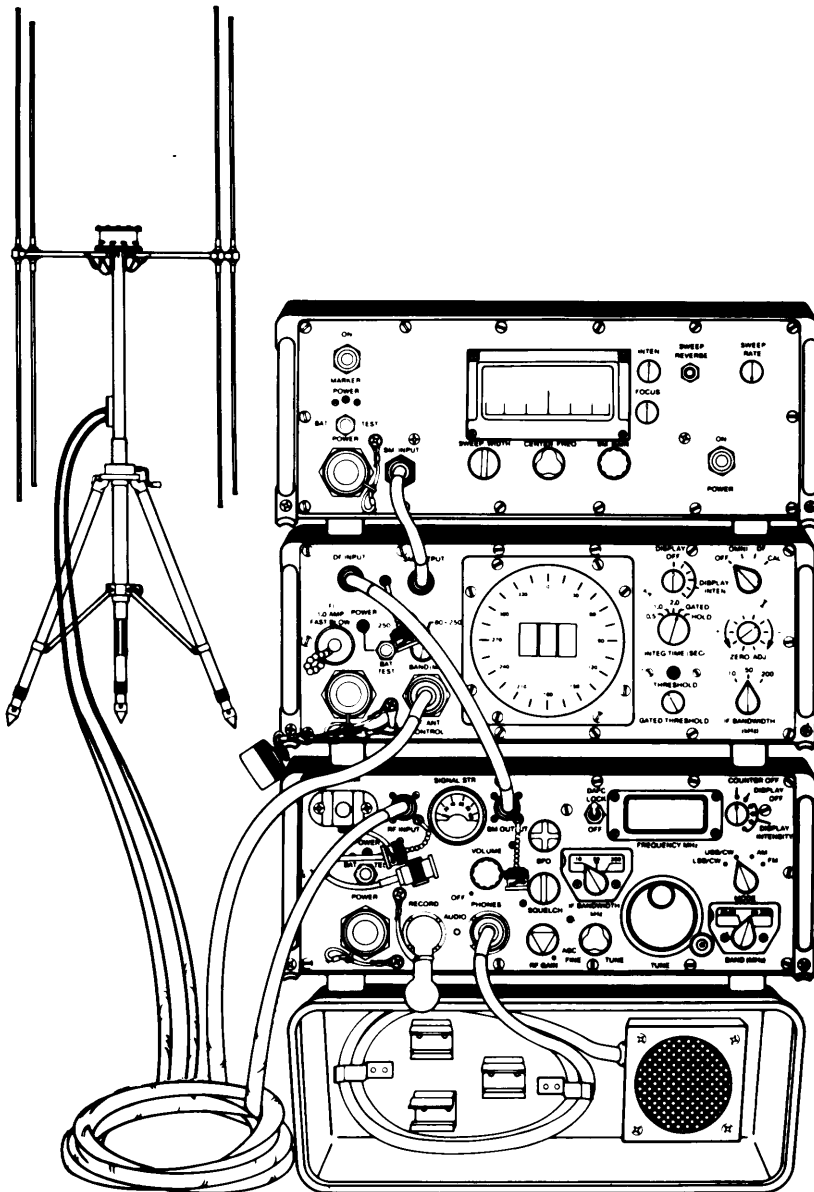


OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL

TM 11-5825-278-12-2



RADIO RECEIVER DIRECTION FINDER SET AN/PRD-11 (NSN 5825-01-188-3435)

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DEPARTMENT OF THE ARMY
13 SEPTEMBER 1985

SAFETY SUMMARY**WARNINGS**

High voltage is used in the operation of this equipment. Death on contact may result if personnel fail to observe the following safety precautions (For Artificial Respiration, refer to FM 21-11):

- Do not be misled by the term "Low Voltage." Potentials as low as 50 volts may cause death under adverse conditions.
- Remove the batteries to the equipment when radio operation has ceased. Leaving batteries in the equipment when it is not in use can cause leakage or an explosion leading to serious bodily damage.
- When using any kind of batteries, be careful not to crush, puncture, disassemble or otherwise mutilate them in order to avoid possible injury to personnel or damage to the equipment.
- Do not attempt to recharge alkaline or magnesium batteries. When using nickel-cadmium batteries, observe extreme caution when recharging by ensuring proper electrical connections and keeping the charger away from other equipment that may spark and cause an explosion.
- Do not remove the protective covers to the equipment unless you are authorized to do so.
- Do not work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid.
- Whenever possible, turn off the power supply to the equipment before beginning maintenance on the equipment.
- Technician must tell operators where dangerous areas are. A periodic review of safety precautions in TB 385-4, Safety Precautions For Maintenance of Electrical/ Electronic Equipment, is recommended.
- Seek advice from your supervisor whenever you are in doubt about electrical safety conditions.

To prevent electrical shocks or damage to the equipment, do not operate your direction finder set until you understand the operation and function of all controls, indicators and connectors.

WARNINGS

Battery BA-5598/U used in this equipment is hazardous. It can explode or generate high heat and catch fire during use or storage. This hazard is present even after the battery is discharged and can no longer operate the equipment. Take the following precautions:

- Remove other combustibles from BA-5598/U storage area.
- Do not mishandle the battery (short cells, try to charge, incinerate, take apart, crush case or damage by dropping).
- Protect hands from burns when removing overheated batteries from equipment. Allow equipment to cool off if possible.
- If equipment case becomes hot, immediately shut equipment off.
- Do not discard discharged batteries with combustibles.

Do not remove the protective covers to any of the units. Voltages within these units can cause electrical shock. Turn off all power to the units before replacing any of the fuses.

Brackets and cable guide inside front covers have sharp edges and may cut fingers.

Be careful that you do not catch your fingers as tripod legs close.

CAUTIONS

The df antenna is easily damaged through careless or improper handling. Use care when setting up the df antenna.

The df antenna is easily damaged through careless or improper handling. Use care when tearing down the df antenna.

Do not position the tripod on a slope that is too steep to set all legs securely on ground. Antenna should not lean more than 30° from vertical.

Examine antenna mast cables to ensure they will not catch on thumbscrew.

CAUTIONS

Do not force compass arm assembly into compass mounting plate. Aluminum tip will bend and may not be able to be removed.

If D-cell insert contains batteries:

- Do not remove batteries before removing cardboard tubes.
- Do not use metal tools to remove batteries or you will short them out.

Wrap cables in loose circles sized to fit within the antenna carrying bag. If the cables are too tightly wrapped, they will break.

Before lowering antenna arm be sure antenna mast cables are free of locking thumbscrews.

Ensure the correct single pin cable is connected to correct plug.

Do not overtighten any of the six single pin cables onto their plugs.

Turn off power to the direction finder set before using angle simulator.

Do not pack any unit without first ensuring that the batteries have been removed from the rear covers.

TECHNICAL MANUAL

HEADQUARTERS

DEPARTMENT OF THE ARMY

NO. 11-5825-278-12-2

Washington, DC, 13 September, 1985

Operator's and Organizational Maintenance Manual

RADIO RECEIVER DIRECTION FINDER SET

AN/PRD-11

(NSN 5825-01-188-3435)

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, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007. A reply will be furnished direct to you.

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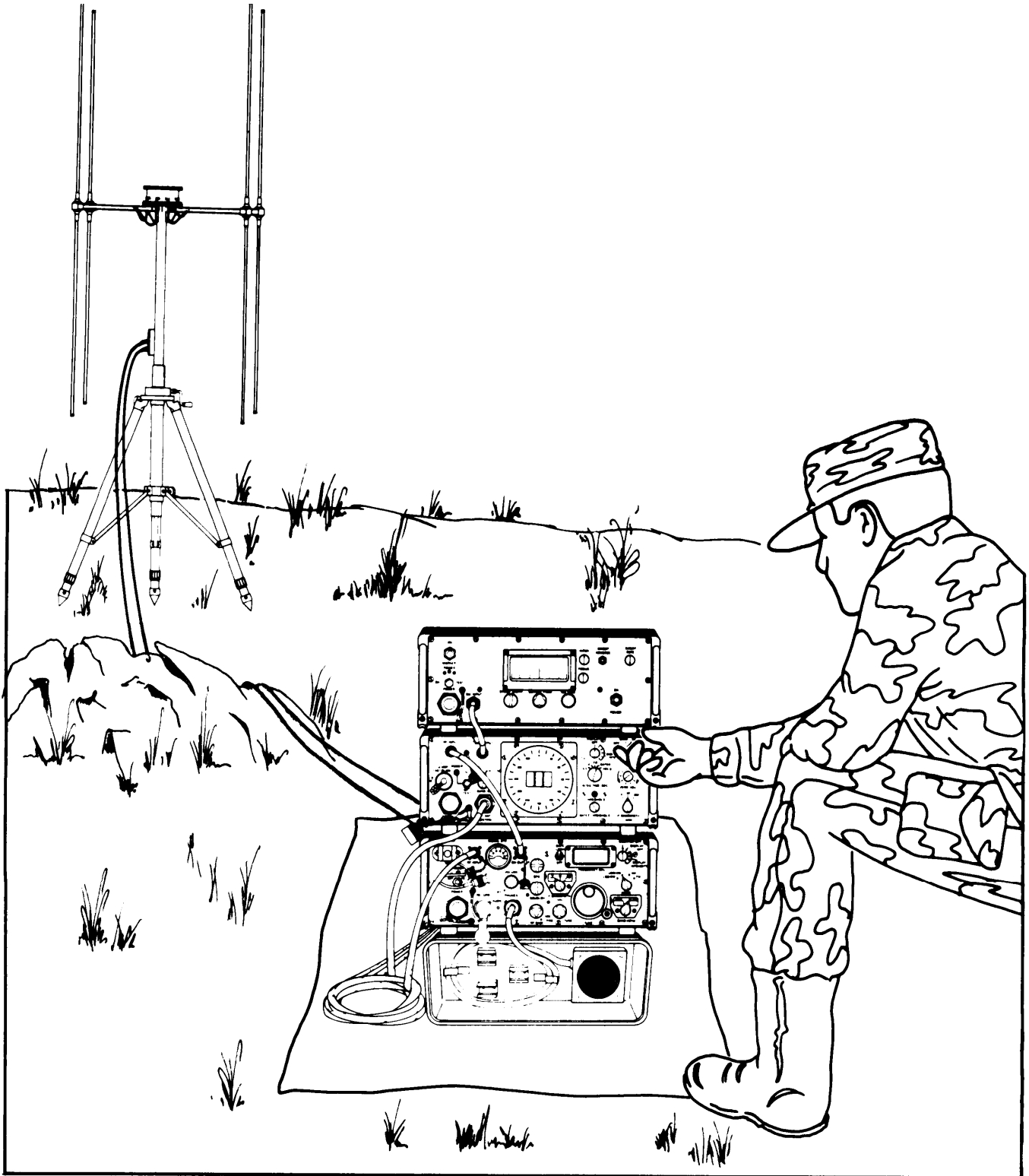
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HOW TO USE THIS MANUAL

This manual tells about installing, operating and maintaining the AN/PRD-11 Radio Receiver Direction Finder Set at the operator and organizational maintenance level. You will find descriptions and configurations as well as operator and maintenance instructions in this manual.



Use the front cover locators and marked pages to quickly find the parts of the manual shown on the cover. These portions of the manual were chosen because they are most often used. This manual has been divided into chapters, sections and paragraphs which are numbered sequentially. Each large section begins with a 'Section Contents' which lists each paragraph by title and page number. Each paragraph that contains several different procedures also has an index that lists the page number on which the procedure begins. In addition, you will find a system of captions which will help you quickly find the information you need. These captions name the pieces of equipment and/or procedures that you will be doing. Some of the procedures may actually consist of several smaller procedures. For example, 'Removing' and 'Replacing' are not separate procedures. They are parts of a larger 'Removing' and 'Replacing' maintenance procedure.



RADIO RECEIVER DIRECTION FINDER SET
AN/PRD-11

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

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1-1. SCOPE

a. Type of Manual. This is an Operator and Organizational Maintenance technical manual.

b. Model Numbers and Equipment Names. The Radio Receiver Direction Finder Set, AN/PRD-11 consists of a Direction Finder Antenna, AS-3732/PRD-11 or AS-3733/PRD-11, a Panoramic Indicator, IP-1355/GRR-8(V), a Receiver, AN/GRR-8(V), and a Processor Display Control, C-11495/PRD-11. This group of equipment will be referred to in this manual as the direction finder-set. The direction finder antenna will be known as the df antenna, the panoramic indicator as the signal monitor, the receiver as the receiver and the processor display control as the df processor.

c. Purpose of Equipment. The direction finder set detects and displays radio signal frequencies and provides line of bearing information for the location of transmitting antennas.

1-2. CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA Pam 310-1 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

1-30 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 prescribed by DA Pam 738-750 as contained in Maintenance Management Update.

b. Report of Packaging and Handling Deficiencies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-54/MCO 4430.3F.

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

1-4. HAND RECEIPT (-HR) MANUALS

This manual has a companion document with a TM number followed by "-HR" (which stands for Hand Receipt). The TM 11-5825-278-10-2HR consists of preprinted hand receipts (DA Form 2062) that list end item related equipment you must account for. As an aid to property accountability, additional -HR manuals may be requisitioned from The US Army Adjutant General Publications Center, Baltimore, MD, in accordance with the procedures in Chapter 3, AR 310-2, and DA PAM 310-10.

1-5. DESTRUCTION OF ARMY ELECTRONICS MATERIEL

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-6. PREPARATION FOR STORAGE OR SHIPMENT

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in paragraphs 4-12, 4-13 and 4-14.

1-7. NOMENCLATURE CROSS-REFERENCE LIST

The list below will help you identify the official nomenclature of the major equipment items used with the direction finder set. It also provides the common name used in the manual when it is different from the official nomenclature. Official nomenclature must be used when completing forms or when looking up technical manuals.

Common Name	Official Nomenclature
Battery	Battery, Dry BA-4386/PRC-25
Battery charger	Power Supply/BA PP-7566/GRR-8(V)
Df antenna	Antenna, Direction Finder AS-3732/PRD-11 and Antenna, Direction Finder AS-3733/PRD-11
Df processor	Control, Processor Display C-11495/PRD-11
Direction finder set	Radio Receiver Direction Finder Set AN/PRD-11
D-Cell battery	Battery BA-30
Headset	Headset H-251/U
Lithium battery	Battery, non-rechargeable, Lithium SO ₂ , BA-5598/U
Mounting tray	Mounting Tray WJ-8640/MT
Nicad battery	Battery, Storage BB-586/U
Receiver	Receiver AN/GRR-8(V)
Signal monitor	Indicator, Panoramic IP-1355/GRR-8(V)
Tuner assembly	Tuner, RF TN-586/GRR-8(V) Tuner, RF TN-584/GRR-8(V) Tuner, RF TN-585/GRR-8(V)
Whip antenna	Antenna, Whip AT-892/PRC-25

1-8. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS

If your direction finder set 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. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ME-MP, Fort Monmouth, New Jersey 07703-5007. We'll send you a reply.

1-9. WARRANTY INFORMATION

The equipment associated with the direction finder set is warranted by Watkins-Johnson Company for a period of two years following delivery. It starts on the date found in block 23, DA Form 2408-9, in the logbook. This warranty may contain repair restrictions. Report all defects in material or workmanship to your supervisor.

1-10. LIST OF ABBREVIATIONS

The list below contains abbreviations used in this manual that may be unfamiliar to you.

ADJ	Adjust
AGC	Automatic Gain Control
am.	amplitude modulation
ANT.	antenna
BA	Battery
BC	Battery Charger
BFO	Beat Frequency Oscillator
bnc	bayonet connector
CAL	Calibrate
crt	cathode ray tube
cw	continuous wave
DAFC	Digital Automatic Frequency Control
dc	direct current
df	direction finding
ECM	Electronic Countermeasures
fm	frequency modulation
hf	high frequency
if.	intermediate frequency
INTEG	Integration
INTEN	Intensity

1-10. LIST OF ABBREVIATIONS - Continued

kHz	kilohertz
LED	Light Emitting Diode
lob	line of bearing
lsb	lower sideband
MHz	Megahertz
NCE	Net Control Element
nicad	nickel cadmium
rf	radio frequency
SM	Signal Monitor
uhf	ultra high frequency
usb	upper sideband
V dc	volts direct current
vhf	very high frequency

1-11. GLOSSARY

The glossary below contains words and phrases used in this manual that may be unfamiliar to you.

Antenna element - The part of the df antenna that detects rf signals.

Automatic gain control (agc) - A circuit which automatically maintains the output volume of receiver regardless of the signal strength.

Bandwidth - The range within the limits of a frequency band.

Cathode ray tube (crt) - A tube in the signal monitor which produces a visible display of signals.

Continuous wave (cw) - A continuous flow of identical waves which can be interrupted according to a code or modulated in amplitude or frequency.

Digital readout - A numerical indication on the df processor and receiver for lob readings.

Df antenna - An antenna whose elements can be turned off and on in sequence in order to determine the direction of a transmitted signal.

1-11. GLOSSARY - Continued

- Df cut - Determining probable location of a target transmitter based on lines of bearing taken by only two direction finding stations.
- Df fix - A most probable location of a target transmitter based on a line of bearing taken at three or more direction finding stations.
- Df flash - An order to immediately tune to and obtain a line of bearing on a specific frequency.
- Df processor - An electronic device which controls the direction finder antenna so as to determine the line of bearing on a transmitted signal.
- Df set - A group of specific electronic equipment composed of a receiver, df processor, signal monitor and a df antenna.
- Direction Finding Station - One direction finder set in operation.
- Fine tune - Adjusting a received signal for maximum reception.
- Frequency - The number of complete cycles in one second of alternating current.
- Frequency band - A continuous and specific range of frequencies.
- High bay - The elements of the df antenna that detect rf signals between 150 and 500 MHz.
- High frequency (hf) - Frequencies in the range of 3 to 30 MHz.
- Kilohertz (kHz) - 1000 cycles per second.
- Line of bearing (lob) - The measurement in degrees of the arrival of a radio signal in relationship to north (grid, true or magnetic) . May also be called an azimuth or shot.
- Lob display - The numerical and circular indication of the line of bearing located on the front panel of the df processor.
- Low bay - The elements of the df antenna that detect rf signals between 20 to 175 MHz.
- Lower sideband (lsb) - The lower range of two groups of frequencies.
- Megahertz (MHz) - 1,000,000 cycles per second.
- Net Control Element (NCE) - The command authority which assigns mission tasks to the operator.
- Orientation - Alining the df antenna to a compass point.

1-11. GLOSSARY - Continued

- Receiver - An electronic device that receives incoming radio signals and converts them to audio form.
- Radio frequency (rf) - Incoming radio signals to a receiver.
- Rf gain - An increase in the strength of a signal.
- Signal - An electrical wave that carries information.
- Signal monitor - An electronic device that displays a signals waveform. Also called panoramic indicator.
- Squelch - To quiet a receiver by reducing its gain.
- Target transmitter - The source of radio transmissions in which a direction finder set is monitoring.
- Threshold - The point at which a signal is first detected.
- Trace - The pattern on the screen of a cathode ray tube (CRT).
- Tune - Adjust to a desired frequency.
- Tuner assembly - An electronic device which may be adjusted to a particular frequency.
- Ultra high frequency (uhf) - Frequencies in the range of 300 to 3,000 MHz.
- Upper sideband (usb) - The higher range of two groups of frequencies.
- Very high frequency (vhf) - Frequencies in the range of 30 to 300 MHz.
- Waveform - A visual display of a signal.

Section II. EQUIPMENT DESCRIPTION

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1-12. Equipment Characteristics, Capabilities and Features	1-9
1-13. Location and Description of Major Components	1-10
1-14. Differences Between Models	1-14
1-15. Equipment Data	1-14
1-16. Safety, Care and Handling	1-16

1-12. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

CHARACTERISTICS

- Battery operated.
- Portable, weatherproof and shockproof.
- Usable as a manpack or mounted in a vehicle.

CAPABILITIES AND FEATURES

- Detects radio frequency signals.
- Provides digital line of bearing (lob) readings on transmitting antennas with an accuracy of 1° under ideal conditions.
- Contains a circular LED dial on the df processor for graphic line of bearing readings.
- Contains an antenna mounted compass for true north orientation.

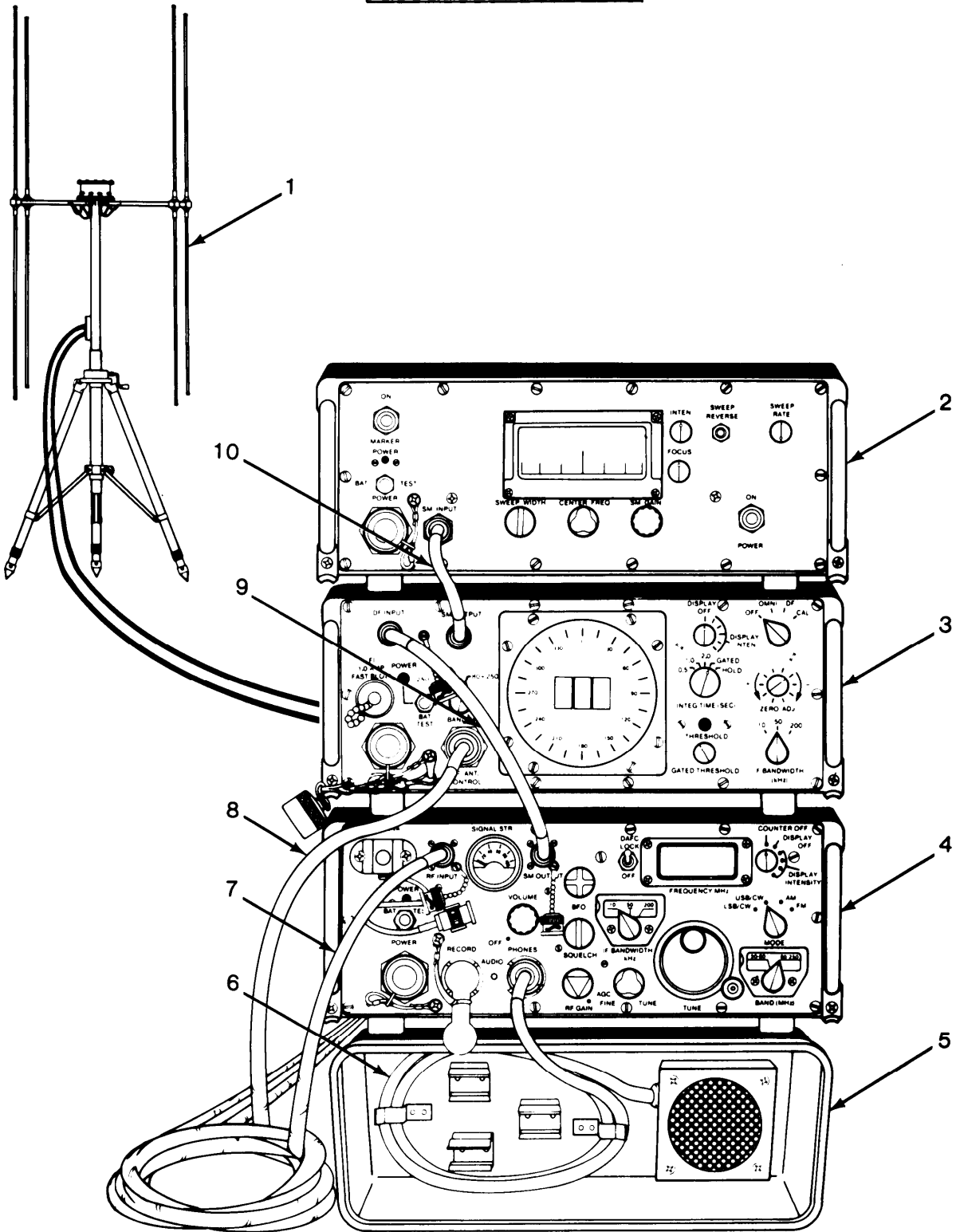
1-13. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

a. Radio Receiver Direction Finder Set AN/PRD-11 consists of a signal monitor, a df processor, a receiver, and a df antenna. All of these units are interconnected by cables and powered by battery packs. During operation, the speaker assembly, receiver, df processor and the signal monitor are stacked one on top of the other. The df antenna can be located up to 44 feet from the equipment.

1. DF ANTENNA. Collects radio signals.
2. SIGNAL MONITOR. Monitors am., fm and cw radio signals. Provides visual waveform display of signal activity of the tuned frequency. Aids the operator in determining the amplitude of the signal being received.
3. DF PROCESSOR. Provides switching signals to the antenna and IF. Input to the signal monitor. Provides a visual line of bearing display and a digital bearing readout for the operator.
4. RECEIVER. Receives and provides audio output of am., fm and cw radio signals.
5. SPEAKER ASSEMBLY. Provides receiver audio output.
6. SPEAKER CABLE. Interconnects the speaker to the receiver.
7. RF CABLE. Interconnects the df antenna to the receiver.
8. DF CABLE. Interconnects the df processor to the df antenna.
9. DF PROCESSOR BNC CABLE. Interconnects the receiver to the df processor.
10. SIGNAL MONITOR BNC CABLE. Interconnects the df processor to the signal monitor.

1-13. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

MAJOR COMPONENTS



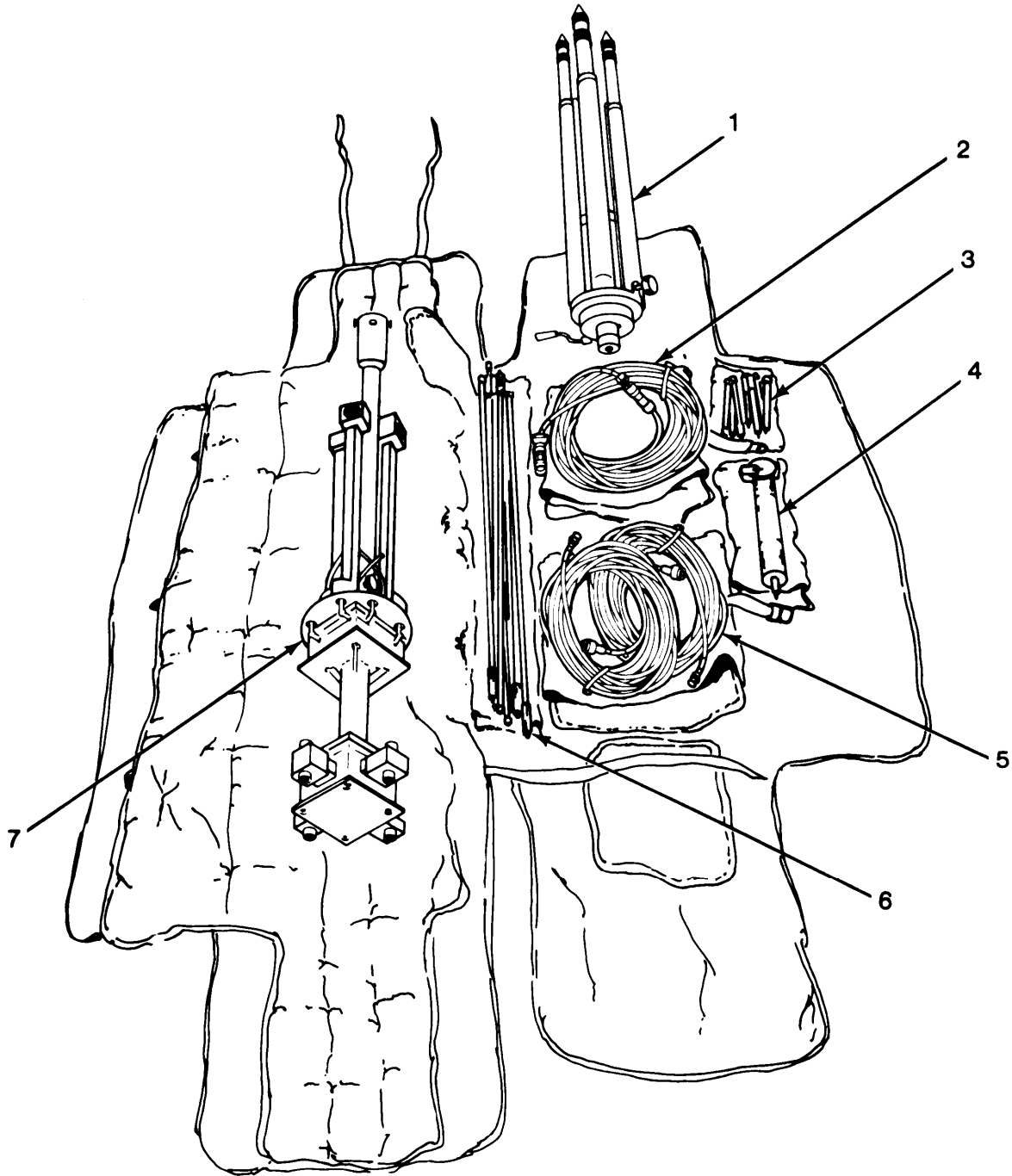
1-13. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

b. There are two df antennas that can be used with the direction finder set. They are the AS-3732/PRD-11 and the AS-3733/PRD-11. They are both transported disassembled in similar antenna carrying bags. Each df antenna component is stored in a specific area of the antenna carrying bag as shown here. The carrying bag for the AS-3733/PRD-11 has additional storage areas for the short antenna elements and second rf cable and additional fastening straps.

1. TRIPOD
2. DF CABLE
3. SHORT ELEMENTS (AS-3733/PRD-11 carrying bag only)
4. COMPASS ASSEMBLY
5. RF CABLES
6. LONG ELEMENTS
7. MAST

1-13. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued

MAJOR COMPONENTS



1-14. DIFFERENCES BETWEEN MODELS

There are two models of the df antenna which can be used with the direction finder set: AS-3732/PRD-11 and AS-3733/PRD-11. The differences between them are listed below. Because of the additional elements and the upper bay section of the AS-3733/PRD-11, installation procedures for both antennas will differ slightly. There are no differences in models of the receiver, signal monitor or the df processor.

Difference	Antenna Specification	
	AS-3732/PRD-11	AS-3733/PRD-11
Frequency	20 - 175 MHz	20 - 850 MHz
Dipole length:		
Lower bay	73 in.	73 in.
Upper bay	nonexistent	14.2 in.
Array diameter:		
Lower bay	43 in.	43 in.
Upper bay	nonexistent	6.7 in.
Number of terminals	2	3
Weight	14 lbs	17 lbs

1-15. EQUIPMENT DATA

DIMENSIONS AND WEIGHTS	
<u>Dimensions</u>	
Receiver	4 X 11 X 12 in.
Df processor	4 X 11 X 12 in.
Signal monitor	4 X 11 X 12 in.
Front panel protective covers (each)	4 X 11 X 3 in.
DF antenna height (including tripod)	
AS-3732/PRD-11 and AS-3733/PRD-11	
Minimum height	103 in.
Maximum height	143 1/4 in.
Battery pack (depth)	2.5 in.
Cables	
Rf	50 ft
Df	50 ft
<u>Weight</u>	
Receiver	19 lbs
Df processor	14 lbs
Signal monitor	18 lbs
Df antenna (AS-3732/PRD-11 and AS-3733/PRD-11):	
Tripod	10 lbs
Antenna	14 lbs
Case	7 lbs
Batteries:	
30 D-cell	16.5 lbs
3 magnesium	9 lbs
3 lithium	4.2 lbs

1-15. EQUIPMENT DATA - Continued

ENVIRONMENTAL LIMITATIONS

Temperature, operating 0 to +50° Celsius
 Temperature, storage -40 to +70° Celsius
 Temperature, degradation point
 Upper 30° Celsius
 Lower 20° Celsius
 Altitude, operating 35,000 ft
 Altitude, nonoperating. 50,000 ft
 Humidity 98%
 Wind (df antenna, erected and secured) 100 mph
 Ice (df antenna only) 1/4 in. radial, maximum

TECHNICAL INFORMATION

Power

Power requirements 14 to 16v dc
 Battery sources D-cell alkaline BA-30
 D-cell nickel cadmium BB-586/U
 Lithium S0₂, BA-5598/U
 Dry Battery BA-4386/PRC-25
 Non-rechargeable Lithium BA-5598/U

Source	Operating Time	
	Display ON	Display OFF
BA-30	5 to 8 hrs	5 to 9 hrs
BB-586/U	6 to 9 hrs	6 to 10 hrs
BA-5598/U	6 to 9 hrs	6 to 10 hrs
BA-4386/PRC-25	6 to 9 hrs	6 to 10 hrs

Reception

Types of reception am., fm, usb/cw, lsb/cw
 Tuner head range:
 TN-586/GRR-8(V) 0.5 to 30 MHz
 TN-584/GRR-8(V)20 to 250 MHz
 TN-585/GRR-8(V) 250 to 500 MHz
 Main tuning control Approximately 35 turns
 If. bandwidths 10 kHz, 50 kHz, 200 kHz
 Meter indication Signal strength
 Df processor accuracy (ideal conditions) 1°

1-16. SAFETY, CARE AND HANDLING

Follow the Warnings, Cautions and Notes listed in this manual in order to protect yourself and your equipment from being harmed. In addition, you can ensure effective radio communication through proper care and handling of the direction finder set by observing these precautions:

- Read your technical manual thoroughly.
- Keep the equipment clean and dry when possible.
- Handle the equipment carefully.
- Conduct routine checks and services.

Section III. PRINCIPLES OF OPERATION

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1-18. Typical Data Flow.	1-18
1-19. Modes of Operation	1-19

1-17. TECHNICAL PRINCIPLES OF OPERATION

The direction finder set consists of a df antenna, a signal monitor, a receiver and a df processor. This set enables you to detect vhf and selected hf and uhf radio signals. In addition, the operator may monitor the detected signal and obtain a line of bearing (lob) on the transmitting antenna.

- THE DF ANTENNA:
- Provides antenna-mounted compass for true north orientations.
 - Intercepts radio frequency (rf) signals between 20 and 175 MHz with a low bay section.
 - Intercepts rf signals between 20 and 500 MHz with a high bay section.
 - Receives electrical signals from the df processor which activate antenna elements in sequence.
 - Inputs rf signals to the receiver for monitoring.

1-17. TECHNICAL PRINCIPLES OF OPERATION - Continued**THE RECEIVER:**

- Receives rf signals from the df antenna in the am., fm and cw modes.
- provides a digital readout of the tuned frequency.
- Locks in the tuned frequency to within 1 kHz to prevent signal drift,
- Provides audio output for a headset, speaker assembly or recorder.
- Provides an input to the signal monitor through the df processor for a visual waveform display of the tuned frequency.
- Provides signal to df processor for determination of lob.

THE DF PROCESSOR:

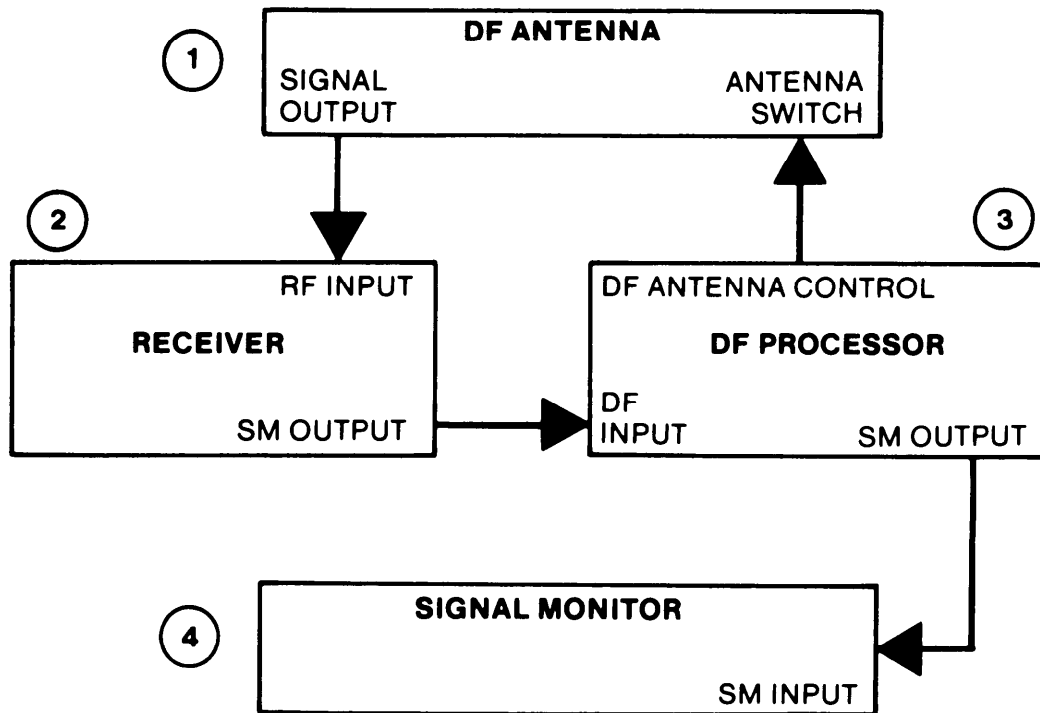
- Activates the df antenna and controls the switching action of the df antenna elements.
- Receives the signal from the receiver.
- Visually displays compass bearing of a transmitting antenna.

THE SIGNAL MONITOR:

- Receives signal input from the df processor.
- Provides a visual display of signal input for determining the amplitude and type of signal being detected.
- Aids operator in fine tuning signals.

1-18. TYPICAL DATA FLOW

The typical flow of signal data through the direction finder set is described as follows:

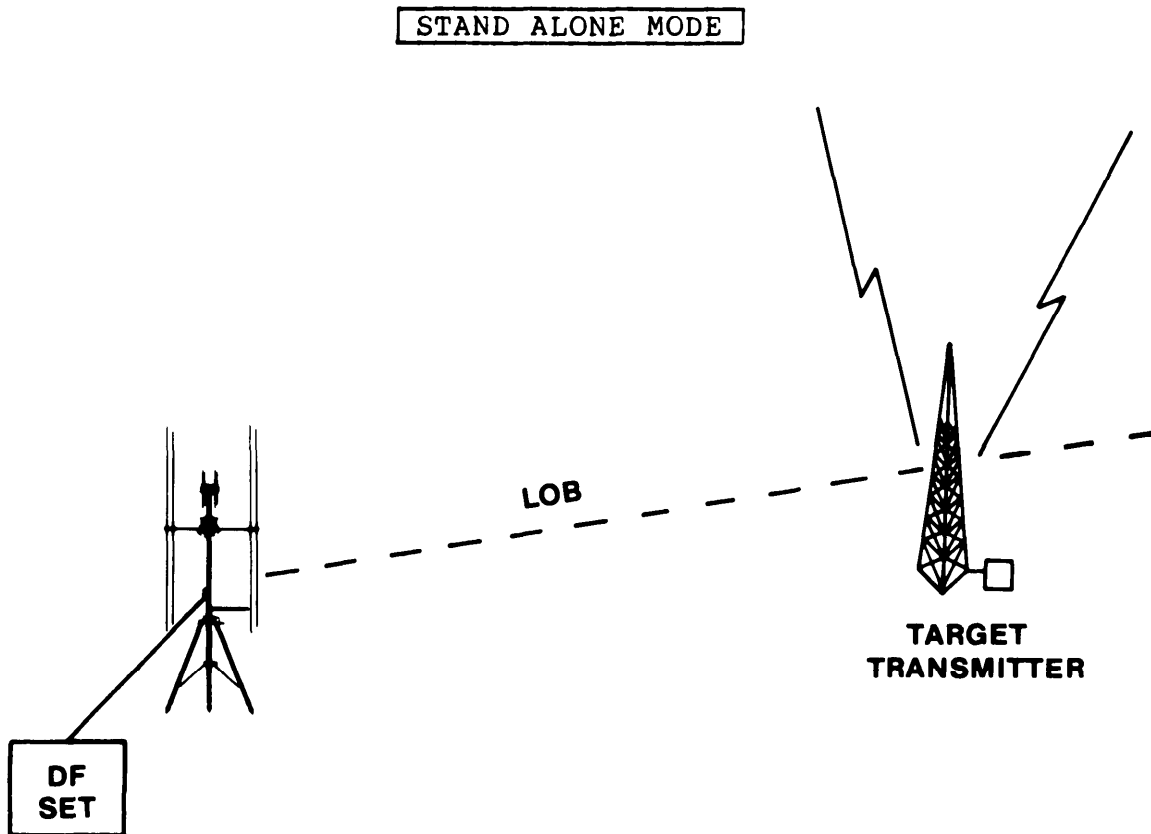


- When power is applied to the units, the df processor (3) sends electrical signals to the df antenna (1) through the antenna control cable.
- The electrical signals from the df processor (3) turn on the df antenna elements in sequence. Rf signals present on each turned on element is sent to the receiver (2) through the rf cable.
- The receiver (2), through operator tuning, indicates the frequency of the rf signal. This signal is simultaneously passed into the df processor (3) through a bnc cable.
- The df processor (3) determines lines of bearing on each tuned signal while passing the signal to the signal monitor (4) through a bnc cable.
- The signal monitor (4) enhances tuning accuracy for the receiver by visually displaying the signals waveform for adjustment.

1-19. MODE OF OPERATION

The direction finder set can be used in a stand alone mode or in a netted mode with two or more other sets.

a. Stand Alone Operation. For stand alone operation, only one direction finder set is required. The stand alone mode is used to search and monitor frequency bands. A line of bearing (lob) can be obtained on a transmitting antenna when operating in this mode. However, the lob will only supply you with direction. You cannot accurately determine distance or location in this mode.

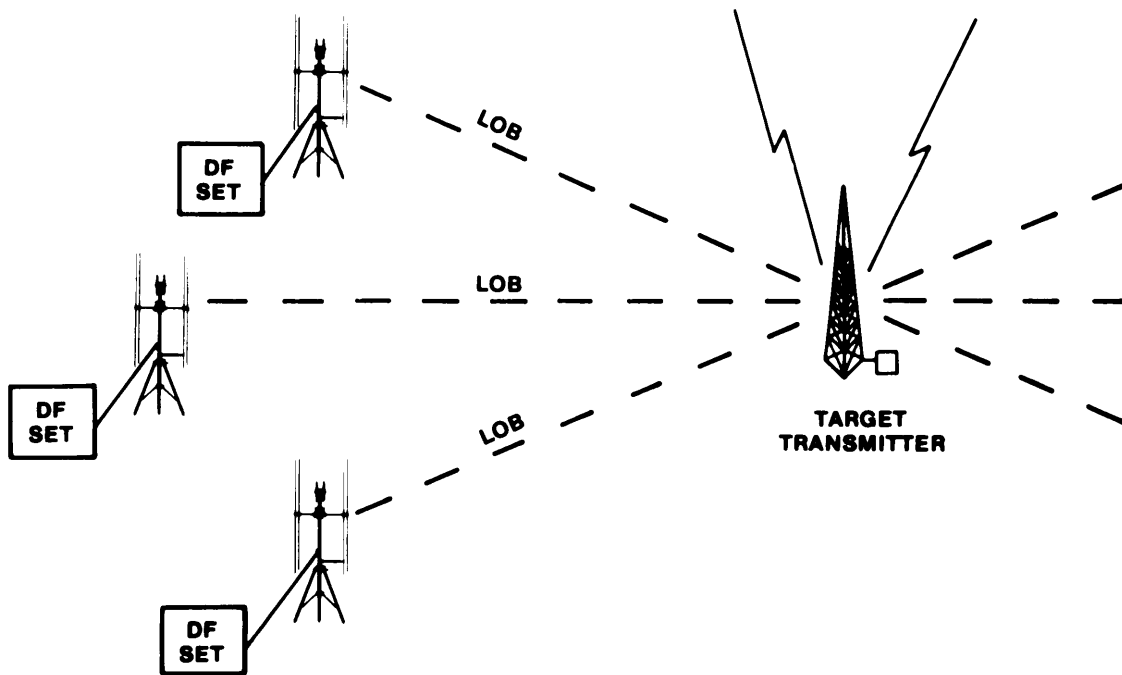


- Detects radio frequency signals between 0.5 and 500 MHz depending on the tuner assembly.
- Allows monitoring of target area radio transmissions.
- Provides line of bearing information for general direction of transmitting antenna.

1-19. MODES OF OPERATION - Continued

b. Netted Operation. In a netted operational mode, three or more separately located direction finder sets are used to obtain a df fix on a transmitting antenna. A Net Control Element (NCE) directs the df stations to tune into the same frequency and report back the line of bearing information displayed on their df processors. The NCE can then plot the location of the target transmission.

NET MODE WITH THREE DF STATIONS



- Each direction finder station detects radio frequency signals between .5 and 500 MHz depending on its installed tuner assembly.
- Each direction finder station systematically monitors and reports radio signals to the NCE and, when directed to do so, locks onto a specific frequency.
- Each direction finder station in return obtains and reports line of bearing information on the specific frequency to the NCE.
- The NCE calculates the most probable location of the transmitter through the lobs reported by the direction finder stations.

CHAPTER 2

OPERATING INSTRUCTIONS

	<u>Page</u>
Section I. Description and Use of Operator Controls, Indicators and Connectors.	2-1
Section II. Operator Preventive Maintenance Checks and Services.	2-13
Section III. Operation Under Usual Conditions.	2-15
Section IV. Operation Under Unusual Conditions.	2-124

Section I. DESCRIPTION AND USE OF OPERATOR CONTROLS, INDICATORS AND CONNECTORS

<u>SECTION CONTENTS</u>	<u>Page</u>
2-1. General.	2-1
2-2. Receiver Controls, Indicators and Connectors.	2-2
2-3. Df Processor Controls, Indicators and Connectors.	2-6
2-4. Signal Monitor Controls, Indicators and Connectors.	2-9
2-5. Antenna Connectors and Indicator.	2-12

2-1. GENERAL

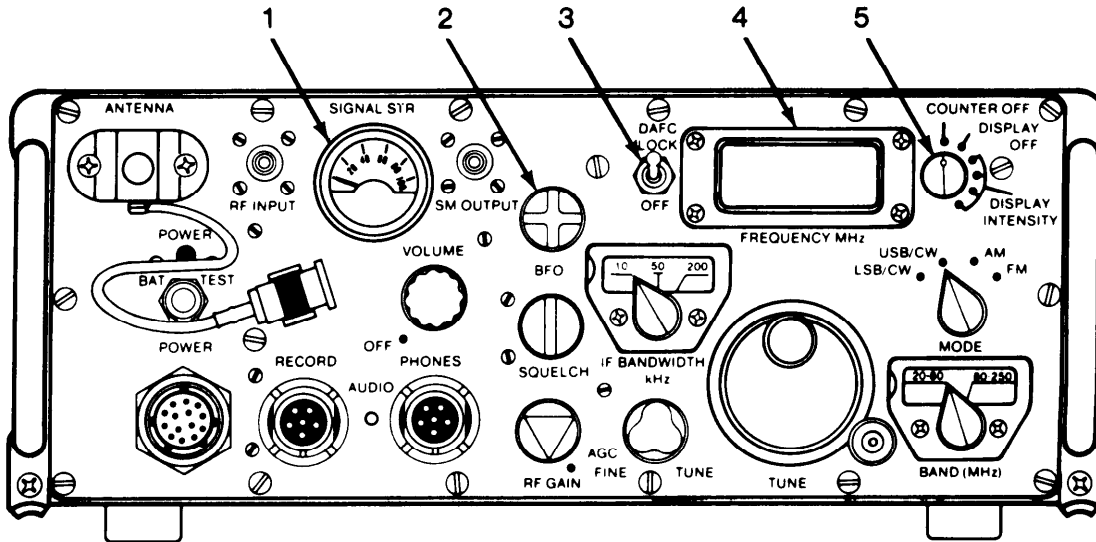
Before attempting to operate the direction finder set, be sure you are familiar with the location and operation of all controls and indicators.

WARNING

To prevent electrical shocks or damage to the equipment, do not operate your direction finder set until you understand the operation and function of all controls, indicators and connectors.

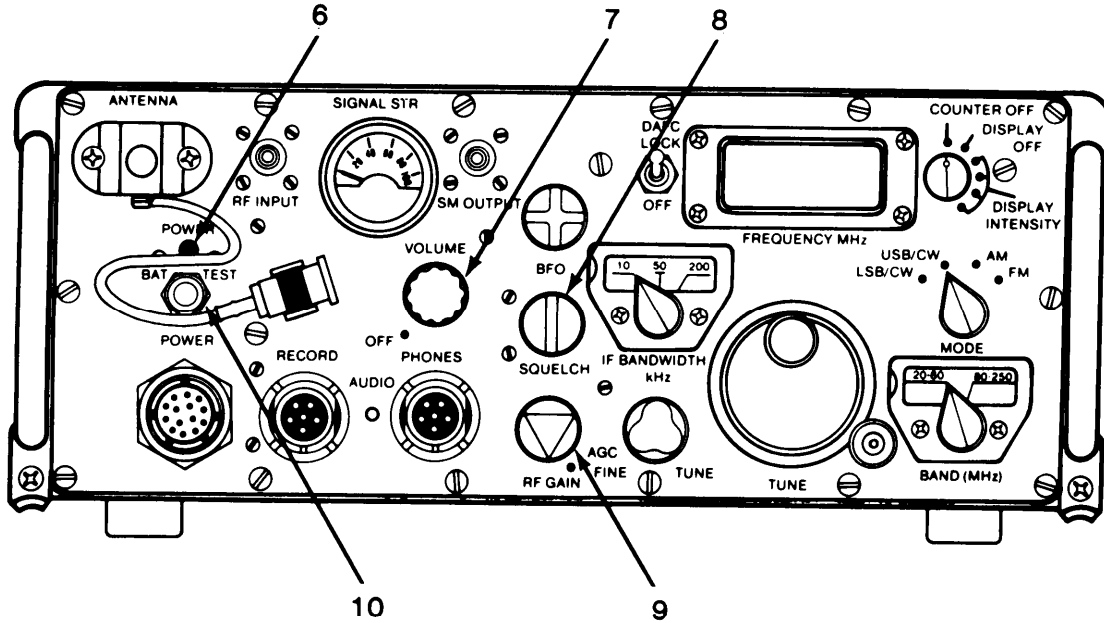
2-2. RECEIVER CONTROLS, INDICATORS AND CONNECTORS

RECEIVER FRONT PANEL



Key	Control, Indicator Or Connector	Function
1	SIGNAL STR	Indicates rf signal strength.
2	BFO	Tunes cw signals for clearer reception.
3	DAFC LOCK	Locks or unlocks frequency for signal stability.
4	FREQUENCY MHZ	Displays tuned frequency.
5	COUNTER OFF/ DISPLAY OFF/ DISPLAY INTENSITY	Adjusts brilliance of frequency display and turns display off for battery conservation.

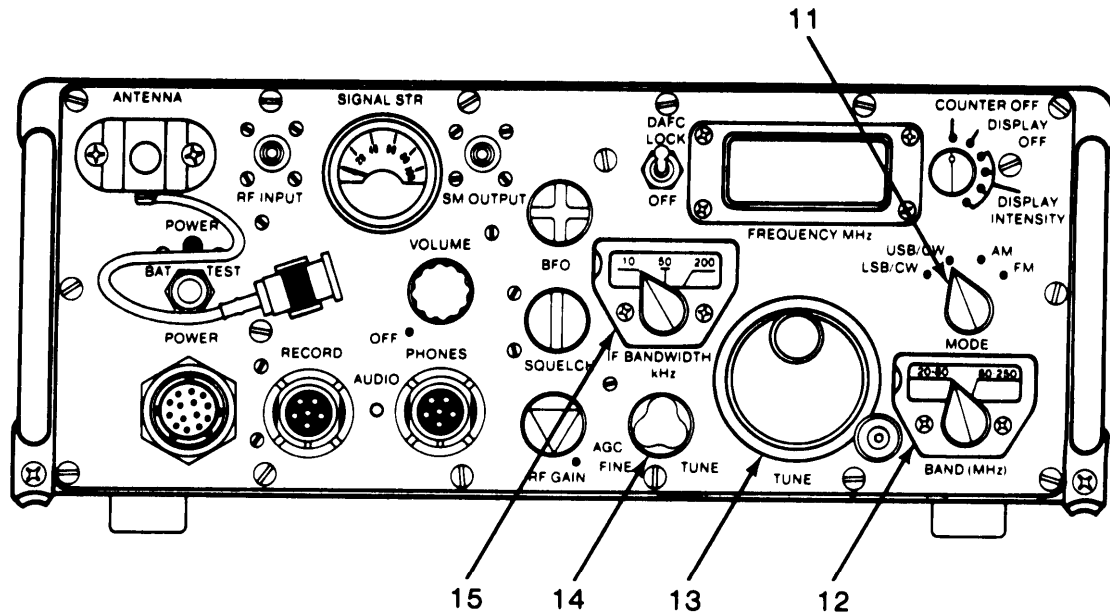
2-2. RECEIVER CONTROLS, INDICATORS AND CONNECTORS - Continued



Key	Control, Indicator Or Connector	Function
6	POWER	Indicates power on. Indicates condition of battery power when BAT TEST pushbutton is depressed.
7	VOLUME	Turns on receiver power. Adjusts audio volume for speaker headset.
8	SQUELCH	Adjusts level of static between transmitting signals.
9	RF GAIN/AGC	Amplifies signal for maximum reception strength. Activates automatic gain control (AGC) circuitry.
10	BAT TEST	Allows testing of battery power.

2-2. RECEIVER CONTROLS, INDICATORS AND CONNECTORS - Continued

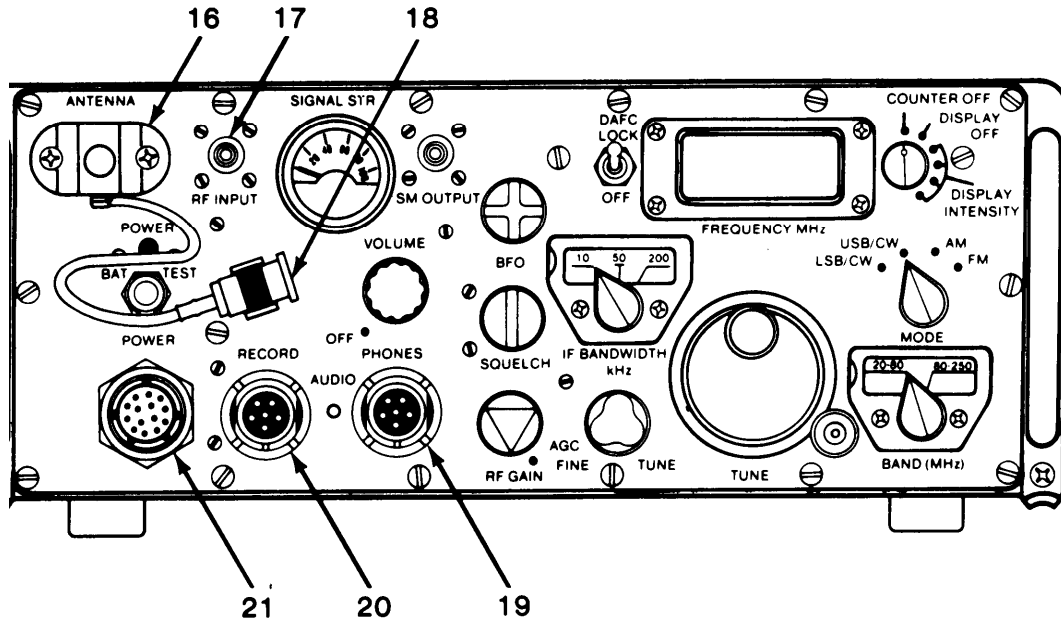
RECEIVER FRONT PANEL



Key	Control, Indicator Or Connector	Function
11	MODE	Sets receiver mode to accept desired type of signal.
12	BAND (MHz)	Selects band range of frequencies to be received.
13	TUNE	Provides selection of frequencies.
14	FINE TUNE	Allows fine tuning of frequencies.
15	IF BANDWIDTH kHz	Selects bandwidth of if. signals.

2-2. RECEIVER CONTROLS, INDICATORS AND CONNECTORS - Continued

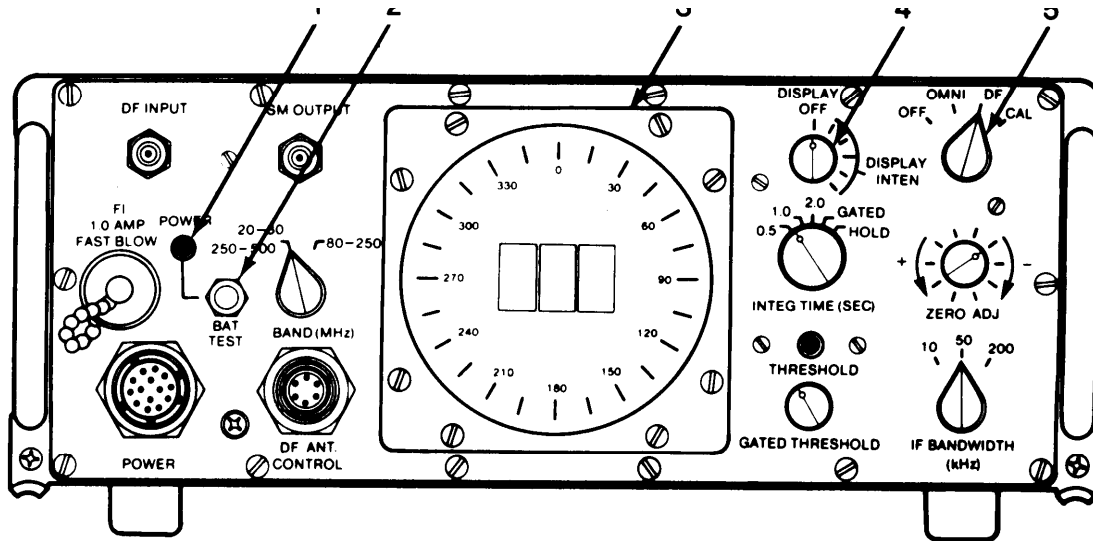
RECEIVER FRONT PANEL



Key	Control, Indicator Or Connector	Function
16	ANTENNA	Provides connection to a whip antenna.
17	RF INPUT	Provides connection to the df antenna.
18	Whip antenna bnc connector	Connects to RF INPUT when using a whip antenna.
19	AUDIO PHONES	Provides connection to speaker assembly or headset.
20	AUDIO RECORD	Provides connection to a recording or monitoring device.
21	POWER	Provides connection to an external power source.

2-3. DF PROCESSOR CONTROLS, INDICATORS AND CONNECTORS

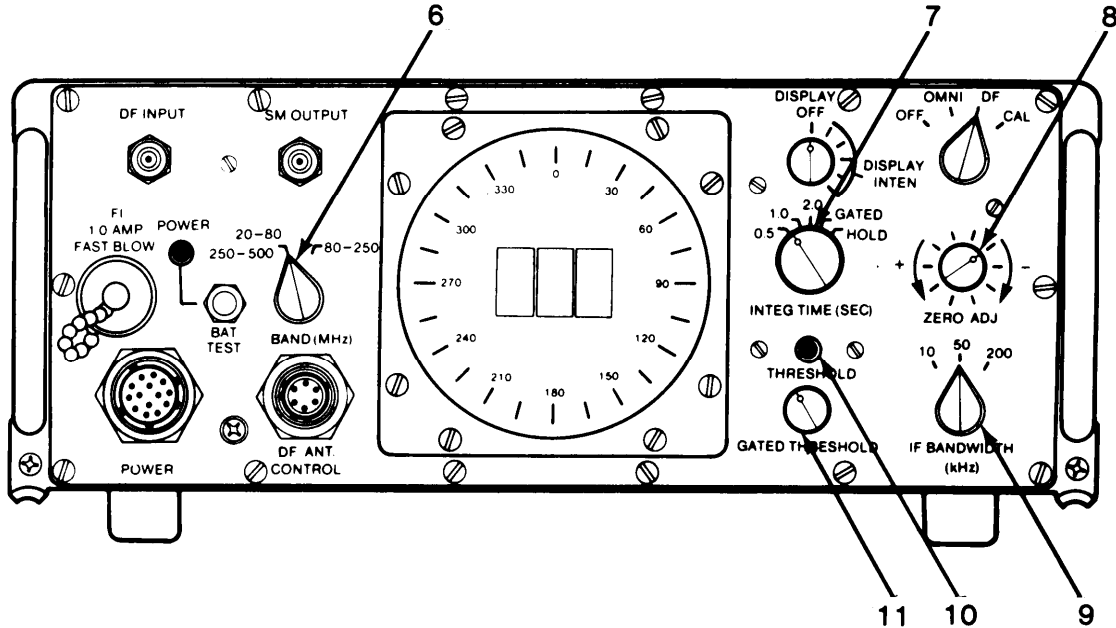
DF PROCESSOR FRONT PANEL



Key	Control, Indicator Or Connector	Function
1	POWER	Indicates power on. Indicates condition of battery power when BAT TEST pushbutton is depressed.
2	BAT TEST	Allows testing of battery power
3	Line of bearing display/ lob display	Contains numerical and circular led display of line of bearing. <ul style="list-style-type: none"> ● Circular led - Provides compass-like representation of numerical lob readout. ● Numerical lob display- Provides numerical readout of line of bearing.
4	DISPLAY OFF/ DISPLAY INTEN	Adjusts brilliance of display.
5	OFF/OMNI/DF/CAL	Turns on power. Selects function.

2-3. DF PROCESSOR CONTROLS, INDICATORS AND CONNECTORS - Continued

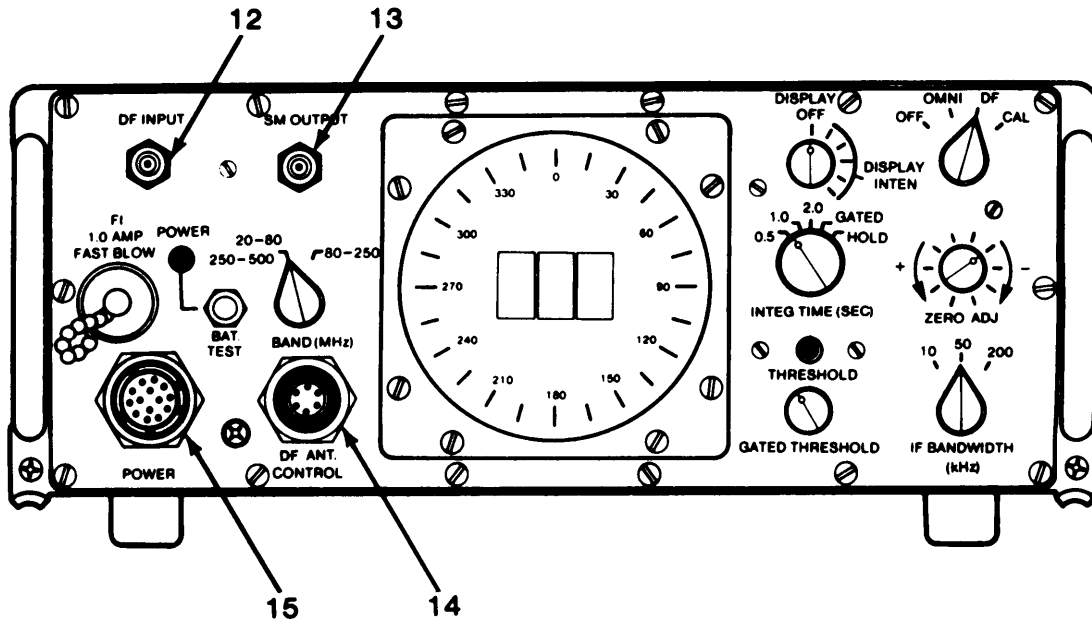
DF PROCESSOR FRONT PANEL



Key	Control, Indicator Or Connector	Function
6	BAND (MHz)	Selects band of frequencies to be processed.
7	INTEG TIME (SEC)	Selects bearing integration time. Provides GATED and HOLD features.
8	ZERO ADJ	Allows calibration of df processor when OFF/OMNI/DF/CAL switch is in CAL position.
9	IF BANDWIDTH (kHz)	Selects if. bandwidth.
10	THRESHOLD	Indicates when signal exceeds threshold.
11	GATED THRESHOLD	Adjusts threshold level which signal must exceed for detection and df processor response.

2-3. DF PROCESSOR CONTROLS, INDICATORS AND CONNECTORS - Continued

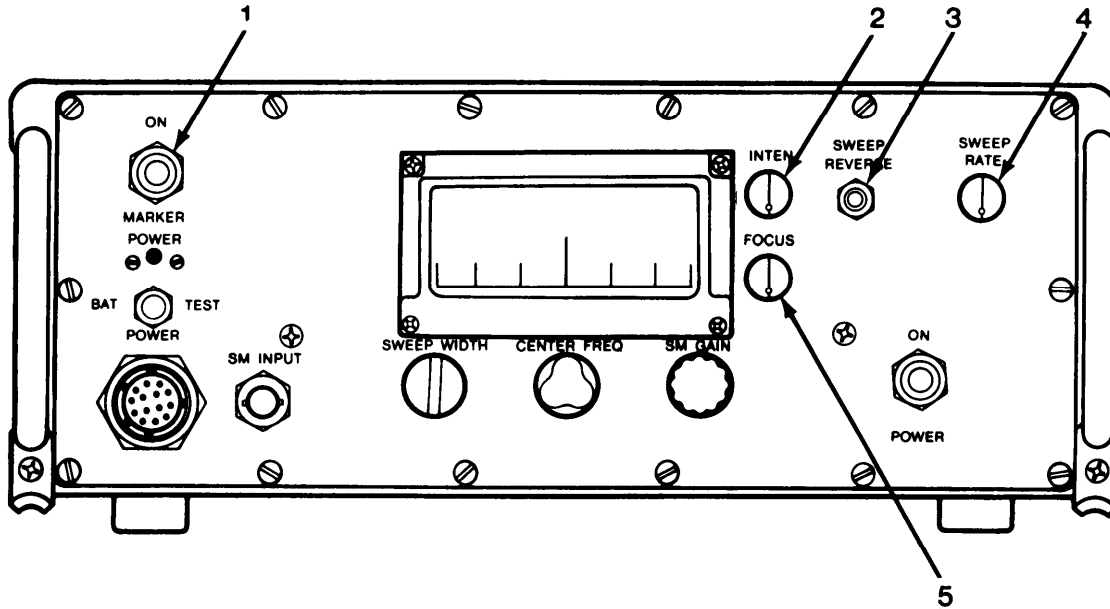
DF PROCESSOR FRONT PANEL



Key	Control, Indicator Or Connector	Function
12	DF INPUT	Provides if. connection to receiver.
13	SM OUTPUT	Provides connection to signal monitor.
14	DF ANT. CONTROL	Provides connection to df antenna.
15	POWER	Provides connection to external power source.

2-4. SIGNAL MONITOR CONTROLS, INDICATORS AND CONNECTORS

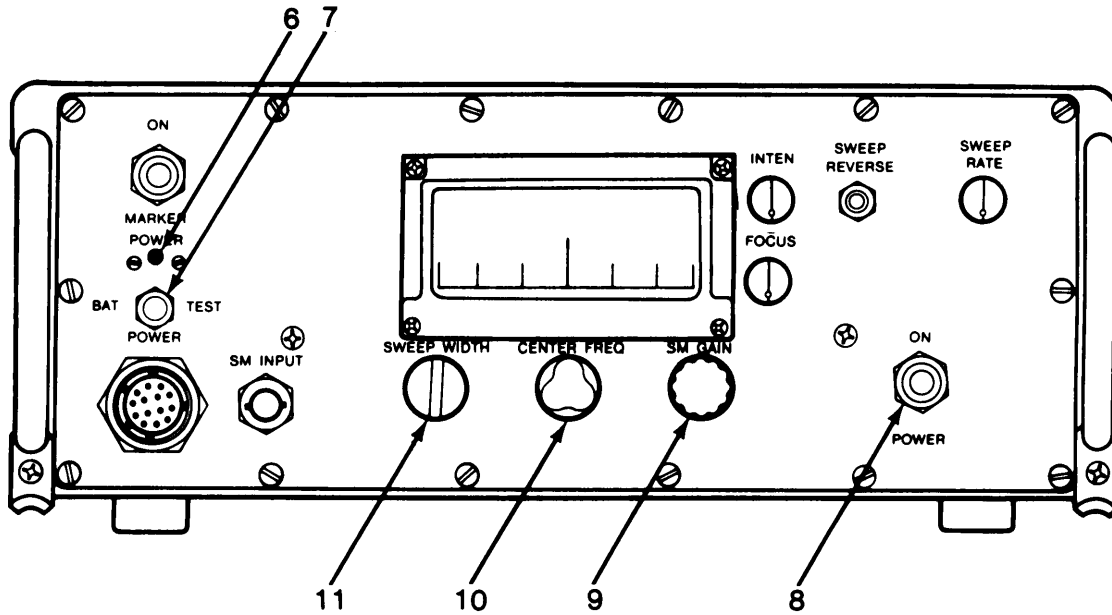
SIGNAL MONITOR FRONT PANEL



Key	Control, Indicator Or Connector	Function
1	MARKER	Allows placement of a center frequency marker on signal monitor screen to indicate center position of if. bandpass.
2	INTEN	Adjusts brilliance of trace on signal monitor screen.
3	SWEEP REVERSE	Reverses direction of signal sweep during tuning of receiver.
4	SWEEP RATE	Varies rate of speed at which signal monitor trace sweeps across screen.
5	FOCUS	Provides means of obtaining a sharp trace on signal monitor screen.

2-4. SIGNAL MONITOR CONTROLS, INDICATORS AND CONNECTORS - Continued

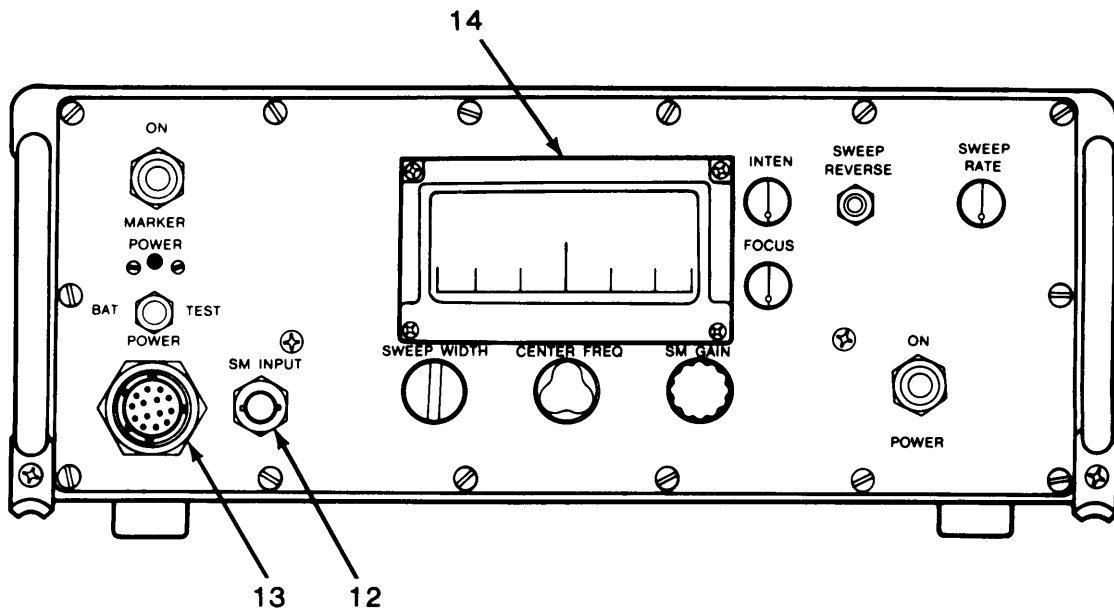
SIGNAL MONITOR FRONT PANEL



Key	Control, Indicator Or Connector	Function
6	POWER	Indicates power on. Indicates condition of battery power when BAT TEST pushbutton is depressed.
7	BAT TEST	Allows testing of battery power.
8	POWER	Turns on power to signal monitor.
9	SM GAIN	Varies height of signal spikes displayed on signal monitor screen.
10	CENTER FREQ	Changes the horizontal position of signal spikes on signal monitor screen.
11	SWEEP WIDTH	Varies width of frequency spectrum being viewed on signal monitor screen.

2-4. SIGNAL MONITOR CONTROLS, INDICATORS AND CONNECTORS - Continued

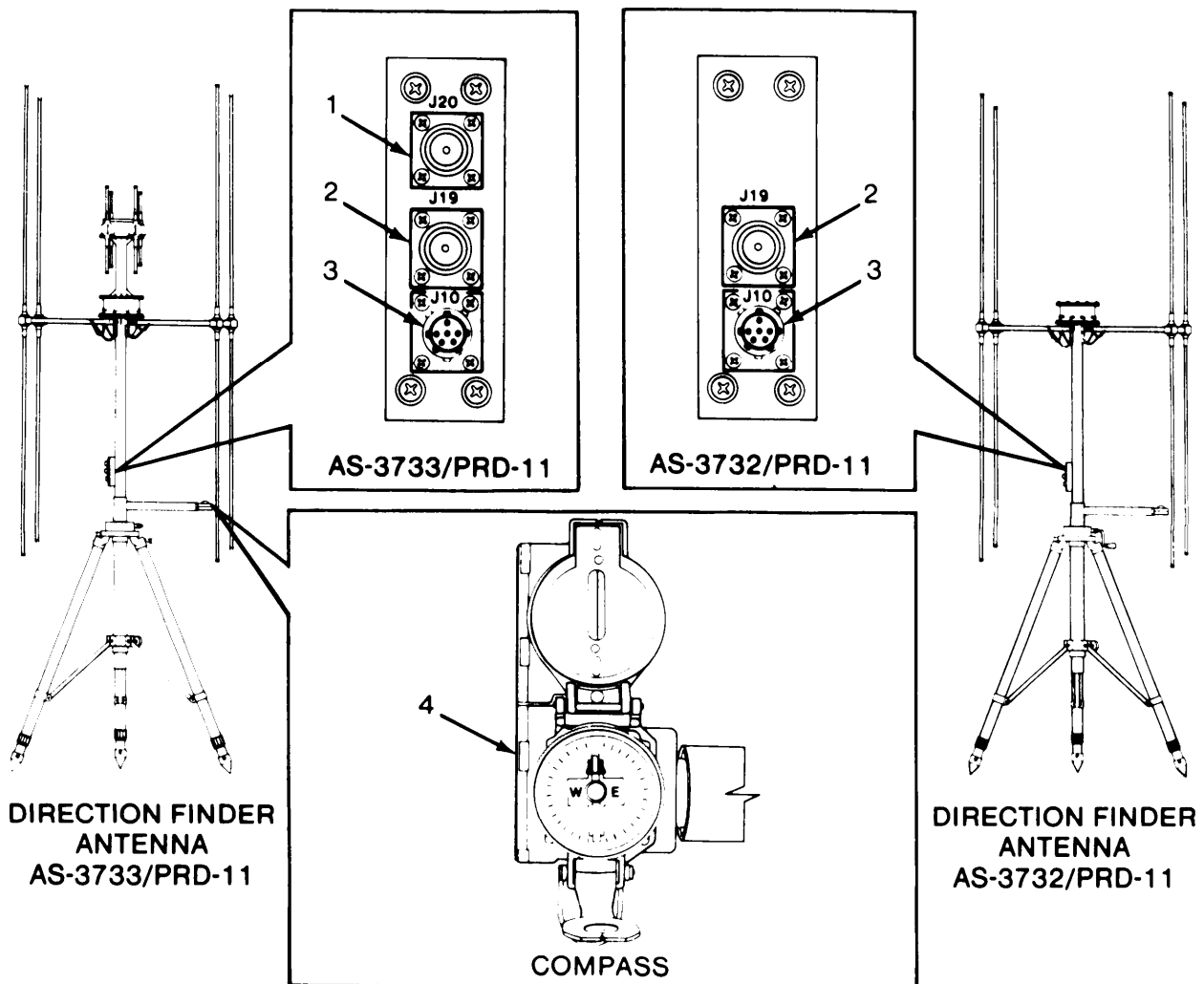
SIGNAL MONITOR FRONT PANEL



Key	Control, Indicator Or Connector	Function
12	SM INPUT	Provides connection to df processor.
13	POWER	Provides connection to an external power source.
14	Signal monitor screen (crt)	Provides display of signal activity.

2-5. ANTENNA CONNECTORS AND INDICATOR

ANTENNA CONNECTOR BOX AND COMPASS



Key	Control, Indicator Or Connector	Function
1	J20	Provides 150 to 850 MHz rf signals to receiver.
2	J19	Provides 20 to 175 MHz rf signals to receiver.
3	J10	Accepts signals from df processor for dipole switching action.
4	Compass	Indicates magnetic direction.

**Section II. OPERATOR PREVENTIVE MAINTENANCE
CHECKS AND SERVICES**

<u>SECTION CONTENTS</u>	
2-6. General.	2-13
2-7. Routine Checks and Services.	2-13
2-8. PMCS Procedures.	2-14

2-6. GENERAL

a. Operator routine checks and services and preventive maintenance checks and services (PMCS) are the required inspection and care of equipment. Both services are necessary in order to keep the direction finder set in good operating condition.

b. Always keep in mind the warnings and cautions pertaining to the-direction finder set. Perform your Before (B) PMCS before the direction finder set is used on a mission.

c. If any portion of the direction finder set fails to operate, refer to paragraph 3-3 and paragraph 3-4. Record any malfunctions or suspected faults on DA Form 2404 (refer to DA Pam 738-750).

2-7. ROUTINE CHECKS AND SERVICES

a. Routine services are a collection of checks and observations performed by the operator at all times. Routine services are not listed in the preventive maintenance checks and services table.

b. No tools or equipment are required for routine servicing of your direction finder set. The following cleaning materials will be useful to you:

- Lint-free cloths
- Soft bristle paint brush

c. You should perform these routine checks prior to operating the equipment:

- Check for completeness of equipment. Ensure all equipment pieces to the direction finder set are accounted for.
- Clean and dust the direction finder set units with a soft Cloth and dry paint brush.
- Check for cuts or fraying on all cables.
- Check for dented, chipped, bent or broken cases and covers.
- Check for rust.
- Check control switches and knobs for smooth operation.
- Ensure switches point to the proper setting or indication.
- Check for bent or broken SIGNAL STR meter needle.
- Check for loose screws.
- Ensure wingnuts are not damaged.
- Check cable connectors.

2-7. ROUTINE CHECKS AND SERVICES - Continued

- Check that cables securely attach to their connectors.
- Ensure the df antenna tripod legs extend freely and lock.
- Check the df antenna for bent antenna elements and for damage to threads on short elements.
- Check the batteries for corrosion or damage.
- Check for canvas rips or mildew on the antenna carrying bag.
- Check to see that items not in use are properly stored.
- Check the technical manual and current changes to publications for completeness.
- Check connectors for uncleanliness or damage.

d. Contact organizational maintenance if any component on the direction finder set is damaged.

2-8. PMCS PROCEDURES

The PMCS table will guide you in the performance of the direction finder sets required scheduled services. An explanation of each column in the table is as follows:

a. Item Number Column. Use this column as the source of item numbers for the "TM Item Number" column on DA Form 2404 in recording the results of your PMCS.

b. Interval Column. This column tells you when PMCS should be performed:

B (Before) Do your B (Before) PMCS to ensure the equipment is functioning properly before a mission.

c. Item To Be Inspected/Procedure Column. This column indicates the portion of equipment that requires PMCS. It also contains a description of the procedure by which PMCS is to be performed.

d. Equipment Is Not Ready/Available If: Column. This column identifies the condition under which the equipment cannot perform the assigned mission requirements.

B - Before			
Item Number	Interval B	Item To Be Inspected/ Procedure	Equipment Is Not Ready/Available If:
1	●	Direction finder set. <ul style="list-style-type: none"> ● Perform the routine checks and services listed in para 2-7c. ● Emplace and operate the equipment as described in chapter 2, section III of this manual. 	<ul style="list-style-type: none"> ● Antenna is damaged or will not erect properly. ● Any unit will not power up. ● Visual readouts on any unit do not power up. ● Switches or knobs on any unit do not function properly.

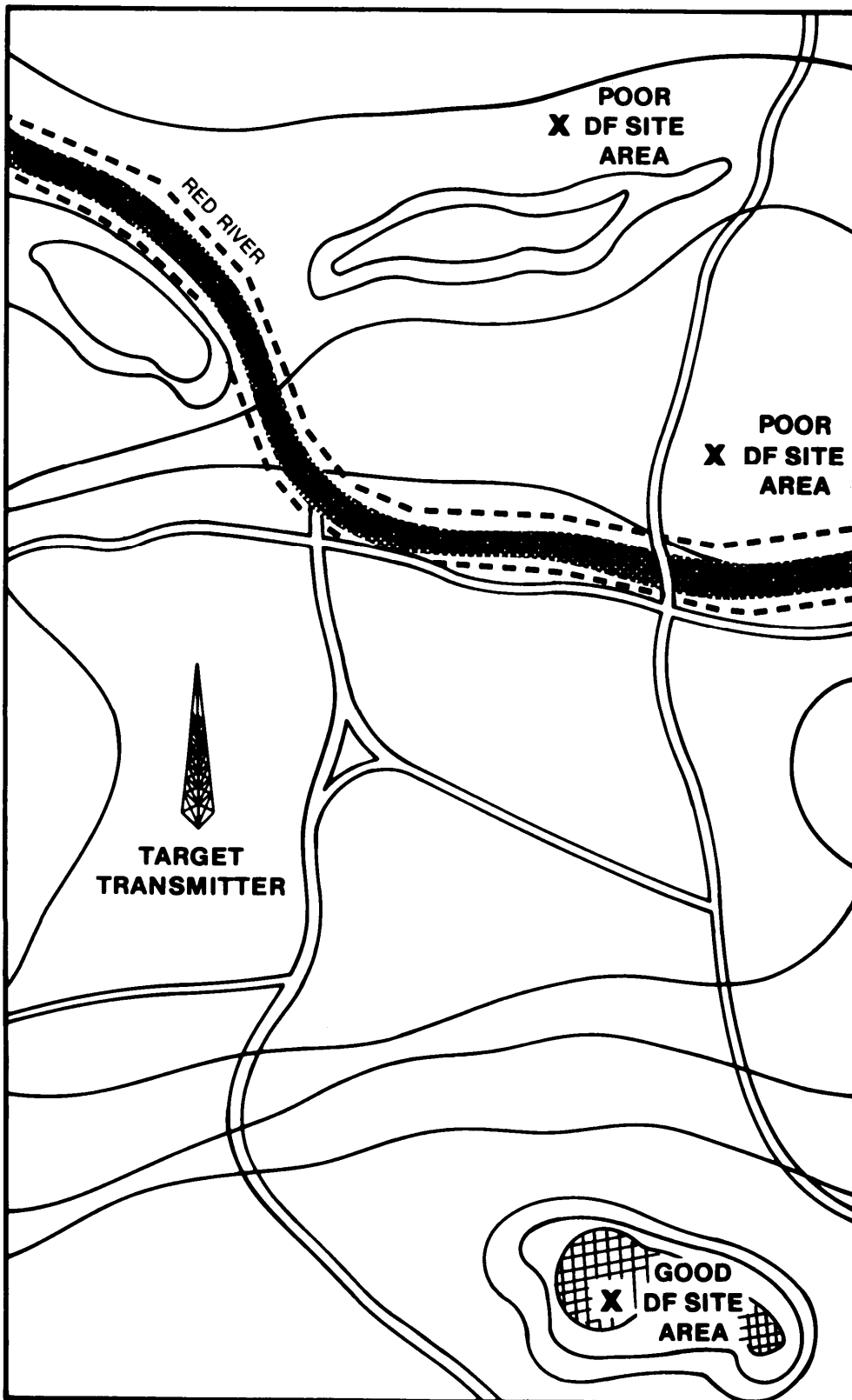
Section III. OPERATION UNDER USUAL CONDITIONS

<u>SECTION CONTENTS</u>	<u>Page</u>
2-9. Site Selection	2-15
2-10. Assembly and Preparation For Use	2-21
2-11. Initial Adjustments.	2-62
2-12. Operating Procedures	2-83
2-13. Preparation For Movement	2-102
2-14. Operation of Auxiliary Equipment	2-123

2-9. SITE SELECTION

Selection of a df site is dependent on both tactical and technical considerations. A combination of problems may occur during site selection. Sites that are best suited technically may not be tactically desirable. When selecting a site, follow the technical guidelines listed in this section. They will help you eliminate serious direction finding errors caused by poor siting.

2-9. SITE SELECTION - Continued

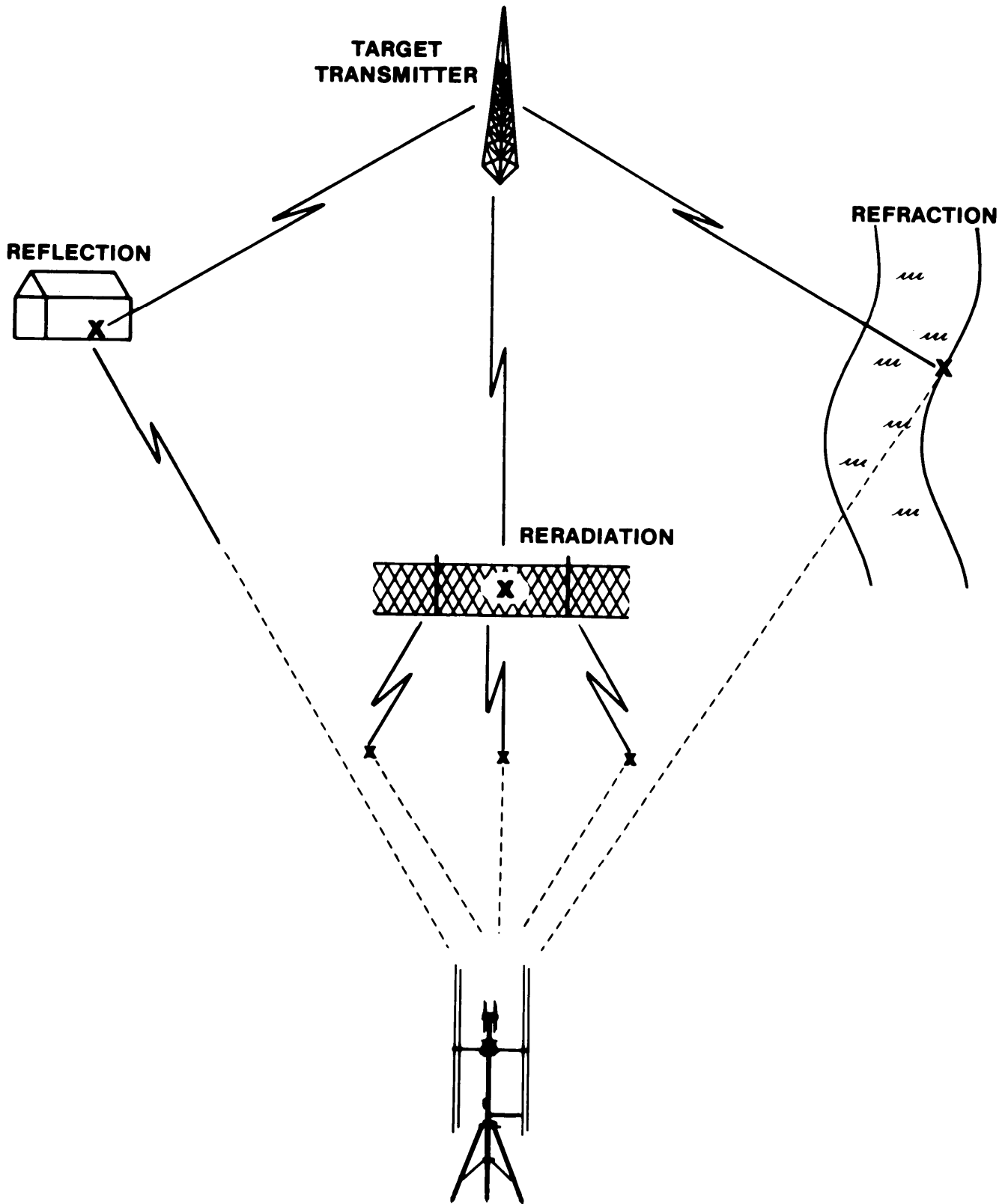


2-9. SITE SELECTION - Continued

a. Terrain Considerations. The terrain on which the direction finder set and the target area are located is an important factor in operations. Observing these procedures will help you choose the most practical site:

- Choose the highest level of ground in the area.
- Choose an area that is flat for at least 90 meters surrounding the df antenna.
- Choose an area as far as possible from bodies of water.
- Choose an area away from objects that reflect, refract, or reradiate such as buildings wire fences and water towers.

2-9. SITE SELECTION - Continued



2-9. SITE SELECTION - Continued

b. Signal Path Considerations. The path of the signal being transmitted from the target area may change direction before being received by your df antenna. This can result in an erroneous line of bearing reading. Keep the following conditions in mind when establishing a df site:

- Radio waves can be reflected off buildings, mountains or metal objects. Position a direction finder set away from such reflectors.
- Metal objects, such as fences or armored vehicles, can act as transmitters when some radio waves pass through them. Avoid metal objects that can cause reradiation. Site vehicles should be in quadrant of least interest.
- Radio waves can be bent as they pass from one atmospheric condition to another. This happens when signals pass through the moist air over water to the dry air over land. Do not position a direction finder set near a shore line.

c. Target Transmitter Location Considerations. The location of the target transmitter may contain conditions that will cause an erroneous reading on your direction finder set. You do not have control over these conditions. However, if the target transmitter is more than 15 kilometers away, the chance of error is greatly reduced.

2-9. SITE SELECTION - Continued

IMPROPER SITE LOCATIONS	
<ul style="list-style-type: none"> ● Valleys ● Jungles ● Mountainous or hilly country ● Shore lines ● Rocky or sandy soil areas ● Cliffs ● Cities ● Near railroad tracks ● Near chimney stacks or water towers ● Near wire fences 	
PREFERRED DISTANCES FROM OBSTACLES	
Obstacles	Distance to be Maintained
Scattered trees and vegetation	185 meters
Mountains or hills	5 kilometers
Shore lines	550 meters
Cliffs	1.6 kilometers
Scattered small buildings	185 meters
Railroad tracks	450 meters
Chimney stacks or water towers	450 meters
Wire fences	275 meters

2-10. ASSEMBLY AND PREPARATION FOR USE

Assembly and preparation for use consists of the tasks that must be performed to prepare for a df mission. The tasks and procedures for performing them are given in the following paragraphs. Assembly and preparation for use includes:

	<u>Page</u>
● Antenna set up	2-21
● Battery installation	2-43
● Unit set up	2-51

a. Antenna Set Up. Antenna set up consists of the procedures that must be performed to prepare a df antenna for operation. Two crewmembers are normally needed to perform these procedures. Under certain circumstances, the antenna can be set up by one crewmember.

	<u>Page</u>
● Setting up tripod	2-22
● Installing df antenna mast and elements	2-25
● Cabling antenna	2-31
● Orienting and raising antenna	2-36

CAUTION

The df antenna is easily damaged through careless or improper handling. Use care when setting up the df antenna.

NOTE

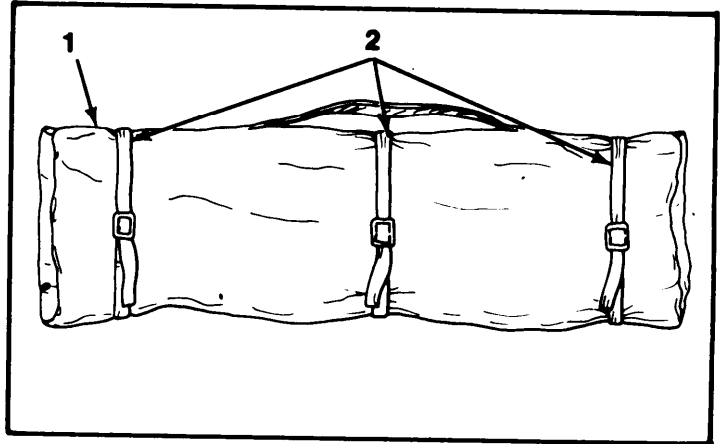
The direction finder set can use two different df antennas. The procedures for setting up each antenna are the same.

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

SETTING UP TRIPOD (SHEET 1 OF 3)

The tripod is stored in the center of the antenna carrying bag. Setting up the tripod requires two crewmembers. The first crewmember will perform the procedures listed in this section. The second crewmember will assist the first when adjusting the length of the tripod legs. To access and set up the tripod, follow these steps:

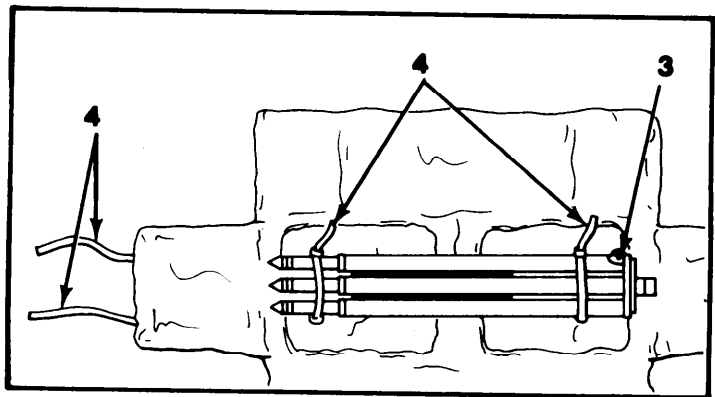
1. Open antenna carrying bag (1) by unbuckling three fastening straps (2) and unrolling bag (1).



NOTE

The AS-3733/PRD-11 antenna carrying bag has four fastening straps which must be unbuckled.

2. Free tripod (3) by pulling four quick release straps (4).
3. Remove tripod (3) from antenna carrying bag (1) and move to selected antenna site.



NOTE

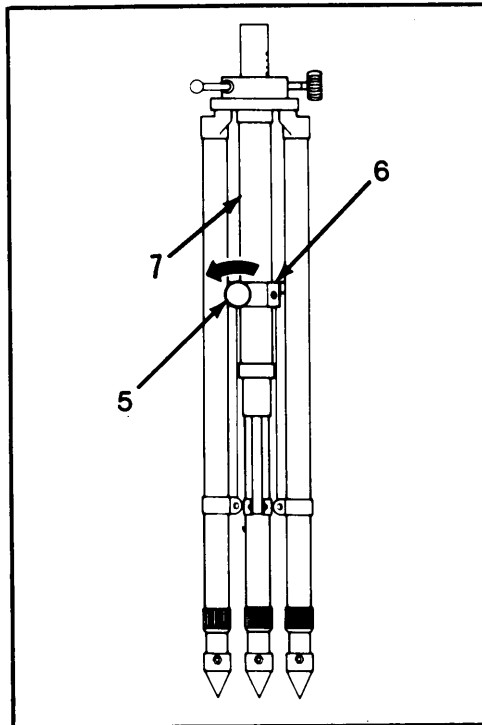
Tripod must be located within 44 feet of the df site to allow the cables to extend up and connect to the antenna mast.

GO ON TO SHEET 2

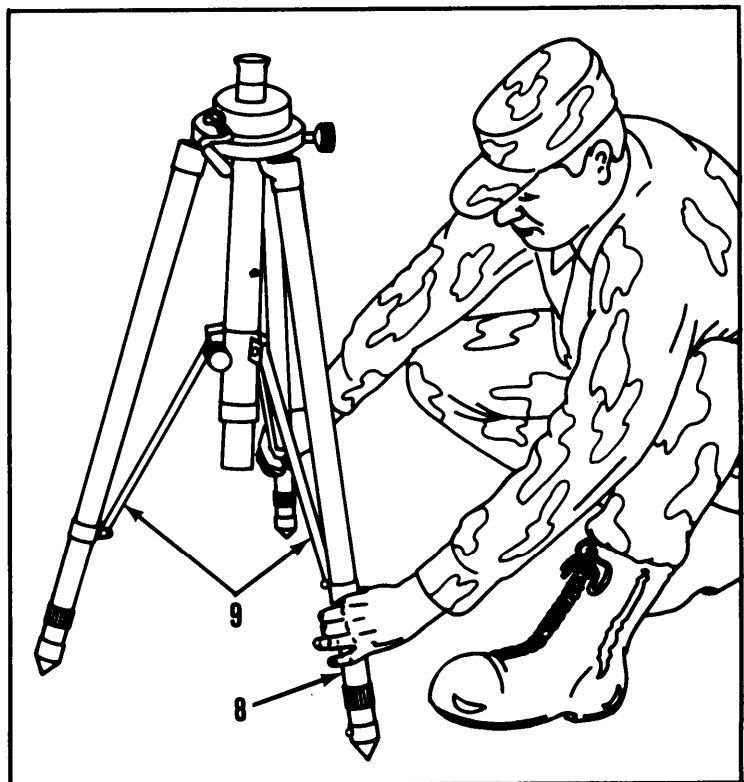
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

SETTING UP TRIPOD (SHEET 2 OF 3)

4. Loosen center tension knob (5) on sliding collar (6) of tripod center column (7) by turning counterclockwise.



5. Grasp tripod legs (8) below stabilizing arms (9) and pull legs open.
6. Push down on stabilizing arms (9).



GO ON TO SHEET 3

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

SETTING UP TRIPOD (SHEET 3 OF 3)

7. Handtighten center tension knob (10) on sliding collar (11) of tripod center column (12) by turning clockwise.

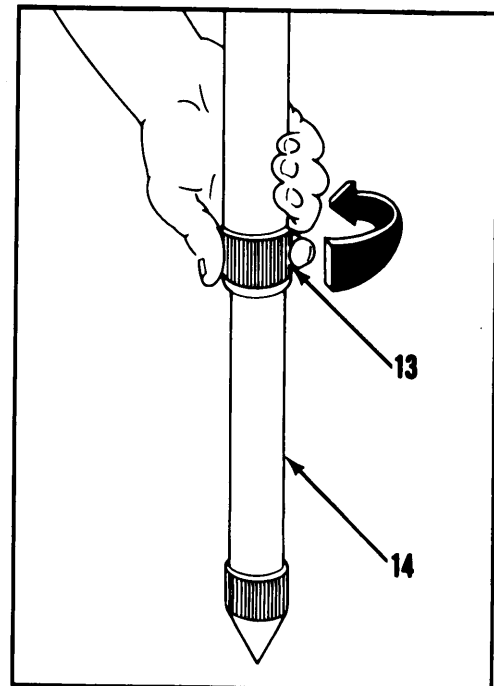
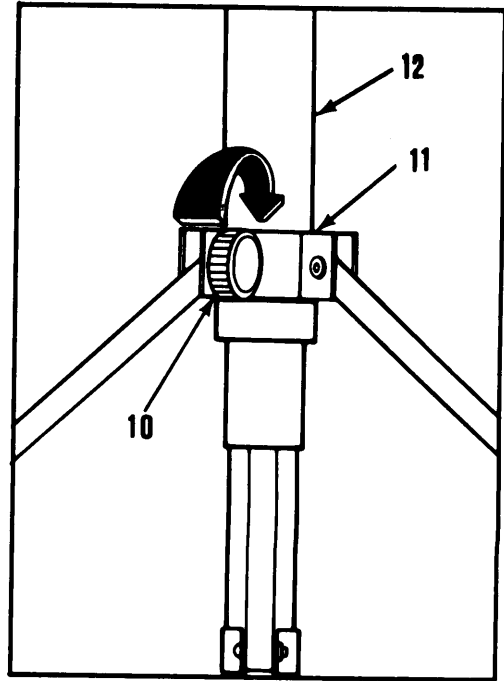
NOTE
The second crewmember will perform 8 below while the first crewmember completes the remaining steps.

8. Lift and hold tripod off ground.

CAUTION
Do not position the tripod on a slope that is too steep to set all legs securely on ground. Antenna should not lean more than 30° from vertical.

NOTE
Extend the legs to maximum length when possible to obtain best reception.

9. Loosen collar (13) at base of tripod leg (14) by turning counter-clockwise.
10. Pull tripod leg (13) out to appropriate length.
11. Handtighten collar (13) by turning clockwise.
12. Repeat 9, 10 and 11 above to extend the other two legs of tripod.
13. Push down on tripod center column (12) to stabilize tripod.



2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

INSTALLING DF ANTENNA MAST AND ELEMENTS (SHEET 1 OF 6)**NOTE**

Perform these procedures only after the tripod is set up and antenna bag is carried to antenna site.

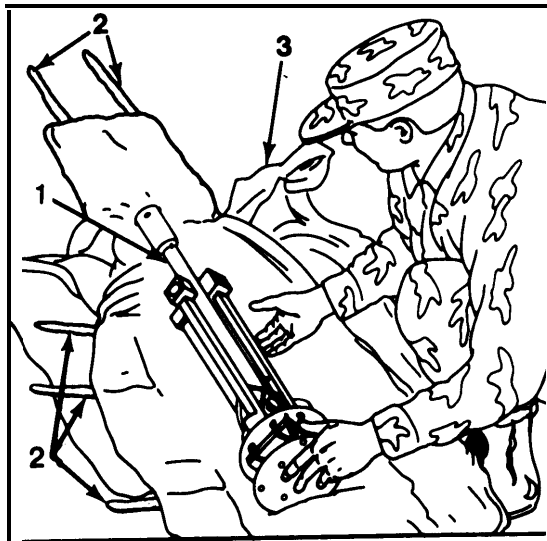
The antenna mast and elements are stored in the antenna carrying bag. If a second crewmember is present, he or she will assist the first by performing procedures indicated below.

1. Free antenna mast (1) by pulling five quick release straps (2) on antenna carrying bag (3).

NOTE

The AS-3733/PRD-11 antenna has six quick release strap which must be unfastened before removing antenna mast.

2. Remove antenna mast (1) from antenna carrying bag (3).

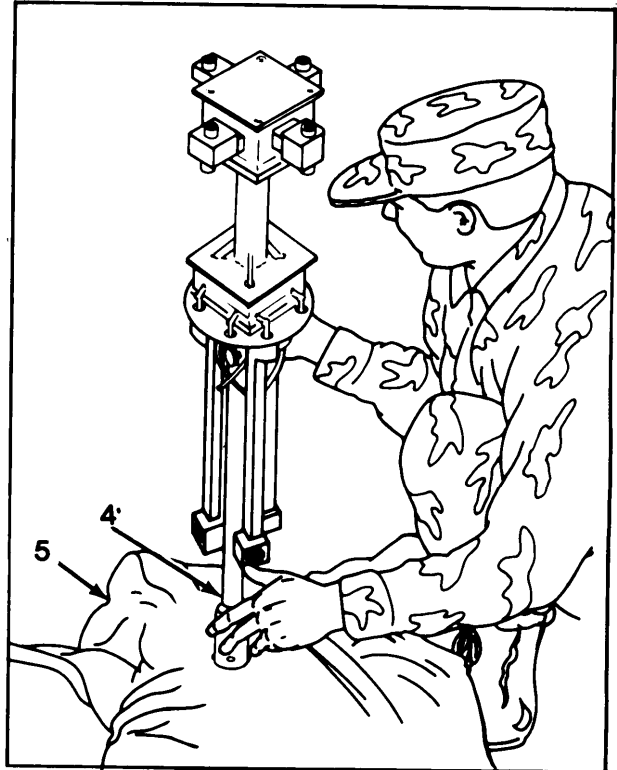


2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

INSTALLING DF ANTENNA MAST AND ELEMENTS (SHEET 2 OF 6)

NOTE
Perform 3 through 6 below only when using the AS-3733/PRD-11 antenna.

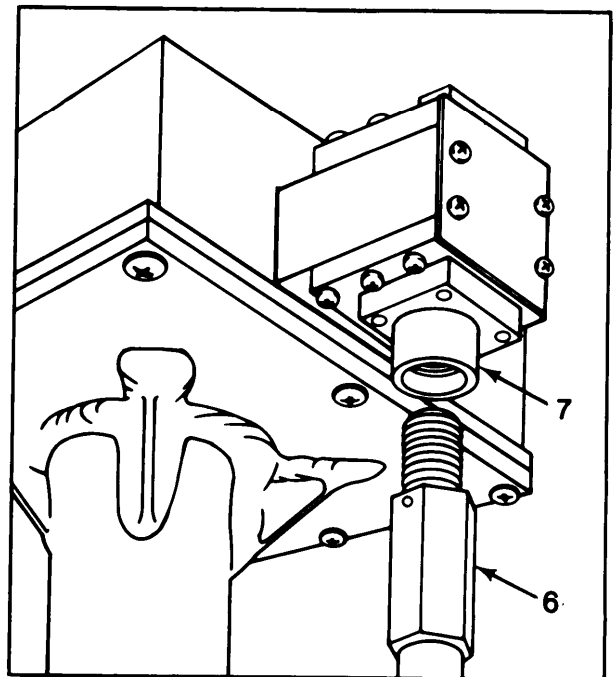
3. Place base of antenna mast (4) on edge of antenna carrying bag (5) and hold antenna mast (4) upright.



NOTE

- Second crewmember will perform 4 below.
- Both crewmembers will perform 5 and 6 below.

4. Remove eight short elements from antenna carrying bag.
5. Insert short elements (6) into upper bay element boxes (7) and screw clockwise until tight.
6. Repeat 5 above for remaining seven elements.

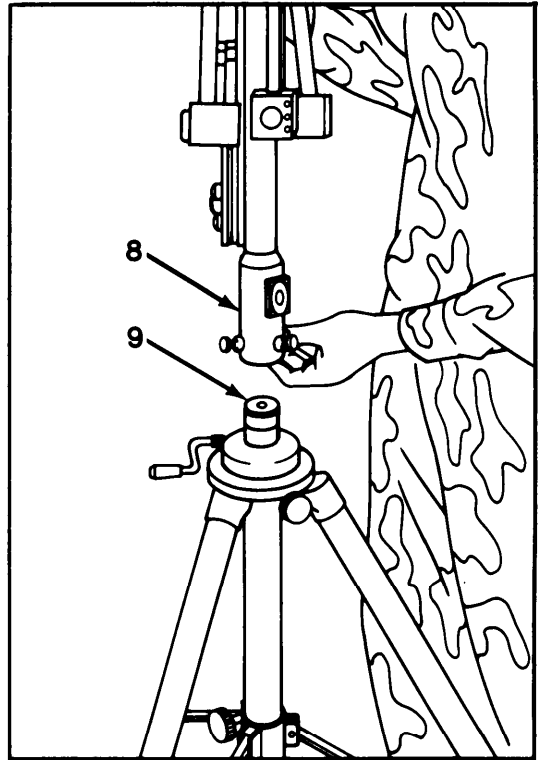


GO ON TO SHEET 3

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

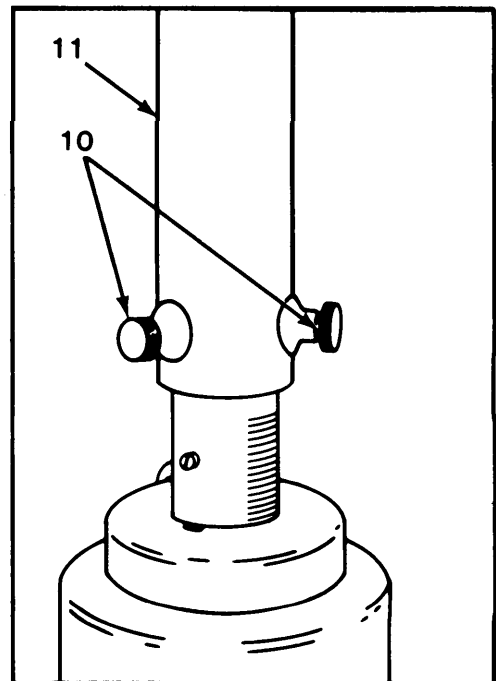
INSTALLING DF ANTENNA MAST AND ELEMENTS (SHEET 3 OF 6)

7. Lift antenna mast (8) and slide onto tripod mount (9).



8. Handtighten three locking screws (10) at base of antenna mast (11) by turning clockwise.

NOTE
 Locking screws will not be flush with antenna column.

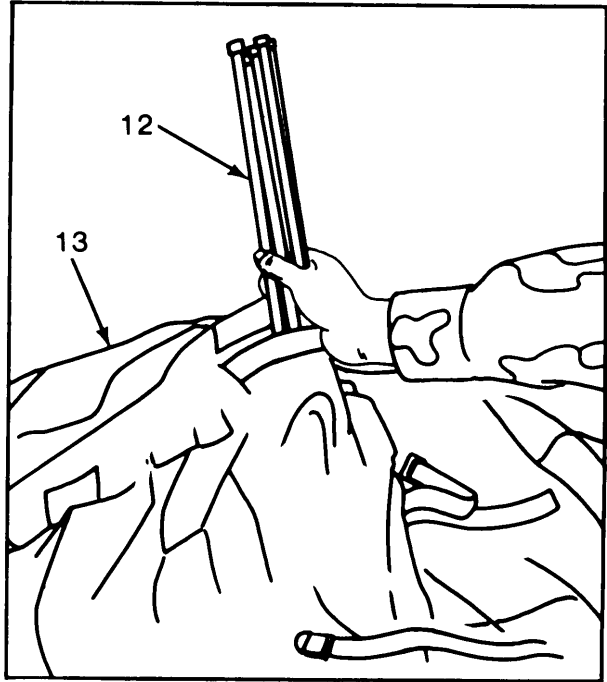


2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

INSTALLING DF ANTENNA MAST AND ELEMENTS (SHEET 4 OF 6)

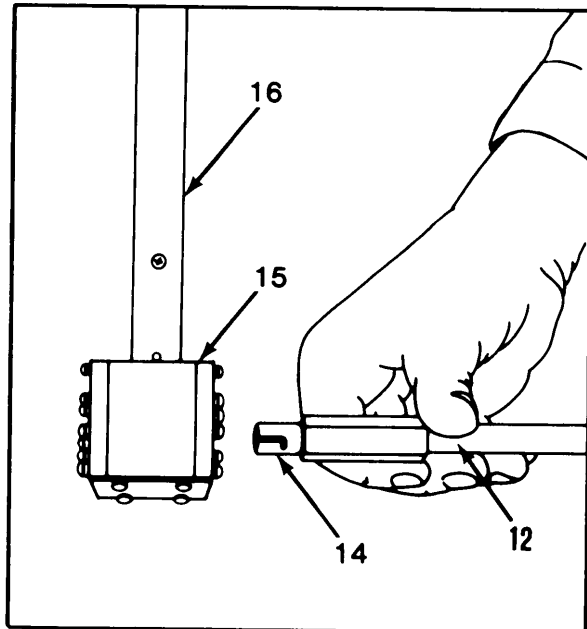
NOTE
Second crewmember will perform 9 below.

- 9. Remove eight long elements (12) from antenna carrying bag (13) and pass elements (12) to the first crewmember as needed.



CAUTION
Do not force element into antenna box. Aluminum tip will bend and may not be able to be removed.

- 10. Holding each end of element (12), insert twist lock connector end of element (14) into antenna element box (15) on folded arm of antenna (16).
- 11. Turn element (12) clockwise until flush with element box (15).
- 12. Continue turning element (12) 1/4 turn clockwise to lock in place.



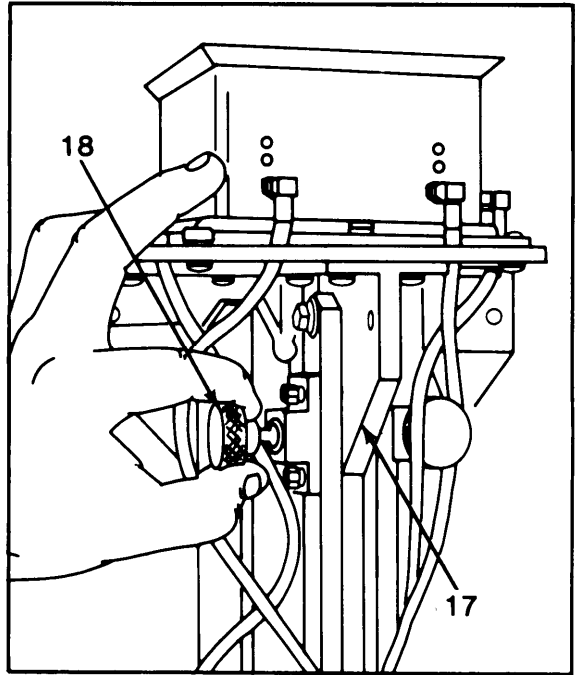
NOTE
Element will click when locked into place.

GO ON TO SHEET 5

2-100 ASSEMBLY AND PREPARATION FOR USE - Continued

INSTALLING DF ANTENNA MAST AND ELEMENTS (SHEET 5 OF 6)

13. Unlock antenna arm (17) by pulling locking thumbscrew (18) out.



CAUTION

Examine antenna mast cables to ensure they will not catch on thumbscrew.

14. Release thumbscrew (18) while raising antenna arm (17) until thumbscrew (18) clicks into place.

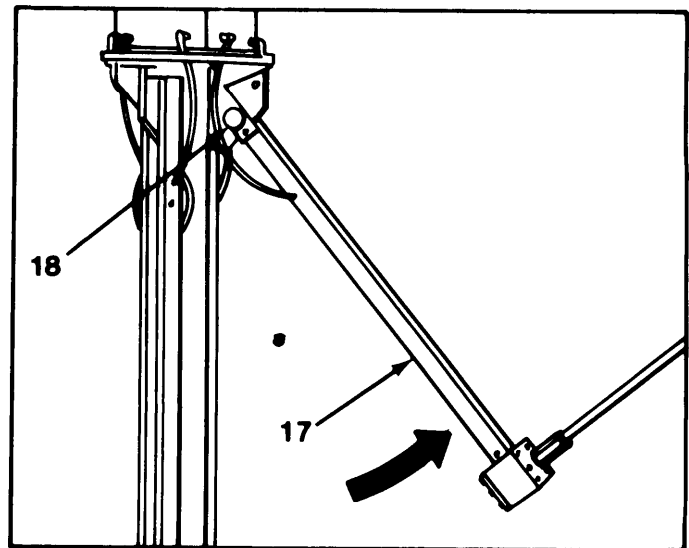
NOTE

Thumbscrew will be locked into place on mounting plate when antenna arms are fully extended thumbscrew is not flush against the antenna arm, ensure thumbscrew is alined with top hole on mounting plate and turn thumbscrew clockwise until it snaps into place.

15. Repeat 10 and 14 above for remaining three antenna arms.

NOTE

Examine three remaining locking thumbscrews to ensure each is locked in place on antenna arm mounting plate.

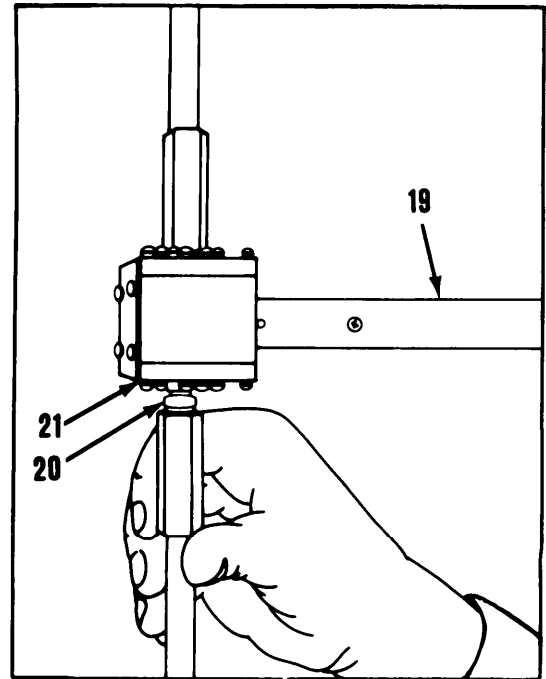


GO ON TO SHEET 6

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

INSTALLING DF ANTENNA MAST AND ELEMENTS (SHEET 6 OF 6)

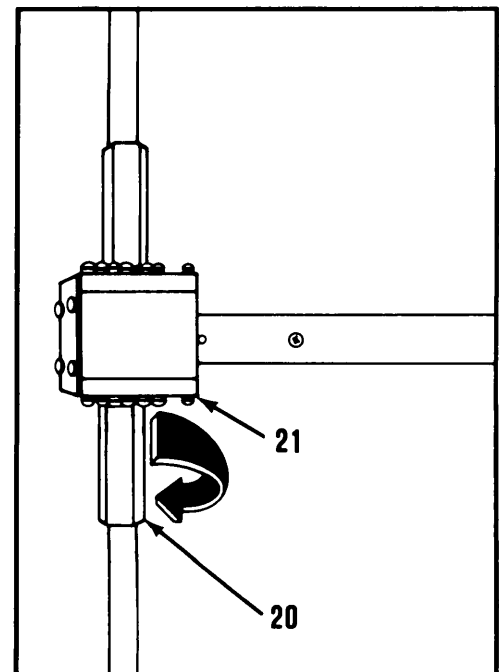
16. Holding antenna arm (19), insert antenna element (20) into lower section of antenna element box (21) on extended arm (19).



17. Turn element (20) clockwise until flush, with antenna element box (21).
18. Continue turning element (20) 1/4 turn clockwise to lock into place.

NOTE
Element will click when locked into place.

19. Repeat 16, 17 and 18 above for remaining three elements.



2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

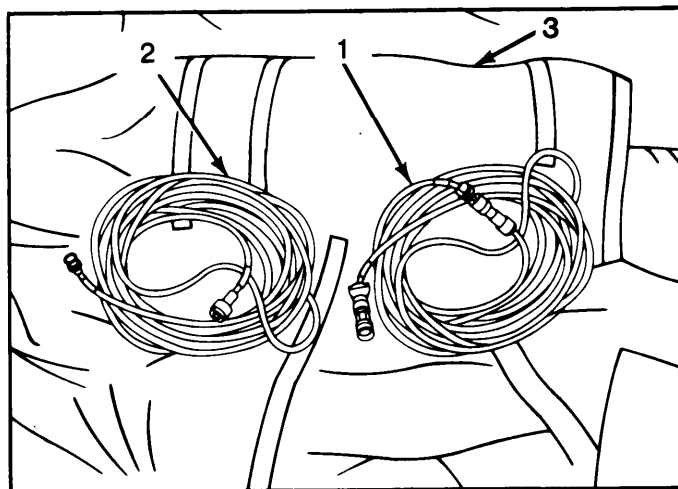
CABLING ANTENNA (SHEET 1 OF 5)

Cabling the df antenna is performed after the tripod and the antenna are set up. One crewmember is sufficient to do the cabling. The second crewmember can roll out the cables and carry them to the df station. This should be done before the cables are connected to the antenna.

1. Remove df (1) and rf (2) cables from antenna carrying bag (3).

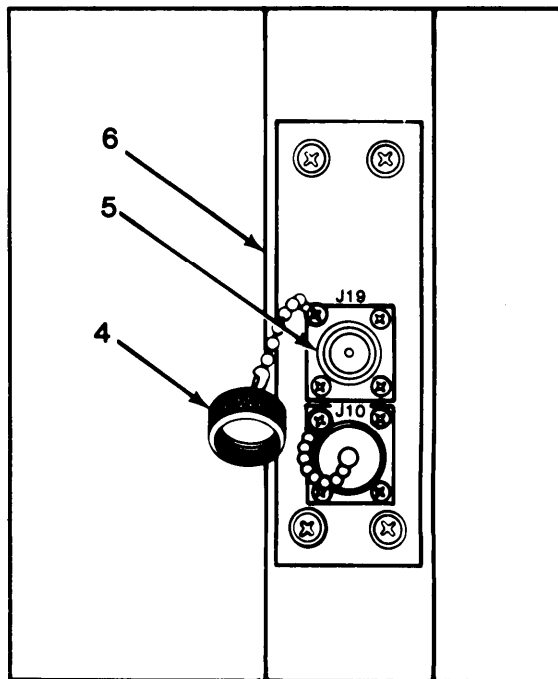
NOTE

- AS-3722/PRD-11 has two cables and AS-3733/PRD-11 antenna has three cables.
- Bnc connector on end of rf cable goes to receiver. Df cable N connector without blue band goes to df processor.



NOTE
Perform 2, 3 and 4 below Only when using the As-3732/PRD-11.

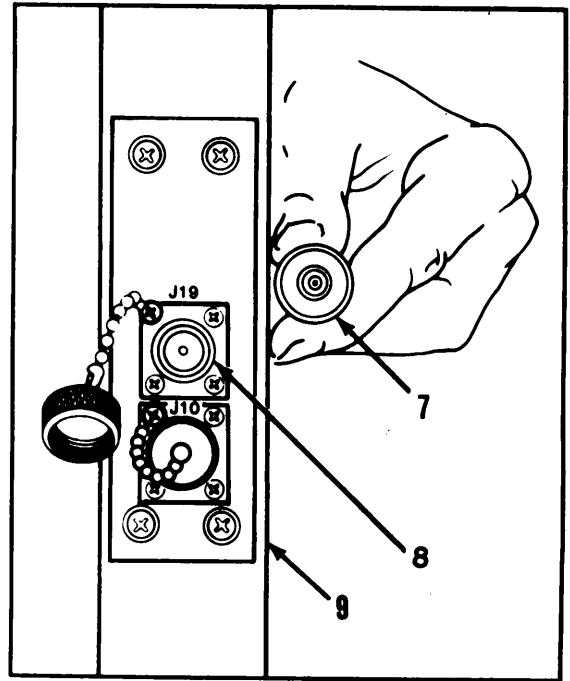
2. Unscrew protective cap (4) from connector J19 (5) on antenna mast column (6).



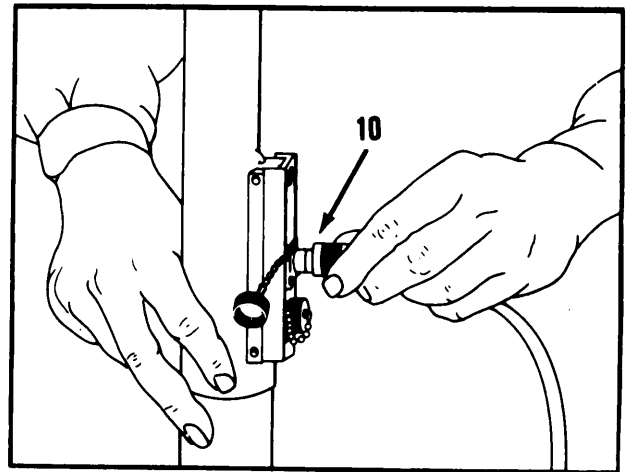
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING ANTENNA (SHEET 2 OF 5)

3. Aline rf cable connector J19 (7) with connector J19 (8) on antenna mast column (9).



4. Push in on cable collar (10) and turn clockwise to screw in place.



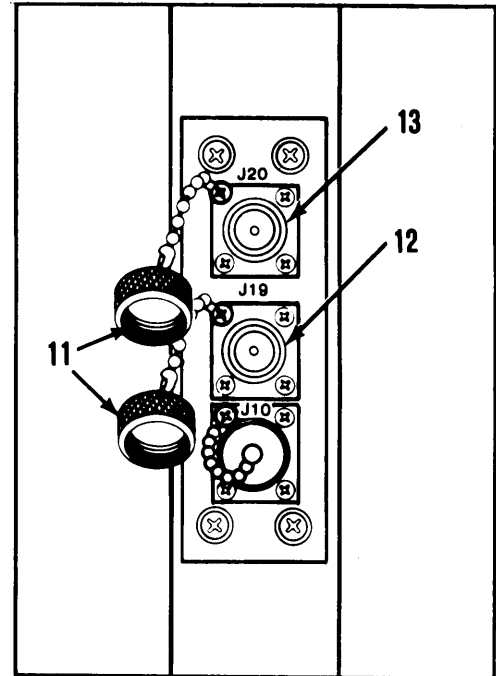
GO ON TO SHEET 3

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

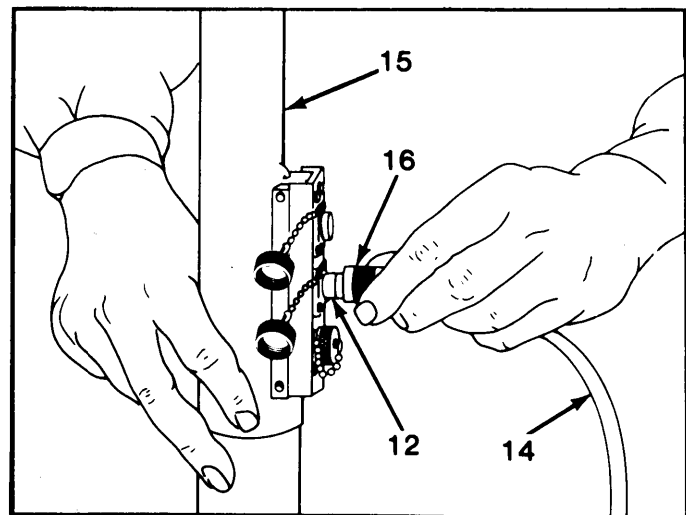
CABLING ANTENNA (SHEET 3 OF 5)

NOTE
 Perform 5 thru 9 below only
 when using the AS-3733/
 PRD-11.

- Remove protective caps (11) from connector J19 (12) and connector J20 (13) by unscrewing counterclockwise.



- Align first rf cable (14) with connector J19 (12) on antenna mast column (15).
- Push in on cable collar (16) and turn clockwise to screw in place.

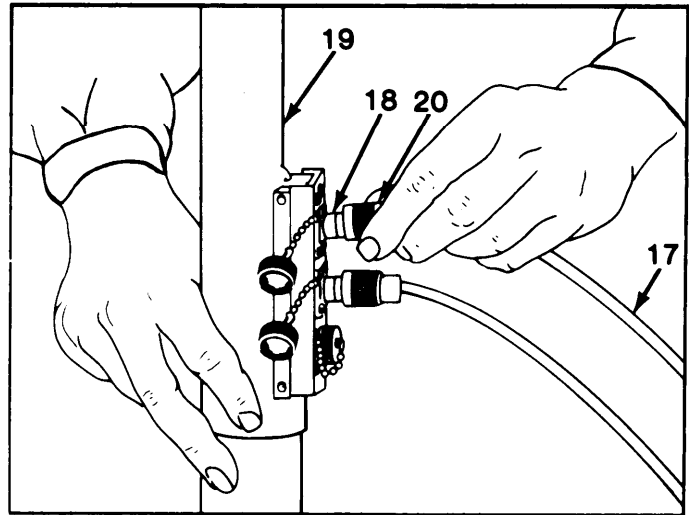


GO ON TO SHEET 4

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

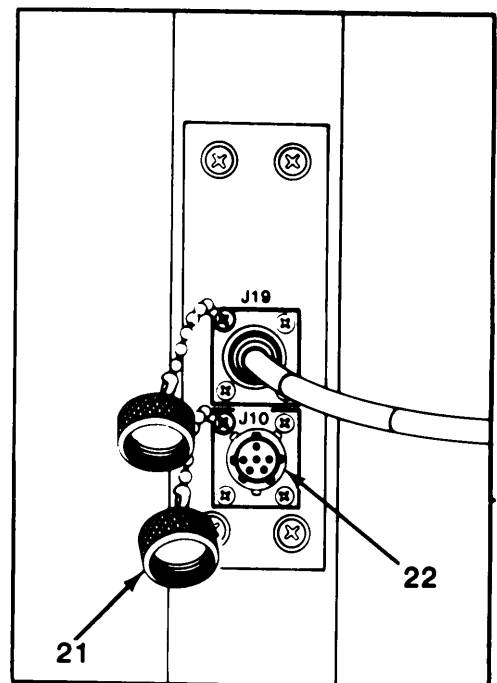
CABLING ANTENNA (SHEET 4 OF 5)

8. Aline second rf cable (17) with connector J20 (18) on antenna mast column (19).
9. Push in on cable collar (20) and turn clockwise to screw in place.



NOTE
Perform 10, 11, and 12 below when using either antenna.

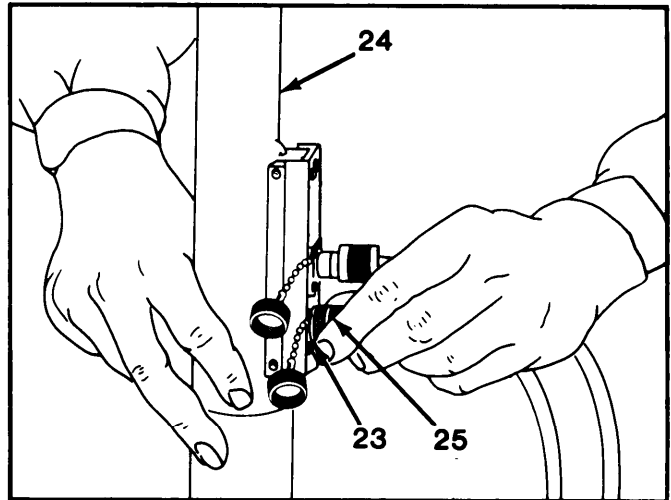
10. Remove protective cap (21) from connector J10 (22) by pushing in and turning 1/4 turn counterclockwise.



GO ON TO SHEET 5

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

11. Aline df cable connector
J10 keys to connector J10
(23) on antenna mast column (24).



12. Push in on cable collar
(25) and turn clockwise to
screw in place.

2-10 ASSEMBLY AND PREPARATION FOR USE - Continued

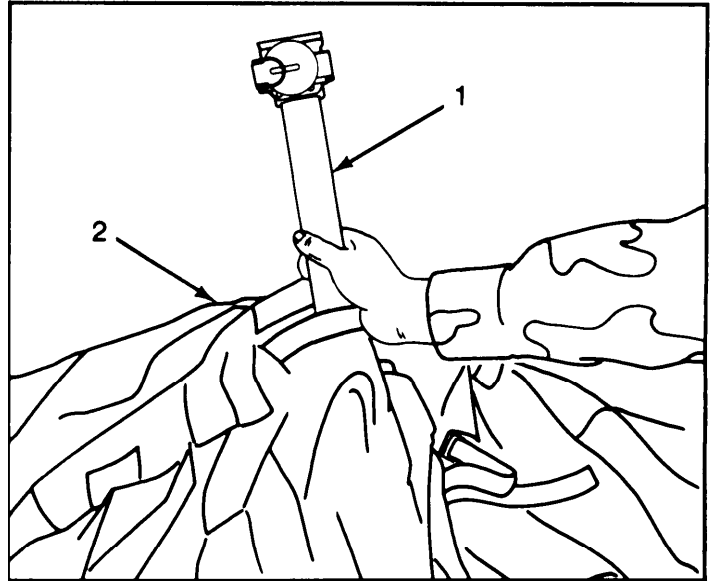
ORIENTING AND RAISING ANTENNA (SHEET 1 OF 7)

NOTE

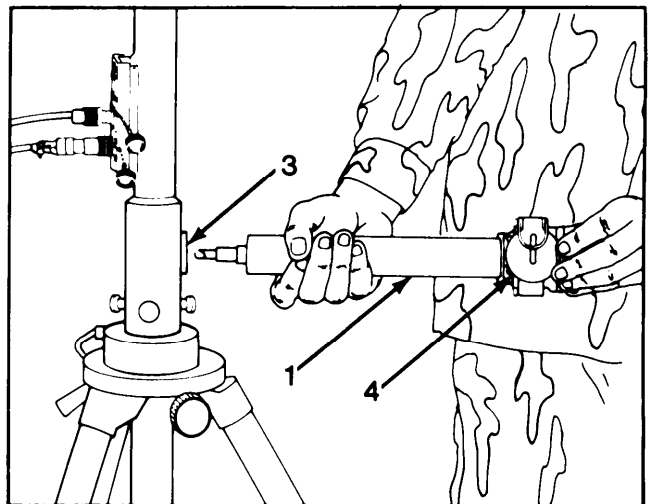
Perform these procedures only after the tripod, antenna and antenna cables are installed.

Orienting the antenna is necessary for proper reception of signals and for obtaining accurate lines of bearing. Only one crewmember is necessary to orient and raise the antenna.

1. Remove compass arm assembly (1) from antenna carrying bag (2).



2. Stand facing compass mounting plate on antenna (3) while holding compass arm assembly (1) with both hands so that compass top cover (4) is up.
3. Turn compass arm assembly (1) so that compass top cover (4) faces to the left.



GO ON TO SHEET 2

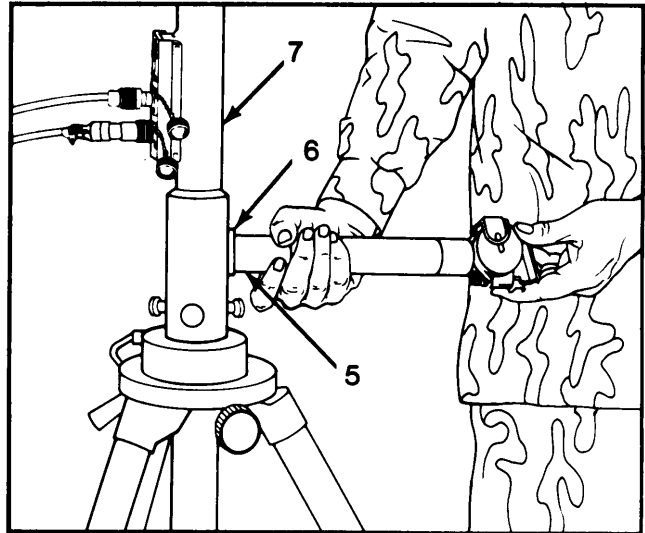
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

ORIENTING AND RAISING ANTENNA (SHEET 2 OF 7)

CAUTION

Do not force compass arm assembly into compass mounting plate. Aluminum tip will bend and may not be able to be removed.

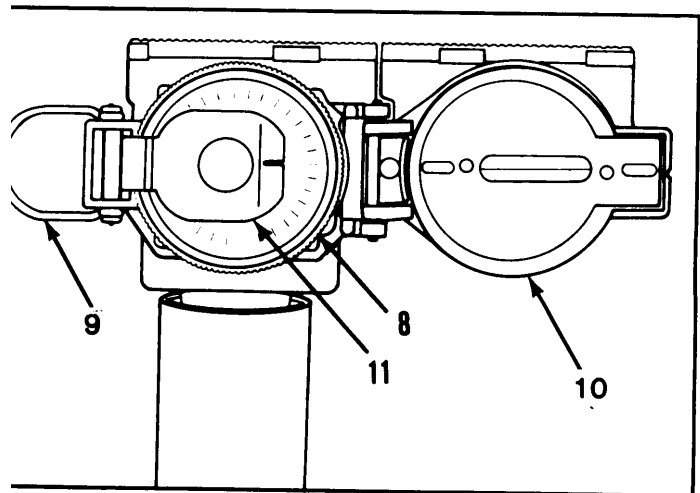
4. Insert compass arm assembly (5) into mounting plate (6) and twist slightly until it slides flush to antenna column (7).
5. Turn compass arm assembly (5) 1/4 turn-clockwise until it locks in place.



NOTE

Compass top cover will face upward.

6. Open compass (8) by pulling back on compass wire lever (9).
7. Open compass top cover (10) fully to expose compass magnifying eyepiece (11).



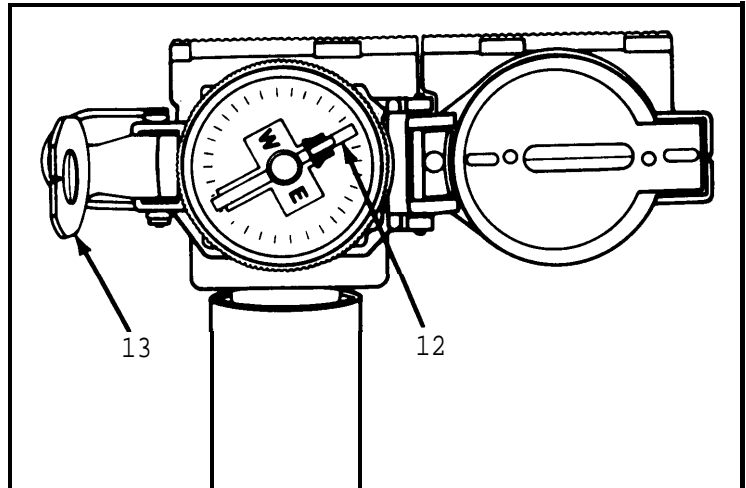
GO ON TO SHEET 3

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

ORIENTING AND RAISING ANTENNA (SHEET 3 OF 7)

8. Free compass needle (12) by pulling up on magnifying eyepiece (13).

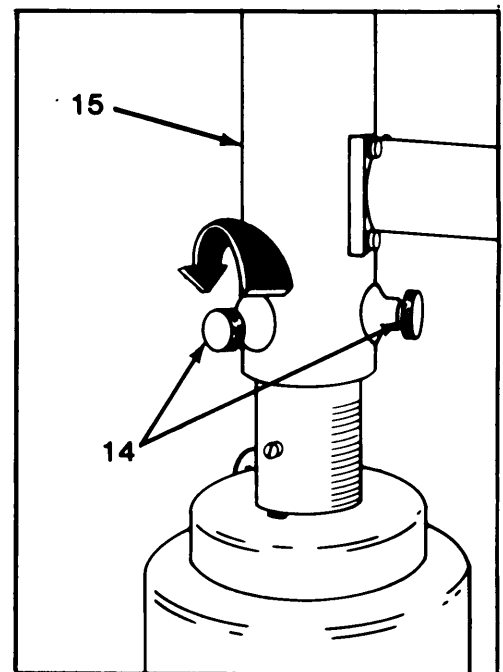
NOTE
Tripod legs may need adjusting to allow compass needle to swing freely.



9. Loosen three locking screws (14) on base of antenna mast (15) by turning counterclockwise.

10. Rotate antenna mast (15) until compass arrow indicates 0 (zero) degrees.

NOTE
Antenna may need further orienting to allow for variance between magnetic north and true north or grid north.



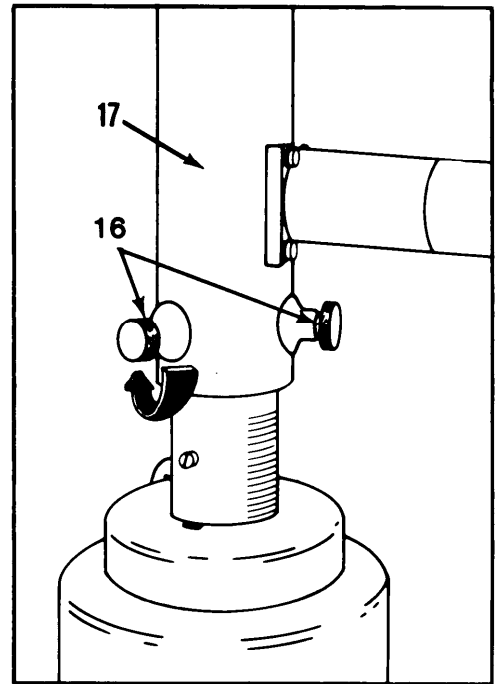
GO ON TO SHEET 4

2-10. ASSEMBLY AND PREPARAION FOR USE - CONTINUED

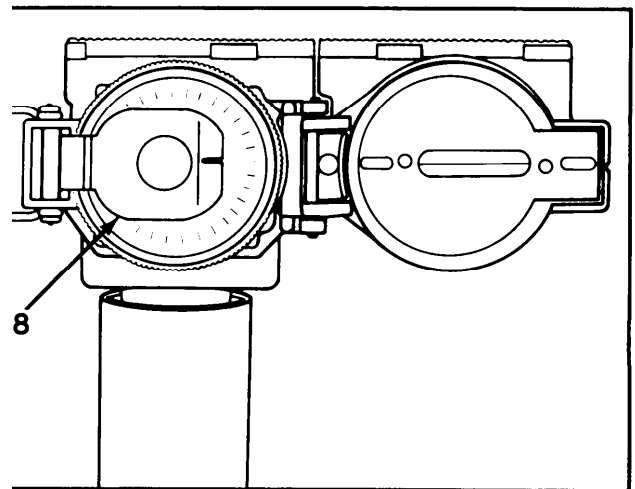
ORIENTING AND RAISING ANTENNA (SHEET 4 OF 7)

11. Handtighten three locking screws (16) on antenna mast base (17) by turning clockwise.

NOTE
 Recheck compass reading to ensure tightening procedures did not change orientation.



12. Lock compass needle by pushing down on magnifying eyepiece (18).

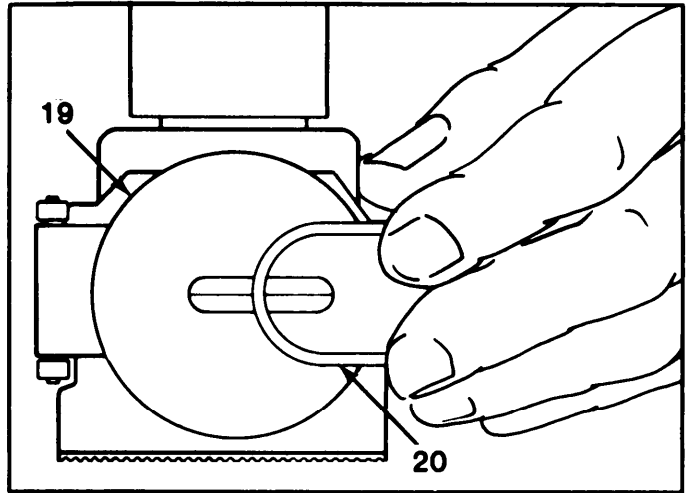


2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

ORIENTING AND RAISING ANTENNA (SHEET 5 OF 7)

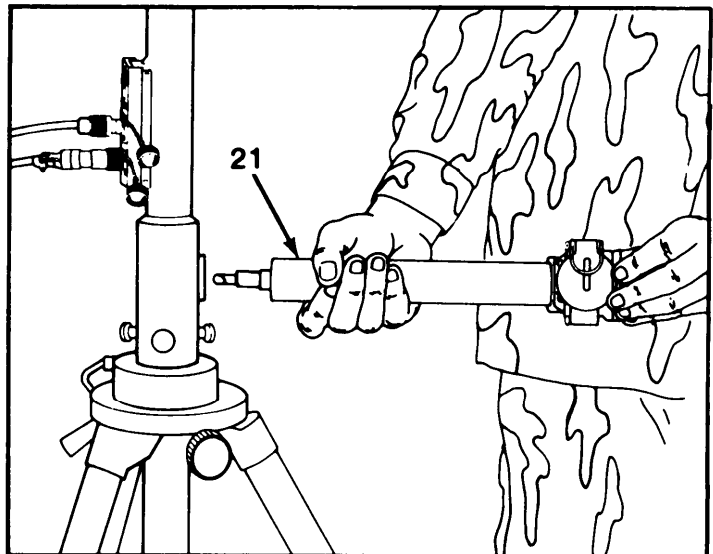
13. Close compass top cover (19).

14. Pull up wire lever (20) and push it down over top cover (19).



15. Remove compass arm assembly (21) by turning 1/4 turn counter-clockwise and pulling out.

16. Return compass arm assembly (21) to antenna carrying bag.

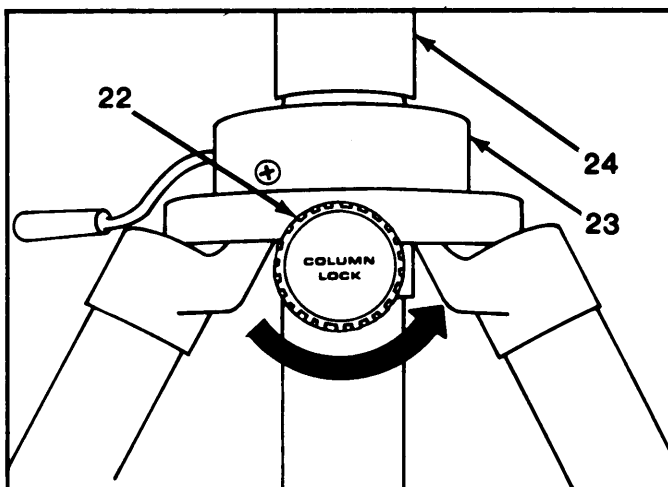


GO ON TO SHEET 6

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

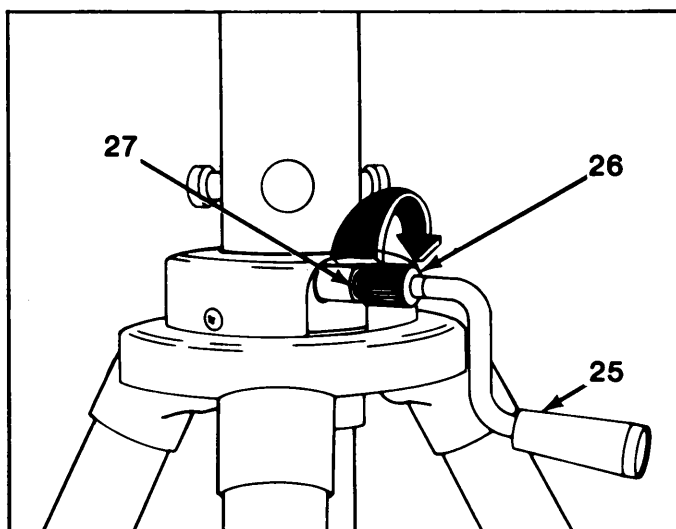
ORIENTING AND RAISING ANTENNA (SHEET 6 OF 7)

17. Loosen COLUMN LOCK knob (22) on antenna crank assembly (23) by turning counterclockwise until mast (24) is free.



18. Lift crank handle (25), slide collar (26) over screw (27) and turn collar (26) clockwise until tight.

NOTE
Crank handle will be positioned to rotate antenna upward.



GO ON TO SHEET 7

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

ORIENTING AND RAISING ANTENNA (SHEET 7 OF 7)

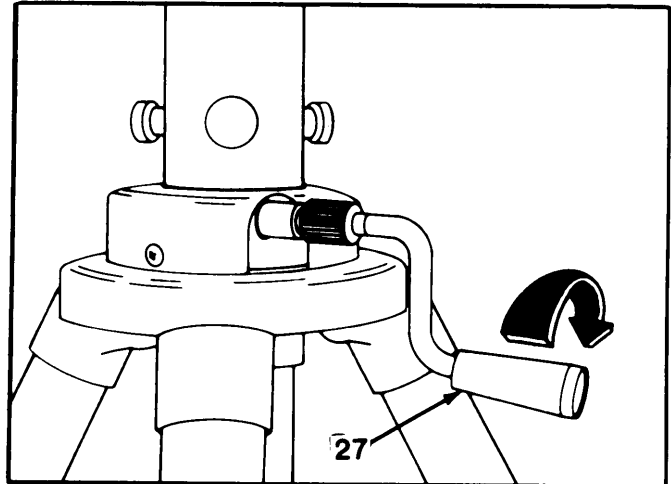
CAUTION

Ensure antenna cables are free of crank assembly.

19. Rotate crank (27) clockwise until antenna reaches maximum height.

NOTE

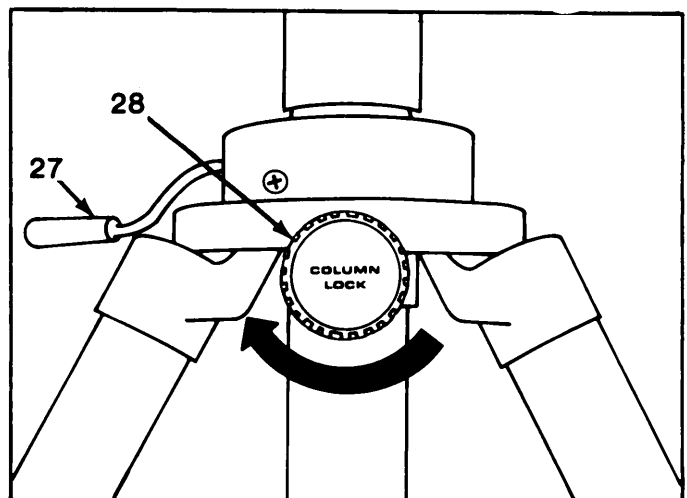
Crank will no longer turn when antenna reaches maximum height.



20. Holding crank handle (27), handtighten COLUMN LOCK knob (28) by turning clockwise.

NOTE

Place antenna carrying bag near df units for ease of finding bag during darkness and use under unusual conditions.



2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

b. Battery Installation. Battery installation consists of the procedures that must be performed to supply the direction finder units with power. Only one crewmember is needed to perform these procedures:

	<u>Page</u>
● BA-4386/PRC-25 battery pack installation.	2-44
● D-Cell battery installation.	2-47

NOTE

Remove receiver, df processor and signal monitor from rucksacks before performing battery installation procedures.

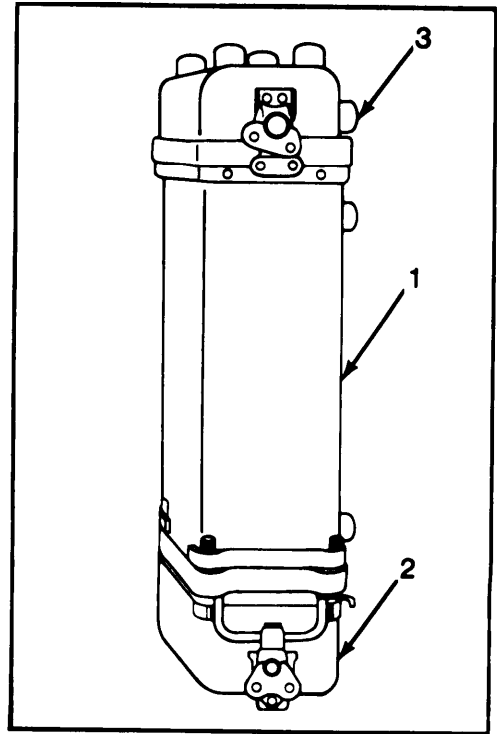
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

BA-4386/PRC-25 BATTERY PACK INSTALLATION (SHEET 1 OF 3)

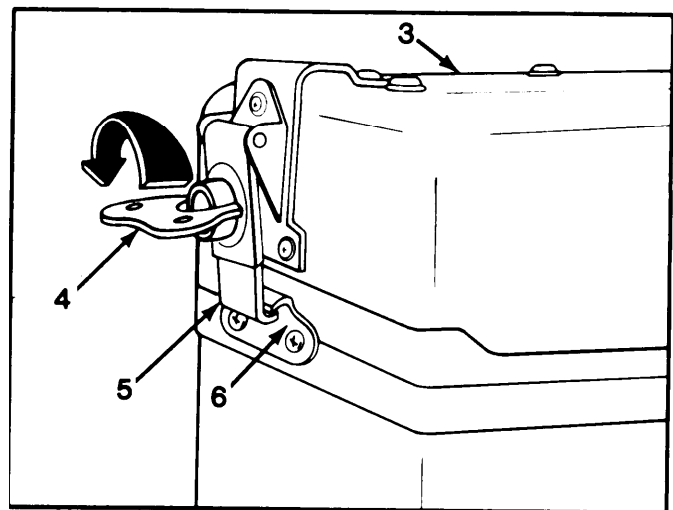
1. Stand receiver (1) up on a flat surface so it rests on its front panel cover (2).

NOTE

- Bottom of receiver (battery cover) (3) will be in up position.
- When replacing batteries during operation, stand receiver up so it rests on handles that extend from the front panel.



2. Lift up on wing fasteners (4) at each side of battery rear cover (3).
3. Turn wing fasteners (4) counterclockwise until clamps (5) are free of receiver clips (6).
4. Lift off battery cover (3) from receiver (1) and set aside.

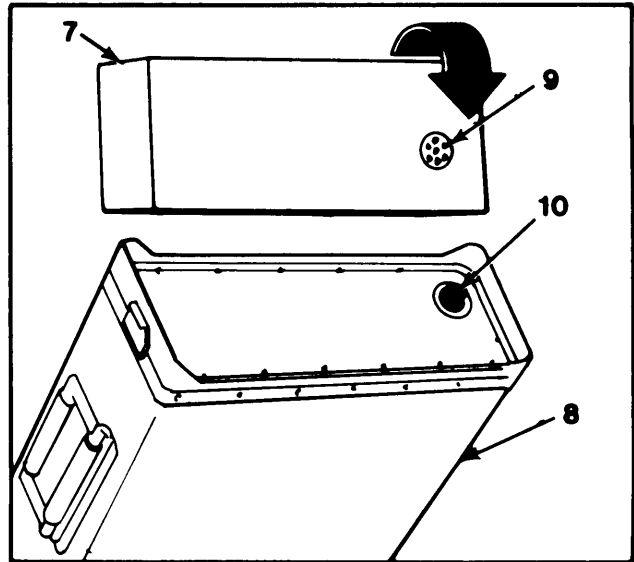


GO ON TO SHEET 2

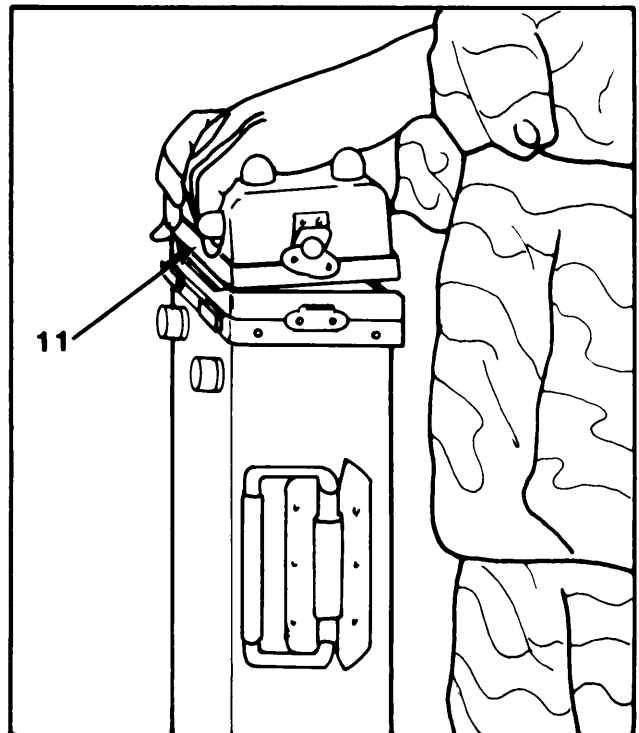
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

BA-4386/PRC-25 BATTERY PACK INSTALLATION (SHEET 2 OF 3)

5. Place battery (7) On bottom Of receiver (8) making sure slots on battery (9) match Prongs on bottom of receiver (10).
6. Press battery (7) into Place.



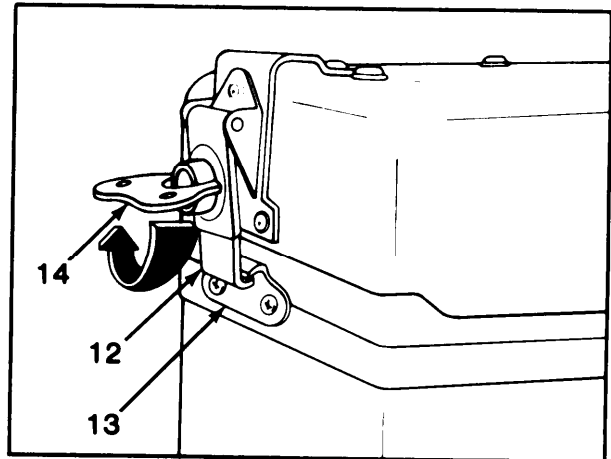
7. Replace battery cover (11).



GO ON TO SHEET 3

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

8. Push each clamp (12) against receiver clip (13) and lift up on wing fasteners (14).
9. Turn wing fasteners (14) clockwise until clamps (12) are locked in receiver clips (13).
10. Push wing fasteners (14) down until flat against receivers sides.
11. Repeat 1 through 10 above for df processor battery installation.
12. Repeat 1 through 10 above for signal monitor battery installation.



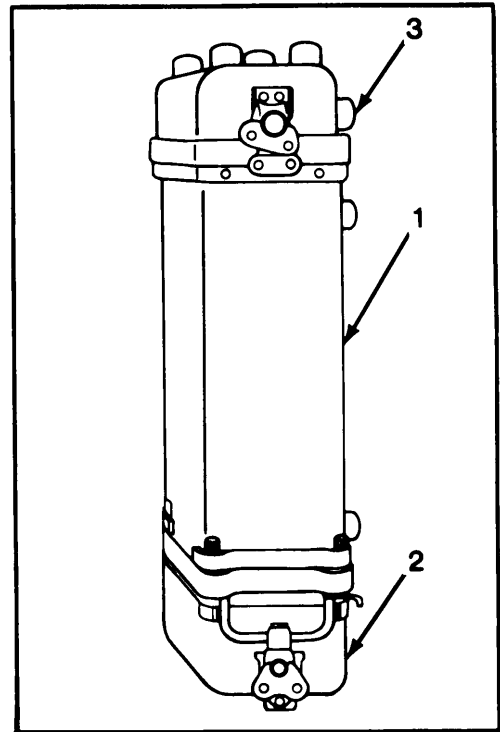
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

D-CELL BATTERY INSTALLATION (SHEET 1 OF 4)

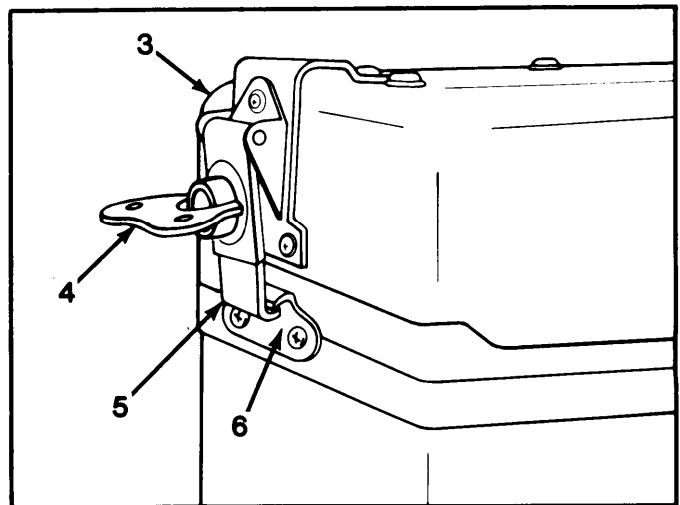
- Stand receiver (1) up on a flat surface so it rests on its front panel cover (2).

NOTE

- Bottom of receiver (battery cover) (3) will be in up position.
- When replacing batteries during operation, stand receiver up so it rests on handles that extend from the front panel.



- Lift up on wing fasteners (4) at each side of battery rear cover (3).
- Turn wing fasteners (4) counterclockwise until clamps (5) are free of receiver clips (6).
- Lift off battery cover (3) from receiver (1) and set aside.

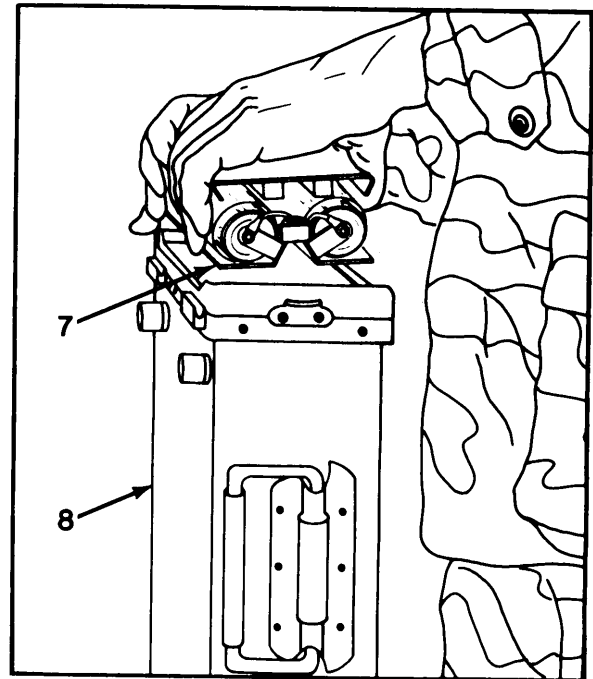


GO ON TO SHEET 2

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

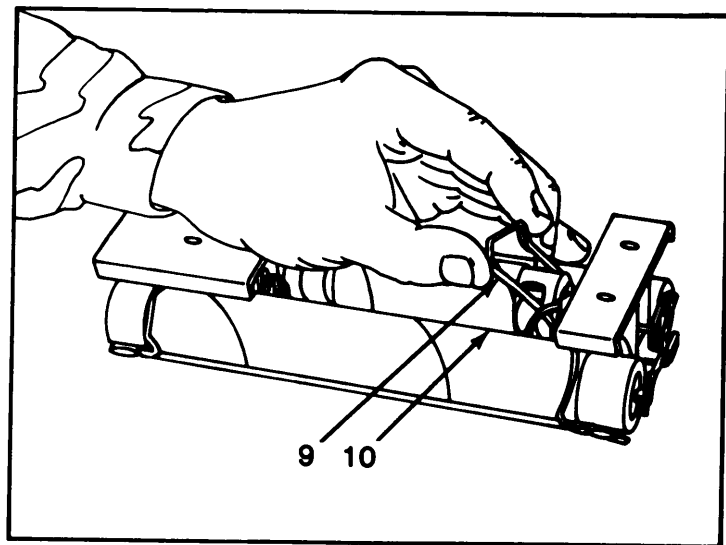
D-CELL BATTERY INSTALLATION (SHEET 2 OF 4)

5. Remove D-Cell insert (7) from receiver (8) by lifting it up off receiver (8).



CAUTION
If D-Cell insert contains batteries:
● Do not remove batteries before removing cardboard tubes.
● Do not use metal tools to remove batteries or you will short them out.

6. Unclip six battery retaining clips (9) from cardboard tubes (10).

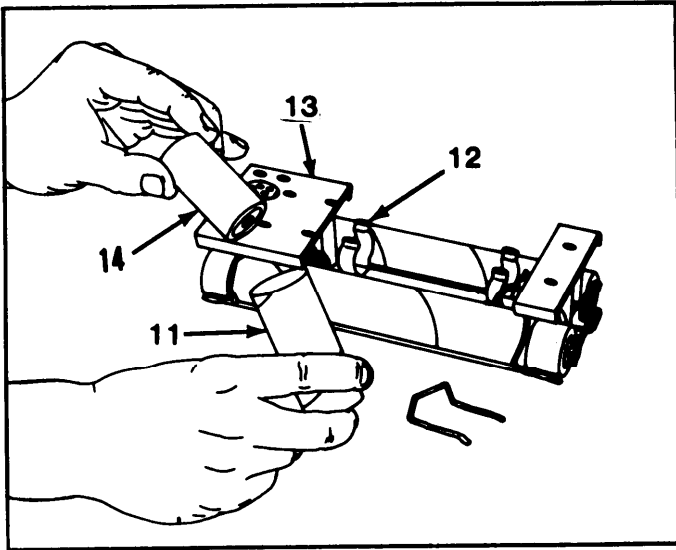


GO ON TO SHEET 3

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

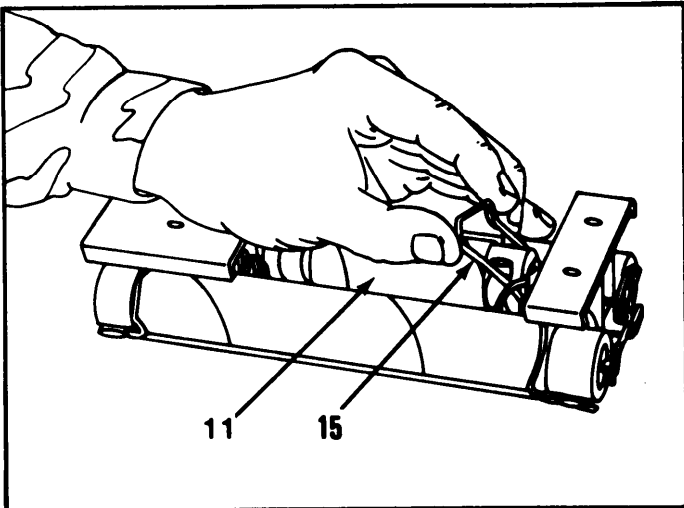
D-CELL BATTERY INSTALLATION (SHEET 3 OF 4)

7. Lift cardboard tubes (11) out from D-Cell insert holder (12) with your hands.
8. If D-Cell insert (13) contains batteries, slide old D-Cells (14) out from cardboard tubes (11).
9. Slide new D-Cells (14) into cardboard tubes (11) making sure cells are stacked positive to negative ends.



10. Clip cardboard tubes (11) with inserted D-Cells (14) back into their holders (12) and replace retaining clips (15)

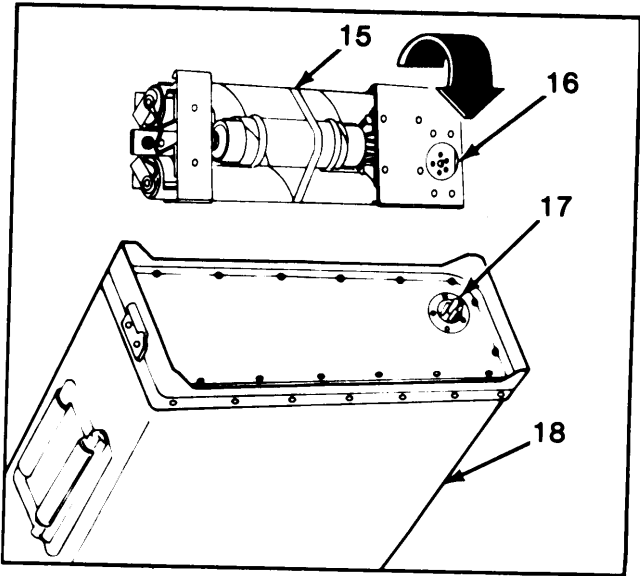
NOTE
 Ensure cells face in direction indicated on each holder.



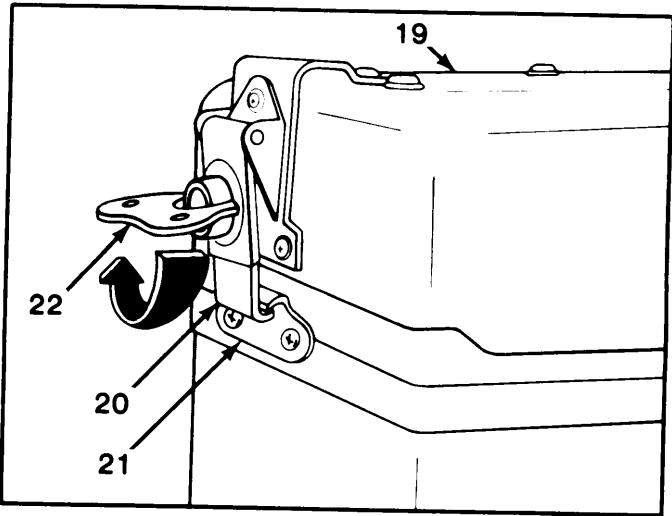
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

D-CELL BATTERY INSTALLATION (SHEET 4 OF 4)

- 11. Replace D-Cell insert (15) onto rear of receiver (18) making sure plug slots on D-Cell insert (16) align with jack prongs on bottom of receiver (17).
- 12. Press D-Cell insert (15) into place.



- 13. Place rear cover (19) on bottom of receiver (18).
- 14. Push each clamp (20) against receiver clip (21) and lift up on wing fasteners (22).
- 15. Turn wing fasteners (22) clockwise until clamps (20) are locked in receiver clips (21).
- 16. push wing fasteners (22) flat against sides of receiver (18).



- 17. Repeat 1 through 16 above for df processor battery installation.
- 18. Repeat 1 through 16 above for signal monitor battery installation.

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

c. Unit Set Up. Unit set up consists of the procedures that must be performed to complete the preparations necessary for operation of the direction finder set. Only one crewmember is needed to perform these procedures:

	<u>Page</u>
● Stacking units	2-52
● Cabling units	2-55

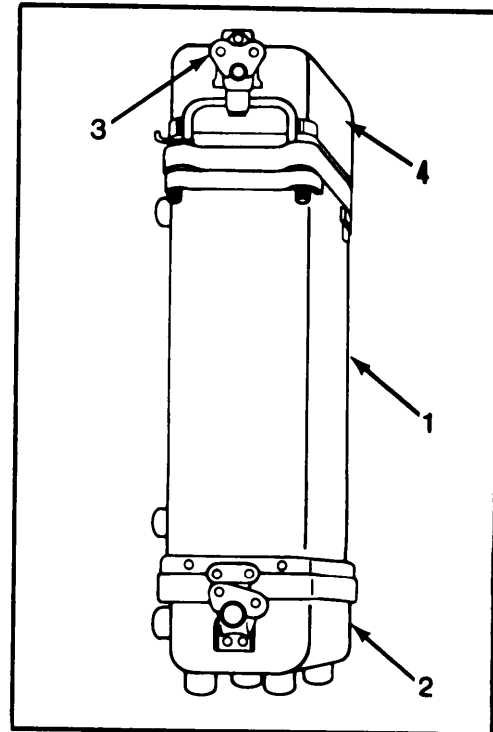
NOTE

perform unit set-up procedures after installing the units batteries. Df units must be located within 44 feet of the antenna site to allow the cables to extend up and connect to the antenna mast.

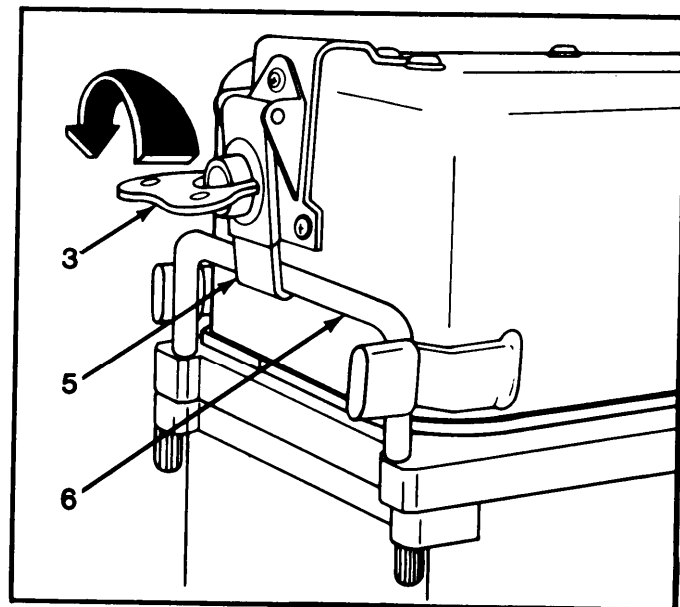
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

STACKING UNITS (SHEET 1 OF 3)

1. Stand receiver (1) up on a flat surface so it rests on its battery cover (2).
2. Lift up on wing fasteners (3) at each side of receiver front panel cover (4).



3. Turn wing fasteners (3) counterclockwise until clamps (5) are free of receiver handles (6).
4. Lift off front panel cover (4) from receiver (1).
5. Repeat 1, 2 and 3 above to remove df processor front panel cover and signal monitor front panel cover.



NOTE
The df processor and signal monitor front covers contain bnc cables.

GO ON TO SHEET 2

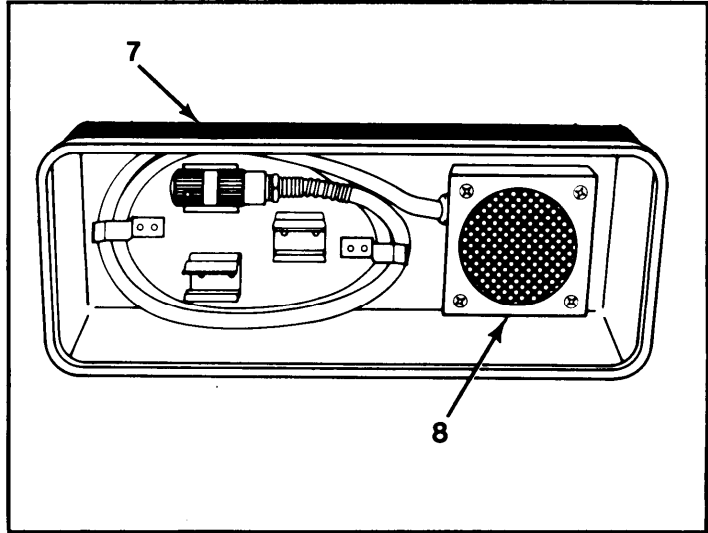
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

STACKING UNITS (SHEET 2 OF 3)

6. Place receiver front cover (7) where units are to be set up.

NOTE

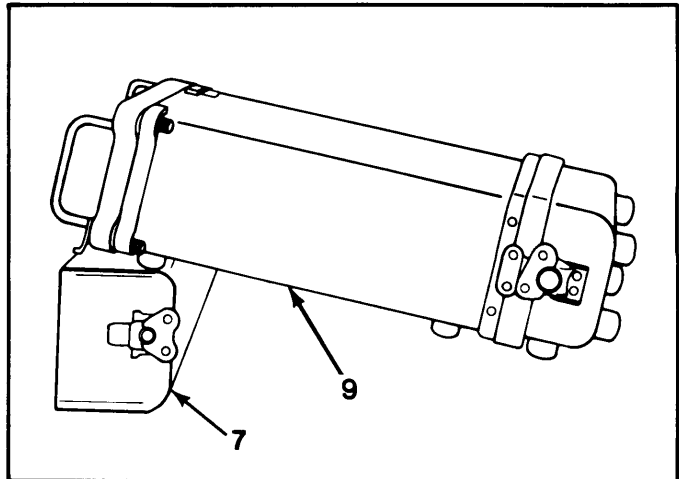
- The receiver front cover (7) contains the speaker assembly (8).
- The receiver front cover (7) is used to support the stacked direction finder units and tilt them upwards.
- Speaker assembly (8) should face forward.



7. Place receiver (9) on top of front panel cover (7).

NOTE

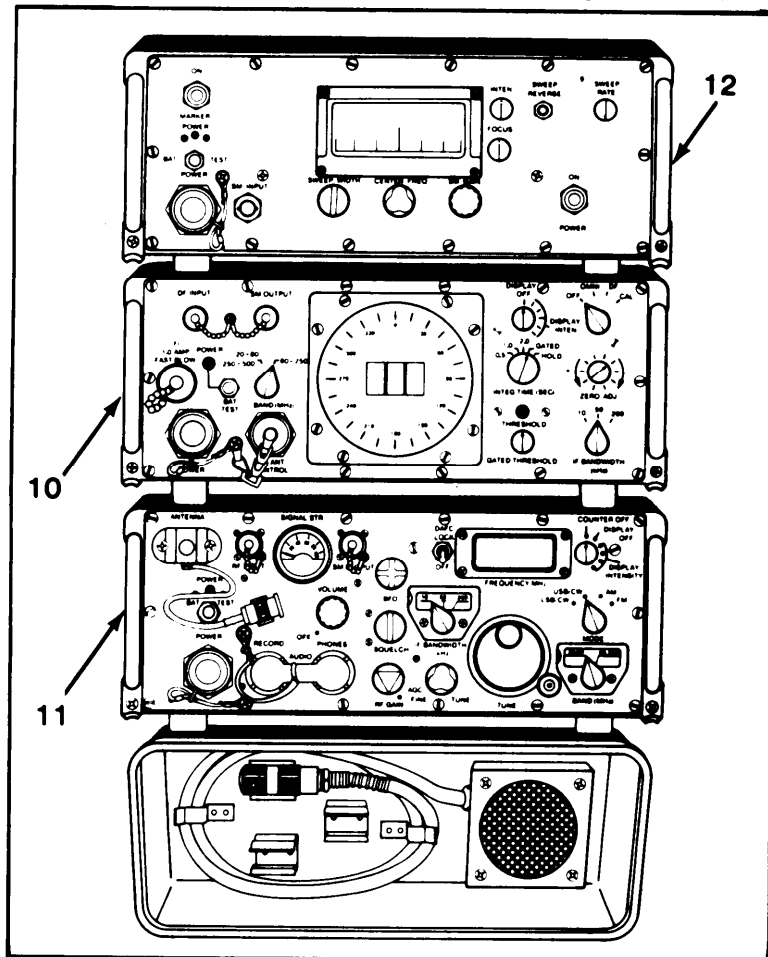
Receiver (9) will tilt upward.



2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

STACKING UNITS (SHEET 3 OF 3)

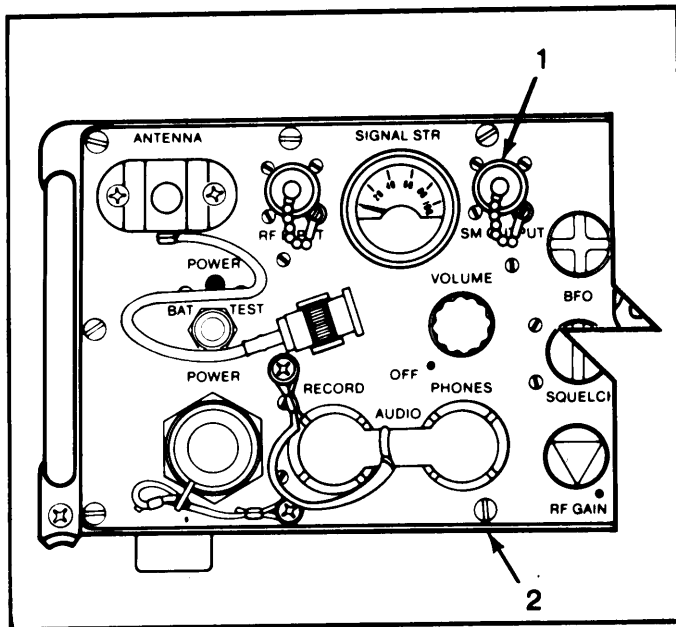
8. Place df processor (10) on top of receiver (11).
9. Place signal monitor (12) on top of df processor (10).



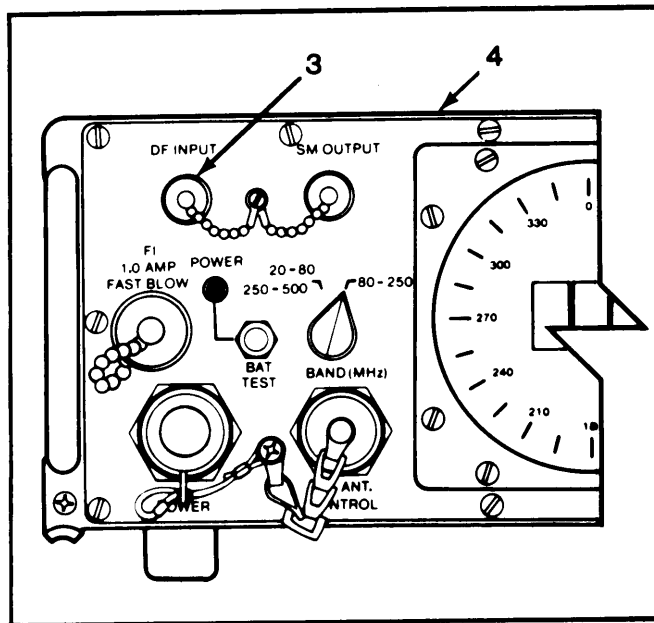
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING UNITS (SHEET 1 OF 7)

1. Remove protective cap from SM OUTPUT (1) on receiver (2) by pushing in and turning 1/4 turn counterclockwise.



2. Remove protective cap from DF INPUT (3) on df processor (4) by pushing in and turning 1/4 turn counterclockwise.

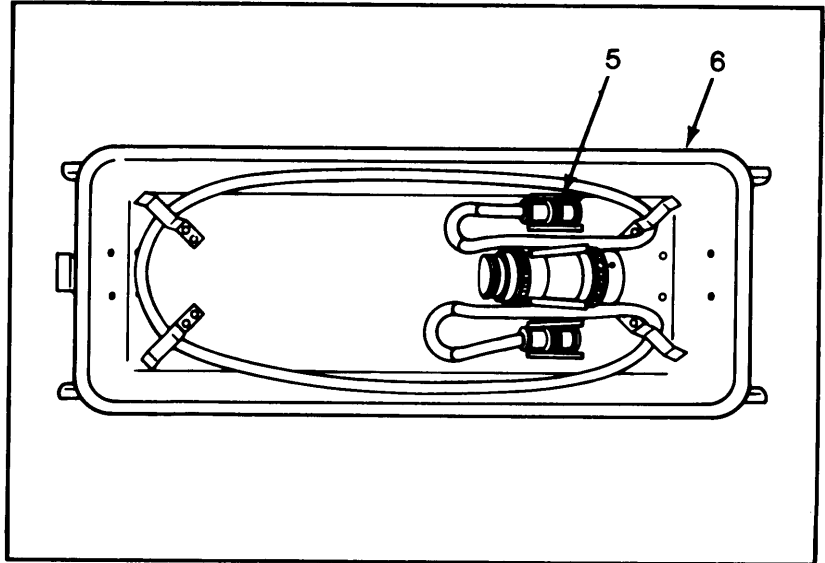


GO ON TO SHEET 2

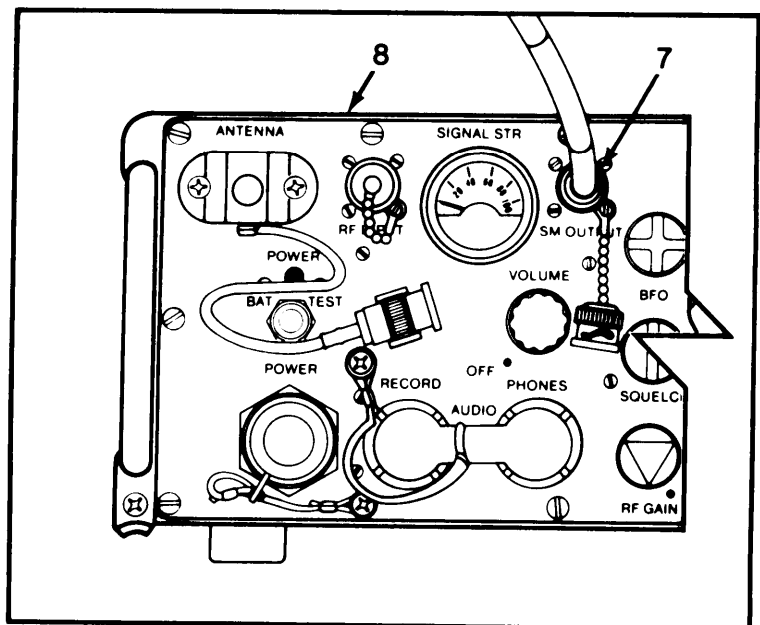
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING UNITS (SHEET 2 OF 7)

3. Remove bnc cable (5) from df processor front cover (6).



4. Connect bnc connector to SM OUTPUT (7) on receiver (8) by pushing in on bnc connector while turning 1/4 turn clockwise until connector locks in place.

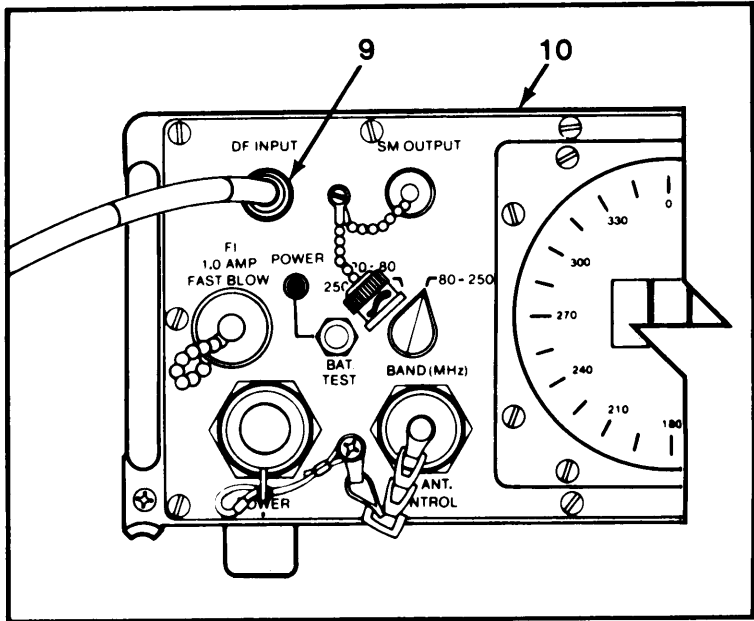


GO ON TO SHEET 3

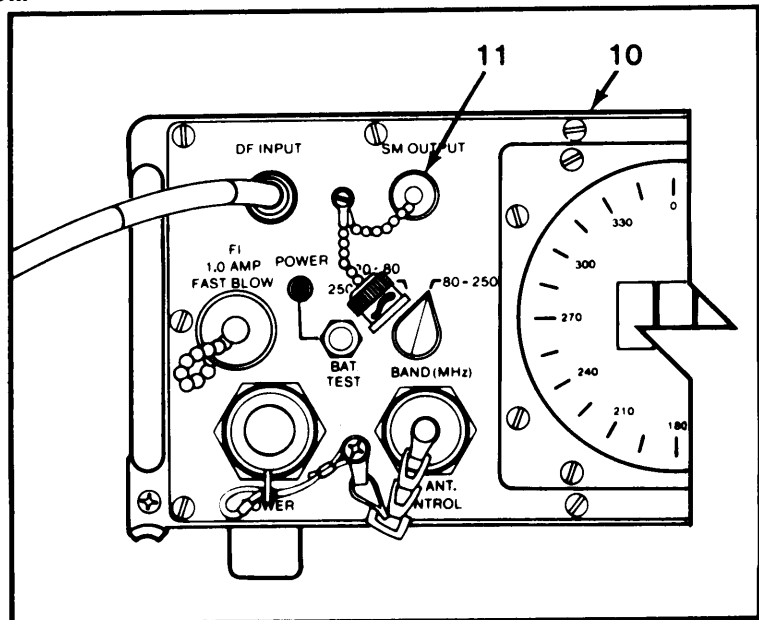
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING UNITS (SHEET 3 OF 7)

5. Connect bnc connector at other end of bnc cable to DF INPUT (9) on df processor (10) by pushing in on bnc connector while turning 1/4 turn clockwise until connector locks in place.



6. Remove protective cap from SM OUTPUT (11) on df Processor (10) by pushing in and turning 1/4 turn counterclockwise.

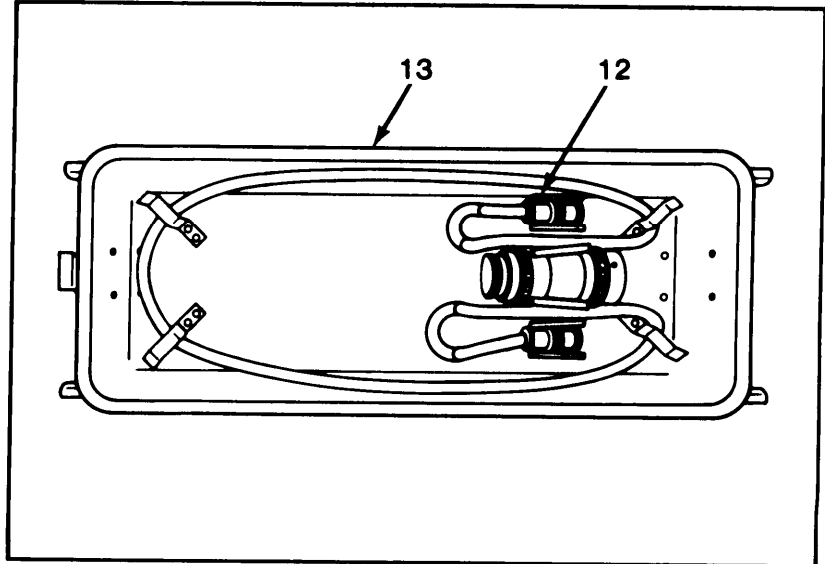


GO ON TO SHEET 4

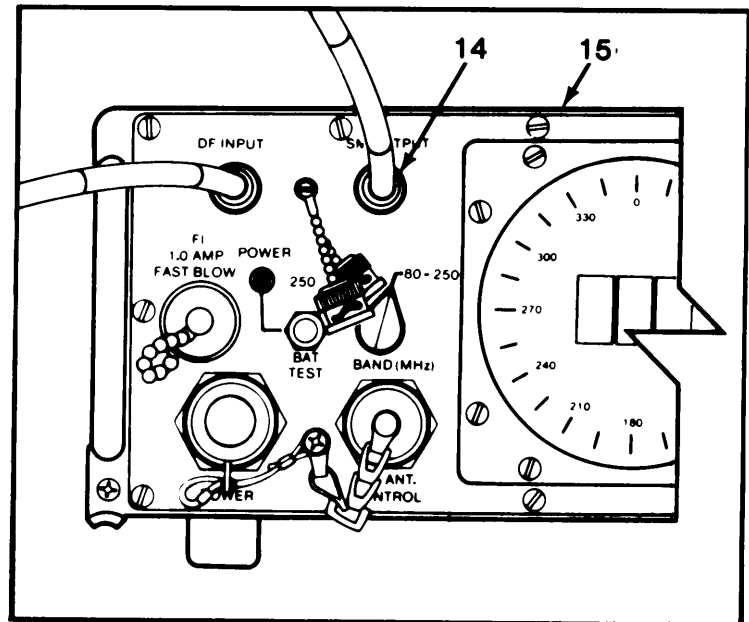
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING UNITS (SHEET 4 OF 7)

7. Remove bnc cable (12) from signal monitor front cover (13).



8. Connect bnc connector to SM OUTPUT (14) on df processor (15) by pushing in on bnc connector while turning 1/4 turn clockwise until connector locks in place.

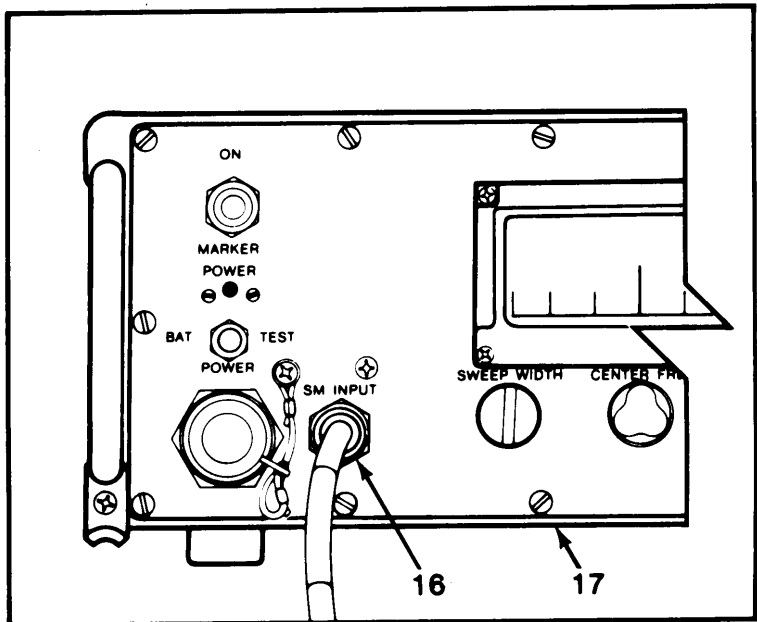


GO ON TO SHEET 5

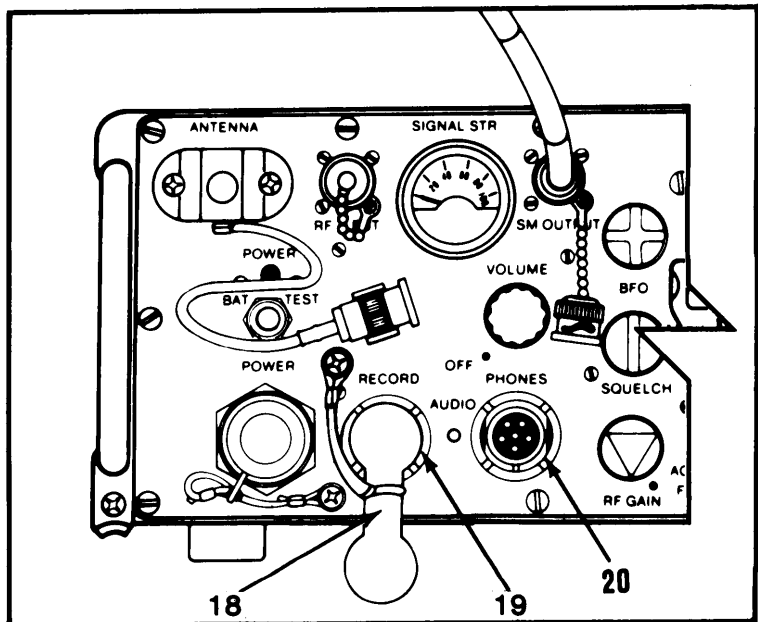
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING UNITS (SHEET 5 OF 7)

9. Connect connector at other end of bnc cable to SM INPUT (16) On signal monitor (17) by pushing in on bnc connector while turning 1/4 turn clockwise until bnc connector locks in place.



10. Remove protective rubber cap (18) from PHONES connector by pressing against RECORD connector (19) while lifting off protective rubber cap (18) and turning rubber cap downward from PHONES connector (20).



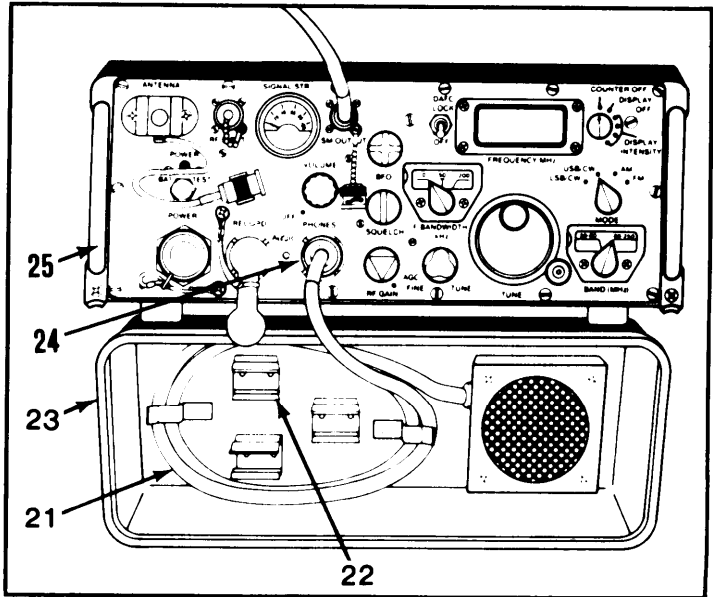
2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING UNITS (SHEET 6 OF 7)

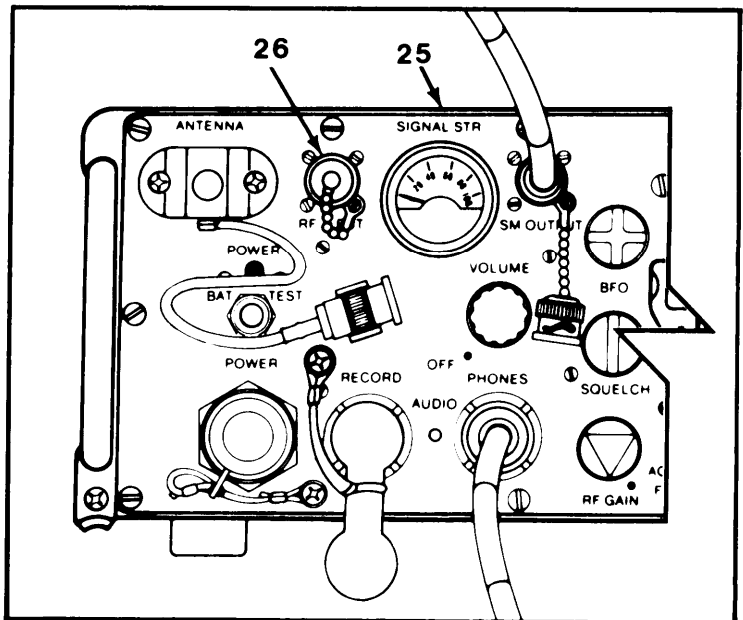
11. Unclip audio connector of speaker cable (21) from holding bracket (22) inside receiver front cover (23) and extend cable.

NOTE
Both RECORD and PHONES connectors are audio output connectors. Ensure speaker cable is connected to PHONES connector.

12. Connect speaker cable (21) to PHONES connector (24) on receiver (25) by pushing in connector and simultaneously turning clockwise until connector locks in place.



13. Remove protective cap from RF INPUT (26) on receiver (25) by pushing in and turning 1/4 turn counterclockwise.



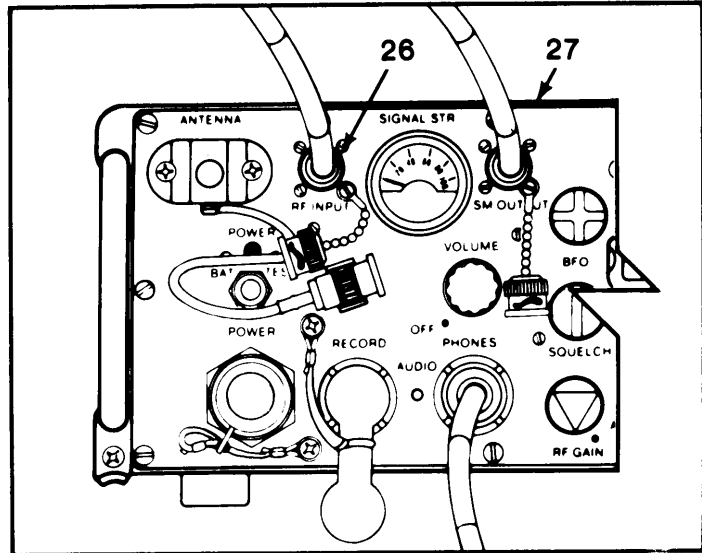
GO ON TO SHEET 7

2-10. ASSEMBLY AND PREPARATION FOR USE - Continued

CABLING UNITS (SHEET 7 OF 7)

NOTE

- If the AN-3733/PRD-11 is used, the rf cable from J19 on the antenna will be connected for frequencies of 20-175 MHz. The rf cable from J20 will be connected for frequencies of 150-850 MHz.
- The AN-3732/PRD-11 has only one rf cable.

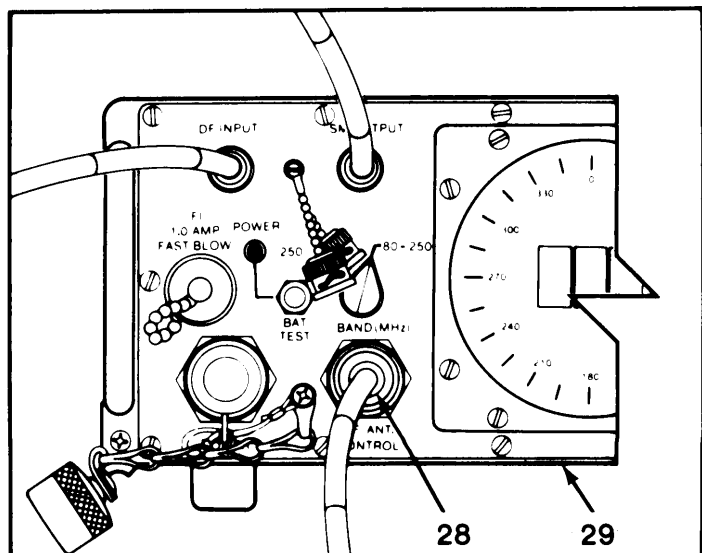


14. Connect rf cable bnc connector to RF INPUT (26) on receiver (27) by pushing in on collar of connector while simultaneously turning 1/4 turn clockwise until bnc connector locks in place.

15. Remove protective cap from DF ANT. CONTROL (28) on df processor (29) by turning counterclockwise.

16. Connect df cable connector to DF ANT. CONTROL (28) by matching large key on df cable connector to slot on DF ANT. CONTROL (28).

17. Push df cable connector into DF ANT. CONTROL (28) and turn 1/4 turn clockwise until connector locks in place.



2-11. INITIAL ADJUSTMENTS

Initial adjustments consist of the tasks that must be performed to power up and set the controls of the direction finder units. Only one crewmember is required to do initial adjustments. Perform these procedures after the units are stacked and all cables are connected. The tasks and procedures for performing them are given in the following paragraphs. Initial adjustments include:

	<u>Page</u>
● Power up procedures	2-62
● Unit control settings	2-69

a. Power Up Procedures. Power up procedures consist of those steps necessary to apply power to a direction finder unit in order for it to operate. Each unit requires different steps.

	<u>Page</u>
● Powering up receiver	2-63
● Powering up df processor	2-65
● Powering up signal monitor	2-67

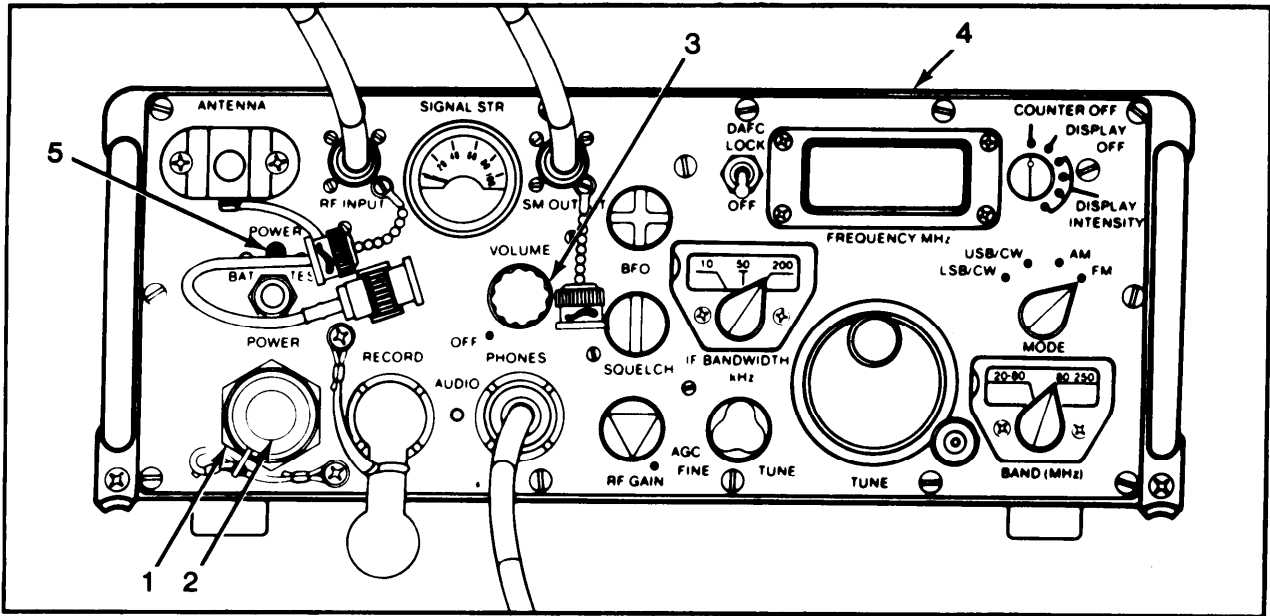
2-11. INITIAL ADJUSTMENTS - Continued

POWERING UP RECEIVER (SHEET 1 OF 2)

1. Check POWER terminal (1) to make sure Protective cap (2) is in place.

NOTE
 If terminal cap is not secured in place, unit will not function.

2. Turn red VOLUME switch (3) clockwise to turn on receiver (4) and set to midrange.
3. Observe that POWER lamp (5) is lit.



GO ON TO SHEET 2

2-11. INITIAL ADJUSTMENTS - Continued

POWERING UP RECEIVER (SHEET 2 OF 2)

- Set COUNTER OFF/DISPLAY OFF/DISPLAY INTENSITY switch (6) to lowest intensity by turning to first position after DISPLAY OFF (7).

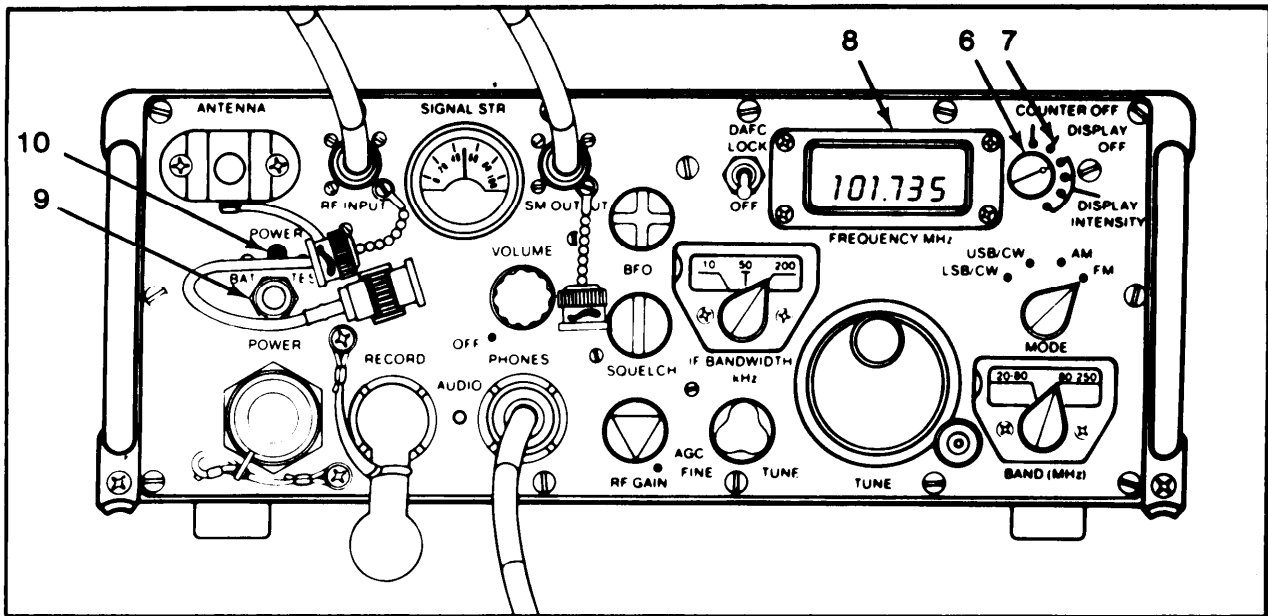
NOTE
COUNTER OFF/DISPLAY OFF INTENSITY switch may need to be set to higher intensity depending on light conditions.

- Observe FREQUENCY MHZ display (8) and ensure frequency appears.

NOTE
Allow units 2 or 3 minutes to warm up before performing 5 below.

- Press and release BAT TEST pushbutton (9) to check battery.
- Observe red POWER lamp (10) above pushbutton (9) and ensure it is lit.

NOTE
Batteries must be replaced if POWER lamp goes out after pressing BAT TEST pushbutton.



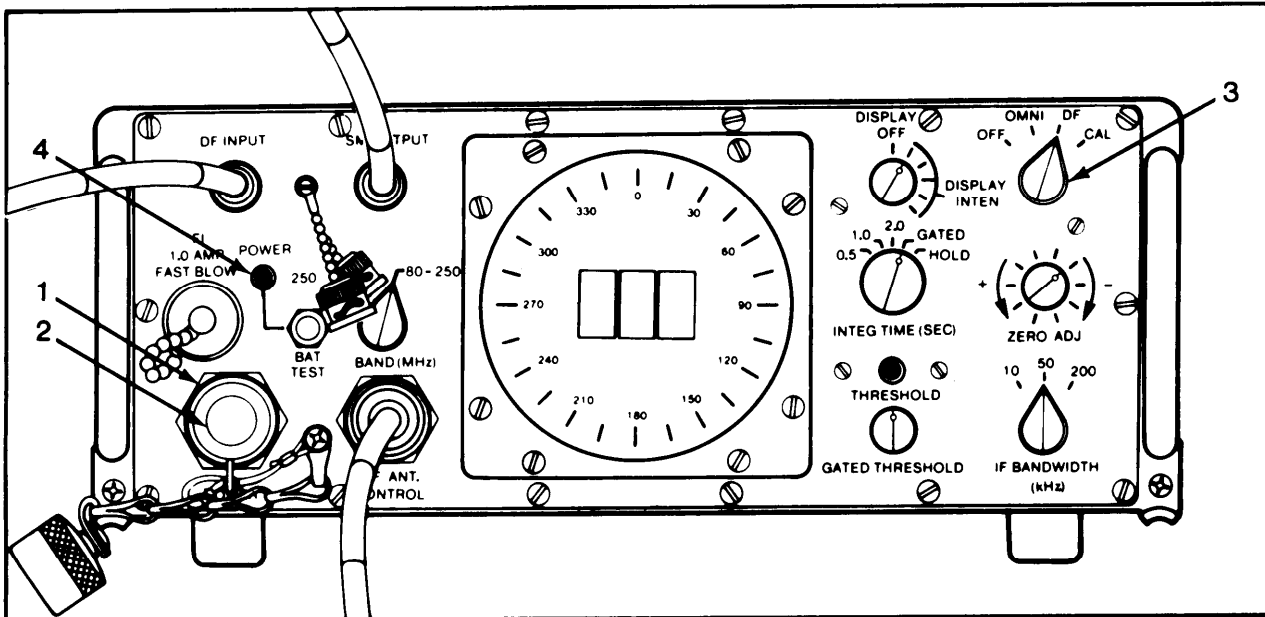
2-11. INITIAL ADJUSTMENTS - Continued

POWERING UP DF PROCESSOR (SHEET 1 OF 2)

1. Check POWER terminal (1) to make sure protective cap (2) is in place.

NOTE
If terminal cap is not secured in place, unit will not function.

2. Set OFF/OMNI/DF/CAL switch (3) to DF.
3. Observe red POWER lamp (4) is lit.



GO ON TO SHEET 2

2-11. INITIAL ADJUSTMENTS - Continued

POWERING UP DF PROCESSOR (SHEET 2 OF 2)

- 4. Set DISPLAY OFF/DISPLAY INTENSITY switch (5) to lowest intensity by turning to first position after DISPLAY OFF.

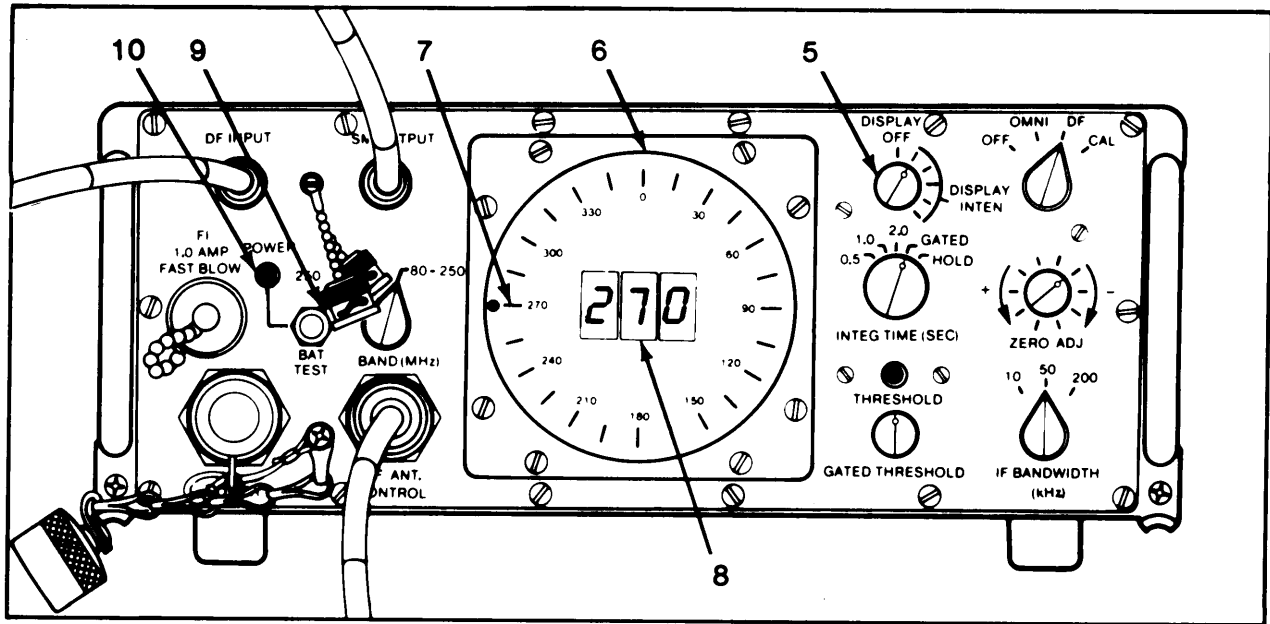
NOTE
COUNTER OFF/DISPLAY OFF/DISPLAY INTENSITY switch (5) may need to be set to higher intensity depending on light conditions.

- 5. Observe df processor display (6) and ensure random line of bearing numbers (7) and red circular LED indicator (8) appear.

NOTE
Allow units 2 or 3 minutes to warm up before performing 5 above.

- 6. Press and release BAT TEST pushbutton (9) to check battery.
- 7. Observe red POWER lamp (10) above pushbutton (9) and ensure it is lit.

NOTE
Batteries must be replaced if POWER lamp (10) goes out after pressing BAT TEST pushbutton (9).



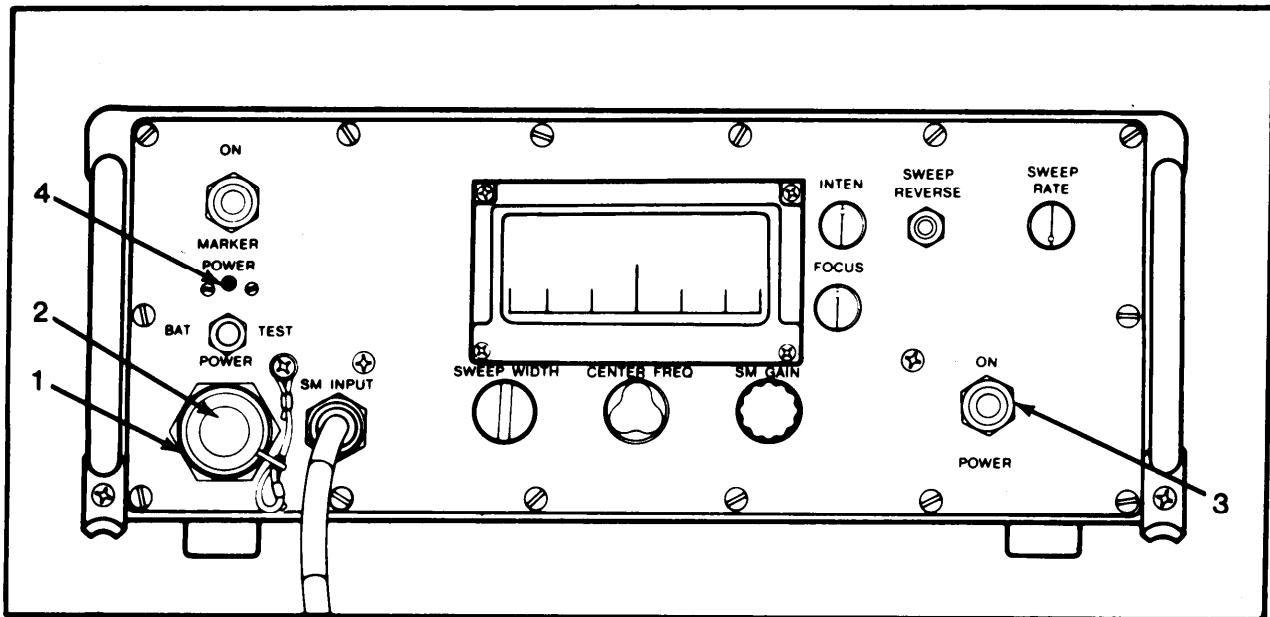
2-11. INITIAL ADJUSTMENT - Continued

POWERING UP SIGNAL MONITOR (SHEET 1 OF 2)

1. Check POWER terminal (1) to make sure protective cap (2) is in place.

NOTE
 If terminal cap is not secured in place, unit will not function.

2. Set ON/POWER toggle switch (3) to ON.
3. Observe POWER lamp (4) is lit.



GO ON TO SHEET 2

2-11. INITIAL ADJUSTMENTS - Continued

POWERING UP SIGNAL MONITOR (SHEET 2 OF 2)

4. Turn INTEN knob (5) clockwise to adjust display (6) to a low but visible level.
5. Observe signal monitor display (6) and ensure that baseline is present.

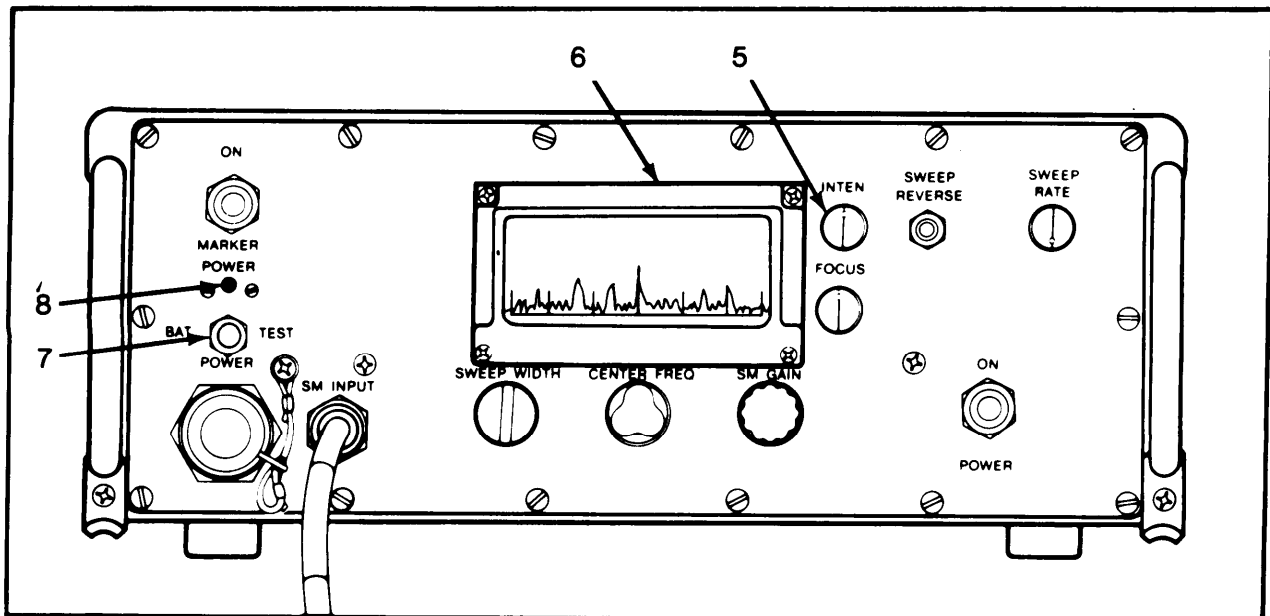
NOTE

Allow units 2 or 3 minutes to warm up before performing 6 below.

6. Press and release BAT TEST pushbutton (7) to check battery.
7. Observe red POWER lamp (8) above pushbutton (7) and ensure it is lit.

NOTE

Batteries must be replaced if POWER lamp (8) goes out after pressing BAT TEST Pushbutton (7)..



2-11. INITIAL ADJUSTMENTS - Continued

b. Unit Control Settings. Unit control settings consist of the final procedures necessary to prepare the direction finder set for operation. Perform these procedures only after power has been applied to each unit. Each unit requires different settings.

	<u>Page</u>
● Receiver control settings	2-71
● Df processor control settings	2-76
● Signal monitor control settings	2-79

NOTE

Receiver should contain tuner assembly appropriate to mission. Installed tuner frequency ranges are displayed with the BAND MHZ switch. If different tuner is required for mission, crewmember should notify organizational maintenance for replacement assembly.

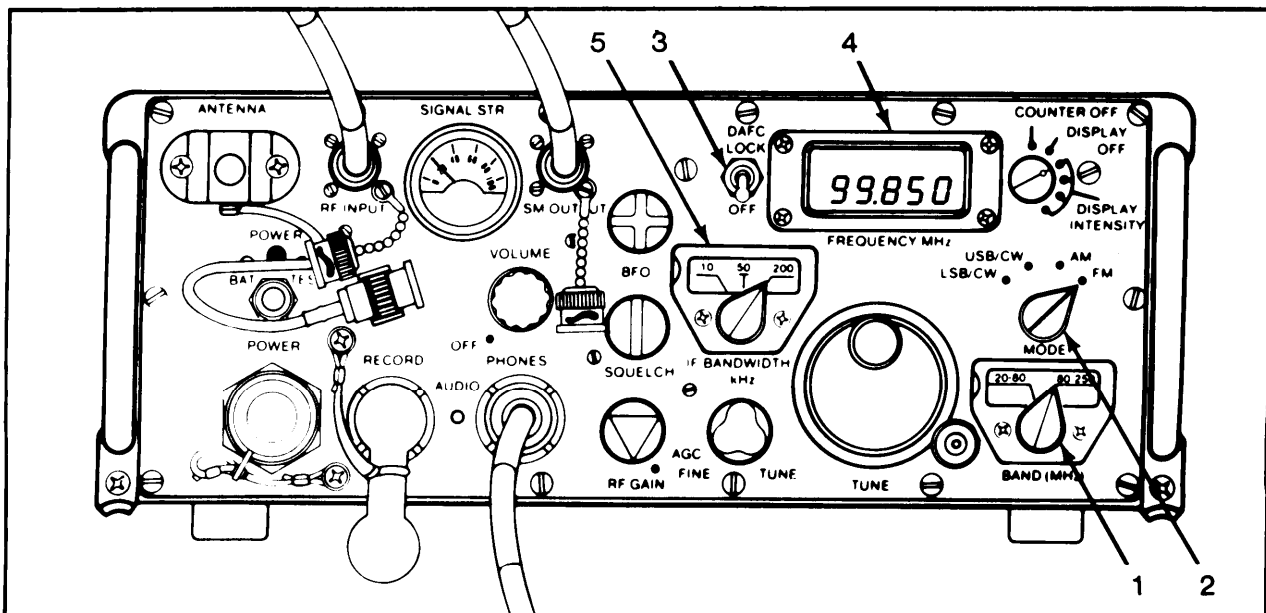
2-11. INITIAL ADJUSTMENTS - Continued

RECEIVER CONTROL SETTINGS (SHEET 1 OF 5)

1. Set BAND MHz switch (1) to required band.
2. Set MODE switch (2) to LSB/CW, USB/CW, AM or FM setting as directed by the Net Control Element (NCE).
3. Set DAFC LOCK switch (3) to OFF.
4. Observe FREQUENCY MHz display (4) and note that last digits fluctuate.
5. Set IF BANDWIDTH (kHz) switch (5) to 10, 50 or 200 setting as directed by the NCE.

NOTE

- When IF BANDWIDTH is unknown, set at 50.
- A greater number of signals can be received at a higher bandwidth setting.



GO ON TO SHEET 2

2-11. INITIAL ADJUSTMENTS - Continued

RECEIVER CONTROL SETTINGS (SHEET 2 OF 5)

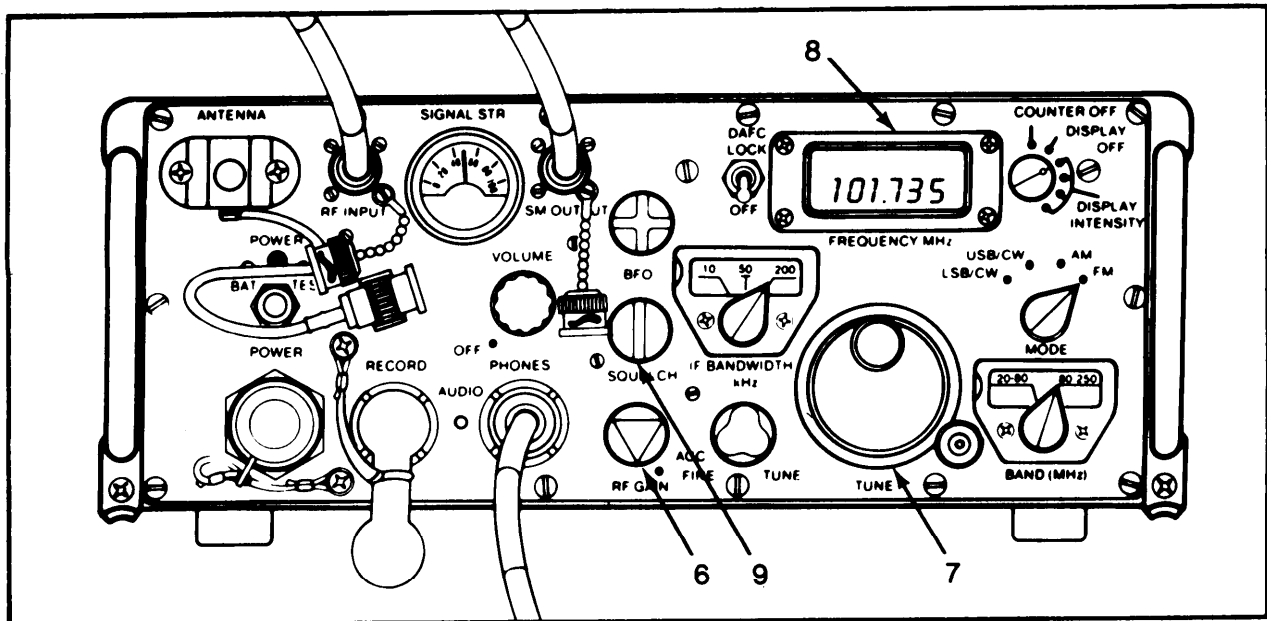
6. Set RF GAIN switch (6) to AGC by turning fully clockwise.

NOTE
Switch will click into AGC position.

7. Rotate TUNE knob (7) clockwise and observe FREQUENCY MHZ display (8) to ensure frequency increases with knob movement.

NOTE
Ensure knob rotates freely and does not bind.

8. Rotate TUNE knob (7) counterclockwise and observe FREQUENCY MHZ display (8) to ensure frequency decreases with knob movement.
9. Rotate SQUELCH knob (9) fully clockwise and then fully counterclockwise until noise static is no longer heard.
10. Rotate TUNE knob (7) to a known transmitting frequency.



GO ON TO SHEET 3

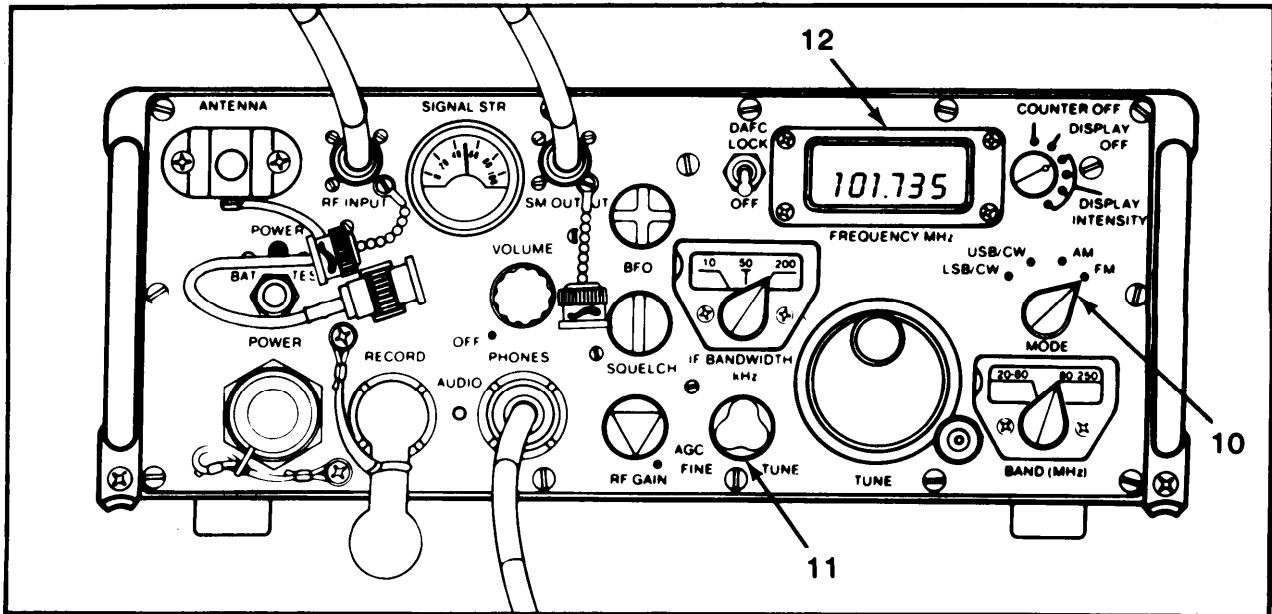
2-11. INITIAL ADJUSTMENTS - Continued

RECEIVER CONTROL SETTINGS (SHEET 3 OF 5)

NOTE

Perform 11 through 16 below only when receiver MODE switch (10) is set to AM or FM.

11. Set FINE TUNE knob (11) to midrange by turning it fully counterclockwise, then fully clockwise, and then counterclockwise to center of turning range.
12. Rotate FINE TUNE knob (11) clockwise while observing FREQUENCY MHz display (12).
13. Observe that frequency increases with FINE TUNE knob (11) movements.
14. Rotate FINE TUNE knob (11) counterclockwise while observing FREQUENCY MHz display (12).
15. Observe that frequency decreases with FINE TUNE knob (11) movements.
16. Reset FINE TUNE knob (11) to midrange by repeating 10 above.

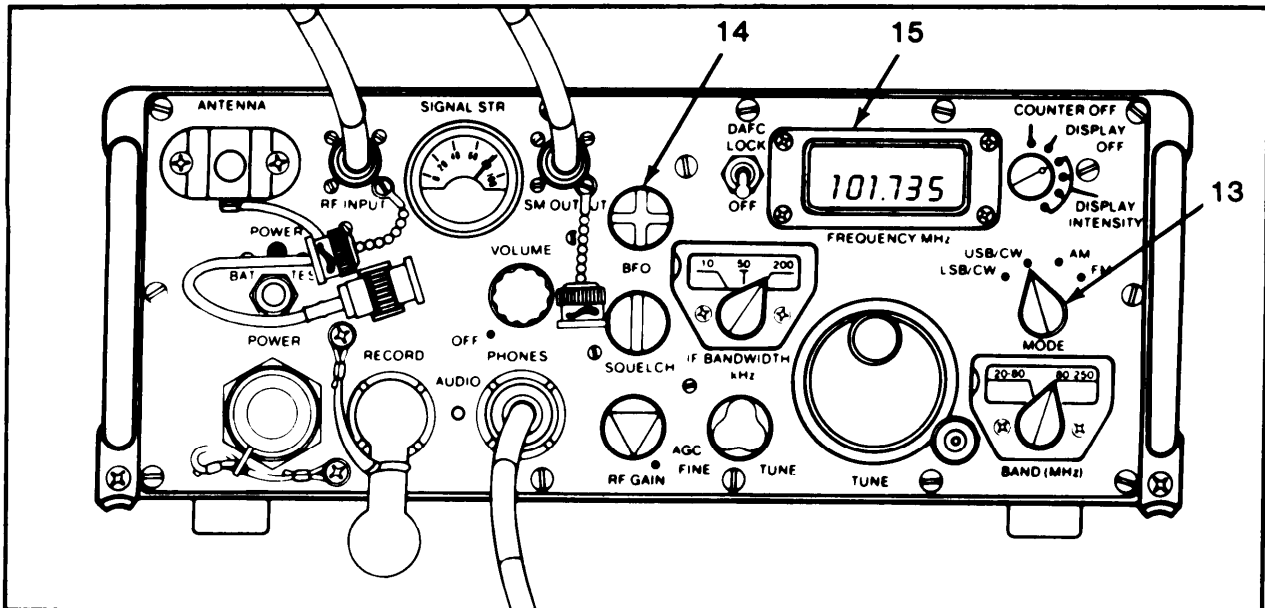


2-11. INITIAL ADJUSTMENTS - Continued

RECEIVER CONTROL SETTINGS (SHEET 4 OF 5)

NOTE
Perform 17 through 22 below only when receiver MODE switch (13) is set to LSB/CW or USB/CW.

17. Set BFO knob (14) to midrange by turning it fully counterclockwise, then fully clockwise, and then counterclockwise to center of turning range.
18. Rotate BFO knob (14) clockwise while observing FREQUENCY MHz display (15).
19. Observe that frequency increases with BFO knob (14) movements.
20. Rotate BFO knob (14) counterclockwise while observing FREQUENCY MHz display (15).
21. Observe that frequency decreases with BFO knob (14) movements.
22. Reset BFO knob (14) to midrange by repeating 17 above.

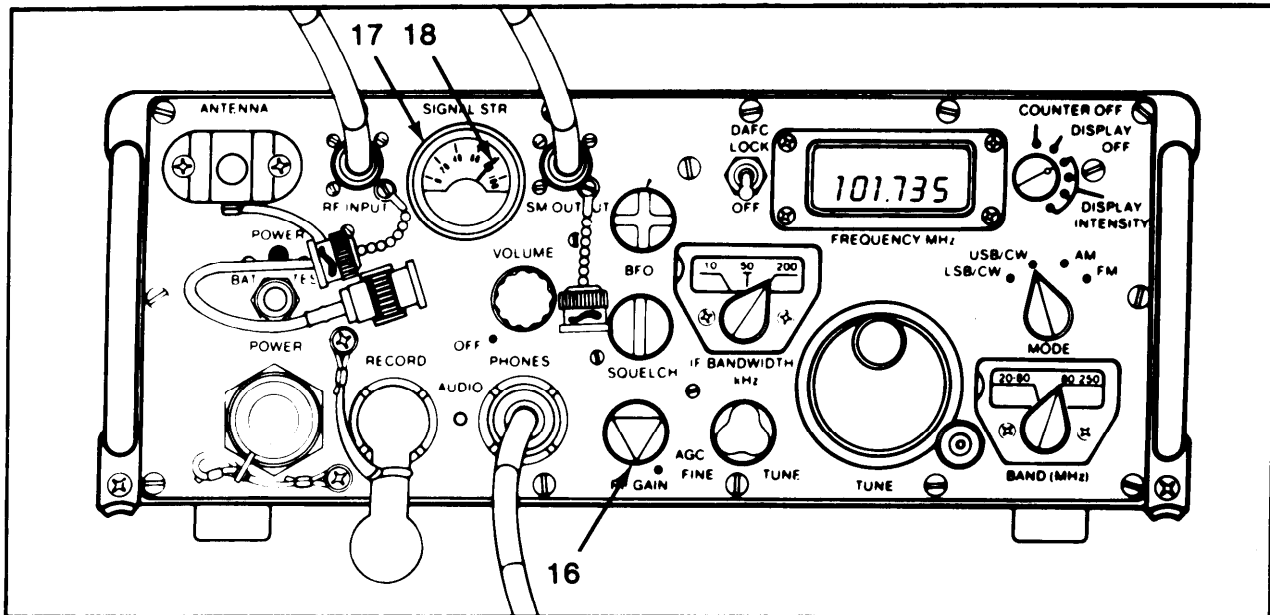


GO ON TO SHEET 5

2-11. INITIAL ADJUSTMENTS - Continued

RECEIVER CONTROL SETTINGS (SHEET 5 OF 5)

23. Rotate RF GAIN switch (16) fully counterclockwise and then rotate RF GAIN switch (16) clockwise while observing SIGNAL STR meter (17).
24. Observe that SIGNAL STR needle (18) moves to right in meter display as the strength of signal increases.
25. Reset blue RF GAIN switch (16) to AGC by turning fully clockwise.



2-11. INITIAL ADJUSTMENTS - Continued

DF PROCESSOR CONTROL SETTINGS (SHEET 1 OF 3)

NOTE

Perform 1 through 6 below to calibrate df processor.

1. Set OFF/OMNI/DF/CAL switch (1) to CAL.

NOTE

- Df processor will not calibrate if INTEG TIME switch (2) is set to GATED or HOLD.
- Perform 2 below if INTEG TIME switch (Z) is set to GATED or HOLD.

2. Set INTEG TIME switch (2) to 0.5, 1.0 or 2.0.
3. Set BAND MHz switch (3) to same frequency range as set on receiver BAND MHz switch (4).

NOTE

- If BAND MHz switch (3) is set to 80-250, readout in 10b display (5) will be $000 \pm 5^\circ$.
- If BAND MHz switch (3) is set to 20-80/250-500 readout on 10b display (5) will be $180 \pm 5^\circ$.

4. Observe 10b display (5) and ensure readout is 000 or 180 (plus or minus 5 degrees).

NOTE

Perform 5 below only when BAND MHz switch (3) is set to 80-250 and 000 readout is not present on 10b display.

5. Adjust to 000 by turning ZERO ADJ switch (6).

NOTE

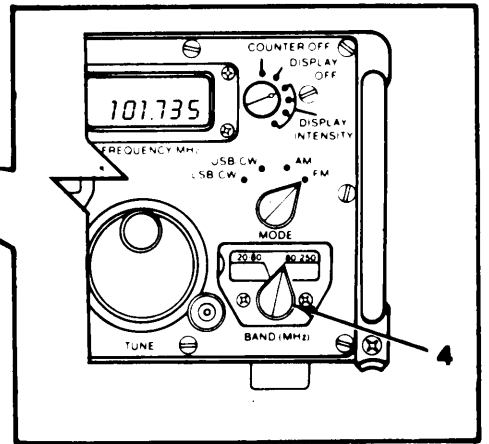
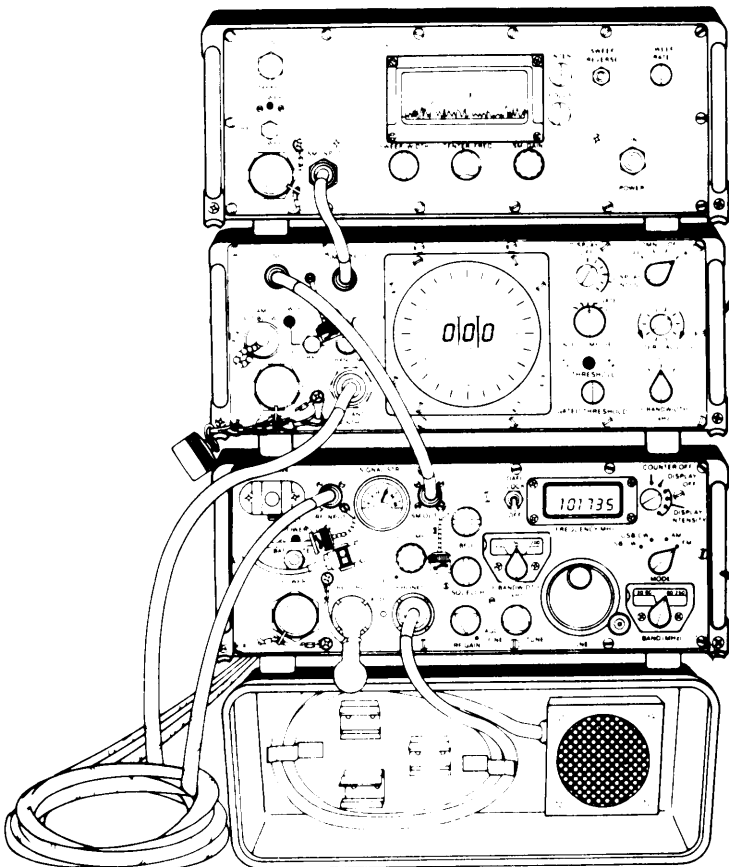
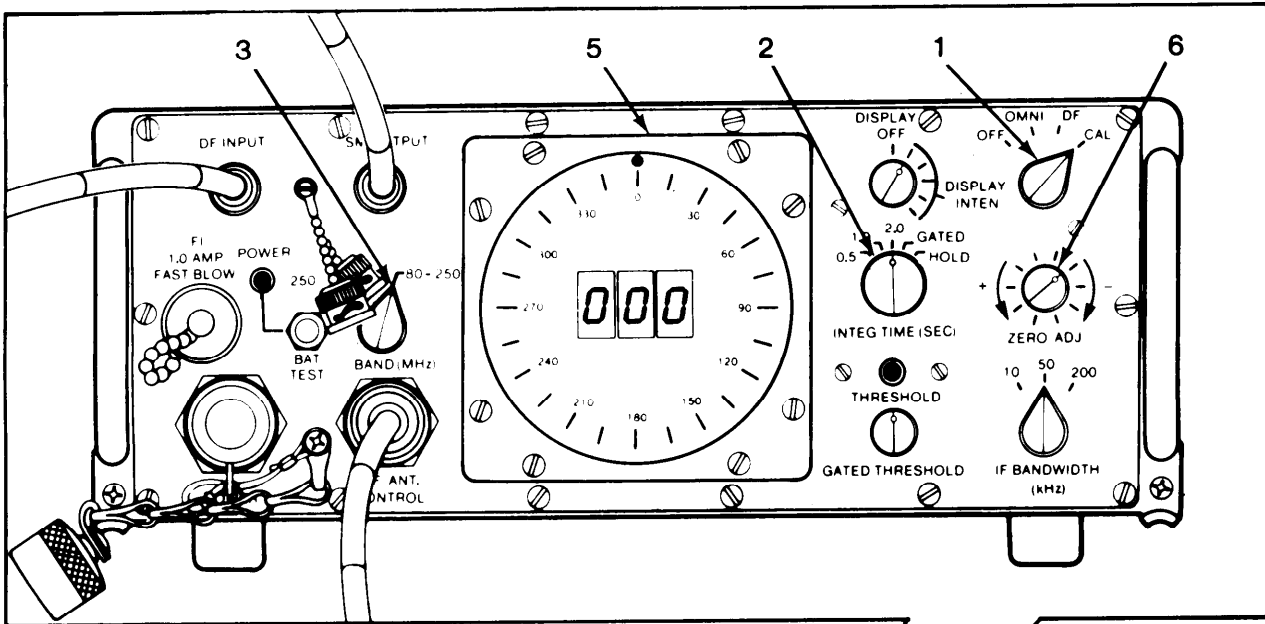
Perform 6 below only when BAND MHz switch (3) is set to 20-80/250-500 and 180 readout is not present on 10b display.

6. Adjust to 180 by turning ZERO ADJ switch (6).

GO ON TO SHEET 2

2-11. INITIAL ADJUSTMENTS - Continued

DF PROCESSOR CONTROL SETTINGS (SHEET 2 OF 3)



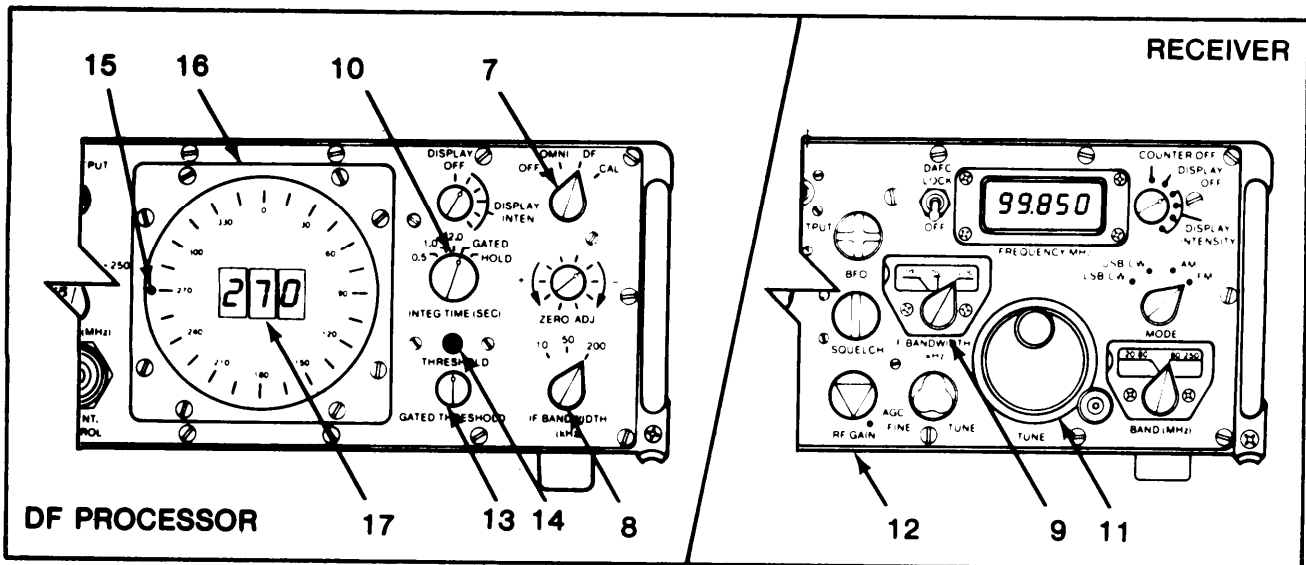
GO ON TO SHEET 3

2-11. INITIAL ADJUSTMENTS - Continued

DF PROCESSOR CONTROL SETTINGS (SHEET 3 OF 3)

7. Set OFF/OMNI/DF/CAL switch (7) to DF.
8. Set IF BANDWIDTH (kHz) switch (8) to same setting as set on receiver IF BANDWIDTH (kHz) switch (9).
9. Set INTEG TIME switch (10) fully clockwise, then back one click to GATED position.
10. Rotate TUNE knob (11) on receiver (12) to frequency with no transmission.
11. Rotate GATED THRESHOLD knob (13) fully clockwise then turn knob counterclockwise just until THRESHOLD lamp (14) goes off.

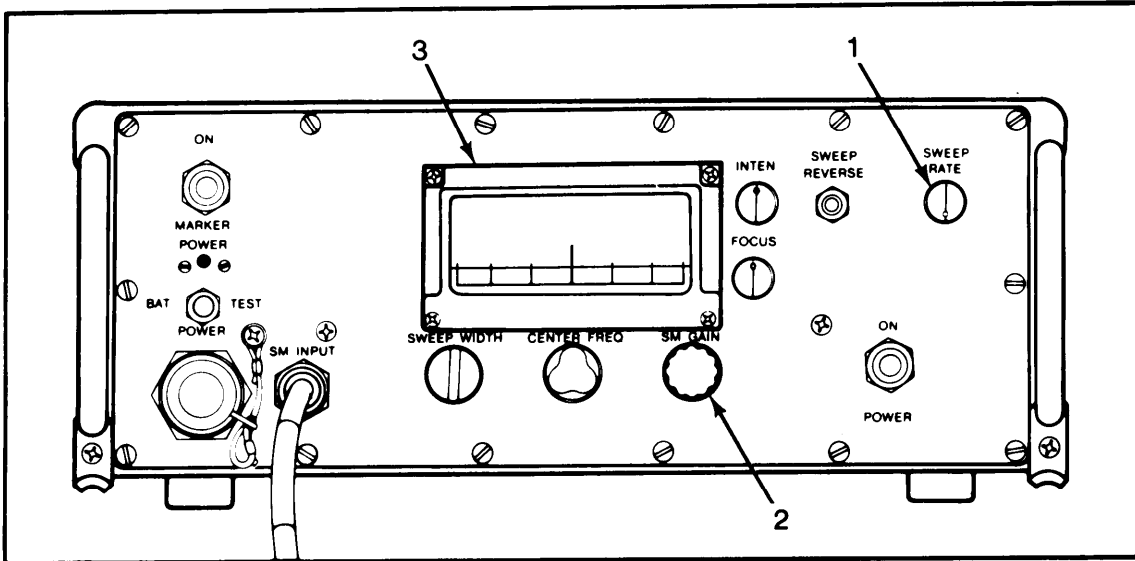
NOTE
 Circular LED (15) on df processor 10b display (16) goes off and numerical 10b display (17) remains fixed when df processor threshold level is higher than the incoming signal level.



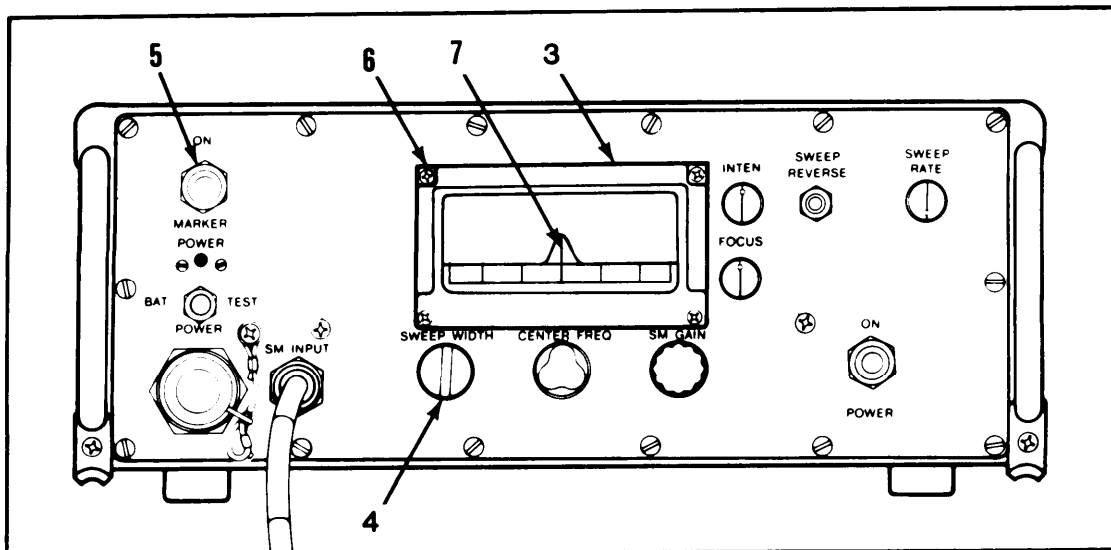
2-11. INITIAL ADJUSTMENTS - Continued

SIGNAL MONITOR CONTROL SETTINGS (SHEET 1 OF 4)

1. Rotate SWEEP RATE knob (1) fully clockwise
2. Rotate SM GAIN knob (2) fully counterclockwise
3. Observe signal monitor screen (3) and ensure background noise is absent.



4. Rotate SWEEP WIDTH knob (4) fully clockwise.
5. Set MARKER SWITCH (5) to ON position.
6. Observe signal monitor screen (6) and ensure marker (7) is present.

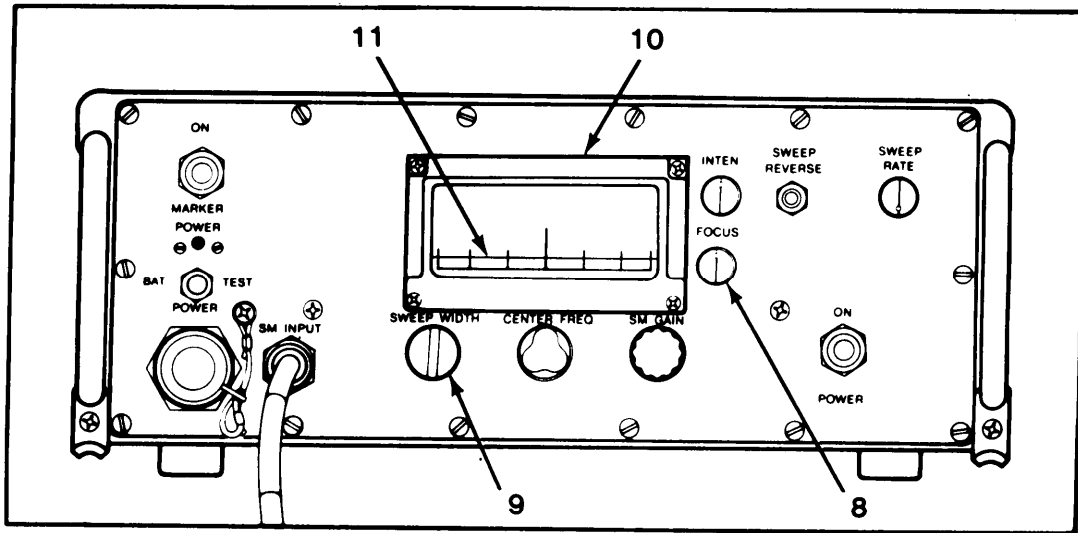


GO ON TO SHEET 2

2-11. INITIAL ADJUSTMENTS - Continued

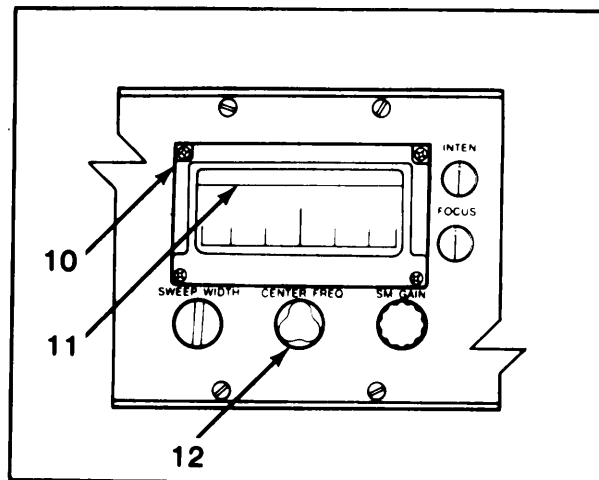
SIGNAL MONITOR CONTROL SETTINGS (SHEET 2 OF 4)

- 7. Rotate FOCUS knob (8) to adjust display until baseline and marker can be seen clearly and sharply.
- 8. Rotate SWEEP WIDTH knob (9) fully counterclockwise while observing signal monitor screen (10).
- 9. Observe that marker (11) widens out until it becomes a straight line.



- 10. Rotate CENTER FREQ knob (12) until line (11) on signal monitor screen (10) reaches maximum height.

NOTE
Line (11) display may move off top of screen as it reaches maximum height.

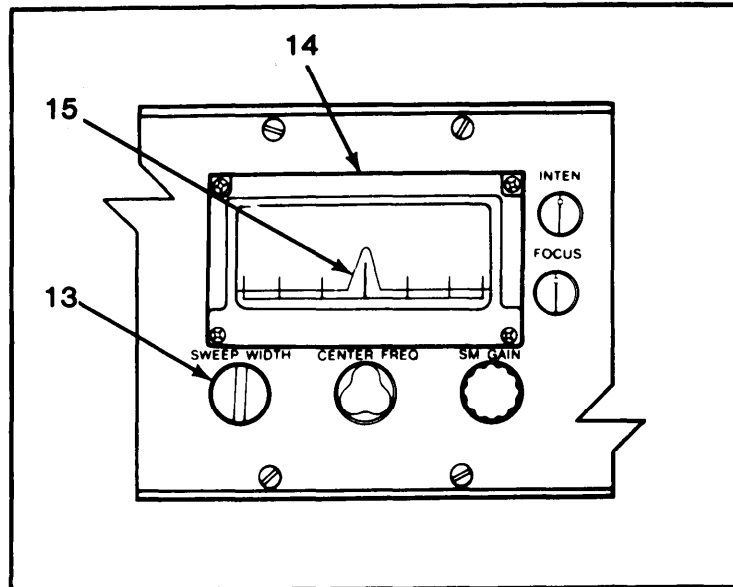


GO ON TO SHEET 3

2-11. INITIAL ADJUSTMENTS - Continued

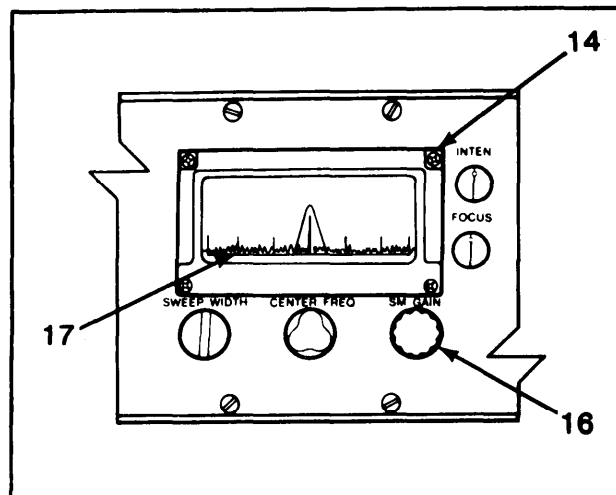
SIGNAL MONITOR CONTROL SETTINGS (SHEET 3 OF 4)

11. Rotate SWEEP WIDTH knob (13) fully clockwise and then 1/4 turn counterclockwise while observing signal monitor screen (14).
12. Observe that marker (15) returns to a narrow spike.



13. Rotate SM GAIN knob (16) clockwise until a baseline of small noise spikes (17) appear on the signal monitor screen (14).

NOTE
 SM GAIN (16) should be adjusted so that marker (15) is distinguishable from noise baseline.



GO ON TO SHEET 4

2-11. INITIAL ADJUSTMENTS - Continued

SIGNAL MONITOR CONTROL SETTINGS (SHEET 4 OF 4)

NOTE

Perform 14 through 17 below to do the following:

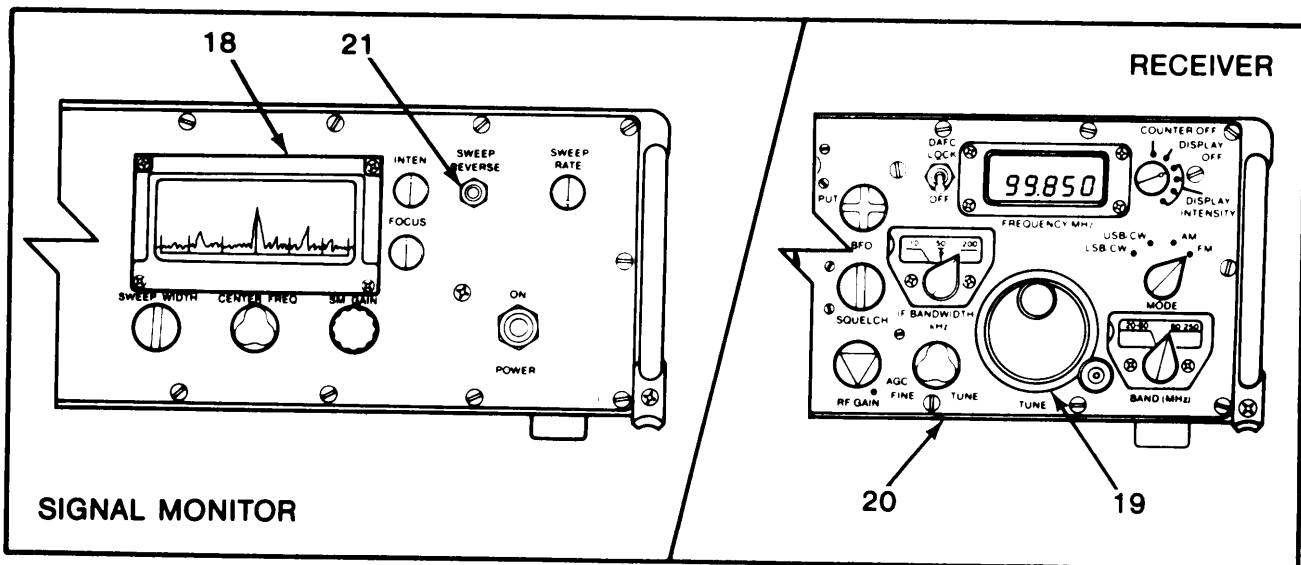
- To make sure left to right movement of noise baseline (18) follows clockwise rotation of tuning knob (19) on receiver (20).
- To make sure right to left movement of noise baseline (18) follows counterclockwise rotation of tuning knob (19) on receiver (20).

14. Rotate TUNE knob (19) on receiver (20) clockwise while observing signal monitor screen (18).
15. Observe that signal on screen moves from left to right with TUNE knob (18) movements.
16. Rotate TUNE knob (19) on receiver (20) counterclockwise while observing signal monitor screen (18).
17. Observe that signal on screen moves from right to left with TUNE knob (19) movements.

NOTE

Perform 18 below only when signals on signal monitor screen do not track as described in 14 through 17 above.

18. Set SWEEP REVERSE toggle switch (21) to opposite position to reverse direction of signal movement.



2-12. OPERATING PROCEDURES

Three operational tasks may be performed with your direction finder set. The Net Control Element (NCE) will tell you which task you are to perform during your mission.

	<u>Page</u>
● Monitoring a frequency	2-83
● Searching a frequency range	2-94
● Responding to a df flash	2-98

a. Monitoring a Frequency. Your NCE may direct you to monitor a specific transmitter. His instructions will include the frequency and mode to which you must set your receiver. He may also specify the bandwidth at which you are to monitor the transmissions, the call sign of the target transmitter, (if known) and the length of time you are to monitor the frequency. Performing your job will involve:

	<u>Page</u>
● Tuning to a frequency	2-84
● Monitoring the signal and reporting transmission data	2-92

The procedures for monitoring a specified frequency can be performed only after the direction finder units have been properly installed and initial adjustments made.

NOTE

Keep in mind:

- Target transmitters may be in a fixed position or mobile.
- Transmissions may be in voice or digital signals.

2-12. OPERATING PROCEDURES - Continued

TUNING TO A FREQUENCY (SHEET 1 OF 8)

1. Rotate black TUNE knob (1) on receiver (2) until specified frequency shows on FREQUENCY MHz display (3).
2. Listen for transmissions and observe signal monitor screen (4) for signal spikes.

NOTE

When transmission is detected:

- Audible voice or digital information will be heard through the speaker.
- Signal spikes will appear on signal monitor screen above noise/static baseline.

If signal monitor screen (4) indicates a signal spike is present but audio is garbled and unclear, perform 3 below.

3. Rotate MODE switch (5) to each switch setting until audio is clearest.

Perform 4 below:

- If after performing 3 above, audio is still garbled and unclear.
- If signal monitor screen (4) indicates a continuous signal is present and audio transmission is unclear and broken.

4. Rotate IF BANDWIDTH (kHz) switch (6) on receiver (2) to each switch setting until audio is clear and unbroken.
5. Rotate IF BANDWIDTH (kHz) switch (7) on df processor (8) to same setting as receiver (2).

NOTE

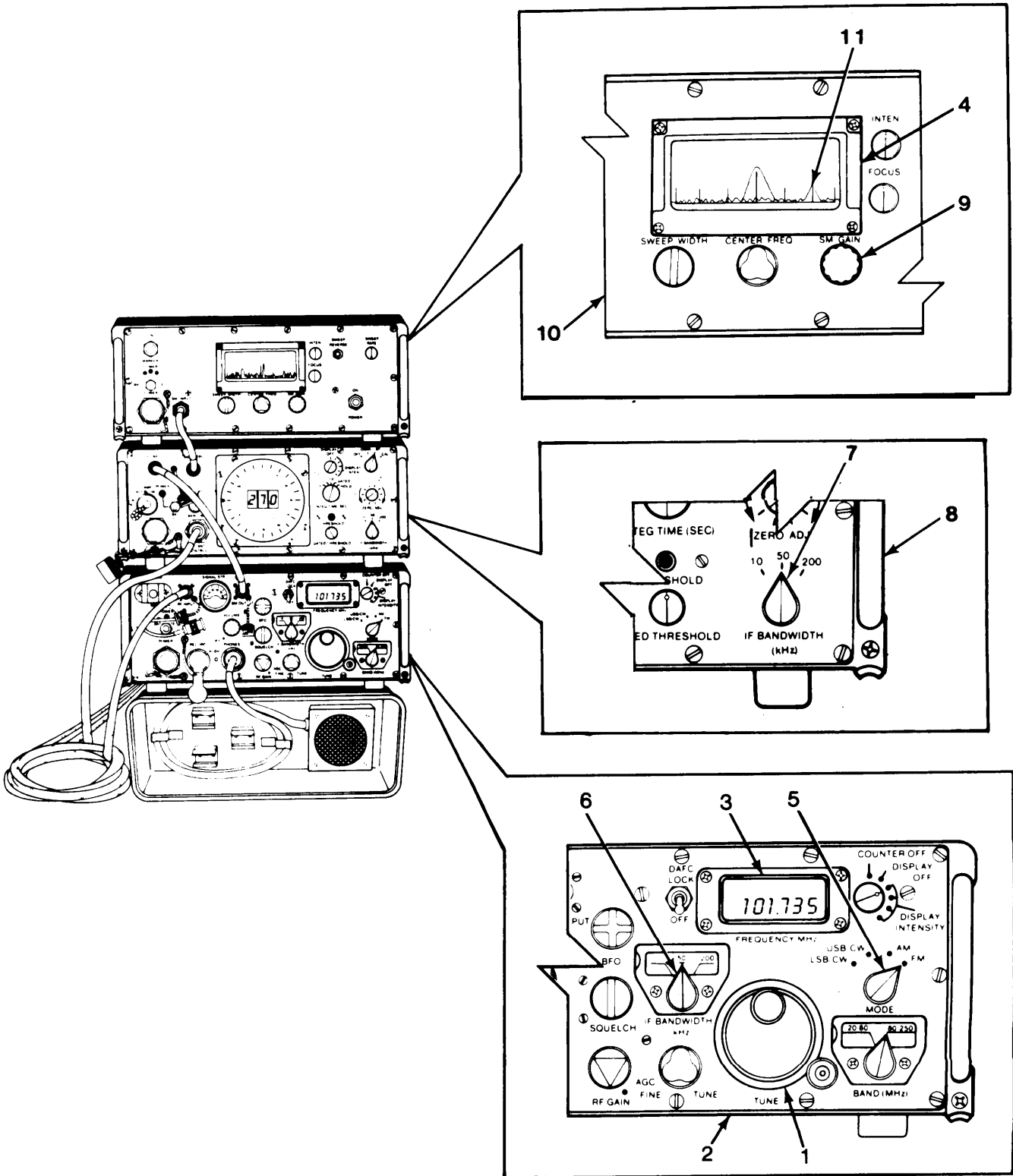
Perform 6 below while simultaneously observing signal monitor screen (4).

6. Rotate SM GAIN knob (9) on signal monitor (10) either clockwise or counterclockwise until signal (11) stands out clearly from noise/static baseline.

GO ON TO SHEET 2

2-12. OPERATING PROCEDURES - Continued

TUNING TO A FREQUENCY (SHEET 2 OF 8)



GO ON TO SHEET 3

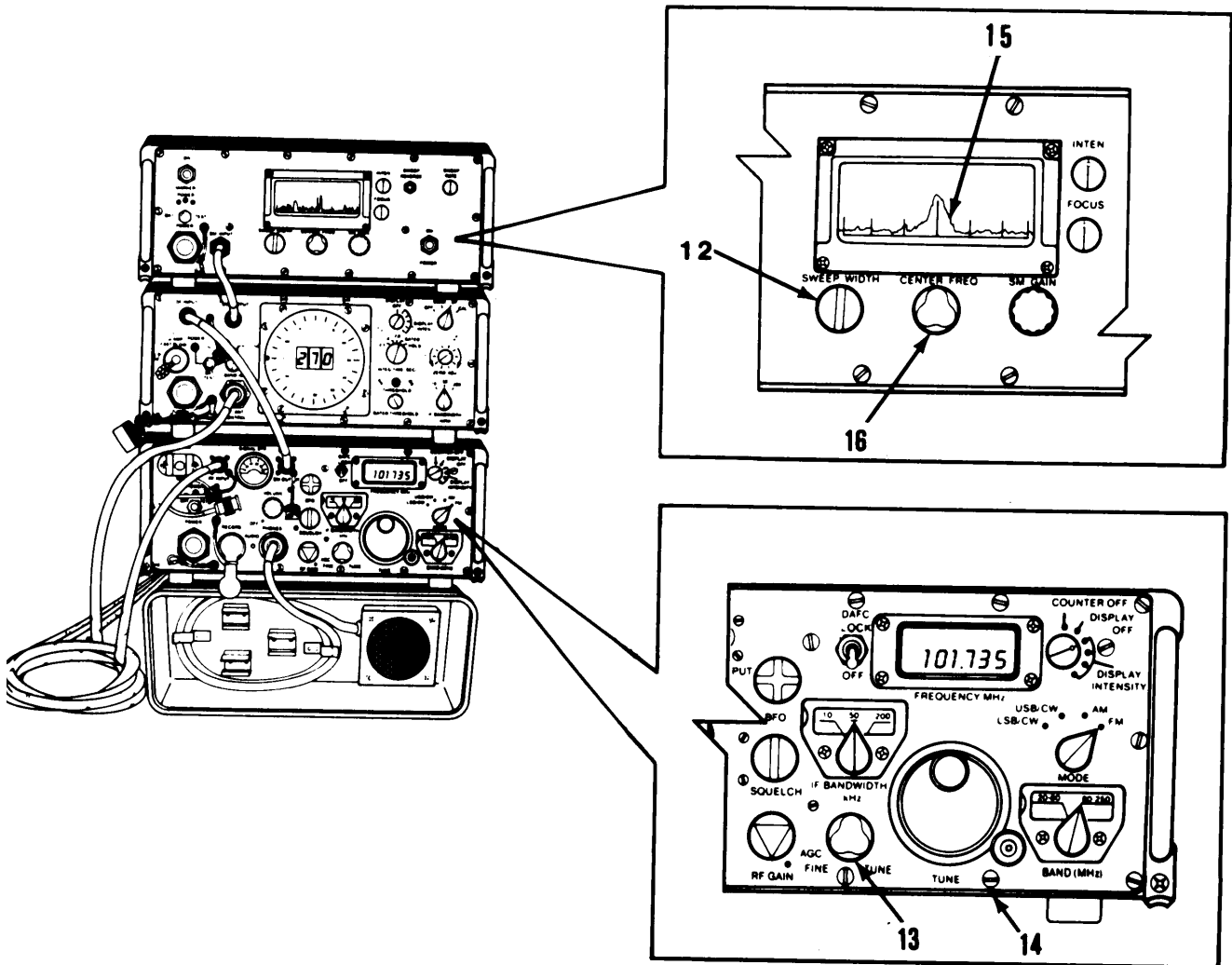
2-12. OPERATING PROCEDURES - Continued

TUNING TO A FREQUENCY (SHEET 3 OF 8)

7. Rotate SWEEP WIDTH knob (12) either clockwise or counter-clockwise to widen out signal for best presentation and to locate center of signal.
8. Rotate FINE TUNE knob (13) on receiver (14) until center of detected signal is alined with marker (15) as closely as possible.

NOTE

- Signal is alined on marker (15) when signal is on top of marker (15) and both are fluctuating up and down.
- Overheating of the signal monitor may cause marker to drift slightly off center. Marker (15) must be checked often to be sure it is centered. Rotate orange CENTER FREQ knob (16) to recenter marker (15).



GO ON TO SHEET 4

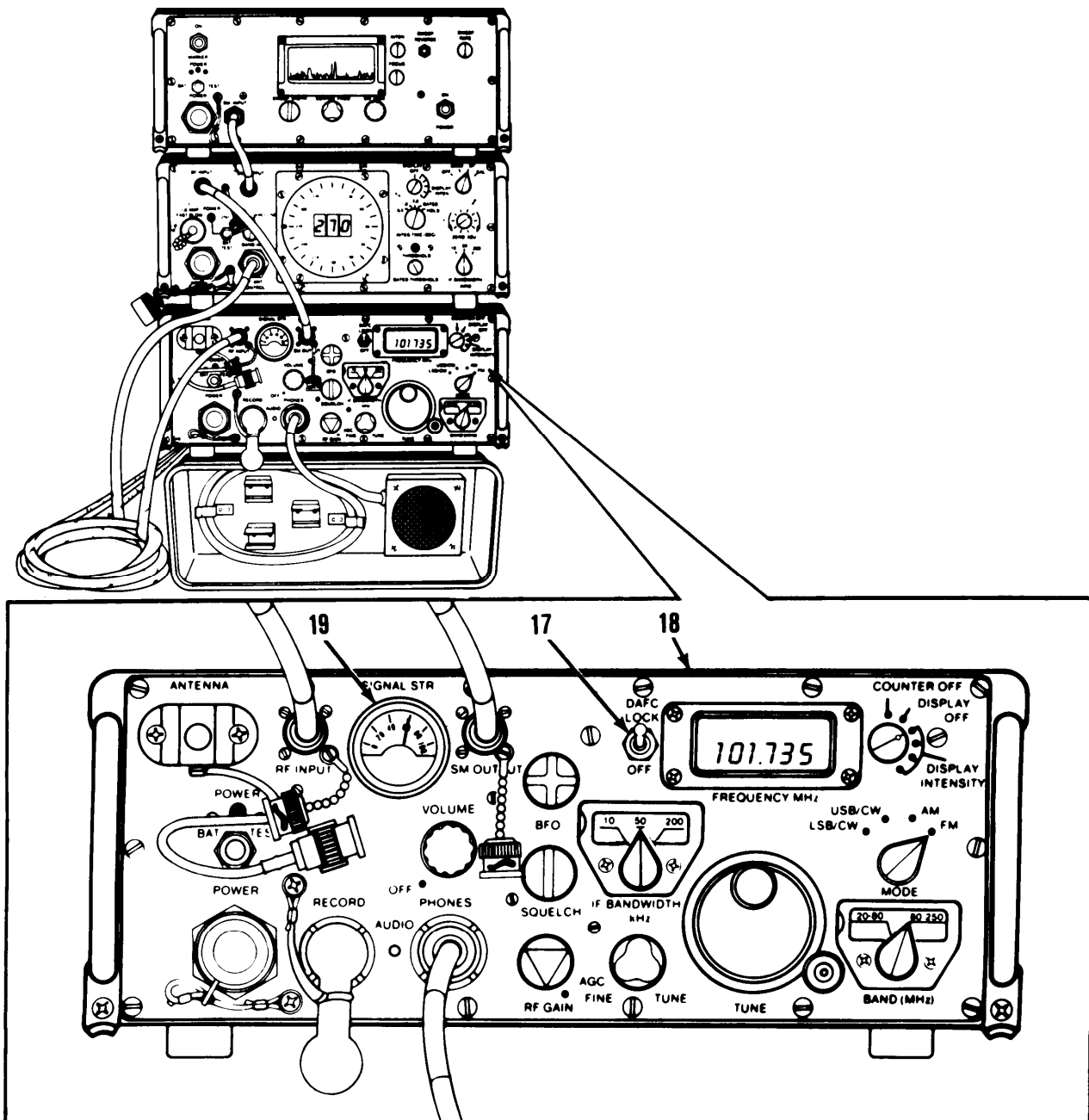
2-12. OPERATING PROCEDURES - Continued

TUNING TO A FREQUENCY (SHEET 4 OF 8)

- Set DAFC LOCK toggle switch (17) on receiver (18) to LOCK.

NOTE
 This action locks the frequency to prevent signal drift.

- Observe SIGNAL STR meter (19) and ensure signal registers at least 60.



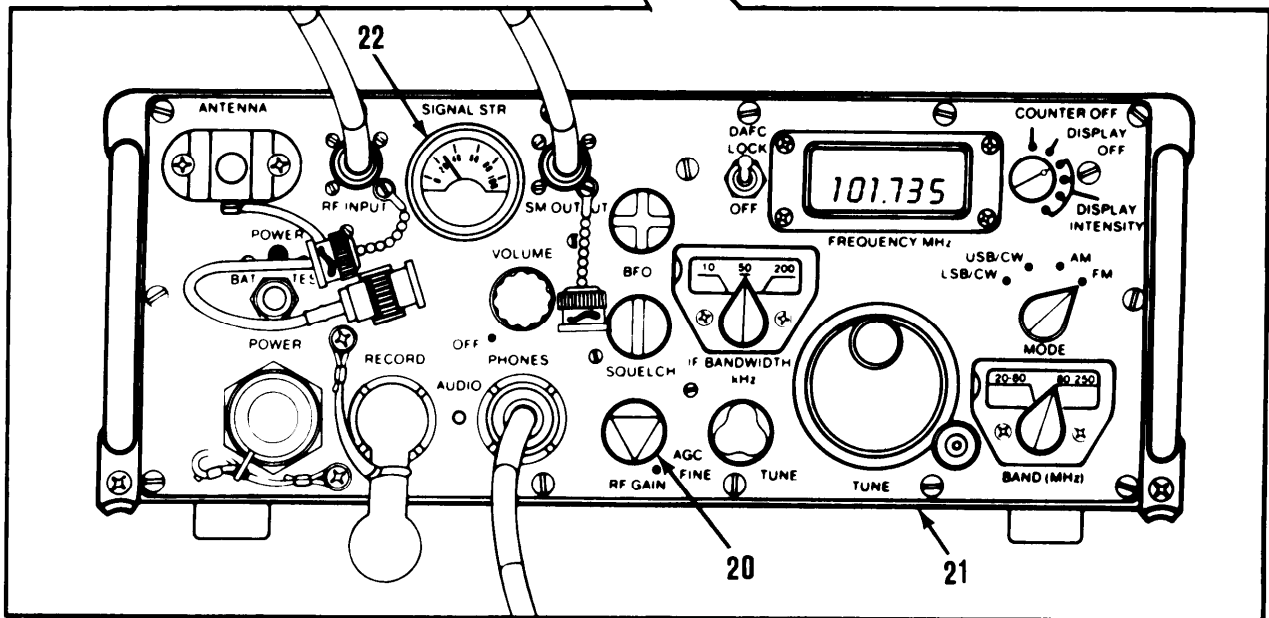
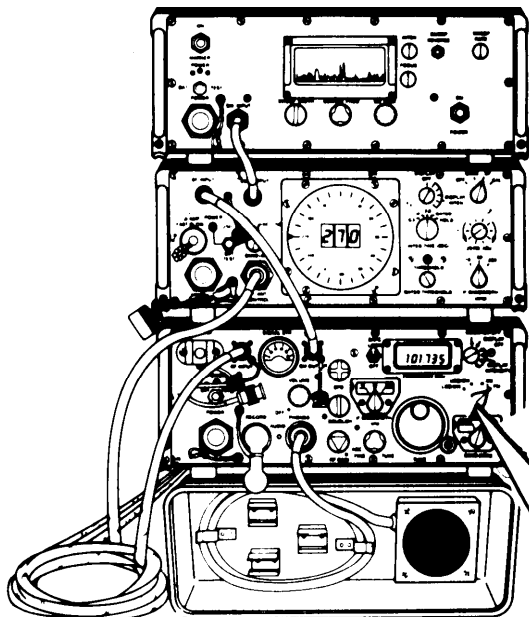
GO ON TO SHEET 5

2-12. OPERATING PROCEDURES - Continued

TUNING TO A FREQUENCY (SHEET 5 OF 8)

NOTE
Perform 11 below only if SIGNAL STR meter registers less than 60 or lob's on df processor show a variance of more than $\pm 3^\circ$.

- 11. Turn RF GAIN switch (20) on receiver (21) counterclockwise out of AGC mode and adjust for maximum reading on SIGNAL STR meter (22).



GO ON TO SHEET 6

2-12. OPERATING PROCEDURES - Continued

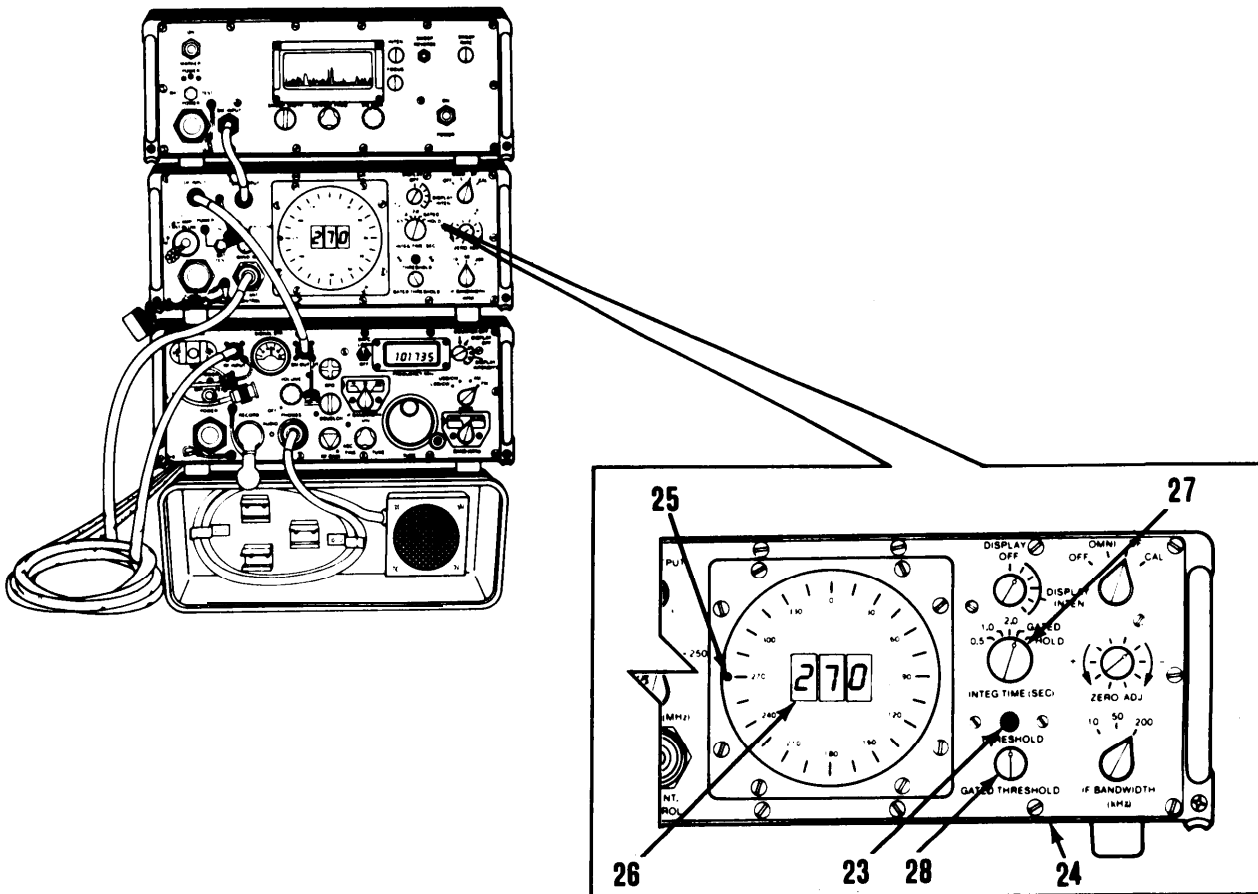
TUNING TO A FREQUENCY (SHEET 6 OF 8)

12. Observe yellow THRESHOLD lamp (23) on df processor (24) to ensure it is lit.

NOTE

- The THRESHOLD lamp (23) is difficult to see. If you have difficulty observing the THRESHOLD lamp (23), check to see that circular LED's (25) are visible and numerical 10b display (26) fluctuates slightly and then becomes stable within $\pm 3^\circ$.
- If circular LED's (25) are not visible and numerical 10b display (26) remains fixed, ensure INTEG TIME (SEC) switch (27) is set to GATED and perform 13 below.

13. Rotate GATED THRESHOLD knob (28) on df processor (24) clockwise until yellow lamp (23) lights, circular LED's (25) become visible and numerical 10b (26) fluctuates slightly and then becomes stable within $\pm 3^\circ$.



GO ON TO SHEET 7

2-12. OPERATING PROCEDURES - Continued

TUNING TO A FREQUENCY (SHEET 7 OF 8)

14. If a transmission ceases, observe numerical lob display (29) on df processor and record.

NOTE

When transmission ceases, the GATED function holds the last processed lob in numerical lob display for that last transmission on the df processor.

15. If a transmission continues, set INTEG TIME (SEC) switch (30) to 2.0.

NOTE

- The INTEG TIME (SEC) switch (30) selects the length of time in which the df processor must integrate bearing data on the incoming signal. By resetting the INTEG TIME (SEC) switch (30) to 2.0, the df processor has longer to process the incoming signal and average out excessive fm modulation before establishing a lob.
- If lob variance is greater than + 3°, when clear audio and a strong signal (greater than 60 on the signal strength meter) is present and when the signal is aligned with the marker, then either the target is not within line of sight, or reflection or reradiation or refraction is occurring between df site and target.

16. Handtighten locking screw (31) on TUNE knob (32) of receiver by turning clockwise.

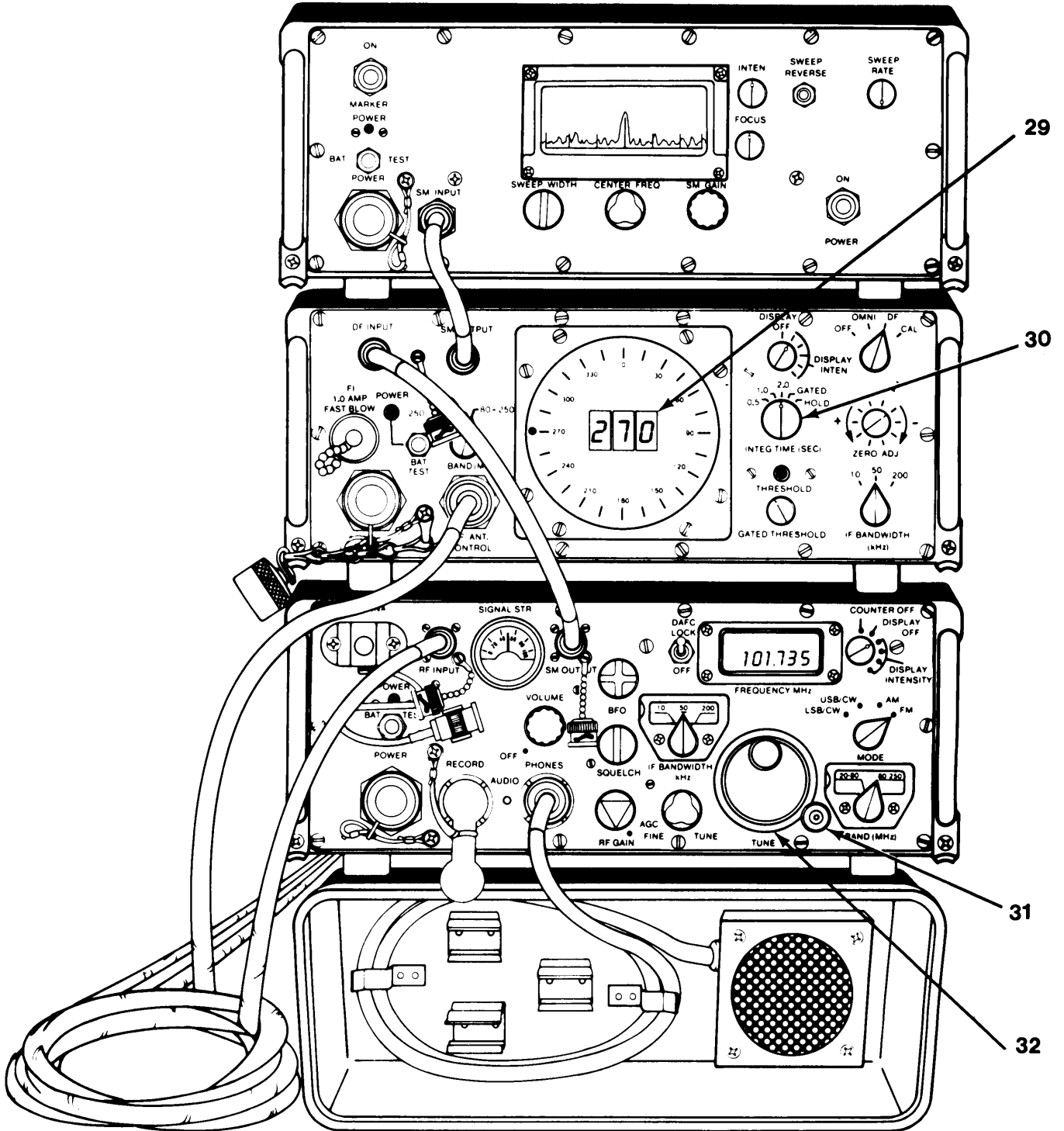
NOTE

Tightening the locking screw (27) will prevent accidental change in frequency.

GO ON TO SHEET 8

2-12. OPERATING PROCEDURES - Continued

TUNING TO A FREQUENCY (SHEET 8 OF 8)



2-12. OPERATING PROCEDURES - Continued

MONITORING THE SIGNAL AND REPORTING TRANSMISSION DATA (SHEET 1 OF 2)

1. Listen to transmission, determine if target is of interest and identify call sign.
2. Observe numerical 10b display (1) readout and circular LED (2) on df processor.

NOTE

During two way transmissions, the df processor will display lobes for each transmitter. In this situation, you will identify the call sign of each transmitter and determine lobe of each.

3. If possible, record up to five consecutive numerical 10b display (1) readouts for the target transmitter.

NOTE

Due to short transmissions, it may not be possible to record five consecutive numerical lobe display readings. In these cases, record as many lobes as displayed.

4. Determine average lobe by totaling five lobes and then dividing by five.

NOTE

If lobes indicate a near true north reading, the readings may fluctuate on each side of 000. This fluctuation will not allow you to average the lobes according to 4 above. In these cases:

Record five consecutive numerical lobe display readings.

Add 360 to each lobe with small degree numbers such as 001, 002, etc.

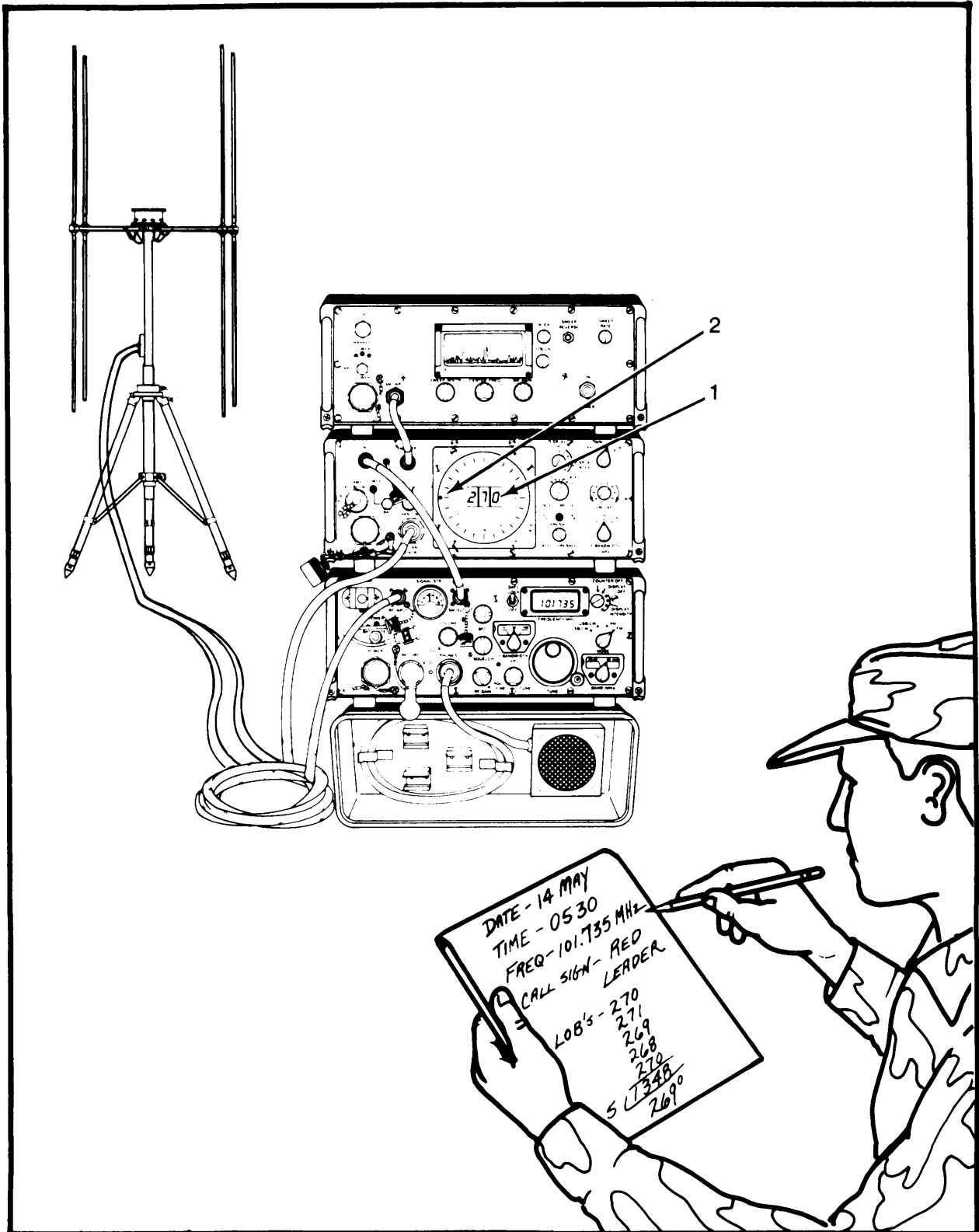
Total all five 10b readings and divide by five to determine the average lobe.

If the resulting average is greater than 360, subtract 360 from the average to determine the average lobe.

5. Record:
 - Time and date.
 - Frequency of each target transmitter.
 - Call signs of each transmitter.
 - Brief summary of each transmission.
6. Report intercept data to NCE.
7. Resume monitoring assigned frequency until asked to do otherwise.

2-12. OPERATING PROCEDURES - Continued

MONITORING THE SIGNAL AND REPORTING TRANSMISSION DATA (SHEET 2 OF 2)



2-12. OPERATING PROCEDURES - Continued

b. Searching a Frequency Range. You will be directed to search a specified frequency range by the NCE. This involves:

- Searching and tuning in on a signal.
- Reporting transmission data.
- Resuming search.

(1) NCE instructions will include the lowest and highest frequencies of the range you are to search, the mode of transmission and the length of time you are to perform the search task.

(2) NCE may also specify priority frequencies within your frequency range. When the priority frequency is reached, it is recommended that it be monitored for at least 2 minutes before continuing your searching task. The cycle of searching and monitoring priority frequencies will be continuously repeated. Not all priority frequencies have signal activity, but each one must be regularly monitored in case it becomes active.

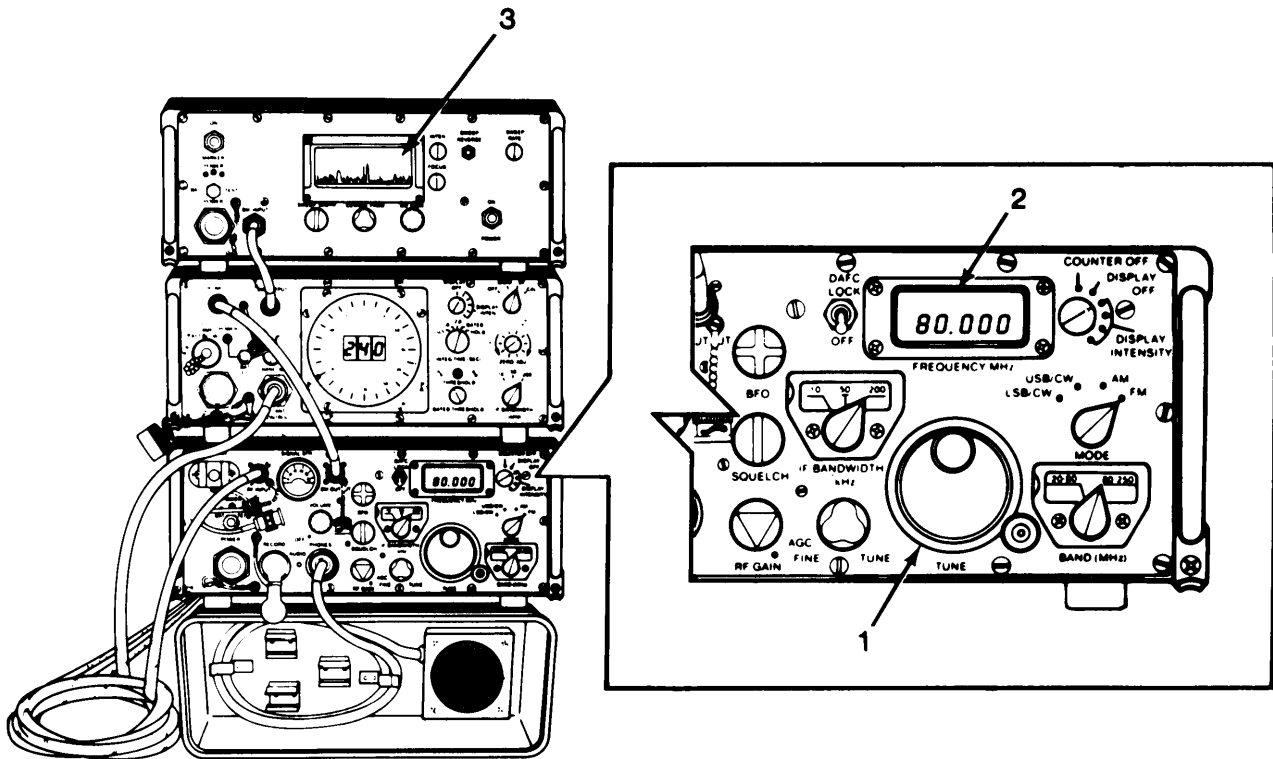
NOTE

The procedures for searching a frequency range can be performed only after the direction finder units have been properly installed and initial adjustments made.

2-12. OPERATING PROCEDURES - Continued

SEARCHING A FREQUENCY RANGE (SHEET 1 OF 3)

1. Rotate TUNE knob (1) on receiver until FREQUENCY MHz display (2) shows lowest frequency of assigned range.
2. Rotate TUNE knob (1) on receiver clockwise to begin upward search of assigned frequency range.
3. Listen for signals while observing signal monitor screen (3) on signal monitor for activity.



GO ON TO SHEET 2

2-12. OPERATING PROCEDURES - Continued

SEARCHING A FREQUENCY RANGE (SHEET 2 OF 3)

4. Stop rotating TUNE knob (4) on receiver when first priority frequency appears on FREQUENCY MHz display (5).
5. Listen for signal and watch for signal activity on signal monitor screen (6) for the required time.
6. If no signal is detected, continue to slowly tune through frequency range while listening for signal.
7. As each priority frequency appears on FREQUENCY MHz display (5), repeat 5 and 6 above.

NOTE

If a signal is detected on an unknown frequency through searching, perform 8 below.

8. Rotate TUNE knob (4) on receiver so that signal is centered on marker.

NOTE

If a signal is detected on a priority frequency or an unknown frequency through searching, perform 9 below.

9. Perform procedures for tuning to a frequency in a above beginning with step 2.

NOTE

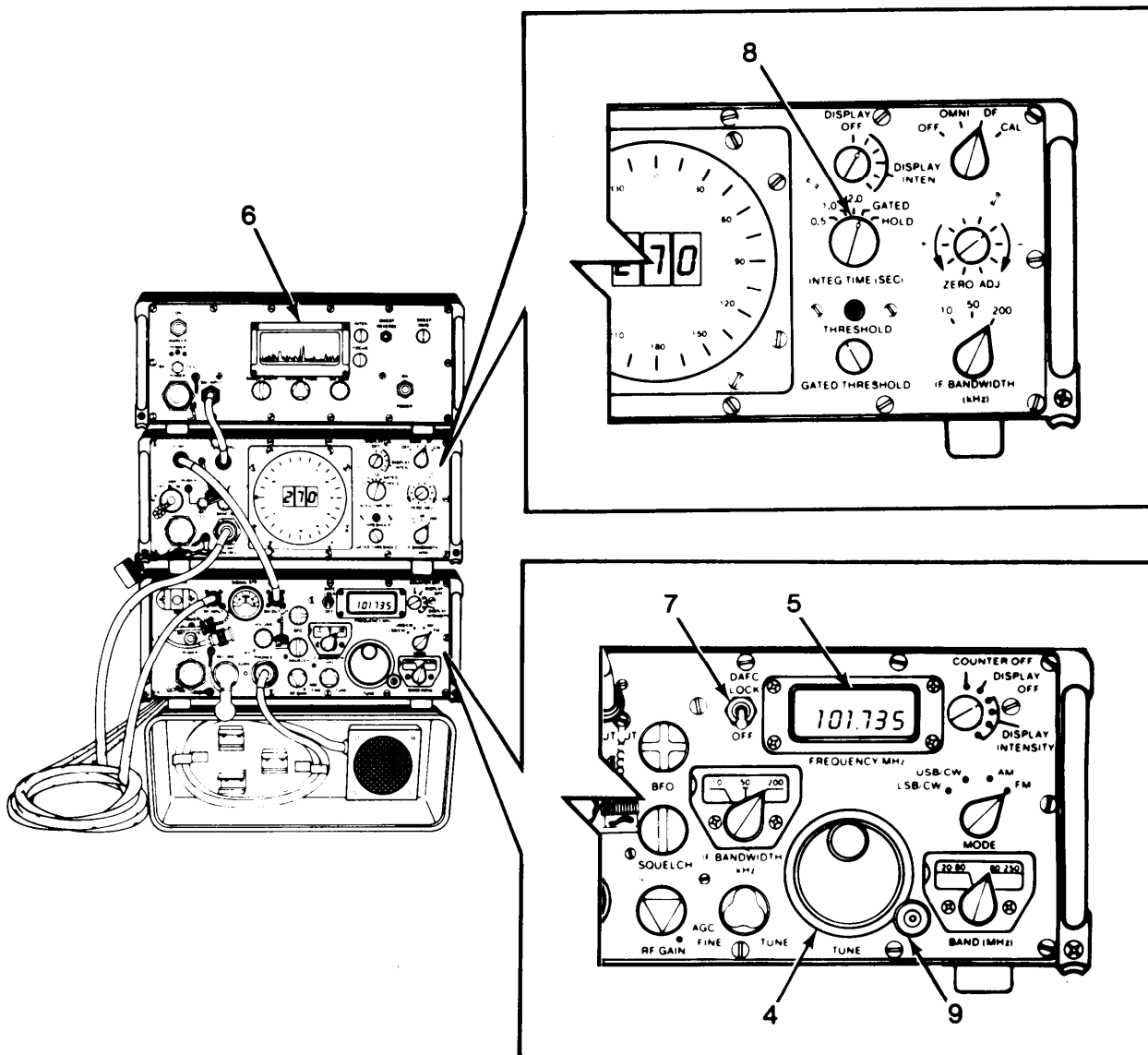
After monitoring transmission, perform 10 thru 14 below.

10. Set DAFC LOCK switch (7) on receiver to OFF.
11. Set INTEG TIME (SEC) switch (8) on df processor to GATED.
12. Loosen locking screw (5) at lower edge of TUNE knob (4) on receiver by turning counterclockwise.
13. Continue to slowly tune through frequency range.
14. When upward limit of assigned frequency range is reached, rotate TUNE knob (4) on receiver counterclockwise to lower limit and repeat 2 through 13 above.

GO ON TO SHEET 3

2-12. OPERATING PROCEDURES - Continued

SEARCHING A FREQUENCY RANGE (SHEET 3 OF 3)



2-12. OPERATING PROCEDURES - Continued

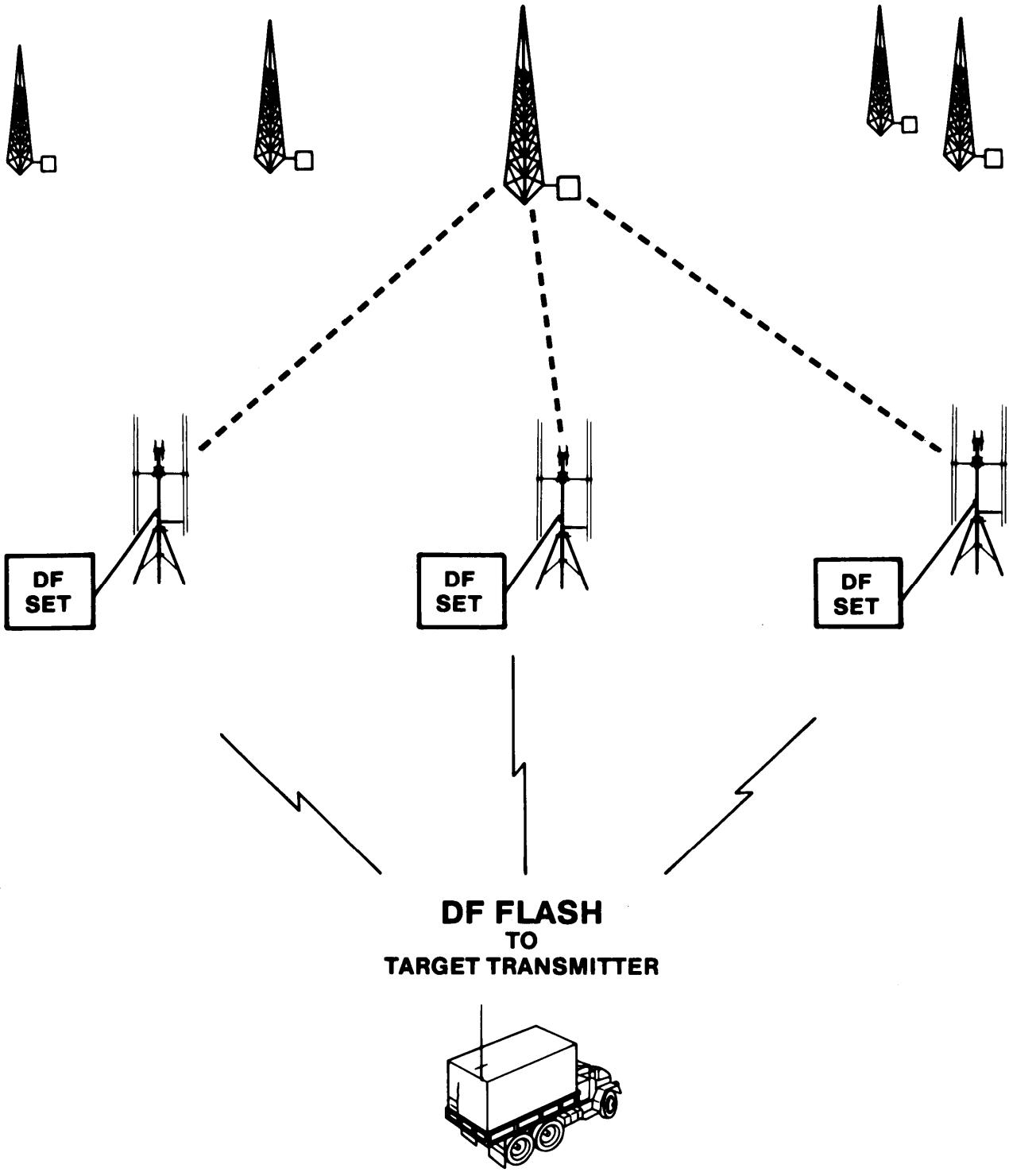
c. Responding To a Df Flash. At any point in your monitoring or searching mission, NCE may send out a df flash. A df flash is a net command that requires each direction finder station to immediately:

- Stop searching or monitoring assigned frequency.
- Tune to and monitor a specific frequency.
- Obtain and report a 10b of the specific frequency.

Lobs from each direction finder station will be processed at NCE station to obtain a df fix on target transmitter.

2-12. OPERATING PROCEDURES - Continued

RESPONDING TO A DF FLASH (SHEET 1 OF 3)

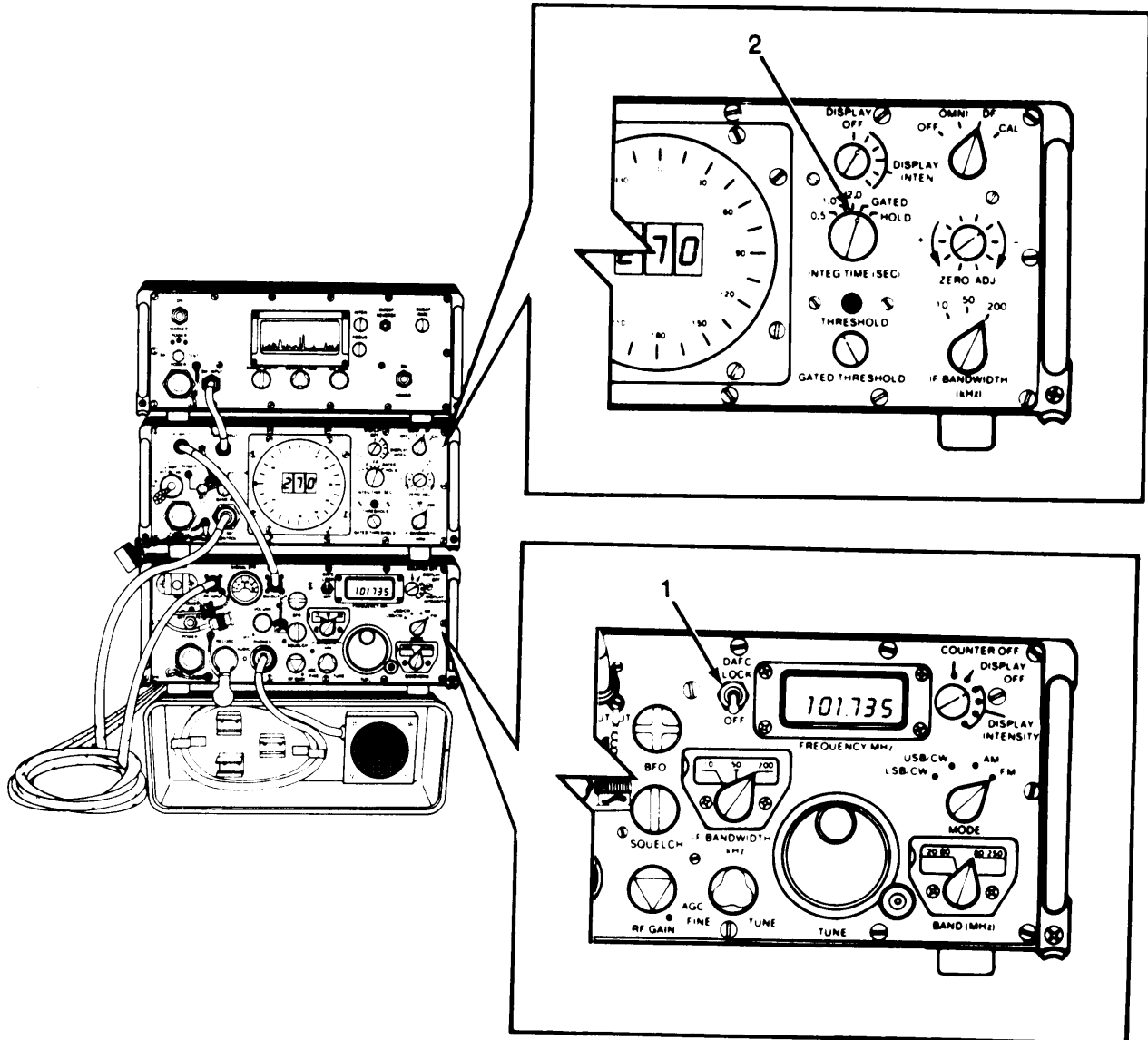


GO ON TO SHEET 2

2-12. OPERATING PROCEDURES - Continued

RESPONDING TO A DF FLASH (SHEET 2 OF 3)

1. Set DAFC LOCK switch (1) on receiver to OFF.
2. Set INTEG TIME (SEC) switch (2) on df processor to GATED.



3. Tune to specified frequency by following procedures listed in a above.

GO TO SHEET 3

2-12. OPERATING PROCEDURES - Continued

RESPONDING TO A DF FLASH (SHEET 3 OF 3)

4. When locked onto specified frequency, listen for call sign.
5. Record five consecutive numerical lob display (3) readouts.
6. Determine average 10b by totaling five lobes and then dividing by five.

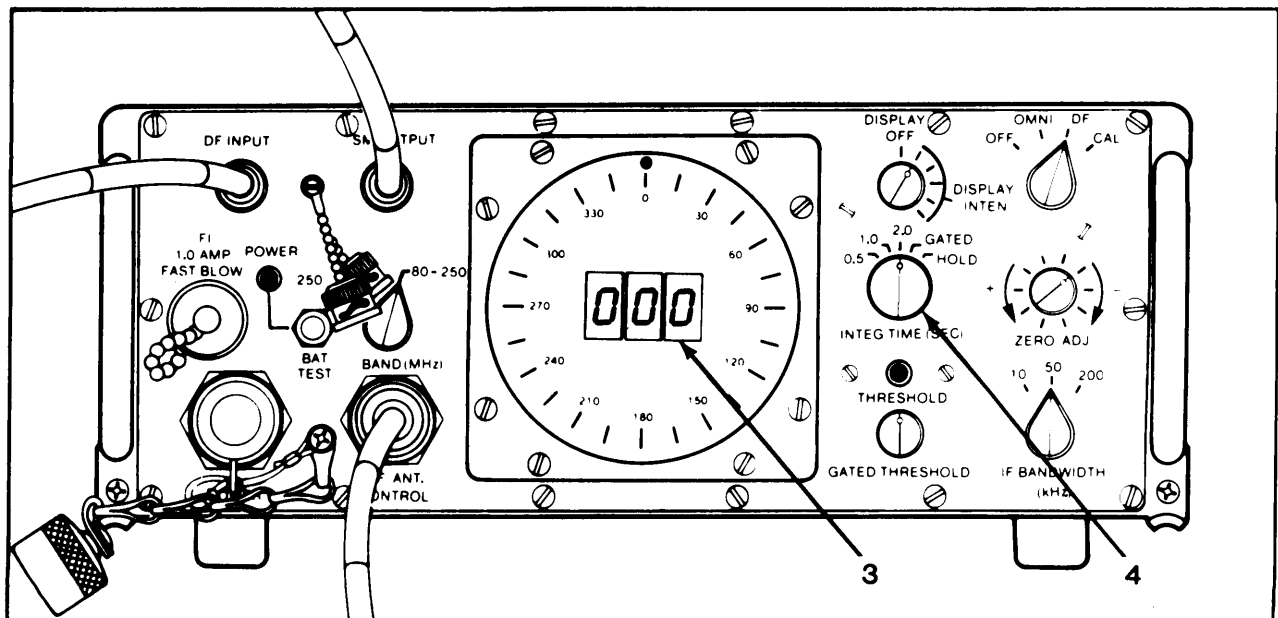
NOTE

If lobes indicate a near true north reading, the readings may fluctuate on each side of 000. This fluctuation will not allow you to average the lobes according to 4 above. In these cases:

- Record five consecutive lobe readings.
- Add 360 to each lobe with small degree number such as 001, 002, etc.
- Total all five 10b readings and divide by 5 to determine the average lobe.

If the resulting average is greater than 360, subtract 360 from the average to determine the average lobe.

7. If time permits, set INTEG TIME (SEC) switch (4) on df processor to 2.0 and repeat 5 and 6 above.
8. Report call sign and 10b to NCE.



2-13. PREPARATION FOR MOVEMENT

Preparation for movement consists of the tear down procedures used when your df location is to be changed or when the df mission is over. You will perform these procedures only after receiving a directive to do so from the NCE. Preparation for movement includes:

	<u>Page</u>
● Displacing units	2-102
● Tearing down df antenna	2-111

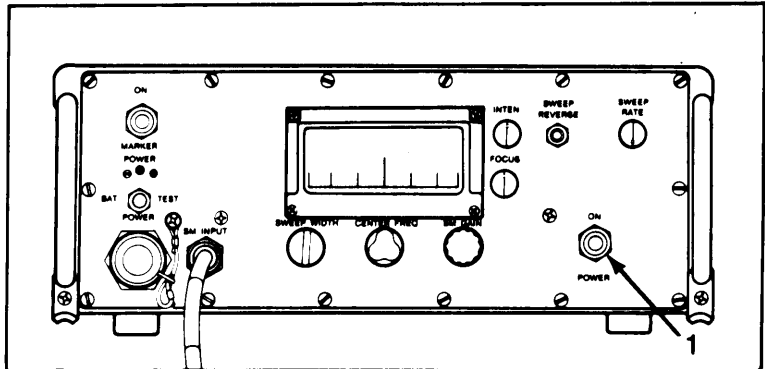
a. Displacing Units. Displacing units include the procedures which must be performed to prepare the receiver, df processor and signal monitor for movement. Only one crewmember is required to tear the units down. These procedures include:

	<u>Page</u>
● Powering down units	2-103
● Disconnecting cables	2-104
● Tearing down units	2-108

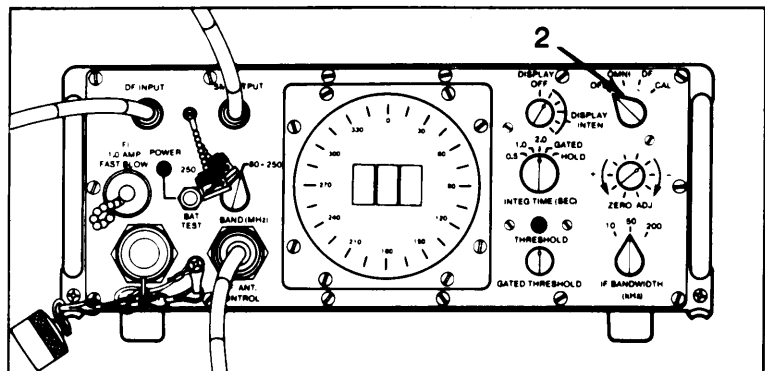
2-13. PREPARATION FOR MOVEMENT - Continued

POWERING DOWN UNITS

1. Set ON/POWER switch (1) on signal monitor to off position.



2. Rotate OFF/OMNI/DF/CAL switch (2) on df processor to OFF.



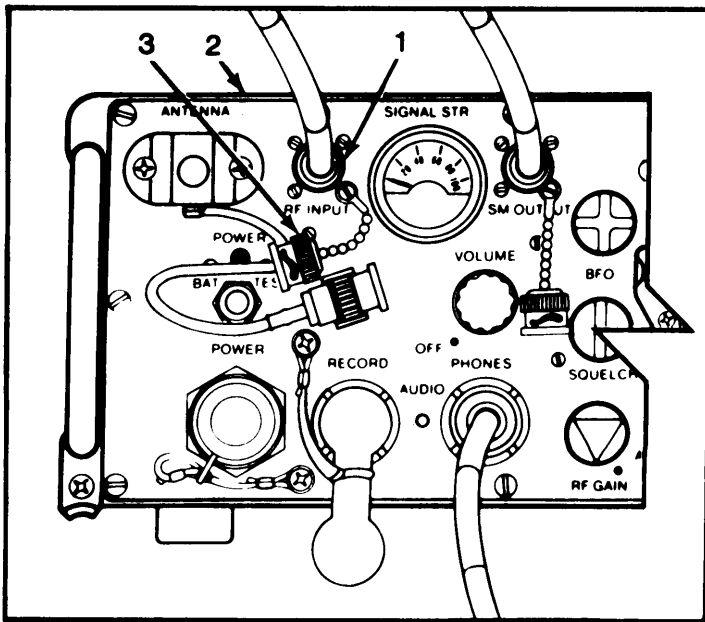
3. Rotate red VOLUME switch (3) on receiver fully counterclockwise until it clicks.

2-13. PREPARATION FOR MOVEMENT - Continued

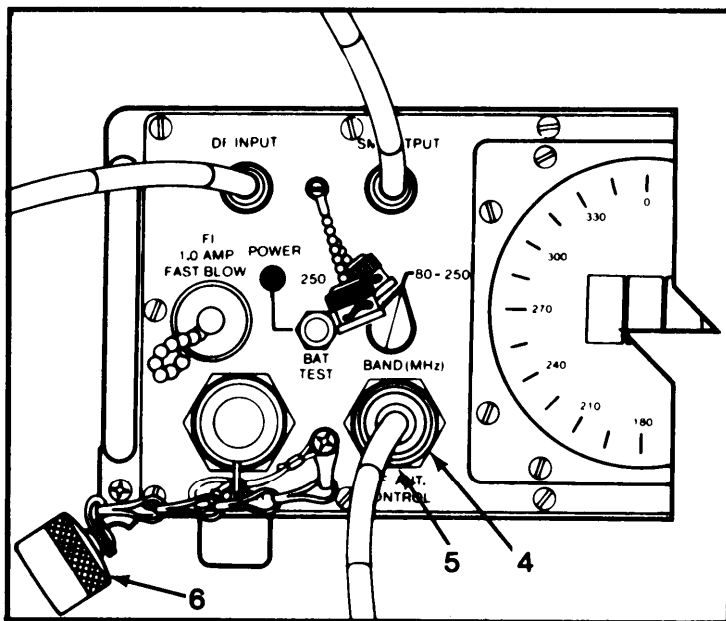
DISCONNECTING CABLES (SHEET 1 OF 4)

NOTE
Disconnect cables only after direction finder units have been powered down.

1. Loosen rf cable bnc connector at RF INPUT (1) on receiver (2) by turning connector collar 1/4 turn counterclockwise.
2. Pull connector off of RF INPUT (1) and place inside front cover.
3. Replace protective cap (3) on RF INPUT (1) on receiver (2) by pushing in and turning 1/4 turn clockwise.



4. Loosen df cable connector at DF ANT. CONTROL (4) on df processor (5) by turning connector collar 1/4 turn counterclockwise.
5. Pull connector off of DF ANT. CONTROL (4) and place inside front cover.
6. Replace protective cap (6) on DF ANT. CONTROL (4) on df processor (5) by pushing in and turning 1/4 turn clockwise.

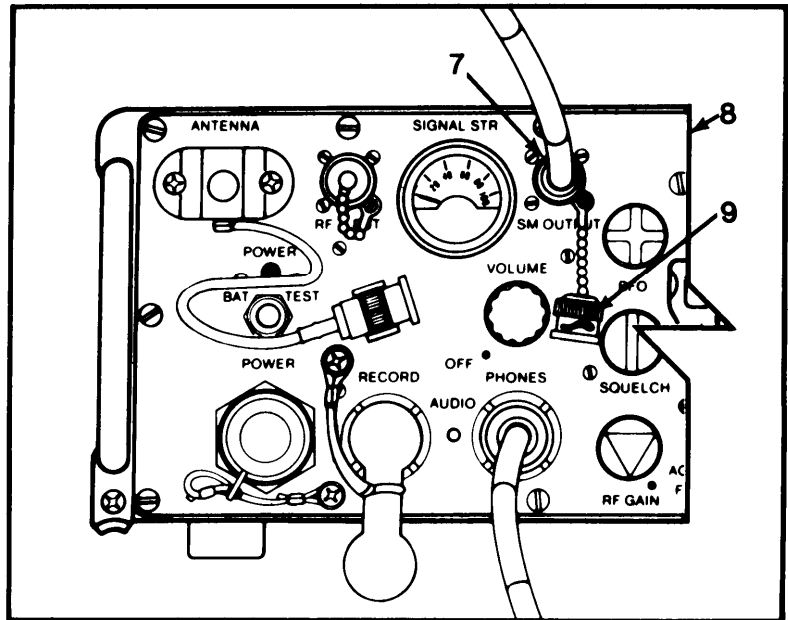


GO TO SHEET 2

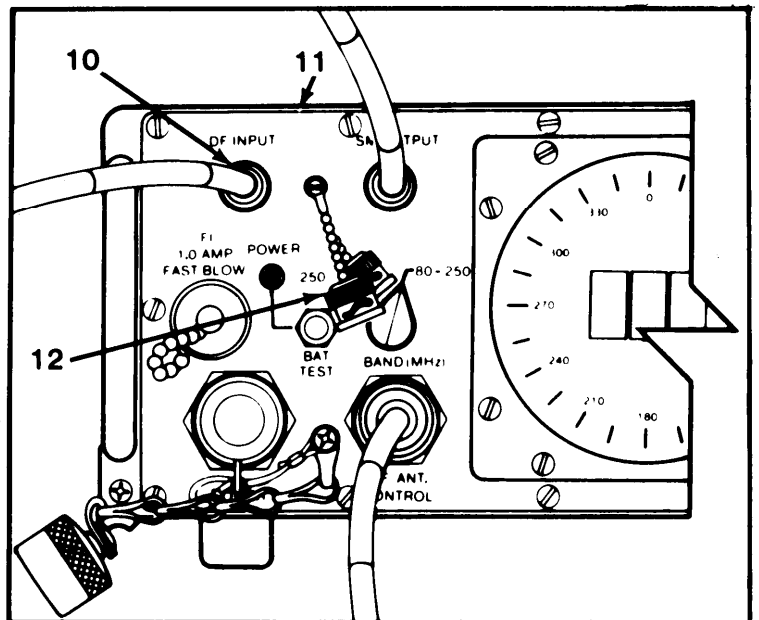
2-13. PREPARATION FOR MOVEMENT - Continued

DISCONNECTING CABLES (SHEET 2 OF 4)

7. Loosen bnc connector at SM OUTPUT (7) on receiver (8) by turning connector collar 1/4 turn counterclockwise.
8. Pull bnc connector off of SM OUTPUT (7).
9. Replace protective cap (9) on SM OUTPUT (7) on receiver (8) by pushing in and turning 1/4 turn clockwise.



10. Loosen bnc connector at DF INPUT (10) on df processor (11) by turning connector collar 1/4 turn counterclockwise.
11. Pull connector off of DF INPUT (10) and set cable inside front cover.
12. Replace protective cap (12) on DF INPUT (10) on df processor (11) by pushing in and turning 1/4 turn clockwise.

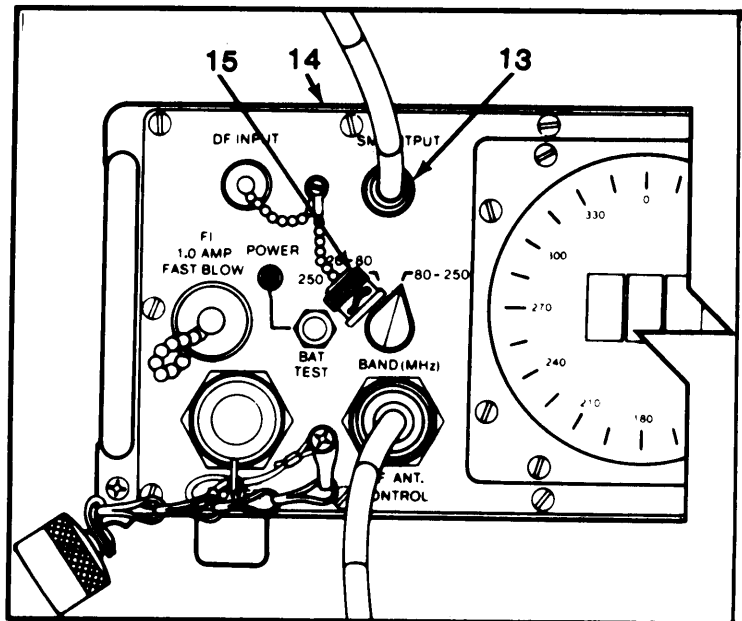


GO TO SHEET 3

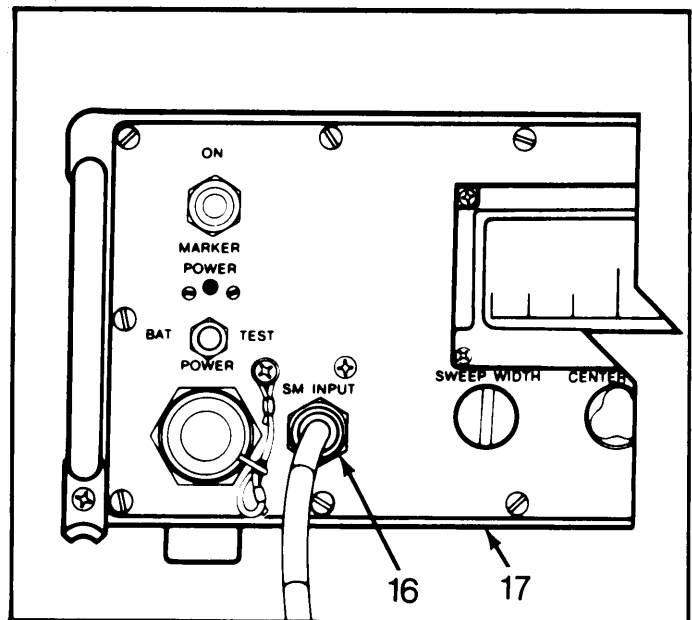
2-13. PREPARATION FOR MOVEMENT - Continued

DISCONNECTING CABLES (SHEET 3 OF 4)

13. Loosen bnc connector at SM OUTPUT (13) on df processor (14) by turning connector collar 1/4 turn counterclockwise.
14. Pull bnc connector off of SM OUTPUT (13).
15. Replace protective cap (15) on SM OUTPUT (13) on df processor (14) by pushing in and turning 1/4 turn clockwise.



16. Loosen bnc connector at SM INPUT (16) on signal monitor (17) by turning connector collar 1/4 turn counterclockwise.
17. Pull bnc connector off of SM INPUT (16) and set cable inside front cover.

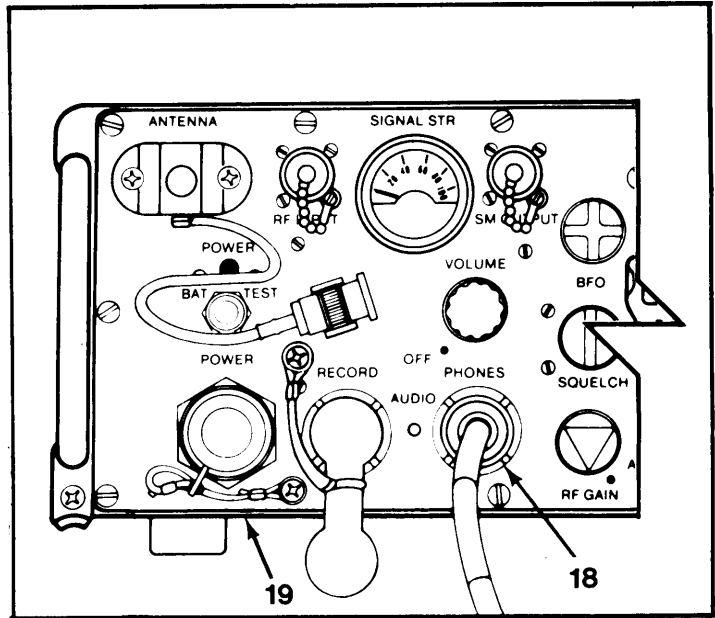


GO TO SHEET 4

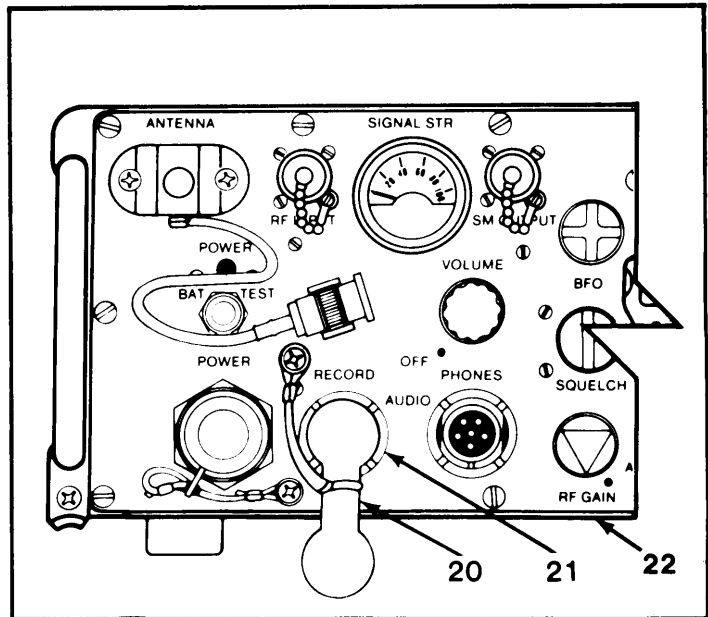
2-13. PREPARATION FOR MOVEMENT - Continued

DISCONNECTING CABLES (SHEET 4 OF 4)

- 18. Loosen AUDIO connector at PHONES connector (18) on receiver (19) by turning counterclockwise.
- 19. Pull AUDIO connector off of PHONES (18) connector and place cable inside receiver front cover.



- 20. Remove rubber protective cap (20) from RECORD connector (21) on receiver (22).
- 21. Replace protective cap (20) on PHONES connector (19) and RECORD connector (21) by pressing in place.



2-13. PREPARATION FOR MOVEMENT - Continued

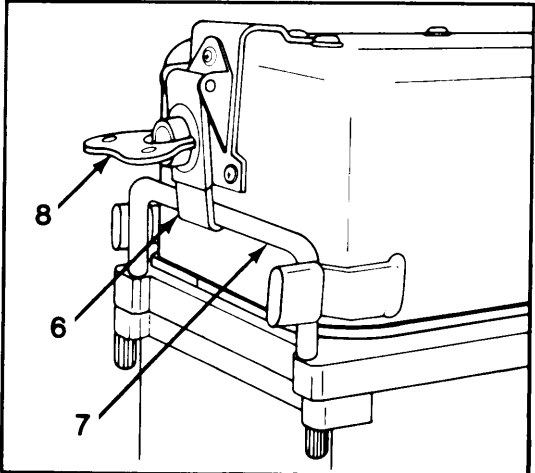
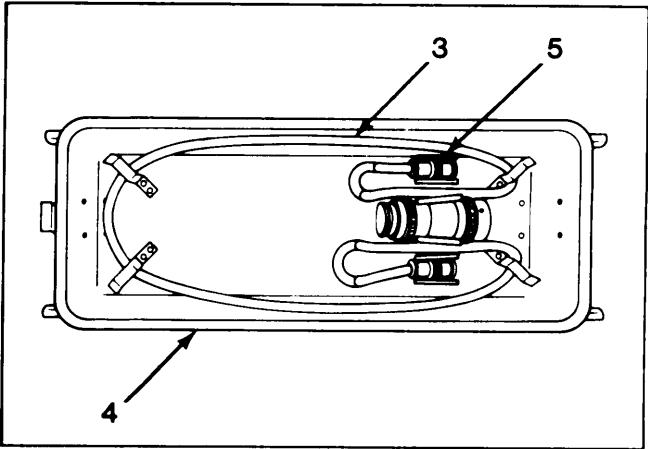
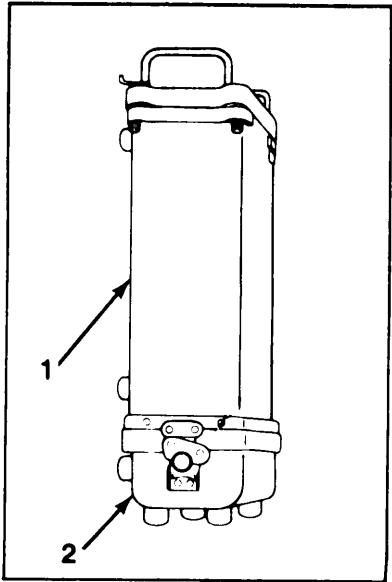
TEARING DOWN UNITS (SHEET 1 OF 3)

1. Lift signal monitor from top of df processor.
2. Stand signal monitor (1) up so that it rests on its battery cover (2).

WARNING
Brackets and cable guide inside front covers have sharp edges and may cut fingers.

Place one 18-inch bnc cable (3) into its position inside signal monitor front cover (4) by pushing connectors into brackets (5) and positioning cable along side of green connector and around perimeter of cover.

4. Replace signal monitor front cover (4) on front panel.
5. Push wing fastener clamps (6) against signal monitor front panel handles (7) and lift up on wing fasteners (8).
6. Turn wing fasteners (8) clockwise until clamps (6) are locked on signal monitor front panel handles (7).
7. Push wing fasteners (8) down until flat against sides of signal monitor.

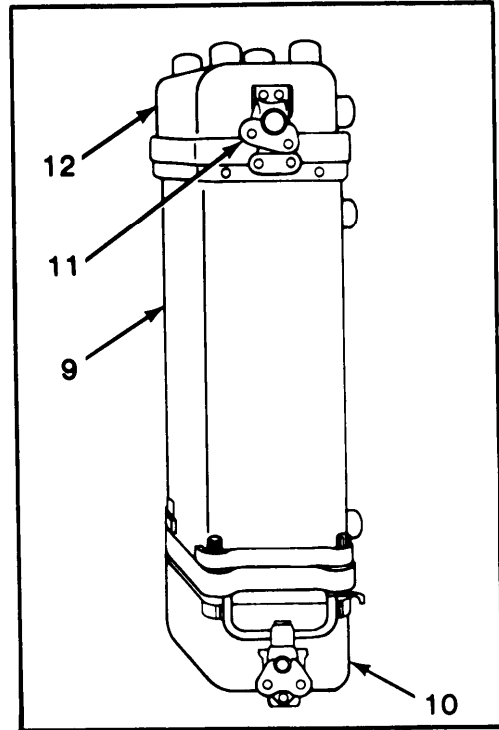


GO ON TO SHEET 2

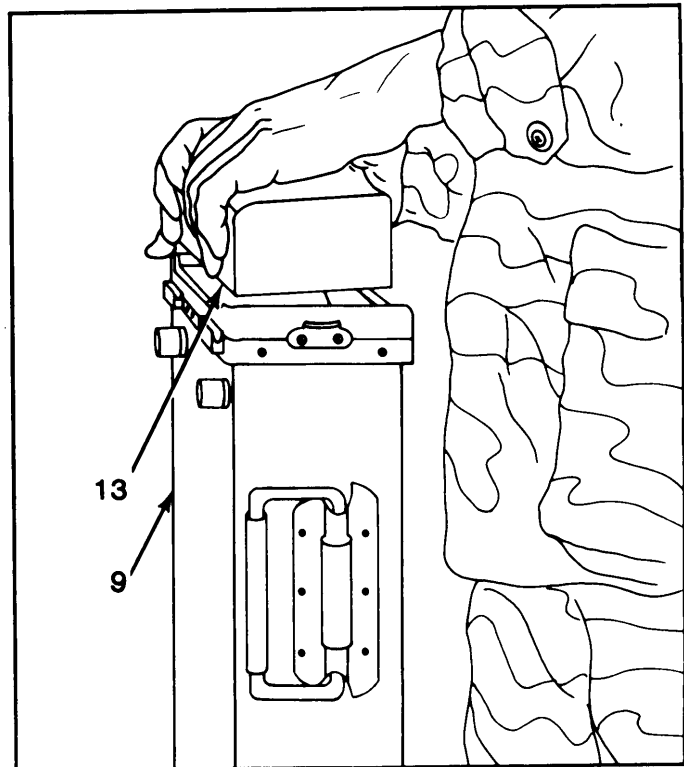
2-13. PREPARATION FOR MOVEMENT - Continued

TEARING DOWN UNITS (SHEET 2 OF 3)

8. Stand signal monitor (9) up on flat surface so that it rests on front cover (10).
9. Lift up on wing fasteners (11) at each side of battery cover (12) of signal monitor (9).
10. Turn wing fasteners (11) counterclockwise until clamps are free of signal monitor clips.
11. Lift off battery cover (12) from signal monitor (9) and set aside.
12. Remove battery or D-Cell insert (13) by lifting it up off signal monitor (9).



NOTE
 When using the D-Cell insert, the entire insert is removed.

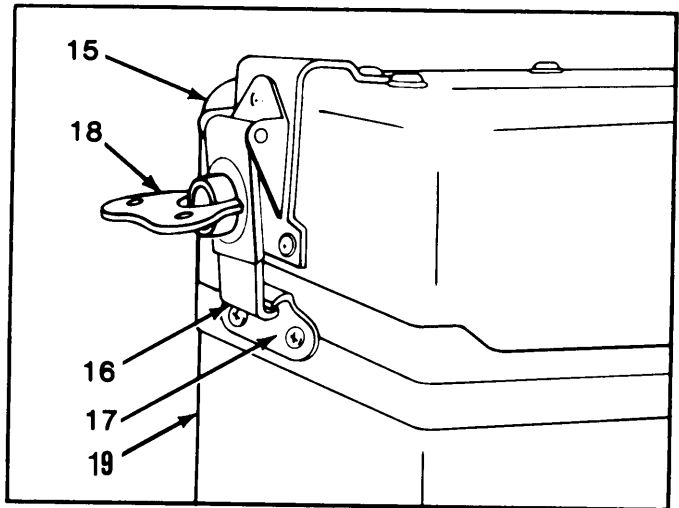


GO ON TO SHEET 3

2-13. PREPARATION FOR MOVEMENT - Continued

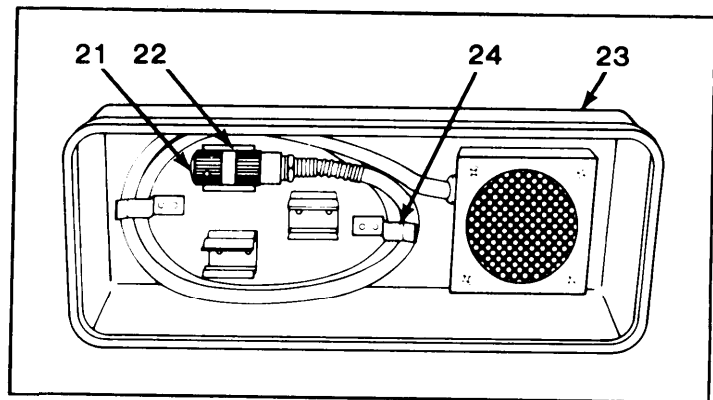
TEARING DOWN UNITS (SHEET 3 OF 3)

13. Replace signal monitor battery cover (15).
14. Push each clamp (16) against signal monitor clip (17) and lift up on wing fasteners (18).
15. Turn wing fasteners (18) clockwise until clamps (16) are locked in signal monitor clips (17).
16. Push wing fasteners (18) down until flat against sides of signal monitor (19).



17. Lift df processor off receiver.
18. Repeat 2 through 16 above for df processor.
19. Lift receiver off speaker assembly.
20. Repeat 2 above for receiver.

21. Place speaker cable connector (21) on bracket (22) inside receiver front cover (23).
22. Wrap speaker cable around brackets (22) and under green clips (24) inside receiver front cover (23) and press speaker cable connector (21) into bracket (22).



23. Replace receiver front cover (23) on front panel.
24. Repeat 5 through 16 above for receiver.
25. Return df units to rucksacks.

2-13. PREPARATION FOR MOVEMENT - Continued

b. Tearing Down Df Antenna. Two crew members will perform the df antenna tear down procedures while the third crewmember is tearing down the receiver, df processor and signal monitor. The first crewmember will tear down the antenna while the second crewmember assists the first by storing components and helping when necessary. Tearing down df antenna includes:

	<u>Page</u>
● Lowering df antenna	2-112
● Disconnecting df antenna cables	2-113
● Removing df antenna mast and elements	2-116
● Tearing down tripod	2-121

Perform df antenna tear down steps only after power has been turned off to the equipment.

CAUTION

The df antenna is easily damaged through careless or improper handling. Use care when tearing down the df antenna.

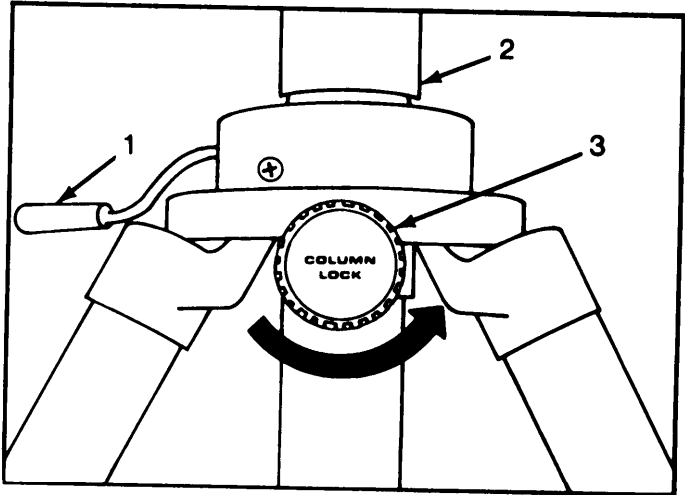
NOTE

The direction finder set can use two different df antennas. The procedures for tearing down each antenna are the same.

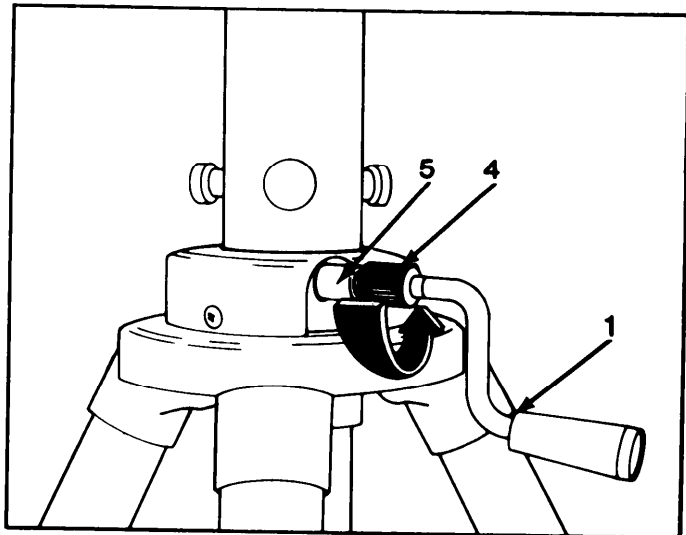
2-13. PREPARATION FOR MOVEMENT - Continued

LOWERING DF ANTENNA

1. Holding antenna crank handle (1), unlock antenna mast column (2) by turning COLUMN LOCK knob (3) on antenna crank assembly two or three turns counterclockwise.
2. Rotate antenna crank handle (1) counterclockwise until antenna is in its lowest position and tighten COLUMN LOCK knob (3) by turning counterclockwise.



3. Loosen crank handle (1) by turning collar (4) counterclockwise.
4. Slide collar (4) off screw (5) and let handle (1) fall loose.

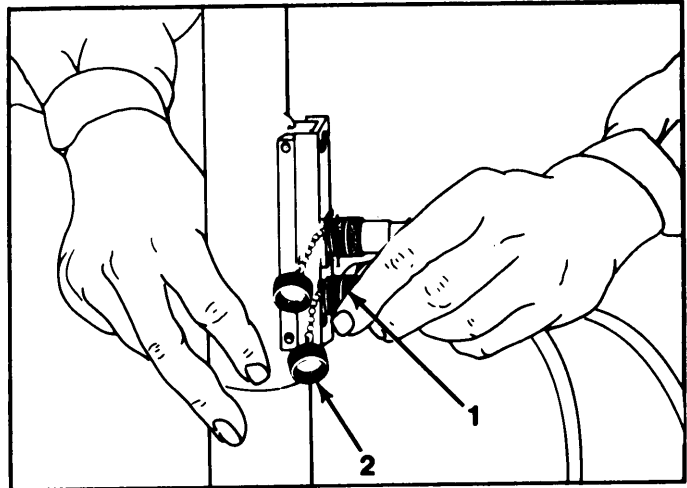


2-13. PREPARATION FOR MOVEMENT - Continued

DISCONNECTING DF ANTENNA CABLES (SHEET 1 OF 3)**NOTE**

Perform 1, 2 and 3 below when using either antenna.

1. Loosen df cable connector at J10 (1) by turning connector collar 1/4 turn counterclockwise.
2. Pull connector off of J10 (1).
3. Replace protective jack cap (2) at J10 (1) by Pushing in and turning 1/4 turn clockwise.



GO ON TO SHEET 2

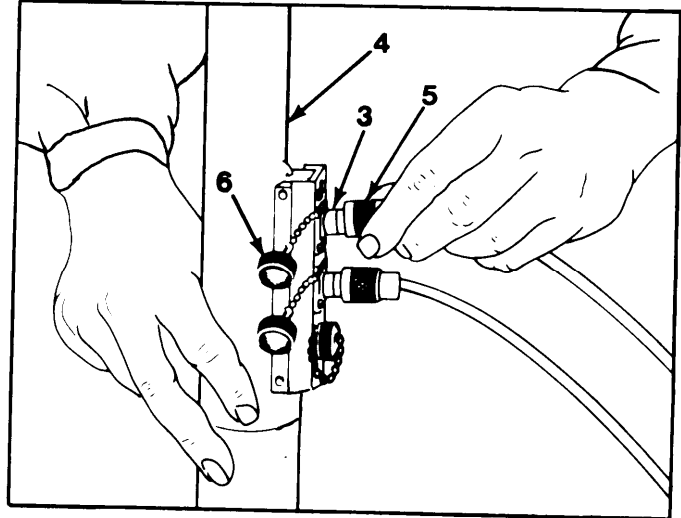
2-13. PREPARATION FOR MOVEMENT - Continued

DISCONNECTING DF ANTENNA CABLES (SHEET 2 OF 3)

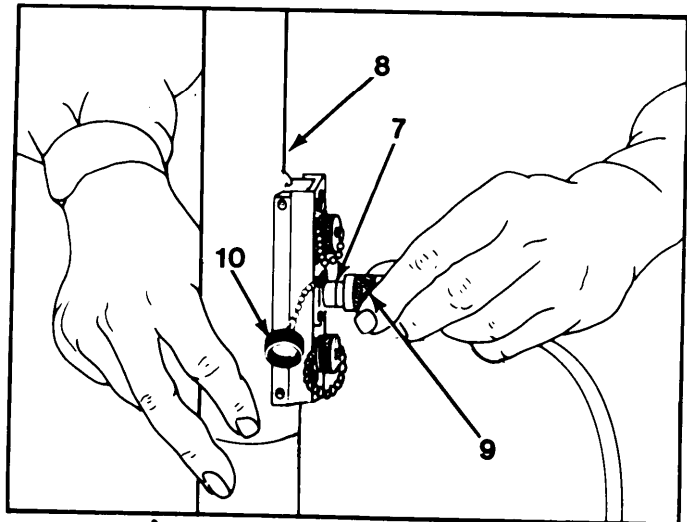
NOTE

Perform 4 through 9 below
when using AS-3733/PRD-11

4. Loosen rf cable connector J20 at connector J20 (3) on antenna mast column (4) by unscrewing connector collar (5) counterclockwise.
5. Pull rf cable connector J20 off of connector J20 (3) on antenna mast column (4).
6. Replace protective cap (6) at J20 (4) by screwing clockwise.



7. Loosen rf cable connector J19 at connector J19 (7) on antenna mast column (8) by unscrewing connector collar (9) counterclockwise.
8. Pull rf cable connector J19 off of connector J19 (7) on antenna mast column (8).
9. Replace protective cap (10) at connector J19 (7) by screwing clockwise.



GO TO SHEET 3

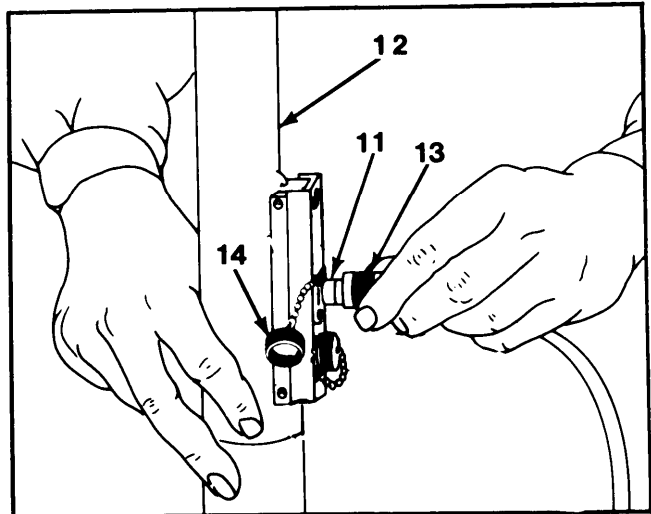
2-13. PREPARATION FOR MOVEMENT - Continued

DISCONNECTING DF ANTENNA CABLES (SHEET 3 OF 3)

NOTE

Perform 1, 2 and 3 below when using AS-3732/PRD-11

10. Loosen rf cable connector J19 at connector J19 (11) on antenna mast column (12) by unscrewing connector collar (13) counterclockwise.
11. Pull rf cable connector J19 off of J19 (11) on antenna mast column (12).
12. Replace protective cap (14) on connector J19 (11) by screwing clockwise.



CAUTION

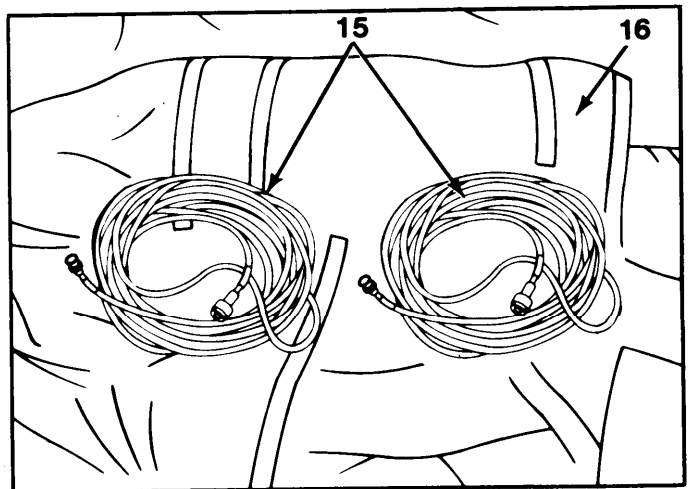
Wrap cables in loose circles sized to fit within the antenna carrying bag. If the cables are too tightly wrapped, they will break.

13. Wrap rf cable(s) (15) in loose circle.

NOTE

The AS-3733/PRD-11 will have two rf cables.

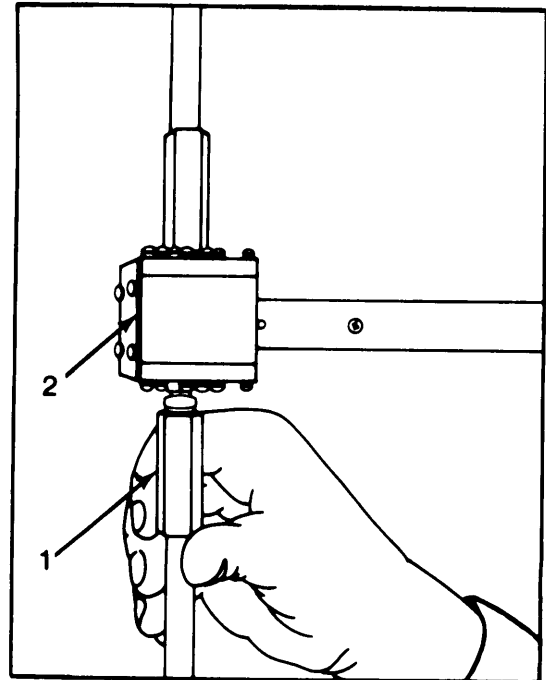
14. Stow rf cable(s) (15) in antenna carrying bag (16).
15. Wrap df cable in loose circle.
16. Stow df cable in antenna carrying bag (16).



2-13. PREPARATION FOR MOVEMENT - Continued

REMOVING DF ANTENNA MAST AND ELEMENTS (SHEET 1 OF 5)

1. Remove lower antenna element (1) from antenna element box (2) by turning 1/4 turn counterclockwise.
2. Pull off antenna element (1).
3. Repeat 1 and 2 above for remaining three lower antenna elements.

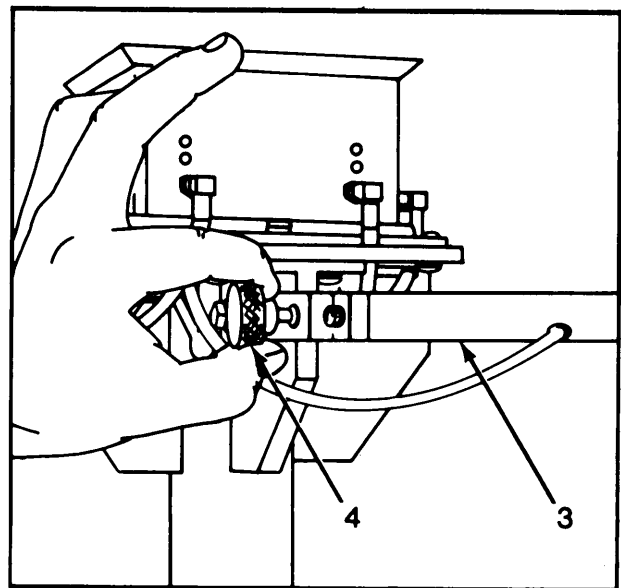


4. Slightly raise antenna arm (3) while simultaneously pulling out on antenna arm locking thumbscrew (4).

CAUTION
Before lowering antenna arm be sure antenna mast cables are free of locking thumbscrews.

5. Lower antenna arm (3) and let go of thumbscrew (4) at same time.

NOTE
A click will be heard when arm is fully extended and thumbscrew locks into place.

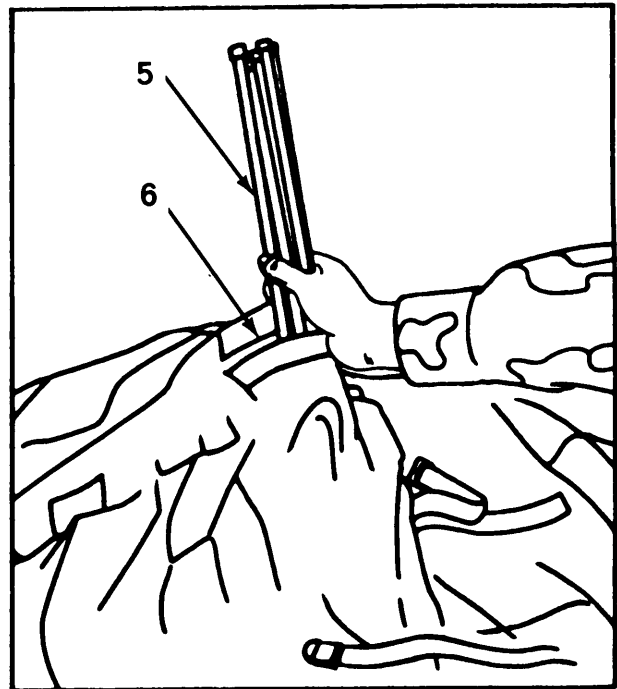


GO TO SHEET 2

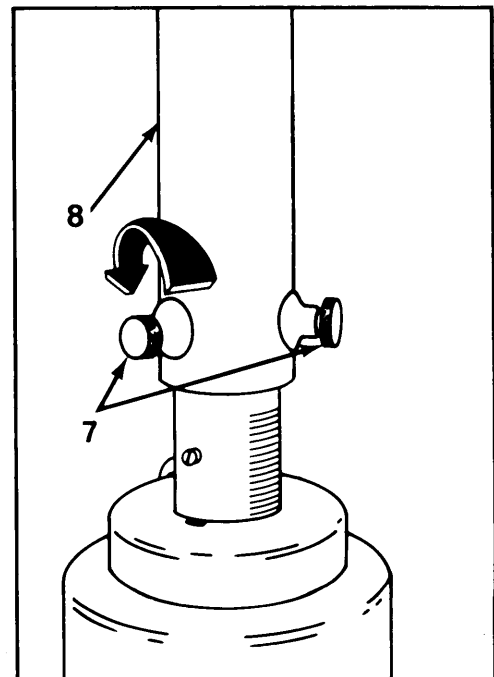
2-13. PREPARATION FOR MOVEMENT - Continued

REMOVING DF ANTENNA MAST AND ELEMENTS (SHEET 2 OF 5)

6. Remove upper antenna element by repeating 1 and 2 above.
7. Repeat 4, 5 and 6 above for remaining three arms.
8. Replace antenna elements (5) in proper compartments of antenna carrying bag (6).



9. Loosen three locking screws (8) at base of antenna mast (9) by turning counterclockwise.



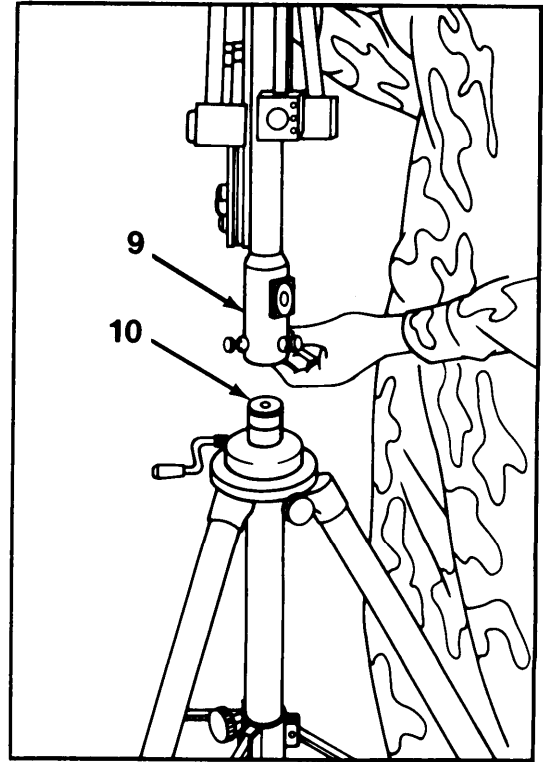
GO TO SHEET 3

2-13. PREPARATION FOR MOVEMENT - Continued

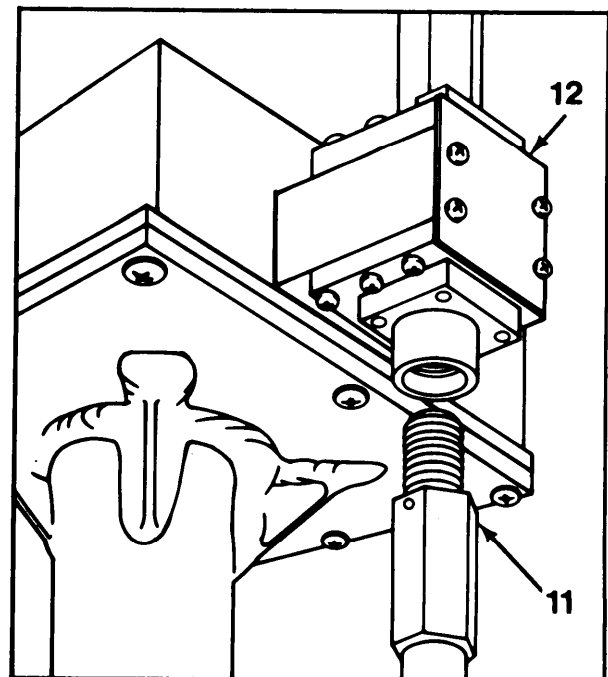
REMOVING DF ANTENNA MAST AND ELEMENTS (SHEET 3 OF 5)

10. Lift antenna mast (10) off tripod mount (11).
11. Set antenna mast base on edge of antenna carrying bag holding mast upright.

Perform 12, 13 and 14 below if AS-3733/PRD-11 antenna is used. Both crewmembers will perform 12. Second crewmember will perform 13.



12. Remove short antenna elements (12) from upper bay element boxes (13) by unscrewing counter-clockwise.
13. Place short antenna elements (12) in proper compartment of antenna carrying bag.

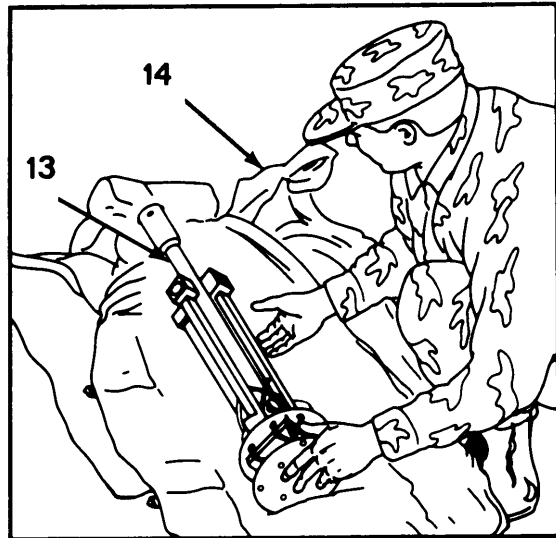


GO ON TO SHEET 4

2-13. PREPARATION FOR MOVEMENT - Continued

REMOVING DF ANTENNA MAST AND ELEMENTS (SHEET 4 OF 5)

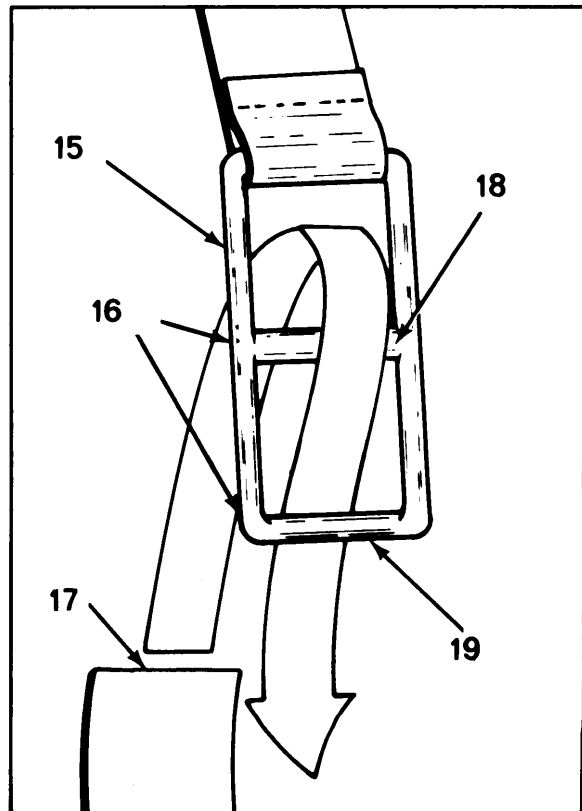
14. Place antenna mast (14) in proper position in antenna carrying bag (15).
15. Secure with five quick release straps by following 15 through 19 below.



NOTE

The AS-3733/PRD-11 has six quick release straps.

16. Hold buckle (16) of quick release strap with two open bars (17) facing you.
17. Thread end of strap (18) upwards through buckle behind middle bar (19).
18. Continue threading strap (18) over middle bar (19) and under end bar (20).
19. Pull strap (18) tight.

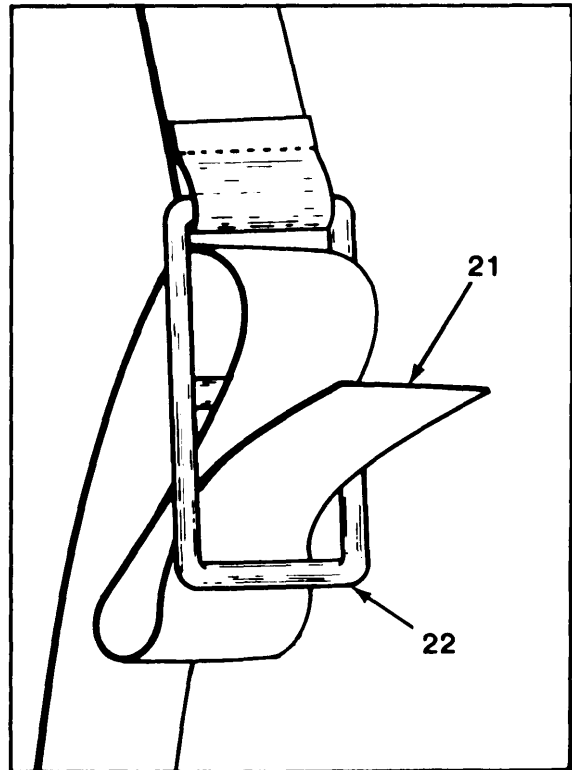


GO ON TO SHEET 5

2-13. PREPARATION FOR MOVEMENT - CONTINUED

REMOVING DF ANTENNA MAST AND ELEMENTS (SHEET 5 OF 5)

20. Insert end of strap (21) back under end bar (22) so that strap (21) forms an end loop (22).
21. Grasp loop (21) with one hand and pull toward you while holding loose end of strap (20) with other hand to tighten.

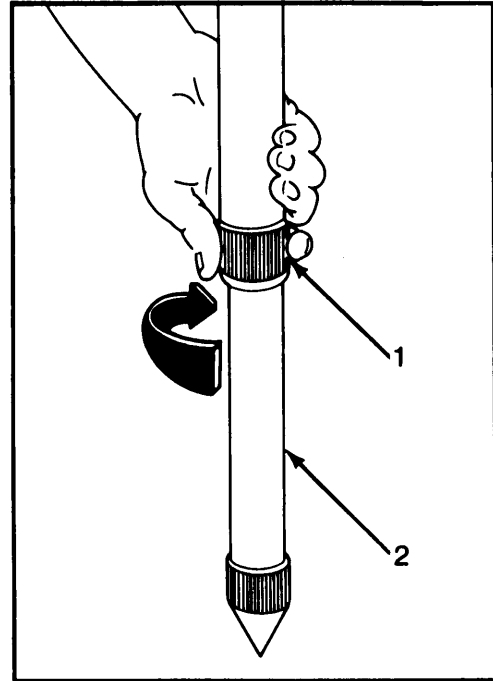


2-13. PREPARATION FOR MOVEMENT - Continued

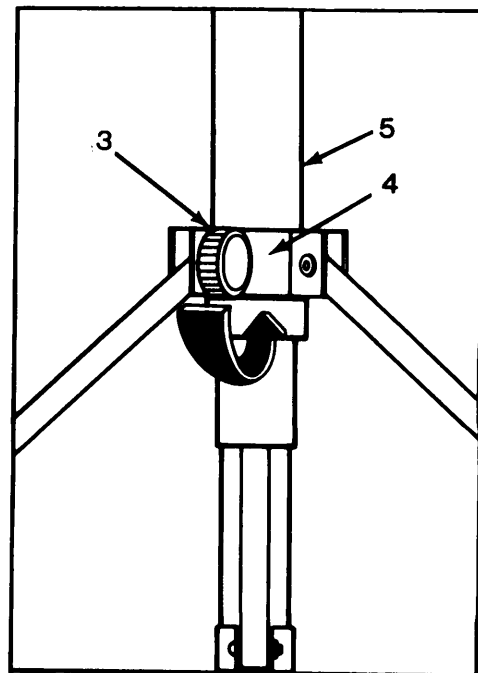
TEARING DOWN TRIPOD (SHEET 1 OF 2)**NOTE**

Second crewmember will perform 1 below.

1. Lift and hold tripod off ground.
2. Loosen collar (1) on base of tripod leg (2) by turning counter-clockwise.
3. Slide tripod leg (2) up all the way.
4. Tighten collar (1) of base of tripod leg (2) by turning clockwise.
5. Repeat 1 through 4 above for remaining tripod legs.



6. Loosen knurled center tension knob (3) on sliding collar (4) of tripod center column (5) by turning counter-clockwise.



GO TO SHEET 2

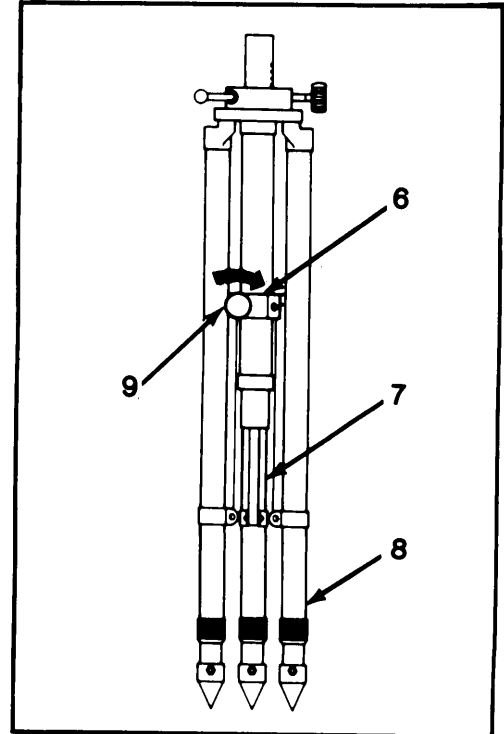
2-13. PREPARATION FOR MOVEMENT - Continued

TEARING DOWN TRIPOD (SHEET 2 OF 2)

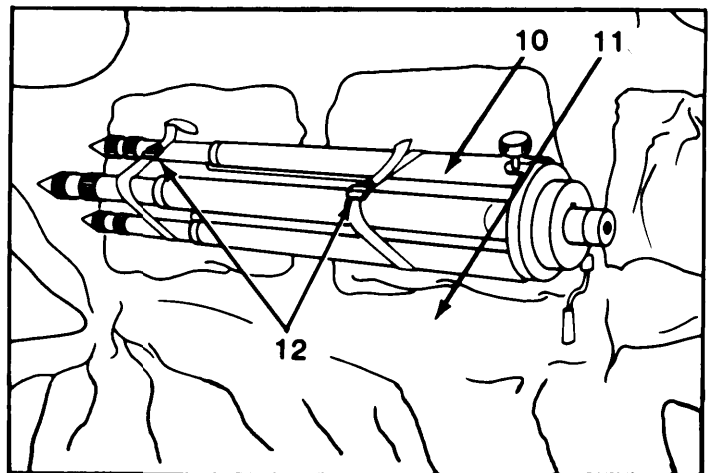
CAUTION

Be careful that you do not catch your fingers as tripod legs close.

7. Pull up on sliding collar (6) and stabilizing arms (7) to close tripod legs (8).
8. Tighten knurled center tension knob (9) by turning clockwise.



9. Place tripod (10) in proper position in antenna carrying bag (11).
10. Secure tripod (10) with four quick release straps (12).
11. Roll Up antenna carrying bag and secure with three fastening straps.



NOTE

The AS-3733/PRD-11 has four fastening straps.

2-14. OPERATION OF AUXILIARY EQUIPMENT

The following auxiliary equipment may be used with the direction finder set:

- Radio Set AN/PRC-77
- Audio Recorder AN/UNH-16A
- Radio Set AN/VRC-12
- Communications Security Equipment TSEC/KY-57
- Headset H-251/U

Headset H-251/U may be used instead of receiver speaker assembly. See Appendix A of this manual for the listing of technical manuals to be used when operating auxiliary equipment.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

<u>Section Contents</u>		<u>Page</u>
2-15.	Operation in Unusual Weather	2-124
2-16.	Fording	2-126
2-17.	Emergency Procedures.	2-126
2-18.	Jamming and ECM Procedures	2-126

2-15. OPERATION IN UNUSUAL WEATHER

The direction finder set is weatherproof and ruggedized to allow continued operation during unusual weather conditions. However, special operational procedures must be followed during these conditions.

Weather Condition	Special Operational Procedure	Unit Limitations
Extreme Heat 32° Celsius (90° Fahrenheit or higher)	Install units in a shady area or provide shade with available covering.	Units will not operate efficiently in temperatures higher than 60° Celsius (140° Fahrenheit).
Extreme Cold -5° Celsius (25° Fahrenheit or lower)	<ul style="list-style-type: none"> ● Use magnesium batteries as a power source. ● Remove batteries from units if operations expect to be down for more than 15 minutes and keep in warm place. ● Check cables regularly for cracks or breaks. 	Units will not operate efficiently in temperatures lower than 0° Celsius (32° Fahrenheit).
Ice or Snow	<ul style="list-style-type: none"> ● Wear gloves when installing equipment to avoid ice burns on your hands. ● Protect units and cables by building windbreaks and covers. 	Antenna elements will not operate efficiently with more than 1/4 inch ice buildup.

2-15. OPERATION IN UNUSUAL WEATHER - Continued

Weather Condition	Special Operational Procedure	Unit Limitations
Rain or Mist	<ul style="list-style-type: none"> ● Provide water drainage away from units. ● Provide cover and keep units dry. 	Units are considered waterproof only when front and rear covers are secured.
Mud	<ul style="list-style-type: none"> ● Install units on top of a waterproof cover. ● Install df antenna tripod legs in most solid area. ● Keep units clean. 	
Dusty or Sandy	<ul style="list-style-type: none"> ● Provide cover against wind direction. ● Keep units clean. 	
Windy (10 mph or greater)	<ul style="list-style-type: none"> ● Tie antenna down with guy wires. ● Protect units from blowing objects or dirt. 	Antenna can withstand gusts up to 100 mph when secured with wires.
Sea Spray	<ul style="list-style-type: none"> ● Provide cover to units to keep dry. ● Wipe units with fresh water-dampened cloth after operation and dry. 	

2-16. FORDING

The direction finder set is waterproof when the front and rear covers of each unit are securely fastened. This allows fording of the equipment when the procedures below are followed.

BEFORE FORDING:

- Attach front and rear panel covers of the direction finder units.
- Ensure extra batteries are sealed in a plastic or waterproof container.
- Ensure df antenna carrying bag is securely fastened.

DURING FORDING:

- Submerge equipment only when necessary.

AFTER FORDING:

- Allow excess water to drain out of df antenna carrying bag.
- Dry the direction finder units with a cloth.

2-17. EMERGENCY PROCEDURES

The direction finder set will operate as long as the life of its batteries. In some cases, you will not have the immediate chance to change batteries when they begin losing their maximum charge levels. Normal operation requires you to maintain low intensity levels to conserve battery power. However, the following emergency procedures will help you temporarily adapt the equipment when continued use of the units is required and battery power is rapidly decreasing.

- Turn COUNTER OFF/DISPLAY OFF/DISPLAY INTENSITY switch on the receiver to COUNTER OFF when continuing monitoring only one frequency.
- Turn DISPLAY OFF/DISPLAY INTENSITY switch on df processor to DISPLAY OFF when no 10b readings need to be recorded.
- Turn INTENSITY switch on signal monitor fully counter-clockwise when continuing monitoring only one frequency.

2-18. JAMMING AND ECM PROCEDURES

There are no special instructions for operating the direction finder set in areas using signal jamming or electronic counter-measures.

CHAPTER 3

OPERATOR MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. LUBRICATION INSTRUCTIONS

No lubrication is performed on the direction finder set by operators.

Section II. OPERATOR TROUBLESHOOTING

<u>SECTION CONTENTS</u>	<u>Page</u>
3-2. Introduction.	3-1
3-3. Symptom Index.	3-2
3-4. Troubleshooting Procedures	3-3

3-2. INTRODUCTION

When your direction finder set fails, use the symptom index and troubleshooting tables to locate the problem.

a. The symptom index will assist you in locating the correct procedure necessary to troubleshoot. To use the index, match the malfunction description with the page noted. Each troubleshooting table will have a malfunction title heading.

b. Each troubleshooting table addresses a common malfunction which you may find during the operation or maintenance of the direction finder set or its components. To use the tables, perform the instructions and corrective actions in the order listed.

c. This manual cannot list all the malfunctions that occur, nor all the tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

3-3. SYMPTOM INDEX

Symptom	Troubleshooting Procedure Page	Contact Organizational Maintenance
<u>RECEIVER</u>		
● POWER lamp that does not light	3-4	
● FREQUENCY MHz display that does not light	3-5	
● No audio and no signal indication on SIGNAL STR meter	3-6	
● FREQUENCY MHz display that has unstable digits	3-8	
● No audio and no signal indication on SIGNAL STR meter:		
When high band is selected		✓
When low band is selected		✓
In one or two IF BANDWIDTH positions		✓
When USB/CW or LSB/CW is selected		✓
When AM is selected		✓
When FM is selected		✓
● No audio when speaker assembly is used		✓
● Changes frequency when DAFC LOCK switch is set to LOCK position		✓
● FREQUENCY MHz display that locks at a preset frequency		✓
<u>DF PROCESSOR</u>		
● POWER lamp that does not light	3-9	
● No line of bearing display	3-11	
● Displays incorrect line of bearing	3-12	
● Displays random lines of bearing	3-13	
● ZERO ADJ control cannot set a 000 or 180 degree bearing		✓
● No circular display when set to GATED mode		✓
● THRESHOLD lamp that does not light		✓
● Random lines of bearing displayed when set to HOLD mode		✓

3-3. SYMPTOM INDEX - Continued

Symptom	Troubleshooting procedure Page	Contact Organizational Maintenance
<u>DF PROCESSOR</u> - Continued		
● Random lines of bearing in one or two IF BANDWIDTH (kHz) positions.		✓
● Circular led that does not turn off when THRESHOLD is adjusted		✓
<u>SIGNAL MONITOR</u>		
● POWER lamp that does not light	3-16	
● No rf signal on crt	3-17	
● No trace on crt	3-18	
● No marker on crt		✓

3-4. TROUBLESHOOTING PROCEDURES

Follow these instructions on how to use the troubleshooting tables:

- a. Begin with Step 1.
- b. Follow the directive listed in the Instruction column.
- c. Match your results with the question asked in the Indication column.
- d. If the answer to the question in the Indication column is yes, look in the yes column and proceed to the step listed. If the answer to the question in the Indication column is no, look in the No column and proceed to the step listed.
- e. Continue through the table until a darkened triangle symbol appears in the Yes or No column. Stop troubleshooting. The malfunction should now be corrected.
- f. Read any comments related to troubleshooting procedures in the Remarks column.

NOTE

Unless otherwise noted, direction finder units should be powered up before you begin troubleshooting procedures.

3-4. TROUBLESHOOTING PROCEDURES - Continued

a. POWER LAMP THAT DOES NOT LIGHT

Step	Instruction	Indication	Yes	No	Remarks
1	Check protective cap on external POWER connector for looseness.	Cap is loose ?	2	3	
2	Tighten protective cap by pushing in on cap and turning clockwise.	POWER lamp lights ?	▲	3	
3	Inspect receiver battery/D-cell insert plug and receiver jack. <ul style="list-style-type: none"> ● Turn off power to receiver. ● Remove battery/D-Cell insert following paragraph 2-10 <u>b.</u> ● Inspect jack/plug for damage. 	Jack/plug good ?	4	4 or contact organizational maintenance.	If receiver or D-Cell insert plug is damaged contact organizational maintenance If BA-4386/PRC-25 is used go to 4
4	Remove/replace batteries following paragraph 3-6 <u>b.</u> <ul style="list-style-type: none"> ● Turn on power to receiver. 	POWER lamp lights ?	▲	5	
5	Remove/replace F1 fuse in D-cell insert following paragraph 3-6 <u>a.</u>	Power lamp lights ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

b. FREQUENCY MHZ DISPLAY THAT DOES NOT LIGHT

Step	Instruction	Indication	Yes	No	Remarks
1	Check setting of COUNTER OFF/DISPLAY/OFF/DISPLAY INTENSITY switch on receiver.	Switch is set to DISPLAY INTENSITY ?	Contact organizational maintenance.	2	
2	Set COUNTER OFF/DISPLAY OFF/DISPLAY INTENSITY switch to DISPLAY INTENSITY by turning fully clockwise.	FREQUENCY MHz display lights ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

c. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
(SHEET 1 OF 2)

Step	Instruction	Indication	Yes	No	Remarks
1	Verify that correct cable is connected to RF INPUT on receiver.	Correct cable connected to RF INPUT on receiver ?	3	2	
2	Recable receiver: <ul style="list-style-type: none"> o Turn off power to receiver. o Connect cables to receiver following paragraph 2-10 <u>c.</u> o Turn on power to receiver. 	Audio and signal indication present ?	▲	3	
3	Check antenna rf cable and connectors at RF INPUT on receiver and rf output connector on antenna. <ul style="list-style-type: none"> o Power down receiver following paragraph 2-139. o Disconnect rf cable from RF INPUT following paragraph 2-139. o Inspect rf cable and connectors for breaks, bent pins or other damage. o Inspect receiver RF INPUT and df antenna rf output connector for other damage. 	Cable connectors or jacks damaged ?	Contact organizational maintenance.	4	

GO ON TO SHEET 2

3-4. TROUBLESHOOTING PROCEDURES - Continued

c. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
(SHEET 2 OF 2)

Step	Instruction	Indication	Yes	No	Remarks
4	<p>Check speaker assemble cable and connector at PHONES connector for receiver.</p> <ul style="list-style-type: none"> ● Reconnect antenna rf cable following paragraph 2-10 <u>c.</u> ● Disconnect speaker assembly cable. See Index in paragraph 2-13 <u>a.</u> ● Inspect speaker cable and connector for breaks, bent pins or other damage. ● Inspect receiver PHONES connector for damage. 	Cable, connector or PHONES connector damaged ?	Contact organizational maintenance.	5	
5	Reconnect speaker cable to PHONES connector or receiver and turn on power to receiver.	Audio and signal indication present ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

d. FREQUENCY MHz DISPLAY THAT HAS UNSTABLE DIGITS

Step	Instruction	Indication	Yes	No	Remarks
1	Perform battery test by pressing BAT TEST push-button.	POWER lamp stays lit ?	Contact organizational maintenance.	2	
2	Remove/replace battery following paragraph 3-6 <u>b.</u>	FREQUENCY MHz display stable ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

e. POWER LAMP THAT DOES NOT LIGHT (SHEET 1 OF 2)

Step	Instruction	Indication	Yes	No	Remarks
1	Check protective cap on external POWER connector for looseness.	Cap is loose ?	2	3	
2	Tighten protective cap by pushing in on cap and turning clockwise.	POWER lamp lights ?	▲	3	
3	Inspect df processor battery/D-cell insert plug and df processor jack: <ul style="list-style-type: none"> ● Turn off power to df processor. ● Remove battery/D-Cell insert following paragraph 2-10 <u>b.</u> ● Inspect jack/plug for damage. 	Jack/plug good ?	4	4 or contact organizational maintenance.	If df processor D-Cell insert plug is damaged contact organizational maintenance. If BA-4386/PRC-25 is used go to 4.
4	Remove/replace batteries following paragraph 3-6 <u>b.</u> <ul style="list-style-type: none"> ● Turn on power to df processor. 	POWER lamp lights ?	▲	5	

GO ON TO SHEET 2

3-4. TROUBLESHOOTING PROCEDURES - Continued

3-4 e. POWER LAMP THAT DOES NOT LIGHT (SHEET 2 OF 2)

Step	Instruction	Indication	Yes	No	Remarks
5	Remove/replace F1 fuse in D-cell insert following paragraph 3-6 <u>a.</u>	Power lamp lights ?	▲	If D-Cells used go to 6.	
6	Remove/replace F1 fuse in D-cell insert following paragraph 3-6 <u>a.</u>	Power lamp lights ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

f. NO LINE OF BEARING DISPLAY

Step	Instruction	Indication	Yes	No	Remarks
1	Check setting of DISPLAY OFF/DISPLAY INTEN switch on df processor.	Switch to DISPLAY INTEN ?	Contact organizational maintenance.	2	
2	Set DISPLAY OFF/DISPLAY INTEN switch fully clockwise to DISPLAY INTEN.	Numerical LOB display lit ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

g. DISPLAYS INCORRECT LINE OF BEARING

Step	Instruction	Indication	Yes	No	Remark
1	Inspect setting of BAND MHz switch on df processor.	Setting same as receiver BAND MHz ?	3	2	
2	Set BAND MHz switch to same setting as BAND MHz switch on receiver.	Displayed bearing is correct ?	▲	3	
3	Orient df antenna.	Displayed bearing is correct ?	▲	4	
4	Inspect antenna arms for damage.	Antenna arms are damaged ?	Contact organizational maintenance.	5	
5	Check df site to ensure it meets df requirements of FM 30-476 and paragraph 2-9 of this TM.	Df site is good ?	Contact organizational maintenance.	Select new site in accordance with FM 30-476 and paragraph 2-9 of this TM.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

h. DISPLAYS RANDOM LINES OF BEARING (SHEET 1 OF 3)

Step	Instruction	Indication	Yes	No	Remarks
1	Check that IF BANDWIDTH setting on df processor matches IF BANDWIDTH setting on receiver.	Settings match ?	3	2	
2	Set IF BANDWIDTH to the same setting on df processor and on receiver.	Lines of bearing steady ?	▲	3	
3	<p>Check antenna RF cable, connectors at RF INPUT on receiver and RF output connector on antenna mast.</p> <ul style="list-style-type: none"> ● Turn power off to receiver and df processor following paragraph 2-13 <u>a.</u> ● Disconnect RF cables from receiver RF INPUT and RF output connector on antenna mast following paragraph 2-13 <u>a.</u> and b. ● Inspect RF cables and connectors for breaks, bent pins and other damage. 				

GO ON TO SHEET 2

3-4. TROUBLESHOOTING PROCEDURES - Continued

h. DISPLAYS RANDOM LINES OF BEARING (SHEET 2 OF 3)

Step	Instruction	Indication	Yes	No	Remarks
	<ul style="list-style-type: none"> ● Inspect receiver RF INPUT connector antenna mast and rf output connector for damage. 	Cable or connector damaged ?	Contact organizational maintenance.	4	
4	<p>Check antenna df cable and connectors at DF ANT CONTROL and at df cable connector on antenna mast.</p> <ul style="list-style-type: none"> ● Reconnect rf cable to receiver RF INPUT connector and antenna mast connector following paragraph 2-10 <u>a</u> and <u>c</u>. ● Disconnect df cable from df processor DF ANT CONTROL connector and antenna mast connector following paragraph 2-13 <u>a</u> and <u>b</u>. ● Inspect df cable and connector for breaks, bent pins or other damage. ● Inspect DF ANT CONTROL connector df processor and antenna mast connector for damage. 	Cable or connector damaged ?	Contact organizational maintenance	5	

3-4. TROUBLESHOOTING PROCEDURES - Continued

h. DISPLAYS RANDOM LINES OF BEARING (SHEET 3 of 3)

Step	Instruction	Indication	Yes	No	Remarks
5	<p>Check bnc cable, connectors and connectors at SM OUTPUT on receiver and DF INPUT on df processor</p> <ul style="list-style-type: none"> ● Reconnect df cable to DF ANT CONTROL connector on df processor and on antenna mast connector following paragraph 2-10 <u>a</u> and <u>c</u>. ● Disconnect bnc cable from receiver SM OUTPUT and df processor DF INPUT following paragraph 2-13a. ● Inspect bnc cable connectors for breaks, bent pins or other damage. ● Inspect receiver SM OUTPUT jack and df processor DF INPUT jack for damage. 	Cable or connector(s) damaged ?	Contact organizational maintenance.	6	
6	Reconnect bnc cable to SM Output on receiver and DF INPUT and df processor and power up units following paragraph 2-11 <u>a</u> .	Lines of wearing steady ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

i. POWER LAMP THAT DOES NOT LIGHT

Step	Instruction	Indication	Yes	No	Remarks
1	Check protective cap on external POWER connector for looseness.	Cap is loose ?	2	3	
2	Tighten protective cap by pushing in on cap and turning clockwise.	POWER lamp lights ?	▲	3	
3	Inspect signal monitor battery/D-cell insert plug and signal monitor jack: <ul style="list-style-type: none"> ● Turn off power to signal monitor. ● Remove battery/D-Cell insert following paragraph 2-10b. ● Inspect connection for damage. 	Jack/plug good ?	4	4 or contact organizational maintenance.	If signal monitor D-Cell insert plug is damaged contact organizational maintenance If BA-4386/PRC-25 is used go to 4.
4	Remove/replace batteries following paragraph 3-6 <u>b.</u> 1 Turn on power to signal monitor.	POWER lamp lights ?	▲	5	
5	Remove/replace F1 fuse in D-cell insert following paragraph 3-6a.	Power lamp lights ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

j. NO RF SIGNAL ON CRT (SHEET 1 OF 2)

Step	Instruction	Indication	Yes	No	Remarks
1	Turn SM GAIN fully clockwise.	Rf signal spikes appear on crt ?	▲	2	
2	<p>Check bnc cable and connectors at SM INPUT on signal monitor and SM OUTPUT on df processor for damage.</p> <ul style="list-style-type: none"> ● Turn power off to signal monitor and df processor following paragraph 2-13 <u>a.</u> ● Disconnect cable from SM INPUT on signal monitor and SM OUTPUT on df processor following paragraph 2-13 <u>a.</u> ● Inspect bnc cable and connectors for breaks, bent pins and other damage. ● Inspect signal monitor SM INPUT connector and df processor SM OUTPUT connector for damage. 	Cables damaged ?	Contact organizational maintenance.	3	
3	Reconnect bnc cable to SM INPUT on signal monitor and SM OUTPUT on df processor and power up units following paragraph 2-10 <u>c.</u>	Rf signal spikes appear on crt ?	▲	Contact organizational maintenance.	

3-4. TROUBLESHOOTING PROCEDURES - Continued

k. NO TRACE ON CRT

Step	Instruction	Indication	Yes	No	Remarks
1	Turn INTEN knob fully clockwise.	Crt illuminates ?	▲	2	
2	Turn SWEEP WIDTH knob fully clockwise.	Crt illuminates ?	▲	Contact organizational maintenance.	

Section III. OPERATOR MAINTENANCE PROCEDURES

<u>Section Contents</u>	<u>Page</u>
3-5. Introduction.	3-19
3-6. Maintenance Procedures.	3-19

3-5. INTRODUCTION

Operator maintenance of the direction finder set consists of:

- Removing and replacing fuses.
- Removing and replacing batteries.

Refer to paragraph 3-6 a for removing and replacing fuses. Refer to paragraph 3-6 b for removing and replacing batteries.

3-6. MAINTENANCE PROCEDURES

WARNING

Do not remove the protective covers to any of the units. Voltages within these units can cause electrical shock.

Turn off all power to the units before replacing any of the fuses.

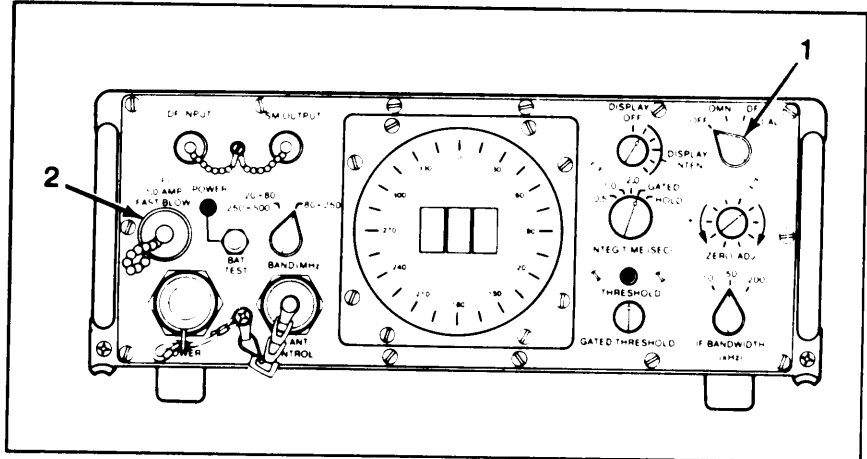
a. Removing and Replacing Fuses. There are four different fuses within the direction finder set that you will have to replace when necessary. One fuse is located on the main chassis of the df processor. The other three fuses are located in the D-cell inserts. Replace these fuses only after instructions listed in the troubleshooting procedures of chapter 3, section II tell you to replace them.

	<u>Page</u>
Removing and replacing df processor fuse	3-20
Removing and replacing D-cell insert fuse	3-23

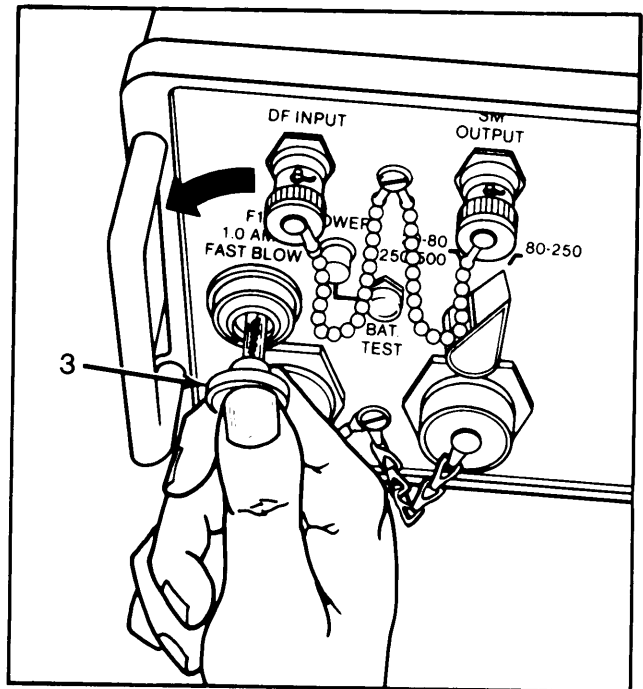
3-6 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING DF PROCESSOR FUSE (SHEET 1 OF 3)

1. Turn OFF/OMNI/DF/CAL switch (1) on df processor to OFF position.
2. Remove protective fuse cap (2) from df processor by turning counter-clockwise.



3. push in on 1.0 AMP FAST BLOW cap (3) on front panel and turn 1/4 turn counterclockwise.

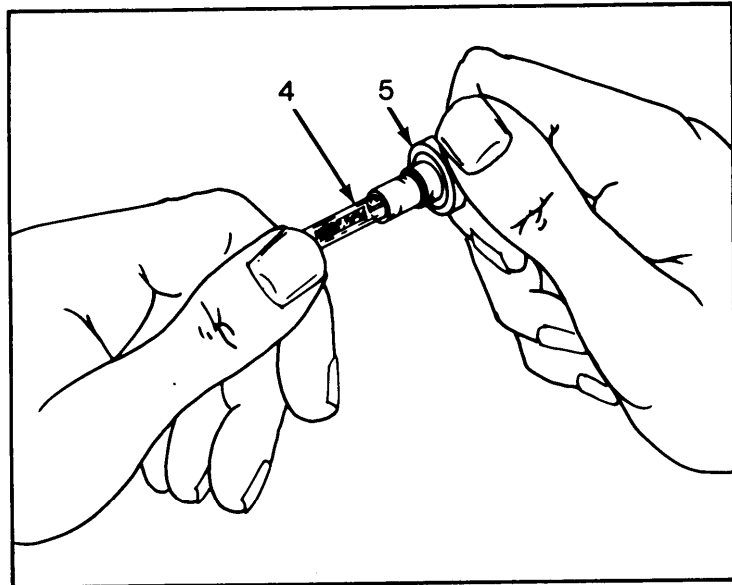


GO ON TO SHEET 2

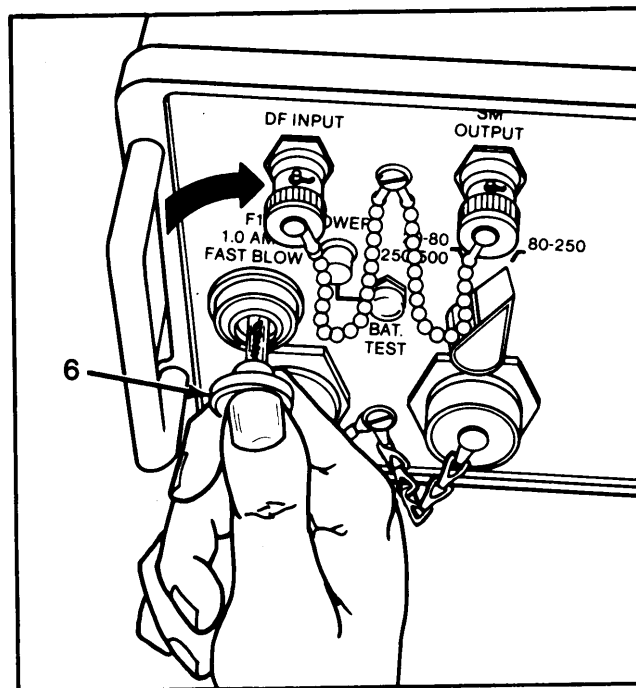
3-6 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING DF PROCESSOR FUSE (SHEET 2 OF 3)

4. Remove fuse (4) from cap (5).
5. Insert a new 1.0 amp fast blow fuse into cap (5).



6. Replace cap (6) in front panel by pushing in and turning 1/4 turn clockwise.

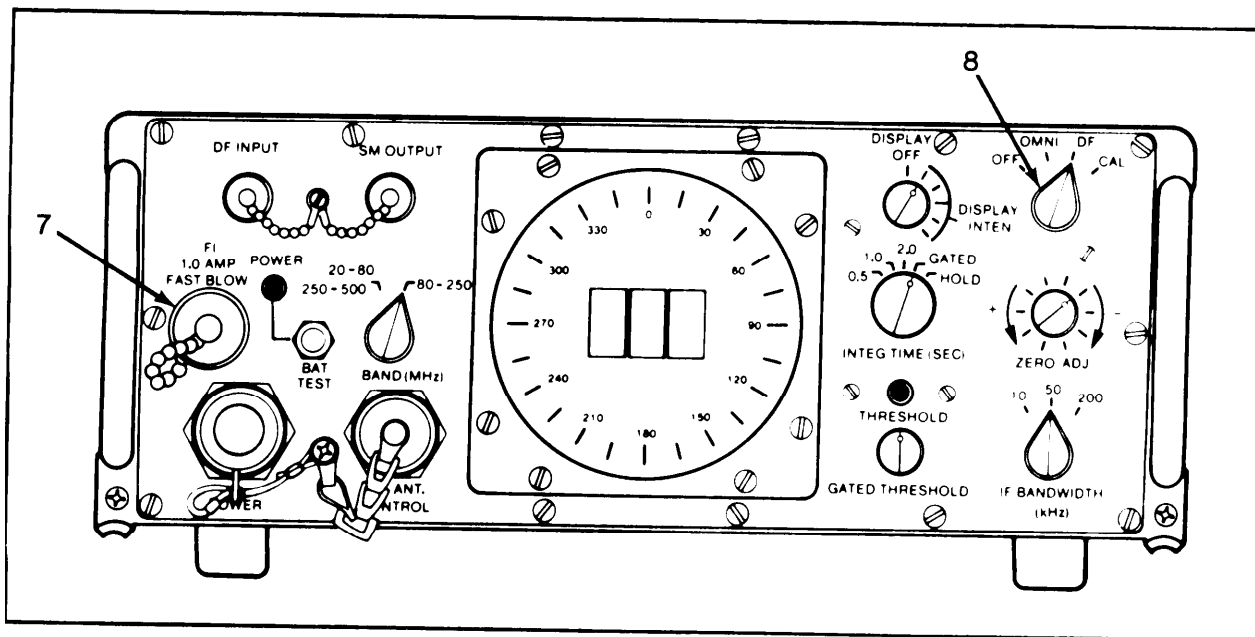


GO ON TO SHEET 3

3-6 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING DF PROCESSOR FUSE (SHEET 3 OF 3)

- 7. Replace protective fuse cap (7) on df processor by turning clockwise.
- 8. Turn OFF/OMNI/DF/CAL switch (8) on df processor to DF position.

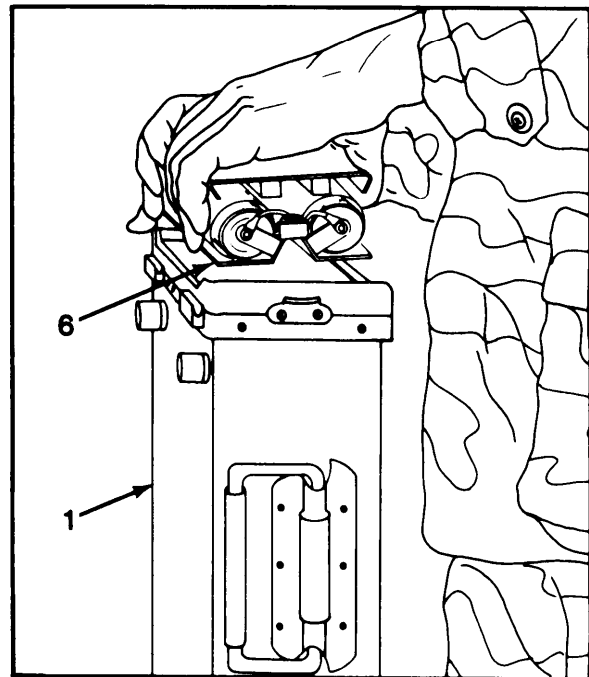
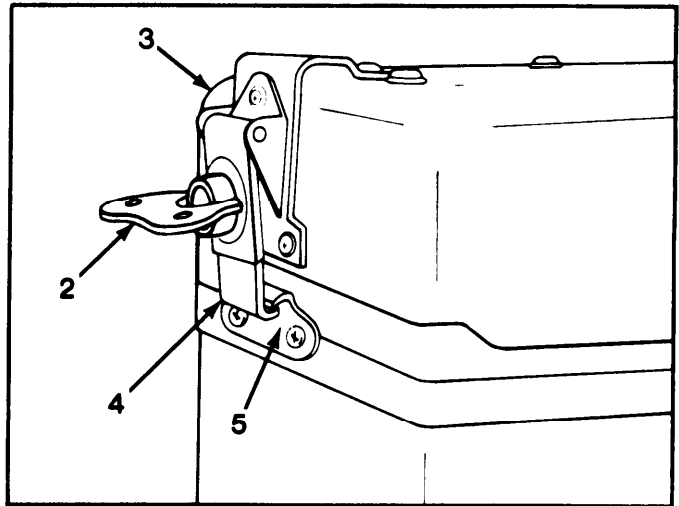


NOTE
Return to the troubleshooting table after removing and replacing the df processor fuse. Troubleshooting procedures must be completed.

3-6 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING D-CELL INSERT FUSE (SHEET 1 OF 3)

1. Turn power off on direction finder unit in accordance with paragraph 2-13 a.
2. Lift up on wing fasteners (2) at each side of battery rear cover (3).
3. Turn wing fasteners (2) counterclockwise until clamps (4) are free of direction finder unit clips (5).
4. Lift off battery cover (3) and set aside.
5. Remove D-cell insert (6) by lifting it up off direction finder unit (1).

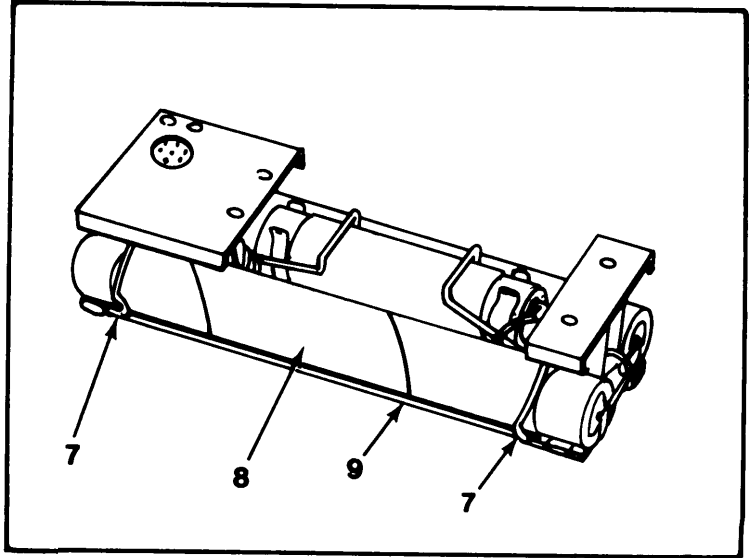


GO ON TO SHEET 2

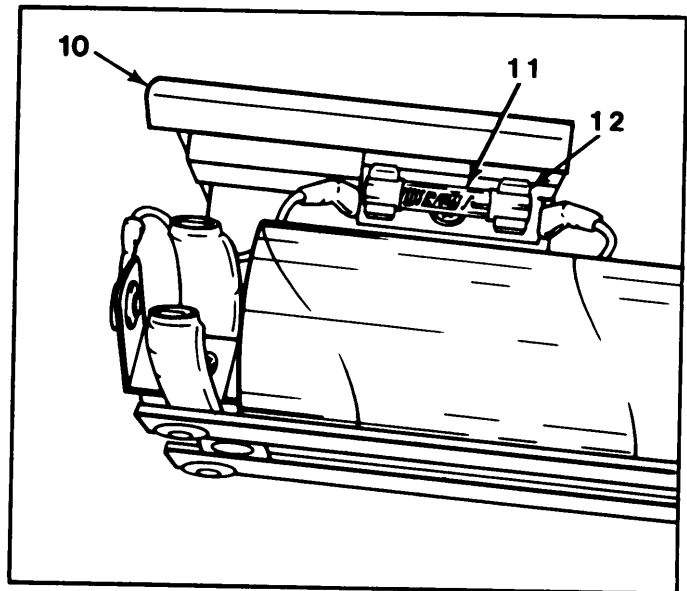
3-6 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING D-CELL INSERT FUSE (SHEET 2 OF 3)

6. Remove two retaining clips (7) from cardboard tube (8) at fuse side of D-Cell insert.
7. Lift cardboard tube (8) at fuse side of D-Cell insert from D-cell insert (9) with your hand.



8. Using fingers, reach under inner edge of receptacle plate (10) and pull out fuse (11) from holder (12).
9. Insert new 3/4 amp slow blow fuse into holder (12) under inner edge of receptacle plate (10) in D-cell insert (9).
10. Replace cardboard tube with batteries (8) and two retaining clips (7).

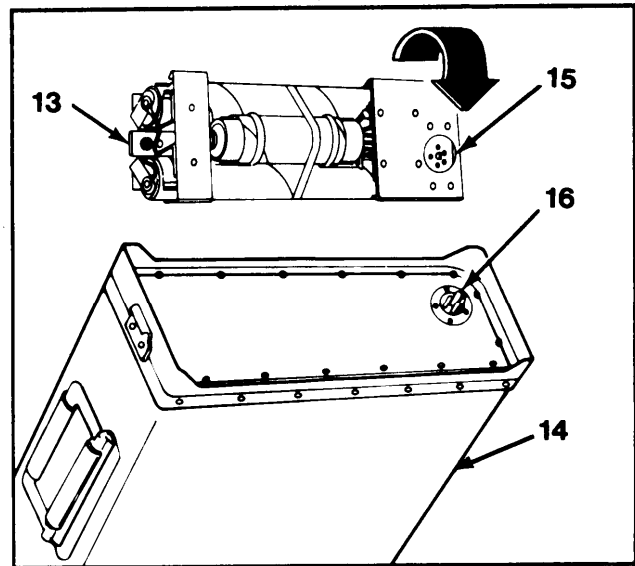


GO ON TO SHEET 3

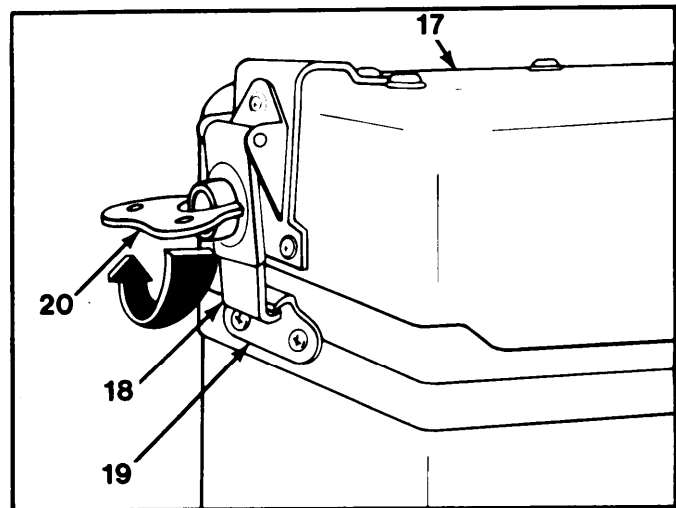
3-6 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING D-CELL INSERT FUSE (SHEET 3 OF 3)

11. Replace D-Cell insert (13) onto rear of direction finder unit (14) making sure plug slots on D-Cell insert (15) align with jack prongs (16) on bottom of direction finder unit.
12. Press D-Cell insert (13) into place.



13. Place battery cover (17) on bottom of direction finder unit.
14. Push each clamp (18) against clip (19) and lift up on wing fasteners (20).
15. Turn wing fasteners (20) clockwise until clamps (18) are locked in clips (19).
16. Push wing fasteners (20) flat against sides of direction finder unit.
17. Power on direction finder unit in accordance with paragraph 2-11A.



NOTE
Return to the troubleshooting table after removing and replacing the D-Cell insert fuse.

3-6. MAINTENANCE PROCEDURES - Continued

b. Removing and Replacing Batteries. When indications on the direction finder set show the batteries have low voltage levels, replace them in all units by following these steps.

1. Power down units in accordance with paragraph 2-13 a.
2. Disconnect cables on units in accordance with paragraph 2-13 a.
3. Remove unit(s) requiring batteries by lifting upper unit(s) off and setting aside.
4. Remove discharged battery and install new one in accordance with paragraph 2-10 b.
5. Restack units in accordance with paragraph 2-10 c.
6. Connect cables on units in accordance with paragraph 2-10 c.
7. Power up units in accordance with paragraph 2-11 a.

Section IV. MAINTENANCE OF
AUXILIARY EQUIPMENT

3-7. GENERAL

The following auxiliary equipment may be used with the direction finder set:

- Radio Set AN/PRC-77
- Audio Recorder AN/UNH-16A
- Radio Set AN/VRC-12
- Communications Security Equipment TSEC/KY-57
- Headset H-251/U

These equipment items are not part of the direction finder set and their troubleshooting and maintenance is not covered in this manual. Procedures for troubleshooting and maintenance of this auxiliary equipment can be found in the following manuals and bulletins:

Equipment	Manual or Bulletin
Radio Set AN/PRC-77	TM 11-5820-667-12
Audio Recorder AN/UNH-16A	TM 32-5835-220-10
Radio Set AN/VRC-12	TM 11-5820-401-12
Communications Security Equipment TSEC/KY-57	AR-750-1 (Section IV)
Headset H-251/U	SB 11-628

CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

	<u>Page</u>
Section I. Repair Parts, Special Tools, TMDE,	4-1
Section II. Service Upon Receipt.	4-2
Section III. Preventive Maintenance Checks and Services.	4-3
Section IV. Organizational Troubleshooting.	4-3
Section V. Organizational Maintenance procedures	4-40
Section VI. preparation For Storage or Shipment	4-67

Section I. REPAIR PARTS, SPECIAL TOOLS,
TMDE, AND SUPPORT EQUIPMENT

<u>SECTION CONTENTS</u>	<u>Page</u>
4-1. Common Tools and Equipment.	4-1
4-2. Special Tools, TMDE, and Support Equipment.	4-1
4-3. Repair Parts.	4-1

4-1. COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to Your unit.

4-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

No special tools, TMDE, or support equipment are needed for organizational maintenance of the direction finder set.

4-3. REPAIR PARTS

There are no repair parts listed for organizational level maintenance of the direction finder set.

Section II. SERVICE UPON RECEIPT

<u>SECTION CONTENTS</u>	<u>Page</u>
4-4. Site and Shelter Requirements	4-2
4-5. Service Upon Receipt of Materiel.	4-2

4-4. SITE AND SHELTER REQUIREMENTS

The direction finder set has specific siting and antenna orientation requirements. Refer to paragraph 2-9 for siting and orienting requirements. There are no shelter requirements for this equipment.

4-5. SERVICE UPON RECEIPT OF MATERIEL

Upon receiving the direction finder set from the manufacturer, perform the following checks:

a. Inspect the equipment for damage incurred during shipment. If e equipment has been damaged, report the damage on SF 361, Discrepancy in Shipment Report.

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check DA PAM 310-1 to see if any MWO'S need to be applied to the equipment.

Section III. PREVENTIVE MAINTENANCE
CHECKS AND SERVICES

4-6. GENERAL

a. preventive maintenance is the systematic care and inspection of equipment necessary to keep it in good operating condition. There are no required PMCS procedures for organizational level maintenance. Keep in mind, however, the routine checks and services listed for operator maintenance in paragraph 2-7.

b. Always keep in mind the warnings and cautions pertaining to the direction finder set.

c. If any portion of the direction finder set fails to operate, refer to paragraphs 3-3 and 3-4.

Section IV. ORGANIZATIONAL TROUBLESHOOTING

<u>SECTION CONTENTS</u>		<u>Page</u>
4-7	Introduction.	4-3
4-8	Symptom Index.	4-4
4-9	Troubleshooting Procedures	4-5

4-7. INTRODUCTION

When an operator identifies a malfunction and the operator corrective actions have failed, use the organizational maintenance symptom index and troubleshooting procedures to locate the cause of the problem.

a. The symptom index will assist you in locating the correct troubleshooting procedure. To use the index, match the malfunction description with the troubleshooting procedure page noted. Each troubleshooting table has a heading which matches the malfunction description in the symptom index.

b. Each troubleshooting table addresses a common malfunction which you may find during the operation or maintenance of the direction finder set or its components. To use the tables, perform the instructions and corrective actions in the order listed.

c. This manual cannot list all the malfunctions that occur, nor all the tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

4-8. SYMPTOM INDEX

Symptom	Troubleshooting Procedure Page
<u>RECEIVER</u>	
● POWER lamp that does not light	4-6
● FREQUENCY MHz display that does not light	4-7
● No audio and no signal indication on SIGNAL STR meter	4-8
● No audio and no signal indication on SIGNAL STR meter:	
When high band is selected	4-13
When low band is selected	4-14
In one or two IF BANDWIDTH positions	4-15
When USB/CW or LSB/CW is selected	4-16
When AM is selected	4-17
When FM is selected	4-18
● No audio when speaker assembly is used	4-19
● Changes frequency when DAFC lock switch is set to LOCK position	4-20
● FREQUENCY MHz display that locks at a preset frequency	4-21
● FREQUENCY MHz display that has unstable digits	4-22
<u>DF PROCESSOR</u>	
● POWER lamp that does not light	4-23
● No line of bearing display	4-25
● Displays incorrect lines of bearing	4-26
● Displays random lines of bearing	4-27
● ZERO ADJ control cannot set a 000 or 180 degree bearing	4-29
● No circular LED when set to GATED mode	4-30
● Random lines of bearing displayed when set to HOLD mode	4-31
● Random lines of bearing in one or two IF BANDWIDTHS positions	4-32
● Circular LED that does not turn off when THRESHOLD is adjusted	4-33
<u>SIGNAL MONITOR</u>	
● POWER lamp that does not light	4-34
● No rf signal on crt	4-35
● No trace on crt	4-38
● No marker on crt	4-39

4-9. TROUBLESHOOTING PROCEDURES

Organizational troubleshooting of the direction finder set is authorized for an EW/Intercept Systems Repairer only. The test equipment and materials that may be required for fault location and their nomenclature are provided in the following table.

Maintenance Supplies	Identification
<p><u>Test Equipment</u> Multimeter RF Voltmeter Angle Simulator High Frequency Probe Test Lead Set</p> <p><u>Materials/Parts</u> Battery, Dry Battery, Storage Battery, D-Cell Fuse, 1 amp, 3AC (71400) AGC1 Fuse/Cartridge, 3/4 amp, 3AG SLOW (71400) MDL 3/4 Receiver Indicator, Panoramic Antenna, Direction Finder Antenna, Direction Finder Control, Processor Display (df processor)</p>	<p>AN/PSM-45 Boonton 92C</p> <p>Boonton 91-12F Simpson No. 00577</p> <p>BA-4386/PRC-25 BB-586/U BA-30 5920-00-280-8342</p> <p>5920-00-230-9128 AN/GRR-8(V) IP-1355/GRR-8(V) AS-3732/PRD-11 AS-3733/PRD-11 C-11495/PRD-11</p>

Follow these instructions when using the troubleshooting tables:

- o Check initial setup for the exact equipment and materials required to perform the procedure.
- o Begin troubleshooting with Step 1.
- o Follow the directive listed in the Instruction column.
- o Match your results with the question asked in the

Indication column.

o If the answer to the question in the Indication column is yes, look in the Yes column and proceed to the step listed. If the answer to the question in the Indication column is no, look in the No column and proceed to the step listed .

o Continue through the table until ▲ or ■ appears in the Yes or No column. A triangle means to stop troubleshooting because the malfunction should now be corrected. A box means to refer back to the symptom index.

o Read any comments related to troubleshooting procedures in the Remarks column.

4-9. TROUBLESHOOTING PROCEDURES - Continued

a. RECEIVER POWER LAMP THAT DOES NOT LIGHT

INITIAL SETUP					
<u>Test Equipment</u> Multimeter Test lead set		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use.	
<u>Materials/Parts</u> Batteries 3/4 amp slow blow fuse Receiver					
Step	Instruction	Indication	Yes	No	Remarks
1	Turn receiver power on by turning volume switch clockwise.	POWER lamp lights?	▲	2	
2	Check for 11.5 to 15 v dc at battery with multimeter in accordance with paragraph 4-11 e.	Voltage reading correct?	5	3	
3	Replace battery in accordance with paragraph 2-10 b and repeat 1 above.	POWER lamp lights?	▲	Repeat 3 and go to 4 or 5	
4	Replace D-Cell insert fuse in accordance with paragraph 3-6 a and repeat 1 above.	POWER lamp lights?	▲	5	Perform only if D-Cell insert is used.
5	Replace receiver in accordance with paragraph 4-11 a and repeat 1 above.	POWER lamp lights?	▲	4	

4-9. TROUBLESHOOTING PROCEDURES - Continued

b. FREQUENCY MHz DISPLAY THAT DOES NOT LIGHT

INITIAL SETUP					
<u>Test Equipment</u>		<u>Equipment Condition Paragraph</u>		<u>Condition Description</u>	
None		2-10		Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u>		2-11 a			
Receiver					
Step	Instruction	Indication	Yes	No	Remarks
1	Rotate DISPLAY INTENSITY knob fully clockwise.	Display lights?	▲	2	
2	Replace receiver in accordance with paragraph 4-11A and repeat 1 above.	Display lights?	▲	Repeat 2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

c. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
(SHEET 1 OF 5)

INITIAL SETUP					
<u>Test Equipment</u>		<u>Equipment Condition Paragraph</u>		<u>Condition Description</u>	
Rf voltmeter		2-10		Direction finder set assembled and prepared for use.	
Angle simulator					
Multimeter					
High frequency probe					
Test lead set				Units powered up.	
<u>Materials/Parts</u>		2-11 a			
Rf cable					
Receiver					
Df cable					
Df processor					
DF antenna					
Step	Instruction	Indication	Yes	No	Remarks
1	Tune receiver to known signal.	Audio and signal indication on SIGNAL STRENGTH meter?	▲	2	
2	Check for signal at AUDIO jacks. ● Disconnect speaker cable from PHONES jack. ● Check for audio signals at PHONES jacks pin B and pin F with multimeter.	Both voltages present?	Go to table 4-9 i.	3	
3	Check receiver under stand alone condition: ● Disconnect rf cable at RF INPUT jack. ● Connect whip antenna to ANTENNA socket on receiver front panel.				

GO ON TO SHEET 2

4-9. TROUBLESHOOTING PROCEDURES - Continued

c. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
SHEET 2 OF 5)

Step	Instruction	Indication	Yes	No	Remarks
3 cont	<ul style="list-style-type: none"> ● Connect bnc of ANTENNA socket to RF INPUT jack. ● Tune to known frequency. ● Check for audio signal at PHONES jack pin B and pin F with multimeter. 	Both voltages present?	4	6	
4	Disconnect rf cable from rf connector on df antenna and check for continuity with a multimeter.	Continuity?	7	5	J19 on AS-3732/PRD-11. J19 or J20 on AS-37321 PRD-11.
5	<p>Reconnect antenna rf cable and check for signal at AUDIO connectors.</p> <ul style="list-style-type: none"> ● Disconnect bnc of antenna cable from DF INPUT connector. ● Check for audio signal at PHONES jack pin B and pin F with multimeter. 	Both voltages present?	▲	7	

GO ON TO SHEET 3

4-9. TROUBLESHOOTING PROCEDURES - Continued

C. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
(SHEET 3 OF 51)

Step	Instruction	Indication	Yes	No	Remarks
6	Replace receiver in accordance with paragraph 4-11 <u>a.</u> and tune to known frequency.	Audio present?		2	
7	Test df processor with angle simulator in accordance with paragraph 4-11 <u>c.</u>	Df processor readings match angle simulator settings?	8	10	
8	Disconnect df cable from DF ANT. CONTROL jack on df processor and J10 on df antenna and check for continuity with a multimeter.	Continuity?	11	9	
9	Replace df cable and check for signal at AUDIO jacks. ● Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present?	▲	11	

GO ON TO SHEET 4

4-9. TROUBLESHOOTING PROCEDURES - Continued

C. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
(SHEET 4 OF 5)

Step	Instruction	Indication	Yes	No	Remarks
10	Replace df processor in accordance with paragraph 4-11 <u>a</u> and check for signal at AUDIO jacks. <ul style="list-style-type: none"> ● Tune receiver to a known signal. ● Check for audio signal at PHONES jack pin B and pin F with multimeter. 	Both voltages present?	▲	2	
11	Check antenna elements (low bay). <ul style="list-style-type: none"> ● Remove elements from antenna in accordance with paragraph 2-13 <u>b</u>. ● Measure resistance of each element from metal stub on bottom of element to metal cap on top of element with multimeter. 	547 ohms ± 100 ohms present?	See Re- marks	12	If trouble shooting AS-3732/PRD-11, go to 15. If trouble shooting AS-3733/PRD-11, go to 13.
12	Replace defective element(s) and repeat 1 above.	Audio and signal indication on SIGNAL STR meter?	▲	2	

GO ON TO SHEET 5

4-9. TROUBLESHOOTING PROCEDURES - Continued

C. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
(SHEET 5 OF 5)

Step	Instruction	Indication	Yes	No	Remarks
13	Check antenna elements (high bay) <ul style="list-style-type: none"> ● Remove elements from antenna in accordance with paragraph 2-13 <u>b.</u> ● Measure resistance of each element from threaded end on bottom of element to metal cap on top of element. 	16K ohms ± 1K ohm present?	15	14	
14	Replace defective element(s) and repeat 1 above.	Audio and signal indication on SIGNAL STR meter?	▲	2	
15	Replace df antenna and check for signal at AUDIO jacks. <ul style="list-style-type: none"> ● Tear down antenna in accordance with paragraph 2-13 <u>b.</u> ● Emplace new df antenna in accordance with paragraph 2-10 <u>a.</u> ● Tune receiver to known signal. ● Check for audio signal at PHONES jack pin B and pin F with multimeter. 	Both voltages present?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

d. NO AUDIO AND NO INDICATION ON SIGNAL STR
METER WHEN HIGH BAND IS SELECTED

INITIAL SETUP					
<u>Test Equipment</u>		<u>Equipment Condition</u>		<u>Condition Description</u>	
Multimeter		2-10		Direction finder	
Test lead set				set assembled and	
<u>Materials/Parts</u>		2-113		prepared for use.	
Receiver				Units powered up.	
Step	Instruction	Indication	Yes	No	Remarks
1	Set receiver BAND MHz switch to higher band and tune receiver to a known signal.	Audio present?	▲	2	
2	Check for signal at AUDIO jacks. 1 Disconnect speaker cable from PHONES jack. 1 Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present?	■	3	
3	Replace receiver in accordance with paragraph 4-11 a and repeat 1 above.	Audio present?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

e. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR
METER WHEN LOW BAND IS SELECTED

INITIAL SETUP					
<u>Test Equipment</u> Multimeter Test lead set		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use, Units powered up.	
<u>Materials/Parts</u> Receiver		2-11 a			
Step	Instruction	Indication	Yes	No	Remarks
1	Set receiver BAND MHz switch to lower band and tune receiver to a known signal.	Audio present?	▲	2	
2	Check for signal at AUDIO jacks. ● Disconnect speaker cable at PHONES jack. ● Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present?	▲	3	
	Replace receiver in accordance with paragraph 4-11 b and repeat 1 above.	Audio present?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

f. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER
IN ONE OR TWO IF BANDWIDTH kHz POSITIONS

INITIAL SETUP					
<u>Test Equipment</u>		<u>Equipment Condition Paragraph</u>		<u>Condition Description</u>	
Multimeter		2-10		Direction finder set assembled and prepared for use. Units powered up.	
Test lead set					
<u>Materials/Parts</u>		<u>Equipment Condition Paragraph</u>			
Receiver		2-11 a			
Step	Instruction	Indication	Yes	No	Remarks
1	Set receiver IF BANDWIDTH switch to 10 kHz and tune receiver to a known signal.	Audio present?	2	4	
2	Set receiver IF BANDWIDTH switch to 50 kHz and tune to known signal.	Audio present?	3	4	
3	Set receiver IF BANDWIDTH switch to 200 kHz and tune to known signal.	Audio present?	■	4	
4	Check for signal at AUDIO jacks. ● Disconnect speaker cable at PHONES jack. Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present?	■	5	
5	Replace receiver in accordance with paragraph 4-11 a and repeat 1, 2 and 3 above.	Audio present?	▲	4	

4-9. TROUBLESHOOTING PROCEDURES - Continued

g. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR
METER WHEN USB/CW OR LSB/CW S SELECTED

INITIAL SETUP					
<u>Test Equipment</u> Multimeter Test lead set <u>Materials/Parts</u> Receiver		Equipment Condition <u>Paragraph</u> 2-10 2-11 a	<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.		
Step	Instruction	Indication	Yes	No	Remarks
1	Set receiver MODE switch to USB/CW and tune receiver to known signal.	Audio present?	2	3	
2	Set receiver MODE switch to LSB/CW.	Audio present?	■	3	
3	Check for signal at AUDIO jacks. ● Disconnect speaker cable at PHONES jack. ● Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present?	■	4	
4	Replace receiver in accordance with paragraph 4-11 a and repeat 1 and 2 above.	Audio present ?	A	3	

4-9. TROUBLESHOOTING PROCEDURES - Continued

h. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR METER WHEN AM IS SELECTED

INITIAL SETUP					
<u>Test Equipment</u> Multimeter Test lead set		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Receiver		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Set receiver MODE switch to AM and tune receiver to known signal.	Audio present?	■	2	
2	Check for signal at AUDIO jacks. ● Disconnect speaker cable from PHONES jack. ● Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present?	■	3	
3	Replace receiver in accordance with paragraph 4-11a and repeat 1 above.	Audio present?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

i. NO AUDIO AND NO SIGNAL INDICATION ON SIGNAL STR
METER WHEN FM IS SELECTED

INITIAL SETUP					
<u>Test Equipment</u>		<u>Equipment Condition</u>		<u>Condition Description</u>	
Multimeter		2-10		Direction finder set assembled and prepared for use.	
Test lead set		2-11a		Units powered up.	
<u>Materials/Parts</u>					
Receiver					
Step	Instruction	Indication	Yes	No	Remarks
1	Set receiver MODE switch to FM and tune receiver to known signal.	Audio present?	■	2	
2	Check for signal at AUDIO jacks. ● Disconnect speaker cable at PHONES jack. ● Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present?	■	3	
3	Replace receiver in accordance with paragraph 4-11a and repeat 1 above.	Audio present?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued
 j. NO AUDIO WHEN SPEAKER ASSEMBLY IS USED

INITIAL SETUP					
<u>Test Equipment</u> Multimeter Test lead set		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Speaker assembly		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Tune receiver to known signal and listen for audio at speaker.	Audio present?	■	2	
2	Check signal at AUDIO jacks. ● Disconnect speaker cable from PHONES jack. ● Check for audio signal at PHONES jack pin B and pin F with multimeter.	Both voltages present ?	3	Go to table 4-9c step 3.	
3	Replace speaker assembly in accordance with paragraph 4-11a and repeat 1 above.	Audio present?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

k. CHANGES FREQUENCY WHEN D AFC LOCK SWITCH IS SET TO LOCK POSITION

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Receiver		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Tune to known signal, set D AFC LOCK switch to LOCK and observe FREQUENCY MHz display.	Display locked on frequency?	■	2	
2	Replace receiver in accordance with paragraph 4-11a and repeat 1 above.	Display locked on frequency?	▲	Re-peat 2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

1. FREQUENCY MHz DISPLAY THAT LOCKS AT A PRESET FREQUENCY

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Receiver		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Rotate TUNE knob clockwise and then counter-clockwise while observing FREQUENCY MHz display.	Display remaining at preset frequency?	2	■	
2	Replace receiver in accordance with paragraph 4-11a and repeat 1 above.	Display remaining at preset frequency?	Repeat 2	▲	

4-9. TROUBLESHOOTING PROCEDURES - Continued

m. FREQUENCY DISPLAY THAT HAS UNSTABLE DIGITS

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Receiver		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Tune receiver to known signal and observe FREQUENCY MHz display.	Digits unstable?	2	■	
2	Replace receiver in accordance with paragraph 4-11a and repeat 1 above.	Digits unstable?	Repeat 2	▲	

4-9. TROUBLESHOOTING PROCEDURES - Continued

n. DF PROCESSOR POWER LAMP DOES NOT LIGHT (SHEET 1 OF 2)

INITIAL SETUP					
<u>Test Equipment</u> Multimeter Test lead set		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use.	
<u>Materials/Parts</u> Batteries 3/4 amp slow blow fuse Df processor					
Step	Instruction	Indication	Yes	No	Remarks
1	Turn df processor power on by turning DISPLAY OFF/ DISPLAY INTENSITY switch clockwise.	POWER lamp lights?	■	2	
2	Check front panel fuse.	Fuse blown?	3	4	
3	Replace fuse in accordance with paragraph 3-6a and repeat 1 above.	POWER lamp lights?	▲	4	
4	Check for 11.5 to 15 v dc at battery with multimeter in accordance with paragraph 4-11e.	Voltage reading correct?	7	5	
5	Replace battery in accordance with paragraph 3-6b and repeat 1 above.	POWER lamp lights?	▲	Repeat 5 & go to 6 or 7	Go to 6 if D-Cell insert used.
6	Replace D-Cell insert fuse in accordance with paragraph 3-6a and repeat 1 above.	POWER lamp lights?	▲	7	Perform only if D-Cell insert is used.

GO ON TO SHEET 2

4-9. TROUBLESHOOTING PROCEDURES - Continued

n. DF PROCESSOR POWER LAMP DOES NOT LIGHT (SHEET 2 OF 2)

Step	Instruction	Indication	Yes	No	Remarks
7	Replace df proces- sor in accordance with paragraph 4-11a and repeat 1 above.	POWER lamp lights ?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

o. NO LINE OF BEARING DISPLAY

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Df processor Df processor bnc cable		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Tune receiver to known frequency and observe df processor display for indication of lob.	Lob displayed?	■	2	
2	Replace df processor in accordance with paragraph 4-11a and repeat 1 above.	Lob displayed?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

p. DISPLAYS INCORRECT LINE OF BEARING

INITIAL SETUP

Test Equipment
Angle simulator

Equipment Condition Paragraph
2-10

Materials/Parts
Df processor

2-11a

Condition Description
Direction finder set assembled and prepared for use. Units powered up.

Step	Instruction	Indication	Yes	No	Remarks
1	Tune receiver to signal of known lob and observe df processor display for indication of correct lob.	Lob correct?	■	2	
2	Test df processor with angle simulator in accordance with paragraph 4-11c.	Df processor readings match angle simulator settings?	■	3	
3	Replace df processor in accordance with paragraph 4-11a and repeat 1 above.	Lob correct?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

q. DISPLAYS RANDOM LINES OF BEARING (SHEET 1 OF 2)

INITIAL SETUP					
	<u>Test Equipment</u>		<u>Equipment Condition Paragraph</u>		<u>Condition Description</u>
	Rf voltmeter		2-10		Direction finder set assembled and prepared for use. Units powered up.
	Multimeter				
	Angle simulator				
	High frequency probe				
	Test lead set				
	<u>Materials/Parts</u>		2-11a		
	Df processor				
	Df processor bnc cable				
Step	Instruction	Indication	Yes	No	Remarks
1	Tune receiver to signal of known lob and observe df processor display for indication of correct lob.	Lob stable?	■	2	
2	Check receiver output: <ul style="list-style-type: none"> ● Disconnect df processor bnc cable at SM OUTPUT on receiver and SM INPUT on df processor. ● Check for signal at SM OUTPUT jack on receiver using a rf voltmeter. 	Signal present?	3	5	
3	Check for continuity of df processor bnc cable with a multimeter.	Continuity?	5	4	

GO ON TO SHEET 2

4-9. TROUBLESHOOTING PROCEDURES - Continued

g. DISPLAYS RANDOM LINES OF BEARING (SHEET 2 OF 2)

Step	Instruction	Indication	Yes	No	Remarks
4	Replace df processor bnc cable, connect it into SM OUTPUT jack on receiver and SM INPUT on df processor and repeat 1 above.	Lob displayed?	▲	5	
5	Test df processor with angle simulator in accordance with paragraph 4-11c.	Df processor readings match angle simulator settings?	■	6	
6	Replace df processor in accordance with paragraph 4-11a and repeat 1 above.	Lob displayed?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

r. ZERO ADJ CONTROL SET A 000 OR 180 DEGREE BEARING

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Df processor		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Calibrate df processor: ● Set OFF/OMNI/DF/CAL switch to CAL. ● Rotate ZERO ADJ knob until lob display reads 000 or 180.	Display adjusts to 000 or 180 ?	▲	2	Display adjusts to 000 when BAND MHz switch is set to 80-250. Display adjusts to 180 when BAND MHz switch is set to 20-80/250-500.
2	Replace df processor and repeat 1 above.	Display adjusts to 000 or 180 ?	▲	Repeat 2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

s. NO CIRCULAR DISPLAY WHEN SET TO GATED MODE

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Df processor		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Observe circular LED on df processor lob display. ● Set INTEG TIME (SEC) switch to GATED. ● Rotate GATED THRESHOLD control fully clockwise.	Circular LED lit ?	▲	2	
2	Replace df processor in accordance with paragraph 4-11a and repeat 1 above.	Circular LED lit ?	▲	Re-peat 2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

t. RANDOM LINES OF BEARING WHEN SET TO HOLD MODE.

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Df processor		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Observe lob display for stable lob. ● Set INTEG TIME (SEC) switch to HOLD.	Lob stable ?	▲	2	
2	Replace df processor in accordance with paragraph 4-11a and repeat 1 above.	Lob stable ?	▲	Re-repeat 2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

u. RANDOM LINES OF BEARING IN ONE OR TWO
IF BANDWIDTHS (KHz) positions

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u>	
<u>Materials/Parts</u> Df processor		2-11a		Direction finder set assembled and prepared for use. Units powered up.	
Step	Instruction	Indication	Yes	No	Remarks
1	Observe lob display for stable lob. ● Set IF BANDWIDTH (kHz) switch to 10, 50 and 200.	Lob stable in all bandwidths ?	▲	2	
2	Replace df processor in accordance with paragraph 4-11a and repeat 1 above.	Lob stable in all bandwidths ?	▲	Re-peat 2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

v. CIRCULAR DISPLAY THAT DOES NOT TURN OFF WHEN THRESHOLD IS ADJUSTED

INITIAL SETUP					
<u>Test Equipment</u> None		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up.	
<u>Materials/Parts</u> Df processor		2-11a			
Step	Instruction	Indication	Yes	No	Remarks
1	Observe circular LED display. ● Set INTEG TIME (SEC) switch to GATED. ● Turn GATED THRESHOLD knob fully counter-clockwise.	Circular LED turned off ?	▲	2	
2	Replace df processor in accordance with paragraph 4-11a and repeat 1 above.	Circular LED turned off ?	▲	Re-peat 2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

w. SIGNAL MONITOR POWER LAMP DOES THAT NOT LIGHT

INITIAL SETUP					
<u>Test Equipment</u> Multimeter Test lead set		<u>Equipment Condition Paragraph</u> 2-10		<u>Condition Description</u> Direction finder set assembled and prepared for use.	
<u>Materials/Parts</u> Batteries 3/4 amp slow blow fuse Signal monitor					
Step	Instruction	Indication	Yes	No	Remarks
1	Turn signal monitor power on by setting POWER/ON switch to ON.	POWER lamp lights ?	▲	2	
2	Check for 11.5 to 15 v dc at battery with multimeter in accordance with paragraph 4-11e.	Voltage reading correct ?	5	3	
3	Replace battery in accordance with paragraph 3-6b and repeat 1 above.	POWER lamp lights ?	▲	Repeat 3 and go to 4 or 5	Go to 5 if D-Cell insert used.
4	Replace D-Cell insert fuse in accordance with paragraph 3-6a and repeat 1 above.	POWER lamp lights ?	▲	5	Perform only if D-Cell insert is used.
5	Replace signal monitor in accordance with paragraph 4-11a.	POWER lamp lights ?	▲	4	

4-9. TROUBLESHOOTING PROCEDURES - Continued

x. NO RF SIGNAL ON CRT (SHEET 1 OF 3)

INITIAL SETUP					
	<u>Test Equipment</u>		<u>Equipment Condition Paragraph</u>		<u>Condition Description</u>
	Multimeter		2-10		Direction finder set assembled and prepared for use. Units powered up. Initial adjustments made.
	Angle simulator				
	Test lead set				
	<u>Materials/Parts</u>				
	Signal monitor		2-11		
	Signal monitor bnc cable		2-12		
Step	Instruction	Indication	Yes	No	Remarks
1	Tune receiver to known signal and observe signal monitor crt.	Rf signal displayed ?	■	2	
2	Check signal monitor: <ul style="list-style-type: none"> ● Connect cable from DF ANT CONTROL INPUT on angle simulator to DF INPUT connector on df processor. ● Disconnect signal monitor bnc cable from SM INPUT on signal monitor. ● Connect cable from DF SIGNAL OUT on angle simulator to SM INPUT on signal monitor. ● Set MARKER switch on signal monitor to off. 				

GO ON TO SHEET 2

4-9. TROUBLESHOOTING PROCEDURES - Continued

x. NO RF SIGNAL DISPLAY ON CRT (SHEET 2 OF 3)

Step	Instruction	Indication	Yes	No	Remarks
2 cont	<ul style="list-style-type: none"> ● Observe signal monitor crt for signal spike. 	Signal spike displayed ?	5	3	
3	<p>Test df processor with angle simulator in accordance with paragraph 4-11c.</p> <ul style="list-style-type: none"> ● Connect DF SIGNAL OUT cable on angle simulator to DF INPUT jack on df processor. ● Test df processor with angle simulator in accordance with paragraph 4-11c. ● Observe df processor for correct simulator readings. 	Df processor readings match angle simulator settings ?	5	4	
4	Replace df processor in accordance with paragraph 4-12a and repeat 1 above.	Rf signal displayed ?	▲	2	
5	Check for continuity of signal monitor bnc cable using a multimeter.	Continuity ?	7	6	
6	Replace signal monitor bnc cable and observe signal monitor crt.	Rf signal displayed ?	▲	7	

GO ON TO SHEET 3

4-9. TROUBLESHOOTING PROCEDURES - Continued

x. NO RF SIGNAL DISPLAY ON CRT (SHEET 3 OF 3)

Step	Instruction	Indication	Yes	No	Remarks
7	Replace signal monitor in accordance with paragraph 4-11a and repeat 1 above.	Rf signal displayed ?	▲	2	

4-9. TROUBLESHOOTING PROCEDURES - Continued

y. NO TRACE ON CRT

INITIAL SETUP <u>Test Equipment</u> None		Equipment Condition <u>Paragraph</u> 2-10	<u>Condition Description</u> Direction finder set assembled and prepared for use. Units powered up. Initial adjust- ments made.
<u>Materials/Parts</u> Signal monitor		2-11 2-12	

Step	Instruction	Indication	Yes	No	Remarks
1	Observe signal monitor crt for marker.	Marker present ?	■	2	
2	Replace signal monitor in accordance with paragraph 4-11a and repeat 1 above.	Marker present ?	▲	Re- peat 2	

Section V. ORGANIZATIONAL MAINTENANCE

<u>SECTION CONTENTS</u>	<u>Page</u>
4-10. Introduction.	4-40
4-11. Maintenance Procedures	4-40

4-10. INTRODUCTION

Organizational maintenance of the direction finder set consists of:

	<u>Page</u>
● Removing and replacing units for servicing	4-40
● Removing and replacing D-Cell insert	4-47
● Removing and installing tuner assemblies	4-48
● Verifying df processor alinement using angle simulator	4-63
● Testing battery pack plug	4-66

4-11. MAINTENANCE PROCEDURES

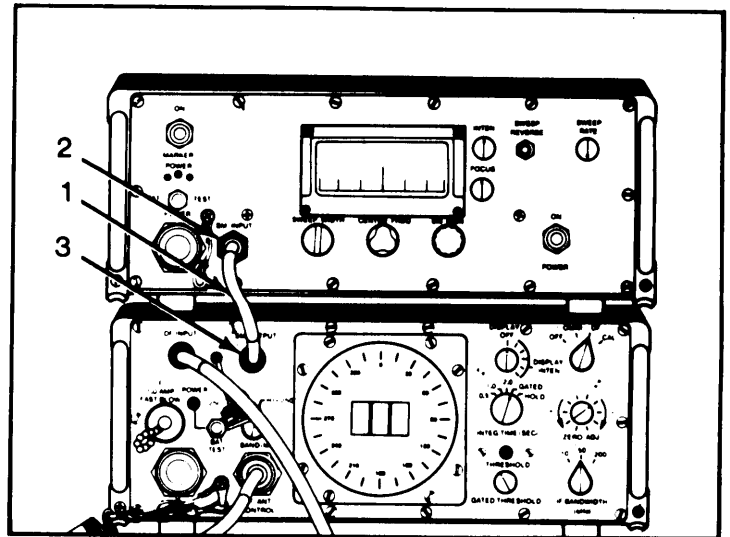
a. Removing and Replacing Units for Servicing. When a unit of the direction finder set needs to be replaced for servicing follow the remove and replace procedures listed below.

	<u>Page</u>
● Removing and replacing signal monitor	4-41
● Removing and replacing df processor	4-42
● Removing and replacing receiver	4-45
● Removing and replacing speaker assembly	4-46

4-11 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING SIGNAL MONITOR

1. Power down units in accordance with paragraph 2-13 a.
2. Disconnect bnc cable (1) from SM INPUT jack (2) of signal monitor.
3. Remove faulty signal monitor and replace with an operational unit.
4. Connect bnc cable (1) from SM OUTPUT jack (3) of df processor to SM INPUT jack (2) on signal monitor.
5. Power up units in accordance with paragraph 2-11 a.



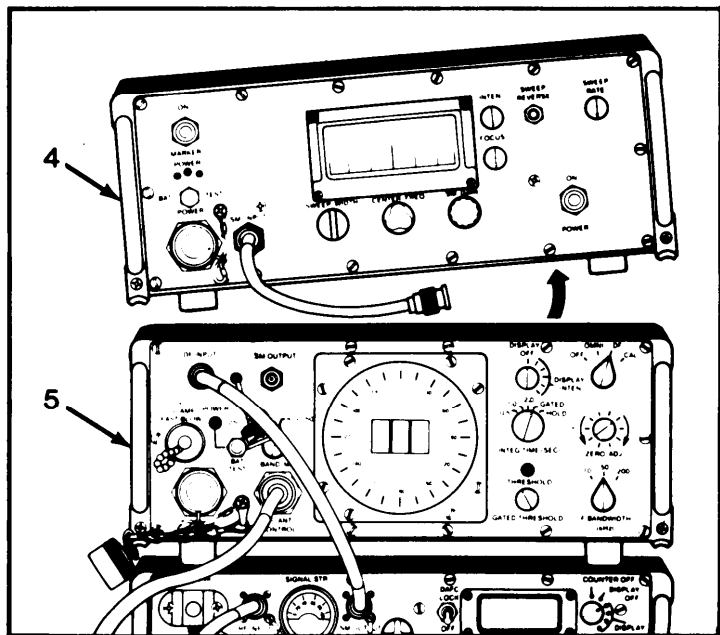
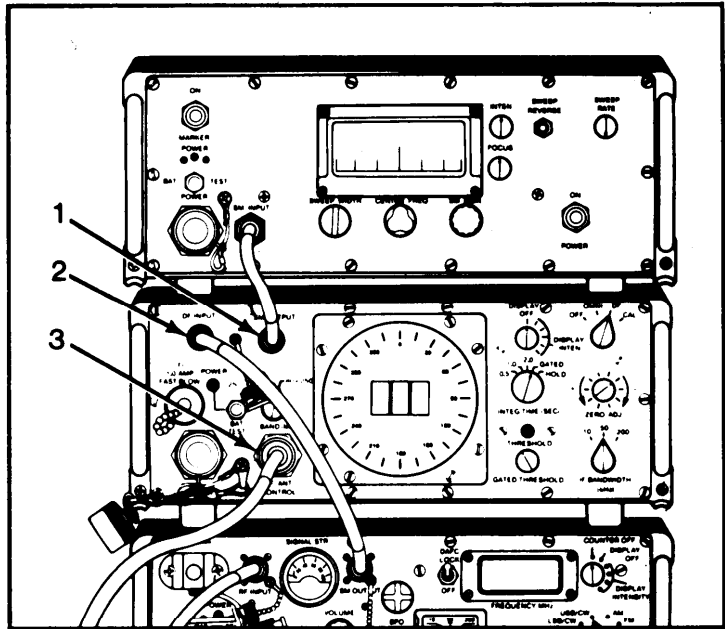
4-11 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING DF PROCESSOR (SHEET 1 OF 3)

1. Power down units in accordance with paragraph 2-13 a.

CAUTION
 Be careful that bnc and df cables and connectors are not snagged on other pieces of equipment when removing signal monitor and df processor.

2. Disconnect bnc cable from SM OUTPUT jack (1) on df processor.
3. Disconnect bnc cable from DF INPUT jack (2) on df processor.
4. Disconnect control cable from DF ANT. CONTROL jack (3) on df processor.
5. Lift off signal monitor (4) from stacked units and set aside.
6. Remove faulty df processor (5) and replace with an operational unit.



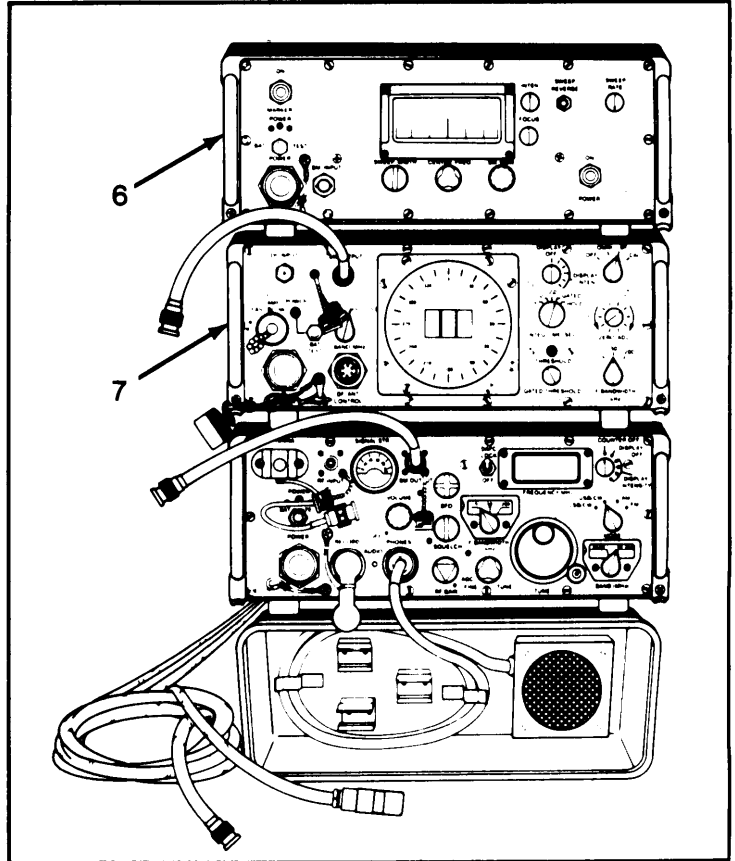
4-11 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING DF PROCESSOR (SHEET 2 OF 3)

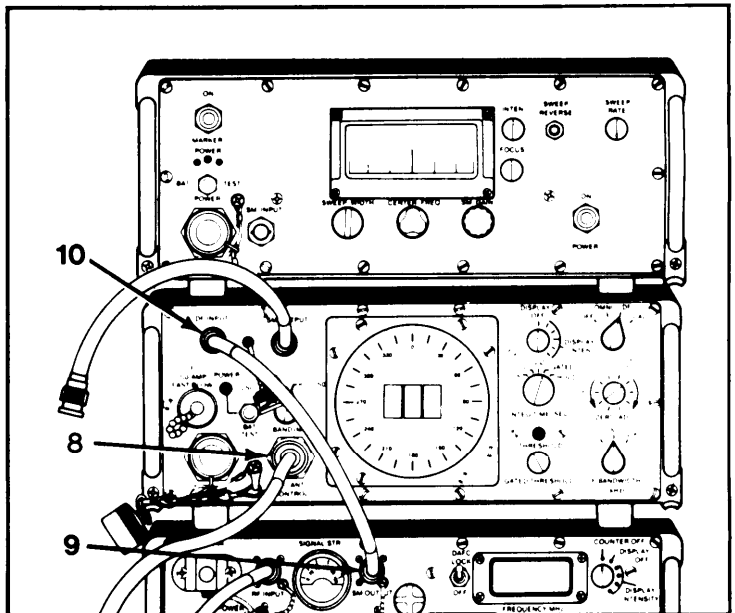
CAUTION

Be careful that bnc and df cables and connectors are not snagged on other pieces of equipment when removing signal monitor and df processor.

7. Replace signal monitor (6) on top of df processor (7).



8. Connect df cable from df antenna to DF ANT. CONTROL jack (8) on df processor (7).
9. Connect bnc cable from SM OUTPUT jack (9) on receiver to DF INPUT jack (10) on df processor (7).

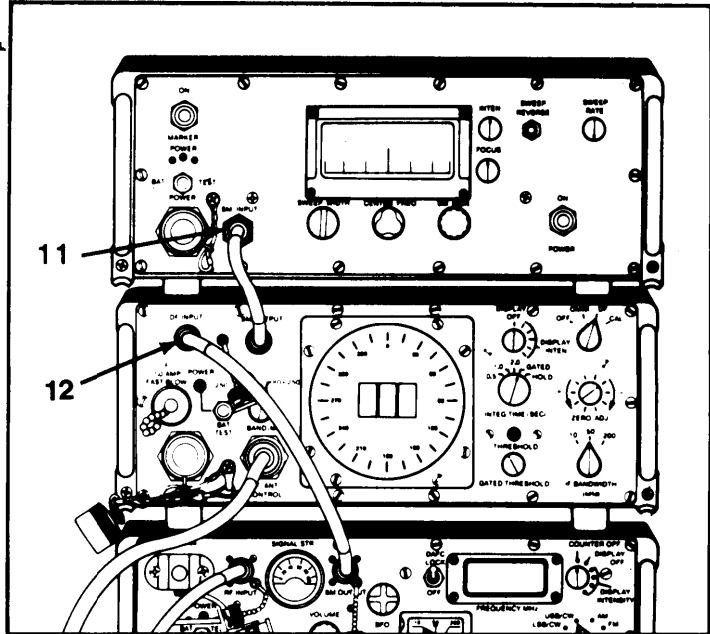


GO ON TO SHEET 3

4-11 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING DF PROCESSOR (SHEET 3 OF 3)

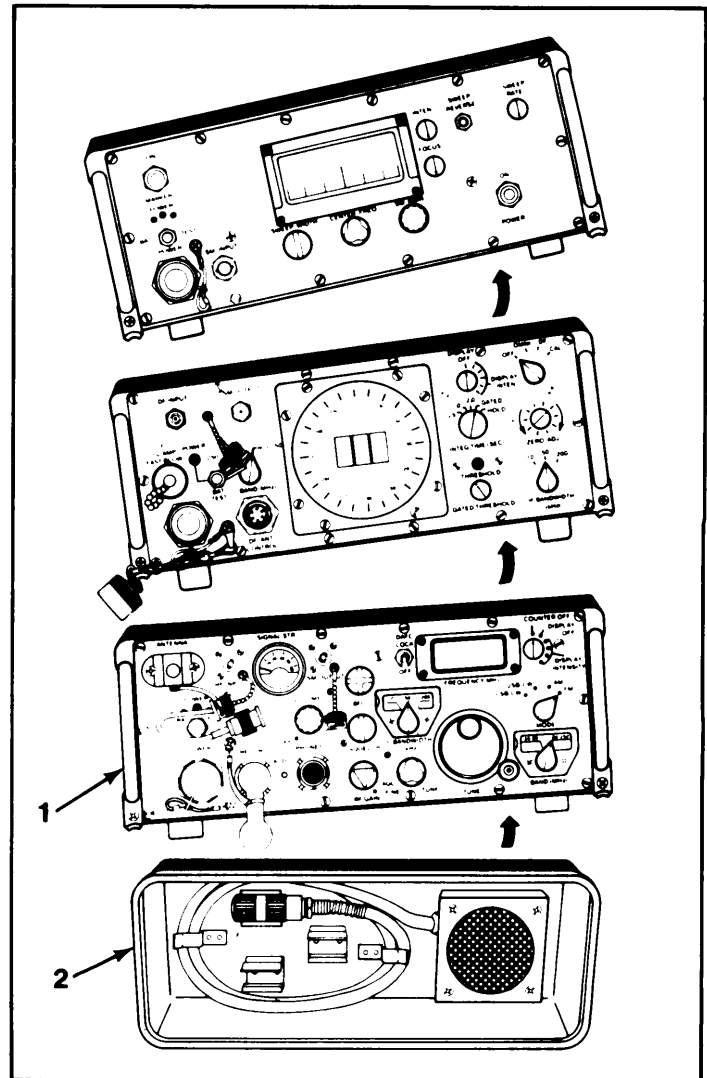
10. Connect bnc cable from SM INPUT jack (11) on signal monitor to SM OUTPUT jack (12) on df processor.
11. Power up units in accordance with paragraph 2-11 a.



4-11 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING RECEIVER

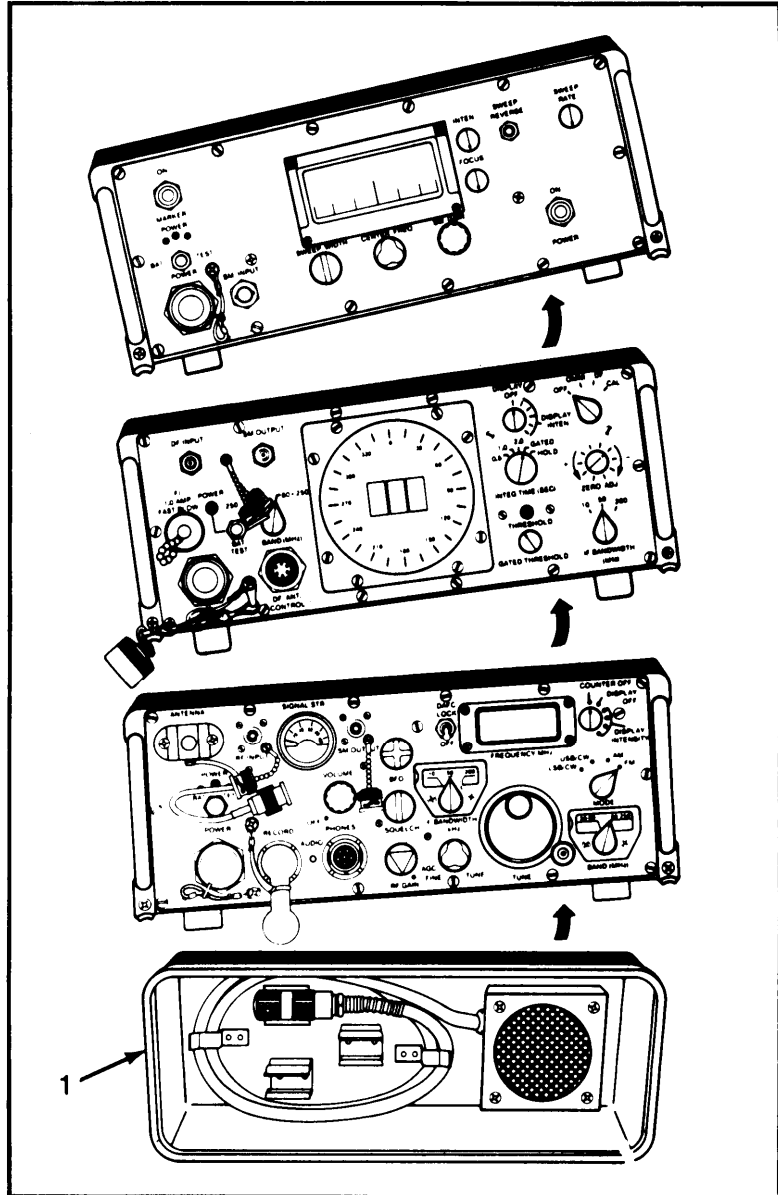
1. Power down units in accordance with paragraph 2-13 a.
2. Uncable units in accordance with para 2-13 a.
3. Lift off each unit and set aside to access receiver (1) and speaker assembly (2).
4. Remove receiver (1) and speaker assembly (2).
5. Replace speaker assembly (2) over receiver front panel in accordance with para 2-13 a.
6. Replace with an operational receiver and speaker assembly.
7. Restack and cable units in accordance with para 2-10 c.
8. Power up units in accordance with para 2-11 a.



4-11 a. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING SPEAKER ASSEMBLY

1. Power down units in accordance with para 2-13 a.
2. Unstack each unit and set aside to access speaker assembly (1).
3. Remove speaker assembly (1) and replace with an operational unit.
4. Restack and cable units in accordance with para 2-10 c.
5. Power up units in accordance with para 2-11 a.



4-11. **MAINTENANCE PROCEDURES - Continued**

b. Removing and Replacing D-Cell Insert. When indications on the direction finder set show D-Cell batteries have low voltage levels, replace the D-Cell insert in all units by following these steps.

1. Remove defective units in accordance with paragraph 4-11 a.
2. Remove defective D-Cell insert from unit following steps in paragraph 2-10 b.
3. Remove batteries from defective D-Cell insert following steps in paragraph 2-10 b.
4. Place D-cell batteries in spare D-Cell insert following steps in paragraph 2-10 b.
5. Place spare D-Cell insert into unit following steps in paragraph 2-10 b.
6. Replace units in stack in accordance with paragraph 4-11 a.

4-11. MAINTENANCE PROCEDURES - Continued

c. Removing and Installing Tuner Assemblies. According to mission requirements you will be removing and installing tuner assemblies within the receiver of the direction finder set. Follow the remove and install procedures in this paragraph.

	<u>Page</u>
● Removing receiver cover	4-44
● Removing tuner assembly	4-46
● Installing tuner assembly	4-51
● Replacing receiver cover	4-55
● Removing and installing BAND MHz plate	4-56

WARNING
 Voltages within the direction finder units can cause electrical shock. Do not work on equipment when power is applied.

INITIAL SETUP	
<p><u>Test Equipment</u> None</p> <p><u>Tools</u> Tool Kit, Electronic Equipment TK-105/G No. 1 Phillips screwdriver 4 in. flat tip screwdriver 7/32 in. box end wrench .05 in. hex head screw key Needlenose pliers</p>	<p><u>Personnel Required</u> EW Intercept Systems Repairer, MOS 33510</p>

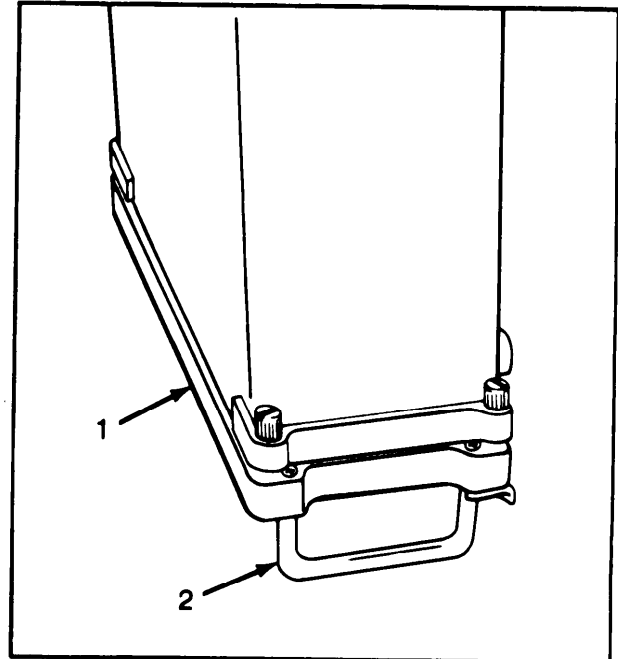
4-11c. MAINTENANCE PROCEDURES - Continued

REMOVING RECEIVER COVER (SHEET 1 OF 2)

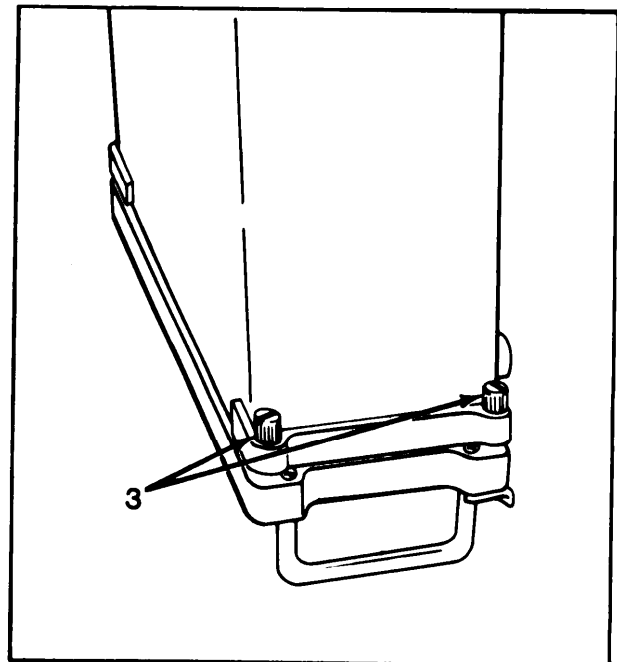
1. Remove front cover and stand receiver (1) up on a flat surface so it rests on its front panel handles (2).

NOTE

- Bottom of receiver (battery cover) will be in up position.
- Ensure battery has been removed.



2. Loosen two slotted screws (3) from each side of front panel with a 4 in. flat tip screwdriver.

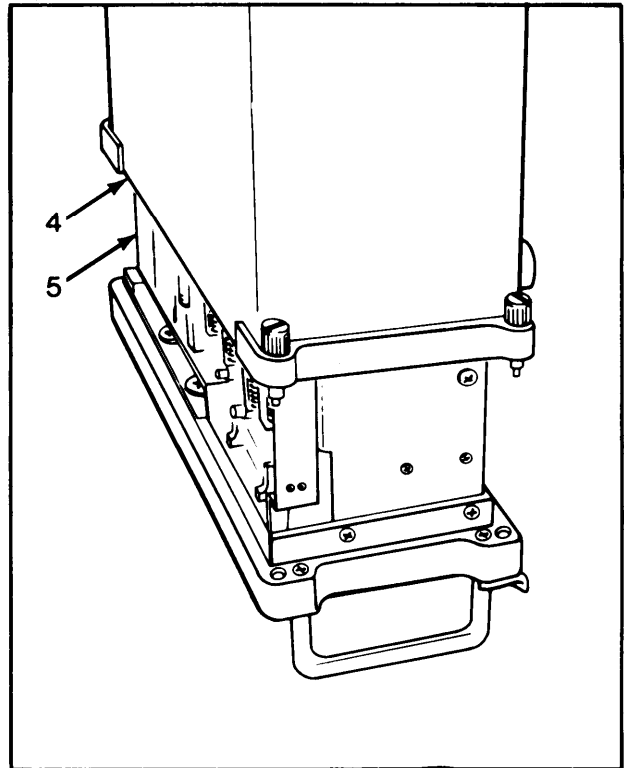


GO ON TO SHEET 2

4-11 c. MAINTENANCE PROCEDURES - Continued

REMOVING RECEIVER COVER (SHEET 2 OF 2)

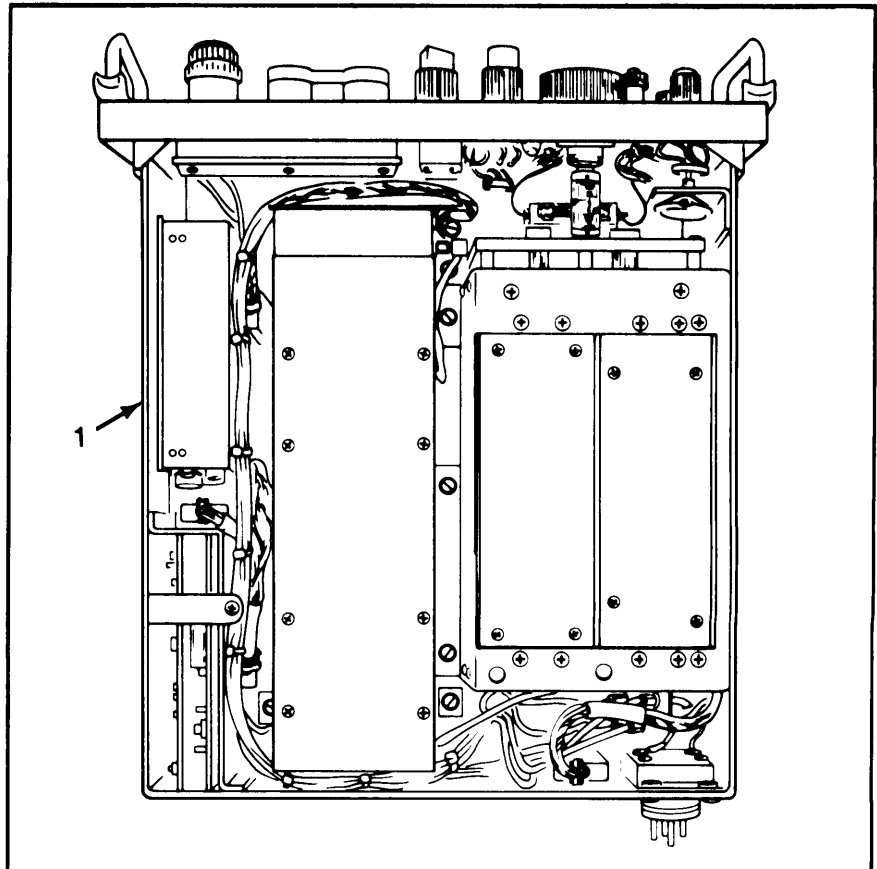
3. Pull receiver cover (4) up and off of receiver chassis (5).



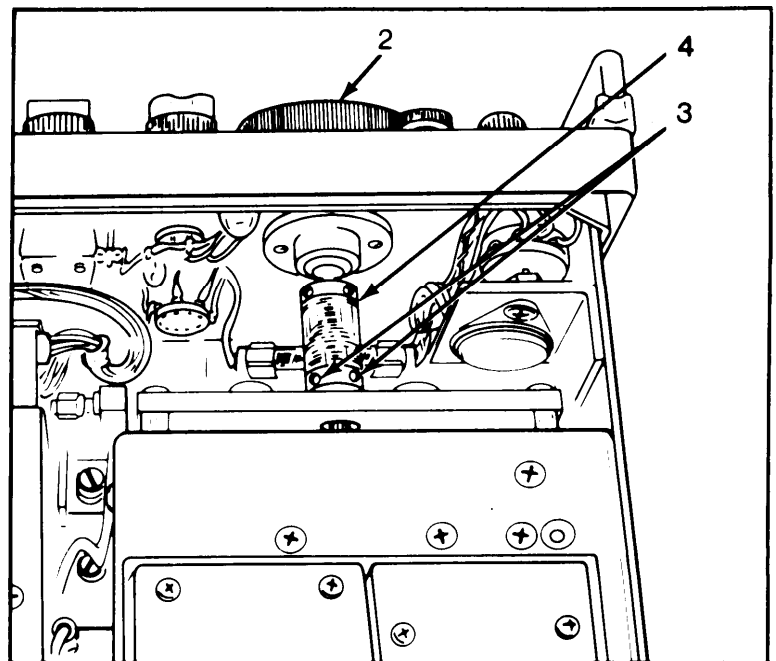
4-11 c. MAINTENANCE PROCEDURES - Continued

REMOVING TUNER ASSEMBLY (SHEET 1 OF 5)

1. Place receiver (1) top side down.



2. Rotate black TUNE knob (2) on front panel of receiver (1) until two setscrews (3) on tuner shaft spring (4) are accessible.
3. Loosen two setscrews (3) using .05 in. hex head screw key.



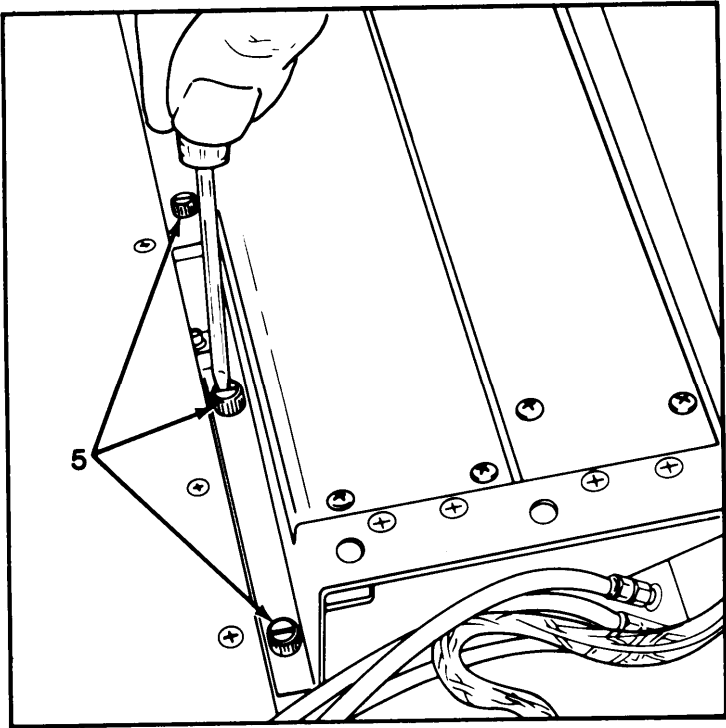
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4-11 c. MAINTENANCE PROCEDURES - Continued

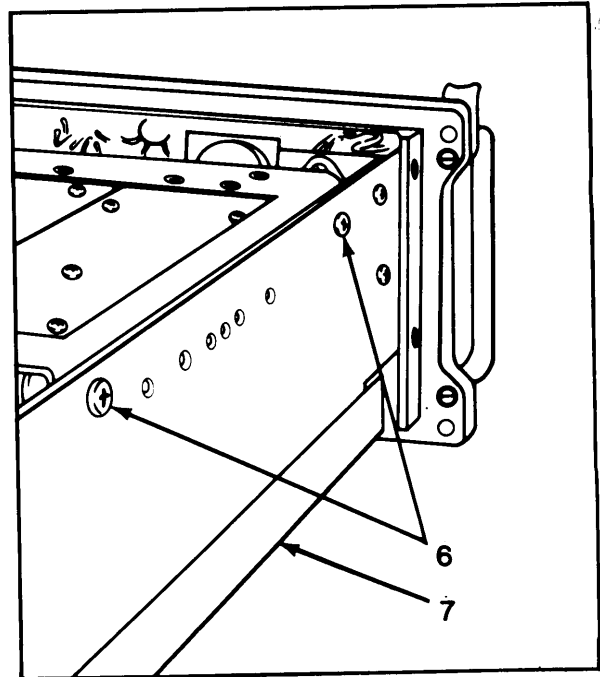
REMOVING TUNER ASSEMBLY (SHEET 2 OF 5)

4. Loosen 3 slotted screws (5) that hold tuner assembly to receiver using 4 in. flat tip screwdriver.

NOTE
 Slotted screws are located between tuner assembly and IF demodulator assembly.



5. Remove two Phillips screws (6) from right side of receiver chassis (7) using No. 1 Phillips screwdriver.

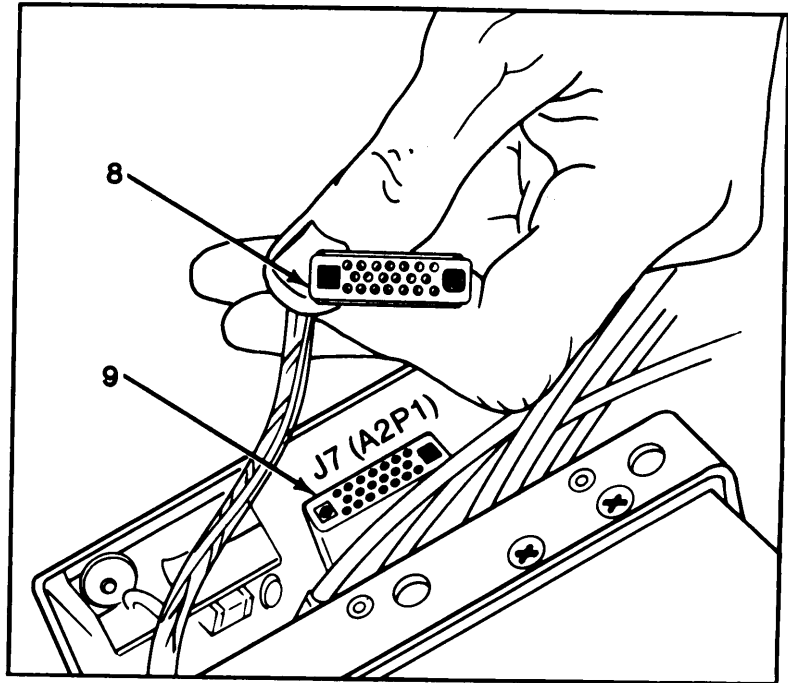


GO ON TO SHEET 3

4-11 c. MAINTENANCE PROCEDURES - Continued

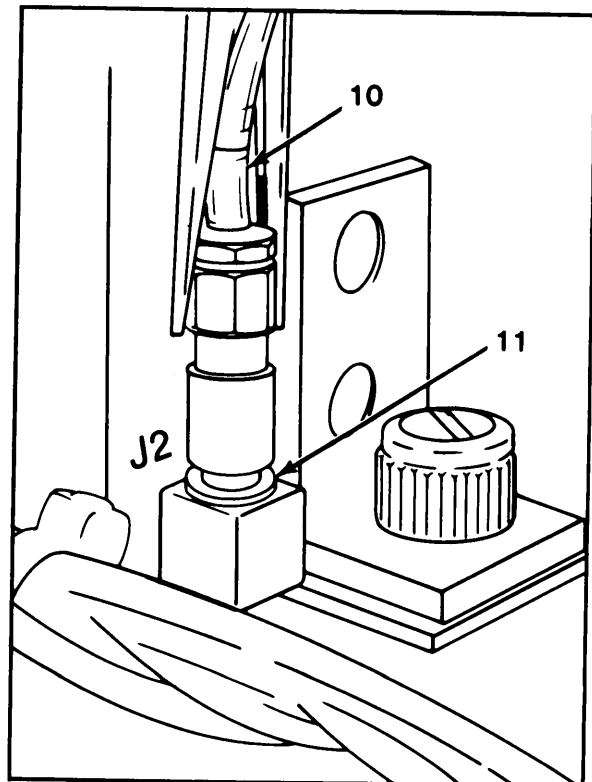
REMOVING TUNER ASSEMBLY (SHEET 3 OF 5)

6. Disconnect multipin plug (8) marked J7 A2P1 from jack J7 at rear of tuner assembly (9).



7. Disconnect cable (10) marked P9 A4J2 from jack J2 (11) at rear of IF demodulator assembly using needlenose pliers.

NOTE
Jack J2 is an SMB pull off-push on type connector.

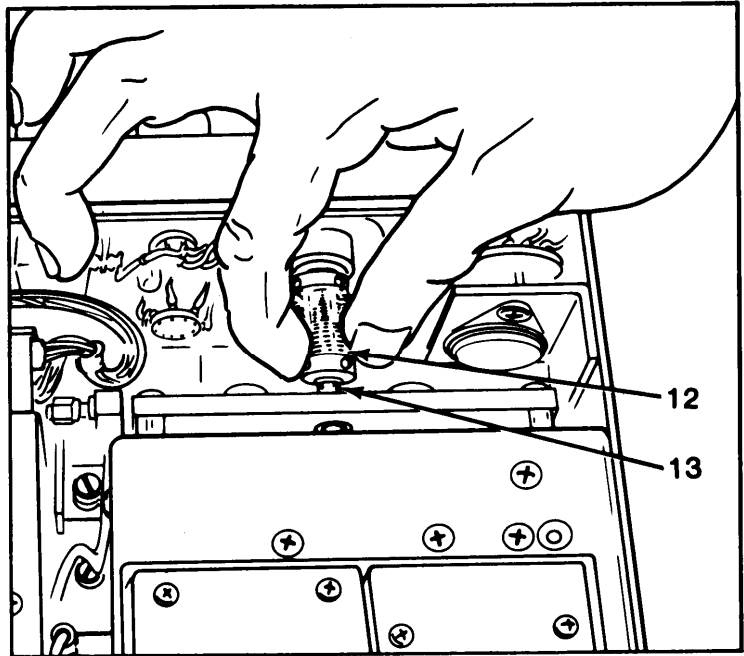


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4-11 c. MAINTENANCE PROCEDURES - Continued

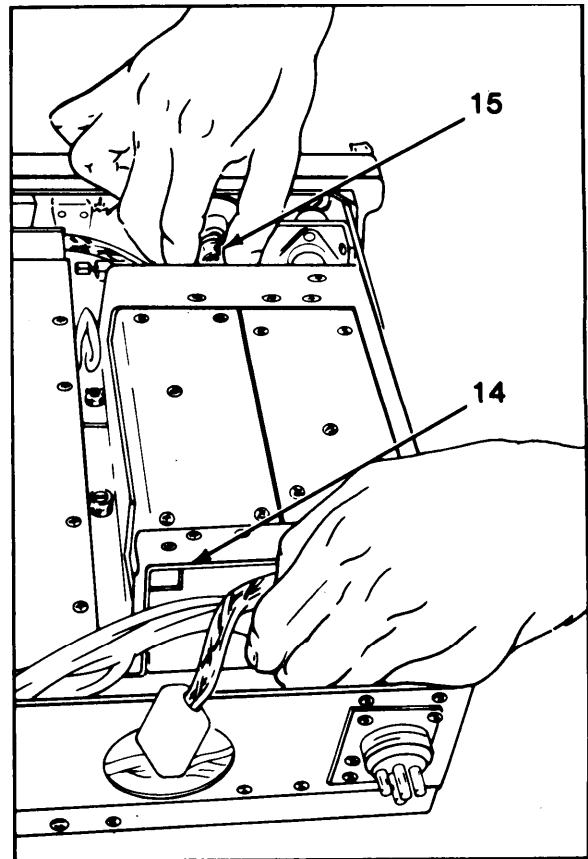
REMOVING TUNER ASSEMBLY (SHEET 4 OF 5)

8. Pull tuner shaft spring (12) backward off of tuner shaft (13).



CAUTION
Do not lift tuner assembly by its cable.

9. Lift rear of tuner assembly (14) up and out of chassis while still holding tuner shaft spring (15) back.



GO ON TO SHEET 5

4-11 c. MAINTENANCE PROCEDURES - Continued

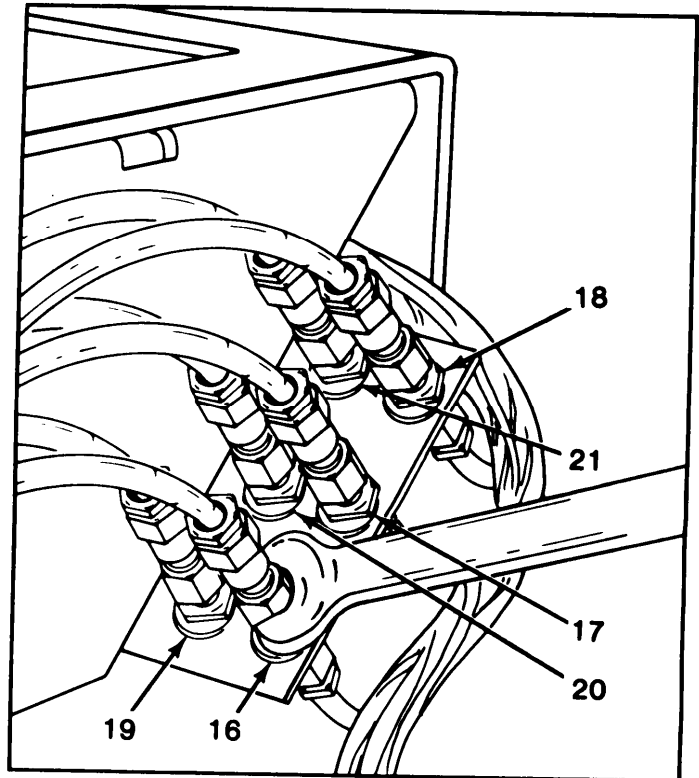
REMOVING TUNER ASSEMBLY (SHEET 5 OF 5)

10. Disconnect the following cables from SMC jacks at rear of tuner assembly using a 7/32 box end wrench:

- Cable A3P2 A2J6 from plug J6 (16)
- Cable A3P1 A2J4 from plug J4 (17)
- Cable P5 A2J2 from plug J2 (18)
- Cable P8 A2J5 from plug J5 (19)
- Cable P6 A2J3 from plug J3 (20)
- Cable P3 A2J1 from plug J1 (21)

11. Lift tuner assembly out of receiver and set aside.

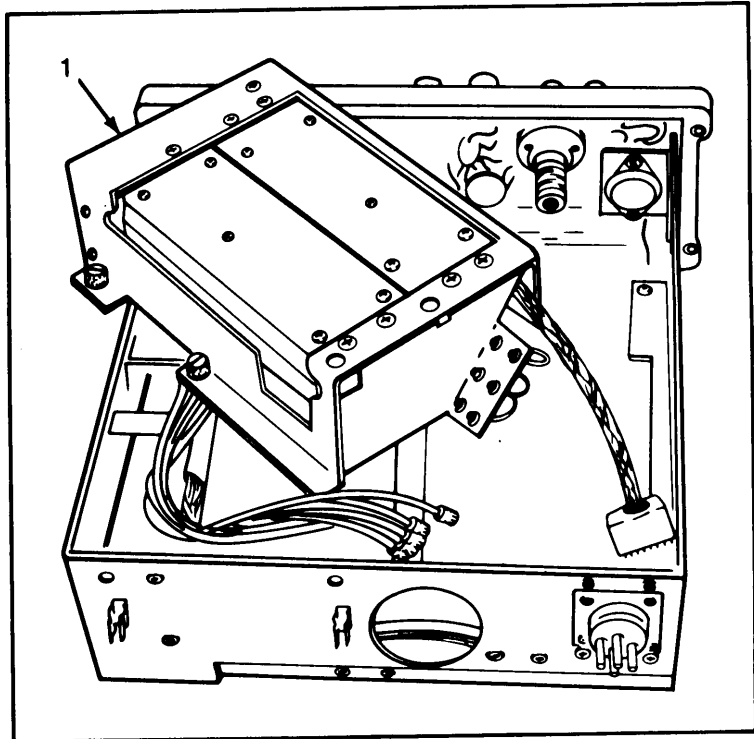
12. Prepare removed tuner assembly for storage by following procedures in paragraph 4-15 b.



4-11 c. MAINTENANCE PROCEDURES - Continued

INSTALLING TUNER ASSEMBLY (SHEET 1 OF 4)

1. Place tuner assembly to be installed (1) on top of receiver.



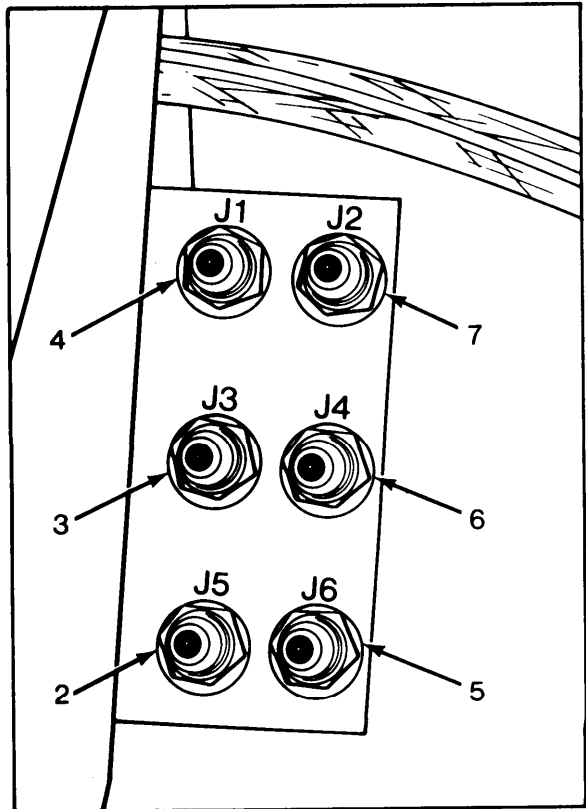
CAUTION

- Ensure the correct cable is connected to correct jack.
- Do not overtighten any of the six cables onto their jacks.

2. Connect and tighten 1/4 turn clockwise with a 7/32 in. box end wrench each cable into the following jacks:

- Cable P8 A2J5 to jack J5 (2)
- Cable P6 A2J3 to jack J3 (3)
- Cable P3 A2J1 to jack J1 (4)
- Cable A3P2 A2J6 to jack J6 (5)
- Cable A3P1 A2J4 to jack J4 (6)
- Cable P5 A2J2 to jack J2 (7)

NOTE
Cables are identified by their number marked sleeves. Jacks are identified by numbers on connector plate.

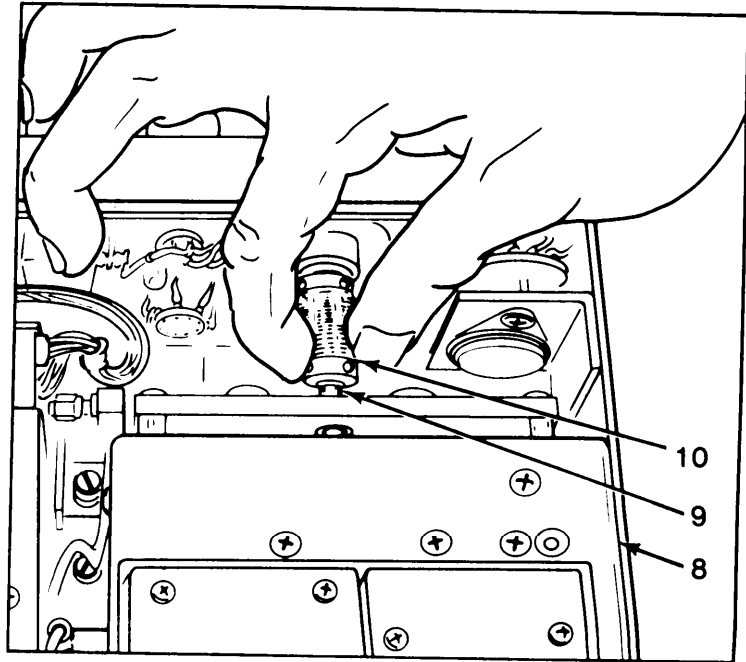


GO ON TO SHEET 2

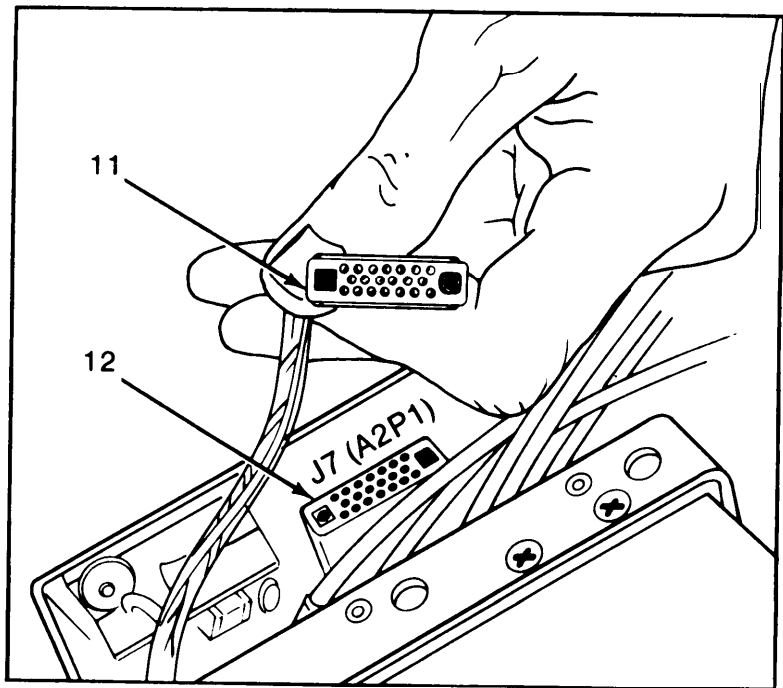
4-11 C. MAINTENANCE PROCEDURES - Continued

INSTALLING TUNER ASSEMBLY (SHEET 2 OF 4)

3. Replace tuner assembly (8) into receiver at 45° angle by placing tuner shaft (9) into tuner shaft spring (10) and then setting tuner assembly in place.



4. Connect multipin SRE plug marked J7 A2P1 (11) onto jack J7 (12) at rear of tuner assembly.

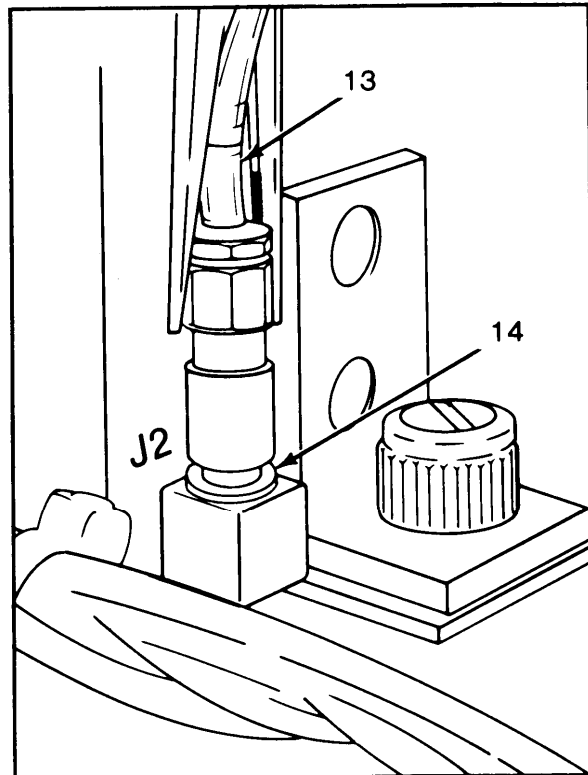


GO ON TO SHEET 3

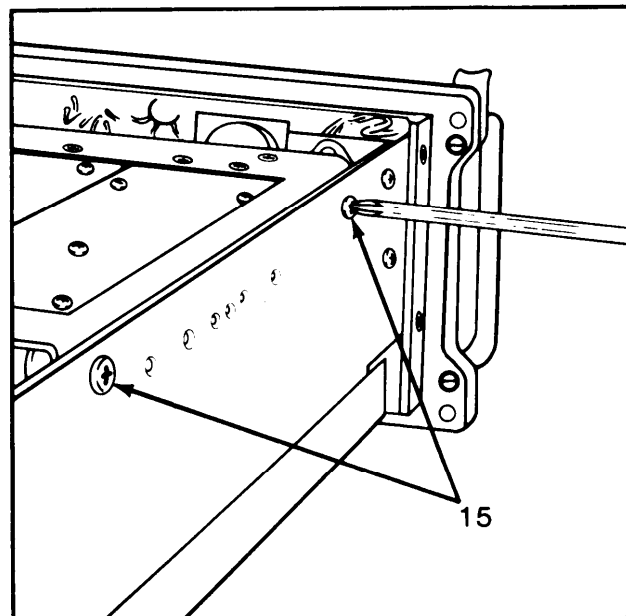
4-11 c. MAINTENANCE PROCEDURES - Continued

INSTALLING TUNER ASSEMBLY (SHEET 3 OF 4)

5. Connect Cable marked P9 A4J2 (13) into jack J2 (14) at rear of IF demodulator assembly by using needlenose pliers.



6. Replace two Phillips screws on right side of receiver (15) and tighten with a No. 1 Phillips screwdriver.

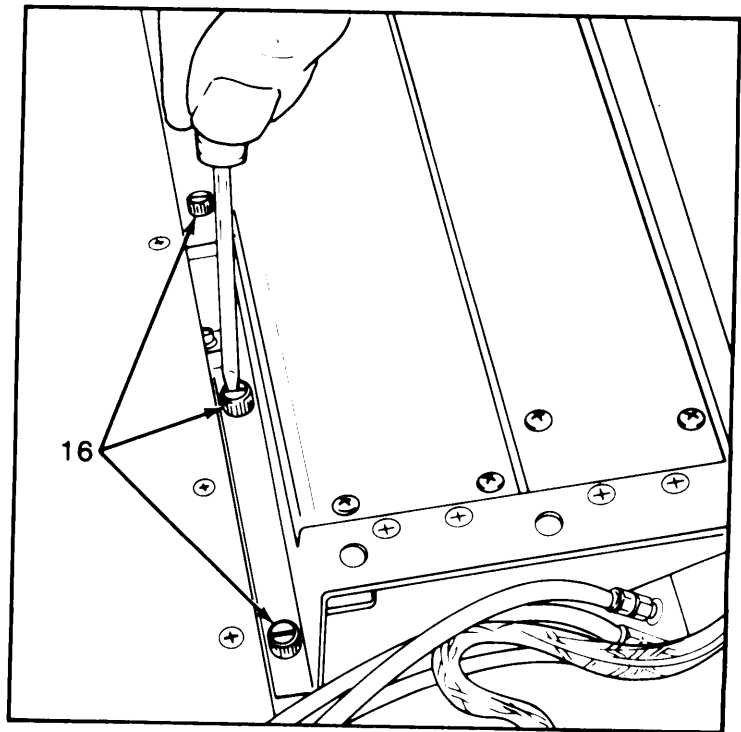


GO ON TO SHEET 4

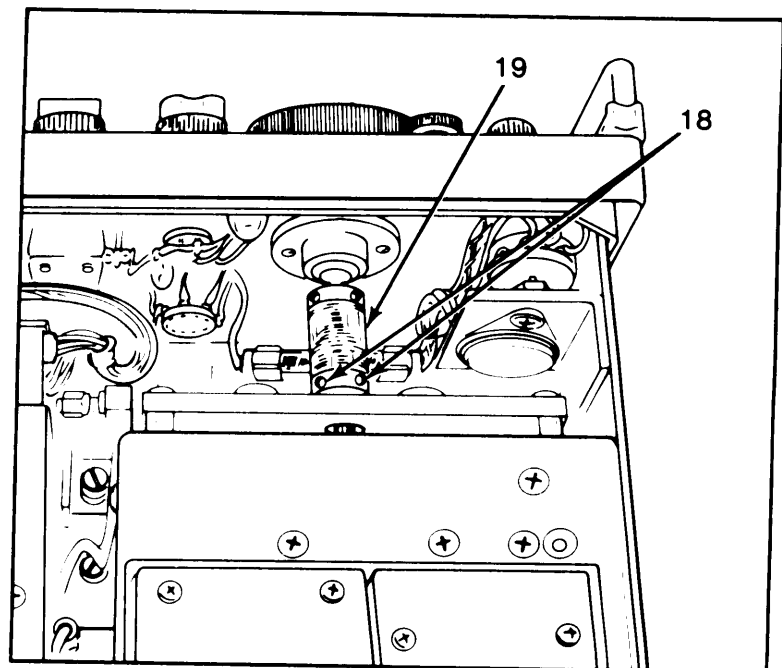
4-11 c. MAINTENANCE PROCEDURES - Continued

INSTALLING TUNER ASSEMBLY (SHEET 4 OF 4)

- 7. Tighten three slotted screws (16) next to tuner assembly and tighten with a 4 inch flat tip screwdriver.



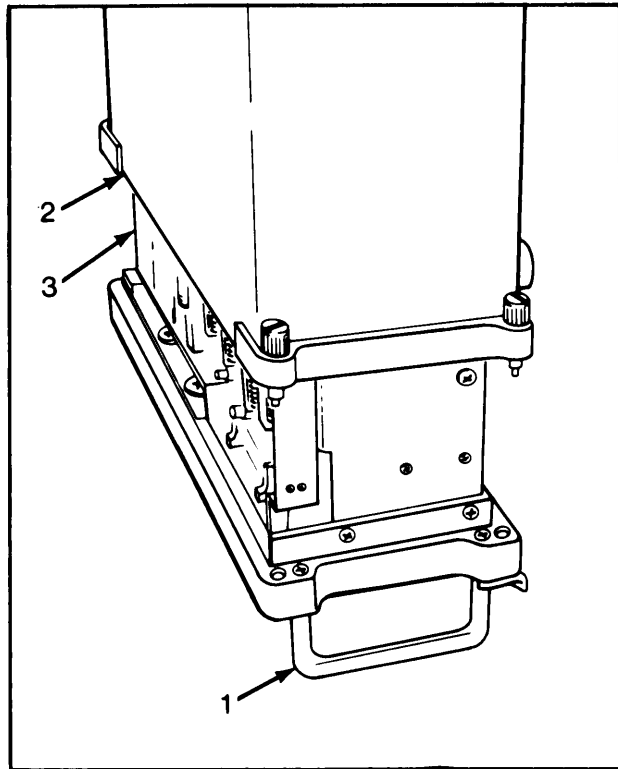
- 8. Tighten two set-screws (18) on tuner shaft spring (19) with a .05 in. hex head screw key.
- 9. Rotate TUNE knob on front of receiver to assure tuner rotates freely.



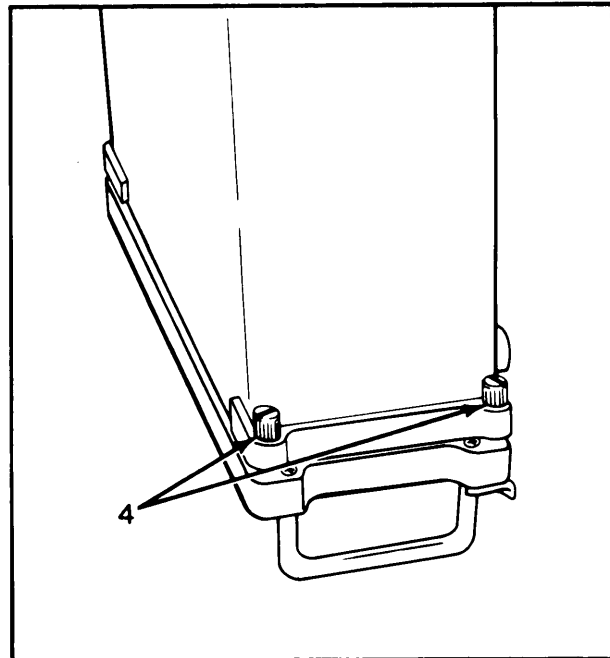
4-11 c. MAINTENANCE PROCEDURES - Continued

REPLACING RECEIVER COVER

1. Place receiver face down on front panel handles (1).
2. Place receiver cover (2) over chassis (3).



3. Tighten two slotted screws (4) on each side of front panel with a 4 in. flat tip screwdriver.

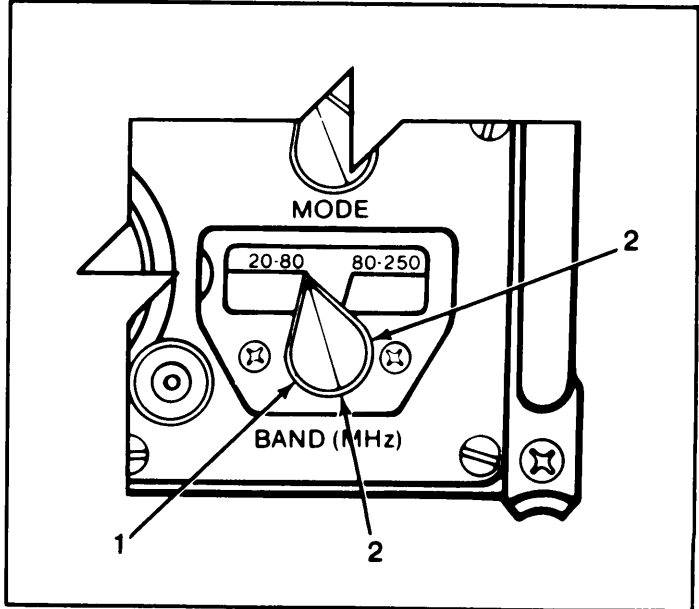


4-11 c. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING BAND MHz PLATE (SHEET 1 OF 2)

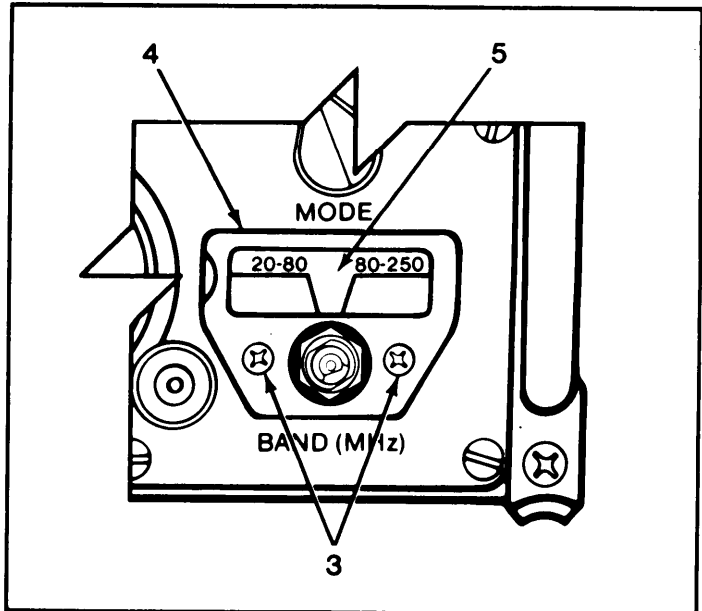
NOTE
 Following steps are to be performed after the new tuner assembly is installed in receiver.

1. Set BAND MHz knob (1) to lower band setting on left.
2. Loosen two setscrews (2) on BAND MHz knob (1) using a .05 in. hex head screw key and remove BAND MHz switch from its shaft.
3. Remove two Phillips screws (3) on BAND MHz window plate (4) using a No. 1 Phillips screwdriver.
4. Remove BAND MHz plate (4) along with placard (5) behind plate.



NOTE
 There should also be a plastic protective cover inside plate. It is not necessary to remove it when changing placards.

5. Insert new placard packaged with new tuner assembly into rear of BAND MHz window plate (4).



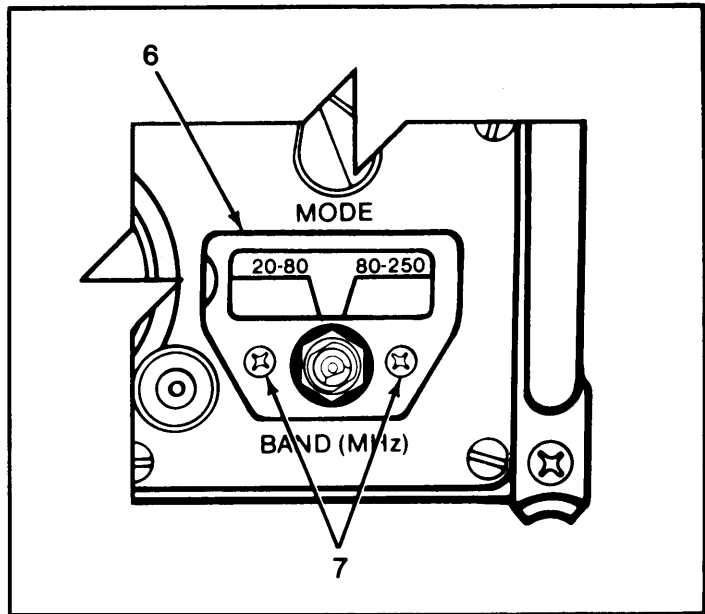
NOTE
 Placards for associated tuner assembly are stored in plastic bag attached to side of tuner assembly.

GO ON TO SHEET 2

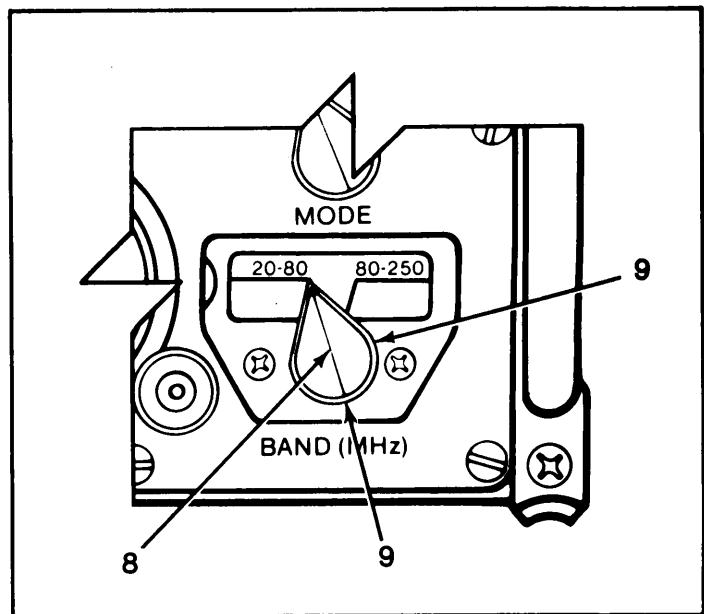
4-11 c. MAINTENANCE PROCEDURES - Continued

REMOVING AND REPLACING BAND MHz PLATE (SHEET 2 OF 2)

6. Replace BAND MHz window plate (6) onto receiver and replace and tighten two Phillips screws (7) using a No. 1 Phillips screwdriver.



7. Replace BAND MHz knob (8) onto its shaft with knob pointing to lower band on left.
8. Tighten two setscrews (9) on BAND MHz switch using a .05 in. hex head screw key.



4-11 d. MAINTENANCE PROCEDURES - Continued

CAUTION

Turn off power to the direction finder set before using angle simulator.

d. Verify Df Processor Alinement Using Angle Simulator. An angle simulator is used during troubleshooting procedures on the direction finder set. The simulator verifies that the df processor is calibrated for accurate line of bearing readings. It acts as a df antenna that is receiving a transmission at 45°. Procedures for using the simulator include preparing the df processor for testing and testing the df processor with the simulator. Follow the illustration and steps below when using the simulator.

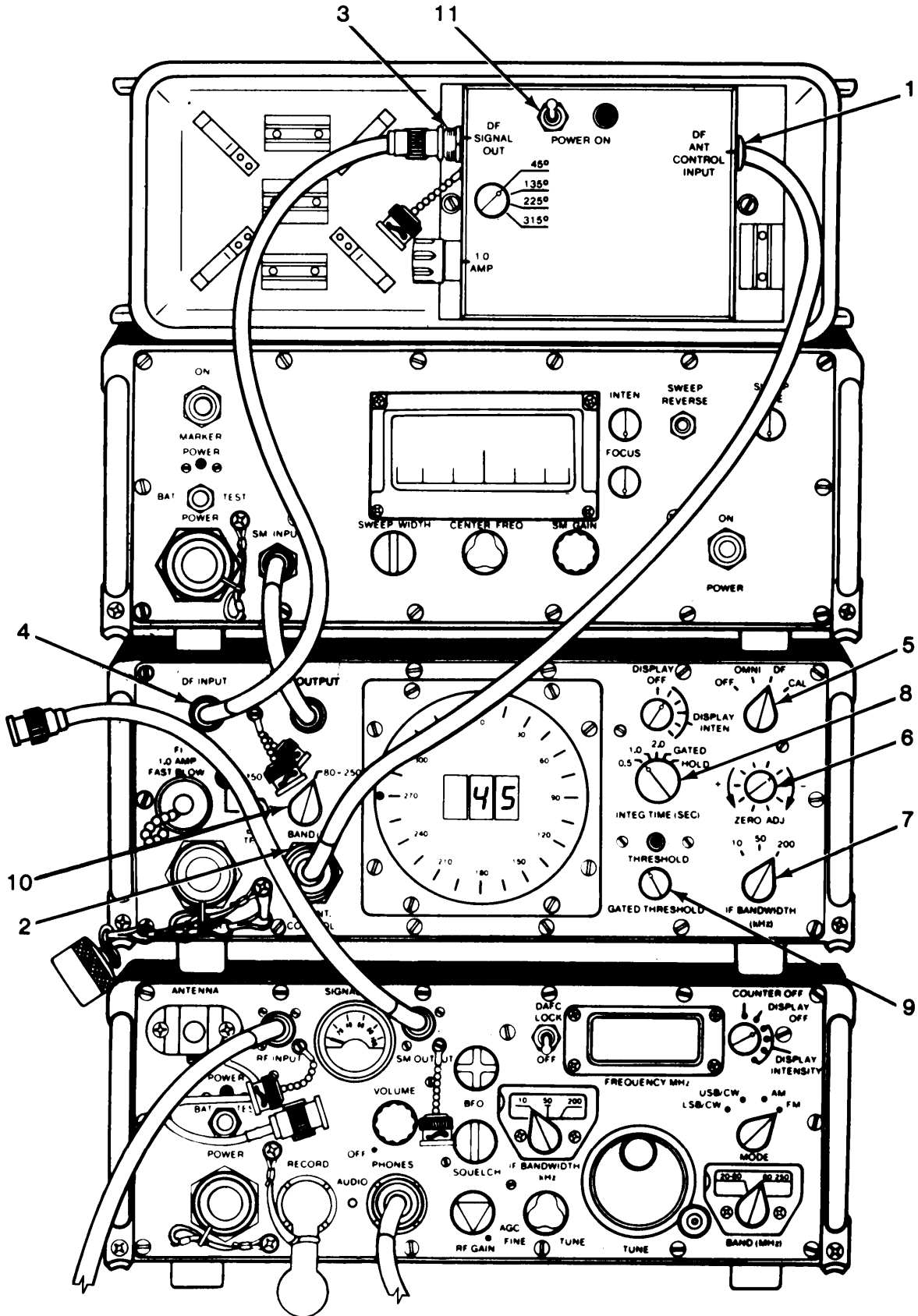
4-11 d. MAINTENANCE PROCEDURES - Continued**PREPARING DF PROCESSOR FOR TESTING**

1. Connect cable from DF ANT. CONTROL input (1) on angle simulator to DF ANT. CONTROL INPUT (2) on df processor.
2. Connect bnc cable from DF SIGNAL OUT (3) on angle simulator to DF INPUT (4) on df processor.
3. Set OFF/OMNI/DF/CAL switch (5) on df processor to CAL.
4. Rotate ZERO ADJ knob (6) on df processor until 000 or 180 appears on display.
5. Set OFF/OMNI/DF/CAL switch (5) on df processor to DF.
6. Set IF BANDWIDTH switch (7) on df processor to 10 kHz.
7. Set INTEG TIME switch (8) on df processor to .05.
8. Rotate GATED THRESHOLD knob (9) on df processor fully clockwise.
9. Set BAND MHz switch (10) on df processor to lower band on left.

TESTING DF PROCESSOR USING ANGLE SIMULATOR

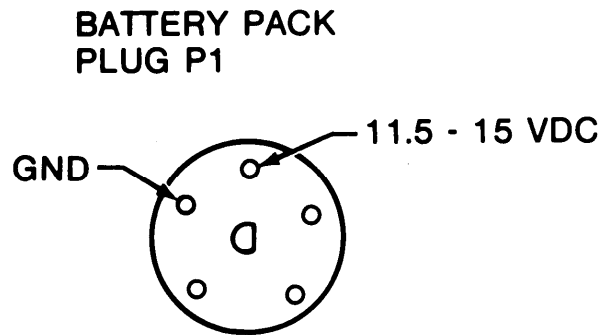
1. Set POWER/ON switch (11) on angle simulator to up position.
2. Set angle simulator switch (12) to 45°.
3. Observe df processor display for (13) reading of 45°, ± 3°.
4. Set angle simulator switch to 135°.
5. Observe df processor display for reading of 135°, ± 3°.
6. Set angle simulator switch to 225°.
7. Observe df processor display for reading of 225°, ± 3°.
8. Set angle simulator switch to 315°.
9. Observe df processor display for reading of 315°, ± 3°.
10. Set IF BANDWIDTH switch (7) on df processor to 50 kHz.
11. Repeat testing of df processor (2 through 8) above.
12. Set IF BANDWIDTH switch (7) on df processor to 200 kHz.
13. Repeat testing of df processor (2 through 8) above to complete testing procedures.

4-11 d. MAINTENANCE PROCEDURES - Continued



4-11 e. TESTING BATTERY PACK PLUG

Use the illustration below to identify test points on the battery pack plug.



Section VI. PREPARING EQUIPMENT FOR STORAGE OR SHIPMENT

SECTION CONTENTS

4-12.	Security Procedures	4-67
4-13.	Packing Instructions	4-67
4-14.	Administrative Storage of Equipment	4-70

4-12. SECURITY PROCEDURES

Refer to AR 190-11 and AR 190-13 for security procedures when preparing the direction finder set for storage or shipment.

4-13. PACKING INSTRUCTIONS

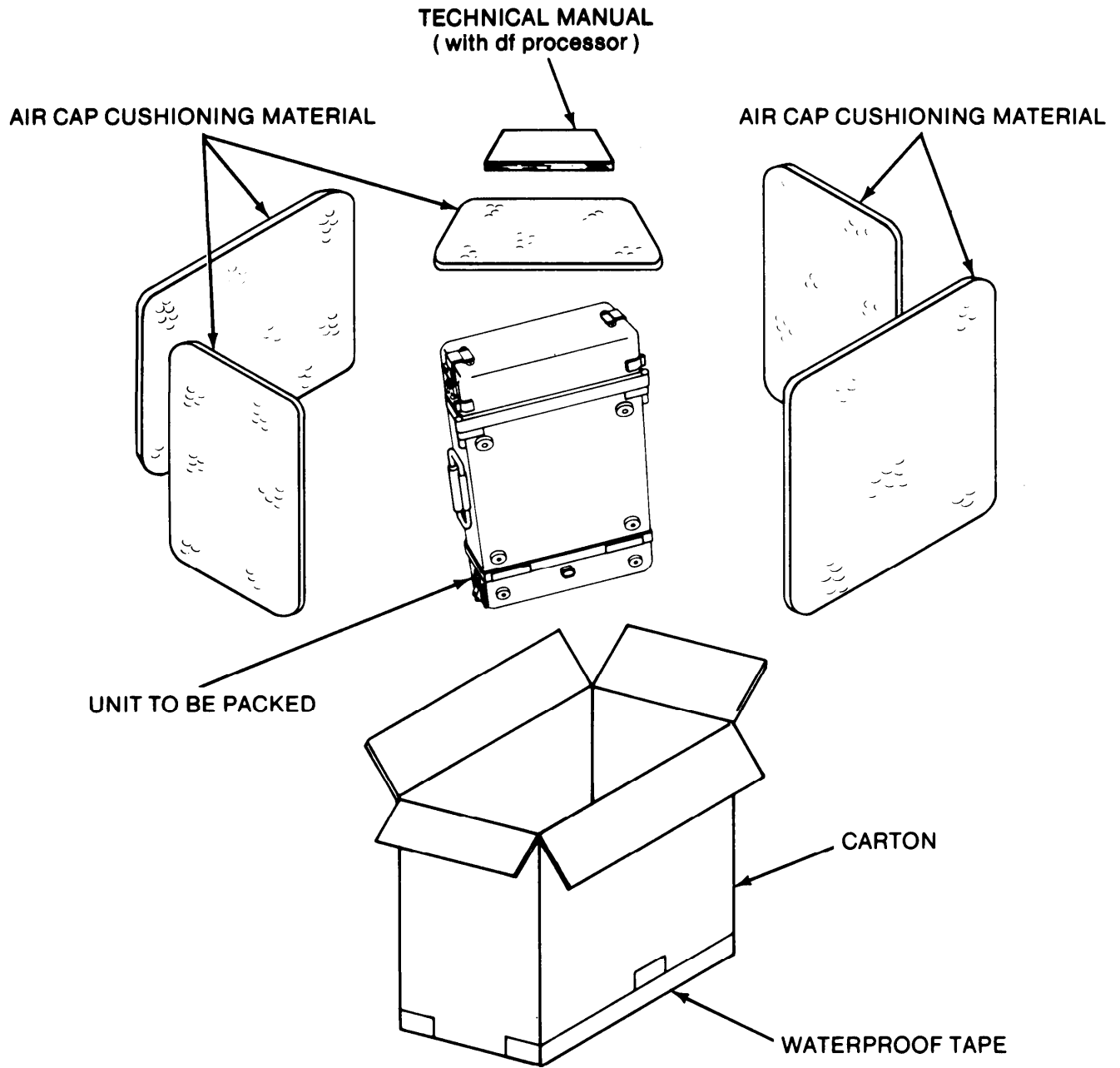
The exact procedures for packaging the direction finder set depends on the materials available and the conditions under which the equipment is to be shipped or stored. Follow the procedures outlined below whenever circumstances permit.

a. Material Requirements. The following materials are required for packaging components of the direction finder set.

- Waterproof tape
- Air cap cushioning material
- Fiberboard
- Moisture proof-vaporproof barrier

NOTE
For stock numbers of packaging materials, refer to SB 38-100.

4-13. PACKING INSTRUCTIONS - Continued



4-13. PACKING INSTRUCTIONS - Continued

b. Packing the Tuner Assembly. The following procedures are to be followed when packing any of the tuner assemblies:

- (1) Secure the multipin cable to the tuner assembly case with tape.
- (2) Cushion the tuner assembly with air cap cushioning material on all sides.
- (3) Form a carton large enough to hold the tuner assembly with fiberboard and waterproof tape.
- (4) Place the tuner assembly in the carton.
- (5) Fill all voids in the carton with air cap cushioning material.
- (6) Seal the carton with waterproof tape.
- (7) Cover the carton with moistureproof and vaporproof foil.
- (8) Identify the contents of the carton with exterior markings.

c. Packing the Direction Finder Units. The following procedures are to be used when packing the units of the direction finder set:

CAUTION

Do not pack any unit without first ensuring that the batteries have been removed from the rear covers.

- (1) Cushion the unit to be packed with air cap cushioning material on all sides.
- (2) Package each technical manual within a close fitting waterproof bag and seal the bags with waterproof tape.
- (3) Form a carton large enough to hold the unit with fiberboard and waterproof tape.
- (4) Place the unit in the carton.
- (5) Fill all voids in the carton with air cap cushioning material.
- (6) Seal the carton with waterproof tape.
- (7) Cover the carton with moistureproof and vaporproof foil.
- (8) Identify the contents of the carton with exterior markings.

4-14. ADMINISTRATIVE STORAGE OF EQUIPMENT

Administrative storage of equipment issued to and used by Army activities will have preventive maintenance performed in accordance with the PMCS charts before storing. When removing the equipment from administrative storage the PMCS should be performed to assure operational readiness. Disassembly and repacking of equipment for shipment or limited storage are covered in paragraphs 4-12 and 4-13.

APPENDIX A

REFERENCES

A-1. SCOPE

This appendix lists all the forms, field manuals, technical manuals and miscellaneous publications that apply to the df set. Only those publications available to, and required by operators and organizational maintenance personnel are listed.

A-2. FORMS

Discrepancy in Shipment Report	SF 361
Equipment Control Record	DA Form 2408-9
Equipment Inspection and Maintenance Work Sheet	DA Form 2404
Hand Receipts.	DA Form 2062
Maintenance Request	DA Form 2407
Quality Deficiency Report	SF 368
Recommended Changes to Equipment Technical Manuals	DA Form 2028-2
Recommended Changes to Publications and Blank Forms.	DA Form 2028
Report of Discrepancy.	SF 364

A-3. FIELD MANUALS

Basic Cold Weather Manual.	FM 31-70
Care and Use of Individual Clothing and Equipment.	FM 21-15
First Aid for Soldiers	FM 21-11
Radio Direction Finding	FM 30-476

A-4. TECHNICAL MANUALS

Operator's Manual Audio Recorder AN/VRC-12	TM 32-5835-220-10
Hand Receipt Technical Manual Covering End Item/Components of End Item (COEI). Basic Issue Items (BIT) and Additional Authorization List (AAL) for Radio Sets AN/VRC-1 2. . .	TM 11-5820-401-10-2-HR
Operators Manual: AN/VRC-12 Radio Sets (Used Without An Intercom System.)	TM 11-5820-401-10-1
Operator and Organizational Maintenance Manual Including Repair Parts and Special Tools List for Intercommunications Set AN/VIC-1(V)	TM 11-5830-340-12&P

A-4. **TECHNICAL MANUALS - Continued**

Operator and Organizational Maintenance
Manual Including Repair Parts
and Special Tools List
for Radio Set AN/PRC-77 TM 11-5820-667-12&P

A-5. **MISCELLANEOUS PUBLICATIONS**

Communications Security Equipment
TSEC/KY-57. AR 750-1 (Section IV)
Consolidated Index of Army Publications
and Blank Forms DA Pam 310-1
Dictionary of United State Army Terms AR 310-25
Field Instructions for Painting and
Preserving Electronics Command
Equipment Including Camouflage Pattern
Painting of Electrical Equipment Shelters TB 43-0118
FSC Class 6135; Primary Battery Supply Data SB 11-6
Headset H-251/U SB 11-628
Painting and Preservation Supplies for
Field Use for Electronics Command
Equipment SB 11-573
Safety Measures to Be Observed When
Installing and Using Whip Antennas,
Field-Type Masts, Towers and Antennas
and Metal Poles That Are Used With
Communications, Radar and
Direction Finder Equipment TB SIG 291
Safety Precautions for Maintenance of
Electrical/Electronic Equipment. TB 385-4
The Army Maintenance Management System
(TAMMS) es DA Pam 738-750
Vehicular Radio Sets and Authorized
Installations .ng) SB 11-131
Warning Notice for Vehicles in Which
Radios Are Mounted in SB 11-624

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION**B-1. General**

This appendix provides a summary of the maintenance operations for the direction finder set. 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.

B-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of 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. Aline. 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.

B-2. Maintenance Functions-Continued

i. Repair. The application of maintenance services (inspect, test, service, adjust, aline, 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 complete serviceable/operational condition as prescribed by maintenance standards (i.e. DMWR) in appropriate technical publication. 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 unservice 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.

B-3. Column Entries

a. Column 1, Group Number. Column 1 lists group number 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 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

B-3. Column Entries-Continued

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tools 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 alphabetical code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. Tool and Test Equipment Requirements (Section 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.

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.

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.

B-5. Remarks (Section 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

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment	(6) Remarks
			C	O	F	H	D		
00	Direction Finder Set AN/PRD-11	Inspect Inspect Inspect Test Test Test Replace Repair Repair Repair Align	0.2		0.2				
				0.5			8.0	2-5	
					0.3			2-5, 7-14	
							2.0	2-5, 7-18	
				0.2				1	
				0.2				1	A
					0.5			6	B
							1.0	6	
							1.1	2-5,8,10-18	

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment	(6) Remarks
			C	O	F	H	D		
01	Receiver, R-2200/GRR-8(V)	Inspect	0.1						
		Inspect			0.2				
		Inspect					0.6		
		Test		0.3				2-5	
		Test			3.0			2-5, 8-14	
		Test					3.0	2-5, 8, 10-17	
		Replace		0.2				1	
		Repair		0.4				1	O, S
		Repair			0.4			6	B
		Repair					1.0	6	
	Align					2.1	2-5, 8, 10-18		
0101	Antenna Switch	Test					1.0	2-5,8,10-11,15	
	Assembly (A1)	Replace			0.7			6	
		Repair					0.5	6	
0102	Tuner (A2)	Test					2.0	8, 10-15, 17	
	TN-586/GRR-8(V) (.5 - 30 MHz)	Replace			0.2			6	P
	TN-584/GRR-8(V) (20 - 250 MHz)	Repair					1.0	6	
	TN-585/GRR-8(V) (250 - 500 MHz)								
0103	Counter Assy (A3)	Test			0.3			2-5, 8-13	
		Test					1.0	2-3,8,10-13,15	
		Replace			0.3			6	
		Repair			0.5			6	R
		Repair					1.0	6	
010301	Counter Board (A3A1)	Test			0.3			2-5, 8-13	
		Test					1.1	2-3,8,10-13,15	
		Replace					0.8	6	
		Repair			0.5			6	F
		Repair					1.5	6	
01030101	Display Board (A3A1A1)	Test					1.0	2-3,8,10-13,15	
		Replace			0.5			6	
		Repair					1.0	6	
010302	Wide Band Amp (A3A2)	Test					0.8	2-5,8,10-13,15	
		Replace			0.3			6	P
		Repair					1.0	6	

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment	(6) Remarks
			C	O	F	H	D		
0104	IF Demodulator (A4)	Test Test Replace Repair Repair			0.3 0.5			2-5, 8-11 2-5, 8, 10-16 6 6 6	C
010401	IF Filters and Diode Switches (A4A4)	Test Replace Repair			0.3			2-5,8,10-11,15 6 6	
010402	AM Detector Buffer (A4A6)	Test Replace Repair			0.3			2-5,8,10-11,15 6 6	
010403	Product Detector (A4A7)	Test Replace Repair			0.3			2-5,8,10-13,15 6 6	
010404	LSB/USB Filters (A4A9)	Test Replace Repair			0.3			4-5,8,10-11,15 6 6	
0105	AGC Squelch (A5)	Test Replace Repair			0.3			2-3,8,10-11,15 6 6	
0106	DC/DC Converter (A6)	Test Test Replace Repair Repair			0.3 0.4 0.4			2-3, 8-9 2-3, 12-13, 15 6 6 6	Q
0107	FM Discriminator (A7)	Test Replace Repair			0.3			8,10-13,15,17 6 6	
0108	Audio/Record Amplifier (A8)	Test Replace Repair			0.3			8,10-13,15 6 6	

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment	(6) Remarks
			C	O	F	H	D		
0109	D-Cell Insert (A9A1)	Test		0.3				2-3	T D
		Test			0.3			2-3	
		Test					0.6	2-3	
		Replace		0.2				1	
		Repair		0.2				1	
		Repair			0.3			6	
		Repair					0.5	6	
0110	Front Panel Covers with Speakers (A10)	Test			0.3			8-13	P
		Test					0.7	8, 10-13, 15	
		Replace		0.2				1	
		Repair			0.3			6	
		Repair					0.5	6	
02	Indicator, Panoramic IP-1355/GRR-8(V)	Test		0.3				2-3	O J
		Test			2.5			2-5,7-11	
		Test					1.5	8, 10-15, 17	
		Inspect		0.1					
		Inspect			0.1				
		Inspect					0.8		
		Replace		0.2				1	
		Repair		0.3				1	
		Repair			0.3			6	
0201	DC/DC Converter (A1)	Test			0.4			2-3, 8-9	Q
		Test					0.5	2-3,8, 12-13,15	
		Replace			0.3			6	
		Repair			0.2			6	
		Repair					0.5	6	
		Repair					1.0	6	
0202	DC/AC Converter (A2)	Test					0.5	2-3	
		Replace			0.3			6	
		Repair					0.5	6	
0203	Signal Monitor (A3)	Test			0.3			2-5, 7-11	K
		Test					1.0	2-5, 8, 10-15	
		Replace					0.3	6	
		Repair			0.4			6	
		Repair					1.0	6	

Section II MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment	(6) Remarks
			C	O	F	H	D		
020301	IF Amplifier (A3A1)	Test			0.5			4-5,8-11 8, 10-11, 15 6 6 6	L
		Test				0.5			
		Replace				0.4			
		Repair			0.3				
		Repair				0.5			
0204	D-Cell Insert (A4A1)	Test		0.3				2-3 2-3 2-3 1 1 6 6	T D
		Test			0.3				
		Test				0.6			
		Replace		0.2					
		Repair		0.2					
		Repair			0.3				
03	Antenna WJ-9880A WJ-9880A-1	Inspect		0.2				2-3 2-3 1 6 6	N M
		Inspect			0.2				
		Inspect				0.4			
		Test				0.5			
		Test				1.0			
		Replace		0.2					
		Repair			0.5				
Repair				1.0					
0301	RF Switch Assembly (A1)	Test				0.4	2-3 6 6		
		Replace				0.5			
		Repair				0.5			
0302	RF Switch Assembly (A2)	Test				0.4	2-3 6 6		
		Replace				0.5			
		Repair				0.5			

Section II. MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment	(6) Remarks		
			C	O	F	H	D				
04	Control Processor Display - C-11495/PRD-11	Inspect	0.1		0.1						
		Inspect									
		Inspect			0.2					0.3	
		Test									
		Test			2.5					1.0	2-3, 4-5
		Test									2-5, 8-13
Replace	0.3	1.5	2-5, 8, 10-13, 15-17								
Repair			1								
Repair	0.3	1.5	1								
Repair			6								
Align			6								
			1.5	2-5, 8, 10-13, 15-17							
			1.4								
0401	IF Demodulator (A1)	Test			0.3			2-5, 8-13	P H		
		Test				1.2	8,10-13,15-16				
		Replace			0.5		6				
		Repair			0.5		6				
		Repair				1.5	6				
040101	IF Filter and Diode Switches (A1A4)	Test				0.8	4-5,8,10-11,15				
		Replace			0.5		6				
		Repair				1.0	6				
040102	AM Detector Buffer (A1A6)	Test				0.6	2-5,8,10-11,15				
		Replace			0.5		6				
		Repair				1.0	6				
0402	AFC Squelch (A2)	Test				0.4	2-3,8,10-11,15				
		Replace			0.3		6				
		Repair				0.5	6				
0403	FM Discriminator (A3)	Test				1.0	2-5,8,10-11, 15				
		Replace			0.4		6				
		Repair				1.0	6				
0404	Mother Board (A4)	Test			0.5		2-5,8-13	I			
		Test				3.0	2-3,8,10-13, 15-16				
		Replace				0.6	6				
		Repair			0.3		6				
		Repair				2.0	6				
040401	Commutative Filter (A4A1)	Test				0.7	8,10-13,15				
		Replace					6				
		Repair				1.0	6				

Section II MAINTENANCE ALLOCATION CHART - Continued

(1) Group Number	(2) Component/ Assembly	(3) Maintenance Function	(4) Maintenance Category					(5) Tools and Equipment	(6) Remarks	
			C	O	F	H	D			
040402	Calibrate and Antenna Switch Driver (A4A2)	Test					0.7	2-3,8,10-13,15		
		Replace						6		
		Repair			0.3			1.0		6
040403	Antenna and Sine Wave Logic (A4A3)	Test					1.0	4-5,8,10-13,15		
		Replace						6		
		Repair			0.3			1.0		6
040404	Angle Count Generator (A4A5)	Test					0.7	8, 10-13, 15		
		Replace						6		
		Repair			0.3			1.0		6
040405	Master Time Controller and Display Logic (A4A6)	Test					0.7	2-3,8,10-13,15		
		Replace						6		
		Repair			0.3			0.3		6
0405	DF Display Assembly (A5)	Test					0.7	2-3	P	
		Replace						6		
		Repair			0.5			1.0		6
0406	D-Cell Insert (A6A1)	Test		0.3				2-3	T D	
		Test						2-3		
		Test						0.6		2-3
		Replace		0.2						1
		Repair		0.2						1
		Repair			0.3					6
		Repair						0.5		6
0407	DC/DC Converter (A7)	Test					0.5	2-3,8,12-13,15		
		Replace						6		
		Repair			0.3			0.5		6
0408	Angle Simulator	Test					0.5	2-3		
		Test						0.5		
		Replace		0.3						1
		Repair			0.5					6
		Repair						0.5		6

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National Stock Number	(5) Tool Number
1	O	Tool Kit, Electronic Equipment TK-100/G	5180-00-605-0079	
2	O,F,D	Multimeter, Digital AN/PSM-45	6625-01-134-2512	
3	O,F,D	Test Lead Set, Simpson Catalog No. 00577	N/A	
4	O,F,D	Voltmeter, RF, Boonton 92C	6625-01-116-9500	
5	O,F,D	High Frequency Probe, Boonton 91-21F	N/A	
6	F,D	Tool Kit, Electronic Equipment, TK-105/G	5180-00-510-8177	
7	F,D	High Voltage Probe, 5 KV, Simpson Cat. No. 00053	N/A	
8	F,D	Power Supply, PP-6547/U	6625-01-823-5359	
9	F	Power Supply Leads *Local Manufacturer	N/A	
10	F,D	Generator, Signal SG-1112(V)I/U, w/options 001,002,003 (2 required)	6625-00-500-6525	
11	F,D	Cable, RF, 50 ohms, 4 ft., BNC-BNC, HP-1053A (9 required)	5995-00-070-8747	
12	F,D	Oscilloscope AN/USM-488	TBD	
13	F,D	Voltage Probe, 10X, TEK P6006	6625-00-524-0572	

*Power Supply Leads, (+24 VDC at less than 1 amp) Banana Plugs-to a U-316/U, 14 pin plug with power (Red) Lead to pin H , black Lead to pin A (Ground).

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS - Continued

(1) Reference Code	(2) Maintenance Category	(3) Nomenclature	(4) National Stock Number	(5) Tool Number
14	F,D	Counter, Frequency TD-1225A(V)1/U	6625-00-498-8946	
15	D	Power Supply Test Leads, HP-11002A	6625-00-079-1426	
16	D	Analyzer, Spectrum AN/USM-489	6625-01-083-9446	
17	D	Generator Sweep SG-1206		
18	D	Step Attenuator HP-3550		

Section IV. REMARKS

Reference Code	Remarks
A	<p>AN/PRD-11 Repair is accomplished by removal and replacement of LRU's throwaway coaxial cables, antenna control cable, and expendable fuses and batteries.</p>
B	<p>Receiver Repair is accomplished by removal and replacement of selected modules and circuit cards, intraconnecting cables, and chassis mounted piece parts.</p>
C	<p>IF Demodulator (Receiver) Repair is accomplished by removal and replacement of throwaways, 21.4 to 10 MHz Converter (A4A1), Gain BW Comp. Amp. (A4A3), 10 MHz Amp. (A4A5) and 10 MHz Amp. (A4A8).</p>
D	<p>Battery Pack (Receiver, DF and Signal Monitor) Repair is accomplished by removal and replacement of throwaway batteries and fuses, and the battery pack power plug (A9A1 P1-RCVR, A6P1-DF, or A4P1-Signal Monitor).</p>
E	<p>Front Panel Protective Cover with Speaker (A10) Repair is accomplished by removal and replacement of the throwaway audio power amplifier assembly (A10A1), LSI component (speaker) and multipin plug (A10P1).</p>
F	<p>Counter Assembly (Receiver) Repair is accomplished by the removal and replacement of Counter Board (A3A1) and the Display Board (A3A1A1).</p>
G	<p>Direction Finder Repair is accomplished by the removal and replacement of the throwaway BW Comp. Amp. (A8) plus other selected modules and circuit cards, intraconnecting cables, and chassis mounted piece parts.</p>
H	<p>IF Demodulator (DF) Repair is accomplished by removal and replacement of the throwaways, 10 MHz Amp. (A1A1), 10 MHz Amp. (A1A5), 10 MHz Amp. (A1A8), Gain BW Comp. Amp. (A1A3) and Low Pass Filter (A1A7).</p>
I	<p>Mother Board Repair is accomplished by removal and replacement of throwaway IF Delay Generator (A4A4).</p>

Section IV. REMARKS - Continued

Reference Code	Remarks
L	Repair is accomplished by removal and replacement of throwaways, IF Amplifier Board (A3A1A1) and IF Amplifier Board (A3A1A2).
M	Repair is accomplished by removal and replacement of throwaway elements.
N	WJ-9880A has one RF Switch. WJ-9880A-1 has two RF Switches.
O	Repair is accomplished by removal and replacement of Front Panel Cover with Speaker and throwaway batteries and fuses.
P	Replacement of assemblies includes piece parts and subassemblies mounted thereon.
Q	Repair consists of equipment adjustments.
R	Repair is accomplished by removal and replacement of the Display Board (A3A1A1).
S	Tuner and Receiver are removed as a unit.
T	Repair is accomplished by removal and replacement of throwaway batteries and fuses.
U	Repair is accomplished by removal and replacement of the fuse, fuse holder, power switch (PS1), LEDs, and angle select switch.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. Scope

This appendix lists the components of end item and basic issue items for the direction finder set to help you inventory items required for safe and efficient operation.

C-2. General

The Components of End Item and Basic Issue Items Lists are divided into the following sections:

a. Section II - Components of End Item. This listing is for informational purposes only, and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts.

b. Section III - Basic Issue Items. These are the minimum essential items required to place the direction finder set in operation, to operate it and to perform emergency repairs. Although shipped separately packaged, basic issue items must be with the direction finder set during operation and whenever it is transferred between property accounts. This manual is your authority to request/requisition replacement basic issue items, based on TOE/MTOE authorization of the end item.

C-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Column 1- National Stock Number. This column indicates the national stock number assigned to the item and will be used for requisitioning purposes.

b. Column 2- Description, FSCM and Part Number. This column indicates the federal item name and, when applicable, a brief description to identify and locate the item. The last line for each item indicates the FSCM (in parentheses) followed by the part number.

c. Column 3- Unit of Measure (O/M). This column indicates the measure used in performing the actual operation/maintenance function. This measurement is expressed by a two-character alphabetical abbreviation.

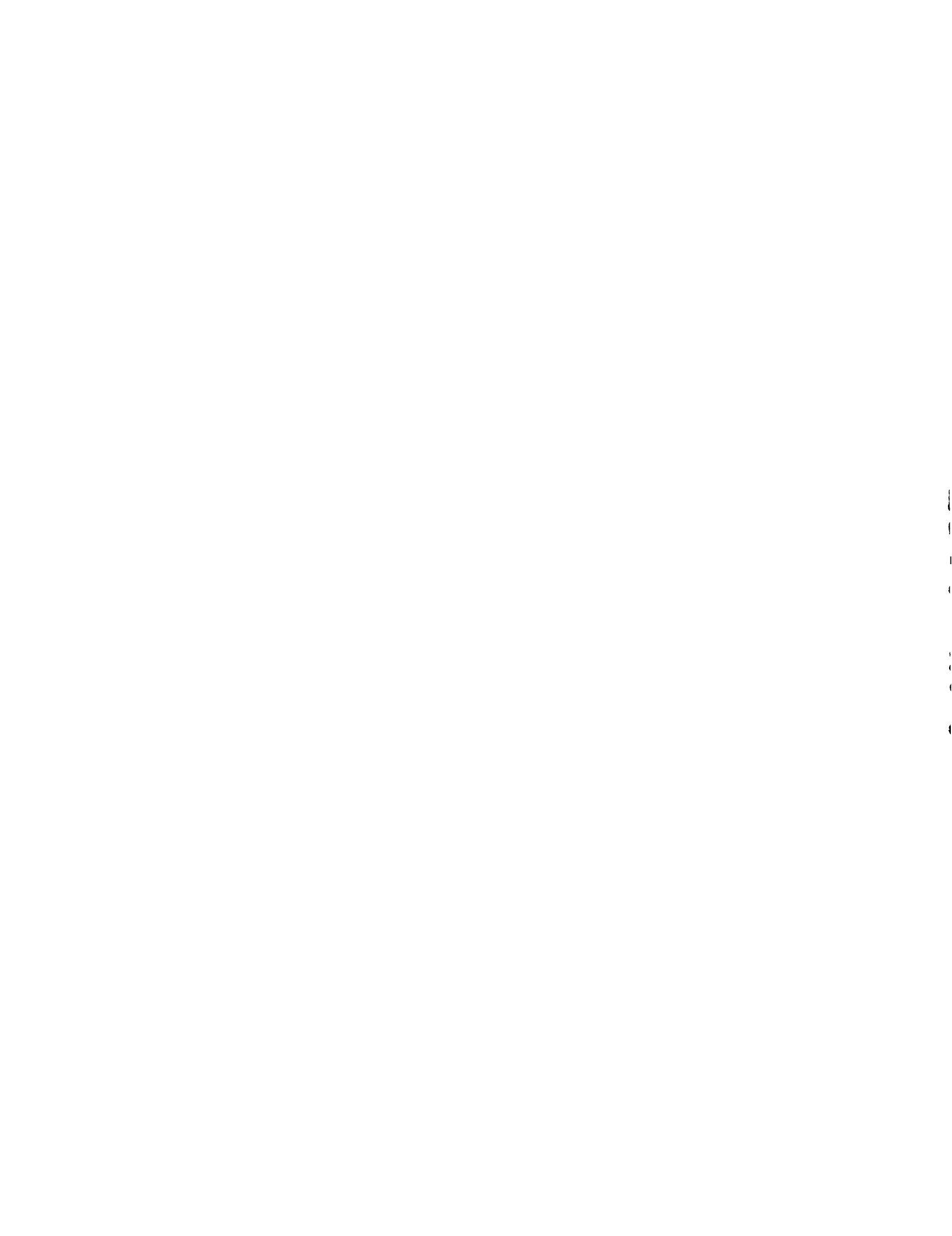
d. Column 4- Quantity Required (Qty Rqd). This column indicates the quantity of the item authorized to be used with/on the equipment.

Section II. COMPONENTS OF END ITEM AND BASIC
ISSUE ITEMS LIST

(1) National Stock Number	(2) Description FSCM and Part Number	(3) Unit of Measure	(4) Quantity Required
5865-01-165-4578	Antenna A AS-3732/PRD-11 (80058) WJ-9880A	Ea.	1
	Antenna A-1 AS-3733/PRD-11 (80058) WJ-9880A-1	Ea.	1
5820-01-160-4411	Control, Processor Display, C-11495/PRD-11 (80058) WJ-8975A	Ea.	1
5895-01-060-6492	Receiver, AN/GRR-8(V) (80058) WJ-8640-1	Ea.	1
5895-01-073-1604	Indicator, Panoramic IP-1355/GRR-8(V) (80058) WJ-9180-1	Ea.	1
5895-01-075-3694	Tuner, RF, TN-586/GRR-8(V) (80058) WJ-9120	Ea.	1
5895-01-075-6391	Tuner, RF, TN-584/GRR-8(V) (80058) WJ-9121	Ea.	1
5895-01-073-1582	Tuner, RF, TN-585/GRR-8(V) (80058) WJ-9124	Ea.	1

Section III. BASIC ISSUE ITEMS

(1) National Stock Number	(2) Description FSCM and Part Number	(3) Unit of Measure	(4) Quantity Required
	TM -12 (80058) N/A	Ea.	1
5820-00-889-3803	Antenna, Whip (26419) AT 892/PRC-25	Ea.	1
	Angle Simulator (80058)WJ-8975A/AS	Ea.	1
*5895-01-073-6839	Power Supply/BA PP-7566/GRR-8(V) (80058)WJ-8640-1/BC	Ea.	1
	Battery, Nickel Cadmium (09823) BB-5866	Ea.	10
<p>* Optional item, used with, but not part of the AN/PRD-11.</p>			



APPENDIX D

Section I. INTRODUCTION

D-1. Scope

This appendix lists additional items you are authorized for the support of the direction finder set.

D-2. General

This list identifies items that do not have to accompany the direction finder set during operations and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

D-3. Explanation of Listing

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type document (i.e., CTA, MTOE, TDA or JTA) which authorizes the item to you.

Section II. ADDITIONAL AUTHORIZATION LIST

(1) National Stock Number	(2) Description FSCM and Part Number	(3) Unit of Measure	(4) Quantity Required
5965-01-182-3384	Headset, Electrical (81134) H-251/U	Ea.	1

APPENDIX E

EXPENDABLE SUPPLIES AND MATERIAL LIST

Section I. INTRODUCTION

E-1. Scope

This appendix lists expendable supplies and materials you will need to operate and maintain the direction finder set. These items are authorized to you by CTA 50-970, Expendable Items.

E-2. Explanation of Columns

a. Column 1 - Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material

b. Column 2- Level. This column identifies the lowest level of maintenance that requires the listed item:

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

c. Column 3- National Stock Number. This is the National stock number assigned to the item; use it to requisition the item.

d. Column 4- Description, FSCM and Part Number. Indicates the federal item name and, when applicable, a brief description of the item. The last line for each item indicates the Federal Supply Code for Manufacturers (FSCM) in parentheses followed by the part number.

e. Column 5- Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two character alphabetical abbreviation (eg., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) Item No.	(2) Level	(3) National Stock Number	(4) Description FSCM and Part Number	(5) Unit of Measure
1	C	6135-00-926-8322	Battery, Dry (80058) BA-4386/PRC-25	Ea.
2	C	6135-00-835-7210	Battery (83740) BA-30	Ea.
3	C	5920-00-280-8342	Fuse, 1 amp, Cartridge 3 AG (71400) AGC 1	Ea.
4	C	5920-00-230-9128	Fuse, Cartridge 3/4 amp, 3 AG Slow blow (71400) MDL 3/4	Ea.

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F03

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°.

REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.

Item 5, Function column. Change "2 db" to "3db."

REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.

Add new step f.1 to read, "Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

Zone C 3. On J1-2, change "+24 VDC to "+5 VDC."

REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

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