

TM 11 5826-225-12

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL
DIRECTION FINDER SET
AN/ARN-83

This copy is a reprint which includes current
pages from Changes 1 and 2.

HEADQUARTERS, DEPARTMENT OF THE ARMY
JANUARY 1966

Change }
No. 1 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 25 July 1973

**Organizational Maintenance Manual
DIRECTION FINDER SET
AN/ARN-83**

TM 11-5826-225-12, 11 January 1966, is changed as follows:

Page 3. Paragraph 1-2 is superseded as follows:

1-2. Indexes of Publications

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

b. DA Pam 310-7. Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

Paragraph 1-3. Delete paragraph 1-3 and substitute:

1-3. Maintenance Forms and Records

Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

1-3.1 Reporting of Equipment Publication Improvements

The reporting of errors, omissions, and recom-

mendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications) and forwarded direct to: Commander, US Army Electronics Command, ATTN AMSEL-MA-A Fort Monmouth, NJ 07703.

Page 4. paragraph 1-6. Change title to COMPONENTS AND DIMENSIONS of Direction Finder Set AN/ARN-83.

Page 7. Add paragraph 1-14 after paragraph 1-13.

1-14. Components Comprising the Operable End Item

FSN	Qty	Nomenclature
5826-985-9173	1	Antenna AS-1863/ARN-83
5826-985-9174	1	Control, Direction Finder C-6899/ARN-83
5826-920-7177	1	Mounting MT-3605/ARN-83
5826-985-9172	1	Receiver, Radio R-1391/ARN-83

Page 24. Appendix II is deleted.

By Order of the Secretary of the Army:

CREIGHTON W. ABRAMS
General, United States Army
Chief of Staff

Official:

VERNE L. BOWERS

Major General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-36. (qty rqr block No. 163) Organizational Maintenance Requirements for AN/ARN-83.

CHANGE }
No. 2 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 5 September 1976

**Operator and Organizational Maintenance
Manual
DIRECTION FINDER SET AN/ARN-83
(NSN 5826-00-912-4415)**

TM 11-5826-225-12, 11 January 1966 is changed as follows:

Title of the manual is changed as shown above.

Page 3. Paragraph 1-8 is superseded as follows:

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-18/MCO P4030.29A, and DLAR 4145.8,

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report/(DISREP) (SF361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

Paragraph 1-3.1, Lines 6 and 7, change to read: Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-MA-Q, Fort Monmouth, N.J. 07703.

Add paragraphs 1-3.2, 1-3.3 and 1-3.4 after paragraph 1-3.1

1-3.2. Reporting Equipment improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407 (Maintenance Request). Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Communications and Electronics Materiel Readiness Command ATTN:

DRSEL-MA-Q, Fort Monmouth, N.J. 07703. A reply will be furnished direct to you.

1-3.3. Administrative Storage

a. General. Electronic equipment that is placed in administrative storage should be capable of being ready for use within a 24-hour period. Select the best available site for storage. Separate stored equipment from equipment in use. Conspicuously mark the area "Administrative Storage".

b. Maintenance Services. Before the Direction Finder Set AN/ARN-83 is placed in administrative storage, perform the maintenance functions in paragraph 8-5. Faulty equipment should not be placed in storage. If equipment fails test, troubleshoot using the procedural in paragraph 8-10. Clean the equipment so that it is free of dirt, grease, and other contaminant.

c. Removal From Storage. When the Direction Finder Set AN/ARN-83 is removed from storage, it must be tested to insure that it is operating satisfactorily for use in the field. Test it by using the procedures in paragraph 3-5 of this manual.

1-3.4. Destruction of Army Electronics Materiel

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

Page 17. Change "repairman" to "technician" in the following places:

Paragraph 3-1, line 2

Paragraph 3-3b, lines 8 and 15.

Page 19. Paragraph 3-7: Change "TB SIG 364" to read "TB 43-0118". Delete last sentence.

Page 23. Appendix I is superseded as follows:

**APPENDIX A
REFERENCES**

Following is a list of Applicable publications available to the operator and organizational technicians of Direction Finder set AN/ARN-83.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletin Supply Manuals (Types 7, 8 and 9), Supply Bulletins and Lubrication Orders.
DA Pam 310-7	US Army Index of Modification Work Orders.
TB 48-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-8826-208-12	Operator and Organizational Maintenance Manual, Multimeter AN/URM-105, and AN/URM-105C including Multimeter ME-77/U and ME-77C/U.
TM 38-750	Army Maintenance Management system (TAMMS)
TM 750-244-2	Procedures for Destruction of Electronics Material to Prevent Enemy Use (Electronics Command).

Page 26. Appendix III is superseded as follows:

**APPENDIX B
MAINTENANCE ALLOCATION**

Section I. INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations for AN/ARN-83. 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 an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified

parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurement (hours, miles, etc.) considered in classifying Army equipments/components

B-3. Column Entries

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" 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 "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" 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 in-

cludes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

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

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

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

B-4. Tool and Test Equipment Requirements (sec III)

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

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

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

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

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

B-5. Remarks (sec IV)

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

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

SECTION II MAINTENANCE ALLOCATION CHART
FOR

DIRECTION FINDER SET AN/ARN-83

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIP.	(6) REMARKS
			C	O	P	M	D		
00	DIRECTION FINDER SET AN/ARN-83	Inspect Test Test Service Replace Repair Repair		0.3 0.3	0.3	1.0		1.2 1.2,12 3 thru 12 2 1.2 3 thru 12 3 thru 12	A C C B E F B
01	ANTENNA, DIRECTION FINDER AS-1863/ARN-8	Inspect Test Test Service Replace		0.1 0.2		0.5		1.2 3 thru 12 2 2	
02	CONTROL, DIRECTION FINDER C-6899/ARN-83	Inspect Test Test Service Replace Repair		0.2 0.2		0.5		1.2 3 thru 6 2 1.2 3 thru 12	
03	RADIO RECEIVER R-1201/ARN-83	Inspect Test Test Test Service Replace Repair Repair		0.3 0.3	0.3	0.5		1.2 3,4 3 thru 12 1.2 1.2 3 thru 12 3 thru 12	
0301	AMPLIFIER, AUDIO FREQUENCY P/N 549-4189-006 (13499)	Inspect Test Test Service Replace Repair			0.3 0.3	0.5		1.2 3 thru 7 1.2 2 3 thru 12	
0302	AMPLIFIER, ELECTRONIC CONTROL TUNING AND BEARING P/N 549-4190-006 (13499)	Inspect Test Test Replace Repair			0.3 0.3	0.5 0.3	1.5	3 thru 12 3 thru 12 3 3 thru 12	
0303	AMPLIFIER, INTERMEDIATE FREQUENCY P/N 549-4188-006 (13499)	Inspect Test Test Replace Repair			0.3 0.3	0.5 0.3	1.5	3 thru 12 3 thru 12 3 3 thru 12	
0304	AMPLIFIER, RF LOOP P/N 549-4174-006 (13499)	Inspect Test Test Replace Repair			0.3 0.4	0.5 0.3	1.5	3,4 4 thru 12 3 3 thru 12	
0306	AMPLIFIER, RF SENSE	Inspect Test Test Replace Repair			0.3 0.4	0.5 0.3	1.5	3,4 4 thru 12 3 3 thru 12	
04	MOUNT, ELECTRICAL EQUIPMENT MT-3806/ARN-83	Inspect Replace Repair Repair			0.2 0.5	2.5		3 3 3	H
0401	INVERTER, AUTOMATIC DIRECTION FINDER CY-2126/ARN-83	Inspect Test Test Replace Repair			0.2 0.2	0.3	2.5	3,4,8 3 thru 6 3 3 thru 7	

**SECTION 2E TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
DIRECTION FINDER SET AN/ARN-83**

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	G,F	MULTIMETER AN/USM-106	6625-00-999-6282	
2	G,F,N	TOOL KIT, ELECTRONIC EQUIPMENT TX-106/G	5180-00-610-8177	
3	F,N,D	TOOL KIT, ELECTRONIC EQUIPMENT TX-100/G	5180-00-605-0079	
4	F,N,D	MULTIMETER AN/USM-223*	6625-00-999-7465	
5	F,N,D	GENERATOR, SIGNAL AN/USM-127*	6625-00-783-5965	
6	F,N,D	COUNTER, ELECTRONIC DIGITAL READOUT AN/USM-207A*	6625-00-044-3228	
7	F,N,D	MULTIMETER ME-200/U	6625-00-913-9781	
8	F,N,D	OSCILLOSCOPE AN/USM-281A*	6625-00-228-2201	
9	F,N,D	GENERATOR, SIGNAL AN/USM-25J	6625-00-775-1874	
10	F,N,D	Q-METER TS-817C/U	6625-00-966-2055	
11	F,N,D	TEST SET, TRANSISTOR TS-183M/U	6625-00-893-2628	
12	F,N,D	TEST SET, DIRECTION FINDER AN/ARN-83	6625-00-999-5199	
		*OR EQUIVALENT TEST EQUIPMENT		

SECTION IV. REMARKS

REFERENCE CODE	REMARKS
A	INSPECT - Visual inspection to determine the maintenance levels needed to maintain the equipment mechanically or electrically.
B	SERVICE - Refers to correcting physical and electrical faults such as scratches by painting lubricating, changing of lights, fuses, knobs, and external damage.
C	TEST - Organizational level of maintenance - refers to operating the equipment to determine what level of maintenance is necessary. Electrically, this means a continuity check to determine conductivity or breaks in conductivity of circuit components and cables.
D	TEST - General Support - refers to checking inside the equipment mechanically and electrically to determine the maintenance needed.
E	REPLACE - Mechanical and electrical components which were found defective are to be replaced with stock parts available at the maintenance level designated.
F	REPAIR - refers to the process of putting the equipment back into working order by replacement of components or mechanically and electrically repairing the equipment moving the same to the next higher level of maintenance.
G	REPAIR - Refers to General Support or Depot level of maintenance.
H	By replacement of resilient mounts.

TM 11-5826-225-12, C2

By Order of the Secretary of the Army:

Official:

J. C. FENNINGTON
Brigadier General, United States Army
The Adjutant General

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Distribution:

To be distributed in accordance with DA Form 12-86, Section I, Organizational Avionics literature requirements for AN/ARN-88.

Organizational Maintenance Manual
DIRECTION FINDER SET AN/ARN-83

	Paragraph	Page
CHAPTER 1. INTRODUCTION		
Section I. General		
Scope	1-1	3
Index of Publications	1-2	3
Forms and Records	1-3	3
II. DESCRIPTION AND DATA		
Purpose and use	1-4	3
Technical characteristics	1-5	3
Components of Direction Finder Set AN/ARN-83	1-6	4
Common names	1-7	4
Description of direction finder set.	1-8	4
Description of receiver	1-9	4
Description of receiver mount.	1-10	5
Description of control unit.	1-11	5
Description of loop antenna	1-12	6
Additional equipment required	1-13	7
CHAPTER 2. OPERATING INSTRUCTIONS		
Operator's controls and indicators	2-1	8
Modes of operation	2-2	9
Preliminary operating procedure	2-3	9
Adf operation	2-4	9
Antenna operation	2-5	11
Manual loop operation	2-6	13
Stopping procedure	2-7	15
Operating precautions	2-8	15
Preflight (daily) operational check	2-9	16
CHAPTER 3. ORGANIZATIONAL MAINTENANCE		
Section I. General		
Scope of maintenance	3-1	17
Tools, materials, and test equipment required	3-2	17
II. PREVENTIVE MAINTENANCE INSTRUCTIONS		
Preventive maintenance	3-3	17
Intermediate preventive maintenance checks and services	3-4	18
Intermediate preventive maintenance checks and services chart	3-5	18
Cleaning	3-6	19
Preservation	3-7	19
Periodic preventive maintenance checks and services	3-8	19
Periodic preventive maintenance checks and services chart	3-9	20
III. TROUBLESHOOTING		
General troubleshooting techniques	3-10	20
Troubleshooting chart	3-11	20
Removal and replacement of control unit	3-12	21
Removal and replacement receiver	3-13	21
Removal and replacement of dc-to-ac inverter on receiver mount	3-14	22
APPENDIX I. REFERENCES		23
II. BASIC ISSUE ITEMS		24
III. MAINTENANCE ALLOCATION		24

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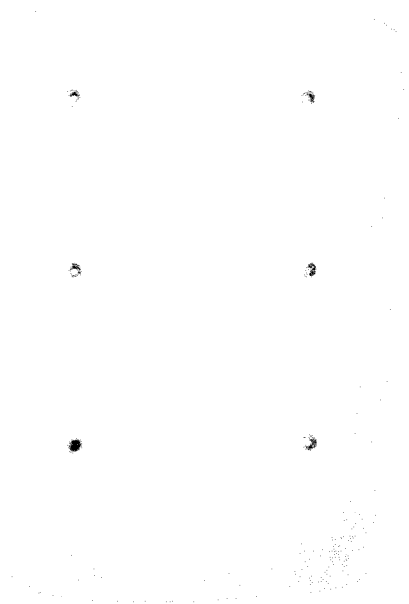
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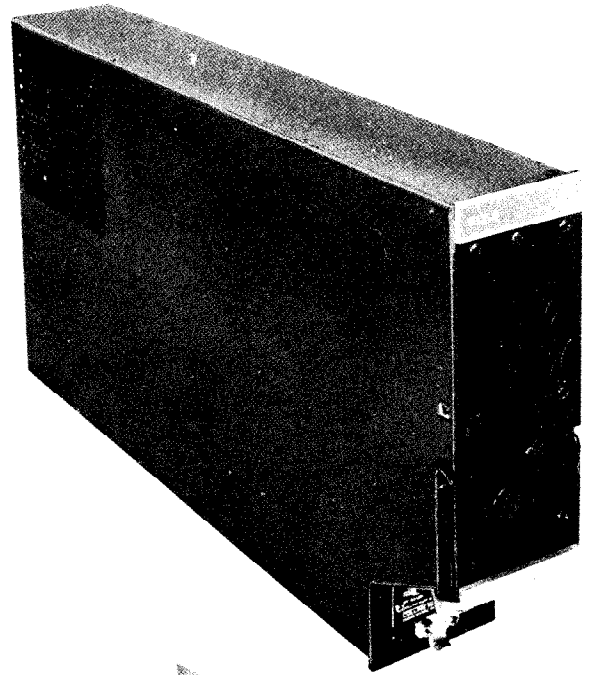
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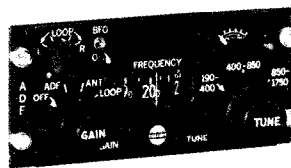
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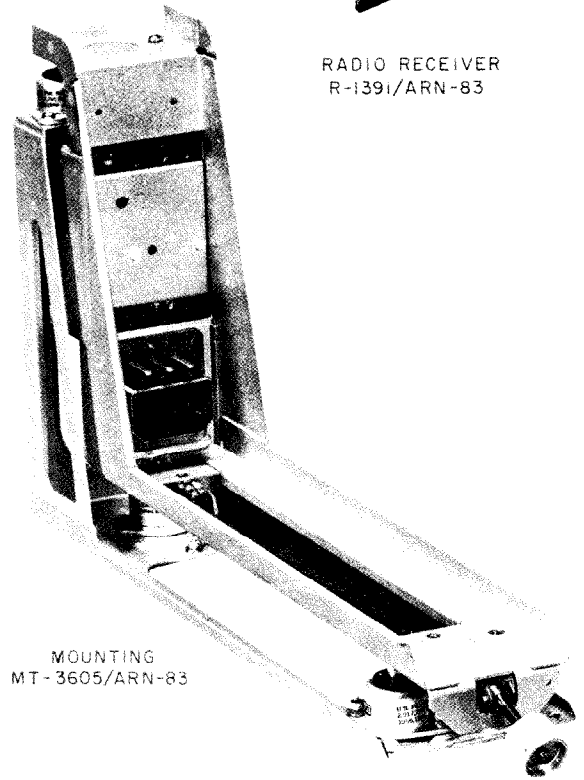
ANTENNA AS-1863/ARN-83



RADIO RECEIVER
R-1391/ARN-83



DIRECTION FINDER
CONTROL
C-6899/ARN-83



MOUNTING
MT-3605/ARN-83

TM5826-225-12-1

Figure 1-1. Direction Finder Set AN/ARN-83.

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

This manual describes Direction Finder Set AN/ARN-83 (fig. 1-1) and covers its operation, preflight check, and organizational maintenance. It includes operating instructions, cleaning and inspection of the equipment, organizational troubleshooting, and replacement of components available to organizational maintenance.

1-2. Index of Publications

Refer to the latest issue of DA Pam 310-4 to determine if there are new editions, changes, or additional publications pertaining to the equipment. DA Pam 310-4 is an index of current technical manuals, technical bulletins, supply manuals, (types 7, 8, and 9), supply bulletins, lubrication orders, and modification work orders that are available through publications supply channels. The index lists the individual parts (-10, -20, -35P, etc.) and the latest changes to and revisions of each equipment publication.

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Use equipment forms and records in accordance with instructions in TM 38-750.

b. Report of Damaged or Improper Shipment. Fill out and forward DD Form 6 (Report of Damaged or Improper Shipment) as prescribed in AR 700-58 (Army), NAVSANDA Publications 378 (Navy), and AFR 71-4 (Air Force).

c. Reporting of Equipment Manual Improvements. The direct reporting of errors, omissions, and recommendations by the individual user for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed using pencil, pen, or typewriter and forwarded direct to Commanding General, U. S. Army Electronics Command, ATTN: AMSEL-MR-(NMP)-MA, Fort Monmouth, N. J. 07703.

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

Direction Finder Set AN/ARN-83 (fig. 1-1) is an airborne automatic direction finder (adf) operating within the frequency range of 190 to 1,750 kilocycles (kc). The equipment provides both visual and aural facilities for adf homing, radio range navigation, and position fixing. It is used as a navigational radio aid to continuously and visually indicate the magnetic bearing of a radio station while providing aural reception of audio transmissions from the station. The azimuth or bearing of a radio station is displayed on the aircraft radio magnetic indicator or other synchro-type bearing indicators.

1-5. Technical Characteristics

Frequency range 190 to 1,750 kc in three ranges.
Accuracy range 190 to 400 \pm 1.5 kc; 400 to 850
 \pm 2.5 kc; 850 to 1,750 \pm 5.0
kc.

Bearing accuracy $\pm 2^\circ$.

Maximum time for bearing
indication 7 seconds.

Bearing data output Capable of driving 1, 2, or 3,
26 volt ac, 400 cps, synchro
bearing indicator.

Aural rf input sensitivity:

Adf mode:
200 kc 70 microvolt per meter.
1,700 kc 25 microvolt per meter.

Aural rf input sensitivity-Continued

Antenna mode:

200 kc 50 microvolt per meter with 270- μ f capacitor on sense antenna input, 40 microvolt per meter with 150- μ f capacitor on sense antenna input.
 1,700 kc 22 microvolts per meter with 270- μ f capacitor on sense antenna input, 18 microvolt per meter with 150- μ f capacitor on sense antenna input.

Loop mode:

200 kc 100 microvolt per meter.
 1,700 kc 30 microvolts per meter.

Receiver intermediate

frequency 1425 kc.

Receiver bandwidth:

Down 6 db at 200 kc . . Not less than 2.6 kc.
 Down 60 db at 200 kc . Not more than 9.0 kc.
 Down 6 db at 1,700 kc. Not less than 3.5 kc.
 Down 60 db at 1,700 kc. Not more than 11.0 kc.

Receiver bfo Crystal oscillator.

Frequency 1425 kc (fixed).

Audio output impedance .,600 ohms.

Audio output level Not less than 100 milliwatts into a 600-ohm load with an rf input signal of 1,000 microvolts per meter, modulated 30 percent at 400 cps.

Power requirements:

Voltage +27.5 \pm 1.0 volts dc.
 Current 2 amperes maximum,

Weight of complete

equipment 18 pounds (less cabling).

1-6. Components of Direction Finder Set AN/ARN-83

Qty	Component	Dimensions (in.)			Unit weight (lb)	Figure
		Height	Depth	Width		
1	Radio Receiver R-1391/ARN-83	7 $\frac{5}{8}$	14 $\frac{5}{8}$	2 $\frac{1}{4}$	9.8	1-2
1	Mounting MT-3605/ARN-83	9 $\frac{1}{2}$	16	3 $\frac{1}{4}$	2.6	1-3
1	Direction Finder Control C-6899/ARN-83	2 $\frac{1}{2}$	4 $\frac{1}{2}$	5 $\frac{3}{4}$	1.8	1-4
1	Antenna AS-1863/ARN-83	$\frac{7}{8}$	16	12	3.8	1-5

1-7. Common Names

Listed below are nomenclature and assigned common names for the equipment covered in this manual.

Nomenclature	Common Name
Direction Finder Set AN/ARN-83.	Direction finder set
Radio Receiver R-1391/ARN-83.	Receiver
Mounting MT-3605/ARN-83	Receiver mount
Direction Finder Control C-6899/ARN-83.	Control unit
Antenna AS-1863/ARN-83	Loop antenna

1-8. Description of Direction Finder Set

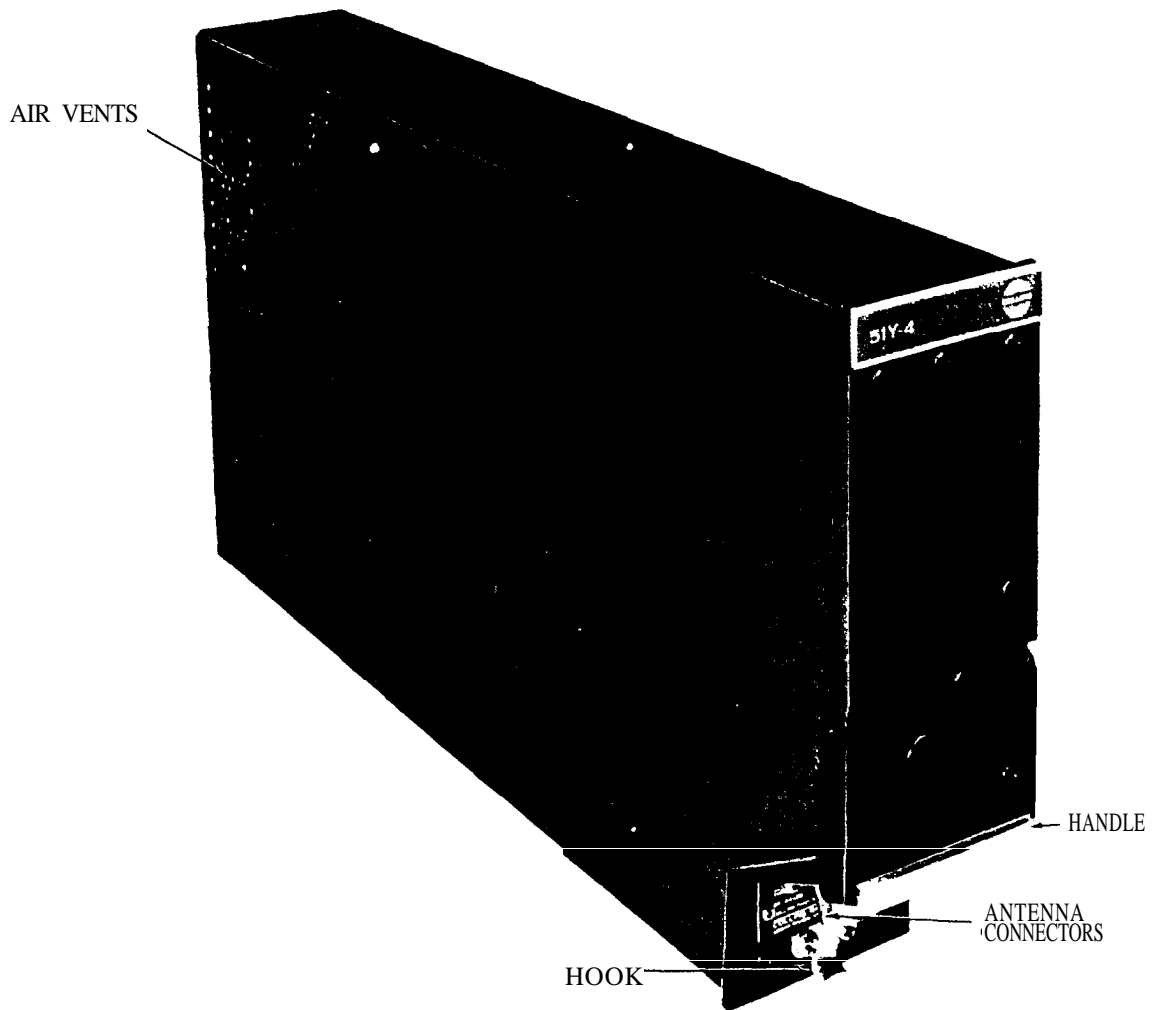
Direction Finder Set AN/ARN-83 consists of a receiver, receiver mount, control unit, and a loop antenna. The direction finder set is intended to be used with a suitable sense antenna, a radiofrequency (rf) inductance compensator, the necessary interconnecting cables, and a bearing indicator. Figure 1-1 shows all components of the direction finder set.

1-9. Description of Receiver

(fig. 1-2)

a. The receiver is housed in a removable metal dust cover provided with air vents. When the receiver is installed on its mount, it is secured at one end by a hook and at the other end by a mating electrical connector. A handle is provided for maintenance functions and transporting the receiver. Connections to the loop and sense antennas are made through keyed connectors at the front of the receiver. Connections for power, signals, and remote control functions between the receiver and control unit are made through a connector at the rear of the receiver, which mates with another connector on the receiver mount.

b. Physically, the receiver chassis is divided into front and rear sections. The front section contains rf circuitry and eight removable subassemblies. The rear section contains synchros, motors, gear trains, and a power supply and is hinged for access to these components. With the exception of power supply transistors, all other transistors use sockets. The internal regulated power supply is capable of suppressing power input voltage transients from -40 to +80 volts direct current (dc) about the nominal +27.5 volts dc required for operation.



TM5826-225-12-2

Figure 1-2. Radio Receiver R-1391 / ARN-83.

1-10. Description of Receiver Mount (fig. 1-3)

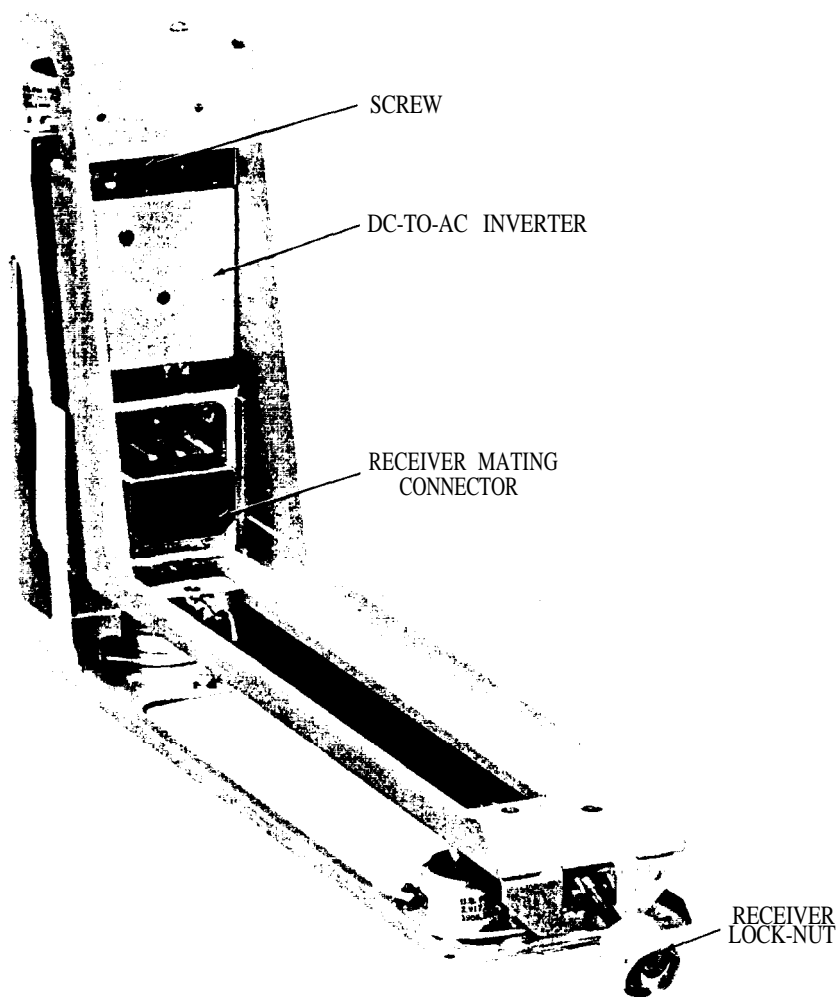
The receiver mount serves as a shock isolator, mating electrical connector support, electrical power and signal distribution center, mount for a dc-to-ac inverter, and the means of securing the receiver to the aircraft. The inverter accepts +27.5 volts dc and supplies 26 volts alternating current (ac) at 400 cycles per second (cps) for synchro excitation. Mechanically, the receiver mount comprises two aluminum frames separated by five vibration isolators. One frame (base) is secured to the aircraft with eight screws. The upper frame supports the receiver at one by the mating elec-

trical connector and at the other end by a locknut that engages a hook at the front of the receiver. Two ground straps connect the two aluminum frames together for electrical ground continuity.

1-11. Description of Control Unit (fig. 1-1)

a. The control unit remotely controls the receiver and contains the necessary controls for selecting the frequency range, tuning the receiver, and selecting all direction finder set operating modes. A tuning meter indicates signal strength.

b. The control unit is inclosed in a removable dust cover and mounts on either the pilot's instru-



TM5826-225-12-3

Figure 1-3. Mounting MT-3605/ARN-83

ment panel or control console with four Dzus type fasteners. Alphanumeric characters on the control unit translucent front panel are illuminated by six lamps mounted behind the panel. Two other lamps illuminate the frequency dial numbers and a white hairline engraved on the dial viewing window. A linkage system, connected to the range switch and frequency dial, positions the dial so that only the frequency range in use appears. All electrical connections to the control unit are made through a connector located at the rear of the unit.

1-12. Description of Loop Antenna

(fig. 1-1)

The loop antenna is a completely sealed unit with a nonremovable electrical connector. Inside the unit are two parallel-connected pairs of ferrite-type coils or loops. When installed on the aircraft, one pair of coils is physically located parallel with the aircraft longitudinal axis and the other pair of coils is located parallel with the aircraft lateral axis. The loop antenna is fixed and does not rotate as in earlier adf systems. Signal output of the loop antenna passes through its associated electrical

connector and rf inductance compensator (para 1-13d) to the receiver.

1-13. Additional Equipment Required

The following items are not supplied as part of Direction Finder Set AN/ARN-83 but are required for use with the set.

a. Sense Antenna. The sense antenna is usually a flush-mounted type, built into the aircraft or a T-type antenna constructed of large diameter wire or tubing mounted on standoff insulators at the bottom of the fuselage, parallel with the aircraft longitudinal axis. It supplies a nondirectional sense radio signal to the receiver. This antenna is originally installed by the aircraft manufacturer.

b. Bearing Indicator. A radio magnetic bearing indicator or a type which displays both the adf hearing and other navigational aids, such as very high frequency omnidirectional radio range, (vor) or compass information, is required. The indicator must be a synchro receiver operating on 26 volts ac

at 400 cps. It is required for indicating the bearing or azimuth of a radio station. Typical bearing indicators are the ID-637/ARN and ID-250/ARN-30.

c. Electrical Cables and Connectors. Cables and connectors are required for interconnections between the receiver mount, control unit, bearing indicator, sense antenna, loop antenna, aircraft interphone system, and primary power. The cabling is originally fabricated and installed by the aircraft manufacturer.

d. Rf Inductance Compensator. The rf inductance compensator, connected between the loop antenna and receiver, compensates for any electromagnetic field distortion introduced into the antenna by the engines, wings, or other metal parts of the aircraft. This field distortion, introduced in one or more quadrants, causes radio station bearings to be displaced from their true direction. Quadrantal error varies with the aircraft configuration so the rf inductance compensator is selected during the installation phase.

CHAPTER 2

OPERATING INSTRUCTIONS

2-1. Operator's Controls and Indicators

(fig. 2-1)

All operating controls are on the control unit.

Control or indicator	Function
Function switch (4-position rotary switch concentric with GAIN control).	Turns direction finder set on and off and enables selection of operating mode. <div style="display: flex; justify-content: space-between;"><i>Switch position</i><i>Action</i></div> OFF Turns direction finder set off. ADF Turns direction finder set on and permits operation for homing or automatic direction finding (adf). ANT Permits radio station reception for radio range navigation, or for use as a radio broadcast station receiver. LOOP Used in conjunction with LOOP switch for aural null homing and manual direction finding.
Range switch (3-position rotary switch concentric with TUNE control).	Selects one of three frequency ranges: 190 to 400 kc, 400 to 850 kc, or 850 to 1750 kc.
TUNE control	Permits tuning receiver frequency within range selected by range switch.
FREQUENCY window	Indicates frequency in kilocycles of range viewed in window.
GAIN control	Permits adjusting audio output to headsets or speakers.
LOOP switch (5-position rotary switch with spring-return to center position).	When function switch is set to LOOP position; LOOP switch enables manual rotation of loop antenna electromagnetic field, and bearing indicator pointer 360° left or right for manual direction finding, or when using aural null for homing to a radio station. <div style="display: flex; justify-content: space-between;"><i>Switch position</i><i>Action</i></div> Center position Removes manual direction finding mode. First position L (left) or R (right) of center. Slow speed position permits rotation of bearing indicator pointer 360° left or right. Second position L (left) or R (right) of center. Fast speed position permits rotation of bearing indicator pointer 90° left or right. <i>Note.</i> Returning the LOOP switch to its center position, stops rotation of bearing indicator pointer at any desired position.
BFO-OFF switch (2-position toggle switch)	Turns beat frequency oscillator on or off.
Tuning meter	Indicates relative signal level of radio stations when tuning receiver.

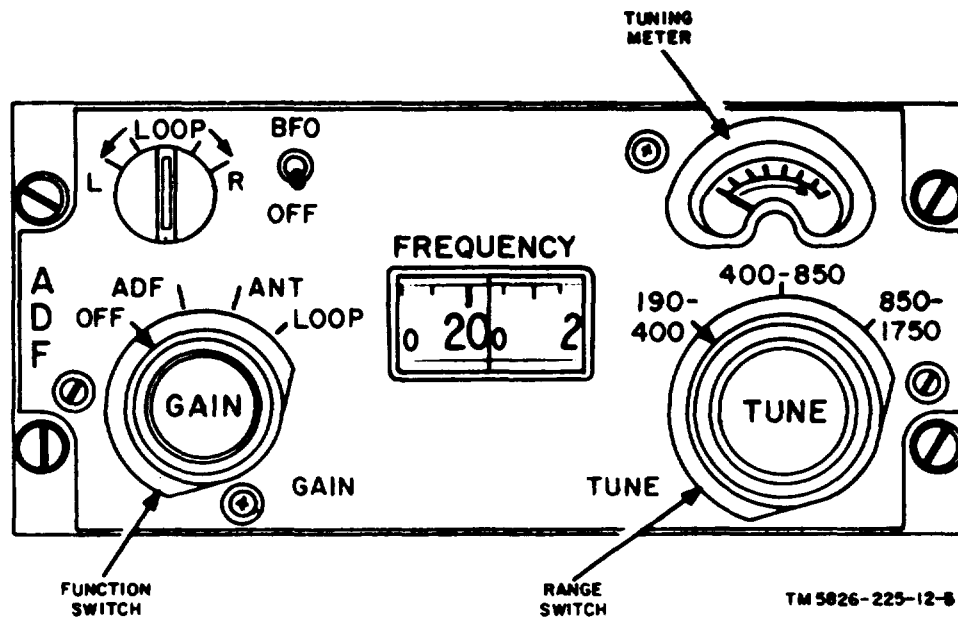


Figure 2-1. Direction Finder Control C-6899/ARN-83, controls and indicators.

2-2. Modes of Operation

a. The control unit function switch enables the selection of three operating modes: ADF mode for automatic direction finding, homing to a radio station, and position fixing; ANT (antenna) mode for radio range navigation or use as a radio broadcast station receiver; and LOOP mode for manual direction finding or when using aural null for homing and position fixing. In any operating mode, the direction finder set will provide an aural output of any audio modulating the radio station rf carrier. A beat frequency oscillator (bfo) aids in tuning for zero beat or supplying audio for continuous-wave (cw) signals.

b. Refer to the following to operate the equipment in any particular mode:

- (1) Preliminary operating procedure (para 2-3).
- (2) Adf operation (para 2-4).
- (3) Antenna operation (para 2-5).
- (4) Loop operation (para 2-6).

2-3. Preliminary Operating Procedure

a. Turn on aircraft radio equipment power controls.

b. Set control unit function switch for desired type of operation (paras 2-4, 2-5, and 2-6).

c. Allow direction finder set to warm up for 5 minutes. See that the panel, tuning meter, and FREQUENCY window arc illuminated.

2-4. Adf Operation

a. *Homing to Radio Station* (fig. 2-2). When homing to a radio station, the aircraft bearing indicator pointer indicates the magnetic bearing of the station and the pilot uses his rudder to fly on this heading and home to the station. Normally, the pilot would maneuver the airplane to hold the bearing indicator pointer under the lubber line. If there is a crosswind, the airplane must crab into the wind and fly a curved and longer flightpath. In figure 2-2, the solid line is the track and bearing to a radio station if no crosswind exists. The dotted line is the actual flightpath with a crosswind from the right. To correct for wind, the pilot must fly into the wind on a heading that will hold the bearing shown in figure 2-2. Use the direction finder set to home to a station as follows:

- (1) Set control unit function switch to ADF and allow 5 minutes for warmup.
- (2) Set BFO-OFF switch to OFF.
- (3) Set range switch to the frequency range of a radio range station, an outer marker, or a broadcast station. The range selected will appear in the FREQUENCY window.

(4) Rotate TUNE control to the frequency of a radio station and tune for maximum signal level on tuning meter (meter pointer swings to the right). The bearing indicator will show bearing of radio station.

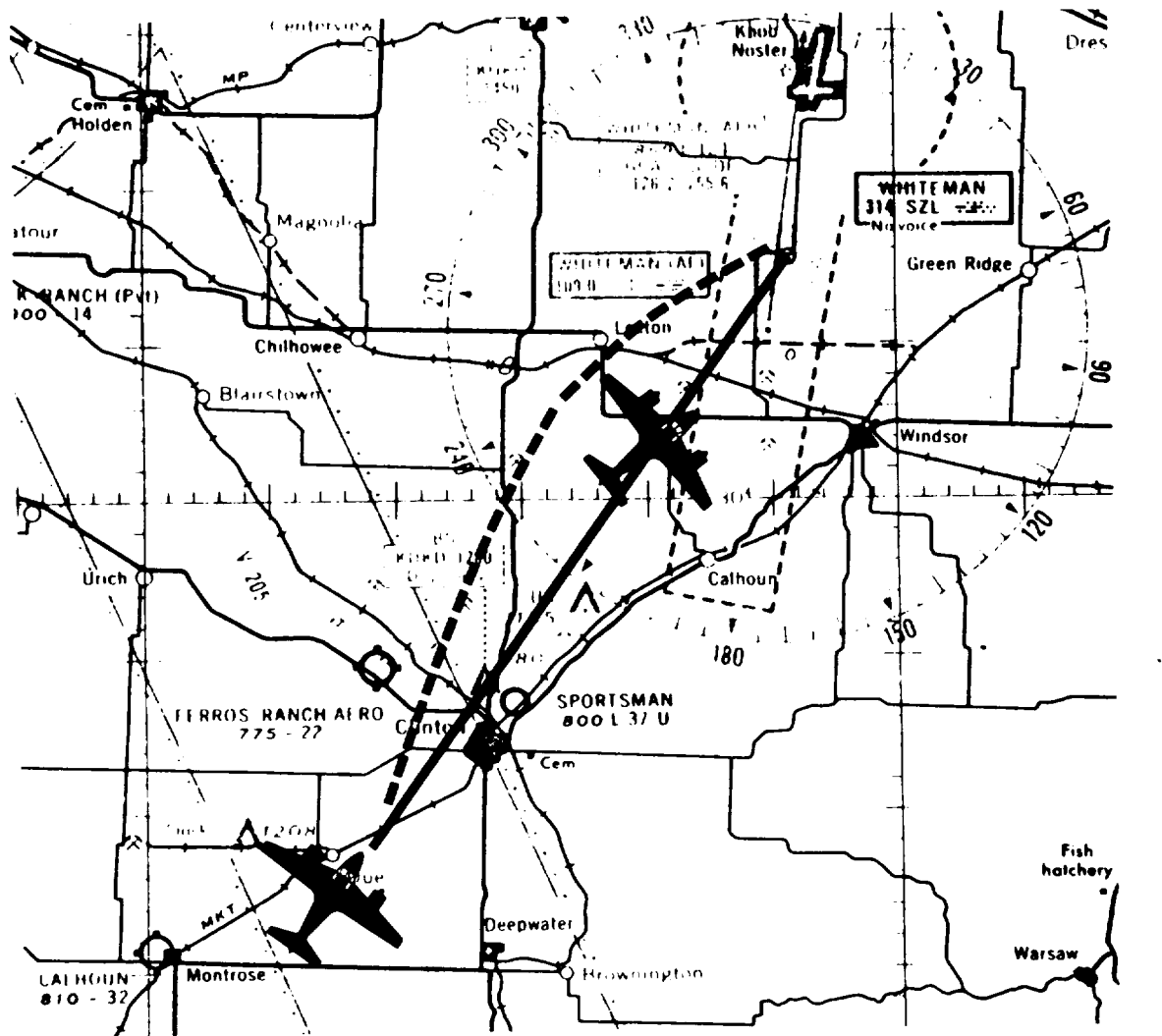
Note. Five turns of the TUNE control will cover the frequency range in use. Frequencies are indicated in kilocycles.

(5) If audio is desired, rotate GAIN control to the right and adjust for a comfortable sound level. If radio station transmission is continuous wave, set BFO-OFF switch to BFO.

(6) If there is no crosswind, maneuver the airplane to position bearing indicator pointer under the lubber line and fly on this heading toward radio station.

(7) For a crosswind condition, check bearing of wind and correct magnetic heading.

b. Using Adf for Position Fix (fig. 2-3). For a position fix, at least two radio stations are required. For maximum accuracy, a third station should also be used. If the pilot is flying on a radio range course, the radio range station serves as one bearing



TM5826-225-12-6

Figure 2-2. Homing to a radio station.

and the bearing of one or two other radio stations is required. Make a position fix as follows:

- (1) Set control unit function switch to ADF and allow 5 minutes for warmup.
- (2) Set BFO-OFF switch to OFF.
- (3) Select the three radio station frequencies to be used and set range switch to frequency range of radio station with the lowest frequency:
- (4) Tune station in for maximum tuning meter indication.
- (5) Record bearing indicated on bearing indicator and the time this bearing was taken. Correct bearing for local magnetic variation and draw a map plot for this radio station, using figure 2-3 as a guide.
Note. The narrow end of the bearing indicator pointer always points to the radio station. For a position fix, record the bearing indicated at the opposite end (wide end) of bearing pointer (bearing from station).
- (6) Select radio station with next higher frequency and set range switch to this range.
- (7) Tune station in for maximum tuning meter indication, Record the time and radio station bearing (bearing from station). Correct bearing for magnetic variation and make a plot on the map.
- (8) Setting range switch and TUNE control accordingly, take a bearing on the third radio station. The triangular intersection of lines on the map plot is your position.

c. Using Adf for Landing Field Approach (fig. 2-4). A landing field approach procedure includes aircraft heading, distance, and time to landing field touchdown, using homing techniques, the outer marker, or other radio facilities available in the immediate area. A typical adf approach is shown by the dotted line in figure 2-4. The solid line indicates the same heading to the radio station as that from station to landing field. Proceed as follows:

- (1) Set function switch to ADF.
- (2) Home in on the radio facility (a(2) through (6) above).
- (3) While flying inbound on the final heading to the radio station or landing field, allow sufficient time to correct for crosswind.

Note. When flying toward the radio station (inbound), the narrow end of the bearing indicator pointer will point to the station. After passing over the station, the narrow end of bear-

ing pointer will rotate 180°. Use this heading to fly outbound.

d. Computing Time or Distance to Radio Station (fig. 2-5). Complete time or distance to a radio station as follows:

- (1) Set function switch to ADF.
- (2) Set range switch to frequency range of radio station to be used. Tune station in for maximum tuning meter indication. Bearing indicator pointer will show bearing of radio station.
- (3) Maneuver airplane so that radio station is at a relative bearing of 20° either side of nose of airplane. Record this bearing and the time bearing was taken.
- (4) Hold a constant heading until the bearing has doubled from 20° to 40° as shown in figure 2-5. Record this time.
- (5) The time required to fly to the radio station is equal to the time required for doubling the bearing from 20° to 40°. Distance is equal to the distance covered while doubling the bearing angle.

2-5. Antenna Operation

When the control unit function switch is set to ANT (antenna) position, the direction finder set may be used either for reception of radio broadcast stations or radio range navigation stations. In this operating mode, the bearing indicator is inoperative.

a. Radio Broadcast Reception.

- (1) Set the function switch to ANT.
- (2) Set range switch to frequency range of desired radio station and tune in radio station for maximum tuning meter indication.
- (3) Adjust GAIN control for desired sound level.

b. Radio Range Navigation. A typical radio range orientation procedure is illustrated in figure 2-6. Two airplanes are shown making a 180° turn for radio beam interception. Use this situation as a guide and proceed as follows:

- (1) Set control unit function switch to ANT.
- (2) Set range switch to frequency range of radio range station.
- (3) While tuning the station in, adjust GAIN control for minimum audio output and tune for maximum tuning meter indication. As the range station is approached, the

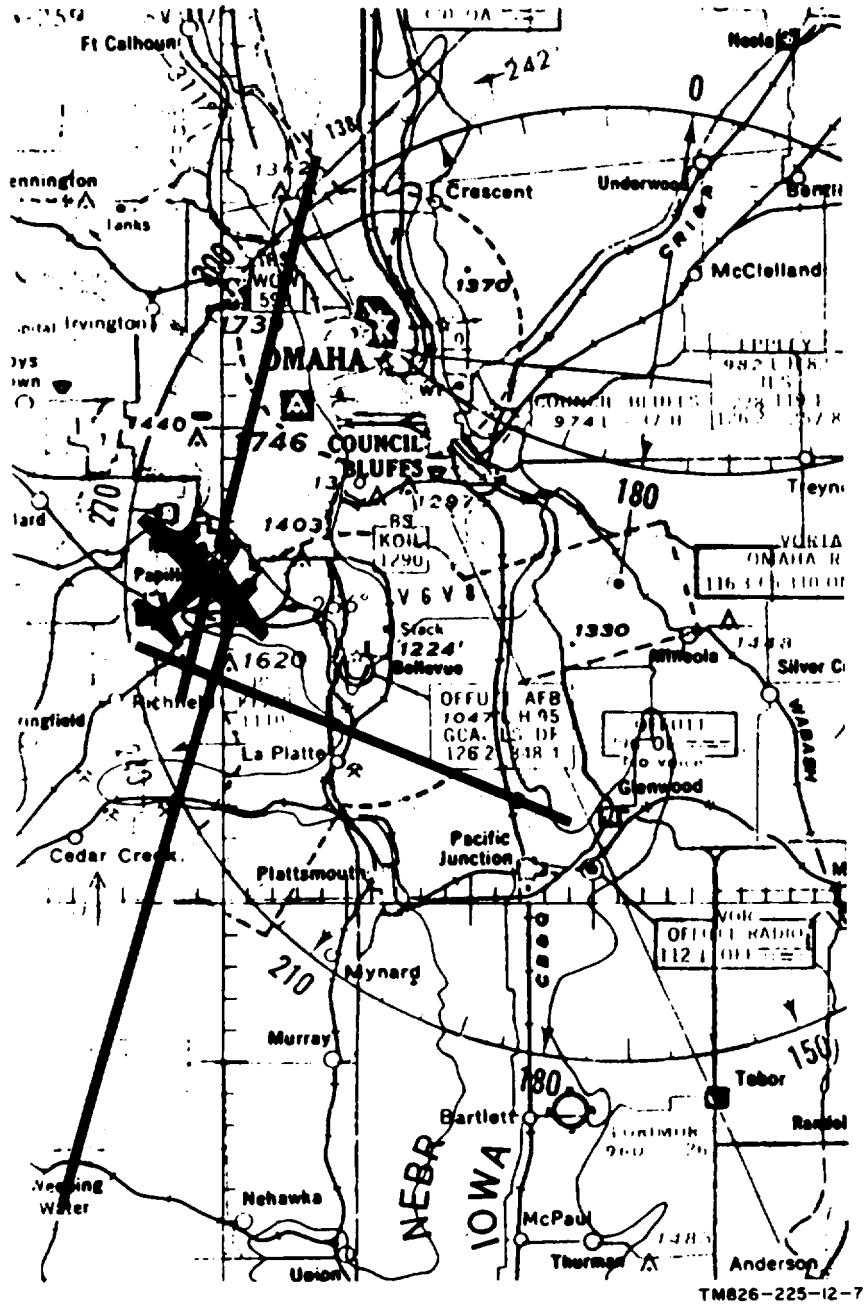


Figure 2-3. Position fixing.

audio output will increase.

- (4) Maneuver airplane to the nearest inbound bisector heading while listening for an increase or decrease of audio level in headset.
- (5) Identify the radio beam by making a 180°

turn to the right after passing through the on-course signal area. If a beam is intercepted before completing the 180° turn, the airplane has intercepted the beam forming the left quadrant. Intercepting a beam

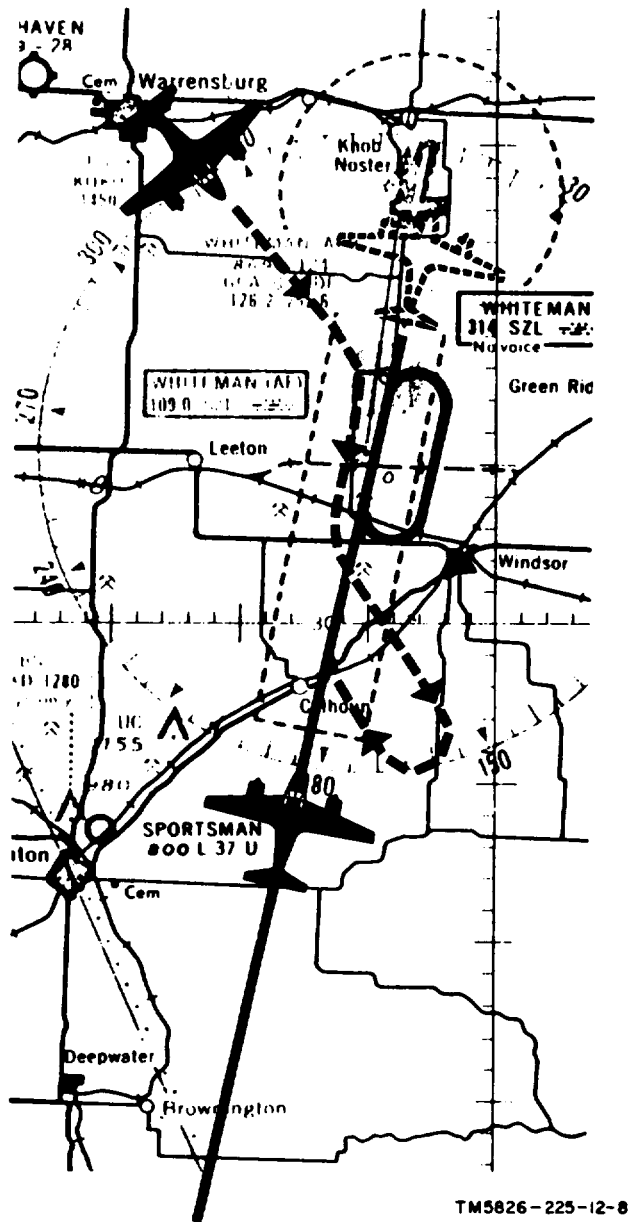


Figure 2-4. Landing field approach.

after completing the turn, means the beam forming the right quadrant has been intercepted.

- (6) After identifying the radio beam, fly on the leg the inbound or outbound heading of which is nearest the desired heading.

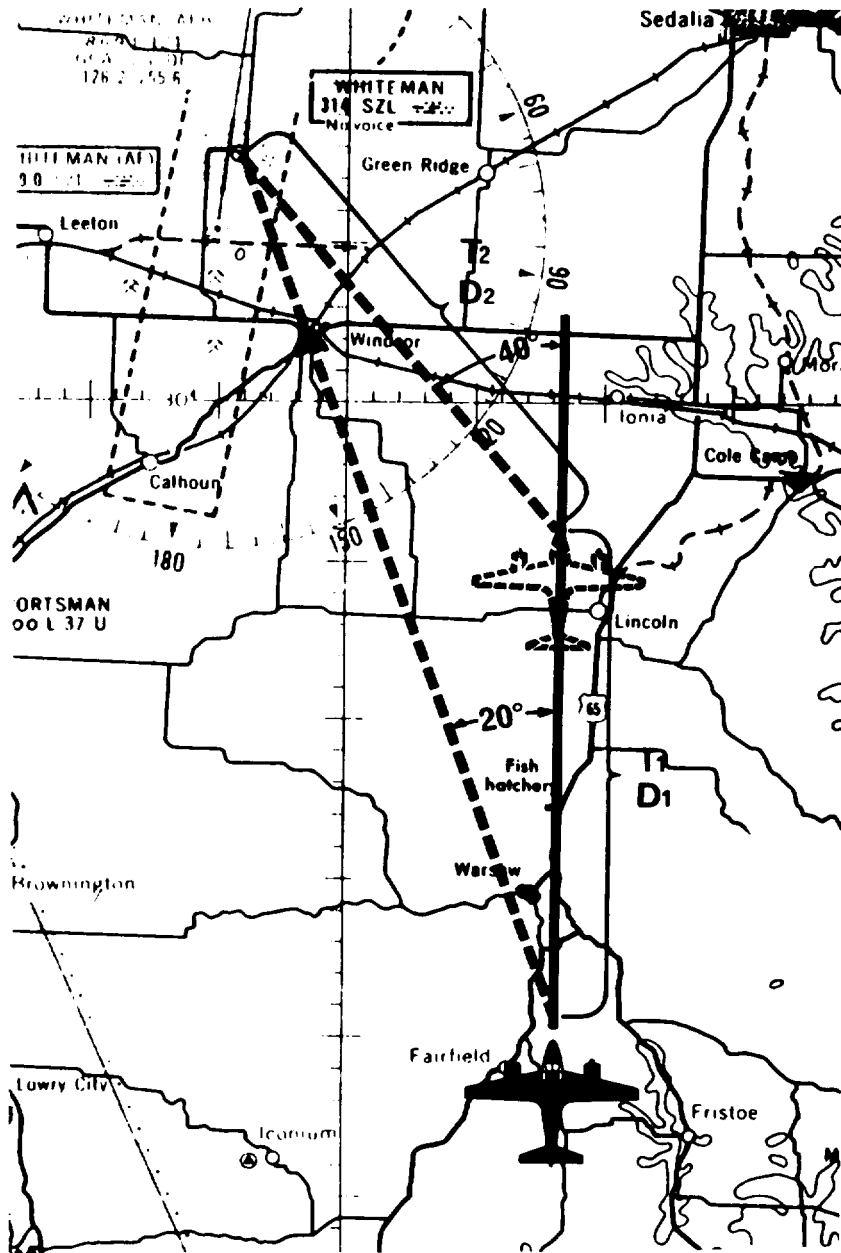
2-6. Manual Loop Operation

This mode of operation is used for aural null homing and manual direction finding. Aural null

homing is useful when adf bearings are unreliable due to night effect (para 2-8), weather, or another radio station causing hunting or oscillation of the bearing indicator.

- a. Set function switch to ANT and range switch to frequency range of radio station to be used.

- b. Set BFO-OFF switch to BFO and adjust GAIN control for minimum audio output. Tune for aural null on radio station. Turn BFO-OFF switch OFF.



TM5826-225-12-9

Figure 2-5. Time and distance plot.

c. Set function switch to LOOP.

Note. The LOOP switch has two positions L (left) and two position R (right) with spring return to the center or off position. In the first position, left or right (slow speed position), the bearing indicator pointer can be rotated 360° in either direction and stopped at any desired position by returning the LOOP switch to its center position. In the second position left or right (fast speed position), the bearing pointer may be rotated 90° in either direction

and stopped at any position. The loop antenna is fixed and cannot rotate. The bearing indicator pointer rotates and points in the same direction as the loop antenna if the antenna could rotate.

d. Using LOOP switch, allow the bearing indicator pointer to rotate to a null (no sound in headset). The bearing indicator pointer will stop on this null.

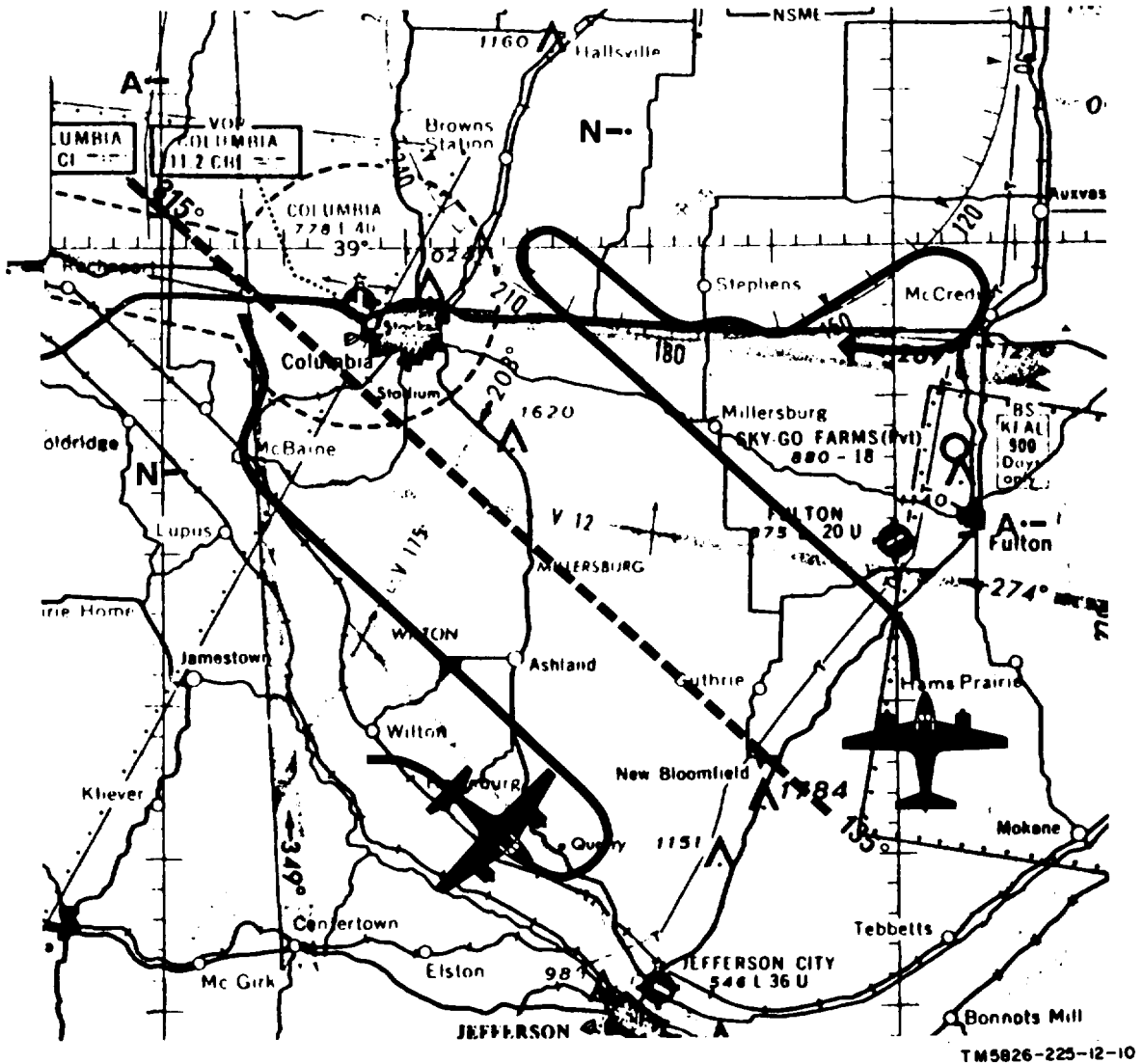


Figure 2-6. Radio range orientation.

e. The true null and direction to the radio station may be indicated by either end of the bearing pointer. To resolve this ambiguity, maneuver airplane for a null indication off the wings instead of dead ahead or behind the airplane. Fly on this null heading to determine which direction the null moves. The null that moves toward the tail surfaces is the true null.

f. Maneuver airplane to place the true null end of bearing pointer under the lubber line and fly on this heading.

2-7. Stopping Procedure

Set the function switch to OFF.

2-8. Operating Precautions

a. *Operating Range.* The operating range of the direction finder set depends on the terrain, enemy interference, and radio noise. The equipment will normally operate over a range of 15 or 20 miles.

b. *Night Effect.* Night effect is usually manifested by skywaves of distant radio stations caus-

ing interference to the audio and bearing accuracy of desired station. When this occurs, use the loop mode for aural null homing (para 2-6).

c. Mountain and Coastal Effects. (groundwaves from low frequency radio stations may be reflected by mountainous terrain. This causes the radio waves to bend and the bearing to a station may change. The same error may occur when crossing a coastline. To reduce this error, increase the altitude or tune direction finder set to a stronger radio station.

d. Electrical Interference. The bearing indicator pointer may oscillate and point to areas of electrical interference. If operating on adf, use the loop mode and aural null homing (para 2-6).

2-9. Preflight (Daily) Operational Check

Perform the following preflight operational check during engine warmup and just prior to flight. Report any direction finder set malfunction or failures noted in flight or during the preflight check in accordance with the requirements in TM 38-750.

a. Set control unit function switch to ANT. See that tuning meter, panel, and FREQUENCY dial are illuminated. Allow 5 minutes for equipment warmup.

b. Set range switch to the frequency range of a radio station. Adjust TUNE control for radio station and maximum tuning meter indication, Note FREQUENCY dial reading under the hairline.

c. Set BFO-OFF switch to BFO.

d. Adjust TUNE control for zero beat in headset. The FREQUENCY dial reading should be identical with that obtained in *b* above. Turn BFO-OFF switch to OFF.

e. Set range switch to each of the three frequency ranges and tune to a radio station in each range to make certain that band switching takes place.

f. Tune the receiver to a radio station the bearing of which is known. Set function switch to ADF; visually see that the bearing indicator pointer indicates the correct bearing to radio station and coincides with the magnetic compass.

g. Using the maximum speed position of LOOP switch (last position right or left), rotate bearing indicator pointer 90° right and then 90° left of adf bearing obtained in *f* above. At both the right and left 90° bearing points, reset LOOP switch to its center position. Bearing indicator pointer should return to the original adf bearing indication at a rate of not less than 25° per second (use a stopwatch).

h. Set function switch to LOOP.

i. Using the slow speed position of LOOP switch (first position right or left of center), rotate bearing indicator pointer 360° in each direction and listen for an aural null in headset. There should be two bearing indicator null positions displaced 180° from each other. Stop bearing indicator pointer on the null that points away from the station.

j. Set function switch to ADF. The bearing indicator pointer should rotate 180° and indicate the same adf bearing as in *f* above.

CHAPTER 3

ORGANIZATIONAL MAINTENANCE

Section I. GENERAL

Note. The pilot or copilot does not perform preventive or organisational maintenance.

3-1. Scope of Maintenance

The main duties assigned to the organizational electronic equipment repairman or crew chief are listed below, together with references to paragraphs covering the specific maintenance functions. The tools, materials, and test equipment are listed in paragraph 3-2.

- a. intermediate preventive maintenance checks and services (para 3-4).
- b. Periodic preventive maintenance checks and services (para 3-81).
- c. Cleaning (para 3-6).
- d. Preservation (para 3-7).
- e. Troubleshooting (para 3-10).
- f. Removal and replacement of control unit (para 3-12).

g. Removal and replacement of receiver (para 3-13).

h. Removal and replacement of receiver mount dc-to-ac inverter (para 3-14).

3-2. Tools, Materials, and Test Equipment Required

- a. Tool Kit, Electronic Equipment TK-105/G.
- b. Brush, MIL-G-7241.
- c. Drycleaning Solvent, Federal Specification PS-661.
- d. Cleaning Compound, Federal stock No. 7930-395-9542.
- e. Lint free cloth.
- f. Sandpaper, fine No. 000.
- g. Multimeter AN/URM-105.

Section II. PREVENTIVE MAINTENANCE INSTRUCTIONS

3-3. Preventive Maintenance

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

a. *Systematic Care.* The procedures given in paragraphs 3-6 and 3-7 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. *Preventive Maintenance Checks and Services.* The preventive maintenance checks and services chart (para 3-5) lists functions to be performed at specific intervals. These checks and services are to

maintain Army electronic equipment in a combat-serviceable condition; that is, in good physical condition and in good operating condition. To help the organizational electronic equipment repairman or crew chief in maintaining combat serviceability, the chart indicates what to check, how to check, and the normal conditions. The *References* column lists the paragraphs or manuals containing supplementary information. If the trouble cannot be remedied by the organisational electronic equipment repairman or crew chief, higher level maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

3-4. Intermediate Preventive Maintenance Checks and Services

Perform the maintenance functions indicated in the intermediate preventive maintenance checks

and services chart (para 3-5) after every 25 hours of flying time. Refer to paragraph 3-10 (troubleshooting) for corrective measures for items 5 through 10 in the chart.

3-5. Intermediate Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
POWER-OFF INSPECTION			
1	Air vents	Clean air ventilating holes in receiver dust cover.	
2	Exterior surfaces	<p>a. Clean control unit front panel, tuning meter lens, and FREQUENCY dial window.</p> <p>b. Check for broken tuning meter lens and FREQUENCY dial window. If lens or dial window is broken, notify a higher level of maintenance.</p> <p>c. Check exposed metal surfaces of control unit, receiver, and receiver mount for rust or corrosion.</p> <p>d. Check surface of loop antenna for dents, deep scratches, and cracks. If antenna is damaged, notify a higher level of maintenance.</p>	<p>a. Para 3-6d.</p> <p>b. None.</p> <p>c. Para 3-7.</p> <p>d. None.</p>
3	Cable and connections.	<p>a. Clean cable connectors and check tightness of all connectors.</p> <p>b. Tighten all cable connections at rear of control unit and at front receiver. Check and tighten cable connections at rear of receiver mount.</p> <p>c. Check all interconnecting cables and connectors for cracks and breaks. Replace cables that have cracks or broken connectors.</p>	<p>a. Para 3-6c.</p> <p>b. None.</p> <p>c. None.</p>
4	Knobs, dials, and switches	<p>a. While making the operating checks (items 5 through 10), observe that the mechanical action of each knob, dial, and switch is smooth and free of external or internal binding.</p> <p>b. Tighten any loose knobs</p>	<p>a. None.</p> <p>b. None.</p>
OPERATION			
		<p><i>Note.</i> If aircraft engines are not operating during the direction finder set operational check, use an auxiliary 28-volt dc power source to prevent drain on the aircraft battery.</p>	
5	Control unit function switch.	Set to ANT. Note that the front panel tuning meter and FREQUENCY dial window are illuminated.	Para 3-11.
6	GAIN control	Rotate clockwise and listen for noise in headset or speaker.	Para 3-11.
7	Range switch and TUNE control.	<p>a. Set range switch to each of the three frequency ranges and tune to a radio station. Check to see that range switching takes place and dial indicates correct frequency range.</p> <p>b. Note that tuning meter indicates signal strength and audio can be heard in headset.</p>	<p>a. Para 3-11.</p> <p>b. Para 3-11.</p>

Sequence No.	Item	Procedure	References
OPERATION			
8	BFO-OFF switch	Set BFO-OFF switch to BFO. Tune to a radio station and listen for beat notes in headset. Zero-beat on station and note that sound is cut off.	l Para 3-11.
9	LOOP and function switches.	<p>a. Set function switch to ANT and tune to a radio station the bearing of which is known.</p> <p>b. Set function switch to LOOP. Using LOOP switch, rotate bearing indicator pointer for an aural null in headset. Note that the bearing indicator pointer will indicate two nulls displaced 180° apart.</p> <p>c. Set LOOP switch to center position and function switch to ADF. Note that bearing indicator pointer rotates and shows bearing of radio station (one null).</p>	<p>c a. Para 3-11.</p> <p>t b. Para 3-11.</p> <p>c c. Para 3-11.</p>

3-6. Cleaning

Inspect the exteriors of the control unit, receiver, and receiver mount. The exterior surfaces and vibration isolators on receiver mount should be clean and free of dust, dirt, grease, and fungus.

a. Remove dust and loose dirt with a clean soft cloth.

Warning: Cleaning compound is flammable and its fumes are toxic. Provide adequate ventilation. Do not use near an open flame.

b. Remove grease, fungus, and ground-in dirt from the equipment cases and receiver mount; use a cloth dampened (not wet) with cleaning compound.

c. Remove dust or dirt from cable and equipment connectors with a soft brush. Remove grease or grime with a lint free cloth moistened with dry-cleaning solvent. Dry with compressed air

Caution: Do not press on the tuning meter face (lens) when cleaning the control unit; the meter may be damaged.

d. Clean the control unit front panel, FREQUENCY dial window, and control knobs; use a soft, clean, lint free cloth. If dirt is hard to remove, dampen cloth in water or for more effective cleaning, use a mild soap,

3-7. Preservation

Remove rust and corrosion from metal surfaces

by lightly rubbing them with fine sandpaper. Brush two thin coats of paint on the bare metal to prevent further corrosion. Refer to the applicable cleaning and refinishing practices specified in TB SIG 364. Refer to TM 9-213 for care of painting equipment.

3-8. Periodic Preventive Maintenance Checks and Services

a. *General.* Perform the maintenance functions indicated in the periodic preventive maintenance checks and services chart (para 3-91 every 100 flying hours (concurrently with the aircraft periodic preventive maintenance checks and services) in addition to the intermediate preventive maintenance checks and services (para 3-5). All deficiencies or shortcomings will be recorded in accordance with the requirements of TM 38-750. Perform all the checks and services given in the chart in the sequence listed.

b. *Periodic Pullout Inspection.* During the aircraft periodic preventive maintenance checks and services, the electronic equipment will be removed from the aircraft for bench tests and inspections, and replacement electronic equipments will be re-installed from float stock. These tests and inspections are performed by direct support personnel. Perform the intermediate and periodic preventive maintenance checks and services after the float stock has been installed.

3-9. Periodic Preventive Maintenance Checks and Services Chart

Sequence No.	Item	Procedure	References
1	Completeness	See that direction finder set is complete.	App. III.
2	Publications	Check to see that all pertinent publications are available. This manual must be complete and in usable condition, without missing pages. All changes pertinent to this publication must be on hand.	DA Pam 310-4.
3	Modification work orders.	Check to see that all URGENT MWO's have been applied to the equipment and that all NORMAL MWO's have been scheduled.	DA Pam 310-4.

Section III. TROUBLESHOOTING

3-10. General Troubleshooting Techniques

The troubleshooting procedure for Direction Finder Set AN/ARN-83 is based on the operational checks included in the intermediate preventive maintenance checks and services chart (para 3-5). To troubleshoot the direction finder set, perform all the operational checks starting with sequence No. 5 in the chart and proceed through the sequences

until an abnormal indication or result is observed. If an abnormal indication is observed, note the sequence number and refer to the corresponding sequence number in the troubleshooting chart (para 3-11). Perform the checks and corrective measures indicated in the troubleshooting chart. If the recommended corrective measures do not correct the trouble, higher level maintenance is required.

3-11. Troubleshooting Chart

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
5	a. One or more panel lamps do not light. b. Front panel, tuning meter, and dial window not illuminated.	a. Lamp or lamps burned out. b. No electrical power because of burned-out fuse in aircraft powerline.	a. Replace control unit (para 3-12). b. Replace fuse.
6	No noise in headset or speaker but front panel is illuminated.	Defective headset, speaker, or receiver.	Replace defective headset or speaker. If not defective, replace receiver (para 3-13).
7	a. Receiver does not switch frequency range. b. Tuning meter inoperative but sound can be heard.	a. Receiver or control unit. b. Meter defective	a. Replace defective receiver (para 3-13). If not defective, replace control unit (para 3-12). b. Replace control unit (para 3-12).
8	No beat notes can be heard in headset.	Bfo circuit in receiver	Check receiver by substitution (para 3-13).
9	Null cannot be obtained in loop mode.	a. LOOP switch defective	a. Replace control unit (para 3-12).
		b. Malfunction in receiver.	b. Replace receiver (para 3-13).
		c. Defective loop antenna or rf inductance compensator.	c. Check loop antenna by substitution. Refer to pertinent aircraft configuration manual. If not defective, check rf inductance compensator by substitution. Refer to pertinent aircraft configuration manual.

Item No.	Trouble symptom	Probable trouble	Checks and corrective measures
9	Positioning LOOP switch has no effect on bearing pointer, but sound can be heard in headset.	a. LOOP switch defective b. Loop antenna c. Cable between loop antenna and receiver. d. Bearing indicator e. Dc-to-ac inverter on receiver mount.	a. Replace control unit (para 3-12). b. Replace loop antenna. Refer to pertinent aircraft configuration manual. c. Check antenna cable connections. Replace defective cable. d. Replace bearing indicator. a. Replace dc-to-ac inverter (para 3-14).
9	Bearing indicator inoperative in adf and loop modes.	a. Bearing indicator b. Malfunction in loop servo-system in receiver. c. Dc-to-ac inverter on receiver mount defective.	a. Replace bearing indicator. b. Replace receiver (para 3-13). c. Replace dc-to-ac inverter (para 3-14).
9	Bearing indicator pointer rotates in one direction only and does not return to center.	a. LOOP switch defective b. Malfunction in receiver	a. Replace control unit (para 3-12). b. Replace receiver (para 3-13).
9	Bearing indicator has slow response.	Malfunction in receiver	Check receiver by substitution (para 3-13).

3-12. Removal and Replacement of Control Unit

Caution: Before removing control unit, disconnect aircraft dc power connected from direction finder set.

a. Removal.

- (1) Remove the cable and connector at the rear of control unit.
- (2) The control unit is secured to the pilot's instrument panel or control console with four Dzus type, quarter-turn fasteners (one fastener at each corner of control panel). Loosen the four fasteners and remove control unit.

b. Replacement.

- (1) Mount control unit on instrument panel and tighten the four quarter-turn fasteners.
- (2) Reconnect cable and connector at rear of control unit.

3-13. Removal and Replacement of Receiver

Caution: Before removing receiver, disconnect aircraft dc power connected from direction finder set.

nect aircraft dc power connected from direction finder set.

a. Removal.

- (1) Disconnect sense antenna and loop antenna cable connection at front of receiver (fig. 1-2).
- (2) Loosen the nut at front of receiver mount (fig. 1-3) which engages a hook on receiver (fig. 1-2). After loosening, push nut down to clear front of receiver.
- (3) Grasp handle at front of receiver and pull receiver forward, removing receiver off mount.

b. Replacement.

- (1) Slide receiver onto receiver mount and make certain that connector at rear of receiver mates with connector at the rear of receiver mount.
- (2) Engage nut at front of receiver mount with hook at front of receiver and tighten the nut.
- (3) Connect the sense and loop antenna cables.

3-14. Removal and Replacement of Dc-to-Ac Inverter on Receiver Mount

Caution: Before removing receiver, disconnect aircraft dc power connected from direction finder set.

a. Removal.

- (1) Remove the receiver (para 3-13a).
- (2) Remove the two screws that hold dc-to-ac inverter to receiver mount.
- (3) Grasp top and bottom of dc-to-ac inverter and pull forward from receiver mount. It may be necessary to rock the dc-to-ac inverter gently back and forth as it is being

removed from the connector on the receiver mount.

b. Replacement.

- (1) Place the dc-to-ac inverter in the receiver mount, making certain the potentiometer side is up and the dc-to-ac inverter connector mates perfectly with its mating connector on the receiver mount.

Caution: The connectors may be damaged if not properly aligned.

- (2) Carefully tighten the two screws that hold dc-to-ac inverter to receiver mount.
Note. Do not adjust the potentiometer.
- (3) Replace the receiver (para 3-13b).

APPENDIX I

REFERENCES

Following is a list of applicable publications available to the organisational repairman of Direction Finder Set AN/ARN-83.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, Lubrication Orders, and Modification Work Orders
DA Pam 310-6	Index of Supply Catalogs and Supply Manuals
SC 5180-91-CL-R07	Tool Kit, Electronic Equipment TK-105/6
TB SIG 364	Field Instructions for Painting and Preserving Electronics Command Equipment
TM 9-213	Painting instructions for Field Use
TM 11-530	Installation Practices for Aircraft Electric and Electronic Wiring
TM 11-6625-203-12	Operator and Organizational Maintenance: Multimeter AN/URM-105, Including Multimeter ME-77/U
TM 38-750	Army Equipment Record Procedures

APPENDIX II

BASIC ISSUE ITEMS

Section I. INTRODUCTION

A2-1. General

This appendix lists items supplied for initial operation. The list includes tools, parts, and material issued as part of the major end item. The list includes all items authorized for basic operator maintenance of the equipment. End items of equipment are issued on the basis of allowances prescribed in equipment authorization tables and other documents that are a basis for requisitioning.

a. Federal Stock Number. This column lists the 11-digit Federal stock number.

b. Designation by Model. Not used.

c. Description. Nomenclature or the standard item name and brief identifying data for each item are listed, in this column. When requisitioning, enter the nomenclature and description.

d. Unit of Issue. The unit of issue is each unless otherwise indicated and is the supply term by which the individual item is counted for procurement, storage, requisitioning, allowances, and issue purposes.

e. Expendability. Nonexpendable items are indicated by NX. Expendable items are not annotated.

f. Quantity Authorized. Under "Items Comprising an Operable Equipment," the column lists the quantity of items supplied for the initial operation of the equipment.

g. Illustration. The "Item No." column lists the reference symbols used for identification of the items in the illustration or text of the manual.

A2-2. Maintenance Float Requirements

SB 11-244 is the authorizing document for maintenance float. It authorizes a maximum number of major components which are installed in Army Aircraft and states in part:

"A careful review will be made by the responsible maintenance officer to limit maximum percentage of maintenance float to only those items that exhibit high failure rates. Items authorized for stockage as maintenance float will be included on the theatre or installation authorized stockage list in accordance with AR 711-16, coded to indicate that stockage is for maintenance float, the field maintenance officer is encouraged to locate the float at Army Airfields in order to obtain maximum utilization."

SECTION II. FUNCTIONAL PARTS LIST

FEDERAL STOCK NUMBER	DESIGNATION BY MODEL	DESCRIPTION	UNIT OF ISSUE	EXP	QTY AUTH	ILLUSTRATION	
						FIGURE NO.	ITEM NO.
5826-985-9175		DIRECTION FINDER SET AN/ARN-83		NX			
		ITEMS COMPRISING AN OPERABLE EQUIPMENT					
ORD THRU AGC		TECHNICAL MANUAL TM 11-5826-225-12			2		
5826-985-9173		ANTENNA AS-1863/ARN-83 (MAINTENANCE FLOAT ITEM)		NX	1		
5826-985-9174		CONTROL, DIRECTION FINDER C-6899/ARN-83 (MAINTENANCE FLOAT ITEM)		NX	1		
5826-920-7177		MOUNTING MT-3605/ARN-83 (MAINTENANCE FLOAT ITEM)		NX	1		
5826-985-9172		RECEIVER, RADIO R-1391/ARN-83 (MAINTENANCE FLOAT ITEM)		NX	1		
		RUNNING SPARE ITEMS					
		NO PARTS AUTHORIZED FOR STOCKAGE AT OPERATOR'S LEVEL					

APPENDIX III

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

A3-1. General.

a. This appendix assigns maintenance functions to be performed on components, assemblies, and subassemblies by the lowest appropriate maintenance category.

b. Columns in the maintenance allocation chart are M follows:

- (1) *Part or component.* This column shows only the nomenclature or standard item name. Additional descriptive data are included only where clarification is necessary to identify the component. Components, assemblies, and subassemblies are listed in top-down order. That is, the assemblies which are part of a component are listed immediately below that component, and subassemblies which are part of an assembly are listed immediately below that assembly. Each generation breakdown (components, assemblies, or subassemblies) is listed in disassembly order or alphabetical order.
- (2) *Maintenance function.* This column indicates the various maintenance functions allocated to the categories.
 - (a) *Service.* To clean, to preserve, and to replenish lubricants.
 - (b) *Adjust.* To regulate periodically to prevent malfunction.
 - (c) *Inspect.* To verify serviceability and detect incipient electrical or mechanical failure by scrutiny.
 - (d) *Test.* To verify serviceability and to detect incipient electrical or mechanical failure by use of special equipment such as gages, meters, etc.
 - (e) *Replace.* To substitute serviceable components, assemblies, or subassemblies, for unserviceable components, assemblies, or subassemblies.
 - (f) *Repair.* To restore an item to serviceable condition through correction of a specific failure or unserviceable condition. This function includes but is not limited to welding, grinding, riveting, straightening, and replacement of parts other than the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes.
 - (g) *Align.* To adjust two or more components of an electrical system so that their functions are properly synchronized.
 - (h) *Calibrate.* To determine, check, or rectify the graduation of an instrument, weapon, or weapons system, or components of a weapons system.
 - (i) *Overhaul.* To restore an item to completely serviceable condition as prescribed by serviceability standards. This is accomplished through employment of the technique of "Inspect and Repair Only as Necessary" (IROAN). Maximum utilization of diagnostic and test equipment is combined with minimum disassembly of the item during the overhaul process.
 - (j) *Rebuild.* To restore an item to a standard as near as possible to original or new condition in appearance, performance, and life expectancy. This is accomplished through the maintenance technique of complete disassembly of the item, inspection of all parts or components, repair or replacement of worn or unserviceable elements using original manufacturing tolerances and/or specifications, and subsequent reassembly of the item.

- (3) *Operator, organizational, direct support, general support, and depot.* The symbol X indicates the categories responsible for performing that particular maintenance operation, but does not necessarily indicate that repair parts will be stocked at that level. Categories higher than those marked by X are authorized to perform the indicated operation.
- (4) *Tools required.* This column indicates codes assigned to each individual tool equipment, test equipment, and maintenance equipment referenced. The grouping of codes in this column of the maintenance allocation chart indicates the tool, test, and maintenance equipment required to perform the maintenance function.
- (5) *Remarks.* Entries in this column will be utilized when necessary to clarify any of the data cited in the preceding columns.

c. Columns in the allocation of tools for maintenance functions are as follows:

- (1) *Tools required for maintenance functions.* This column lists tools, test, and maintenance equipment required to perform the maintenance functions.
- (2) *Operator, organizational, direct support, general support, and depot.* The dagger (†) symbol indicates the categories normally allocated the facility.
- (3) *Tool code.* This column lists the tool code assigned.

A3-2. Maintenance by Using Organizations

When this equipment is used by Signal services organizations organic to theater headquarters or communication zones to provide theater communications, those maintenance functions allocated up to and including general support are authorized to the organization operating this equipment.

SECTION II. MAINTENANCE ALLOCATION CHART

PART OR COMPONENT	MAINTENANCE FUNCTION	MAINTENANCE CATEGORY					TOOLS REQUIRED	REMARKS
		O/C	O	DS	GS	D		
AUTOMATIC DIRECTION FINDER AN/ARN-83	service	X		X			11	External
	inspect	X		X			11	External
	test	X					4,12	Internal
	repair			X			1,2,3,5,6,7,8,9,10,11,13	
	align			X			11	
	overhaul			X	X		1,2,3,5,6,7,8,9,10,11,13	
RADIO RECEIVER R-1391/ARN-83	service	X		X			11	External
	inspect	X		X			11	Lubricate gear train
	test	X					4,12	External
	repair			X			1,2,3,5,6,7,8,9,10,13	Internal
	align			X			11	
	overhaul			X	X		1,2,3,5,6,7,8,9,10,13	
DIRECTION FINDER CONTROL C-6899/ARN-83	service	X						External
	inspect	X						
	test	X					4	
	replace	X		X			5,6,7,8,13	
	repair			X			12	
MOUNTING MT-3605	inspect	X					11	External
	replace	X					11	
ANTENNA AS-1683/ARN-83	inspect	X						External
	test			X			9,13	

Section II. MAINTENANCE ALLOCATION CHART

SECTION III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

TOOLS REQUIRED FOR MAINTENANCE FUNCTIONS	MAINTENANCE CATEGORY					TOOL CODE	REMARKS
	O/C	O	DS	GS	D		
ANALYZER, SPECTRUM TS-723/U			/	/	/	1	
AUDIO OSCILLATOR TS-382/U			/	/	/	2	
FREQUENCY METER AM/USM-26			/	/	/	3	
MULTIMETER AM/URM-105		/				4	
MULTIMETER TS-352/U			/	/	/	5	
MULTIMETER MS-26/U			/	/	/	6	
OSCILLOSCOPE AM/UEM-140			/	/	/	7	
RF SIGNAL GENERATOR AM/URM-25			/	/	/	8	
Q-METER TS-617/U			/	/	/	9	
TEST SET, TRANSISTOR TS-1836/U			/	/	/	10	
TOOL KIT, ELEC EQUIP TK-100/G			/	/	/	11	
TOOL KIT, ELEC EQUIP TK-105/G		/				12	
TEST SET AM/ARM-93			/	/	/	13	

Section III. ALLOCATION OF TOOLS FOR MAINTENANCE FUNCTIONS

By Order of the Secretary of the Army:

HAROLD K. JOHN80N,
General, United States Army,
Chief of Staff

Official:

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Major General, United States Army,
The Adjutant General.

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☆ U.S. GOVERNMENT PRINTING OFFICE : 1992 O- 311-831 (60669)

PIN : 028227-000