TM 11-5826-258-24

TECHNICAL MANUAL

ORGANIZATIONAL DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

RADIO RECEIVING SETS AN/ARN-123(V)1 (NSN 5826-01-016-2762) AN/ARN-123(V)2 (NSN 5826-01-016-2761)

This copy IS a reprint which includes current pages from Changes 1.

HEADQUARTERS, DEPARTMENT OF THE ARMY

TECHNICAL MANUAL
No. 11-5826-258-24

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, 12 August 1977

ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL
RADIO RECEIVING SETS
AN/ARN-123(V)1 (NSN 5826-01-016-2762)
AN/ARN-123(V)2 (NSN 5826-01-016-2761)
AN/ARN-123(V)3 (NSN 5826-01-058-6800)
AND
AN/ARN-123(V)4 (NSN 5826-01-070-4067)

Current as of 24 August 1979

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 back of this manual direct to: Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, NJ 07703.

In either case, a reply will be furnished direct to you.

LIST OF ILLUSTRATIONS

LIST OF TABLES

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Radio Receiving Sets AN/ARN-123(V)1, AN/ARN-123(V)2, AN/ARN-123(V)3, and AN/ARN-123(V)4 (fig. 1-1) and covers operation, preflight check, organizational, direct and general support procedures. It includes operating instructions, cleaning and inspection of equipment, replacement of components available to organizational maintenance, and direct support and general support bench tests.

b. Through this manual Radio Receiving Set AN/ARN-123(V)(*) indicates Radio Receiving Set AN/ARN-123(V)1, AN/ARN-123(V)2, AN/ARN-123(V)3 or AN/ARN-123(V)4.

c. The maintenance allocation chart (app B) is current as of 1 August 1978.

NOTE

This set must not be repaired by maintenance personnel under terms of the warranty. This manual contains instructions to be followed when the set fails. NEVER break or tamper with the warranty seal.

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.

1-3. Maintenance Forms, Records and Reports

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

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

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

1-4. Warranty

a. This equipment is under a Reliability Improvement Warranty. To ensure validation of the warranty, the following steps must be taken when returning discrepant equipment.

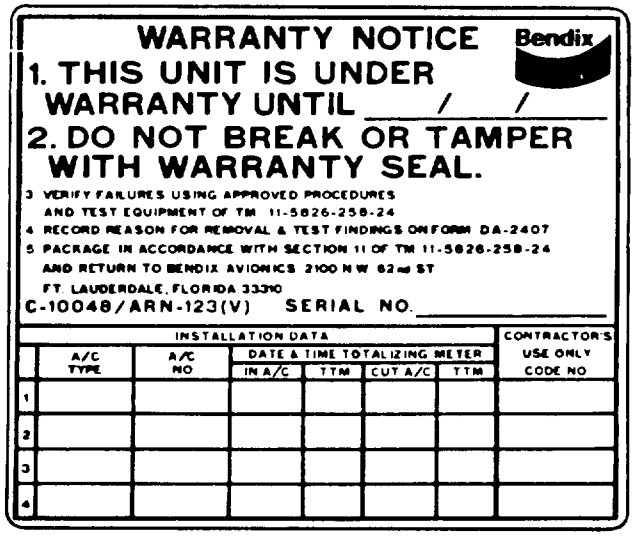
(1) DA Form 2407 is to accompany the equipment to the contractor's facility.

(2) Fill in the required information on the WARRANTY NOTICE attached to the equipment.

b. Failure to provide the information required by these documents may invalidate the warranty.

c. Opening of the unit or destruction of the tamperproof seal shall be cause to invalidate the warranty on this equipment.

d. Return the equipment as expeditiously as possible to the contractor at the address shown on the WARRANTY NOTICE (fig. 1-2).


WARRANTY NOTICE

Bendix

1. THIS UNIT IS UNDER WARRANTY UNTIL ___/___/___

2. DO NOT BREAK OR TAMPER WITH WARRANTY SEAL.

3 VERIFY FAILURES USING APPROVED PROCEDURES AND TEST EQUIPMENT OF TM 11-5826-258-24

4 RECORD REASON FOR REMOVAL & TEST FINDINGS ON FORM DA-2407

5 PACKAGE IN ACCORDANCE WITH SECTION II OF TM 11-5826-258-24 AND RETURN TO BENDIX AVIONICS 2100 N W 62nd ST FT. LAUDERDALE, FLORIDA 33310

C-10048/ARN-123(V) SERIAL NO. _____

	INSTALLATION DATA						CONTRACTOR'S USE ONLY
	A/C TYPE	A/C NO	DATE & TIME TOTALIZING METER IN A/C	TTM	OUT A/C	TTM	CODE NO
1							
2							
3							
4							

EL00N002

Figure 1-2. Typical Warranty Notice.

1-5. Reporting Equipment Improvement Recommendations (EIR)

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

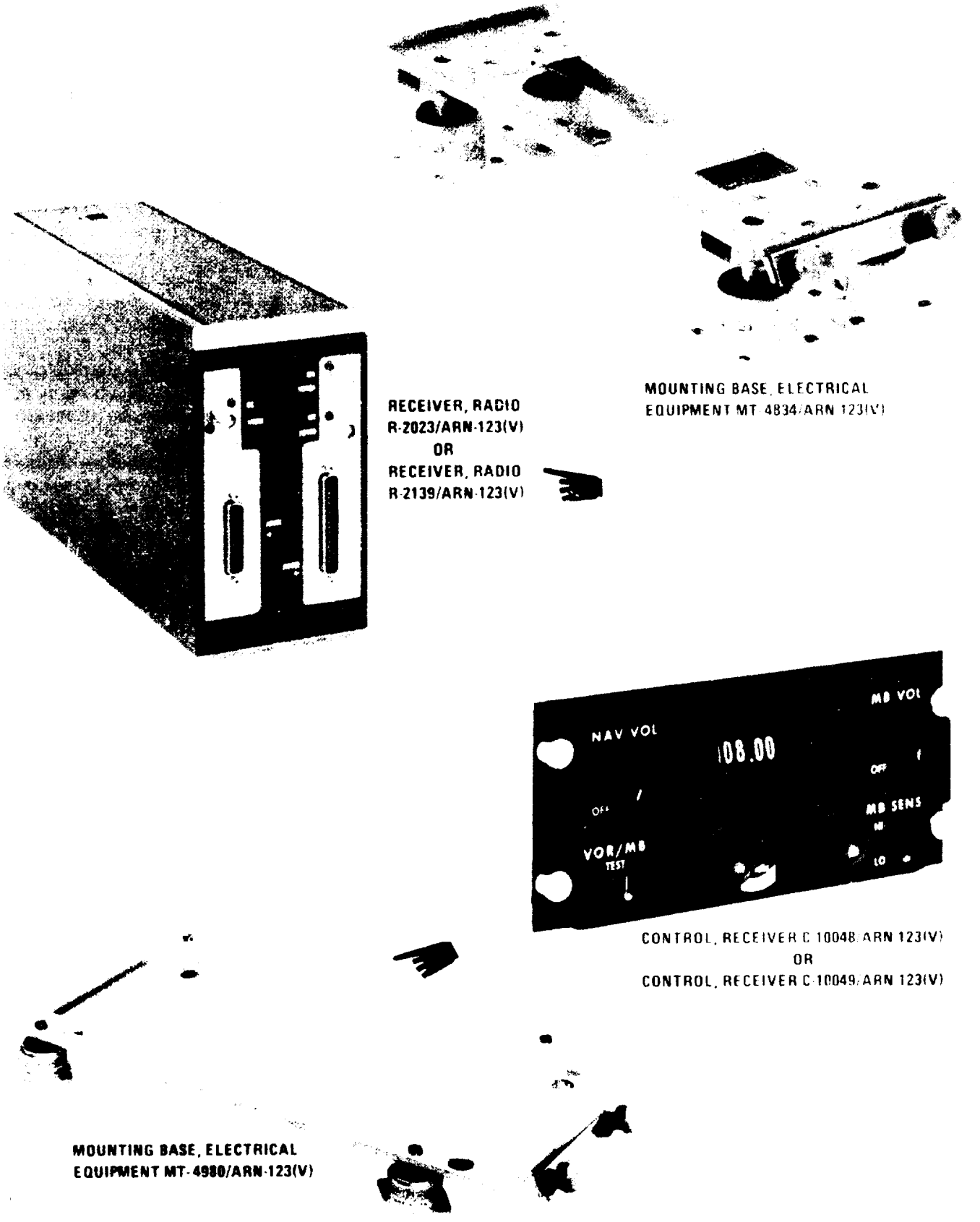


Figure 1-1. Radio Receiving Set AN/ARN-123(V)(*).

1-6. Administrative Storage

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

1-7. Destruction of Army Electronics Materiel

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

Section II. DESCRIPTION AND DATA

1-8. Description of Receiving Set

a. Radio Receiving Set AN/ARN-123(V)(*) (fig. 1-1) is an integrated navigation package consisting of

(1) Radio Receiver R-2023/ARN-123(V) or R-2139/ARN-123(V).

(2) Receiver Control C-10048/ARN-123(V) or C-10049/ARN-123(V).

(3) Mounting Ease, Electrical Equipment MT-4834/ARN-123(V) or MT 4980/ARN-123(V).

b. The differences between the four sets are as follows:

(1) The AN/ARN-123(V)1 has red panel lighting in Receiver Control C-10048/ARN-123(V) and includes Receiver, Radio R-2023/ARN-123(V) and Mounting Base, Electrical Equipment MT-4834/ ARN-123(V).

(2) The AN/ARN-123(V)2 has white panel lighting in Receiver Control C-10049/ARN-123(V) and includes Receiver, Radio R-2023/ARN-123(V) and Mounting Base, Electrical Equipment MT-4834/ARN-123(V).

(3) The AN/ARN-123(V)3 has red panel lighting in Receiver Control C-10048/ARN-123(V) and includes Receiver, Radio R-2023/ARN-123(V) and Mounting Base, Electrical Equipment MT-4980/ ARN-123(V).

(4) The AN/ARN-123(V)4 has red panel lighting in Receiver Control C-1004/ARN-123(V) and includes Receiver, Radio R-2139/ARN-123(V) and Mounting Base, Electrical Equipment MT-4834/ ARN-123(V).

1-9. Description of Receiver

a. General. Radio Receivers R-2023/ARN-123(V) and R-2139/ARN-123(V) are remote-located, integrated navigation packages which contain a 200-channel VOR/LOC receiver, a 40-channel glideslope receiver and a marker beacon receiver. The three receivers perform the intended mission of the unit independently of each other. Performance degradation within any of the major sections will not affect the performance of the others.

(1) The set provides the following capabilities.

(a) Manual VOR indications.

(b) ILS localizer indications.

(c) ILS glideslope indications.

(d) Marker beacon capability.

(e) Automatic VOR bearing indication.

(2) A navigation composite signal is available at the set connector for such possible application as driving an RNAV (area navigation) computer.

b. VHF Omnirange (VOR)/Localizer (LOC) Receiver Section. The VOR/LOC receiver section receives and processes VOR and localizer signals over the frequency range 108.00 to 117.95 MHz, 200 channels (160 VOR channels and 40 localizer channels), with a channel spacing of 50 kHz. The VOR/LOC receiver section provides the outputs for the operation of

(1) Four VOR/localizer deviation needles, three VOR/localizer warning loads and two TO/ FROM loads, such as those contained in Course Deviation Indicator ID-1347C/ARN or equivalent.

NOTE

When used as part of the AN/ARN-123 System, the ZERO SWITCH on the rear of the ID-1347C/ARN-82 must be set to the R-1388A/ARN-82 position. If the switch cover reads R-1388.ARN-82, the cover must be removed, the switch underneath must be repositioned, and the cover must be reinstalled in the reversed position. so that the R-1388A/ARN-82 label is facing outward.

(2) Three RMI pointers of three Azimuth Indicators ID-250/ARN, ID-998/ASN or equivalent.

(3) 400 Hz output to an omnibearing selector (OBS).

(4) Voice and identification signals to aircraft headphone/speaker system.

c. Glideslope (GS) Receiver Section. The GS receiver section receives and processes glideslope signals over the frequency range of 329.15 to 335.00 MHz; 40 channels, with a channel spacing of 150 kHz. The glideslope receiver section provides the outputs for the operation of ID-1347C/RN or equivalent.

d. Marker Beacon (MB) Receiver Section. The MB receiver section receives and processes 75 MHz marker beacon signals and converts them into an output that drives a single marker beacon lamp system (or optional three-lamp system).

1-10. Description of Receiver Control

Receiver Control C-10048/ARN-123(V) or C-10049/ARN-123(V) is installed in the aircraft console or cockpit panel. The unit is used primarily to control Radio Receiver R-2023/ARN-123(V) or R-2139/ARN-123(V) and provides the following functions:

a. Power ON/OFF control.

b. VOR/LOC audio volume control.

c. Marker beacon audio volume control (controlled independently from the VOR/LOC audio volume control).

d. Marker beacon HI/LO sensitivity control.

e. GS/LOC energize function (ground) on ILS channels.

f. VOR/LOC/GS frequency selection (2-out-of-5). The glideslope and localizer frequencies are automatically paired. Display of selected frequency in readout window from 108.00 through 117.95 MHz in 50 kHz steps.

g. Self-test control that energizes the self-teat circuitry of the VOR and marker beacon receivers.

h. Automatic frequency selection of a 200-channel distance measuring equipment receiver. The DME frequencies are paired with the 200 VOR/LOC channels.

i. Control panel lighting, 28 vdc red (or white) color. The lighting system allows control of the intensity of the panel lighting from the aircraft master dimmer control.

1-11. Description of Receiver Mount

Mounting Base, Electrical Equipment MT-4834/ARN-123(V) and MT4980/ARN-l23(V) are lightweight mounting frames which provide vibration isolation to the receiver through the use of four vibration isolators. The mounts are designed for remote-located mounting and contain a holddown clamp to secure the receiver into place in the mount. Flexible metal ground straps across each of the resilient absorbers provide electrical ground to the airframe.

1-12. System Application

(fig 1-3)

a. The airborne receiver basically consists of several operational sections. The glideslope receiver section provides the up/down deviation and flag alarm information to drive the glideslope loads of the VOR/ILS indicator (CDI) and the flight guidance systems. A VOR/LOC receiver section provides the left/right deviation, flag alarm and to/from information to drive the VOR/LOC loads of the VOR/ILS indicator (CDI) and the flight guidance systems.

b. Automatic conversion of the VOR bearing provides relative bearing for driving the pointer of a radio magnetic indicator (RMI). An audio output is also provided for voice and identification purposes. Finally, the marker receiver section provides a marker beacon output capable of driving a standard one-lamp system or, optionally, a three-lamp system. An audio output is provided for identification purposes. Three separate antenna jacks (glideslope, VOR/LOC (NR), and marker) are provided to accept the rf inputs for each of the corresponding receivers.

1-13. Tabulated Data

Technical characteristics of the receiver set are listed in table 1-1.

Table 1-1. Tabulated Data

VOR/LOC Receiver Section:	
Frequency range	108.00 MHz through 117.95 MHz
Number of channels	VOR: 160 channels LOC: 40 channels
Channel spacing	50 kHz
Antenna impedance	52 ohms
Voltage to standing wave ratio (VSWR)	6:1 maximum

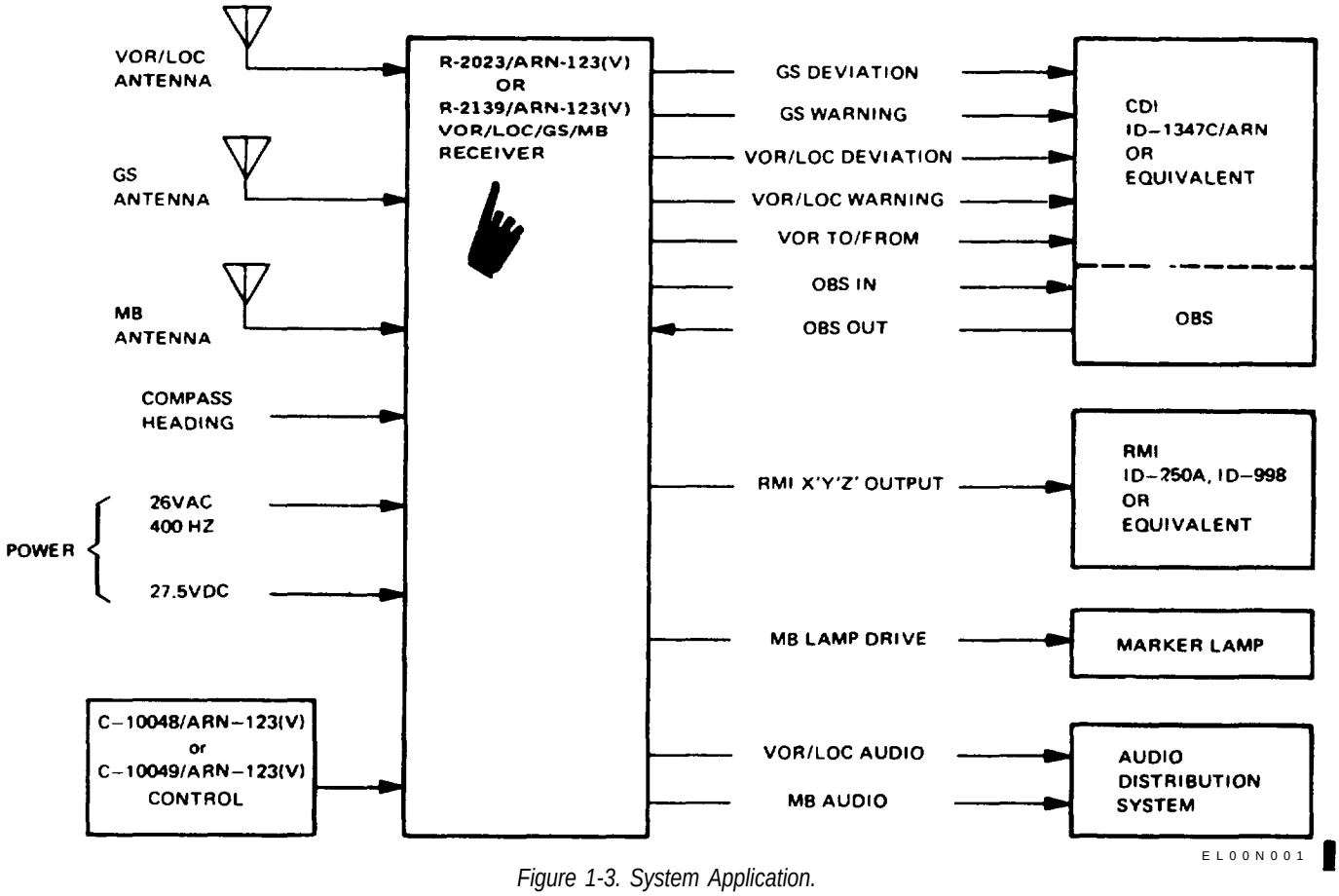


Figure 1-3. System Application.

Table 1-1. Tabulated Data-Continued

Accuracy	
Manual VOR	Bearing error leas than ±0.75° under the conditions of paragraph 2.1.1 of DO- 153 using a precision tracking selector.
Automatic VOR	Bearing error leas than ±2.0° under the conditions of paragraph 2.4 of DO- 153.
Localizer	Centering error lees than 6.3 millivolt-s (Class D) under the conditions of paragraph 2.1 of RTCA Document DO-131.
Deflection sensitivity:	
VOR	150 ± 10 millivolts for 10° course offset.
Localizer	90 millivolts for a 0.093 DDM with a deflection linearity of 90 ± 9 millivolts at 0.093 DDM.
Audio output power	Adjustable balanced output which provides 50 milliwatts into 150-ohm external load.
Audio frequency response	Audio output will not vary more than 6 db from 350 Hz to 2500 Hz.
Harmonic distortion	Less than 25% with a 50 to 20,000 µv standard audio test signal
Manual gain control	More than 50 db.
sensitivity:	
Audio (VOR and localizer)	Does not require more than 3.0 microvolt rf input signal modulated 30% by 1000 Hz for a 6-db signal-plus-noise-to-noise ratio.
RF, VOR	Does not require more than 3.0 microvolt standard VOR teat signal for fully concealed VOR flag and satisfactory navigation performance.
RF, localizer	Does not require more than 3.0 microvolt standard localizer test signal for fully concealed localizer flag and satisfactory navigation performance.
VOR adjacent channel	Bearing information will not change more than 10 because of adjacent channel signals.
Time response	Automatic indication will be within 3° of new bearing, within 15 seconds after an offset course of 180° is abruptly applied.
Damping characteristics:	
VOR	When the difference in phase between the two components of an on course standard VOR teat signal of 1000 microvolt is abruptly changed, the pointer of a CDI ID-1347 C/ARN equivalent will reach 70% of its ultimate position within 3.5 seconds for the R-2023/ARN-123(V) or 5.7 seconds for the R-2139/ARN-123(V) and the pointer overshoot will not exceed 20%.

Table 1-1. Tabulated Data-Continued

Localizer	When the DDM of a standard localizer signal is abruptly changed, the pointer of a CDI ID-1347C/ARN or equivalent shall reach 67% of its ultimate deflection within 2 seconds and pointer overshoot shall not exceed 5%.
Operating temperature	-46° C to +55° C.
Storage Temperature	-54° C to +71° C.
Warmup time:	
Standard temperature conditions	Less than 90 seconds
Extreme temperature conditions	Less than 3 minutes.
Power input:	
Performance	Meets specified performance when operated from a dc primary source with characteristics and limits as defined in MIL-STD-704 dated 6 October 1959, Category B.
Power source transients	Meets transient conditions as specified in MIL-STD-704 dated 6 October 1959.
Frequency control	Mark 11 Standard Frequency Control System (2-out-of-5).
spurious rejection	Better than 60 db.
Standard outputs	VOR and localizer
	Left-right deviation output capable of driving four 1000-ohm 150-0-150 microampere meter movements.
	Warning signal output capable of driving three 1000-ohm 250 microampere meter movements.
	VOR only.
	Ambiguity output capable of driving two 500-ohm, 200 microampere meter movements.
	Ambiguity indication will be clearly TO and FROM over the rf signal input range of 10 to 20,000 microvolt and at all bearings up to ± 60° from the selected radial.
Ambiguity sensitivity	100 millivolts minimum
GS receiver section	
Frequency range	329.15 MHz through 335.00 MHz
Number of channels	40
Channel spacing	150 kHz
Antenna impedance	52 ohms
VSWR	6:1 maximum
Accuracy	Centering error less than 10 millivolts (Class D) under the conditions of paragraph 2.1 of RTCA Document DO-132.
Deflection sensitivity	78 millivolts for .091 DDM with a deflection linearity of 78 ± 7.8 millivolts at 0.091 DDM.
Rf sensitivity	Does not require more than 20 microvolt Standard GS Test Signal for fully concealed GS flag and satisfactory navigation performance.
Damping characteristics	When the DDM of a Standard Glide Slope Test Signal is abruptly changed from zero to any value less than 0.175 DDM, the winter of a CDI ID- 1347C/ARN or equivalent will reach 67% of its ultimate deflection within 2 seconds and pointer overshoot will not exceed 5%.
Operating temperature	-46° C to + 55° C.
Storage temperatures	-54° C to + 71° C.
warmup time:	
Standard temperature conditions	Less than 90 seconds
Extreme temperature conditions	Less than 3 minutes
Power input:	
Performance	Meets specified performance when operated from a dc primary source with characteristics and limits as defined in MIL-STD-704 dated 6 October 1959, Category B.
Power source transients	Meets transient conditions as specified in MIL-STD-704 dated 6 October 1959.
Frequency control	Mark II Standard Frequency Control System, (2-out-of-5).
Spurious rejection	Better than 60 db.
Standard outputs	Updown deviation output capable of driving three 1000-Ohm 150-0-150 microampere meter movements.
MB receiver section:	
Operating frequency	75 MHz.
Antenna impedance	52 ohms.
VSWR	2:1 maximum
Selectivity	More than 55 db attenuation at all frequencies outside the range of 74.8 MHz to 75.2 MHz.
Receiver threshold adjustment range	
High sensitivity mode activated by providing a ground to receiver	Adjustable from 200 to 1000 microvolt. Adjusted to 500 microvolt.

Table 1-1. Tabulated Data–Continued

Low sensitivity	Adjustable from 1000 to 3000 microvolt. Adjusted to 1500 microvolt.
Audio output power	Balanced output which provides 50 milliwatt-s into a 150-ohm external load
operating temperature	-46° C to +55° C.
Storage temperature	-54° C to +71° C.
Warmup time:	
Standard temperature conditions	Less than 90 seconds.
Extreme temperature conditions	Less than 3 minutes.
Power input:	
Performance	Meets specified performance when operated from a dc primary source with characteristics and limits as defined in MIL-STD-704 based 6 October 1959, Category B.
Power source transients	Meets transient conditions as specified in MIL-STD -704 dated 6 October 1959.
Lamp drive	Lamp drive capable of operating single marker beacon light system with total lamp load range of from 40 to 200 milliamperes at 28 vdc.
Control:	
Storage temperature	-54° C to +71° C.
Frequency selection	ARINC Mark 11 (2-out-of-5) per ARINC Characteristic 410.
Frequency range selection	108.00 through 117,95 MHz in 50 kHz steps.
Whole MHz control (left knob)	Mechanically positions whole MHz wafer switches and units/tenths MHz frequency drums simultaneously.
Fractional MHz control (right knob)	Mechanically positions fractional MHz wafer switches and tenths/hundredths drums simultaneously.
LOC/GS frequency pairing	In accordance with FAA Advisory Circular 170-12.
NAV-VOL-OFF control	Provides power on/off control for VOR/LOC/GS/MB receivers and VOR/LOC audio output level control.
MB VOL-OFF	Provides an independent MB audio output level control. Provides on/off control for optional switching of lamp common wire.
VOR/MB-TEST	Activates VOR and MB lamp self-test circuits, (Requires external signal),
MB SENS (HI/LO)	Provides means of controlling MB sensitivity (a ground is provided in HI switch position).
DME channeling	Separate set of ARINC 2-out-of-5 wires ARINC Mark ii per ARINC Characteristic 410 to control 200 channel DME receiver.
Lighting:	
Power requirements	27.5 vdc, 80 milliamperes.
Color	Red (or white, refer to paragraph 1 -8) in accordance with MIL-P- 7778.
GS/LOC energize function	Provides a ground to energize GS/LOC receiver on ILS frequencies
Mounting Base, Electrical Equipment MT-4834/ARN-123(V):	
Weight	2.0 lb max.
Dimensions	See table 1-2.
Storage temperature	-54°C to +71° C.
Mounting Base, Electrical Equipment MT-4980/ARN-123(V):	
Weight	1.05 lb max.
Dimensions	See table 1-2.
Storage Instructions	-54° C to +71° C.

1-14. Items Comprising an Operable Equipment

The items in table 1-2 make up Radio Receiving Set AN/ARN-123(V)(*). Additional items required to complete the system are listed in paragraph 1-15.

Table 1-2. Components Included in Radio Receiving Set AN/ARN-123(V)(*)

NSN	Item	Qty	Dimensions (in.)			Unit wgt (lb)
			Hgt	Depth	Width	
5826-01-020-2258	Radio Receiver R-2023/ARN-123(V) or	1	7-1/5	12-1/8	4-1/8	9.45
5826-01-070-4065	Radio Receiver R-2139/ARN-123(V)	1	7-1/5	12-1/8	4-1/8	9.45
5826-01-020-2263	Receiver Control C-10048/ARN-123(V)	1	2-5/8	4-1/4	5-3/4	1.55
5826-01-022-9255	Receiver Control C-10049/ARN-123(V)	1	2-5/8	4-1/4	5-3/4	1.55
5826-01-020-2266	Mounting Base, Electrical Equipment MT-4834/ARN-123(V) or	1	2-1/8	10	4-1/3	1.0
5826-01-058-7717	Mounting Base, Electrical Equipment MT-4980/ARN-123(V)	1	1-1/8	13-5/8	7-1/8	1.05

1-15. Additional Equipment Required

The following chart lists additional equipment required:

Name	Part no. or designation	No. of units required
Antenna, VOR/localizer/ glideslope	AS-580( ) ARN	1
or		
Antenna, VOR/LOC receiver	AS-1304( )/ARN	1
and		
Antenna, glideslope receiver	AS-5071( )/ARN	1
Antenna, marker beacon receiver	AT-640( )/ARN	1
Indicator, course*	ID-1347C/ARN-82	1
Indicator, marker beacon		1
Indicator, radio magnetic	ID-250A/ARN	1

*The ZERO SWITCH in the rear of the ID-1347C/ARN-82 course indicator must be set to the R-1388A position.

Section III. SERVICE UPON RECEIPT

1-16. Packaging Data

The radio receiver, receiver control, and receiver mount are individually packaged in separate weather-resistant corrugated fiberboard cartons with all seams and joints sealed with water-resistant, pressure-sensitive tape. Each item is enclosed within a sealed plastic bag and cushioned within the carton with preformed plastic molding material. A typical packaging configuration with contents is shown in figure 1-4. The approximate exterior dimensions of the equipment and boxes are provided in table 1-3.

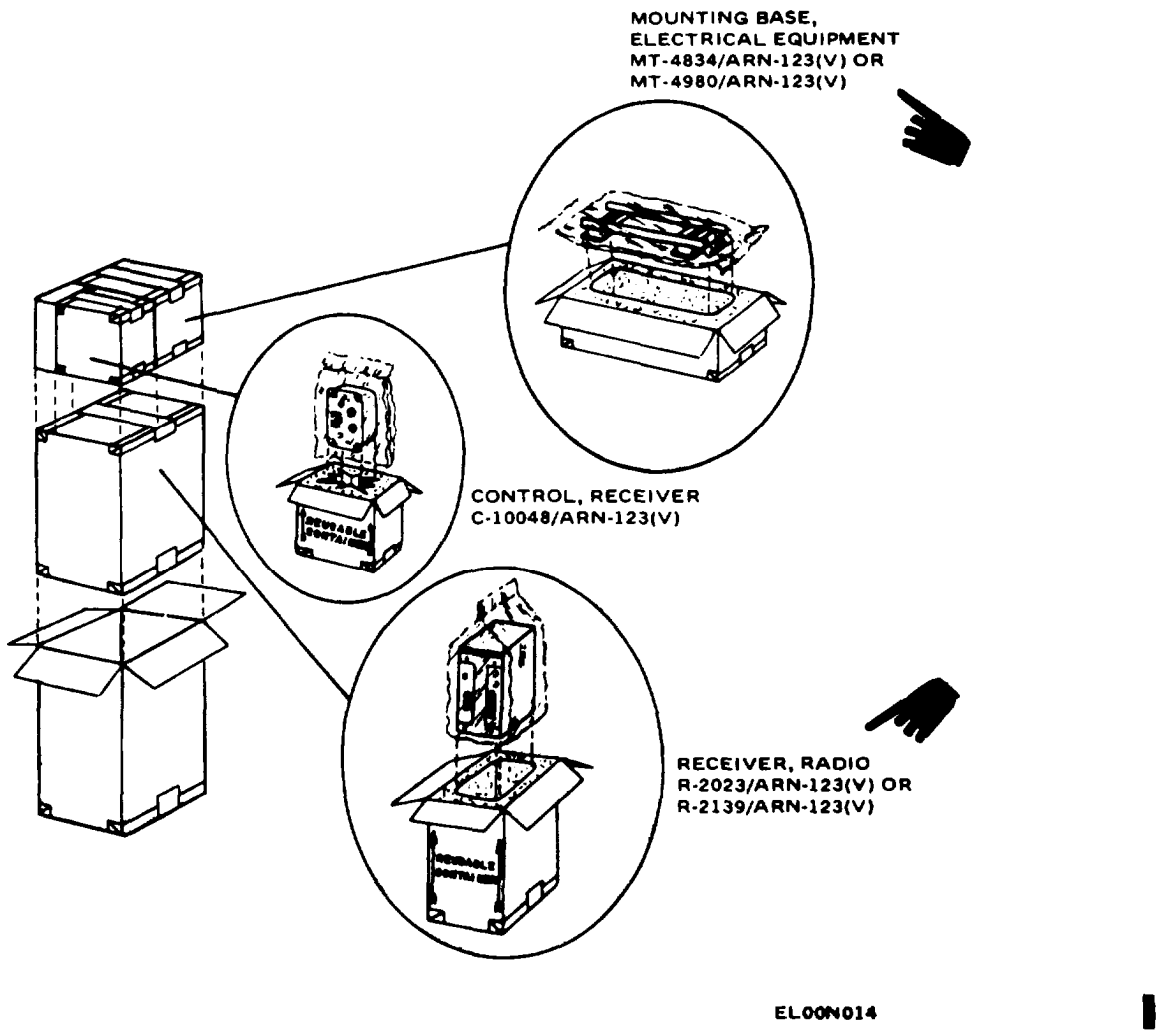


Figure 1-4. Interface conversion group packaging diagram, for receiving set, radio AN/ARN-123(V).

Figure 1-4. Packaging Diagram.

Table 1-3. Packaging Data

Component	Item net dim (in.)	Carton size (in.) (id)	Volume (cu ft)	Weight (lb)
Control, Receiver C-10048/ARN-I23(V)1	5.13 x 5.75 x 2.625	9.75 x 6.62 x 12.25	0.46	4.00
Receiver, Radio R-2023/ARN-123(V) or R-2139/ARN-123 (V)	11.93 x 4.12 x 7.18	11.25 x 8.12 x 17	0.89	12.00
Mounting Base, Electrical Equipment MT-1834/ARN-123(V)	13.62 X 4.38 X 2.25	17-1/8 x 9-3/4 x 4-1/8	0.40	2.00
Mounting Base, Electrical Equipment MT-4980/ARN-I23(V)	13.62 x 7.12 x 1.17	14-1/4 x 9-1/4 x 3-114	0.25	2.00
Consolidation box		17-3/4 x 11-5/8 x 18-1/2	2.20	19.00

1-17. Unpacking Instructions

To unpack the equipment, open the carton, and remove the technical manual. Remove each individual box from the consolidation container. Open the component boxes, exercising care when removing the items to prevent damage to the components or destruction of the cartons, plastic bag, or the internal dunnage. Do not dispose of the packaging materials.

NOTE

The reusable containers shalll be retained for use in repackaging and shipping between the Government and contractor's overhaul facility.

1-18. Checking Unpacked Equipment

a. Inspect the equipment for damage that may have occurred during shipment. If the equipment has been damaged, or packaging deficiencies are discovered, fill out and forward DD Form 6 (AR 700-58).

b. Check to see that the equipment is complete as listed on the packaging slip. If the packing slip is not available, check the equipment against the items listed in table 1-3.

1-19. Repacking

Repackage the equipment using reverse procedure in paragraph 1-17 and figure 1-4. If the original packaging materials are not available for use, package the equipment as follows:

a. Place each item within a plastic bag fabricated of material conforming to L-P-378. Wrap the item in cellilosic cushioning material conforming to PPP-B-843, type II, a minimum of 6 inches on all surfaces and secure the wrap with tape conforming to PPP-T-45. Place the cushioned item within a close-fitting fiberboard box conforming to PPP-B-636, W5c and seal all seams and joints with tape conforming to PPP-T-76.

b. When individual components are being shipped, the packaged item shall be overpacked within a close-fitting box.

c. When more than one item is being shipped, a quantity of the packaged items shall be overpacked within a close-fitting box.

d. Substitute packaging materials may be selected from those items listed in SB 38-100.

1-20. Shipment Marking

The packed radio sets or individual items with appropriate copy of DA Form 2407 shall be addressed to the contractor marked as follows:

Bendix Corporation
Avionics Division
2100 N.W. 62nd Street
Ft. Lauderdale, Florida 33310
ATTN: CONUS Repair Service Administrator
Reliability Improvement Warranty
M/F: Contract DAAB07-75-C-0853
For Repair and Direct Return

CHAPTER 2
OPERATING INSTRUCTIONS

Section 1. CONTROLS AND INSTRUMENTS

2-1. Damage from Improper Settings

No damage results from improper settings.

2-2. Operator/Crew Controls

Controls and indicators are illustrated in figure 1-1 and identified in table 2-1.

Table 2-1. Operator Controls

NOTE

This table covers only items used by the operator. Items used by higher category maintenance personnel are covered in instructions for the appropriate maintenance category

Control, indicator or connector	*Function*
NAV VOL-OFF control	Provides power on/off control for VOR/LOC/GS/MB receiver sections. Provides VOR/LOC audio output level control.
MB VOL-OFF control	Provides independent MB audio output level control. Provides on/off control for optional switching of lamp common wire.
Frequency range selection	108.00 through 117.95 MHz in 50 kHZ steps.
Whole MHz control (left knob)	Mechanically positions whole MHz wafer switches and units/tenths MHz frequency drums simultaneously.
Fractional MHz control (right knob)	Mechanically positions fractional MHz wafer switches and tenths/hundredths drums simultaneously.
VOR/MB TEST control	Activates VOR and MB lamp self-test circuits.
MB SENS HI-LO control	Provides means of controlling MB sensitivity. (A ground is provided when switch is in HI position.)

Section II. OPERATION UNDER USUAL CONDITIONS

2-3. Types of Operation

The receiving set may be used as a VOR receiver or an ILS receiver. The desired type of operation is selected by tuning the receiving set to the frequency corresponding to that operation: ILS operation is selected by tuning to the odd tenth-MHz frequencies between 108.00 and 112.00 MHz. VOR operation is selected by tuning to the frequencies between 108.0 and 117.95 MHz, except the odd tenth-MHz between 108.00 and 112.0 MHz which are reserved for ILS operation.

2-4. Starting Procedure

a. Turn on the aircraft radio equipment primary power.

b. Turn the NAV VOL-OFF control past the OFF detent to the desired audio volume.

c. Set the control unit to the desired frequency.

2-5. VOR Operation

a. Flying From VOR Station. If the direction to a certain position (fig. 2-1) is known with respect to a VOR station, that position can be reached as folows:

(1) Tune the receiving set to the VOR station frequency.

(2) Set the course card (in the illustrated example 205° radial) so that the desired direction of travel away from the VOR station is beneath the course index.

(3) Fly generally toward the destination. When the to/from indicator indicates FR, fly in the direction which centers the VOR/localizer needle.

(4) When the VOR/localizer needle is centered, the aircraft is on the line from the station to the destination. By flying in the direction originally determined and. keeping the VOR/localizer needle centered, the destination will be reached.

b. Direct Flight to VOR Station.

(1) To fly directly to a VOR station, tune to the VOR station and rotate the course card until the to/from indicator indicates TO and the VOR/localizer needle is centered.

(2) Fly in the direction read beneath the course index while keeping the VOR/localizer needle centered.

c. *Flying Selected Inbound Radial.*

(1) Tune to the station and rotate the course card so that the desired course of approach is beneath the course index. A TO indication should appear on the

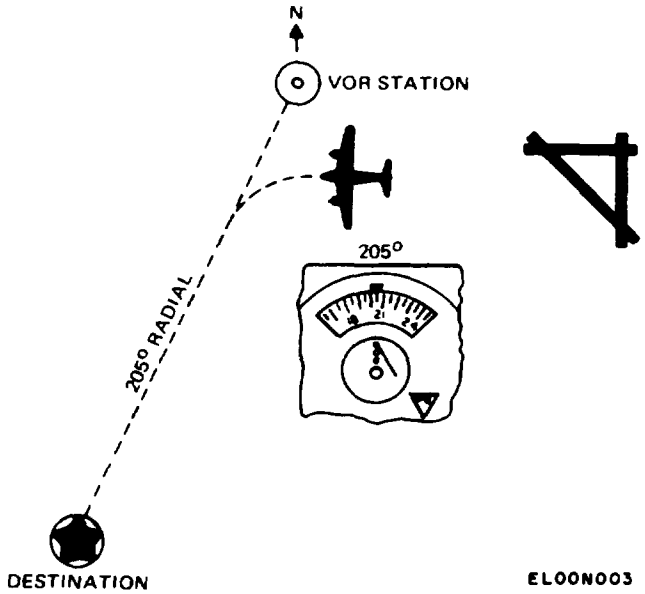


Figure 2-1. Flying From VOR Station.

to/from indicator (select the inbound radial, not the outbound).

(2) Fly in the general direction toward the selected radial; then turn in the direction in which the VOR/localizer needle deviates. As the needle centers, turn to the heading of the selected inbound radial and keep the needle centered.

d. Position Finding With VOR. When two VOR stations can be received, the VOR system provides a method of position finding (fig. 2-2). This method is accurate when the two stations are at least 30° apart (with respect to the aircraft) and not more than 150° apart (with respect to the aircraft). At angles less than 30° and more than 150°, the accuracy degrades until finally it is impossible to use this method when the stations are 0° or 180° apart (are in line with the aircraft). The aircraft position is determined as follows:

(1) Tune the navigation receiver to one of the stations.

(2) Rotate the course card until the VOR/localizer needle is centered and the to/from indicator FR. Read the bearing beneath the course index, which in the figure 2-2 example is 88°. This is the bearing from the station to the aircraft.

(3) Locate the station on a map and draw a line from the station in the direction determined in (2) above,

(4) Repeat the procedures given in (l), (2), and (3) above on a second VOR station (preferably one which is separated approximately 90° from the first station). The bearing for the second VOR station read under the course index is 32°

(5) The intersection of the two lines is the aircraft position.

e. VOR Approach. The VOR approach is executed when the desired landing runway does not have ILS facilities but the VOR station is in line with the desired runway (fig. 2-3). Proceed as follows

(1) As the aircraft comes within range of the VOR station, set the course card to the specified radial or a convenient inbound radial (80° radial shown) and tune the navigation receiver to the VOR station.

(2) Fly toward the desired radial to center the VOR/localizer needle.

(3) When the VOR station is reached, set the course card to the reciprocal (0° radial) of the final appreach course. Fly toward the reciprocal of the final approach course to center the VOR/localizer needle.

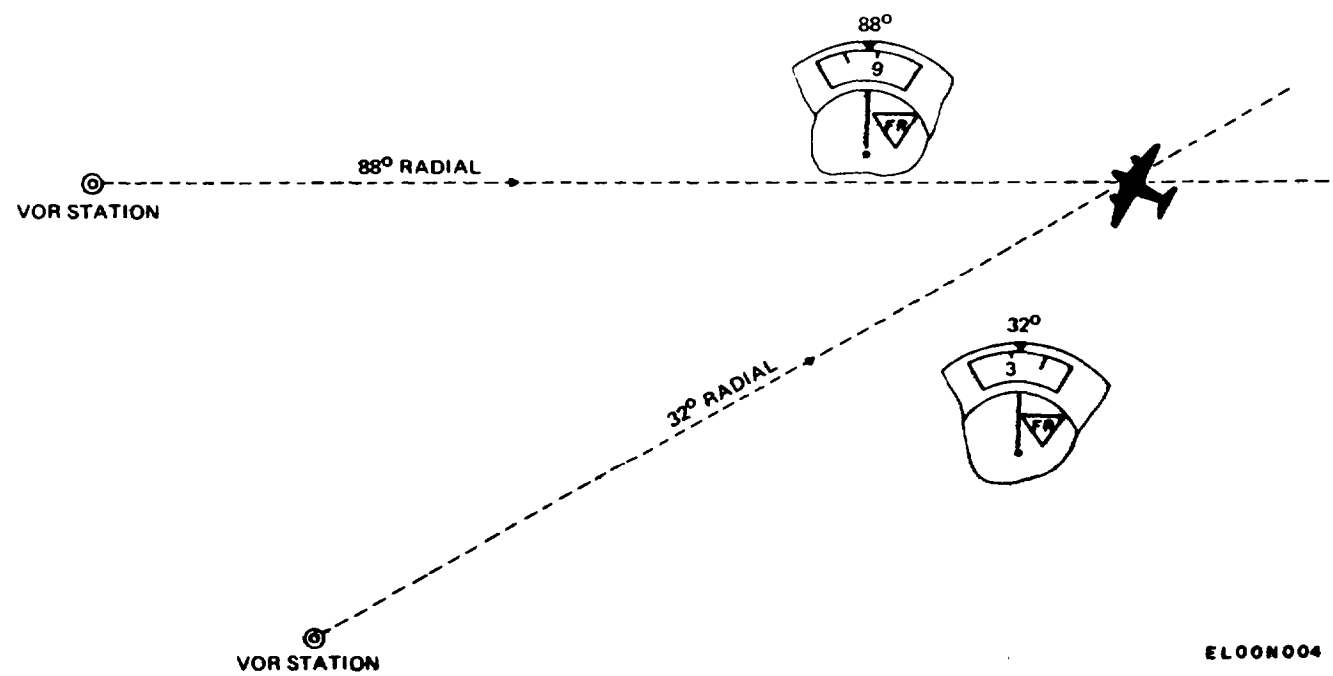


Figure 2-2. Position Finding With VOR.

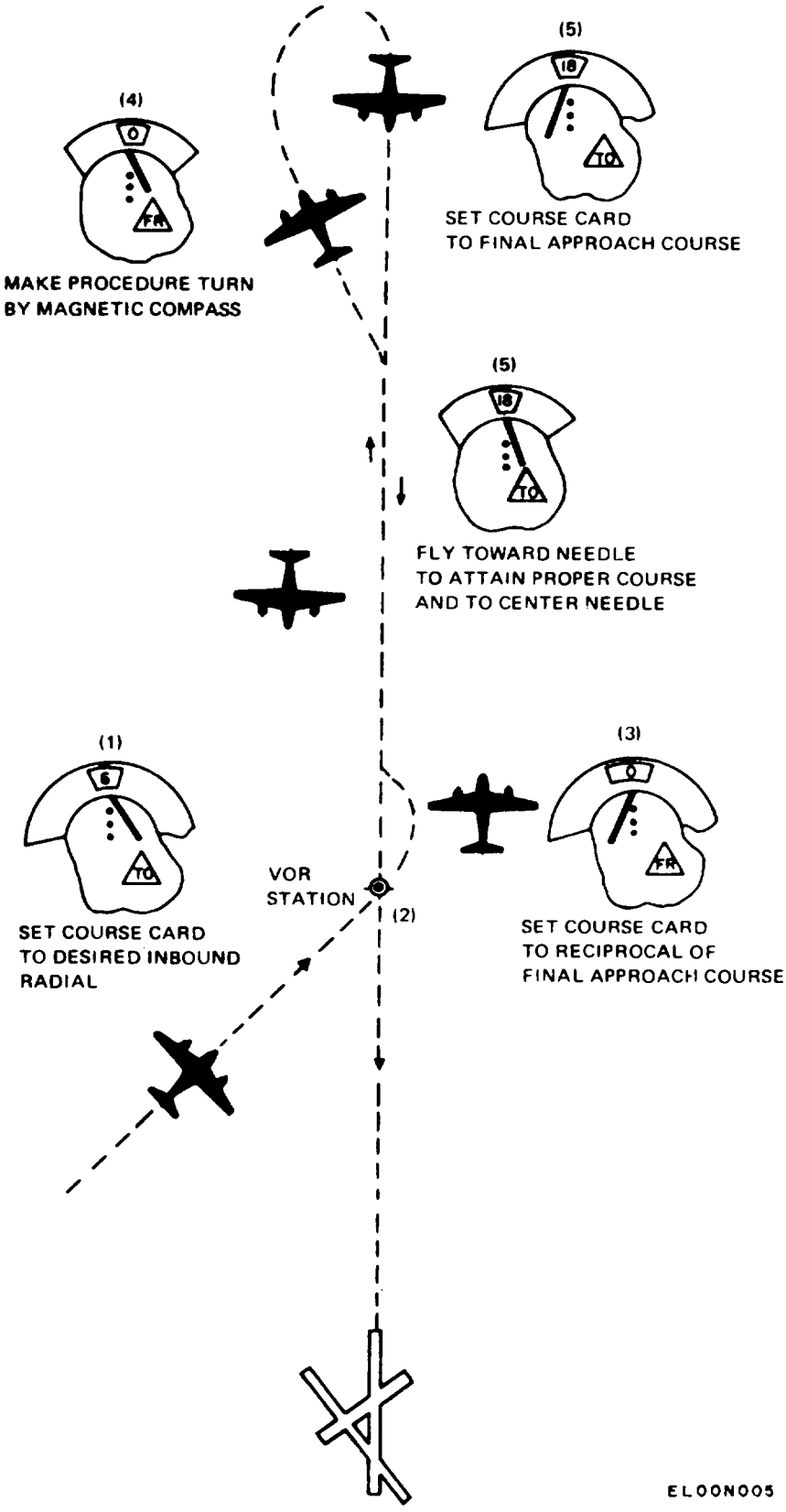


Figure 2-3. VOR Apprcach.

The to/from indicator should indicate FR.

(4) After proper elapsed time, make a 45° left turn by compass. After 45 seconds, make a 180° right turn by compass.

(5) Before the procedure turn is completed, set the course card (180° radial) to the final approach course.

Continue to fly on the procedure turn until the final approach line is intercepted and the VOR/localizer needle centers. When the VOR/localizer needle centers, turn to the final approach course. If the needle deviates from the center, fly toward the needle to keep the aircraft on course and center the needle.

(6) After the runway comes into view, make a final approach and landing,

2-6. ILS Operation

a. ILS Approach. The ILS approach is executed when the desired landing runway has ILS facilities and the VOR station is not in line with the desired runway (fig. 2-4). Proceed as follows:

(3) When the VOR station is reached, set the course card to the published vor-to-outer marker radial. Fly past the VOR station and become established on the vor-to-outer marker radial. The to/from indicator should indicate FR.

(4) Before the outer marker is reached, switch the receiving set to the localizer frequency. The to/from indicator is blanked and the course card has no effect on localizer.

(5) As the outer marker is reached, the final approach course LO the runway is intercepted and the VOR/localizer needle will be centered.

(6) Turn to the reciprocal of the final approach and keep the VOR/localizer needle centered. The

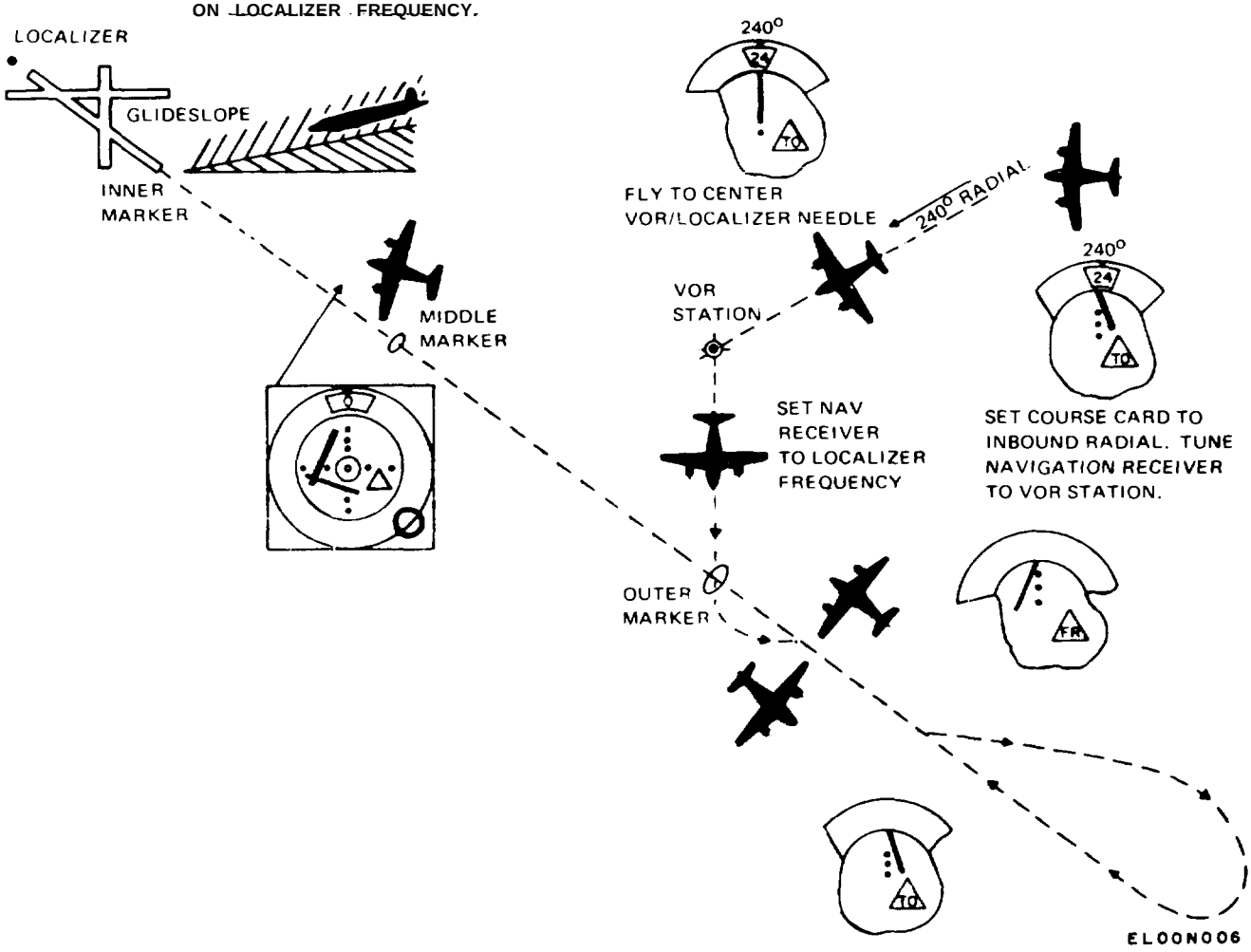


Figure 2-4. ILS Approach.

(1) As the aircraft comes within range of the VOR station, set the course card to the specified radial (240° radial) or a convenient inbound radial and tune the receiving set to the VOR station.

(2) Fly toward the desired radial to center the VOR/localizer needle.

VOR/localizer needle normally deviates toward the proper path. but when outbound on the localizer front course (or inbound on the localizer back course), the deviation is reversed or away from the proper path. Therefore, fly away from the needle to center the needle when outbound.

(7) After proper elapsed time, fly a 45° left turn by the compass. After 45 seconds, make a 180° right turn by compass.

(8) Fly to complete the procedure until the final approach course is intercepted and the VOR/localizer needle is centered. The needle deviates in the direction of the proper path when inbound.

(9) Fly in the direction which the VOR/localizer and glideslope needles deviate. When both needles are centered, the aircraft is on the correct glidepath and localizer path.

b. Marker Beacon Operation.

(1) For a ground facility to supply the pilot with distance data relative to the beginning of the runway, three marker beacon transmitters are generally provided along the approach path to the runway.

(2) The outer marker beacon transmitter is usually located from 4 to 7 miles from the runway. Passage of the aircraft over the outer marker is aurally identified by a series of keyed dashes and visually by a blue marker lamp in the cockpit (or single lamp as applicable).

(3) The middle marker beacon transmitter is located about 1 mile from the edge of the runway. Passage of the aircraft over the middle marker is identified aurally by alternate dots and dashes and visually by the amber marker lamp in the cockpit (or single lamp as applicable).

(4) The inner marker beacon transmitter is generally located at the edge of the runway. Passage over the inner marker is identified aurally by a series of dots and visually by the white marker lamp in the cockpit (or single lamp as applicable).

(5) Marker beacon receiver sensitivity is controlled in the aircraft by the receiver control panel MB SENS HI-LO control. High sensitivity operation is usually used when making an approach to the outer marker beacon or while enroute. Low sensitivity operation may be employed for positive identification of marker beacon passage.

(6) The volume of the marker beacon audio signals is controlled by the receiver control MB VOL knob.

2-7. Stopping Procedure

Stop the receiving set by turning the NAV VOL control to OFF.

Section III. OPERATION UNDER UNUSUAL CONDITIONS

2-8. Warning Flags

a. VOR/LOC Warning Flag. A red LOC flag appears on the course indicator whenever the selected VOR or localizer signal is unreliably weak or a malfunction occurs in the VOR/LOC section of the receiver. (The course indicator is not part of Radio Receiving Set AN/ARN-123.)

b. GS Warning Flag. A red GS flag appears on the course indicator whenever the glideslope signal is unreliably weak or a malfunction occurs in the glideslope section of the receiver.

c. Receiver Section Malfunction. ***The*** three receiver sections (VOR/LOC-GS-MB) perform independently of each other. Performance degradation within any one of the major sections will not affect the performance of the others,

2-9. Extreme Temperatures

The receiving set may take a little longer to warm up (up to 3 minutes) under conditions of extreme cold.

Section IV. PREFLIGHT (DAILY) OPERATIONAL CHECK

2-10. General

The operational check given in paragraph 2-11 supplements the inspection procedures in the aircraft operator's condensed checklist. The operational check should be performed just before flight. The pilot ***or co***-pilot should report any malfunction or failure noted in flight.

2-11. Operational Check/Self-Test

NOTE

This test requires an external VOR rf signal generated by a ground station, or ramp test Set.

a. Set the course indicator OBS control for a 315° indication under the course index.

b. Move the control unit VOR/MB switch to the TEST position (down).

c. The CDI deviation needle should indicate center ± 2 dots.

d. The VOR/LOC flag should be buried,

e. The RMI should point to the 315° radial (±5°).

f. The marker beacon lamp(s) should illuminate.

CHAPTER 3
MAINTENANCE INSTRUCTIONS

NOTE

Tools and equipment required for maintenance of the AN/ARM-123(V)(*) are specified in appendix B.

Section I. REPAINTING AND REFINISHING

3-1. Original Protective Finish

The outside surfaces of the receiver and control (with the exception of the light panel) are treated in accordance with MIL-F-14072A and a final film of black lusterless enamel No. 37038. Unpainted internal surfaces and functional parts are chemically passivated.

3-2. Retouching/Repainting

After cleaning (para 3-8), remove corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to TB 43-0118, Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters,

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

3-3. General

The preventive maintenance checks and services are defined herein for specific intervals. These checks and services will maintain Army electronic equipment in Serviceable condition; that is, in good general (physical) condition and in good operating condition. To assist the organizational electronic equipment repair technician or crew chief in maintaining combat serviceability, the table indicates what to check and the normal conditions. The references list the paragraphs or manuals that contain supplementary information. If the defect cannot be remedied by the organizational electronic equipment repair technician or crew chief, higher category of maintenance 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. Flight Line Preventive Maintenance

Perform the preventive maintenance functions undicated in table 3-1 every 25 hours of flying time (concurrently with the aircraft intermediate maintenance checks and services).

Table 3-1. Flight Line Preventive Maintenance Checks and Services

Total taskhours required: 1.24

Sequence No.	ITEM TO BE INSPECTED PROCEDURE	Work Time (T/H)
	SECTION I – POWER OFF	
	Taskhours required	
1	EXTERIOR SURFACES	.08
	Clean the receiver and control unit front panel in accordance with paragraph 3-8.	
	Check for broken glass on the control unit. Refer to higher category maintenance for repair.	
	Check all exposed metal surfaces for rust and corrosion. Retouch in accordance with paragraph 3-2.	
2	EXTERIOR ITEMS	.08
	Check safety wiring on the mount fasteners. REFER to TM 55-1500-323-25.	
	Check the action of all mechanical knobs and switch to verify smooth and free operation	
	Tighten any loose mounting screws	
	SECTION II -- POWER ON	
	Taskhours required:	
3	PANEL LAMPS	.08
	Check to see that control unit panel lamps illuminate when the aircraft dimmer control is rotated.	

Table 3-1. Flight Line Preventive Maintenance Checks and Services-Continued

Total taskhours required: 1.24

Sequence No.	ITEM TO BE INSPECTED PROCEDURE	Work Time (T/H)
4	GLIDESLOPE OPERATIONAL CHECK Check the receiver glideslope function for proper operation in accordance with paragraphs 3-14 and 3-15.	.25
5	MARKER BEACON OPERATIONAL CHECK Check the receiver marker beacon function for proper operation in accordance with paragraphs 3-14 end 3-15,	.25
6	VOR OPERATIONAL CHECK Check the receiver VOR function for proper operation in accordance with paragraphs 3-14 and 3-15.	.25
7	LOC OPERATIONAL CHECK Check the receiver localizer function for proper operation in accordance with paragraph 3-14 and 3-15.	.25

3-5. Bench Test Preventive Maintenance

a. During the aircraft periodic preventive maintenance checks and services (every 300 flying hours), the electronic equipment will be removed from the aircraft for bench tests and inspections given in table 3-2. Replacement electronic equipments will be reinstalled from float stock. These tests and inspections are performed by director general support personnel.

b. The flight line maintenance checks indicated in table 3-1 are performed ‘on the float stock being installed in the aircraft.

Table 3-2. Bench Test Preventive Maintenance

Total taskhours required: 3.74

Sequence No.	ITEM TO BE INSPECTED PROCEDURE	Work Time (T/H)
	SECTION I – GENERAL	
	Taskhours required:	
1	PUBLICATIONS Check to see that all pertinent publication are available. This manual must be complete and in usable condition, without missing pages. All changes pertinent to this publication must be on hand. Refer to DA Pam 310-4.	.08
2	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 schedule. Refer to DA Pam 310-7.	.08
	SECTION II - RECEIVING SET	
	Taskhours required:	
3	RECEIVING SET Check to see that receiving set is complete. Refer to paragraph 1-14.	.08
4	RECEIVER CONTROL Perform the following tests in accordance with paragraph 3-17 and 3-18. a. Switching tests. b. Audio volume adjustment tests. c. Panel lighting test.	.5
5	VOR RECEIVER SECTION Perform the following tests in accordance with paragraph 3-19 or paragraph 3-24. a. RT sensitivity test. b. Audio output test. c. Agc flatness test. d. VOR course width test. e. VOR to/from ambiguity teat. f. VOR alarm flag teat. g. VOR runout error test. h. VOR self-test.	1.0
6	LOC RECEIVER SECTION Perform the following tests in accordance with paragraph 3-20 or paragraph 3-25. a. LOC centering tact. b. LOC sensitivity teat. c. LOC alarm flag teat.	.5
7	GLIDESLOPE RECEIVER SECTION Perform the following tests in accordance with paragraph 3-21.	1.0

Table 3-2. Bench Test Preventive Maintenance-Continued

Total taskhours required: 3.74

Sequence No.	ITEM TO BE INSPECTED PROCEDURE	Work Time (T/H)
	a. Rf sensitivity test. b. Course centering test. c. Deflection sensitivity test. d. Age response test. e. Warning signal teat.	
8	MARKER BEACON RECEIVER SECTION Perform the following tests in accordance with paragraph 3-22. a. Audio output power teat. b. Lamp actuation teat. c. Threshold sensitivity test.	

Section III. TROUBLESHOOTING

3-6. General

Troubleshooting the receiver and receiver control is limited to functional checkout on the flight line, component substitution indicated in table 3-3, and verification by bench testing.

3-7. Corrective Action

Corrective action is limited to removal and replacement of the components described in section IV. Troubleshooting or repair beyond that described in this manual is not authorized. If the receiver or control fails any one of the bench tests, all testing will stop and the unit must be returned to the manufacturer.

Table 3-3. Troubleshooting

Malfunction	Probable cause	Corrective action
Panel lamp(a) do not light	Faulty bulb(s)	Replace faulty bulb(s) (para 3- 13)
System does not function as specified in the flight line tests (ch 3, sec V)	Faulty receiver, control, or other units not part of this receiving set	Check by substitution (para 3-10 and 3-12). Refer to the appropriate manuals for substitution of interfacing equipment not part of this receiving set. Refer defective receiver or control unit to higher category of maintenance for bench test (ch 3, sec VI)
System does not function as specified in the bench tests (ch 3, sec VI)	Faulty receiver and/or control unit.	Return to manufacturer for repair under warranty.

Section IV. MAINTENANCE

3-8. General

Maintenance of the radio receiver set is limited to the procedures in this section and the following sections in this chapter. Personnel are cautioned that the manufacturer's warranty is voided if the receiver is opened by military personnel or if repair beyond that covered in this manual is attempted. Components found defective in the bench tests in section VI or section VII are to be returned to the manufacturer.

3-9. Cleaning

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

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

WARNING

The fumes of trichloroethane are toxic. Protide thorough ventilation whenever used. DO NOT USE NEAR AN OPEN FLAME. Trichloroethane is not flammable, but exposure of the fumes to an open flame or hot metal surface forms highly toxic phosgene gas.

b. Remove grease, fungus, and ground-in dirt from the equipment cases and mounting, Use a cloth dampened (not wet) with trichloroethane.

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 trichloroethane. Dry with compressed air.

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

3-10. Removal and Replacement of Receiver

a. Removal.

(1) Disconnect the cables from the front of the receiver.

(2) Loosen the two thumbscrews on the front of the mounting tray enough so that the lip on the bottom of the receiver will clear the clamp.

(3) Lift the front end of the receiver slightly and slide it off the mounting tray.

b. Replacement.

(1) Slide the receiver into the mounting tray. Be sure the lip on the rear of the receiver fits snugly under the lip on the back of the mounting tray.

(2) Place the clamp over the lip on the front of the receiver and tighten the two thumbscrews.

(3) Connect the cables to the front of the receiver.

3-11. Removal and Replacement of Mount

a. Removal.

(1) Remove the receiver as described in paragraph 3-10a.

(2) Remove the screws that attach each of the vibration isolators and the ground straps to the airframe and remove the mount.

b. Replacement.

(1) The receiver mount is installed in the reverse order of removal.

(2) Tighten the mounting screws.

3-12. Removal and Replacement of Receiver Control C-10048/ARN-123(V) or C-10049/ARN-123(V)

a. Removal.

(1) Loosen the four captive turnlock fasteners that secure the control unit. to the aircraft mounting panel.

(2) Pull the control unit out of the aircraft mounting panel and disconnect the cable from the rear of the control unit.

b. Replacement.

(1) Connect the control unit cable to the rear of the unit.

(2) Insert the control unit into the aircraft mounting panel and fasten the four turnlock fasteners securely.

3-13. Control Parts Replacement

a. Knobs.

(1) Remove the knobs by loosening the knob setscrews and sliding the knobs off the stems.

(2) Apply Loctite, grade HV, to the setscrews when reinstalling or replacing the knobs.

b. Front Panel.

(1) Remove the control knobs as instructed in ***a*** above. Remove the felt washers.

(2) Remove the two screws that attach the front panel and remove the panel.

c. Lamps and Lamp Filters.

(1) Remove the front panel as instructed in *b* above.

(2) Using tweezers or needle-nosed pliers, the lamp filters and lamps can be pulled straight out through the front panel.

NOTE

Replace the lamp filters whenever the lamps are replaced.

Section V. FLIGHT LINE TESTS

3-14. General

a. The operational checks given in paragraph 3-15 are performed on the flight line with the equipment installed in the aircraft. These checks should be performed before removal and replacement of components as the result of inflight problems or malfunctions observed during operational checks (para 2-11) and should be performed as part of the aircraft intermediate preventive maintenance checks and services. Malfunctioning components should be removed for bench testing in accordance with section VI or section VII. The glideslope, VOR, and localizer tests are made using Signal Generator SG- 13/ARN. The marker beacon tests use Test Oscillator BC- 376. The aircraft and receiver power must be on.

NOTE

If the aircraft engines are operated during the following tests, the pilot or an authorized crewmember will start and operate the engines. If the aircraft engines are not operated, use an auxiliary power source to prevent excessive drain on the aircraft battery. Refer to the aircraft manuals for connection and power requirements, and for setting of communication power controls.

b. The tests should be conducted at a location which is free of electromagnetic energy reflecting surfaces such as buildings, other aircraft, etc.

3-15. Flight Line Operational Tests

a. Test Setup.

(1) With the SET LINE TO 21V control OFF, connect the SG-13/ARN to a 21- to 29-volt dc portable power source.

(2) Set METER switch to LINE.

(3) Rotate SET LINE TO 21V control for 21 ±0.5 volts indication on meter.

(4) Set the MEGACYCLES control to 109.30 (332.00 MHz), and set receiver frequency (in aircraft) to 109.30, or any frequency with a reported discrepancy.

(5) Set AUDIO SELECTOR switch to GLIDE SLOPE.

(6) Set NAV GS switch to GS.

(7) Set MICROVOLTS control to lK microvolt.

(8) Set METER switch to CAR.

(9) Adjust CARRIER SET control for redline indication on meter.

(10) Set LOC-GS switch to DOWN.

(11) Position the SG-13/ARN 50 feet directly in front of the aircraft center and move towards the aircraft until the glideslope warning flag is driven out of view.

b. Glideslope Test Procedure.

(1) Set MICROVOLTS control to 10K microvolt.

(2) Set LOC-GS control to center (white line).

(3) The glidescope deviation indicator in the aircraft shall be within the center donut.

(4) Set LOC-GS control to UP.

(5) The glidescope deviation indicator in the aircraft shall deflect full scale upward.

(6) Set LOC-GS control to DOWN.

(7) The glideslope deviation indicator in the aircraft shall deflect full scale downward.

c. VOR Test Procedure.

(1) Perform the test setup procedures given in paragraph 3-14a.

(2) Set MEGACYCLES control to 114.90 MHz.

(3) Allow at least 15 minutes warmup. With METER switch in CAR position, adjust CARRIER SET control for redline indication on meter.

(4) Set AUDIO SELECTOR switch to VOR.

(5) Set MICROVOLTS control to 10K microvolts.

(6) Set NAV GS switch to NAV.

(7) Set receiver frequency (in aircraft) to 114.90 MHz.

(8) Set VOR control to 0°,

(9) Adjust the aircraft OBS control for zero deviation. The OBS dial shall indicate 0° ±5.0°.

(10) Set VOR control to each of its other positions and adjust the OBS control for zero at each position. The OBS dial shall indicate the same reading as the VOR control for each position (±5.0°).

d. Localizer Test Procedure.

(1) Perform the test setup procedures.

(2) Set MEGACYCLES control to 110.10 MHz.

(3) Allow at least 15 minutes warmup, then adjust CARRIER SET control for redline indication on meter.

(4) Set AUDIO SELECTOR switch to TONE LOC.

(5) Set MICROVOLTS control to 10K microvolt.

(6) Set receiver frequency (in aircraft) to 110.10 MHz.

(7) Set LOC-GS control to center (white line).

(8) The LOC deviation indicator in the aircraft shall be within the center donut.

(9) Set LOC-GS control to LEFT.

(10) The LOC deviation indicator in the aircraft shall deflect to the left,

(11) Set LOC-GS control to RIGHT.

(12) The LOC deviation indicator in the aircraft shall deflect to the right,

e. Marker Beacon Test Procedure. Flight line tests of the marker beacon receiver are performed using Test Oscillator BC-376. The BC-376, with its antenna fully extended, must be placed 10 to 20 feet from the marker beacon receiver antenna. A headset can be used to monitor the marker beacon audio output.

(1) Turn the BC-376 on and move it toward the receiver antenna until a strong signal is heard in the headset,

(2) Set the BC-376 MODULATION switch to 400. The OUTER marker lamp on the aircraft instrument panel must light, and the MIDDLE and AIRWAY lamps must not light.

(3) Set the BC-376 MODULATION switch to 1300. The MIDDLE marker lamp on the aircraft instrument panel must light, and the OUTER and AIRWAY lamps must not light.

(4) Set the BC-376 MODULATION switch to 3000. The AIRWAY marker lamp on the aircraft instrument panel must light, and the MIDDLE and OUTER lamps must not light.

NOTE

Test must be performed with aircraft away from electromagnetic energy and reflecting surfaces such as buildings or other aircraft.

Section VI. DIRECT AND GENERAL SUPPORT BENCH TESTS

3-16. General

a. This section contains direct and general support bench testing procedures for the receiver and the control. The test procedures specify the minimum performance limits within which the equipment may opcrate and still be suitable for installation in an aircraft. As such the tests may be used to check equip ment removed from an aircraft or units removed from storage.

b. If the units test within the acceptable limits given, no further testing is required and the equip ment may be considered suitable for installation in an aircraft.

c. If either the receiver or the control fails to meet any requirement of the tests, no further testing is required. The equipment is returned to the manufacturer for disposition under the terms of the equipment Warranty.

NOTE

Personnel must be aware that any attempts at maintenance beyond the testing specified herein will void the manufacturer’s warranty

3-17. Test Equipment Calibration

All test equipment used in the bench tests must have a valid calibration sticker attached, and must be in prop er working order. The following adjustment procedures must be performed before performance of the test procedures.

a. *Power Supply PP-348/ARN Adjustment.*

(1) Connect Cable CX-1290/ARN to OUTPUT of power supply and to POWER INPUT of Signal Generator SG-lA/ARN.

(2) Connect Cable CX-237/U to LINE INPUT of power supply and to 115-volt ac line.

(3) Set POWER switch to HEATER. Wait 5 minutes.

(4) Set POWER switch to ON. The power indicator lamp should light. Wait 5 minutes for warmup.

(5) Set INPUT VOLTAGE ADJUST switch to NORMAL.

(6) Needle on INPUT VOLTAGE meter should read 115 volts ac ±10 percent. If reading is incorrect, reset INPUT VOLTAGE ADJUST.

b. Signal Generator SG-1A/ARN Adjustment.

(1) Perform Power Supply PP-348/ARN adjustment procedures *(a* above).

(2) Set OSC SEL switch to MO.

(3) Turn FREQUENCY to 112.0 MHz.

(4) Adjust RF LEVEL for redline on RF MONITOR meter.

(5) Set OSC SEL switch to OFF.

(6) Adjust METER ZERO (right side) until RF MONITOR meter indicates 0.

(7) Set OSC SEL switch to MO.

(8) Turn FREQUENCY to 88.0 MHz.

(9) Adjust RF LEVEL for redline on RF MONITOR meter.

(10) Set MOD switch to 400~.

(11) Set MOD RANGE switch to 100 percent.

(12) Adjust MOD LEVEL until PERCENT MODULATION meter indicates 100.

(13) Set MOD switch to EXT.

(14) Set OSC SEL switch to XTAL.

(15) Set XTAL FREQ switch to 110.1 MC.

(16) Turn FREQUENCY to 110.1 MHz.

(17) Adjust RF LEVEL for redline on RI *MON*-ITOR meter.

(18) Set XTAL FREQ switch to 114.9 MC.

(19) Turn FREQUENCY to 114.9 MHz,

(20) Adjust RF LEVEL for redline on RF MONITOR meter.

c. *Modulator MD-83A/ARN Adjustment.*

(1) Connect the MD-83A/ARN MOD OUTPUT to the SG-lA/ARN EXT MOD INPUT.

(2) Set POWER switch to ON.

(3) Adjust the SG-lA/ARN MOD LEVEL control fully counterclockwise.

(4) Set the SG-lA/ARN for full-scale reading at 30 percent modulation.

(5) Set the MD-83A/ARN FUNCTION SELECTOR to CAL.

(6) Set the MD-83A/ARN SPECIFIC SIGNAL SELECTOR to 30˜ VARØ.

(7) Adjust the MD-83A/ARN 30~ VARØ potentiometer (inside the door on front panel) for 1.0 volt on the OUTPUT meter.

(8) Adjust the SG-1A/ARN MOD LEVEL control to read 30 percent on PERCENT MODULATION meter.

(9) Set the MD-83A/ARN SPECIFIC SIGNAL SELECTOR to 9960FM.

(10) Adjust the MD-83A/ARM 9960FM potentiometer for 30 percent reading on SG-lA/ARN PERCENT MODULATION meter.

(11) Set the MD-83A/ARN SPECIFIC SIGNAL SELECTOR to 90-150~.

(12) Set the MD-83A/ARN TONE LOCALIZER to CAL 90˜.

(13) Adjust the MD-83A/ARN 90˜ potentiometer for 20 percent reading on SG-1A/ARN PERCENT MODULATION meter.

(14) Note the exact reading on the MD-83A/ARN OUTPUT meter so that the 150-Hz signal can be set to the same point.

(15) Set the MD-83A/ARN TONE LOCALIZER to CAL 150˜.

(16) Adjust the MD-83A/ARN 150˜ potentiometer for exactly the same reading on the OUTPUT meter as obtained in the 90-Hz adjustment.

3-18. Receiver Control Tests

a. Test Equipment Required. Multimeter AN/USM-223, or equivalent, is required.

b. Frequency Switching. At the frequency settings specified in table 3-4, check for specified ground or open condition at the specified pine. Pin conditions shall be as specified for frequency settings obtained by both clockwise and counterclockwise rotation of control frequency selector knobs. Rear connector pins 27 and 44 shall be connected to ground for this check.

c. Power Switching.

(1) With the control NAV VOL and MB VOL knobs both set in the OFF positions, check for continuity between rear connector pins 6 and 8, then pins 8 and 13. There must not be continuity.

(2) Move the NAV VOL knob clockwise out of the OFF position and then check for continuity between rear connector pine 6 and 8, then pins 8 and 13. There must be continuity between pins 6 and 8, but not between pins 8 and 13.

(3) Move the MB VOL knob clockwise out of the OFF position and then check for continuity between pine 8 and 13. There must be continuity.

Table 3-4. Frequency Switching Pin Conditions

NOTE

G represents a ground reading. All others open.

PIN NO.	15	22	23	24	25	26	28	29	30	31	32	33	37	38	39	40	41	42	43	45	46	47	48	49	50
FREQUENCY																									
108.00		G			G			G		G				G	G			G			G		G		
108.05		G			G		G	G		G				G	G			G		G	G		G		
108.10	G	G			G				G	G				G	G			G				G	G		
108.15	G	G			G		G		G	G				G	G			G		G		G	G		
108.20		G			G				G		G			G	G			G				G	G		
108.25		G			G		G		G		G			G	G			G		G		G	G		
108.30	G	G			G					G	G			G	G			G				G	G		
108.35	G	G			G		G			G	G			G	G			G		G		G	G		
108.40		G			G					G		G		G	G			G					G		G
108.45		G			G		G			G		G		G	G			G		G			G		G
108.50	G	G			G						G	G		G	G			G					G		G
108.55	G	G			G		G				G	G		G	G			G		G			G		G
108.60		G			G			G			G			G	G			G			G				
108.65		G			G		G	G			G			G	G			G		G	G				
108.70	G	G			G			G				G		G	G			G			G				G
108.75	G	G			G		G	G				G		G	G			G		G	G				G
108.80		G			G				G			G		G	G			G				G			G
108.85		G			G		G		G			G		G	G			G		G		G			G
108.90	G	G			G			G	G					G	G			G			G	G			
108.95	G	G			G		G	G	G					G	G			G		G	G	G			
109.95	G	G				G	G	G	G				G	G	G				G	G	G	G			
110.95	G		G			G	G	G	G				G			G			G	G	G	G			
111.95	G	G	G				G	G	G				G		G	G				G	G	G			
112.95		G		G			G	G	G				G		G		G			G	G	G			
113.95			G	G			G	G	G				G			G	G			G	G	G			
114.95			G		G		G	G	G				G			G		G		G	G	G			
115.95				G	G		G	G	G				G				G	G		G	G	G			
116.95				G		G	G	G	G				G				G		G	G	G	G			
117.95					G	G	G	G	G				G					G	G	G	G	G			

PIN NO. 15 22 23 24 25 26 28 29 30 31 32 33 37 38 39 40 41 42 43 45 46 47 48 49 50

d. Marker Beacon Sensitivity Switching.

(1) Place the MB SENS switch in the LO position and then check for continuity between rear connector pins 12 and 14. There must not be continuity.

(2) Place the MBS SENS switch in the HI position and then check for continuity between rear connector pins 12 and 14. There must be continuity.

e. VOR/Marker Beacon Test Switching.

(1) Place the VOR/MB TEST switch in the test (down) position and then check for continuity between rear connector pins 10 and 16. There must be continuity.

(2) With the VOR/MB TEST switch not in the test position (up), check for continuity between rear connector pins 10 and 16. There must not be continuity.

f. VOR/LOC Audio Volume Adjustment.

(1) Measure the resistance between rear connector pins 1 and 3. The resistance must be 750 to 1250 ohms.

(2) Measure the resistance between rear connector pins 1 and 2 while rotating the NAV VOL knob from the OFF position to its fully clockwise position. The resistance must increase smoothly from 0 ohm to between 900 and 1100 ohms with no intermittency.

g. Marker Beacon Audio Volume Adjustment.

(1) Measure the resistance between rear connector pins 17 and 19. The resistance must be 110 to 190 ohms.

(2) Measure the resistance between rear connector pins 17 and 18 while rotating the MB VOL knob from the OFF position to its fully clockwise position. The resistance must increase smoothly from 0 ohms to between 135 and 165 ohms with no intermittency.

h. Panel Lighting Test.

(1) *Test equipment required.* Hewlett-Packard Model 6266B Power Supply, or equivalent, is required.

(2) *General test conditions.* The receiver control chassis shall be grounded.

(3) *Test.* Apply 27.5 vdc power to the receiver control rear connector (+ at pin 21, - at pin 10). Both panel lamps must be fully illuminated.

3-19. VOR Bench Tests

a. Test Setup. All VOR and LOC bench tests are performed with the test setup shown in figure 3-1. Coaxial cables with 52 ohms characteristic impedance are used for all rf and modulation interfaces. Test set cable plugs P2, P3, and P7 mate with jacks J2, J3, and J7 on Receiver Adapter Cable CX-13034/AR. Plugs P11001 and P12002 on the receiver adapter cable connect to J11001 and J12002 on the receiver panel.

b. Initial Switch Settings. Before performing the VOR/LOC receiver section bench test procedures, set the controls of all items of test equipment as follows:

Radio Test Set AN/ARM-92B:	
OFF/PWR/TEST	PWR
MODE	400 Hz
BEARING	BRG
Compass heading	0
FLAG LOAD	4
SENS	LO
IND TEST	V/L RCVR
DEVIATION	0
AUDIO	V/L
OBS	N(0°)
CONTROL frequency	114.90 MHz
Audio Output Meter TS-585/U:	
IMPEDANCE	X1, 150
MULTIPLY BY	10
Modulator MD-83A/ARN:	
POWER	ON
TONE LOCALIZER	OFF
PHASE ANGLE SELECTOR	0°
FUNCTION SELECTOR	CAL
SPECIFIC SIGNAL SELECTOR	30~VAR Ø
MASTER ATTENUATOR	Counterclockwise
1000˜	OFF
Power Supply PP-348/ARN:	
POWER	ON
INPUT VOLTAGE ADJUST	NORMAL
Signal Generator SG-1A/ARN:	
FREQUENCY	114.90
OUTPUT LEVEL	1K
MOD RANGE	100%
MOD	EXT
XTAL FREQ	114.9 MC
OSC SEL	XTAL

NOTE

The FREQUENCY dial must be adjusted for peak on RF MONITOR meter, and the RF LEVEL control must be set for a redline indication on RF MONITOR meter.

c. VOR Test Signal. The VOR test signal is an rf carrier, amplitude modulated simultaneously 30 percent by a 9960 Hz subcarrier which is in turn frequency modulated at a deviation ratio of 16 by a 30-Hz reference phase signal, and 30 percent by a 30-Hz variable phase signal which can be varied in phase with respect to the 30 Hz reference phase signal. When the test procedure calls for a VOR test signal, proceed as follows:

(1) Set Power Supply PP-348/ARN POWER switch to ON.

(2) Set Signal Generator SG-1A/ARN controls as follows:

(a) FREQUENCY to 114.90.
(b) OUTPUT LEVEL to 1K (1000 microvolts).
(c) MOD RANGE to 30%.
(d) MOD to EXT.
(e) EXTAL FREQ to 114.9 MC.

(3) Set Modulator MD-83A/ARN controls as follows:

(a) POWER to ON.
(b) TONE LOCALIZER to 0.
(c) 1000~ to OFF.
(d) *FUNCTION* SELECTOR to CAL
(e) SPECIFIC SIGNAL SELECTOR to 30~VAR Ø

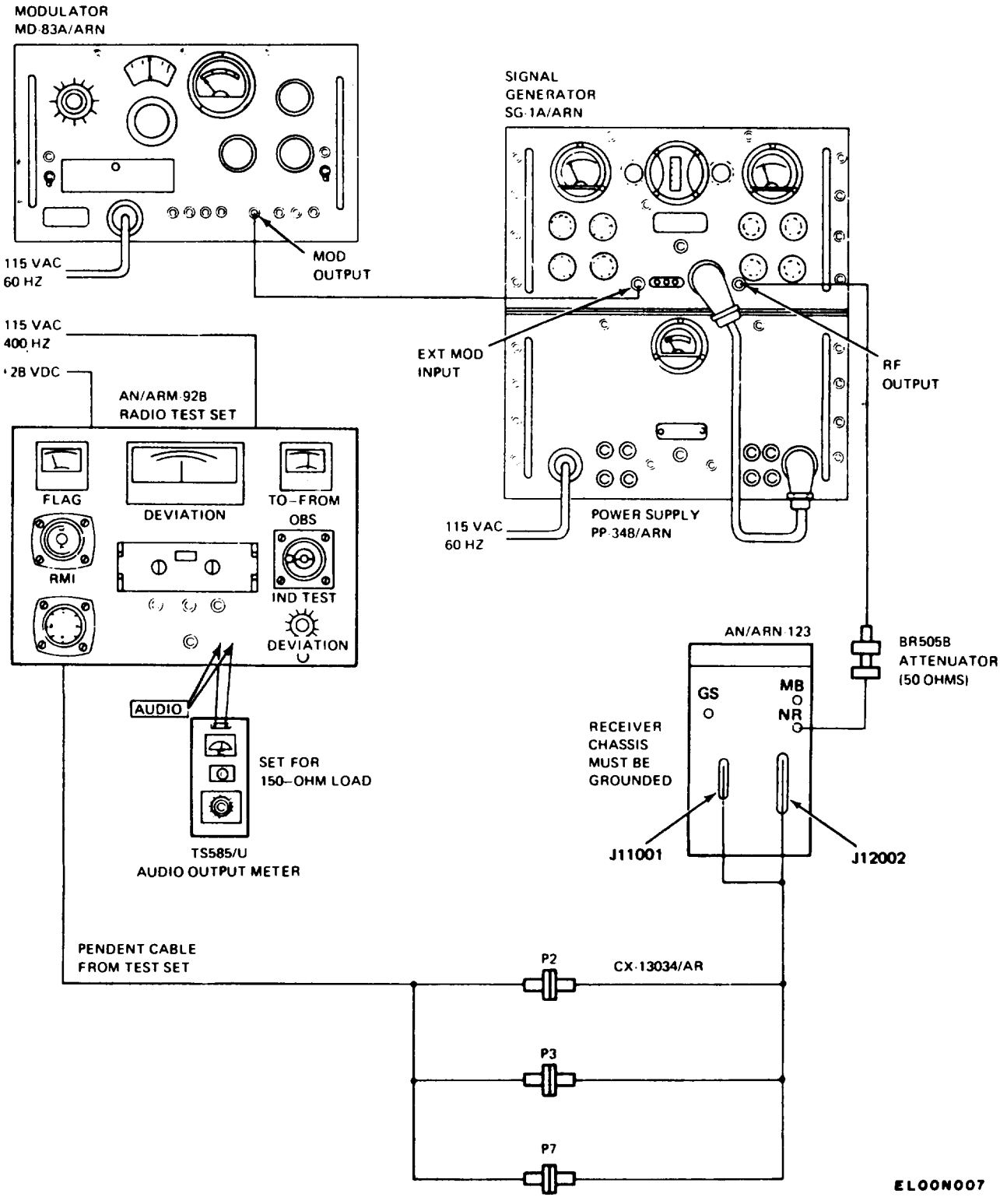


Figure 3-1. Bench Test Setup, VOR/LOC.

(f) PHASE ANGLE SELECTOR to 0.

(4) Set Radio Test Set AN/ARM-92B controls as follows:

(a) OFF/PWR/TEST to PWR.

(b) Frequency dial to 114.90 MHz.

(c) IND TEST to V/L RCVR.

(d) BEARING (switch) to BRG.

(e) BEARING (control) to 0.

(5) Set Audio Output Meter TS-585/U IMPEDANCE to Xl, 150 and MULTIPLY by 1.0.

(6) Adjust SG-lA/ARM FREQUENCY dial for peak on RF MONITOR meter.

(7) Adjust SG-lA/ARN RF LEVEL control for redline indication on RF MONITOR meter,

(8) Adjust SG-lA/ARN MOD LEVEL control for full scale (30 percent) indication on PERCENT MODULATION meter.

(9) Set MD-83A/ARN SPECIFIC SIGNAL SELECTOR to 9960FM. The SG-1A/ARN PERCENT MODULATION meter should indicate 30 percent.

NOTE

If a 30-percent indication is not obtained in the preceding step, open the potentiometer door on the MD-83A/ARN front panel and adjust the 9960 FM potentiometer for a 30-percent indication on the SG-lA/ARN PERCENT MODULATION meter.

(10) Set SG-lA/ARN MOD RANGE switch to 100%.

(11) Set MD-83A/ARN FUNCTION SELECTOR to ODR.

d. RF Sensitivity Test.

(1) Set rf signal generator for a 5-microvolt output signal at 114.90 MHz modulated 30 percent by 1000 Hz as follows:

(a) Rf signal generator MOD switch to 1000~.

(b) Rf signal generator MOD RANGE switch to 30%.

(c) Adjust rf signal generator MOD LEVEL control for 30 percent indication on PERCENT MODULATION meter.

(2) Set radio test frequency to 114,90 MHz.

(3) Note audio output meter reading in decibels.

(4) Turn rf signal generator MOD switch to EXT. Audio output meter shall read at least 6 db lower than noted reading.

(5) Repeat steps (1) thru (4) with Radio Test Set, and rf Signal Generator set to the following frequencies:

106.00	111.30	114.60	117.90
109.10	112.40	115.70	117.95
110.20	113,50	116.80	

NOTE

If unusual or defective receiver performance has been noted on a specific channel frequency, perform the rf sensitivity test on that frequency. Use Electronic Counter, Digital Readout AN/USM-207, or equivalent, to monitor the test frequency output of Signal Generator SG-1A/ARN.

e. Audio Output Test.

(1) Set rf signal generator for a 1000-microvolt output signal at 114.90 MHz modulated 10 percent by 1000 Hz.

(2) The audio output meter shall read at least 50 milliwatts.

f. Agc Flatness Test.

(1) Set rf signal generator for a 1000-microvolt output signal at 114.90 MHz modulated 30 percent by 1000 Hz.

(2) Note audio output meter reading in db.

(3) Slowly vary the output the rf signal generator between 10 microvolt and 10,000 (10K) microvolt. The audio output meter shall not vary more than k 10 db from noted reading.

g. VOR Course Width Test.

(1) Set up a standard VOR test signal.

(2) Set the radio test set BEARING switch to OBS.

(3) Set the radio test set OBS control to N (north).

NOTE

The OBS indicator on the radio test set must be an ID-1347C/ARN.

(4) Set the modulator PHASE ANGLE SELECTOR for O on radio test set DEVIATION meter, Note the PHASE ANGLE SELECTOR setting.

(5) Adjust the modulator PHASE ANGLE SELECTOR for 150 microampere (positive) deflection on radio test set DEVIATION meter. Note the PHASE ANGLE SELECTOR setting.

(6) Adjust the modulator PHASE ANGLE SELECTOR for 150 microampere (negative) deflection on radio test set DEVIATION meter, Note the PHASE ANGLE SELECTOR setting.

(7) Compare the three PHASE ANGLE SELECTOR readings. The second and third readings must be 10° ±2° from the first reading.

h. VOR to/From Ambiguity Test.

(1) Set up a standard VOR test signal.

(2) Set the PHASE ANGLE SELECTOR on the modulator to 0.

(3) Set the OBS control on the radio test set to N.

(4) The TO-FROM meter on the radio test set must indicate between 500 and 1200 microampere to the left of zero.

(5) Reduce the output level from the rf signal generator to 5 microvolt.

(6) The TO-FROM meter on the radio test set must indicate between 500 and 1200 microamperes to the left of zero.

(7) Reset the output level of the rf signal generator to 1000 microvolt.

(8) Set the PHASE ANGLE SELECTOR on the

modulator to 180°.

(9) The TO-FROM meter on the radio test set must indicate between 500 and 1200 microampere to the right to zero.

i. VOR Alarm Flag Test.

(1) Set up a standard VOR test signal.

(2) Set the PHASE ANGLE SELECTOR on the modulator to 0.

(3) Set the BEARING selector on the radio test set to 0°.

(4) The FLAG meter on the radio teat set must indicate 220 microampere minimum.

(5) Set the FUNCTION SELECTOR switch on the modulator to CAL.

(6) Set the SPECIFIC SIGNAL SELECTOR switch on the modulator to 30~VAR Ø.

(7) The FLAG meter on the radio teat set must indicate 180 microampere or less.

(8) Set the SPECIFIC SIGNAL SELECTOR switch on the modulator to 9960FM.

(9) The FLAG meter on the radio teat set must indicate 180 microampere or less.

j. VOR Runout Error Test.

(1) Set up a standard VOR test signal.

(2) Set the BEARING switch on the radio test set to BRG.

(3) Set the FUNCTION SELECTOR switch on the modulator to ODR.

(4) Set the BEARING selector on the radio test set to 0^{O}.

(5) Set the PHASE ANGLE SELECTOR on the modulator for 0 on the radio test set DEVIATION meter.

(6) The position of the PHASE ANGLE SELECTOR on the modulator must be within * 3° of the BEARING control setting.

(7) The RMI pointer on the radio test set must indicate within ±5° of the BEARING control setting.

(8) Repeat (4) through (7) above substituting the following angles in (4): 30°, 60°, 90°, 120°, 150°, 180°, 210°, 240°, 270°, 300°, 330°.

(9) Set the PHASE ANGLE SELECTOR on the MD-83A to 30^{0}.

(10) Set the COMPASS SIMULATOR on the AN/ARM-92B to the following headings 0°, 60°, 90°, 150°, 180°, 210°, 270°, and 330°.

The RMI pointer on the AN/ARM-92B must indicate 30° ±5° for all the above headings.

k. VOR Self-Test.

(1) Set up a standard VOR test signal.

(2) Set the PHASE ANGLE SELECTOR on the modulator to 0.

(3) Set the BEARING switch on the radio test set to OBS.

(4) Set the OBS control on the radio test set to 315°.

(5) Actuate the TEST switch on the radio test set CONTROL.

(6) The DEVIATION meter on the radio test set must indicate 0 ± 40 microampere. (Allow time for the meter to settle.)

(7) The TO-FROM meter on the radio test set must indicate at least 500 microampere to the left of zero.

(8) The FLAG meter on the radio test set must indicate 220 microampere minimum.

(9) The RMI pointer on the radio test set must point between 310 and 320 degrees.

(10) Release the TEST switch.

3-20. LOC Bench Tests

a. Test Setup. The LOC bench tests are performed with the same test setup as used for VOR bench tests (fig. 4-l).

b. Initial Switch Settings. The initial switch settings for the localizer bench tests are the same as for the VOR bench tests except that the radio teat set CONTROL frequency must be set to 110.10 MHz.

c. Standurd LOC Test Signal. The standard LOC test signal is an rf carrier amplitude modulated simultaneously with 90 ± 0.27 Hz and 150 ± 0.45 Hz so that the sum of the two modulation percentages equals 40 ± 2 per cent. When the test procedure calls for a standard LOC teat signal, proceed as follows:

(1) Set Power Supply PP-348/ARN POWER switch to ON.

(2) Set Signal Generator SG-lA/ARN controls as follows

(a) FREQUENCY to 110.10.

(b) OUTPUT LEVEL to lK (1000 microvolts).

(c) MOD RANGE to 30%.

(d) MOD to EXT.

(e) XTAL FREQ to 110.0 MC.

(3) Set Modulator MD-83A/ARN controls as follows:

(a) POWER to ON.

(b) TONE LOCALIZER to CAL 90~.

(c) 1000˜ to OFF.

(d) FUNCTION SELECTOR to TONE LOC.

(4) Set Radio Test Set AN/ARM-92B controls as follows:

(a) OFF/PWR/TEST to PWR.

(b) Frequency dial to 110.10.

(c) IND TEST to V/L RCVR.

(5) Set Audio Output Meter TS-585/U IMPEDANCE to X1, 150 and MULTIPLY by 10.

(6) Adjust SG-lA/ARN FREQUENCY dial for peak on RF MONITOR meter.

(7) Adjust SG-1A/ARN RF LEVEL control for redline indication on RF MONITOR meter.

(8) Adjust SG-lA/ARN MOD LEVEL control for 20 percent indication on PERCENT MODULATION

meter.

(9) Set MD-83A/ARN TONE LOCALIZER switch to CAL 150˜. The SG-lA/ARN PERCENT MODULATION meter should indicate 20%.

NOTE

If a 20 percent indication is not obtained in the preceding step, open the potentiometer door on the MD-83A/ARN front panel and adjust the 150˜ potentiometer for a 20% indication on the SG-lA/ARN PERCENT MODULATION meter.

(10) Set SG-lA/ARN MOD RANGE switch to 100%.

(11) Set MD-83A/ARN TONE LOCALIZER to 0.

d. LOC Centering Test.

(1) Set up a standard LOC test signal (para 3-20a, b, and c).

(2) The AN/ARM-92B DEVIATION meter shall indicate 0 ± 10 microamperes.

e. LOC Sensitivity Test.

(1) Set up a standard LOC teat signal.

(2) Set the MD-83A/ARN TONE LOCALIZER to 4DB (right side) for 90 Hz predomination.

(3) The AN/ARM-92B DEVIATION meter shall indicate between 70 and 110 microampere right of zero.

(4) Set the MD-83A/ARN TONE LOCALIZER to 4 DB (left side) for 150 Hz predomination.

(5) The AN/ARM-92B DEVIATION meter shall indicate between 70 and 110 microampere left of zero.

f. LOC Alarm Flag Test.

(1) Set up a standard LOC test signal (para 3-20a, b, and c).

(2) The AN/ARM-92B FLAG meter shall indicate 220 microamperes minimum.

(3) Set the MD-83A/ARN TONE LOCALIZER switch to CAL 150~.

(4) The AN/ARM-92B FLAG meter shall indicate 180 microampere or less.

(5) Set the MD-83A/ARN TONE LOCALIZER switch to CAL 90~.

(6) The AN/ARM-92B FLAG meter shall indicate 180 microampere or less.

3-21. Glideslope Bench Tests

a. Test Setup. The glideslope bench tests are performed with the test setup shown in figure 3-2. Standard 52-ohm coaxial cables with mating connectors are used for all rf and modulation interfaces. Adapter Cable CX-13034/AR connects the receiver to Radio Test Set AWARM-92B.

b. Initial Switch Settings. Before performing the glideslope section bench test procedures, the controls of all items of test equipment should be set as follows:

Radio Test Set AN/ARM-92B

OFF/PWR/TEST	OFF
MODE	400 HZ
BEARING control	0
BEARING switch	BRG
FLAG LOAD	4
SENS	LO
IND TEST	GS RCVR
DEVIATION	0
CONTROL frequency	109.30

Radio Test Set AN/ARM-5

POWER	STAND BY
OMNI TRACK	0
MODULATION	AMP LOC ⓓ
IDENTIFIER	OFF
ATTENUATOR	0
MC	B

Frequency Converter AN/ARM-69

POWER	OFF
FREQ MC	332.0

c. Glideslope Test Signal. The glideslope teat signal is an rf carrier amplitude-modulated 22.5 percent by a 90-Hz signal and 22.5 percent by a 150-Hz signal. The rf carrier supplied by Radio Teat Set AN/ARM-5 is converted in frequency by Frequency Converter AN/ARM-69. The two modulation signals can be varied in relative amplitude by the MODULATION and ATTENUATOR controls on the AN/ARM-5. The glideslope test signal is set upon the bench test equipment as follows:

(1) Set the AN/ARM-69 power switch to ON. The power lamp shall light.

(2) Set the AN/ARN-5 controls as follows

(a) POWER – STANDBY switch to POWER.

(b) MC switch to B.

(c) MODULATION switch to 90~.

(d) Adjust 90˜ MOD for 22.5 on %M meter.

(e) MODULATION switch to 150~.

(f) Adjust 150˜ MOD for 22.5 on %M meter.

(g) MODULATION switch to AMP LOC ⓓ. The %M meter should read approximately 40.

(3) Set the AN/ARM-69 FREQ MC switch to 332.0.

(4) Adjust RF LEVEL SET until LEVEL SET meter pointer is centered.

(5) Remove Cable CG-409/U (without attenuator) from the AN/ARM-5 RF OUTPUT 1 VOLT jack and connect to the RF OUTPUT ATTEN jack.

(6) Set AN/ARM-92B OFF/PWR/TEST switch to PWR.

d. Rf Sensitivity Test,

(1) Adjust the AN/ARM-5 ATTENUATOR to 50 microvolt.

(2) Set MODULATION switch to AMP LOC ⓓ.

(3) The AN/ARM-92B DEVIATION meter must indicator 90 ± 30 microamperes right of zero.

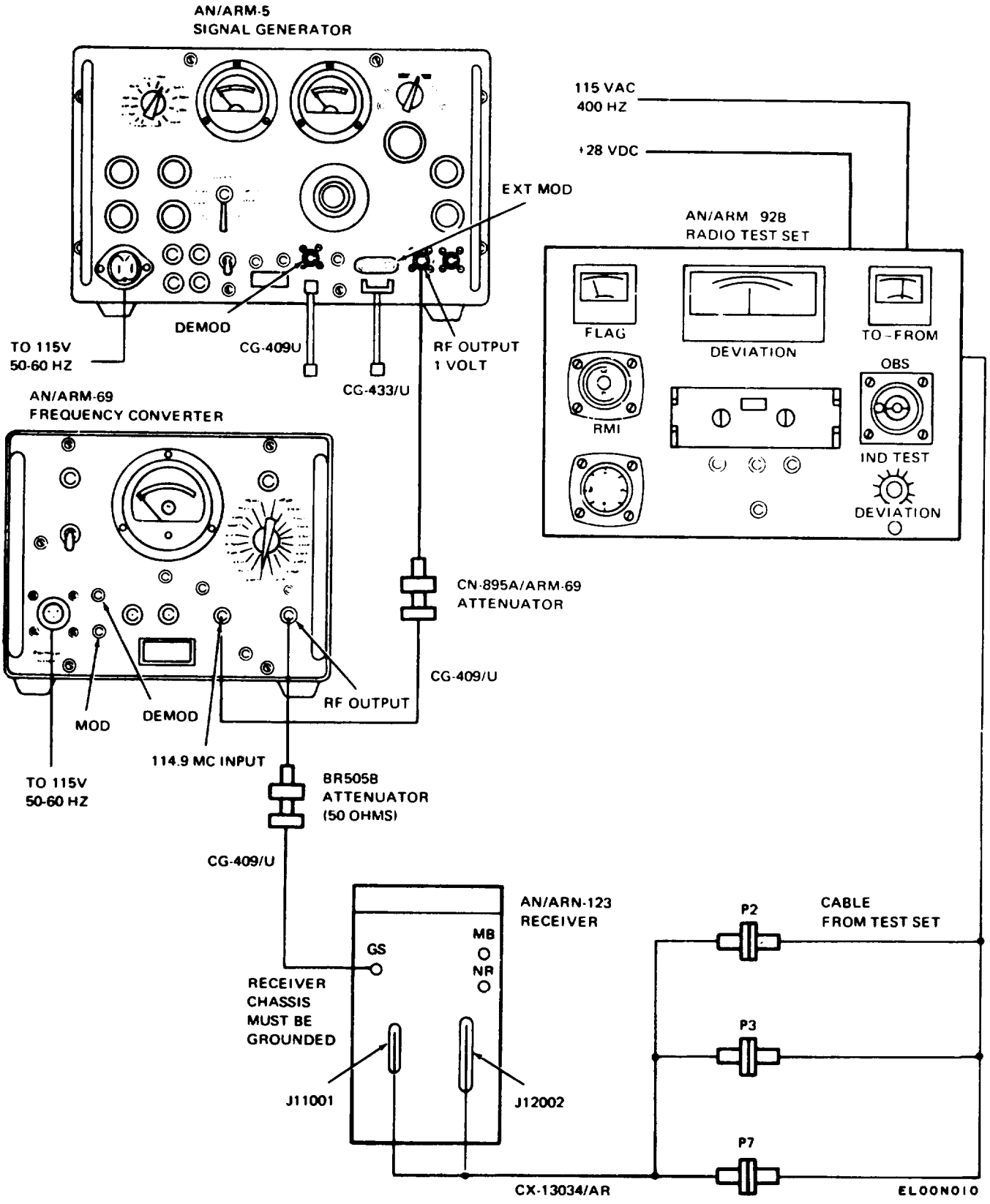


Figure 3-2. Bench Test Setup, Glideslope.

(4) Set AN/ARM-69 FREQ MC and AN/ARM-92B CONTROL frequency to each glide-slope channel in table 3-5 and verify the AN/ARM-92B DEVIATION meter reads 90 ± 30 microampere right of zero at each setting.

(5) Repeat the teat on all frequencies with the AN/ARM-5 MODULATION switch set to AMP LOC. The AN/ARM-92B DEVIATION meter must indicate 90 ± 30 microampere left of zero at each setting. Return the controls to 332.0 and 109.30.

e. Course Centering Test.

(1) Adjust the AN/ARM-5 ATTENUATOR to 700 microvolts.

(2) Set the AN/ARM-5 MODULATION switch to AMP LOC.

(3) The AN/ARM-92B DEVIATION meter must indicate 0 ± 30 microampere.

Table 3-5. *Frequency Pairs for Glideslope Sensitivity Test*

AN/ARM-92B Freq. sel. (MHz)	Sig. gen. freq. (mhz)	AN/ARM-92B freq. sel. (mhz)	Sig. gen. freq. (mhz)
108.10	334.70	110.10	334.40
108.30	334.10	110.30	335.00
108.50	329.90	110.50	329.60
108.70	330.50	110.70	330.20
108.90	329.30	110.90	330.80
109.10	331.40	111.10	331.70
109.30	332.00	111.30	332.30
109.50	332.60	111.50	332.90
109.70	333.20	111.70	333.50
109.90	333.80	111.90	331.10

f. Deflection Sensitivity Test.

(1) Adjust the AN/ARM-5 ATTENUATOR to 700 microvolts.

(2) Set the AN/ARM-5 MODULATION switch to AMP LOC.

(3) The AN/ARM-92B DEVIATION meter must indicate 90 ± 30 microampere right of zero.

(4) Set the AN/ARM-5 MODULATION switch to AMP LOC.

(5) The AN/ARM-92B DEVIATION meter must indicate 90 ± 30 microampere left of zero.

g. *Agc Response Test.*

(1) Adjust the AN/ARM-5 ATTENUATOR to 700 microvolt.

(2) Set the AN/ARM-5 MODULATION switch to AMP LOC.

(3) Note the reading on the AN/ARM-92B DEVIATION meter. The indication must be 90 ± 30 microamperes right of zero.

(4) Adjust the AN/ARM-5 ATTENUATOR slowly between 100 and 10,000 microvolt. The AN/ARM-92B DEVIATION meter must indicate within 30 microampere *of the* previously noted reading throughout the entire output level range.

h. Warning Signal Test.

(1) Adjust the AN/ARM-5 ATTENUATOR to 700 microvolt.

CAUTION

Disconnect Cables CG-409/U and CG-483/U from the AN/ARM-69 DEMOND and MOD jacks except while performing the warning signal teat. Maintain approximately 22.5 percent modulation (each tone) on the AN/ARM-5.

(2) Set the AN/ARM-5 MODULATION switch to 90˜.

(3) Adjust the AN/ARM-5 90˜ MOD control for 22.5 on %M meter. The AN/ARM-92B FLAG meter must indicate leas than 180 microampere.

(5) Adjust the AN/ARM-5 150˜ MOD control for 22.5 on %M meter. The AN/ARM-92B FLAG meter must indicate less than 180 microampere.

(6) Connect Cable CG-409/U between AN/ARM-5 DEMOD jack and AN/ARM-69 DEMOND jack.

(7) Connect Cable CG-433/U between AN/ARM-5 EXT MOD terminals and AN/ARM-69 MOD jack.

(8) Set the AN/ARM-5 MODULATION switch to AMP LOC.

(9) Set the AN/ARM-5 DEMOD adjust (screwdriver adjustment) for 80 on %M meter. The AN/ARM-92B FLAG meter must indicate 220 microampere minimum.

3-22. Marker Beacon Bench Tests

a. Test Setup. The marker beacon bench tests are performed with test setup shown in figure 3-3.

b. Initial Switch Settings. Before performing the marker beacon bench test procedures, set the controls of all items of teat equipment as follows

Radio Test Set AN/ARM-92B	
0FF/PWR/TEST	PWR
MODE	400 HZ
BEARING control	0
BEARING switch	BRG
FLAG LOAD	4
SENS	LO
IND TEST	GS RCVR
DEVIATION	0
CONTROL frequency	109.30
AUDIO	MB
Audio Oscillator AN/URM-127	
ATTENUATOR	X1
OUTPUT CONTROL	Midrange
FREQ. RANGE MULTIPLIER	X10
Frequency control dial	40
FREQ. METER switch	ON
POWER switch	ON
RF Signal Generator AN/USM-44	
Power switch	ON
ATTEN.	5 mv. (-33 dBm)
MOD SELECTOR	EXT MOD
FREQUENCY RANGE	C (42-90 MHz)
FREQUENCY	Adjust to 75 MHz (using

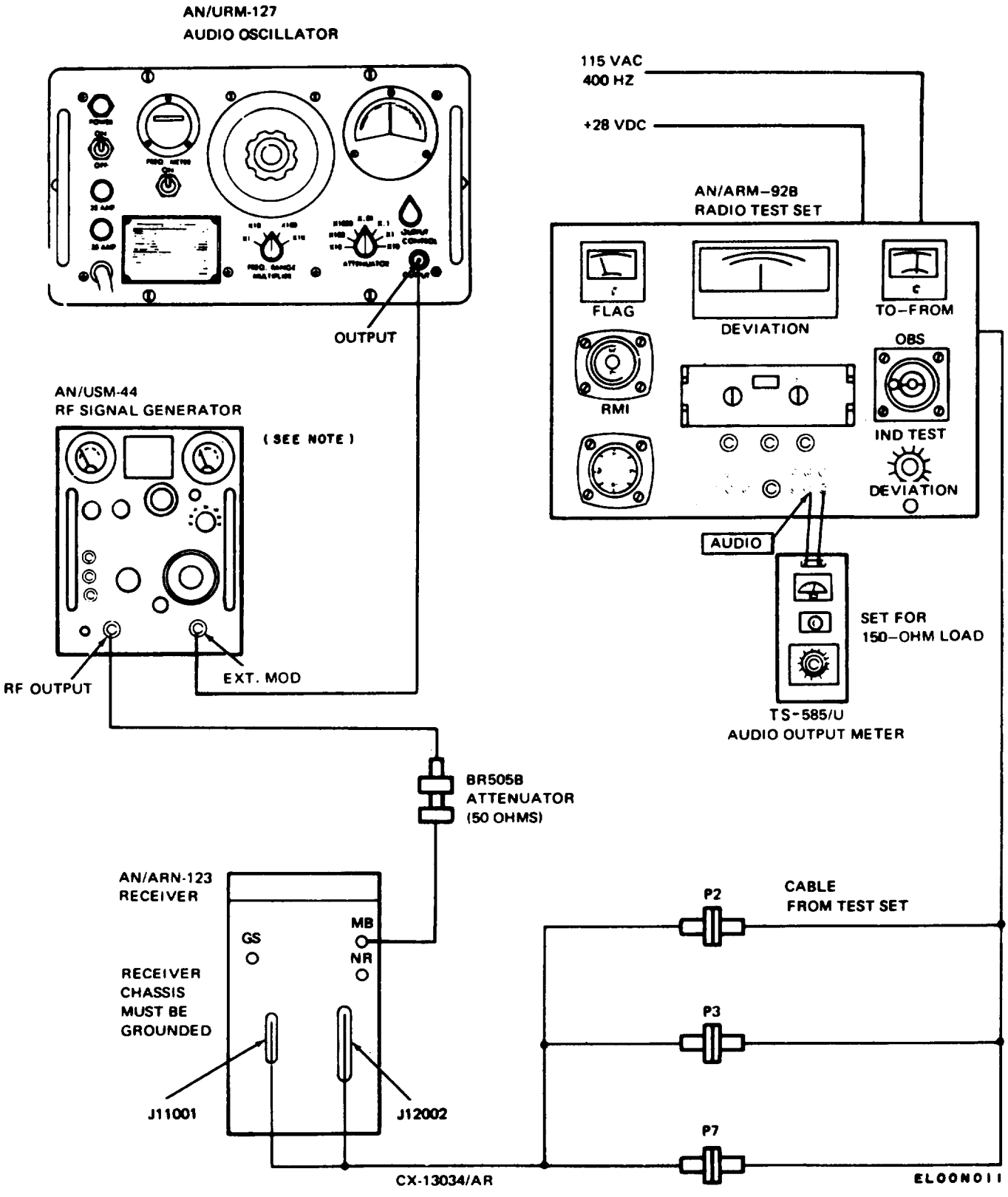


Figure 3-3. Bench Test Setup, Marker.

	Electronic Counter AN/USM-207 Digital Readout)
AMP. TRIMMER	Peak on meter
OUTPUT LEVEL	SET LEVEL (red arrow)
MOD LEVEL	80%
Audio Output Meter TS-585/U	
IMPEDANCE	X1, 150
MULTIPLY BY	10

c. Marker Test Signal. The marker test signal is a 75-MHz rf carrier amplitude-modulated 80 percent by a single tone of 400 Hz, 1300 Hz, *or* 3000 Hz.

d. Audio Output Power Test.

(1) Adjust the AN/USM-44 FREQUENCY control for a peak reading on Audio Output Meter TS-585/U.

(2) Adjust the AN/USM-44 ATTEN. dial until the blue lamp (outer) on the AN/ARM-92B glows dimly.

(3) Note the reading in millivolts on the AN/USM-44 ATTEN, dial; then adjust the ATTEN. dial to 10 times the noted reading.

(4) The TS-585/U must indicate at least 40 milliwatts.

e. Lamp Actuation Test.

(1) Adjust the AN/URM-127 frequency control to 40 (400 Hz).

(2) Adjust the AN/USM-44 ATTEN. dial to 50 millivolts

(3) The blue OUTER marker lamp on the AN/ARM-92B must light. The amber and white lamps must not light.

(4) Adjust the AN/URM-127 frequency control to 130 (1300 Hz).

(5) The amber MIDDLE marker lamp on the AN/ARM-92B must light. The blue and white lamps must not light.

(6) Set the AN/ARM-127 FREQ. RANGE MULTIPLIER to X100.

(7) Adjust the AN/URM-127 frequency control to 30 (3000 Hz).

(8) The white AIRWAY marker lamp on the AN/ARM-92B must light. The blue and amber lamps must not light.

f. Threshold Sensitivity Test.

(1) Set the AN/ARM-92B SENS switch to HI.

(2) Set the AN/URM-127 FREQ. RANGE MULTIPLIER to X10.

(3) Set the AN/URM-127 frequency control to 130 (1300HZ).

(4) Adjust the AN/USM-44 ATTEN. dial until amber lamp (middle) on AN/ARM-92B glows dimly.

(5) The rf output level indicated on the AN/USM-44 ATTEN. dial must be between 250 and 1000 microvolts.

(6) Set the AN/ARM-92B SENS switch to LO.

(7) Adjust the AN/USM-44 ATTEN. dial until amber lamp on AN/ARM-92B glows dimly.

(8) The rf output level indicated on the AN/USM-44 ATTEN. dial must be between 1.0 and 3.0 millivolts.

Section VII. ALTERNATE VOR/LOC BENCH TEST

3-23. General

This section presents an alternate VOL/LOC bench teat procedure using Radio Test Set AN/ARM-5A.

a. Test Setup. All VOR and LOC bench teats are performed according to the test setup in figure 3-4. Coaxial cables with 52-ohm characteristic impedance are used for all rf and modulation interfaces. Test set cable plugs P2, P3, and P7 mate with jacks J2, J3, and J7 on Receiver Adapter Cable CX-13034/AR. Plugs P11001 and P12002 on the receiver adapter cable connect to J11001 and J12002 on the receiver panel.

b. Initial Switch Settings. Before performing the VOL/LOC receiver section bench test procedures, set the controls of all items of test equipment as follows:

Radio Test Set AN/ARM-92B:

Control	*Setting*
OFF/PWR/TEST	PWR
MODE	400Hz
BEARING switch	BRG
BEARING control	0
COMPASS SIMULATOR	N(0 degrees)
FLAG LOAD	4
SENS	LO
IND TEST	V/L RCVR
DEVIATION	0

Control	*Setting*
AUDIO	V/L
OBS COURSE CARD	N(0°)
CONTROL frequency	114.90

Audio Output Meter TS-585/U:

Control	*Setting*
IMPEDANCE	X1, 150
MULTIPLY BY	100

Radio Test Set AN/ARM-5A:

Control	*Setting*
POWER	ON
OMNI TRACK	0
MODULATION	OMNI
IDENTIFIER	OFF
MC	B(114.90)
ATTENUATOR µV	lK
30˜ MOD	Full ccw
9960˜ MOD	Full ccw
90˜ MOD	Full ccw
150˜ MOD	Full ccw
RF meter	Adjust ZERO SET for 0.
%M (MODULATION) meter	Adjust ZERO SET for 0.
RF LEVEL SET	Adjust for red level set line
MODULATION	Set to 1000˜.
1000˜ MOD	Adjust for 30% (0-100 scale) on %M meter.

c. Test Procedure. After the test equipment has

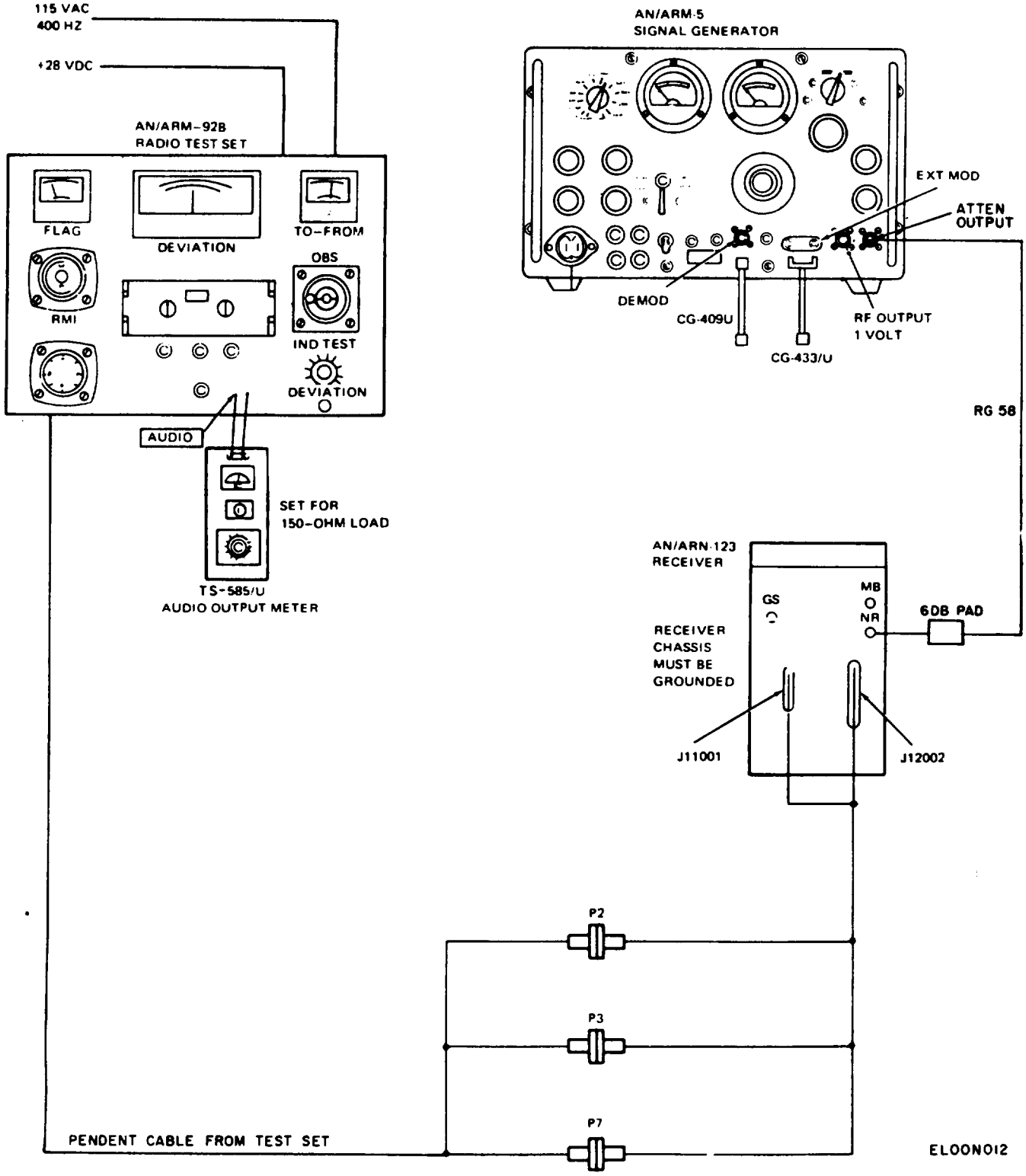


Figure 3-4. Bench Test Setup for VOR/LOC Tests usingAN/ARM-5A.

been setup and the controls set as in *b* above, make the following control settings on the AN/ARM-5A:

Control	*Setting*
MODULATION 9960˜ MOD	Set to 9960˜. Adjust for 30% (green arrow) on %M meter.
MODULATION 30˜ MOD	Set to 30˜. Adjust for 30% (green arrow) on %M meter.
MODULATION 90˜ MOD	Set to 90˜. Adjust for 20% (red dot) on %M meter.
MODULATION 150˜ MOD	set for 150˜. Adjust for 20% (red dot) on %M meter.

NOTE

Repeat adjustment of 90˜ MOD and 150˜ MOD until the same reading is obtained.

3-24 VOR Bench Tests

a. Rf Sensitivity Test.

(1) Set the AN/ARM-5A for a 5-microvolt output signal at 114.90 MHz modulated 30% by 1000 Hz as follows:

(a) Set ATTENUATOR µv control to 5.

(b) Set MODULATION control to 1000~.

(2) Note the TS-585/U meter reading in decibels,

(3) Turn the AN/ARM-5A MODULATION switch to EXT. The TS-585/U shall indicate at least 6 db lower than the noted reading.

NOTE

If unusual or defective receiver performance has been noted on a specific channel frequency, perform the rf sensitivity test on that frequency. Use the alternate rf sensitivity test given in paragraph 3-26.

b. Audio Output Test.

(1) Set the AN/ARM-5A for a lK µV output signal at 114.90 MHz modulated 10 percent by 1000 Hz.

(2) Set MODULATION control to 1000˜.

(3) Adjust 1000˜ MOD control for 10 percent modulation (0-100 scale).

(4) Set ATTENUATOR ˜V to 1k.

(5) The TS-585/U shall indicate at least 50 milliwatt.

c. Agc Flatness Test.

(1) Set AN/ARM-5A for a 1K-microvolt output signal at 114.90 Mz modulated 30 percent MHz by 1000 Hz.

(2) Set the AN/ARM-5A 1000˜ MOD control for 30 percent (0-100 scale).

(3) Note TS-585/U meter indication in db.

(4) Slowly vary the output of the AN/ARM-5A ATTENUATOR µV between 10 microvolt and 10K microvolt. The TS-585/U shall not vary more than ±10 db from the noted indication.

d. VOR Course Width Test.

(1) Set the MODULATION control on the AN/ARM-5A to OMNI.

(2) Set the AN/ARM-92B BEARING switch to OBS.

(3) Set the AN/ARM-92B OBS course card to N (North).

(4) Set the OMNI TRACK control on the AN/ARM-5A to 0.

(5) Set ATTENUATOR µV to 1K.

(6) Adjust the OBS knob on the AN/ARM-92B to zero (µa) indication on the DEVIATION meter.

(7) Note the OBS course card reading.

(8) Adjust the OBS knob on the AN/ARM-92B for a 150 (µa) right indication on the DEVIATION meter. The OBS course card reading must be -10° ± 3° from the reading in (7) above.

(9) Repeat (7) above for 150 (µa) left indication. The OBS course card shall be +10° ±3° from the reading (7) above.

e. VOR TO/FROM Ambiguity Test.

(1) Set the OBS control on the AN/ARM-92B to N.

(2) The TO-FROM meter on the AN/ARM-92B must indicate greater than 500 microampere to the left of zero.

(3) Set the AN/ARM-5A ATTENUATOR µv to 5.

(4) The TO-FROM meter on the AN/ARM-92B must indicate greater than 500 microamperes to the left of zero.

(5) REset the ATTENUATOR µv of the AN/ARM-5A to 1K.

(6) Set the OMNI TRACK switch on the AN/ARM-5A to 180°.

(7) The TO-FROM meter on the AN/ARM-92B must indicate greater than 500 microampere to the right of zero.

f. VOR Alarm Flag Test.

(1) Set the OMNI TRACK switch on the AN/ARM-5A to 0.

(2) Set the BEARING selector on the AN/ARM-92B to 0.

(3) Set the BEARING switch on the AN/ARM-92B to BRG.

(4) The FLAG meter on the AN/ARM-92B must indicate 220 microampere minimum.

(5) Set the MODULATION switch on the AN/ARM-5A to 30˜.

(6) The FLAG meter on the AN/ARM-92B must indicate 180 microampere or leas.

(7) Set the MODULATION switch on the AN/ARM-5A to 9960˜.

(8) The FLAG meter on the AN/ARM-92B must indicate 180 microampere or less.

g. VOR Runout Error Test.

(1) Set the MODULATION switch on the

AN/ARM-5A to OMNI.

(2) Set the BEARING selector on the AN/ARM-92B to 0.

(3) Set the OMNI TRACK switch on the AN/ARM-5A to 0.

(4) The DEVIATION meter on the AN/ARM-92B shall indicate zero ± 120 microampere (equivalent to ±5°).

(5) The RMI pointer on the AN/ARM-92B must indicate within 70 of the BEARING selector setting.

(6) Repeat (2) through (5) above substituting the following angles in (2) and (3) above:
30°, 60°, 90°, 120°, 150°, 180°, 210°, 240°, 270° 300°, and 330°

(7) Set the OMNI TRACK switch on the AN/ARM-5A to 30°.

(8) Set the COMPASS SIMULATOR on the AN/ARM-92B to the following settings
0°, 60°, 90°, 150°, 180°, 210°, 270°, and 330°.

(9) The RMI pointer on the AN/ARM-92B must indicate 30° ± 7° for all the above settings.

h. VOR Self-Test.

(1) Set the OMNI TRACK switch of the AN/ARM-5A to 0.

(2) Set the BEARING switch on the AN/ARM-92B to OBS.

(3) Set the OBS control on the AN/ARM-92B to 315°.

(4) Actuate the TEST switch on the AN/ARM-92B CONTROL panel.

(5) The DEVIATION meter on the AN/ARM-92B must indicate zero ±120 microampere. (Allow time for the meter to settle.)

(6) The TO-FROM meter on the AN/ARM-92B must indicate greater than 500 microampere to the left of zero.

(7) The FLAG meter on the AN/ARM-92B must indicate 220 microampere minimum.

(8) The RMI pointer on the AN/ARM-92B must point between 308 and 322 degrees.

(9) Release the TEST switch.

3-25. LOC Bench Tests

a. Test Setup. The LOC bench test are performed with the same test setup as used for VOR bench tests (fig. 3-4).

b. Initial Switch Settings. The initial switch settings for the localizer bench tests are the same as for the VOR bench tests except that the AN/ARM-92B CONTROL FREQUENCY must be set to 110.90 MHz.

c. The AN/ARM-5A is setup as described in paragraph 3-23b and c.

NOTE

Before performing the LOC bench tests, be sure the 90˜ and 150˜ modulation percentages are set to exactly 20 percent each. Set the AN/ARM-5A MC switch to A (110.9) MHz).

d. LOC Centering Test.

(1) Set the Modulation switch on the AN/ARM-5A to AMP LOC (↓).

(2) Set the ATTENUATOR µv control to 1K.

(3) The AN/ARM-92B DEVIATION meter shall indicate 0 ± 10 microampere.

e. LOC Deflection Sensitivity Test.

(1) Set the MODULATION switch on the AN/ARM-5A to AMP LOC (↙).

(2) The AN/ARM-92B DEVIATION meter shall indicate between 60 and 120 microampere left to zero.

(3) Set the MODULATION switch on the AN/ARM-5A to AMP LOC (↘).

(4) The AN/ARM-92B DEVIATION meter shall indicate between 60 and 120 microampere right to zero.

f. LOC Alarm Flag Test.

(1) Set the MODULATION switch on the AN/ARM-5A to AMP LOC (↓).

(2) The AN/ARM-92B FLAG meter shall indicate 220 microampere minimum.

(3) Set the MODULATION switch on the AN/ARM-5A to 150˜.

(4) The AN/ARM-92B FLAG meter shall indicate 180 microamperes or less.

(5) Set the MODULATION switch on the AN/ARM-5A to 90˜.

(6) The AN/ARM-92B FLAG meter shall indicate 180 microampere or leas.

3-26. VOR/LOC Receiver Sensitivity Test

This procedure provides an alternate test of the VOR/LOC receiver sensitivity for frequencies other than 114,90 MHz. The teat is performed with the test setup in figure 3-5,

a. Initial Switch Settings.

Radio Test Set AN/ARM-92B:

Control	*Setting*
OFF/PWR/TEST	PWR
MODE	400 Hz
BEARING switch	BRG
BEARING control	0
COMPASS SIMULATOR	N (0 degrees)
FLAG LOAD	4
SENS	L0
IND TEST	V/L RCVR
DEVIATION	0
AUDIO	V/L
OBS	N (0°)

Audio Output Meter TS-585/U:

Control	*Setting*
IMPEDANCE	Xl, 150
MULTIPLY BY	100

Signal Generator AN/USM-44:

Control	*Setting*
Power Switch	ON
Output Attenuator (control)	1.0 millivolt (-47 dBm)

Control	*Setting*
MOD. SELECTOR	1000
FREQUENCY RANGE (selector)	D
FREQUENCY	Desired frequency. Use AN/USM-207 to set frequency within 1 Khz.
AMP. TRIMMER	Peak on meter
OUTPUT LEVEL	SET LEVEL (red arrow)
MOD LEVEL	30%

b. Procedure. In the following procedure 108.00 megahertz is used as an example of a selected frequency; therefore, set the CONTROL frequency on the AN/ARM-92B to 108.00 Hz. Set the FREQUENCY control to 108.00 megaHertz using the AN/USM-207 to set within 1 KHz. Use this procedure to check VOR/LOC receiver sensitivity at following frequencies:

108.00	111.30	114.60	117.90
109.10	112.40	115.70	117.95
110.20	113.50	116.80	

(1) Check to see that there is audio output present on the TS-585/U.

(2) Set the Output Attenuator control on the AN/USM-44 for an indication of 5 microvolt on the OUTPUT VOLTS-DBM indicator.

(3) Note the indication on the TS-585/U meter.

(4) Turn the MOD. SELECTOR on the AN/USM-44 to CW.

(5) The indication on the TS-585/U meter shall be at least 6 db less than the indication in (3) above.

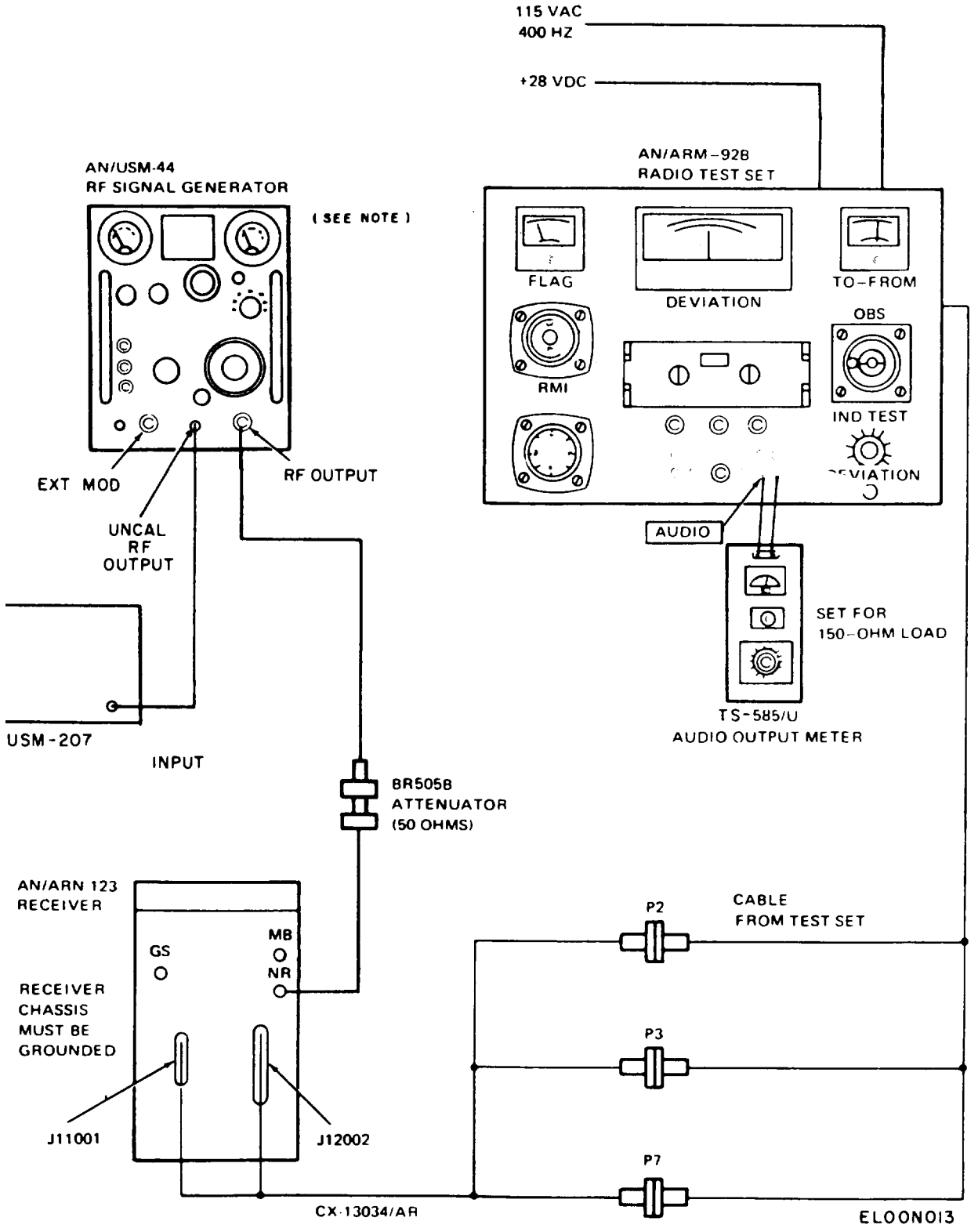


Figure 3-5. Bench Test Set, Alternate VOR/LOC Receiver Setsitivity Test.

APPENDIX A
REFERENCES

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8,and 9), Supply Bulletins, and Lubrication Orders
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
SB 11-641	Repair and Return Procedures under Reliability Improvement Warranty (RIW) for AN/ARN-123(V)1, Receiving Set, Radio and the R-1963/ARN, Receiver, Radio.
SB38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used by the Army.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-5017	Output Meters TS-585A/U, TS-585B/U, TS-585C/U, and TS-585D/U.
TM 11-5556	Signal Generator SG-13/ARN.
TM 11-6625-508-10	Operator's Manual: Signal Generators AN/USM-44 and AN/USM-44A.
TM 11-6625-522-14-2	Operator's, Organizational, and General Support Maintenance Manual: Test Oscillator BC-376P (FSN 6625-098-3668).
TM 1l-6625-588-15	Organizational, Direct Support, General Support, and Depot Maintenance Manual Including Repair Parts and Special Tool Lists: Modulator MD-83/ARN.
TM 1l-6625-636-12	Operator and Organizational Maintenance Manual: Converter, Frequency, Electronic AN/ARM-69,
TM 1l-6625-654-14	Operator's, Organizational, Direct Support, and General Support Maintenance Repair Parts and Special Tools Lists (Including Depot Maintenance Repair Parts and Special Tools Lists) for Multimeter AN/USM-223.
TM 11-6625-700-10	Operator's Manual: Digital Readout, Electronic Counter AN/USM-207.
TM 1l-6625-2709-12	Operator's and Organizational Manual: Test Set, Radio AN/ARM-92B.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 55-1500-323-25	Organizational, DS, GS, and Depot Maintenance Manual: Installation Practices for Aircraft Electric and Electronic Wiring.
TM 740-90-1	Administrative Storage of Equipment.

APPENDIX B
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

B-1. General

This appendix provides a summary of the maintenance operations for AN/ARN-123(V). 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, lubricant, 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 teat 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. This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes,

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

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

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, teat, 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 (Sect. III)

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

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

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

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

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

B-5. Remarks (Sect. IV)

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

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

(Next printed page is B-3)

SECTION II MAINTENANCE ALLOCATION CHART
FOR
AN/ARN-123(V)

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
00	RADIO RECEIVING SET AN/ARN-123(V)1	Test		0.2				2.3	A
		Repair		0.2				1	
		Inspect		0.1					
0 1	RADIO RECEIVER R-2023/ARN-123(V)	Inspect			0.1				
		Test			0.2			4 thru 14	
		Replace		0.2				1	B
		Repair							
02	RECEIVER CONTROL C-10048/ARN-123(V)	Inspect			0.1				
		Test			0.2			4 thru 14	
		Replace		0.2				1	
		Repair		0.2					C
03	MOUNTING BASE. ELECTRICAL EQUIPMENT MT-4834/ARN-123(V)	Inspect		0.1					
		Replace		0.1				1	
		Repair							B
00	RADIO RECEIVING SET AN/ARN-123(V)3	Test		0.2				2. 3	A
		Repair		0.2				1	
		Inspect		0.1					
01	RADIO RECEIVER R-2023/ARN-123(V)	Inspect			0.1				
		Test			0.2			4 thru 14	
		Replace		0.2				1	B
		Repair							
02	RECEIVER CONTROL C-10048/ARN-123(V)	Inspect			0.1				
		Test			0.2			4 thru 14	
		Replace		0.2				1	
		Repair		0.2					C
03	MOUNTING BASE, ELECTRICAL EQUIPMENT MT-4980/ARN-123(V)	Inspect		0.1					
		Replace		0.1				1	
		Repair							B
00	RADIO RECEIVING SET AN/ARN-123(V)4	Test		0.2				2.3	A
		Repair		0.2				1	
		Inspect		0.1					
01	RADIO RECEIVER R-2139/ARN-123(V)	Inspect			0.1				
		Test			0.2			4 thru 14	
		Replace		0.2				1	B
		Repair							
02	RECEIVER CONTROL C-10048/ARN-123(V)	Inspect			0.1				
		Test			0.2			4 thru 14	
		Replace		0.2				1	
		Repair		0.2					C
03	MOUNTING BASE ELECTRICAL EQUIPMENT MT-4834/ARN-123(V)	Inspect		0.1					
		Replace		0.1				1	
		Repair							B

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR AN/ARN-123(V)

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	TOOL KIT, ELECTRONIC EQUIPMENT TK-101/G	5180-00-064-5178	
2	O	SIGNAL GENERATOR SG-13/ARN	6625-00-539-8575	
3	O	TEST OSCILLATOR BC-376( )	6625-00-519-2408	
4	F,H	TEST SET, RADIO AN/ARM-92B	6625-00-631-5501	
5	F,H	SIGNAL GENERATOR SG-1A/ARN	6625-00-649-4636	
6	F,H	SIGNAL GENERATOR AN/USM-44( )	6625-00-669-4031	
7	F,H	SIGNAL GENERATOR AN/URM-127	6625-00-783-5935	
8	F,H	TEST SET AN/ARM-5A	6625-00-669-0272	
9	F,H	CONVERTER, FREQUENCY, ELECTRONIC AN/ARM-69	6625-00-082-4281	
10	F,H	TOOL KIT, ELECTRONIC EQUIPMENT TK-100/G	5180-00-605-0079	
11	F,H	DIGITAL READOUT, ELECTRONIC COUNTER, AN/USM-207	6625-00-911-6368	
12	F,H	OUTPUT METER TS-585	6625-00-244-0501	
13	F,H	MULTIMETER AN/USM-223	6625-00-999-7465	
14	F,H	MODULATOR MD-83A/ARN	6625-00-539-8563	

SECTION IV. REMARKS
AN/ARN-123(V)

REFERENCE CODE	REMARKS
A	Repair is accomplished by replacing defective LRU.
B	Repair is accomplished by contractor under terms of a Reliability Improvement Warranty.
C	Repair is limited to replacement of knobs, front panel assembly, lamps. All other repair accomplished by contractor under terms of a Reliability Improvement Warranty.

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

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Stateside Army Depot
ATTN: AMSTA-US
Stateside. N.J. 07703

DATE 10 July 1975

PUBLICATION NUMBER	DATE	TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/[illegible]C-76

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PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			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 [illegible] 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.
3-10	3-3		3-1	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.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		F03		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.

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER	SIGN HERE:
SSG I. M. DeSpiritof 999-1776	SSG I. M. DeSpiritof

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