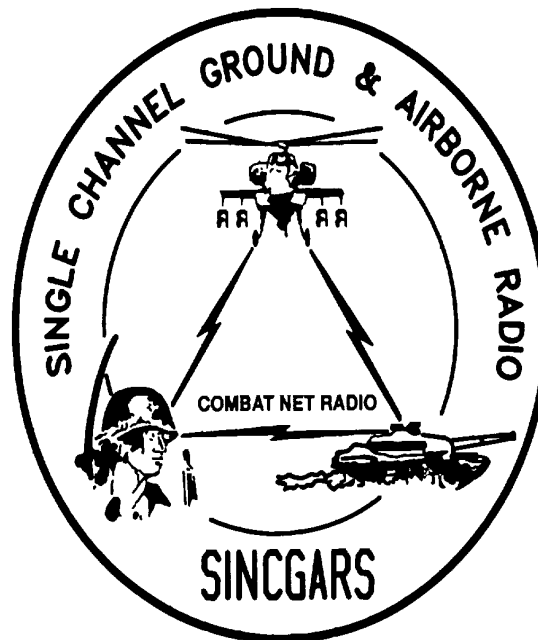


TECHNICAL BULLETIN



**INSTALLATION INSTRUCTIONS FOR
INSTALLATION KIT,
ELECTRONIC EQUIPMENT, MK-2377/VRC
(NSN 5895-01-225-0517) (EIC: N/A)
TO PERMIT INSTALLATION OF RADIO SETS
AN/VRC-87A/88A/90A
IN A CARRIER, PERSONNEL,
FULL TRACKED, ARMORED, M113/A1/A2
IN CONJUNCTION WITH MK-2376/VRC
(AN/VRC-89A/91A)
FOR ADA FUNCTIONS**

Approved for public release; distribution is unlimited.

HEADQUARTERS, DEPARTMENT OF THE ARMY

1 SEPTEMBER 1993

**INSTALLATION INSTRUCTIONS FOR INSTALLATION KIT
ELECTRONIC EQUIPMENT MK-2377NRC
(NSN: 5895-01-225-0517) (EIC: N/A)
TO PERMIT INSTALLATION OF
RADIO SETS AN/VRC-87A/88A/90A
IN A
CARRIER, PERSONNEL, FULL TRACKED, ARMORED, MI 13/A1/A2
IN CONJUNCTION WITH MK-2376NRC (AN/VRC-89A/91A SERIES) FOR ADA FUNCTIONS**

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual direct to: Commander, US Army Communications Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LM-LT, Fort Monmouth, New Jersey 07703-5007.

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

TABLE OF CONTENTS

Subject	Section	Page
Scope	0.1	1
General Information	0.2	1
Maintenance Forms, Records, and Reports.....	0.3	1
Reports of Maintenance and Unsatisfactory Equipment.....	0.3.1	1
Report of Packing and Handling Deficiencies.....	0.3.2	1
Discrepancy in Transportation Deficiency Report (TDR) (SF 361)	0.3.3	1
Consolidated Index of Army Publications	0.4	1
Purpose of Installation.....	1	2
End Item or System to be Modified	2	2
Application Times.....	3	2
Time for Completion of Installation.....	3.1	2
Time for Installation of One Assembly or Component.....	3.2	2
Preparation for Installation	4	2
Preparation of Vehicle.....	4.1	2
Preparation of MK.....	4.2	2
MK, Distribution, and Consumables.....	4.3	3
Tools and Test, Measurement, and Diagnostic Equipment (TMDE) Required	4.4	7
Installation Procedures.....	5	8
Installation of Antenna AS-3900NRC (antenna).....	5.1	10
Installation of Antenna Base.....	5.1.1	10
Installation of Top Antenna Assembly.....	5.1.2	11
Installation of Mounting Base, Electrical Equipment MT-6352/VRC (mounting base).....	5.2	12
Installation of Loudspeaker, Permanent Magnet LS-454/U (speaker).....	5.3	14
Installation of Cables.....	5.4	15
Post-Installation and Checkout	5.5	17
Appendix A References.....		A-1

LIST OF ILLUSTRATIONS

Figure	Title	Page
4-1(1)	MK Illustrated Parts List	5
4-1(2)	MK Illustrated Parts List	6
5-1(1)	MK and Radio Installation: MK Equipment Locations.....	8
5-1(2)	MK and Radio Installation: Radio Equipment Locations.....	9
5-2(1)	Antenna Base Installation.....	10
5-2(2)	Top Antenna Assembly Installation.....	11
5-3	Mounting Base Installation	13
5-4(1)	Speaker Installation - A	14
5-4(2)	Speaker Installation - B	14
5-5	Installation of Cables.....	16
5-6	Cable Diagram: For AN/VRC-87A/88A/90A.....	18

LIST OF TABLES

Table	Title	Page
4-1	Parts List for Installation of Radio Set AN/VRC-87A/88A/90A Series.....	4

0.1 SCOPE.

This technical bulletin provides installation instructions for Installation Kit, Electronic Equipment MK-2377NRC, commonly referred to as the Mounting Kit (MK). The MK shall be installed into the following type of vehicle(s):

- Carrier, Personnel, Full Tracked, Armored, M113, AI, A2

The MK is used for installation of radio set components at field locations. The information contained in this technical bulletin is the official authorization to perform the installation at the unit maintenance level.

NOTES

- **This technical bulletin is not an authorization for requisition or turn-in of vehicles.**
- **This technical bulletin does not establish quantity or types of vehicles assigned to using units.**

This technical bulletin does not contain information on the maintenance or replacement of the MKs. This information is contained in the MAC of TM 11-5820-890-20-2, TM 11-5820-890-204 and RPSTL of TM 11-5820-890-20P.

0.2 GENERAL INFORMATION.

The MK becomes operable when all the radio set components are installed in the vehicle and correct power is supplied. Refer to TM 11-5820-890-20-1 or TM 11-5820-890-20-4 for installation, Operational (OP) Check instructions, and required maintenance procedures. Refer to TM 11-5820-890-20P for repair parts.

Included in the radio set is:

- AN/VRC-87A/88A/90A (for RT-1523(C)/IU)

0.3 MAINTENANCE FORMS, RECORDS, AND REPORTS.

0.3.1 Reports of Maintenance and Unsatisfactory Equipment. See Section 4.2.2.3 for information.

0.3.2 Report of Packing and Handling Deficiencies. See Section 4.2.2.1 for information.

0.3.3 Discrepancy In Transportation Deficiency Report (TDR) (SF361). See Section 4.2.2.2 for information.

0.4 CONSOLIDATED INDEX OF ARMY PUBLICATIONS.

Refer to the latest issue of DA Pam 25-30 to determine whether there are new changes, or additional publications pertaining to the equipment.

1. PURPOSE OF INSTALLATION.

The Installation Kit Electronic Equipment MK-2377/VRC (MK) contains the items needed to mount Radio Set AN/VRC-87A/88A/90A in a Carrier, Personnel, Full Tracked, Armored, M113, A1/A2 (vehicle), and is used with MK-2376 to replace an AN/VRC-48.

2. END ITEM OR SYSTEM TO BE MODIFIED.

Not applicable.

3. APPLICATION TIMES.

3.1 Time for Completion of Installation. Using two people, a total of 4.5 work hours is required. Typical vehicle downtime is 4.5 hours.

3.2 Time for Installation of One Assembly or Component. The following table lists the time required to install one component. All times have been rounded off to the nearest half hour. The sum of these items will not reflect the typical vehicle downtime.

ITEM	SECTION	TIME
Antenna AS-3900/VRC	5.1	0.5
Mounting Base, Electrical Equipment MT-6352/NRC	5.2	0.5
Cables	5.3	1.0

4. PREPARATION FOR INSTALLATION.

This section explains how to prepare the vehicle and MK for installation.

4.1 Preparation of Vehicle. To prepare the vehicle for installation, insure that the site includes adequate lighting and a power source when drilling is required. Inspect the vehicle for damage that could affect installation. Have any such damage repaired before installing MK.

4.1.1 Items to be Removed. Remove existing AN/VRC-12 radio family installation kit/harness. See TM 11-5820-401-20-2 for removing items used with intercom systems, or TM 11-5820-401-20-1 (used without intercom systems), and TM 9-2320-289-20.

4.1.2 Items to be Retained. Not applicable.

4.2 Preparation of MK. To prepare MK, unpack, inspect and check inventory.

4.2.1 Precautions During Handling. Observe these steps to prevent equipment damage.

- a. Keep dust cover in place on connectors.
- b. Do not disassemble or modify parts in MK unless authorized to do so.
- c. Keep mounting hardware covered and protected until needed.
- d. When exposed to moisture, rain or salt water, keep all parts dry to prevent corrosion.

4.2.2 Unpack and Inspect Equipment.

4.2.2.1 Inspect Packaging for Evidence of Damage. Any shipping damage should be reported on SF364 Report of Discrepancy (ROD) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR 400-64/MCO 4430.3F.

4.2.2.2 Unpack and Inventory MK. If any item is missing, fill out and forward Transportation Deficiency Report (TDR) (SF361) as described in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

4.2.2.3 Examine Each Item for Damage. If any item is damaged, fill out and forward SF364 Report of Discrepancy (ROD) as prescribed in AR 735-11-2/DLAR 4140.55/NAVMATINST 4355.73A/AFR-400-64/MCO 4430.3F. All damages should be reported as prescribed in DA Pam 738-750, as contained in Maintenance Management Update.

4.3 MK, Distribution and Consumables.

4.3.1 Items Supplied In MK and/or Required for Installation. Use Table 4-1 and Figure 4-1 to identify and inventory MK parts.

4.3.2 Distribution and Issue Instruction

- a. US Forces: Do not requisition MK. They will be shipped automatically.
- b. US Army Depots: Requisition MK through supply channels.
- c. Multiservice: Instructions shall be included for multiservice modifications.
- d. MAPIMAS Countries: Instructions shall be provided for MAP/MAS countries.

Table 4-1. Parts List for Installation of Radio Set AN/VRC-87A188A/90A

NSN	ITEM DESCRIPTION AND PART NUMBER	QUANTITY IN MK	SMR CODE	FIGURE ITEM NO.	
5985-01-297-2971	Antenna, Vehicular AS-3900NRC (A3017899-1)	1	PAOOF A	4-1, 2	
5305-00-847-1159	Screw, Cap, Hexagon (3/8-16 x 1 3/4 in) MS35307-365	4	PAOZZA		
5310-00-913-8881	Nut, Hexagon (3/8-16 in) MS51971-3 (Not Used)	4	PAOZZA	4-1, 1	
5310-00-061-1258	Washer, Lock, Internal / External-Toothed (3/8 in) MS45904-76 (Not Used)	8	PAOZZA		
5310-00-889-2527	Washer, Lock, Internal /External-Toothed (5/16 in) MS45904-72	2	PAOZZA		
5306-00-225-9086	Bolt, Machine (5/16-24 x 5/8 in) MS90726-31 (Not Used)	1	PAOZZA		
5330-01-205-2864	Gasket (A3013655-1)	1	PAOZZA		
5975-01-188-8873	Mounting Base, Electrical Equipment MT-6352/VRC (A3013367-1)	1	PAOOF A		
5306-00-225-9089	Screw, Cap, Hexagon (5/16-24 x 1 in) MS90726-34	5	PAOZZA		
5310-00-889-2527	Washer Lock, Internal /External-Toothed (5/16 in) MS45904-72	10	PAOZZA		
5310-00-880-7746	Nut, Hexagon (5/16-24) MS51968-5	5	PAOZZA		
5965-00-043-3463	Handset, H-250/U	1	PAOZZA		4-1, 7
5965-00-876-2375	Loudspeaker, Permanent Magnet LS-454/U	1	PAOZZA		4-1, 6
5995-01-226-2436	Cable Assembly, Power Electrical CX-13306/VRC (4 FT, 0 IN) (A3014043-7)	1	PAOZZA		4-1, 4
5995-01-219-7029	Cable Assembly, Radio Frequency CG-3855NRC 5 FT, 0 IN) (A3014031-2)	1	PAOZZA		4-1, 5
4020-01-341-8795	Fiber Rope Assembly A3167672-1	1	PAOZZA		4-1, 3
5975-00-111-3208	Strap, Tiedown, Electrical Components MS3367-5-9	10	PAOZZA		
5305-01-090-3012	Screw, Tapping, Thread-cutting (5/16-18 x 3/4 in) MS51851-106	1	PAOZZA		

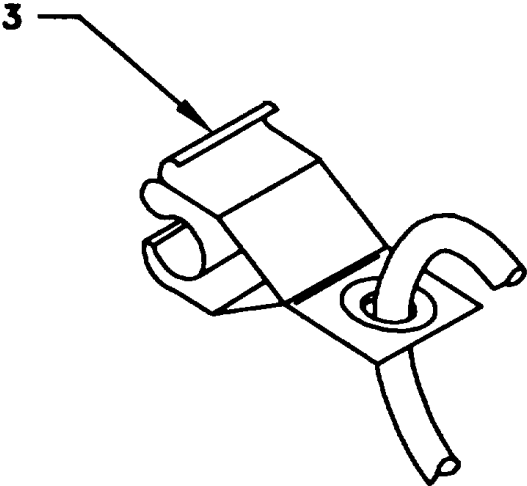
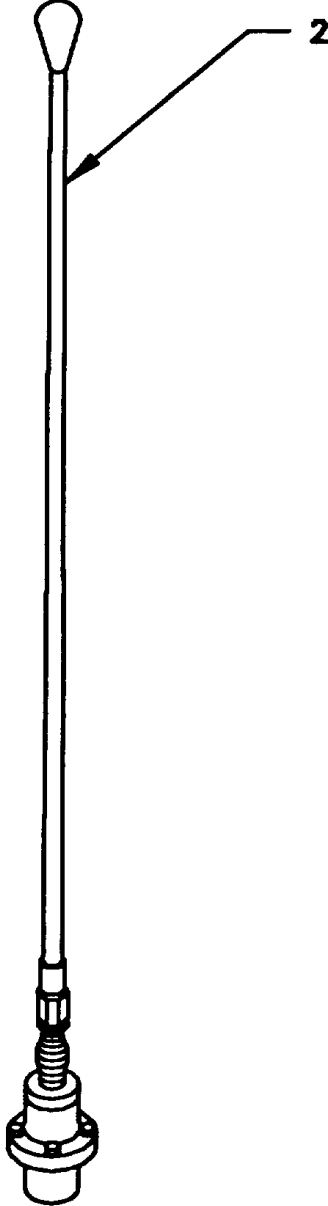
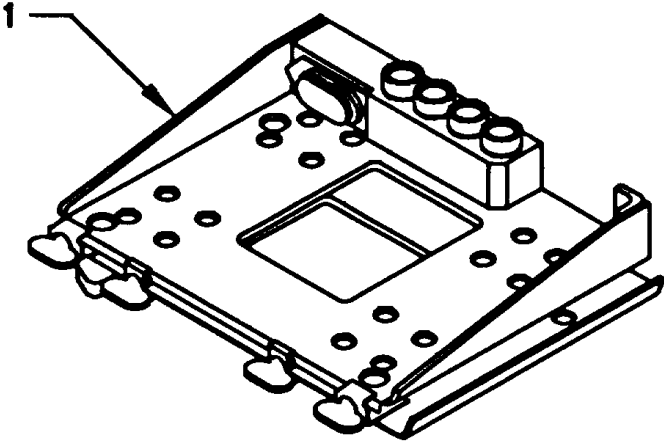


Figure 4-1(1). MK Illustrated Parts List

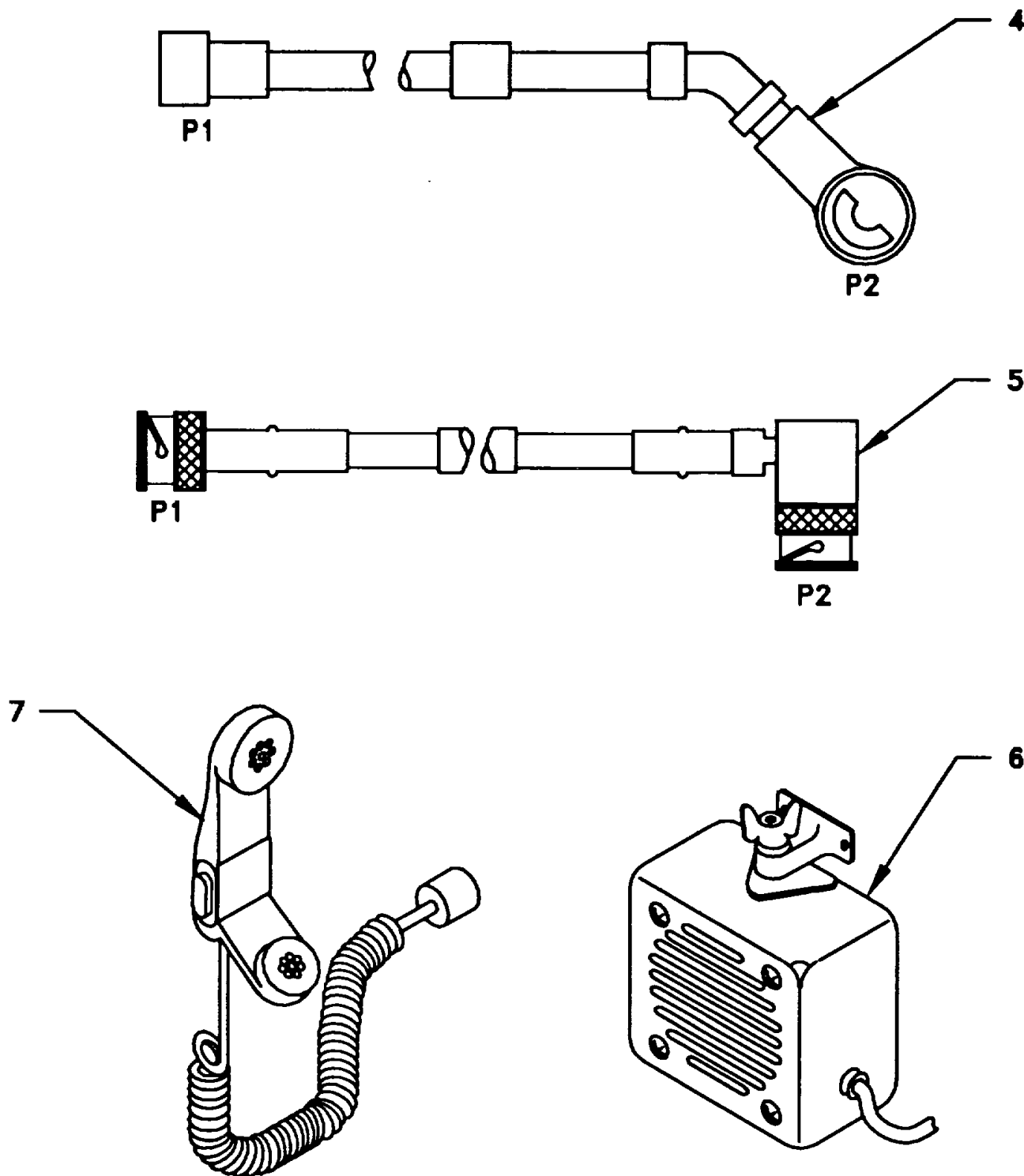


Figure 4-1(2). MK Illustrated Parts List

4.3.3 Consumable Materials. The table below lists materials required for installation but not supplied with MK.

NSN	NOMENCLATURE
8040-00-117-8510 6850-00-880-7616	Adhesive-Sealant, Clear, RTV Silicone Compound, MIL-S-8660

4.4 Tools and Test, Measurement, and Diagnostic Equipment (TMDE) Required. The following tools and TMDE are needed for installation.

NOMENCLATURE	NSN	QUANTITY
Radio Set*		1
Pocket Knife, Electrician's	5110-00-240-5943	1
Screwdriver, No. 2 Point Phillips, 4 in	5120-00-234-8913	1
Screwdriver, 1/4 in Flatbed, 4 in	5120-00-222-8852	1
Pliers, Round Nose	5120-00-240-6172	1
Pliers, Diagonal Cutting	5110-00-965-0974	1
Wrench, Open/Box:		
1/2 in	5120-00-228-9506	1
9/16 in	5120-00-228-9507	1
Handle, Socket Wrench:	5120-00-240-5364	1
Socket: 1/2 in	5120-00-237-0977	1
9/16 in	5120-00-227-6704	1
Electric Drill	5120-00-889-8994	1
Drill Bit: 3/8 in	5133-00-227-9666	1
13/32 in	5133-00-227-9668	1
5/16 in	5133-00-227-9662	1

*Use radio issued with your vehicle if available.

5. INSTALLATION PROCEDURES.

This section describes where and how to install MK items in the vehicle. See Figure 5-1 for an overall view of where the MK equipment, as well as radio components, will be installed. When installing MK equipment, be sure to read and follow instructions and illustrations carefully.

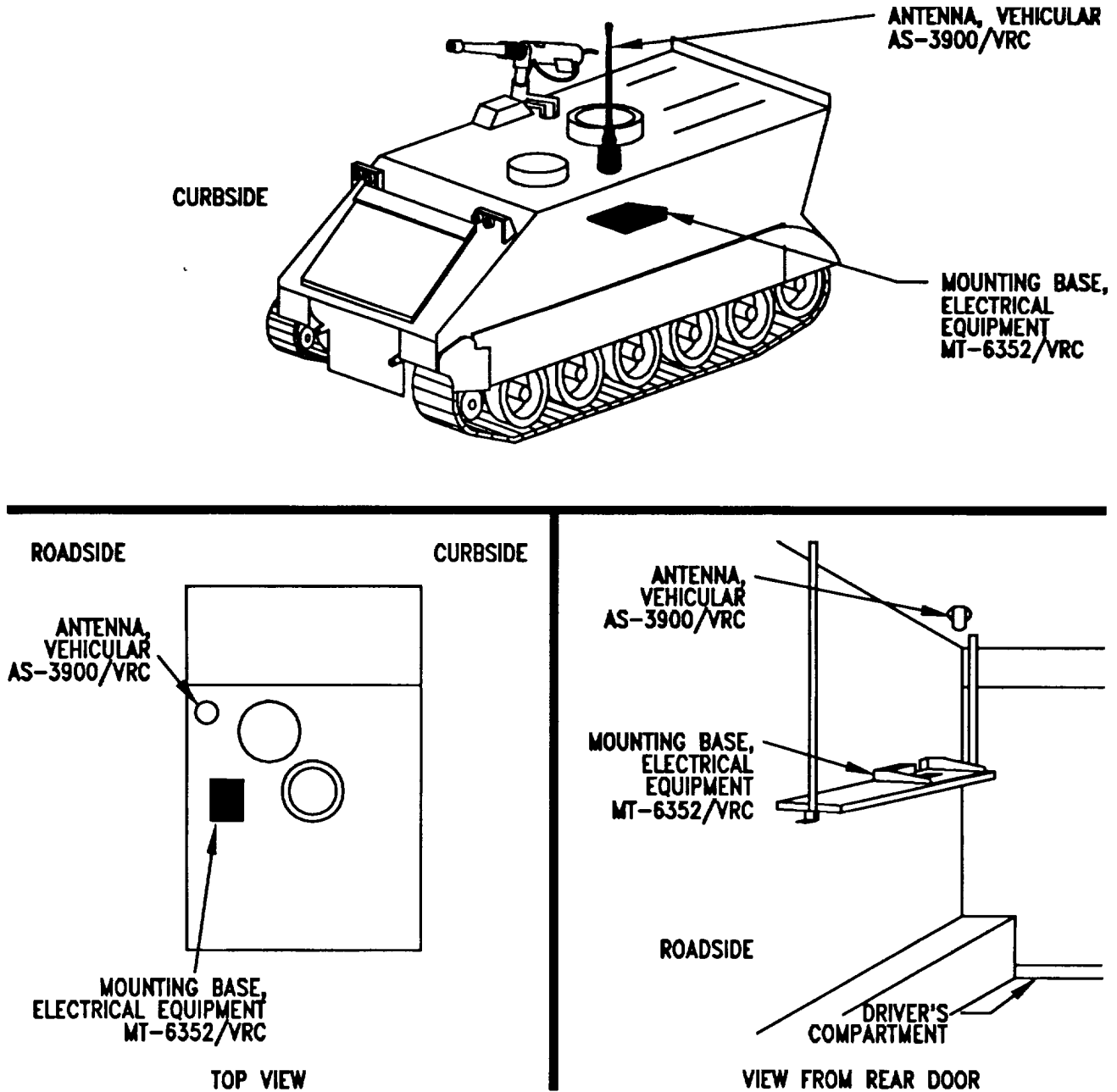
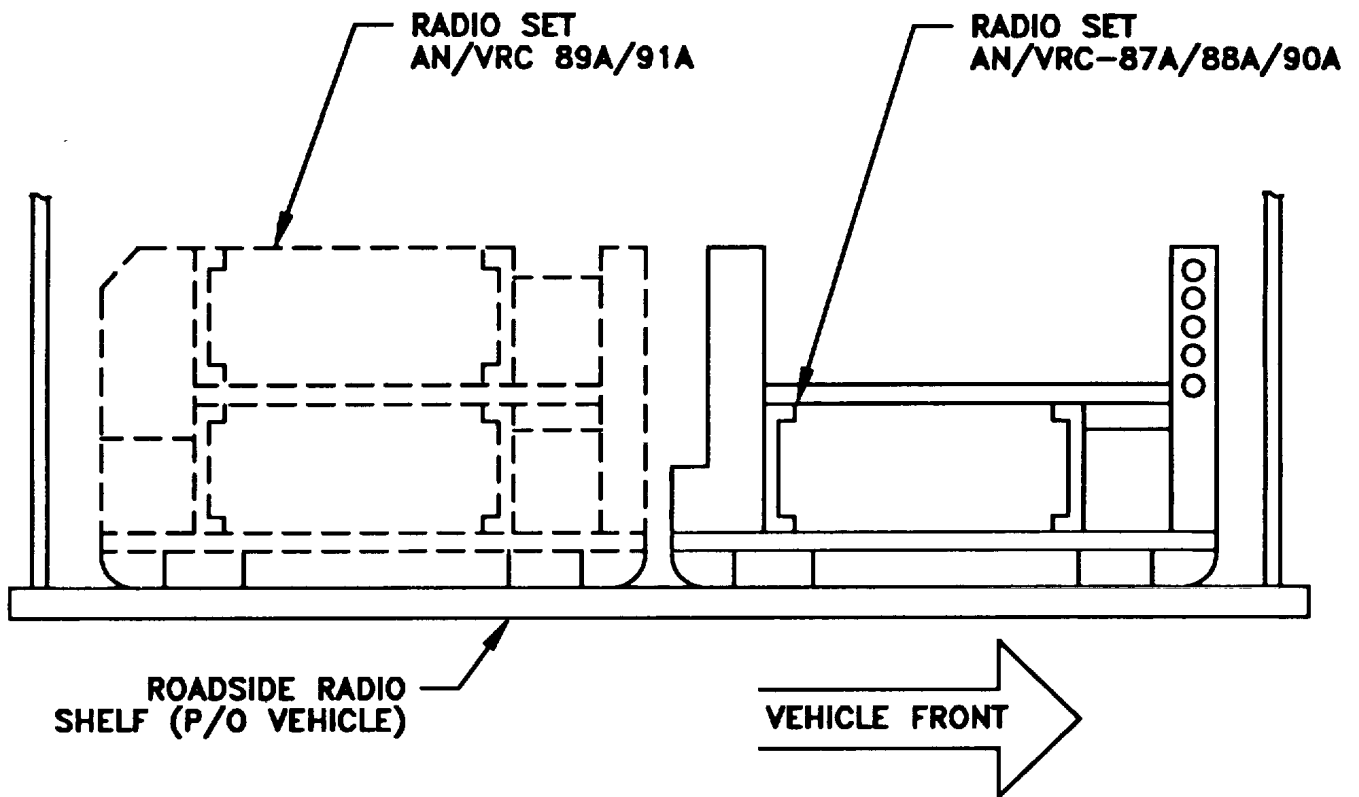


Figure 5-1(1). MK and Radio Installation: MK Equipment Locations

5. INSTALLATION PROCEDURES. Continued.



NOTE: AN/VRC-89A/91A INSTALLED USING MK-2376

ROADSIDE

Figure 5-1(2). MK and Radio Installation: Radio Equipment Locations

5.1 Installation of Antenna, Vehicular AS-3900/VRC (antenna).

5.1.1 Installation of Antenna Base. Use this procedure to install the antenna base at location shown in Figure 5-1(1).

ITEM	ACTION	REMARKS
<p>NOTE Apply a thin coat of adhesive-sealant to both sides of each internal /external-toothed (IET) washer during installation, and to the area of contact where IET washer is to be placed.</p>		
a. Existing port cover and	Remove. See Figure 5-1(1) for location. gasket.	
b. Gasket (3)	Apply thin coat of silicone compound to both sides. Place on port and align with mounting holes. See Figure 5-2(1).	
c. Antenna base (7).	Place on top of gasket (3) and port. Align mounting holes.	
d. Four cap screws (1) and four internal / external-toothed (IET) washers (2).	Install and secure	Tools: 9/16 in open /box wrench.
e. Ground strap (6), tapping screw (5) and two IET washers (2).	Install and secure to existing boss.	Tools: 1/2 in open/box wrench.

- 1. CAP SCREW (3/8-16 X 1 3/4 IN)
- 2. IET WASHER (3/8 IN)
- 3. GASKET
- 4. IET WASHER (5/16 IN)
- 5. TAPPING, THREAD-CUTTING SCREW (5/16-18 X 3/4 IN)
- 6. GROUND STRAP
- 7. ANTENNA BASE

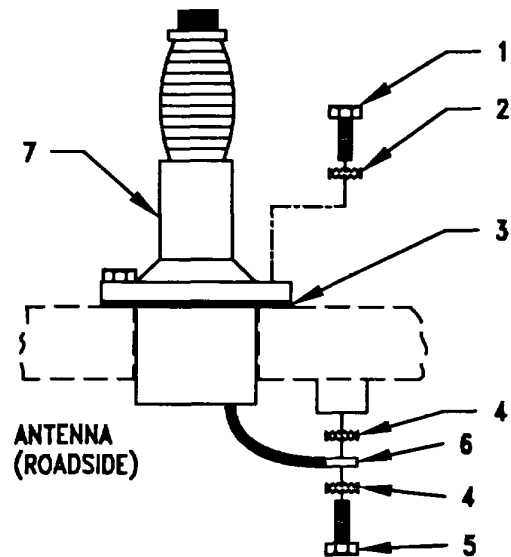
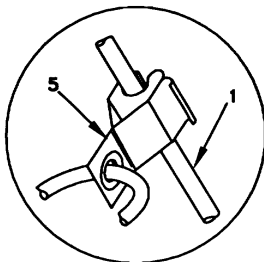


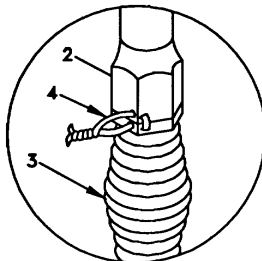
Figure 5-2(1). Antenna Base Installation

5.1.2 Installation of Top Antenna Assembly. The top portion of the antenna includes a lower element and an upper element (with installed cap). Use the following procedure to assemble, install and tie down all antennas.

ITEM	ACTION	REMARKS
a. Antenna elements (1,2)	Apply silicone compound to element threads and assemble See Figure 5-2(2).	
b. Antenna element (2)	Install and hand-tighten to antenna base (3).	
c. Lock wire (4)	Install to antenna element (2) and antenna base (3). See Figure 5-2(2), Detail A. Cut and remove excess with diagonal cutting pliers	
d. Fiber rope assembly (5)	Attach clip to antenna element (1). Tie rope to vehicle to position antenna in desired location. See Figure 5-2(2), Detail B.	



DETAIL B



DETAIL A

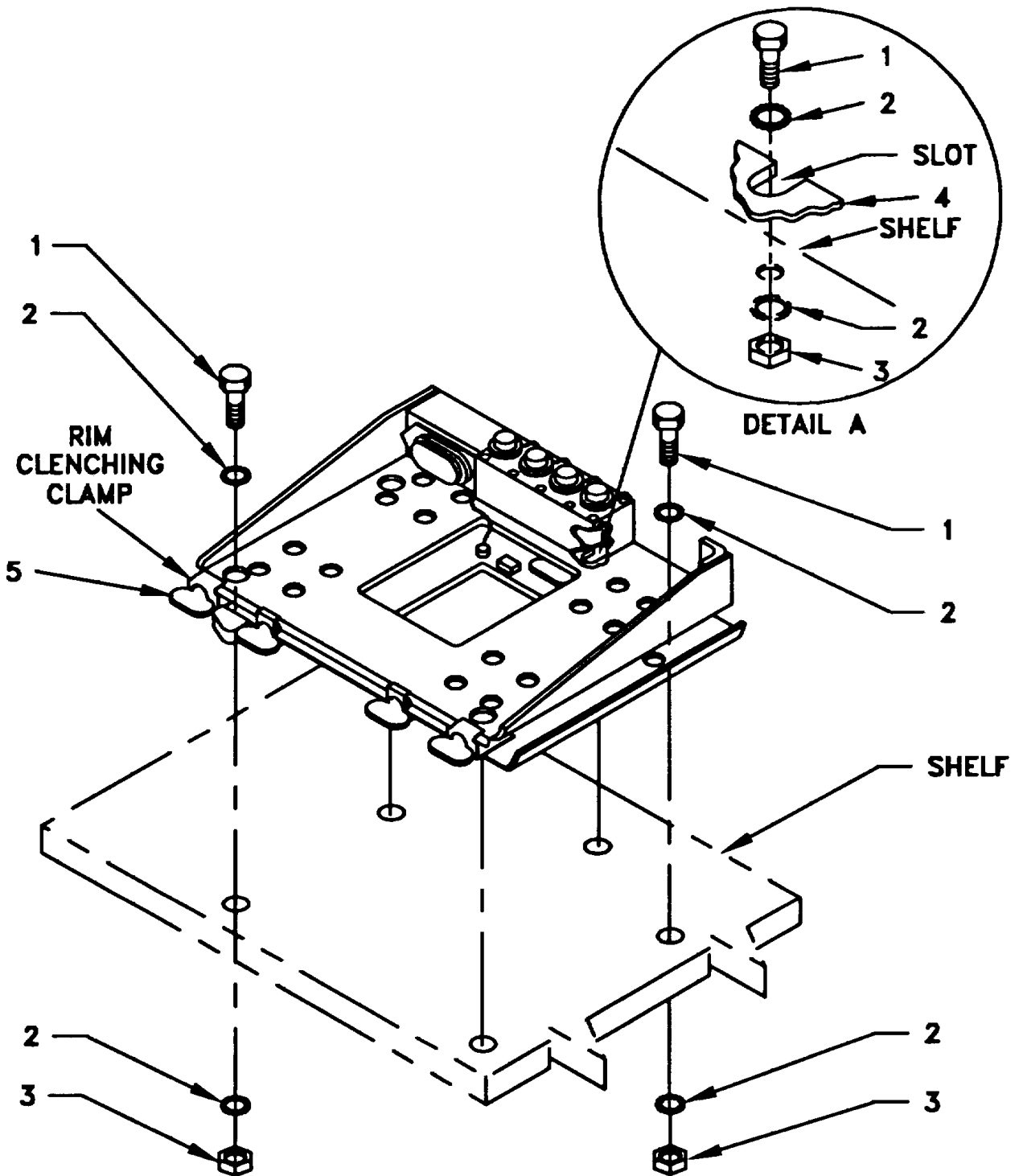
- 1. ANTENNA ELEMENT (UPPER)
- 2. ANTENNA ELEMENT (LOWER)
- 3. ANTENNA BASE
- 4. LOCK WIRE
- 5. FIBER ROPE ASSEMBLY

Figure 5-2(2). Top Antenna Assembly Installation

5.2 Installation of Mounting Base, Electrical Equipment MT-6352NRC (mounting base). Remove and retain attaching bag of 5/16 in mounting hardware for installation. See Figure 5-3 and perform the following steps. To insure good electrical grounding, any rust, corrosion or paint around mounting holes in radio shelf should be removed before installing the mounting base.

ITEM	ACTION	REMARKS
NOTE		
Apply a thin coat of adhesive-sealant to both sides of each internal /external-toothed (IET) washer during installation, and to the area of contact where IET washer is to be placed.		
a. Mounting base (4)	Place on roadside shelf (Figures 5-1(1) and 5-1(2). Use as template and mark mounting holes. Drill 3/8 in holes as necessary.	Tools: Drill, 3/8 in bit.
b. Two outer thumbscrews (5)	Turn ccw until both sets of threads have cleared center of holes.	
c. Mounting base (4)	Aline four holes and rear slot with matching hole pattern in shelf.	
d. Five cap screws (1), ten internal external-toothed (IET) washers (2) and five nuts (3).	Install and tighten to mounting base (4) and shelf	Tools: 1/2 in socket and 1/2 in open/box wrench.
e. Two outer thumbscrews (5).	Tighten and secure.	

5.2 Installation of Mounting Base, Electrical Equipment MT-6352NRC (mounting base). Continued.



- 1. CAP SCREW (5/16-24 X 1 IN)
- 2. IET WASHER (5/16 IN)
- 3. NUT (5/16-24 IN)
- 4. MOUNTING BASE
- 5. THUMBSCREW

Figure 5-3. Mounting Base Installation

5.3 Installation of Loudspeaker, Permanent Magnet LS454U (speaker). Mounting location for speaker to be determined by the vehicle commander. The details below show typical methods of mounting the LS-454/U.

Method A. See Figure 5-4(1).

- a. Determine speaker (3) location.
- b. Drill 13/32 in diameter hole through mounting surface.
- c. Insert stud on speaker (3) through drilled hole; then secure with lock washer (2) and wing nut (1).

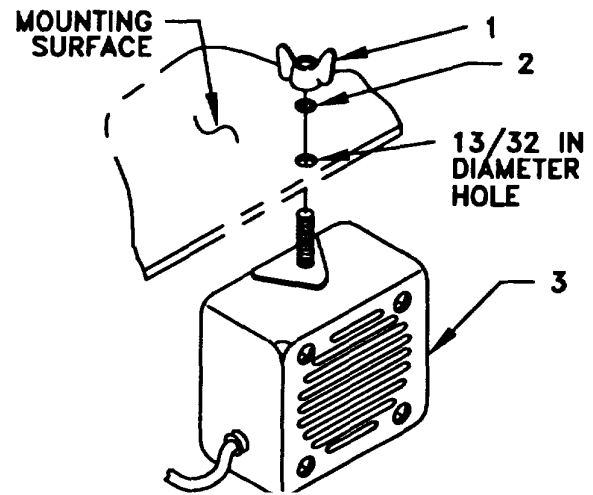


Figure 5-4(1). Speaker Installation - A

1. WING NUT (P/O 3)
2. LOCK WASHER (P/O 3)
3. LS-454/U LOUDSPEAKER
4. CAP SCREW (1/4-20 X 1 IN)
5. SPEAKER BRACKET (P/O 3)
6. LOCK WASHER (1/4 IN)
7. NUT (1/4-20 IN)

Method B. See Figure 5-4(2).

NOTE

Items (4), (6) and (7) are not supplied in kit.

- a. Determine speaker (3) location.
- b. Drill two 5/16 in diameter holes through mounting surface.
- c. Install and secure two cap screws (4), two lock washers (6) and two nuts (7) to speaker bracket (5) and mounting surface.
- d. Insert stud on speaker (3) through speaker bracket (5) hole; then secure with lock washer (2) and wing nut (1).

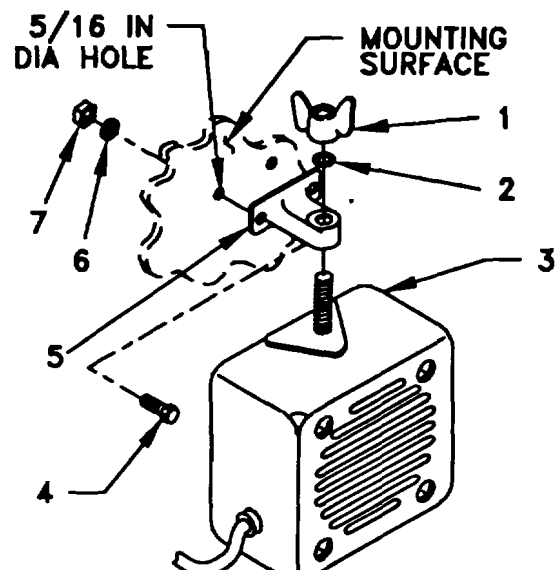


Figure 5-4(2). Speaker Installation - B

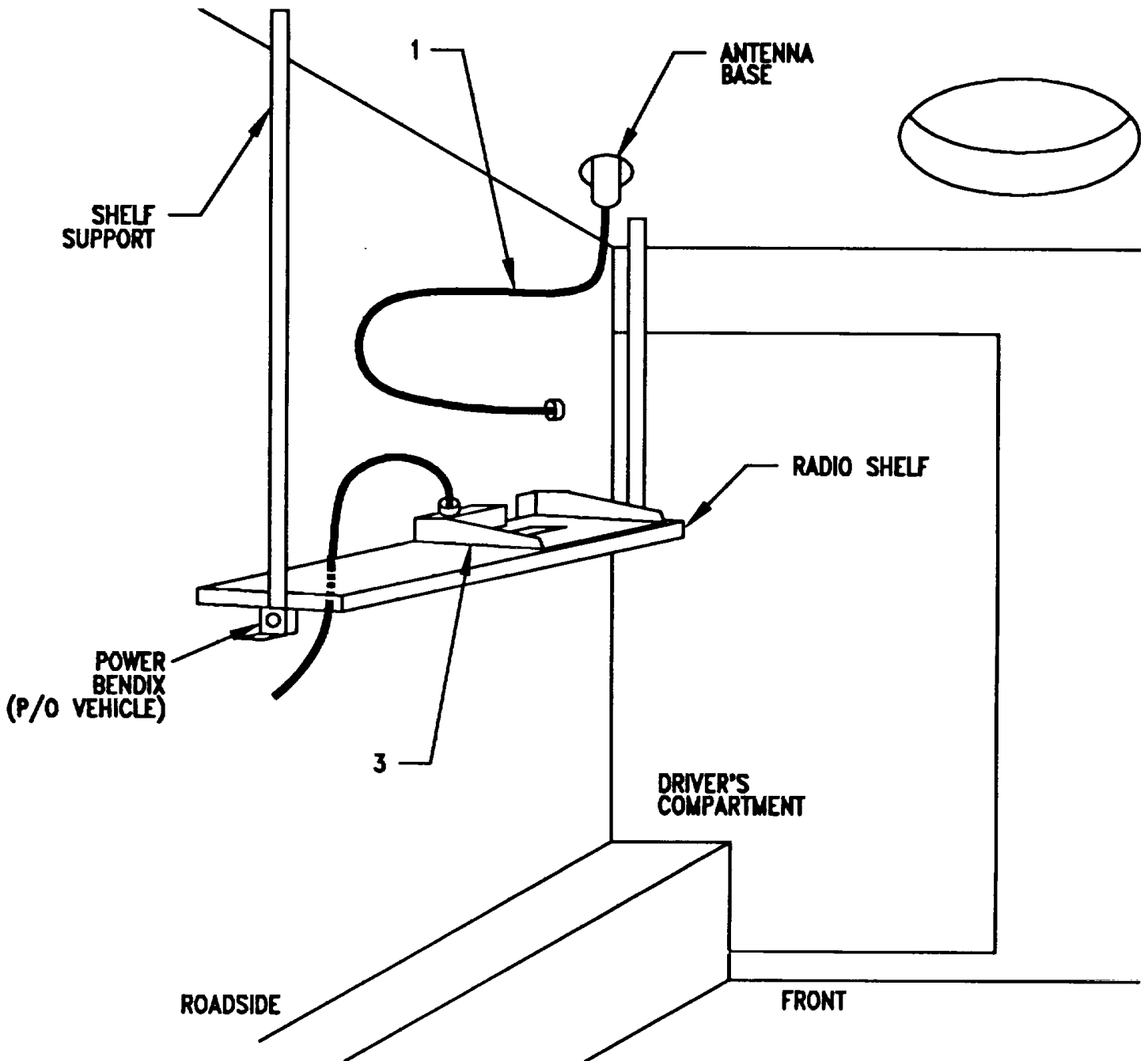
5.4 Installation of Cables. To accomplish the installation, leave loop dampers and tiedown straps loose enough to adjust cable slack and allow easy adjustment of equipment. When installation is complete, tighten and secure all clamps, clips and tiedown straps.

WARNING

Make sure vehicle power source is positioned OFF or disconnected before installing cables.

ITEM	ACTION	REMARKS
a. RF cable (1) connector P1.	Connect and secure to roadside antenna base connector J1. See Figure 5-5.	
b. Power cable (2) connector P1.	Connect and secure to left power bendix connector. See Figure 5-5.	
c. Power cable (2) connector P1.	Connect and secure to mounting base (3) connector J1.	

5.4 Installation of Cables. Continued.



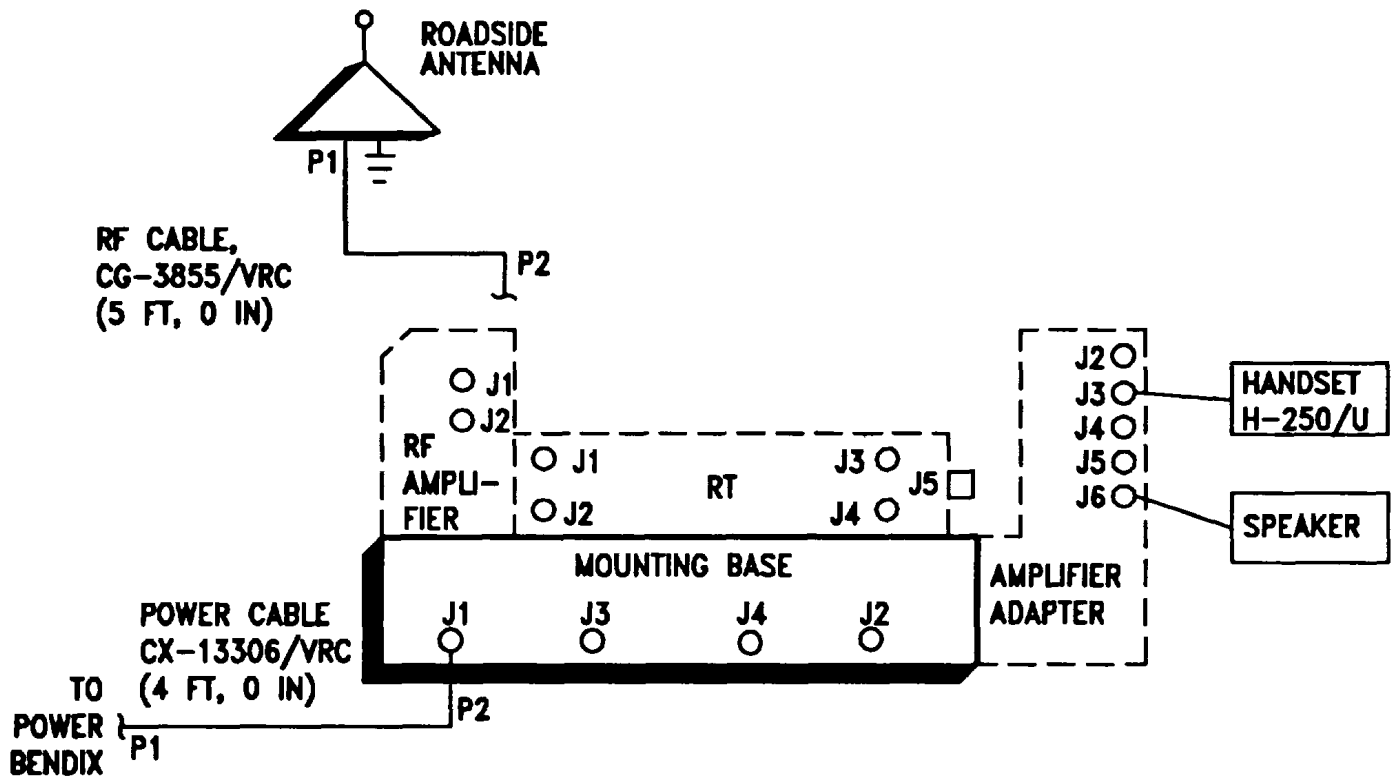
1. RF CABLE, CG-3855NRC (5 FT, 0 IN)
2. POWER CABLE, CX-13306NRC (4 FT, 0 IN)
3. MOUNTING BASE

Figure 5-5. Installation of Cables

5.5 Post-installation and Checkout After equipment is installed and cables are connected, perform the following steps.

ITEM	ACTION	REMARKS
a. Equipment	Check for secure mounting. Check for loose parts, connectors, and mounting hardware.	
b. Cables	Check for proper installation and connection of cables. See Figure 5-5 for cable connections. Unused cables should be stowed in appropriate place Inside the vehicle.	
c. Loop clamps	Check that all have been properly installed and tightened.	
d. Protective covers	Insure that all Installed cables are covered when not in use or connected.	
e. Radio Issued with vehicle	Install and connect cables. See TM 11-5820-890-20-1 or TM 11-5820-890-20-4 for installation and operational (OP) checks and instructions.	
f. MK line replaceable units	See TM 11-5820890-20P for Repair Parts and Special Tools List (RPSTL) information.	

5.5 Post-Installation and Checkout. Continued.



CABLE ASSEMBLY	FROM			TO		
	CABLE CONN	UNIT	UNIT CONN	CABLE CONN	UNIT	UNIT CONN.
CX-13306N/VRC (4 FT, 0 IN)	P2	Mounting Base	J1	P1	Power Bendix Connector	
CG-3855NRC (5 FT, 0 IN)	P2	RT	J1	P1	Front Roadside Antenna Base	J1

Figure 5-6. Cable Diagram: For AN/VRC-87A/88A/90A

APPENDIX A**REFERENCES**

AMDF	Army Master Data File (Microfiche)
AR 710-2	Supply Policy Below the Wholesale Level as Contained in Unit Supply UPDATE
AR 725-50	Requisitioning, Receipt and Issuing System in UPDATE
DA Pam 25-30	Consolidated Index of Army Publications (Microfiche)
DA Pam 710-2-1	Using Unit Supply System Manual Procedures as Contained in Unit Supply UPDATE
SB 11-131-2	Vehicular Radio Sets and Authorized Installations (SINCGARS)
TM 11-5820-890-10-1	Operator's Manual (ICOM Radio Sets)
TM 11-5820-890-10-3	Operator's Manual (Non-ICOM Radio Sets)
TM 11-5820-890-20-1	Unit Maintenance Manual (ICOM Radio Sets)
TM 11-5820-890-20-2	Unit Maintenance Manual (ICOM Radio Sets)
TM 11-5820-890-20-4	Unit Maintenance Manual (Non-ICOM Radio Sets)
TM 11-5820-890-20P	Repair Parts and Special Tools List

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By Order of the Secretary of the Army:

GORDON R. SULLIVAN
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Chief of Staff

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PARA-GRAPH

FIGURE NO.

TABLE NO.

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

TEAR ALONG PERFORATED LINE

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER

SIGN HERE:

DA FORM 2028-2
1 JUL 79

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.—IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

