

**1. INTRODUCTION**

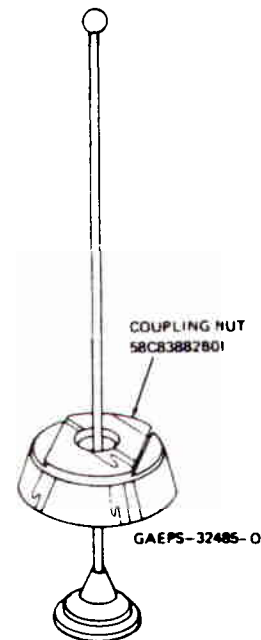
1.1 The antennas described in this section are supplied with an appropriate antenna whip, coaxial cable and connector, and mounting hardware. Mounting hardware and installation is described for permanent vehicle type mounting.

1.2 Refer to Table 1 for model identification. Figures 1 through 3 identify the component parts of the antenna. Refer to the recommendations for antenna location paragraph at the end of this instruction section for safety information.

ROD WITH CHROME NUT (ROD)	ANTENNA ONLY		
	MOTOROLA PART NO.	ANTENNA MODEL NUMBER	FREQ. RANGE (MHZ)
01-80352A07	01-83938B03	RAD4012ARB	150.8-162
01-80352A08	01-83938B04	RAD4020ARB	162-174
01-80305K05	01-83938B12	HKAD4001A	216-225
01-80352A11	01-83938B06	RAE4034ARB	450-470
01-80352A90	01-83938B11	RAF4021ARB	806-870

*Table 1. Model Complement*

Antenna Model	Frequency Range (MHz)
<i>Roof Mount Models</i>	
RAD4012ARB	150.8 – 162
RAD4020ARB	162 – 174
HKAD4001A	216 – 225
RAE4022ARB	403 – 430
RAE4034ARB	450 – 470
RAF4021ARB	806 – 870



*Figure 1. Whip Parts Identification*

MOBILE QUARTER-WAVE ANTENNAS

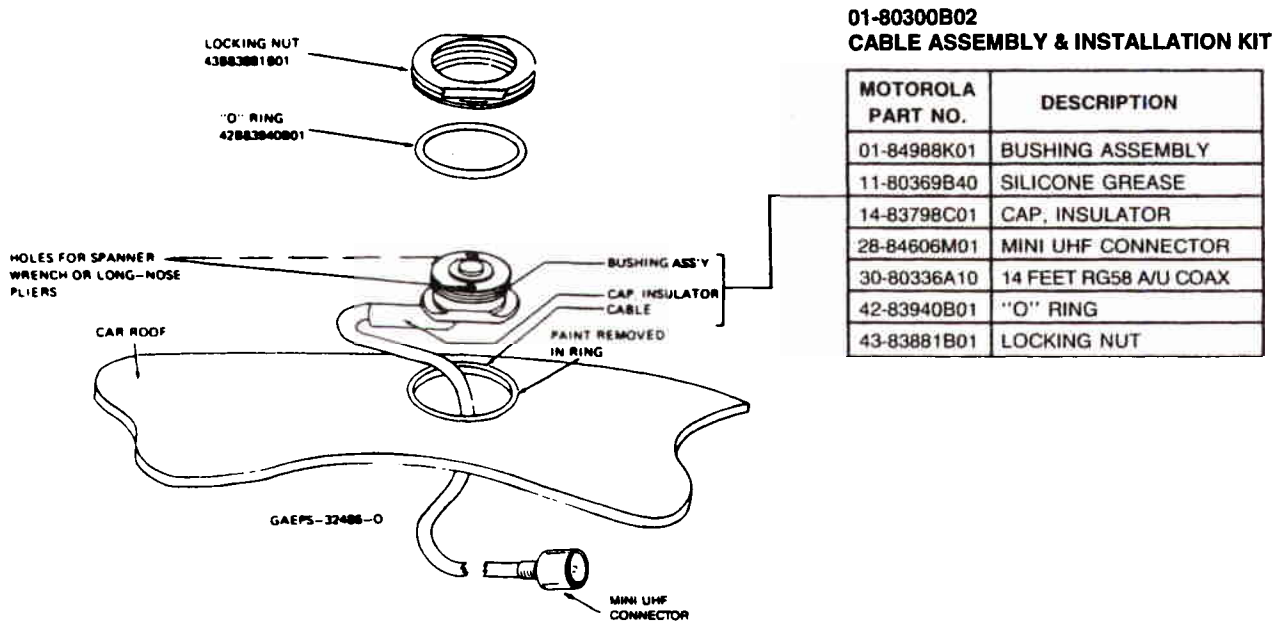


Figure 2. Roof Mount Parts Identification

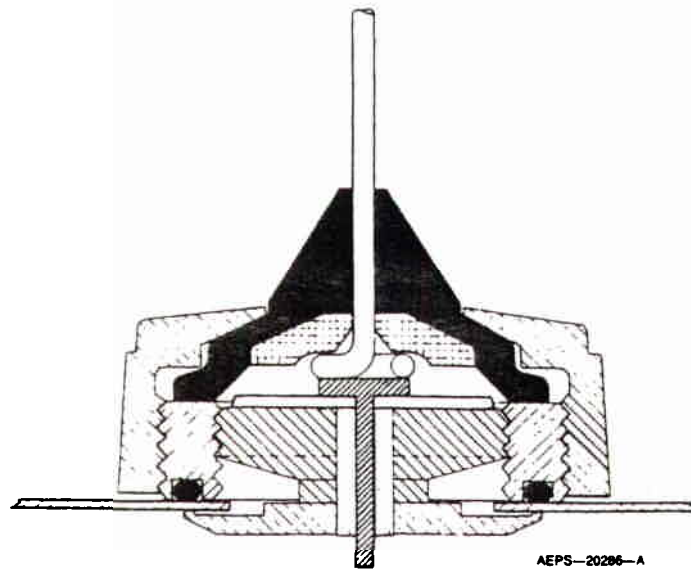


Figure 3. Cross-Section of Assembled Antenna

## 2. INSTALLATION

### 2.1 MOUNTING HARDWARE

#### INSTALLATION—ROOF MOUNT

##### 2.1.1 General

2.1.1.1 The installation procedure which follows is for a typical passenger car. The procedure may vary slightly with the type of vehicle on which the antenna is to be installed. Generally speaking, however, the procedures outlined are of a universal nature.

##### **NOTE**

The antenna should be mounted on a flat metal roof of .020 to .040 inch thickness.

2.1.1.2 First, select a location for the antenna as near the center of the roof as possible.

2.1.1.3 The headlining may be probed with the fingers to make sure that all points of obstruction are avoided.

##### 2.1.1 Installation Procedure— Single Wall Construction

Step 1. Locate the center of the roof by careful measurement, remove the headlining as necessary, and drill a pilot hole down through the roof. If the interior light of the car is centered in the roof, remove this light and fixture and drill the pilot hole up through the roof at about the center of the interior light mountings. This centers the antenna mount on the roof and allows for easy access.

Step 2. Drill a 3/4" hole from the top of the roof until the saw bottoms. Use a Motorola hole cutting saw (01-80382A25) or equivalent. When the saw bottoms on the roof, it cleans off the paint in a neat circle and assures good contact with the locking nut.

##### **IMPORTANT**

For proper seating of bushing assembly, remove burrs and scrape any foreign matter from underside of hole out to at least 1/8" from edge.

Step 3. Remove the molding which secures the headlining in the rear quarter of the car on the side on which the radio set is installed.

##### **NOTE**

To insure ease of assembly, thread the locking nut on and then off the bushing assembly before installation. This removes any burrs which may be present.

Step 4. See Figure 4. From the top, feed the RG-58A/U lead-in cable between the headlining and the metal roof, and into the trunk. Then take up the slack from the trunk end of the cable.

Step 5. See Figure 5. The bushing assembly is now in a position to drop into the hole in the roof. It should be tilted at a slight angle and fed into the 3/4" hole. The threaded top will not fall through the hole.

Step 6. See Figure 6. Hold the antenna bushing assembly in place with the index finger and thread the locking nut onto it as shown.

Step 7. Pull up on the bushing assembly as illustrated in Figure 7, and make sure it is centered and seated (both shoulders inside the drilled hole), and that the "O" ring is in the groove in the locking nut. (As furnished, the "O" ring has been placed in the locking nut groove and imbedded in silicone grease). Tighten the locking nut until it bottoms firmly against the roof top.

##### **NOTE**

See Figure 2. If the bushing assembly should slip or rotate for any reason during the tightening procedure, insert the tips of a long nose plier or spanner wrench into the two holes in the bushing assembly and apply force to prevent rotation until the locking nut is tight.

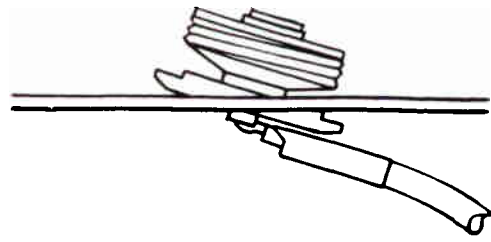
The locking nut *must* come into contact with the car roof to insure the proper antenna radiation pattern. This can only happen when the rubber "O" ring is fully compressed.

Step 8. Take up the slack in the cable and replace the headlining retainer molding.

Step 9. Replace headlining and dome light if removed.



Figure 4. Coaxial Cable Insertion



AEPD-12B32-B

Figure 5. Bushing Assembly Insertion

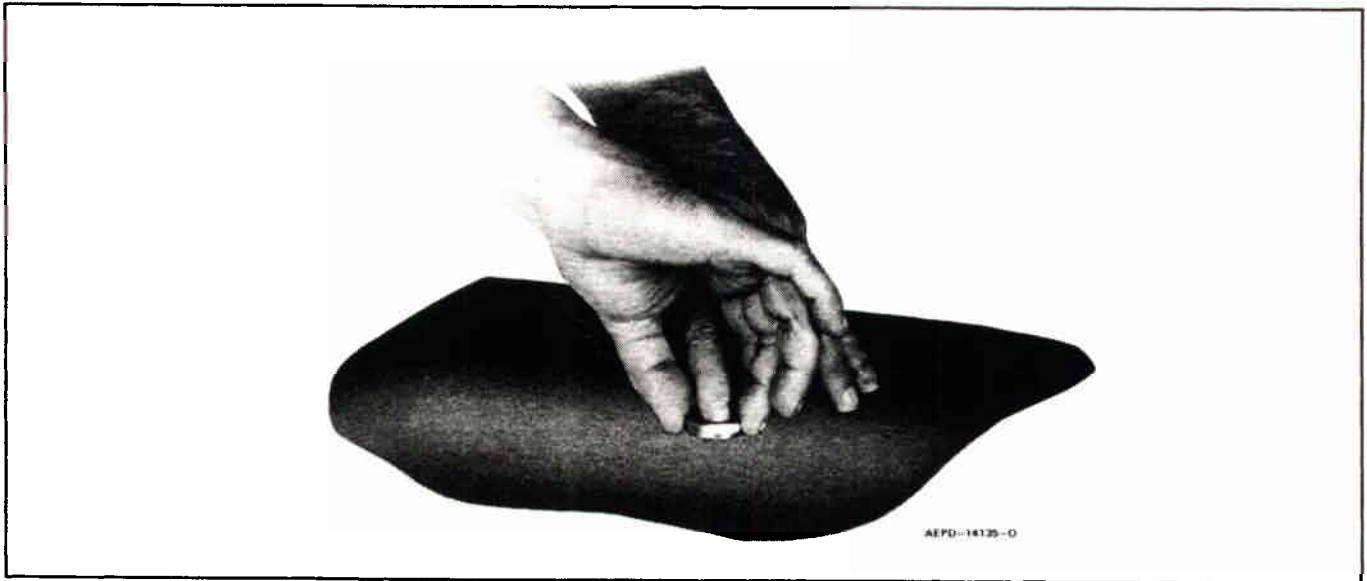


Figure 6. Locking Nut Positioning



Figure 7. Locking Nut Tightening

### 2.1.3 Installation Procedure—Double Wall Construction

#### 2.1.3.1 Vehicles with Dome Lights or Removable Headlining.

Step 1. Remove the dome light from its mount or remove the headlining from the installation area.

Step 2. Drill a small pilot hole centered in the roof of the vehicle. The center of the cavity where the dome light was removed is sufficiently close.

Step 3. Using a 1 ¼" diameter hole saw cut a hole in the inside layer of the metal.

Step 4. Remove the metal and filler from this 1 ½" diameter hole.

Step 5. Complete the installation per installation procedure given for vehicles with single wall construction. A completed mount is illustrated in Figure 8.

#### 2.1.3.2 Vehicles Without Dome Lights

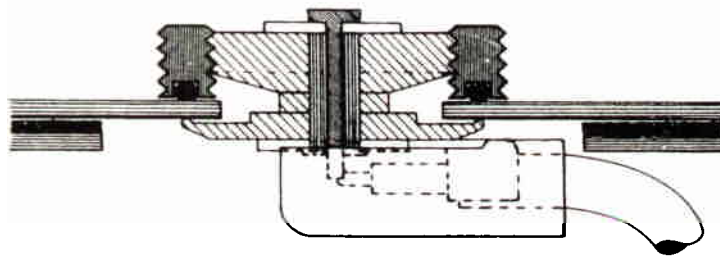
When the vehicle has no dome light, and it is not feasible to remove the headlining to get to the inside surface, proceed as follows:

Step 1. Locate the center of the roof and make sure the area beneath this point is clear to allow passage of a drill.

Step 2. With a 3/4" diameter hole cutting saw carefully cut a 3/4" hole from the top of the roof through both thicknesses of metal. Clean the metal in a neat circle around the hole to assure a good contact between the roof metal and the locking nut.

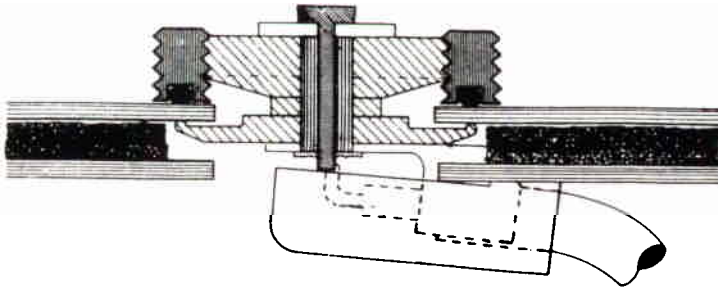
Step 3. Remove any burrs and remove the filler separating the roof thicknesses for a distance of 1/4" back from the hole.

Step 4. Install the mount to the outside roof thickness per installation procedure given for vehicles with single wall construction.



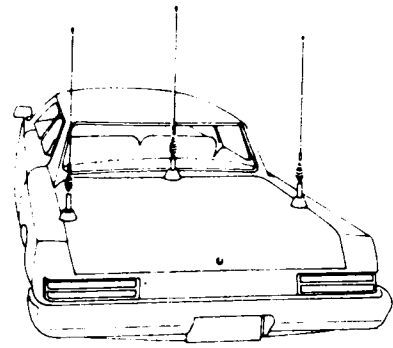
GAEPS-8707-C

*Figure 8. Roof Mount in Vehicle With Dome Light or Removable Headlining*



GAEPS-8708-D

Figure 9. Roof Mount in Vehicle Without Dome Light



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Figure 10. Typical Mounting Locations

### MOTOROLA RECOMMENDATIONS FOR MOBILE ANTENNA LOCATION

The United States Department of Labor, through the provisions of the Occupational Safety and Health Act of 1970 (OSHA), has established an electromagnetic safety standard which applies to the use of mobile radios. Proper installation and use of this antenna will result in exposure below the OSHA Limit.

Antennas must be installed at least two feet\* (0.6 meter) from vehicle operators and passengers unless shielded by a metallic surface.

Motorola recommends that mobile antennas be located as follows:

Standard metal passenger vehicles . . . . .	Center roof or center trunk lid
Vans, pickups, and other light trucks (metal roofs) . . . . .	Center roof
Heavy duty equipment with metal roofs (heavy duty trucks, semi-tractors, heavy refuse trucks, cement mixer trucks) . . . . .	Center cab roof
Specialty vehicles (such as T-roofs, sun roofs, or convertibles) . . . . .	Center truck lid
Other vehicles . . . . .	Contact your Motorola Field Technical Representative. Do not install closer than two feet or without proper antenna ground plane.

(Gutter mount antennas are not recommended for transmitters of more than 6 watts.)

\*Motorcycle and Industrial Dispatcher radios — one foot (0.3 meter) for transmitters of 30 watts or less.

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