



# MOBILE QUARTER-WAVE ANTENNAS Roof Mount

## INTRODUCTION

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 roof mounting only.

Refer to Table 1 for model identification. Figures 1 through 3 identify the component parts of the antenna. Refer to SAFETY INFORMATION at the end of this leaflet for recommendations for antenna location and safety aspects.

**Table 1: Model Complement**

Antenna Model	Frequency Range
<i>Roof Mount Models</i>	
RAD4198_	136-144 MHz 1/4 wave
RAD4199_	146-150.8 MHz 1/4 wave
RAD4200_	150.8-162 MHz 1/4 wave
RAD4201_	162-174 MHz 1/4 wave
RAE4151_	403-430 MHz 1/4 wave
RAE4152_	450-470 MHz 1/4 wave

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Rod with Chrome Nut (Rod)	Antenna Only		
	Motorola Part Number	Antenna Model No.	Freq Range (MHz)
01-80352A05	01-83938B01	RAD4198_	136-144
01-80352A06	01-83938B02	RAD4199_	146-150.8
01-80352A07	01-83938B03	RAD4200_	150.8-162
01-80352A08	01-83938B04	RAD4201_	162-174
01-80352A09	01-83938B05	RAE4151_	403-430
01-80352A11	01-83938B06	RAE4152_	450-470

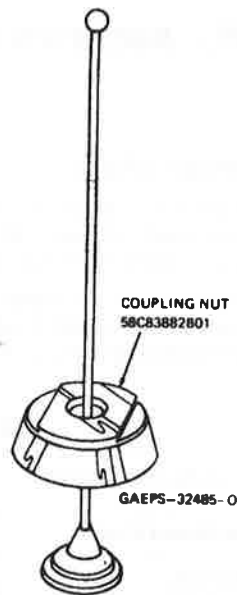


Figure 1 Whip Parts Identification

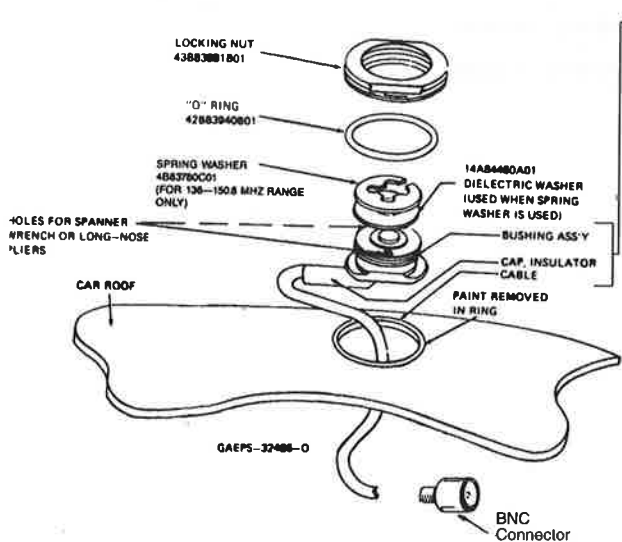


Figure 2 Roof Mount Parts Identification

Bushing and Cable Assembly (136-150.8 MHz Range))

Motorola Part No.	Description
01-84551A01	Bushing and cable Assembly includes following:
01-84551A01	Bushing Assembly
30-475378	168" RG-58A/U Coax
14-83796C01	Cap. Insulator

Bushing and Cable Assembly (150.8-174MHz, 450-470MHz Ranges))

Motorola Part No.	Description
01-80350A76	Bushing and cable Assembly includes following:
01-84988K01	Bushing Assembly
30-475378	168" RG-58A/U Coax
14-83796C01	Cap. Insulator

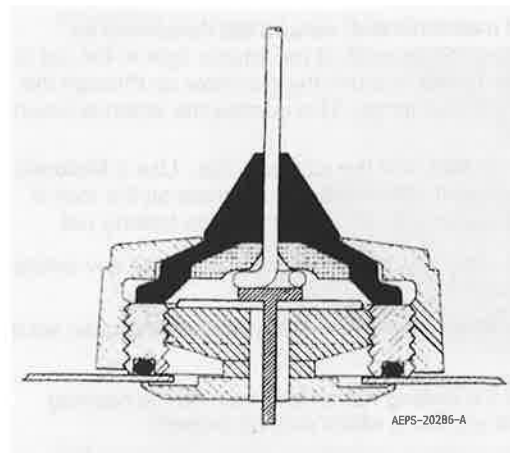


Figure 3 Cross-Section of Assembled Antenna

Replacement Installation Hardware Kit W/ Coupling Kit

Motorola Part No.	Description
11-80369B40	Silicone Grease
0902105F01	BNC Connector
42-83940B01	"O" Ring
43-83881B01	Locking Nut
58-83882B01	Coupling Nut

Replacement Installation Hardware Kit W/O Coupling Kit

Motorola Part No.	Description
11-80369B40	Silicone Grease
0902105F01	BNC Connector
42-83940B01	"O" Ring
43-83881B01	Locking Nut

## INSTALLATION

### Mounting Hardware Installation – Roof Mount

#### General

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.

First, select a location for the antenna as near the centre of the roof as possible

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

### Installation Procedure – Single Wall Construction

1. Locate the centre of the roof by careful measurement, remove the headlining as necessary, and drill a pilot hole down through the roof. If the interior light in the car is centred in the roof, remove this light and fixture and drill the pilot hole up through the roof at about the centre of the interior light mountings. This centres the antenna mount on the roof and allows for easy access.
2. Drill a 19mm (¾") 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 3.2mm (1/8") from edge.

3. Remove the molding which secures the headlining 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.



Figure 4 Coaxial Cable Insertion

4. See Figure 4. From the top, feed the RG-58A/U lead-in cable between the headlining and the metal roof, and back to the transceiver location. Then take up the slack from the transceiver end of the cable.
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 19mm (¾") hole. The threaded top will *not* fall through the hole.

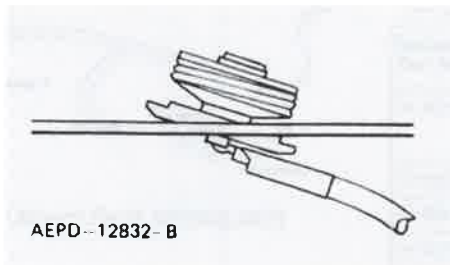


Figure 5 Bushing Assembly Insertion

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



Figure 6 Locking Nut Positioning

7. Pull up on the bushing assembly as illustrated in Figure 7 and make sure it is centred 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.

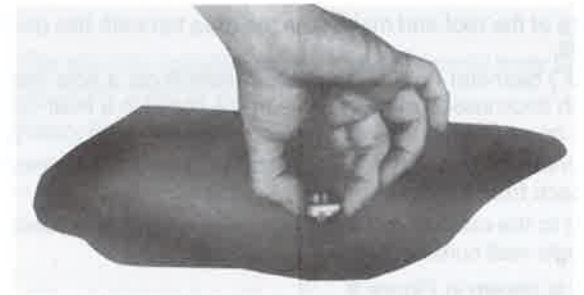


Figure 7 Locking Nut Tightening

**Note:** See Figure 3. 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.

8. Take up the slack in the cable.
9. Replace headlining and dome light (if removed).

### Installation Procedure – Double Wall Construction

#### Vehicles with Dome Lights or Removable Headlining

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

- Using a 32mm (1 1/4") diameter hole saw cut a hole in the inside layer of the metal.
- Remove the metal and filler from this 32mm (1 1/4") diameter hole.
- Complete the installation per the installation procedure given for vehicles with single wall construction. A completed mount is illustrated in *Figure 8*.

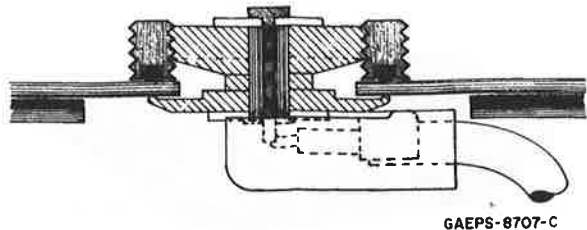


Figure 8 Roof mount in Vehicle with Dome Light or Removable Headlining

#### 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:

- Locate the centre of the roof and make sure the area beneath this point is clear to allow passage of a drill.
- With a 19mm (3/4") diameter hole cutting saw **carefully** cut a 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.
- Remove any burrs and remove the filler separating the roof thicknesses for a distance of 6.4mm (1/4") back from the hole.
- Install the mount to the outside roof thickness per installation procedure given for vehicles with single wall construction.

A completed mount is shown in *Figure 9*.

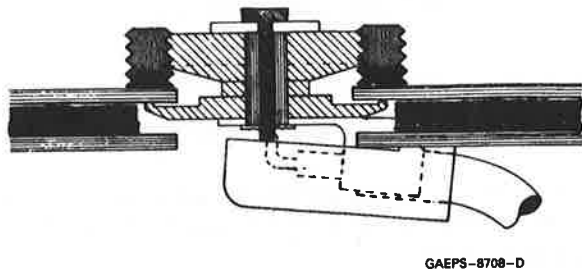


Figure 9 Roof Mount in Vehicle without Dome Light

## SAFETY INFORMATION

### MOBILE RADIO OPERATION AND EME EXPOSURE

To assure optimal radio performance and that human exposure to radio frequency electromagnetic energy is within national and international standards and guidelines, transmit only when people outside the vehicle are at least the minimum distance away from a properly installed, externally-mounted antenna. Table 2 lists the minimum distance for several different ranges of rated radio power.

Table 2: Rated Power and Distance

Radiated Power of Vehicle-installed Mobile Two-way Radio	Minimum Distance From Transmitting Antenna
7 to 15 Watts	30.5 cm (1 Ft)
16 to 50 Watts	61 cm (2 Ft)
More than 50 Watts	91.5 cm (3 Ft)

## ANTENNA INSTALLATION

### Mobile Antennas

Recommended mobile antenna installations are limited to metal body vehicles at the centre of the roof and centre of the trunk deck locations.

The antenna installation must additionally be in accordance with:

- The requirements of the antenna manufacturer/supplier
- Instructions in the Radio Installation Manual