



ASSEMBLY & INSTALLATION GUIDE

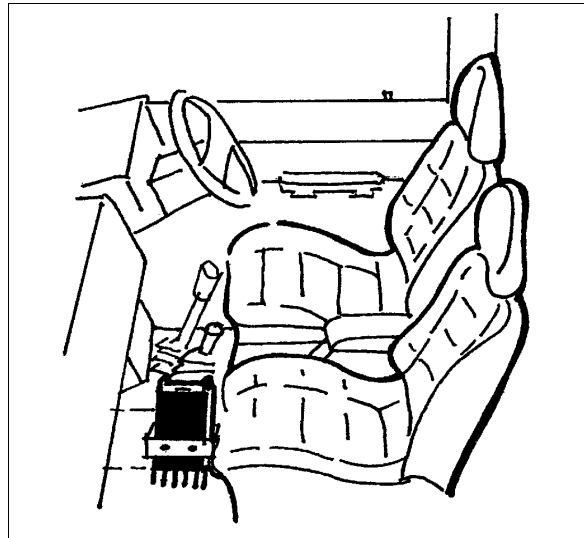
HF-90 VEHICLE PACKAGE (QM9015)

Step 1: Installation of the HF-90 Transceiver and Associated Parts

1. First decide where you wish to mount the HF-90 transceiver. This should be fixed somewhere which is both convenient and safe for operator use. Examples of typical locations include the following:
 - In a vertical position, up against the centre console, on the passenger side.
 - In a vertical position, up against the rear of the centre console.
 - Under the vehicle dashboard.
 - On the roof of the vehicle (inside), between the two visors.
 - In an overhead console.

Do not mount the HF-90 on top of the vehicle dashboard, as this may leave the transceiver exposed to excessive heat. The location you choose will depend mainly on the make and model of your vehicle, and how much room you have available.

2. Next, position and secure the HF-90 mounting cradle using two screws provided (note that a separate Assembly & Installation Guide is provided together with the mounting cradle). Once the mounting cradle has been fixed, fit the HF-90 Transceiver using the two brass guides provided, then secure by tightening the butterfly nuts.
3. Mount the external loudspeaker and microphone clip in convenient locations using the self-tapping screws supplied.
4. To fit the HF-90 power cable (this is the heavy duty power cable), plug the circular 4-pole connector to the rear of the HF-90 transceiver. Then feed the other end of the cable through the firewall bulkhead using a grommet and route it toward the vehicle battery.

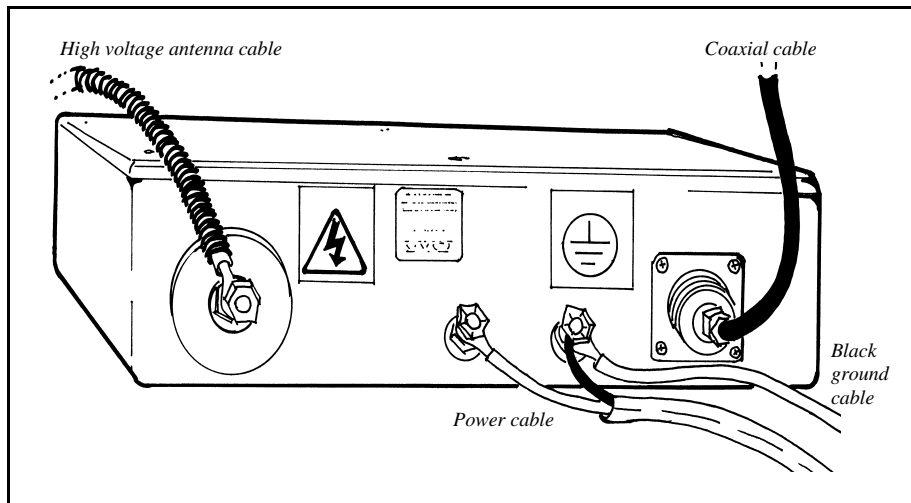


The illustration above shows one possible location to mount the HF-90 Transceiver - up against the centre console, on the passenger side of the vehicle.

5. Bolt the HRC fuse to a flat surface within the engine compartment close to the battery.
6. Trim the HF-90 power cable to length, allowing sufficient black sheathed conductor to reach the negative battery terminal and sufficient red sheathed conductor to reach the fuse.
7. Use the surplus red sheathed conductor to make up a lead between the fuse and the positive battery terminal.
8. Crimp and solder the circular lugs on the ends of the cables and secure to the battery terminals.
9. Now you are ready to proceed to Step 2. Please refer to the following three pages for instructions on how to install the TA-90 tuner, vehicle whip antenna and associated parts.

Step 2: Installation of the TA-90 Tuner, Vehicle Whip Antenna and Associated Parts

Before proceeding to the next step, you need to decide whether you are going to mount the TA-90 tuner internally (within the vehicle) or externally (on a bull bar). Q-MAC recommends the internal installation wherever possible.



This illustration above shows the various connections on the side of the TA-90 Tuner.

Option #1 - Fitting the TA-90 Tuner Internally:

Advantages:	<i>Allows better protection of the TA-90 Tuner Conceals TA-90 Tuner More reliable installation over the long term</i>
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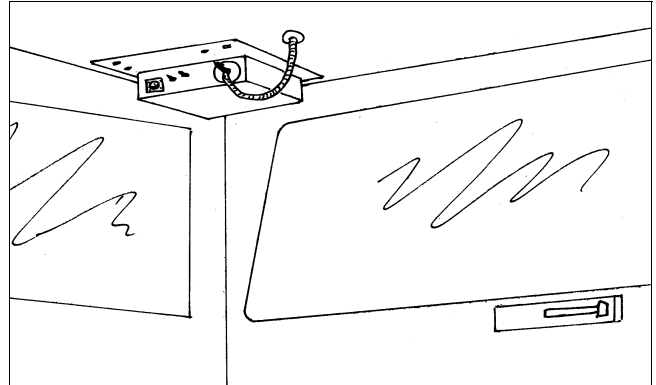
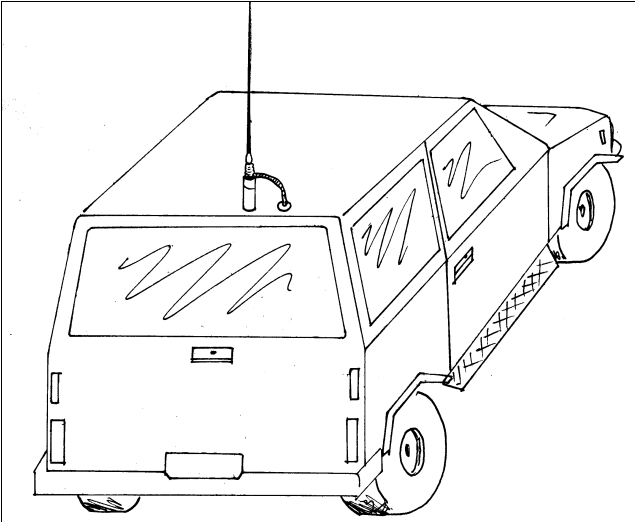
1. First decide on the best location to fit the vehicle whip antenna. You may decide to fit the antenna in any of the following locations:
 - On the roof of the vehicle.
 - Against the rear of the vehicle (up high).
 - Against the side of the vehicle (up high).

Wherever possible, do not mount the antenna up against the metalwork of the vehicle, as this will result in a loss of radiated signal. The best location will be subject to the particular make and model of your vehicle, as well as the nature of your application and your own personal preference. Do not fit the antenna at this stage.

2. Based on where you have decided to fit the antenna, you can now plan to locate and fix the TA-90 tuner. Note that the tuner should be located as close as possible to the antenna, as this will increase the efficiency of the radiated signal. The TA-90 tuner is connected to the antenna via the high voltage antenna cable (covered in split convoluted tubing). Given that this cable is 600mm in length, this is the maximum distance which can separate the tuner from the antenna.
3. Once you have finalised where the antenna and tuner are to be located, you can fit the antenna itself. Note that the antenna sits on the heavy duty spring, which in turn is fitted to the white plastic insulator. This means that the white plastic insulator forms the base of the antenna. This base requires a flat area approximately 60 x 60mm for mounting, through which the 13mm threaded screw will be placed. You will need to fabricate a suitable bracket if mounting the antenna up against the rear/side of the vehicle. If mounting on the roof of the vehicle, it is recommended that you place a reinforcement plate directly under the roof metalwork where the antenna is mounted, to ensure minimum strain during movement.
4. The TA-90 tuner is supplied already mounted on an aluminium plate. This plate has mounting holes, which can be used to fix the tuner to the inside wall/roof of your vehicle. If there are inadequate holes provided, for your particular installation, additional holes will need to be drilled through the plate. Ensure that the TA-90 tuner is mounted securely and in a safe position, as close as possible to the antenna.
5. Once the TA-90 tuner has been secured in place, the high voltage antenna cable (covered in split convoluted tubing) should be connected to the 1/4" stud on the tuner (this sits on the white insulating disk, as shown in the above illustration), using the end with the small circular lug. Secure using the nylock nut provided.

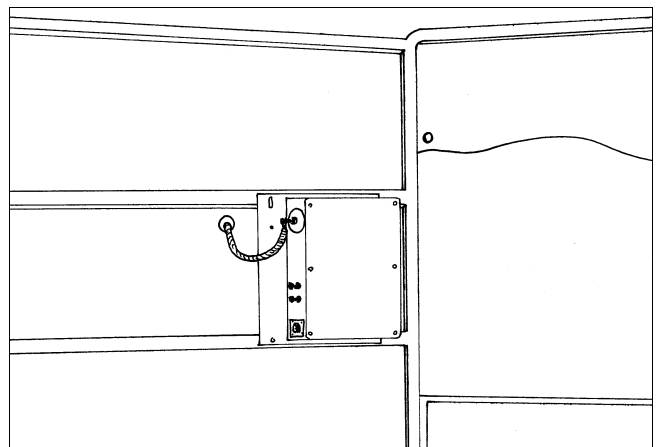
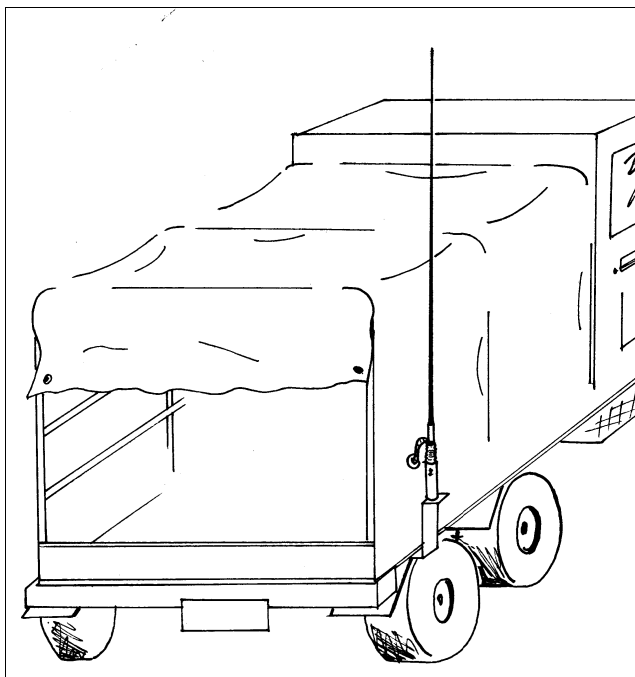
- You will then need to make a clearance hole through the body/roof of the vehicle. The clearance hole must be at least 25mm in diameter and have the appropriate grommet fitted (as supplied). Next, pass the high voltage cable through the grommet, ensuring that the convoluted tubing is kept on the cable, for insulating purposes. The free end of the cable, which is terminated with the large circular lug, should then be secured between the spring and antenna, taking care to centre the spacing washer. Do not feed any other cables close to the high voltage antenna cable.

Internal installation of TA-90 tuner - with antenna mounted on roof of civilian-type vehicle



The illustration on the left shows the vehicle whip antenna mounted on the roof of the vehicle. Note the high voltage cable which passes from antenna, through the body of the vehicle (via a suitable grommet), to the tuner. The tuner, as pictured above, is mounted as close as possible to the antenna to maximise efficiency.

Internal installation of TA-90 tuner - with antenna mounted on side of military-type vehicle



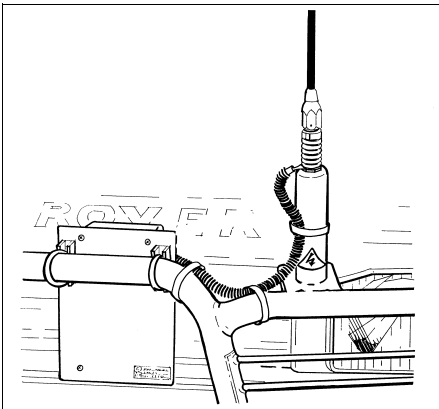
The illustration on the left shows the vehicle whip antenna mounted up against the side of a canvas-covered vehicle. The antenna is supported by a customised antenna bracket. Note that in such an installation it is not as important to mount the antenna in a high position, as the canvas does not react against the antenna in the same way as the metalwork on a conventional vehicle. The high voltage cable passes from antenna, through the canvas, to the tuner. The tuner, as pictured above, is mounted as close as possible to the antenna to maximise efficiency. Note that the tuner should be grounded to the metal vehicle frame.

- Next, make a short (low-resistance) connection between the ground terminal on the TA-90 tuner (indicated by the green label) and the metal ground of the vehicle body, using the ground cable provided.
- Then you will need to connect the TA-90 power cable. This is the smaller twin power cable supplied as part of the TA-90 mounting kit. Connect this cable to the white 4-pole receptacle at the rear of the radio (this branches off the larger HF-90 power cable). The other end of the TA-90 power cable is to be connected to the terminals on the TA-90 tuner itself. Note that this power cable carries a control signal from the radio, which is essential for correct operation. Connecting the TA-90 power cable directly to the battery will result in failure to operate correctly.
- The PL259 plug should then be fitted to the bare end of the coaxial cable supplied. Once fitted, this end of the cable is plugged into the TA-90 tuner. The coaxial cable should then be run together with the TA-90 power cable to the rear of the HF-90 transceiver, where it is then plugged into the BNC terminal.

Option #2 - Fitting the TA-90 Tuner Externally to a Bull Bar:

Advantages: **Simpler installation**
 No holes required in body of vehicle
 Allows driver to watch antenna at front of vehicle

1. First decide where the vehicle whip antenna is to be fitted. The best position is on the passenger side of the vehicle (so that driver vision is not impaired). The antenna should ideally be mounted on a bracket approximately 60 x 60mm, welded to the bull bar. Do not fit the antenna at this stage.
2. The TA-90 tuner is supplied already mounted on an aluminium plate (stone guard). This plate has mounting holes for 45mm C-clamps and 50mm C-clamps, which are provided with the system. To ensure radiation efficiency and protection it is recommended that the tuner is mounted behind the bull bar in a vertical fashion (using the appropriate sized C-clamps to secure the unit to the bull bar), with the connectors on the side of the box facing the antenna. The distance between the antenna base and the TA-90 tuner should be as short as possible to maximise efficiency. Given that the high voltage antenna cable is 600mm in length, this is the maximum distance which can separate the tuner from the antenna.
3. Once the TA-90 tuner has been secured in place, the high voltage antenna cable (covered in split convoluted tubing) should be connected to the ¼" stud on the tuner (this sits on the white insulating disk, as shown in the above illustration), using the end with the small circular lug. Secure using the nylock nut provided. The free end of the cable, which is terminated with the large circular lug (with spacing washer in centre), is to be secured between the spring and antenna. Secure to the bull bar with the cable ties provided, ensuring that the split convoluted tubing is not removed. Do not feed any other cables close to the high voltage antenna cable.
4. The ground cable must be connected to the ground stud on the TA-90 tuner (using the end with the small circular lug). The other end of the cable (with large circular lug) may be bolted underneath the antenna bracket using the 1/2 inch threaded screw provided. Correct earthing in this manner is essential. The white high voltage insulator is then fitted directly on top of the antenna bracket using the same 1/2 inch threaded screw. Once the insulator base is fitted to the antenna bracket, fit the heavy duty spring directly on top, then secure the vehicle whip antenna.
5. Then you will need to connect the TA-90 power cable. This is the smaller twin power cable supplied as part of the TA-90 mounting kit. Connect this cable to the white 4-pole receptacle at the rear of the radio (this branches off the larger HF-90 power cable). The other end of the TA-90 power cable is to be connected to the terminals on the TA-90 tuner itself. Note that this power cable carries a control signal from the radio, which is essential for correct operation. Connecting the TA-90 power cable directly to the battery will result in failure to operate correctly.
6. The PL259 plug should then be fitted to the bare end of the coaxial cable supplied. Once fitted, this end of the cable is plugged into the TA-90 tuner. The coaxial cable should then be run together with the TA-90 power cable to the rear of the HF-90 transceiver, where it is then plugged into the BNC terminal.



This illustration shows the TA-90 tuner with mounting plate fixed to the bull bar in the vertical position, using the C-clamps. It also shows the correct method of securing the high voltage antenna cable.

Antenna Assembly:-

When complete, the antenna assembly should comprise the following parts(from the bottom up):

- 1/2 inch screw bolt
- Black ground cable
- Antenna bracket
- White high voltage insulator
- High voltage antenna cable
- Heavy duty spring
- Vehicle whip antenna