

# GOING HF MOBILE

## **Going Mobile:**

If you follow a few simple rules when installing your mobile setup you will avoid the common pitfalls. Although it mainly relates to HF Installations, similar rules apply to VHF and UHF Mobile Setups. Almost any radio can be installed in a car, but the question is "Is it worth it?" Handheld radios are just that, handheld. Base station radios are just that, base stations. Consider buying a decent mobile Transceiver rather than just taping your portable to the dashboard. Mobiles are designed for use in a car, usually come wired for do it yourself installation, and are generally more tolerant to voltage and amperage fluctuations that can occur especially during start-up and winter situations.

## **Power Supply:**

A 100 Watt mobile rig will draw around 20 Amps. Thick cable must be used, 6mm copper is an absolute minimum and both the negative and positive lead should be run direct to the battery terminal via a fuse. The original Manufacturers lead should be more than adequate. Make sure the fuse is as near as possible to the battery. Run the power cable through a suitable hole in the bulkhead from the engine bay into the car. It is always difficult to find a suitable hole in modern cars but try where the clutch or accelerator cables come through, there should be some room to make an additional hole in the rubber bush. Use electrical tape or cable ties to fix the cable on its route through the engine bay to the battery. Everything rattles about so much in there it's easy for the cable to drop onto some hot component or chafe against a sharp edge which could cause big sparks! Just remember not to connect the battery until you've got the cable all pulled through.... sparks again. When routing the cable inside the car it is usually possible to hide it under the carpet or plastic trim panels until it emerges at the position where the rig is to be fitted. The hardest part is now going to be finding a good ground connection for the rig amongst all the plastic. Although it is better electrically to run the negative lead back to the battery, for RF reasons also bond the negative side of the transceiver to the car body, as close as possible to the rig. Good places to look are seat mounting bolts and safety belt mounting bolts, scrape the paint off the bodywork where the connection will be made, use a large earth tag and do the bolt up tightly. Obviously this grounding (negative) lead should be at least as thick as the negative and positive supply lead from the Battery. Running leads near vehicle control equipment such as Computer and Ignition gear, is not a good idea and should be avoided as much as possible. Once you're inside the vehicle, take care not to have cables lying under your seat that could get caught up in the seat runners.

## **Positioning:**

If you don't have one of these super new radios with detachable front panels, you will need to mount the rig where you can get at it. This is no easy task in a modern car but it is worth investigating which bits of the dash, such as the glove box, can be removed without damage to reveal a suitable space. Otherwise it's "jam it between the front seats" time. I would strongly advise against mounting it under the dash where you or your passenger's knees may come into contact with it in a crash... Most modern rigs are immune to reasonable amounts of vibration but especially with older non-synthesised rigs it is not a good idea to fix them down too firmly, use some padding. If you do feel the need to drill holes in trays etc, try to buy the same item as a spare part from your Car Dealer, then you can at least replace the messed up one when updating your vehicle. Personally, under the seat is the last place I'd mount a rig, especially if it has a cooling fan. It won't take long for the fan filter to clog up..

If you really want to hide the rig, up under the Dash is usually a good dust free area. Just requires some extra effort.

## **The Aerial**

You'll need one of these! The best place to mount it is in the centre of the roof. If you can't fit a luggage rack or similar device then a gutter mount on the edge of the roof is next best for a small aerial. For the DX chaser with no roof rack, a large whip can be fitted to the tow hitch or similar place SO LONG AS THE LOADING COIL IS AT LEAST AS HIGH AS THE BONNET. An extension pole fitted to the tow hitch is suitable. Or the top railing of your Bull Bars. Bike Carriers that mount on your car tow ball make great antenna mounting poles. The feed to the aerial should be via coax cable, RG58 for ease of feeding it through the door seal and it stands 200W with very little loss over the short length required.

The braid of the coax must be grounded as close to the base of the aerial as possible. If you are

using a luggage rack or a frame between roof rails, then run earth straps between the metal frame parts to ensure good contact. *(Even Boot Hinges are poor RF Conductors, so if your mounting to your Boot or Bonnet, put earth straps here also. Of course this does not apply to V/UHF).* Usually a good place to find a ground point near the roof is the top seat-belt mounting point just inside the door. You can run some thinnish connecting wire in through the door seals with no problems. These some pretty neat mobile bonnet brackets available nowadays that require no drilling of holes in your vehicle.

Plenty of RTV (Silicon Sealer) around the Antenna base coax connection should eliminate any concerns with moisture getting into the coax or corrosion of the connection. Again, for V/UHF, there are some good ready made and sealed mounting brackets that look much smarter than a lump of RTV.

#### **Suppression:**

This can be tricky. There are three ways that interference can get to receiver, by direct radiation from the ignition system etc., by radiation from the car's wiring loom which is carrying interference and by conduction into the rig down the power leads. Supply-borne interference should not occur on a good radio but, if it does, it is simply cured by fitting a large electrolytic capacitor (10,000uF) in parallel with a high quality polyester 1uF straight across the supply terminals at the back of the set. I wonder how many electronic hobby shops could supply you a 10,000uF Cap off the shelf.... A few turns of thick wire round a ferrite rod can also be tried in series with the positive lead just before the capacitors.

The first type of interference (direct radiation) is best tackled by ensuring that the car's bonnet (hood) is well grounded. Put earth straps across the hinges and ensure that the bonnet shuts tight. If your car has a plastic bonnet you're in trouble! Try lining it with cooking foil glued inside and earth this at the hinge end with straps. The ignition system should have some suppression fitted as standard, resistive leads and/or plugs etc. but it's worth checking that they haven't been changed by a previous owner, resistor plugs usually have an R in the type number. If it proves troublesome, braid from thick coax can be slid over the HT leads and grounded but the leads must be in perfect condition otherwise you will get flash-over and misfires.

The second type of interference is the most common. All sorts of bits of electronic stuff scattered around the car can kick out noise that finds its way to the receiver by radiation from the wiring loom. Tracing the source is tricky, does it start when the ignition key is turned on or only when the engine is running? If it is there without the engine running then pull fuses out of the fuse box until it stops, hopefully this will lead you to the culprit (instrument regulators are a prime suspect).

Once you find it you should be able to decouple it with a 1uF capacitor on the supply side straight down to ground. I stopped one noise source by decoupling the fuse which fed it, in the fuse box, no need to take the dash apart.

Some cars seem designed to radiate interference. One of mine had the ignition coil mounted on the bulkhead, the spark-current had to flow from the coil to the engine block via the HT leads and then back to the coil via a strap at the bottom of the engine and up through the bulkhead! A reduction of over 10dB was made when the coil was insulated from the bulkhead and connected, with a thick strap, straight to the cylinder head.

Of course most of these problems don't occur if you use a diesel engine, and you'll get better fuel figures! This leaves us with alternators, which can cause hash (use a filter) and engine management electronic "black boxes" which can cause all sorts of noises but are best left alone unless you know what you're doing! About all you can try is to decouple the supply to ground right by the box and route interconnections separately from the rest of the wiring loom, especially the lead to the coil.

#### **Its so much harder these days, with modern Vehicles?:**

Rubbish... It really doesn't seem so long ago that we were using the back seat for HF Operation. Now we have Rigs that cover from HF to UHF, and not much bigger than a VHF Mobile Transceiver and using only one antenna for all bands..., in some cases even shorter than a High Gain V/UHF Antenna. Okay, granted some interference is dam hard to track down and to totally eliminate in the modern computerised vehicle, but then receiver noise suppression has improved with later rigs, so I guess one cancels the other. Except that Rigs have shrunk in size... From my own experiences it's much easier now!

#### **Do I need an ATU for Mobile?**

I really hope not...If your antenna is not tuned for a designated frequency... forget it...fix it so it tuned... No matter how good your ATU is, you will hardy hear a thing. Not to mention all the RF that will be radiating off your coax and upsetting other vehicle equipment, and possibly the vehicle parked beside you. For a couple hundred dollars you can actually buy a decent antenna, so why bother even considering a \$300 or \$400 ATU.

**Do I need to check SWR?**

Why do we keep getting this question???? One of the two most necessary items in any Ham Radio Shack is a good SWR Meter. Only then are you ready for a Transceiver and an Antenna. As for answering this question "Do I need to check SWR?", I think you've got my drift..