

HF Mobile Frustrations

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Most of us who have been hams for very long have at least thought about installing a HF radio in our car or truck. Hopefully we return to our senses and this impulse passes, but every now and then you see someone start down this path which can have more than its share of frustration and unanticipated problems.

Mobile installations have become a lot simpler with the modern HF rigs that have detachable control heads and relatively small radio bodies. With a little ingenuity they can be fitted into most cars successfully. However there are a few items to consider while planning your installation. These include safety, security, DC power, antennas, and RF noise.

Safety must be forefront as you choose control head location and consider how operation of the rig will be a distraction to your driving. Control head placement is very important in terms of how an airbag might inflate and possibly drive rig parts into your body.

While we all enjoy our hobby we don't want any equipment embedded in our bodies courtesy of an inflated air bag. You, in fact, may be buried with your rig (or at least parts of it) as a tribute to your love of the hobby.

We will likely want to tune the radio (at least change the frequency) while driving. The rig display should therefore be reasonably close to our normal field of vision as we view the road. The further away we have to look to see the control head, the greater the diversion and the greater the possibility of an accident

Other diversion can be caused by tuning the antenna system as you QSY up and down the bands. The screwdriver style of antenna is very effective for mobile work. The only problem is that you have to tune it to the specific frequency on which you intend to operate. As you know, this is done by running a shorting bar up and down the antenna coil (operated remotely by using a screwdriver motor to position the shorting bar) until it becomes resonant to the desired frequency. This practice usually requires you to watch an SWR meter and tune to the minimum value or conversely power output and tune for maximum value.

Some systems actually have memories that move the antenna shorting bar to the desired position automatically; however these tend to be expensive.

Another possibility is to get an automatic antenna tuner and accept the fact that the antenna is out of resonant and let the tuner do the matching work. While there is no ideal answer to this issue, it is good to think about how you intend to operate by talking to some experienced HF mobilers to determine the best alternative for your situation.

Security is simply avoiding the heartbreak of coming back to your vehicle to find your rig missing. While there are a number of approaches to alarming, one of the best approaches is to keep the rig well out of sight. Perhaps the detachable control head can be removed when leaving the vehicle unattended. Also the “flag” represented by your mobile antenna could also be fitted with quick disconnects for easy detachment and storage in the trunk or out of sight in the truck. Also, some hams do not use ham call license plates which can alert a well-informed thief of the possibility of radio equipment in your vehicle.

Noise, DC power and antenna selection considerations are somewhat mutually interdependent. Sometimes it is best to think about how to avoid RF noise in the receiver when laying out an installation. Things that can be considered are isolation and separation as well as shielding. Noise sources often find their way into the receiver through the DC power feed as well as the antenna. Additionally, strong RF fields showing up in the wrong places in the car can create serious vehicle operating problems and possible equipment failure.

It is good to know where the computer is located for the vehicle and route power cables well away from it. Also keep the antenna as far away from it as practical. Power leads serving the radio should be brought all the way back to the battery without any intermediate termination. Also bring both the positive and negative leads back to the battery – don’t rely on the body or frame for the return path of current on the negative terminal side of the installation. A little exploration of your vehicle will identify where cabling is routed around the vehicle. It is also good to avoid routing power, antenna, or control head wiring near this cable. It is particularly good to know how the fuel pump is powered (most are located in the gas tank which means you have a noise source express delivered to your trunk).

Vehicle generated RF noise can also be radiated such that it is picked up by the antenna as well as thought the DC power cabling to your rig. This problem can be addressed by shielding achieved by grounding your trunk lid and hood. While helpful, don’t expect this grounding to eliminate the problem completely.

Ideally, you could find the noise source in your vehicle and fix it at the point of origin. However, you put yourself at risk in terms of voiding warranties if you get too creative in this endeavor. Some car companies will help you in dealing with noise issues while others (such as Toyota) will not support it under any circumstances and will not answer even simple questions about mobile radio installations.

Digital signal processing of the audio signal is also an effective treatment for noise suppression. It certainly improves the signal to noise ratio of the received audio, but if the incoming RF signal is below the noise level, no audio processing will pull it out. Audio signal processing helps with listening fatigue and intelligibility but will not help with weak-signal reception.

Well, you have made it this far in terms of reading about the perils of HF radio installation. If you still are going forward, come to the next club meeting early, look in the parking lot and see who is running HF mobile. Most hams are anxious to talk about their

experiences and you will surely gain insight on planning your own installation. Who knows you may avoid some pitfalls along the way and avoid some of the rework and optimization that many of us have had to do after the initial installation in order to achieve acceptable performance.

Good luck and good (quiet) mobile DX!