ham shack, Digital Voice (DV) contact. There is a time delay, while the audio is converted into digital, on the transmitting radio and back to audio, at the receiver. It was like being in a cave or having some sort of reverberation effect applied to the audio. So, I took one of the radios out to my workshop, in the “shed” behind our house. It Sounded much better. The audio was a little different than FM. I thought the audio sounded better. My wife says it simply sounds different. I then installed an ID-800H in her car and in my truck.

We started talking vehicle to vehicle, simplex on 70cm. D Star, when heard on an analog FM radio, sounds like a computer modem. Thus, since D Star is completely incompatible with analog FM, I chose 445.9625 MHz as our D Star simplex frequency. This is a 12.5 KHz split channel. I did not think we would bother anyone.

There are various two-meter frequencies that are used for D Star: 145.60, 145.61 and 145.67. Note that these are down in the “Miscellaneous and Experimental” section of the two-meter band. The nationwide trend is towards using 145.67 as a calling frequency. Time will tell.

When the IC-91AD handi talkies came out, I bought one. Here again, this is a good analog FM radio. On the digital side, it is pretty much equivalent to the ID-800. The text message is shorter. But, other than that, they behave much the same.

We are now down to the matter at hand: How does D Star perform? There are no repeaters in the area, so all I can discuss is simplex, mobile to mobile and mobile to H/T. Also, I have not tried any data transfer, only DV conversations.

In general you can talk a little further, using D Star than with FM. But, please note that D Star will give you nowhere near the range that you will get with SSB. However, there is a noticeable increase in range, vs. analog FM. Our first QSO ended at six miles. This path was thru concrete and Oak Trees. A few days later we talked for a little over ten miles. Signals were still quite good, when one of us got where we were going.

Like anything digital, D Star is either a one or a zero. With the exception of multipathing, which I will cover, below, you either have a “in the car with you” quality audio or nothing, at all. This is quite a change from FM or SSB operation.

The IC-91AD Handi Talkie arrived. Our first contact was H/T to mobile, over about a seven-mile path. We were hearing each other equally well. I thought the ID-800H was on low power – it wasn’t. When we got home, I checked the power output of both radios. The Handi Talkie was running about 4 watts. The ID-800H was putting out about 45 watts. We were hearing each other equally well, with a 10 db power difference? Interesting. This was not the only time we have noticed this effect.

The arrival of the IC-91 brought the multipathing issue to the forefront. With analog FM, multipathing causes the familiar “picket fence effect”. Multipathing causes distortion of the D Star audio, similar to what you hear on a cellphone. It can render even a strong signal unusable, at times. It is not usually that noticeable working mobile to mobile. H/T to mobile, when the mobile is driving 45 miles per hour, through Oak Trees, it is a real problem. I

thought using two meters, vs. 440, would improve, this problem – it didn't. I think the problem is worse with a H/T because of the small capture area of the antenna. A three-foot long, gain, mobile whip provides some small amount of diversity reception. I think using a repeater, with a 20-foot long antenna will vastly improve the multipathing problem. I understand the APCO P25 (digital voice) radios, that the Highway Patrol uses, have the same multipathing problem.
Conclusions: D Star is a superior mode vs. analog FM. You can talk further, with higher quality audio. Multipathing is a problem, but, I still think D Star to be the better system. Please consider a D Star compatible radio, for your next VHF purchase.
My current plans are to build a 70cm D Star repeater. I should have the equipment, sometime in September. I have been conditionally coordinated a frequency of 441.975 MHz (+5).
For more information on D Star, go to the Icom America website and click on D Star. The forums are particularly interesting. There are other sites devoted to D Star, try a Google or Yahoo search.
The trend is clear. Commercial, public safety and military interests are going Digital. D Star, with its data transfer capability has great potential for public service. I believe that D Star or something like D Star will play a large role in the future of Amateur Radio.

A Laptop Mount for Your Car

By

Geoff Haines, N1GY

When my son was kind enough to give me "Streets and Trips 2008" including the GPS unit for my birthday, I was overwhelmed. I have used GPS enabled mapping software before, but this was a whole new ballgame. The only fly in the ointment was that I had no way to secure my laptop in my SUV. Since leaving it on the passenger seat was not an option, I knew I would have to come up with a mounting system.

After intensive research on the internet, I discovered that I could buy a mounting system for the computer. The research indicated that I could pay anywhere from less than $50 to well over $600. The cheap version did not appeal to me because it looked flimsy, and the price of the sturdy units was out of the question. However, the aforementioned research gave me an idea. With a little bit of thinking, I could probably design the sturdy features of the expensive mounts into my mount, while using the materials similar to the cheap mount. A few hours with pencil and paper, and several more hours measuring the space I had to work with in the SUV, and I had a viable plan.

At this point it is worth reflecting on the requirements I delineated for this project. The majority of the mount had to be removable. The mount had to be very sturdy. The mount had to offer some degree of tilt and swivel for the laptop tray. Also, the laptop would have to be attached to the mount in a way that was both secure and yet easily un-docked when needed elsewhere.

The drawing in Figure 1 shows the design that appeared to meet all of these criteria.

The basic material used was ½" I.D. galvanized pipe from the local hardware store. I did check with one of the big home improvement stores, but their selection of fittings was woefully inadequate for my design. The much smaller hardware store had everything I needed, except for some aluminum tubing I already had in hand. The parts list in Table 1 shows what I used. If you plan to build a similar mount, some of the specific pieces may be different, depending on the specific vehicle and type of laptop you wish to use.

All of the nuts and bolts used were stainless steel and at some point in the future I will probably paint the galvanized pipe and fittings. Since some of the screws used pierce the floor pan of the vehicle, I felt that stainless steel would be the best way to go. I wouldn't want any rust to show up due to the project in the future.

The assembly of the mount began with the partial disassembly of the vehicle. Nothing major, just unbolting the front passenger seat mounts and loosening the back mounts on the same seat. The best way to ensure rigidity for the laptop mount is to connect it securely to the body of the car. The best way to do that is to sandwich the base of the laptop mount between the seat rails and the floor pan of the vehicle. All of the expensive commercial mounts do it this way, so why change it.

One of the 6" straps was bolted to one of the "floor flanges" and after boring out another hole in the strap to fit the seat mounting bolt, it was secured under the inside seat rail. The second strap received a ½" long ¼"x 20 bolt, lock washer and nut. With the nut and lock washer facing up, this strap was then secured under the outside seat rail. With that both passenger seat rails were re-secured to the floor pan and torqued down to factory specs. If all this is done properly, the floor flange should wind up relatively flat and well secured to the car body.

In all likelihood, the position of the flange will not be exactly where one wishes it to be relative to the final position of the laptop. We can solve this dilemma by using piping elbows of 45 or 90 degrees to shift the upper end of the laptop mount to a more favorable location, as shown in the accompanying photographs. With these fittings securely attached to the floor flange and with the upper end of the piping in a vertical position, tightly secure one half of a "plumbing union" to the top of the assembly, as shown in the photos. I found that the half without the nut worked better on the bottom, making it easier to attach the upper portion of the mount when needed. Make doubly sure that all of the piping connections are very tight and unable to move. This part of the mount needs to be as rigid as possible. All further adjustments of the final position of the laptop will take place in the upper portion of the mount.

Using an idea from one of the more expensive commercial mounts, I decided to add another brace parallel to the body of the car, as well as the brace that goes from the mount to the outside passenger seat rail. A conduit clamp of suitable size was clamped around the piping just below the plumbing union and two braces made from 3/8" aluminum tubing were secured to it as shown. The brace that is at right angles to the car centerline was secured to the strap installed earlier under the outside seat rail, using the hardware previously installed. The other brace is secured to the opposite side of the clamp and run forward to be screwed firmly to the floor pan near the center console. These braces increase the rigidity of the lower assembly.

Now that the lower assembly is in place, and before we proceed with the upper

assembly, a few words of caution are in order. Even though the mount appears secure and certainly will not come “unglued”, the piping joints may still be prone to shift a little with time. If desired, it would be smart to remove the seat bolts one more time and take the entire lower assemble to a welder who can tack-weld each junction of pipe and fitting to absolutely fix them in place relative to each other. An alternative would be to use something like “J-B Weld” or “Liquid Steel” to firmly set each joint. This would probably be a good time to paint the lower mount too. Once done, the entire lower assembly can be re-installed under the seat rails of the passenger seat. Now that the lower part of the laptop mount is done, we can move on to the upper assembly.

From the lower end of the upper half of the mount, the order of assembly goes something like this:

The other half of the plumbing union is attached to its mate. A pipe nipple of the correct length is firmly secured to the union. A 90 degree elbow is secured to the nipple. In my particular situation, a 1 ½” nipple, another 90 degree elbow and another 1 ½” nipple brought me to the second floor flange that will be screwed to the bottom of the laptop tray (or desk, if you prefer). Your particular situation may call for using more elbows and pipe to create a double arm to increase the swivel travel for your mount. The drawings show both assemblies, use the one that best fits your situation.

Since the basic swivel function of the mount can be handled by the plumbing union, some of these piping joints can be solidified using the same techniques as with the lower half of the mount. Some of the joints will have to be left slightly adjustable to properly position the laptop for you or your passenger. You will easily determine which connections can be frozen in place with welding or the epoxy compound, and which will need some manually adjustable mechanism. Tilting of the laptop tray can be handled by the top-most 90 degree elbow, and a second swivel joint can be the junction of the piping nipple that directly attaches to the floor flange that is screwed to the bottom of the tray. If it is desired to be able to lock these adjustments in place, there are a couple of possibilities. I used ½” hex nuts, available in the electrical department of the hardware store to create a “lock-nut” against one end of the 90 degree elbow. If you feel like a more aggressive solution, the elbow could be drilled and tapped for a locking bolt or knob. By tightening the bolt against the threads of the pipe nipple, you will lock the elbow in place. I would suggest some kind of rubber tip on the bolt to avoid damaging the threads of the pipe.

The laptop tray can be made of any material you desire. Plywood, Marine-Tex, Aluminum sheet, or Plexi-glass can all be used. Cut a rectangle to match the laptop and add trim pieces to keep the laptop from sliding off accidentally. In my case, I had a monitor shelf that was not being used for its original purpose. I cut the legs off and used them to create stop blocks which were screwed into place to keep the laptop positioned correctly on the tray. A couple of lengths of hook and loop tape from the local fabric shop were fashioned into a strap that fits across the top of the laptop just in front of the screen hinge and keeps the laptop securely on the tray. The white stripe across the front of my tray is a length of wood trim covering up the area where I chopped of the front of the monitor shelf to fit better into the car. Had I not had this shelf unit I would have used ½” plywood for the tray.

Paint and finish the upper mount to your liking and the project is almost complete.

Install the laptop on the tray and connect it to power. Either a DC source if you have a DC cord set for your computer or an AC cord set connected to a small inverter which is then powered by DC. If you go this route, get an inverter capable of real sine wave AC and buy one with at least a 150 watt rating. Your computer will not appreciate stepped sine wave power at any wattage and most laptops will need at least 120 watts of AC power. My inverter is permanently wired into the SUV and controlled by a lighted rocker switch on the center console. I also have similar switches to control the power to both of the transceivers that are mounted in the car. Most laptops have a mouse-like panel built in. If not there are various solutions for mouse control. An optical mouse will work on any surface, including the top of your center console. If there is enough room, a small mouse pad can be secured to the tray or to another area within the seating area.

The total cost for this project was between $40 and $60, not including the tray, nor for that matter, the laptop. An equivalent mount would have cost $200 or more. The price may vary depending on the size of the piping, costs in your location, and the type of tray you construct. As is so often heard in QST, “Your mileage may vary”.

Now that we have your laptop mounted in your vehicle, what can we do with it? The possibilities are almost endless. The obvious use is for GPS enabled mapping software, but almost anything you can do with your computer is also on the table. With a Wi-Fi connection, you can surf the Internet. With a small interface module and the appropriate software, you can do almost any digital mode. You could use software to give you PC control of your radio, if so configured. The possibilities are legion.

There is, however, one VERY IMPORTANT WARNING! Do NOT try to do these things while driving! With your attention diverted from the main task at hand, which is TO DRIVE THE CAR, you are an accident looking for a place to happen. Using the mapping program is one thing, but trying to type a response to another station on PSK-31 or RTTY will put you in the hospital faster than the baud rate of your favorite digital mode. If you want to do some “mobile RTTY”, pull over, find a good parking place, and have at it. If your passenger is a ham, let them do the radio work while you drive the car, or vice versa.

Having your laptop in your car can be very handy for many, many things. It’s just that keeping your concentration on driving isn’t one of them. Field Day, ARES responder, Rover Station, RDF contests, there are all kinds of uses for a computer in your car. But make sure the driver is driving, not trying to change the baud rate or type a response to a QSO.

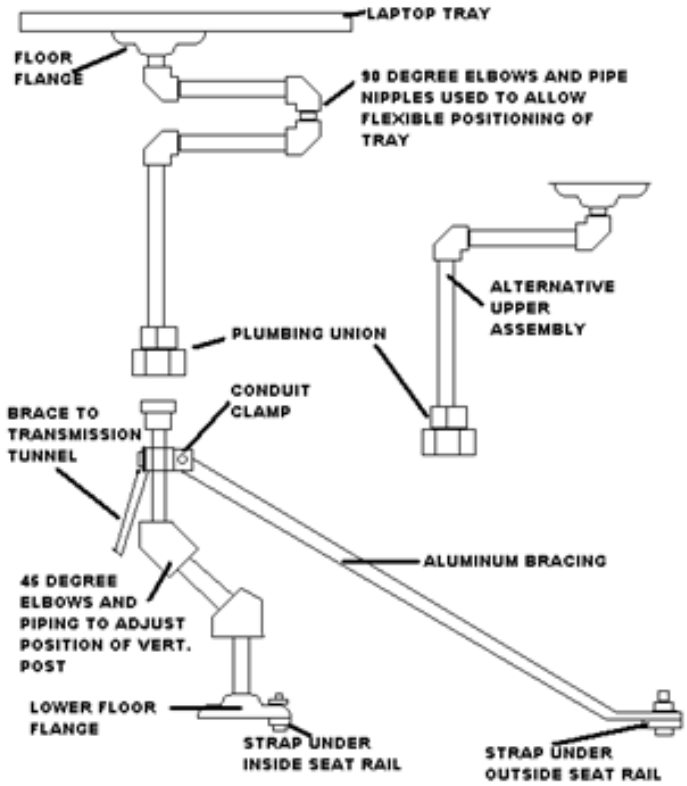
A Laptop Mount For Your Car.

Table 1

Parts List

Part	Quantity
Suitable Tray	1

Galv. Floor Flange 2
45 Deg. Elbow 2
90 Deg. Elbow 2 to 4 Dep. On Final Design
Plumbing Union 1
Pipe Nipple (Close) 2
Pipe Nipple 1 ½” 2
Pipe Nipple 3” 1
Pipe Nipple 6” 1 to 3 Dep. On Final Design
Conduit Clamp 1
Aluminum tubing 2 lengths 12 to 14” as needed
Assorted Hardware as needed
(bolts, nuts,
lock washers,
screws etc.)
Paint as needed
J-B Weld or equiv. as needed



That about does it for this season. I want to wish each and every Ham Radio Operator in West Central Florida a joyous Holiday Season and a wonderful New Year.
73,
Geoff Haines, N1GY
ASM, West Central Florida Section, ARRL
TC, West Central Florida Section, ARRL
Editor, The Experimenter