

GPS Interface for the ID-880H

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The Icom ID-880H is a popular mobile rig for D-STAR digital voice mode operation. With an external GPS module (a combination of the GPS antenna and receiver in one package) connected, the ID-880H radio can also provide GPS reporting. This article describes a relatively simple GPS interface you can make in a few hours, which is powered by a USB outlet and doesn't require any special cables. Note that I chose to hardwire the GPS cable to the adapter and use interface connectors and plugs for the other two cables.

GPS Requirements and Connection

Icom states that any external GPS

module used must have an RS-232C output, in the NMEA data format, and be connected to the radio's data jack. An "optional" data communication cable, OPC-1529R, is available from Icom to make the connection, with the proviso that a null-modem adapter also be used. As noted in the *QST* review of the ID-880H, newer USB-only GPS modules are not compatible with the ID-880H and cannot be used. (QST Jan 2010)

GPS and Mounting

I used the Garmin GPS 18X high-sensitivity module. It has a magnetic base for easy mounting, and it comes with a 5-meter cable with six wire connections. I saw no reason to shorten the cable, but rolled up and tied off what I

didn't need. For mounting using the magnetic base, I used a 1½-inch-diameter plated steel fender washer mounted with hook-and-loop fastener tape on the dash of my car, close to the front windshield, for a good view of the sky. The GPS 18X requires 4.0–5.5 V dc at less than 100 mA, which is easily supplied from the vehicle USB connector or a USB cigarette lighter plug.

Data Jack

The data jack is located on the rear panel of the ID-880H (J5 on the ID-880H schematic), and is an ordinary 2.5-millimeter stereo audio-type jack with three connections: ground, RX data (ring), and TX data (tip). (Note: the Icom schematic appears to

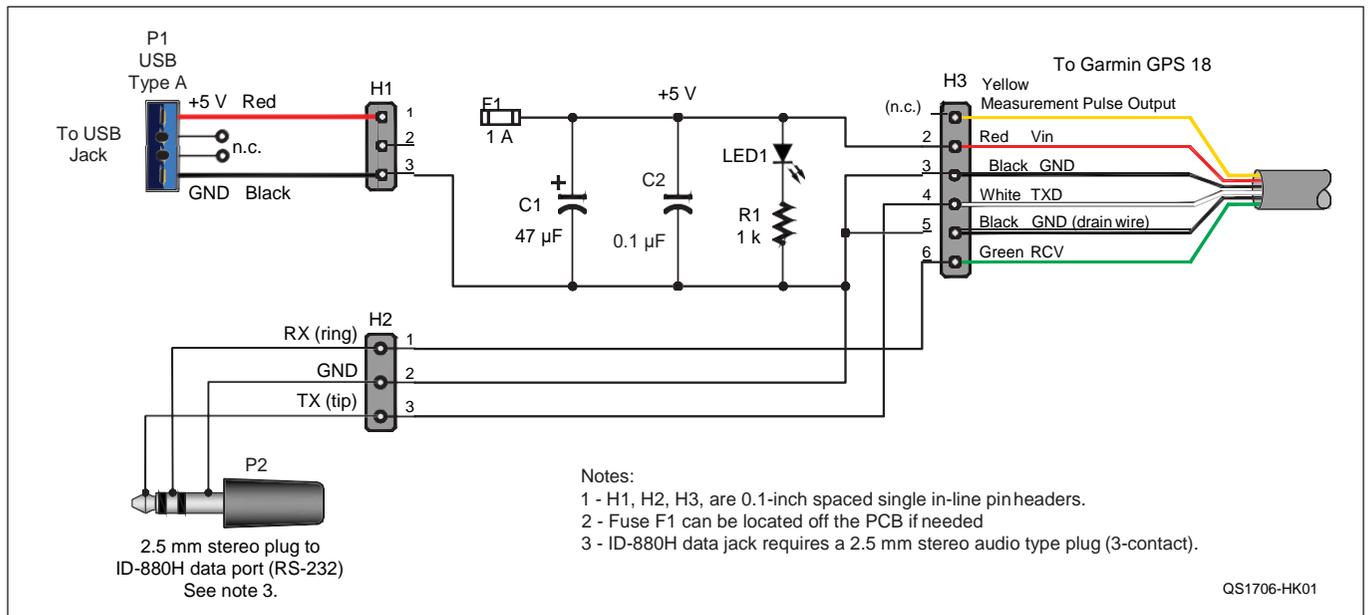


Figure 1 — The schematic diagram of the adapter.

Table 1
GPS Adapter Parts List

Reference	Part Description
C1	Capacitor, 47 uF, 25 V, radial electrolytic
C2	Capacitor, 0.1 uF, 50 V, ceramic
R1	Resistor, 1 k Ω , 1/4 W, 5%
pcb	0.062-inch perforated copper stripboard

have the RX and TX connections to J5 reversed, depending on your interpretation of the jack symbol.) The data jack is connected to a MAX3221 RS-232C transceiver IC, which requires RS-232C RX and TX signal levels (3 to 12 V space, -3 to -12 V mark) for the GPS icon to appear on the ID-880H display.

I used a 1 A fuse, as recommended by Garmin, which can be either on or off the circuit board, as best suits your assembly. Capacitors C1 and C2 are there as “good practice” to decouple any conducted noise on the +5 V supply line. The 3-millimeter green LED is a “power on” indicator and is mounted 1/4 inch above the board by a nylon spacer. This brings it closer to the top of the box, and also lessens the possibility of LED damage when soldering. You may have to adjust the value of R1 to accommodate the LED you use.

USB Cable Preparation

The USB plug cable (Jameco 229682) can be adapted from almost any unused or extra USB cable you have around. Some of the cheaper ones use very thin wire and may not be very robust. A good-quality cable will be marked as using two #28 AWG wires and two #24 AWG wires. The #24 AWG wires are usually the red and black, used for the +5 V supply.

I used an old printer USB cable that had the USB A on one end and the USB B on the other. I simply cut off the USB B end and separated the wires. Keep the red and black, and cut off the others, which are usually green and white. Note: there are some badly made cables that don’t adhere to the color code, therefore, verify that the red and black are indeed the +5 V lines by using a voltmeter while plugging the USB A connector into a known good USB outlet.

2.5-Millimeter Plug and Cable

I used the Digi-Key CP-2203-ND cable for my project. Pre-made stereo audio cables can *sometimes* be found with a 3.5-millimeter plug on one end, and a 2.5-millimeter plug on the other. Simply clip off the 3.5-millimeter end, unless you want to have the cable detachable, then use it with a 3.5-millimeter jack wired to H2.

Assembly and Options

Referring to Figure 1, I mounted the few parts needed (see Table 1) onto a small piece of stripboard [Perforated board with copper traces running horizontally on one side. — *Ed.*] about 1 x 2 inches (see Figures 2 and 3), which fit nicely into a Jameco 18922 plastic box. I installed straight, single-row male pin headers for H1, H2, and H3 (Jameco 68339 cut to size). These made easy attachment points for the cables that make up the USB, radio, and GPS connections. You can solder the wires directly to them or use mating inline female headers.

You could also solder cable wires directly to the underside of the stripboard. Another possibility would be to trim the stripboard down to about 1 x 1.5 inches and use large diameter heat-shrink tubing in place of the box.

In the stripboard layout (see Figure 2), the four double crosses mark four points where the copper strip on the reverse should be cut. Mounting hole locations are shown by the crosshairs. There are also five wire jumpers shown in addition to the components.

This simple adapter is all that’s needed to make your position data available for your D-STAR operations. — 73, Don Dorward, VA3DDN, va3ddn@arrl.net

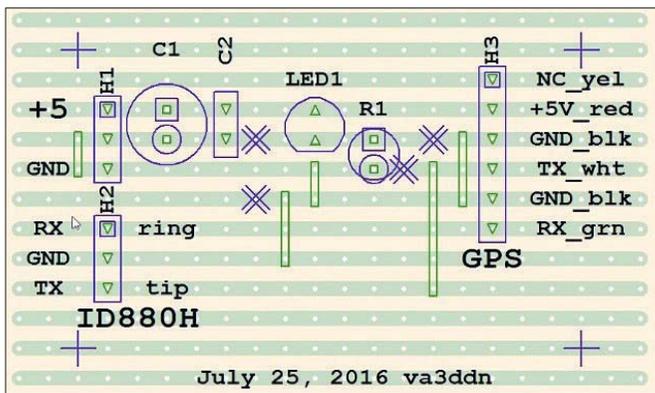


Figure 2 — The parts layout used for the adapter. The layout isn’t critical and can be modified to fit your needs. The material is 0.062-inch perforated copper stripboard, cut to 1.2 x 2.1 inches (www.veroboard.com). [Don Dorward, VA3DDN, photo]

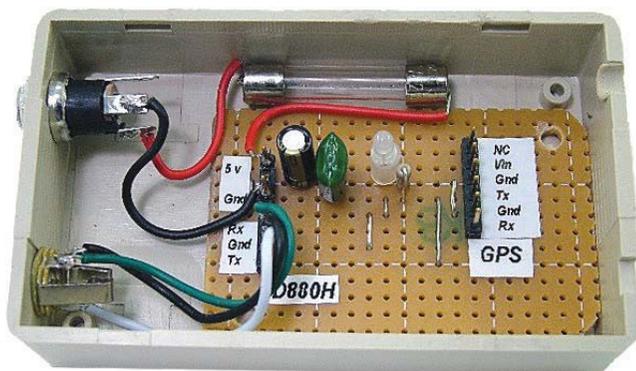


Figure 3 — The assembled adapter mounted in its case. [Don Dorward, VA3DDN, photo]

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Additional Photos not included in the QST article:



NOTE GPS ICON SHOWN IN UPPER RIGHT CORNER OF THE ID-880H DISPLAY

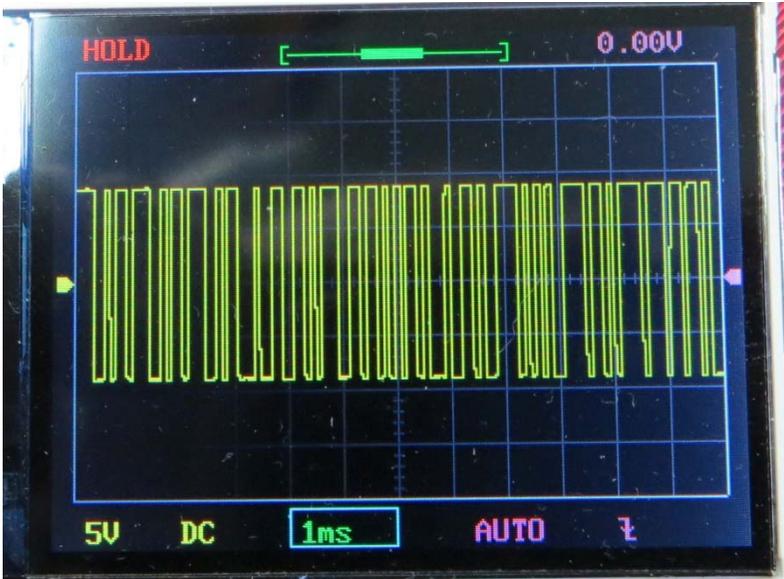


MAIN SYSTEM COMPONENTS (GPS, ADAPTER INTERFACE , CABLES)

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GARMIN GPS-18X MOUNTED ON DASH OF CAR



DSO DISPLAY SHOWING RS-232C OUTPUT SIGNAL FROM GARMIN
(NOTE THE + AND - LOGIC LEVELS, APPROX +/- 9v)