

## ICOM ID-880H: External GPS Antenna

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One of the many options available when operating a D-Star transceiver is to add in APRS styled information as part of DV (Digital Voice) Mode, known as D-PRS or Digital Position Reporting System.

I have been fortunate in that one of the club members (from Branch 63) loaned me his ICOM IC-2820H VHF/UHF transceiver for an extended period of time. As part of this transceiver you need to purchase the ICOM D-Star UT-123 board to add D-Star capability. As part of installing this board you also get in the box an external GPS antenna that is both supplied power from the transceiver as well as returning GPS positioning back in return.



Figure 1: ICOM IC-2820H



Figure 2: ICOM UT-123 D-Star board and GPS Antenna

As I primarily operate in a mobile environment so I decided that the ICOM ID-880H was a better fit for me. I purchased it from ICOM New Zealand as part of the Branch 63 Special offer in 2011. The ICOM ID-880H has the D-Star board already built in at purchase time so it's also a simple solution to add in an external GPS antenna as it is for the IC-2820. After searching the internet I found that the Garmin GPS 18x PC antenna was one that several hams had used with the ID-880H with some success.



Figure 3: ICOM ID-880H

The Garmin 18 antenna comes in various models, the one that I required had a serial DB9 (standard nine pin serial PC styled connector) as well as a cigarette lighter adaptor to supply the required DC to power the GPS antenna. Other versions include USB (ideal for use with laptops); another is just bare wires at the end of a cable so you can roll your own connector.



Figure 4: Garmin GPS 18x Antenna

Additional hardware was also required, a nine pin null modem DB9 adaptor (connector) plus the ICOM Data Cable (Part Number: OPC-1529R Serial Data Cable to PC).

The null modem is required to cross over some of the pins, much like an Ethernet cross over cable.



As I ended up with two female connectors one on each end of the two cables an additional nine pin gender changer was required to complete the connection.

Once the cable was completed it was a simple matter to plug one end into the IC-880H's data port, and the GPS cigarette lighter adaptor into the power socket in the car, then place the GPS antenna with a view of the sky on the dashboard of the car.

Various menu changes have to be made to the IC-880H to transmit D-PRS (Digital APRS styled packets) .One of the most important settings is to get the GPS antenna and the transceiver to talk to each other. You need to set the GPS Speed to **4800 baud** not the default of 9600 baud.

Figure 5: Null Modem Adaptor

See below for additional transceiver settings for the GPS to work correctly and thereby report your position as required. I use ICOM's (free) ID-880 programming software and OPC-1529R Serial Data Cable to make these menu changes - you can of course do it manually through the front panel of the transceiver.

Regardless how you program, under **GPS SETTINGS**.... set the following:

**GPS ON** - checked

**GPS Speed** - 4800 bps (CRITICAL, nominal (default) is wrong)

**Indicator** - checked (displays GPS icon on radio)

**Position Format** - mm.ss (my choice)

**Sentence Format** - RMC & GGA checked (CRITICAL, no other setting)

**TxMode Items** - DVA

**Units** – metric (unless you like feet/mile)

**UTC Offset** - +12:00 (for New Zealand plus 12 hours UTC)

**GPS Alarm** - off (you could turn ON)

**AutoTxTimer** - 30 minutes (you transmit DPRS data with every PTT)

**Unpronto Address** - API880,DSTAR\* (CRITICAL, nominal setting)

**Comment** – Mark ZL2VH-C (you have 39 characters to say whatever you wish....?)

**Data Extension** - OFF

**Symbol** – Car (similar to vehicle choices in APRS; your choice)

**Other symbol** - (blank)

**Time Stamp** - HMS



Figure 6: ICOM ID-880H display showing the GPS top right (indicates the GPS Antenna has a satellite lock). "DV A" appears when GPS transmission or GPS-A transmission is selected in the DV mode.

Track my positioning data (or other club members) on <http://aprs.fi>

**Parts List:**

Garmin 18x PC (<http://www.triginstruments.co.nz>) \$132.25.

ICOM Data Cable (OPC-1529R Serial Data Cable to PC) approximately \$75.00

DB-9 Null Modem Cable approximately \$10.00

**Garmin Reference Information:**

The GPS 18x is offered in 3 different cable configurations. All 3 versions of the GPS 18x come complete with non-volatile memory for storage of configuration information, a real-time clock and raw measurement output data for sophisticated customer applications:

- GPS 18x PC — has DB-9 pin serial connector with a 12 V cigarette lighter adapter; can output data in NMEA 0183 format (industry standard) or proprietary Garmin format.
- GPS 18x USB — has A-style USB connector, compatible with USB 2.0 and 1.1 full-speed hosts; can output data in Garmin proprietary format only.
- GPS 18x LVC — has bare wire for connection to a variety of applications; can output data in NMEA 0183 format (industry standard) or proprietary Garmin format; provides a pulse-per-second logic-level output with a rising edge aligned to within 1 microsecond of UTC time.

The GPS 18x OEM is a high-sensitivity GPS sensor that replaces the GPS 18 OEM.

**Update: July 2012**

Since writing the initial document, I have tidied up the install of the GPS Antenna, so here are some additional pictures:



Figure 7: GPS antenna as viewed from driver's seat, with wiring going into the A pillar.



Figure 8: GPS antenna power connector. This cigarette lighter adaptor connects to a Y adaptor from the main socket in the centre console of the vehicle. The cabling is well out of the way travelling across the dashboard under the steering column.