

## CATNIP II – Electronics Upgrades Part 2

Part 1, covered preparations for installation of a Lowrance HDS9 sonar/chartplotter. The dash panel was fabricated and ready for installation. The connections between the HDS9 and the Standard Horizon GX2150 VHF radio were made with flat 4 trailer light connectors.



After installing the new panel, the GPS position from the chart plotter was displayed on the VHF radio. However, AIS targets were not displayed on the chart plotter. I had not able to test this function previously. Fortunately I could easily access the wiring by removing the 4 screws holding the HDS9 in the dash. My decision to use plugs rather than permanent electrical connections paid off big time.

I reconnected the old HDS8 and found that AIS targets were displayed. This told me that the problem was either the wiring connections or the new chart plotter itself. Assuming the connections for the HDS8 and HDS9 were the same, I had simply duplicated the previous wiring connections. I contacted Radioworld but they were no help. After some browsing on the Internet, I found information from someone who had the same problem. He suggested connecting as follows:

HDS 9 Yellow to GX2150 blue  
HDS 9 Orange to GX2150 Grey  
HDS 9 Green to GX2150 Brown  
HDS 9 bare shield to GX2150 Green

I cut off all the carefully soldered connections to the flat 4 plugs. Then I twisted the wires together and insulated them with bits of tape. I powered everything up and it worked! I removed the entire dash panel, brought it home and remade all the connections permanently with solder, heat shrink and tape.

After reinstallation, I started getting interference on the HDS9 sonar screen. By turning various pieces of equipment on and off, I determined that the source was VHF radio. Also, the radio screen started to freeze. The only way to get the VHF radio to restart was to disconnect and reconnect the power wire. Unplugging the flat 4 trailer light connector used make the NMEA 0183 connections between the HDS9 and the VHF radio eliminated the interference and the radio freezing. I temporarily connected the VHF radio to the old LMS-240 sonar/chartplotter. This eliminated the sonar interference and provided the position data to the radio but AIS targets were not shown on the HDS9.

In desperation, I send an email to Standard Horizon. They responded promptly and expressed the opinion that the NMEA 0183 connection between the HDS9 and the VHF radio was incorrect. After considerable time spent studying the equipment manuals, I discovered that there are two different types of NMEA 0183 wiring. RS 232 has three wires: Transmit (TX), Receive (RX) and Common. The connections are RX to TX, TX to RX and Common to Common. RS 422 has four wires. One pair of wires transmits and one pair receives. There is no Common wire.

Both the Lowrance HDS9 and the Standard Horizon GX2150 have RS 422 connections. The HDS9 manual identifies the NMEA 0183 wires as RX\_A, RX\_B, TX\_A and TX\_B. The GX2150 manual identifies them as RX+, RX-, TX+ and TX-. Obviously the RX wires of the GX2150 connect to the TX wires of the HDS9 and vice versa but there are two ways to connect each pair. Some experimenting was needed. To make this easier, I purchased a terminal strip.



I connected the wires from the VHF radio to one side of the strip and the wires from the HDS 9 to the other side. It was easy to interchange the connections until everything worked. After a little experimenting, I discovered that

RX\_A = RX+, RX\_B = RX-

TX\_A = TX+, TX\_B = TX-

I ended up with the following and so far it is working fine:

<b>HDS 9</b>	<b>GX 2150</b>
RX_A (orange)	TX+ (Gray)
RX_B (green)	TX- (Brown)
TX_A (yellow)	RX+ (Blue)
TX_B (blue)	RX- (Green)

Instead of assuming the old connection would work or believing something from the internet, I should have just figured out the proper connections on my own. Oh well, live and learn.