Application Bulletin

August 3. 2007 Garmin GPS to XLe

Garmin GPS to XLe Application Note

Overview

The HE200GPS183 GPS Receiver (GPS183) is an OCS accessory that provides a variety of GPS data to the control system with a high degree of accuracy. GPS stands for “Global Positioning System” – which consists of a set of earth-orbiting satellites and ground stations. GPS allows a portable receiver to calculate with a high degree of accuracy its current position, time, velocity, etc.

The GPS183 uses NMEA0183 protocol – which is a standard established by the National Marine Educators Association. The GPS183 utilizes RS-232 for data communications, and is powered by 5Vdc. Most OCS models (NX, LX, QX) provide an appropriate 5V output on their serial ports. The XLe does not feature a 5V output – it requires an external 5V, 60mA power supply to power the GPS183.

Products used:

HE200GPS183 Horner GPS

HE-XE105 Horner XLe

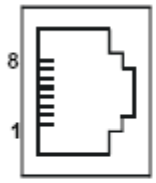
References:

Horner GPS Manual MAN0857-01
XLE Hardware Manual MAN0808-01, 0809-01 and 0810-01

GPS Cable Pin out

Pin	Color	Signal Name	Direction
1	Yellow	1Hz Measurement Pulse	Out
2	Red	Supply Voltage In (5V)	In
3	Black	Signal Common (0V)	-
4	White	Transmit Data (TXD)	Out
5	Black	Supply Voltage Common (0V)	-
6	Green	Receive Data (RXD)	In

XLe Port Pin out



Pin	MJ1 Pins		MJ2 Pins	
8	TXD	OUT	TXD	OUT
7	RXD	IN	RXD	IN
6	0 V	Ground	0 V	Ground
5	NC	No Connect	NC	No Connect
4	CTS	OUT	TX-	OUT
3	RTS	IN	TX+	OUT
2	RX- / TX-	IN / OUT	RX-	IN
1	RX+ / TX+	IN / OUT	RX+	IN

Note:

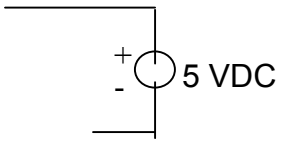
1. The Yellow wire from the GPS is NOT used
2. The Thicker Black wire is for the supply voltage common
3. The XLe pin out is for the port, NOT the cable connector

Wiring Diagram

GPS XLe(MJ2)

1 Yellow (Not Used)
2 Red ---------- Supply Voltage 5 VDC
3 Black (small) ---------- 6 Ground
4 White ---------- 7 RXD

5 Black (Thick) ---------- Supply Voltage Common (0V)
6 Green ---------- 8 TXD

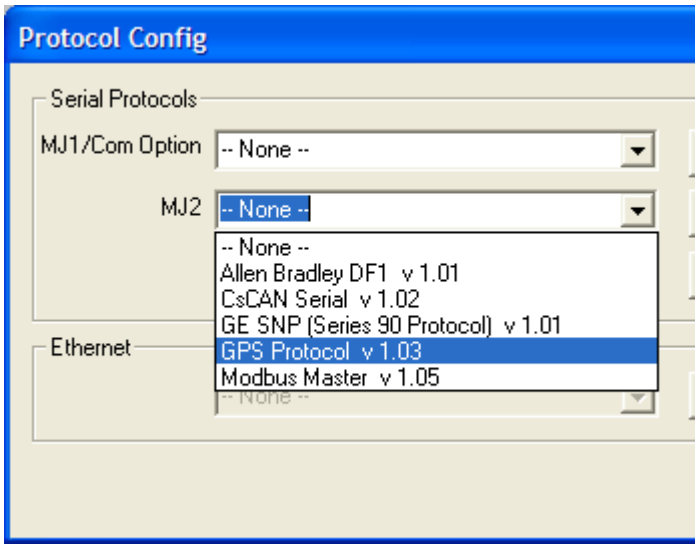


Configuration inside of CsCAPE (v8.10 or higher)

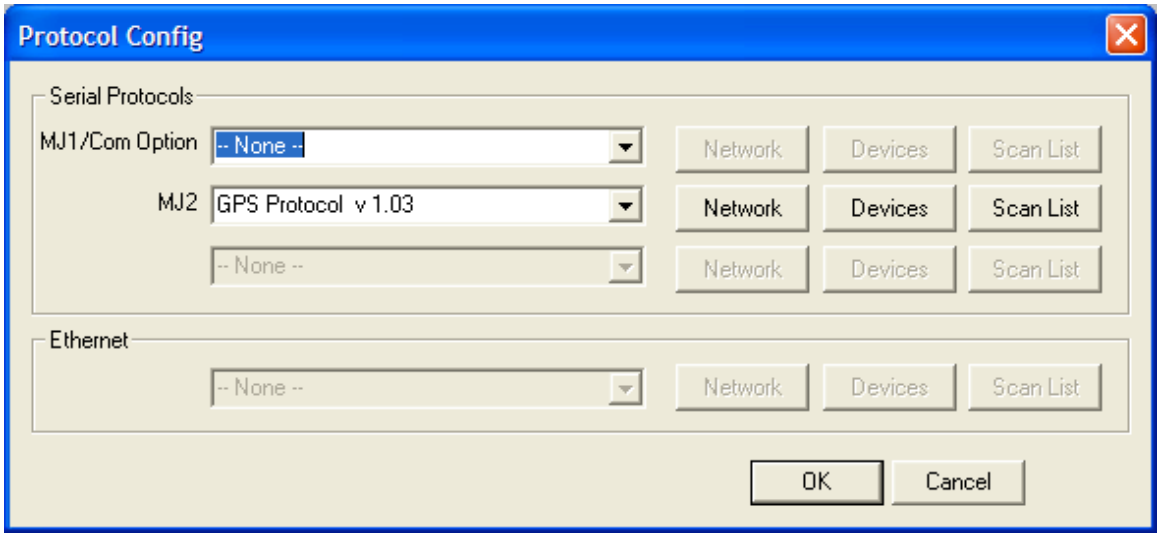
Use comm. Port 2 (MJ2) on the XLe. This will keep you programming port (MJ1) available for CsCAPE programming, diagnostics, and troubleshooting.

Use CsCAPE to set MJ2 protocol to the GPS protocol

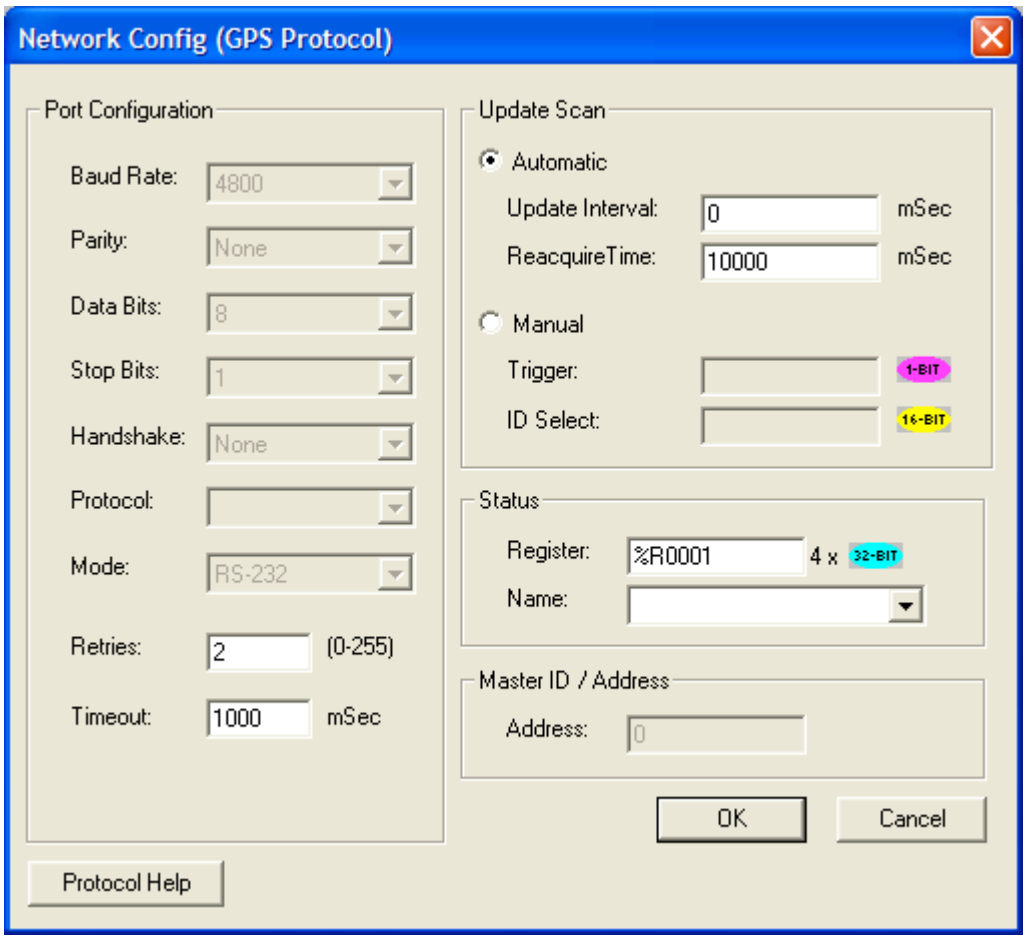
1. Open CsCAPE
2. Set the hardware configuration to your model of XLe
3. Select **Program** then **Protocol Config**…
4. From the drop down list on **MJ2 select GPS Protocol v1.03**



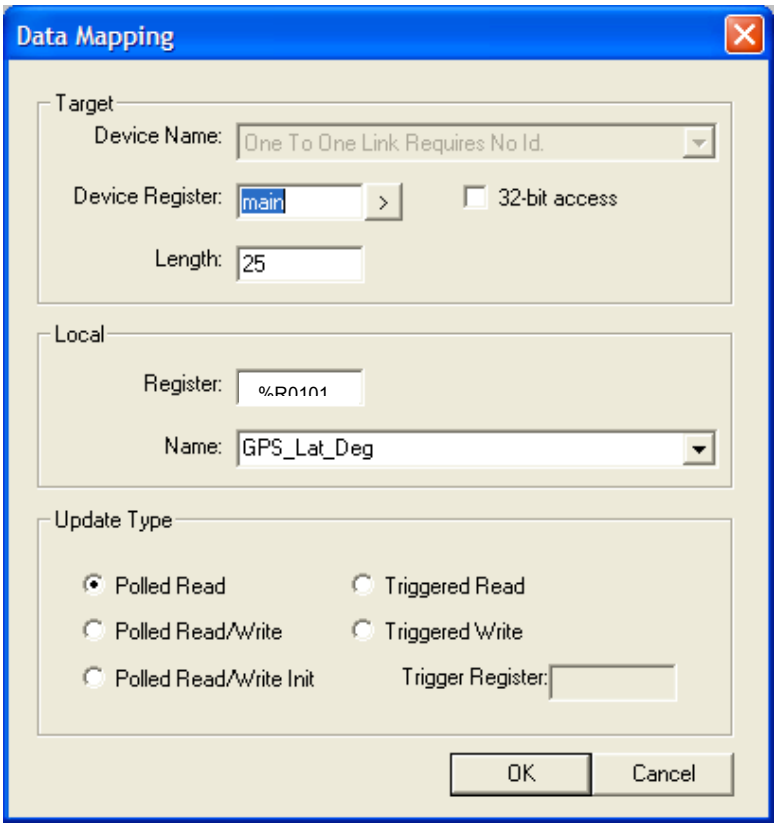
This will add the GPS Protocol to the MJ2 field. You are now ready to start the three steps required for any protocol configuration



5. The first step is to set the **Network Setup** parameters. This is to configure the comm. Port settings. Baud Rate, Parity, Data Bits, Stop Bits, Handshaking, Protocol, RS232 or RS485, Scan Update Rate, Timeout and retries. All of these parameters are defaulted to the correct parameters. **The only thing you need to set in this box is the Status Registers.** I used %R1 for this demo. This will give you information about the status of the communications between the GPS and the XLe on MJ2.

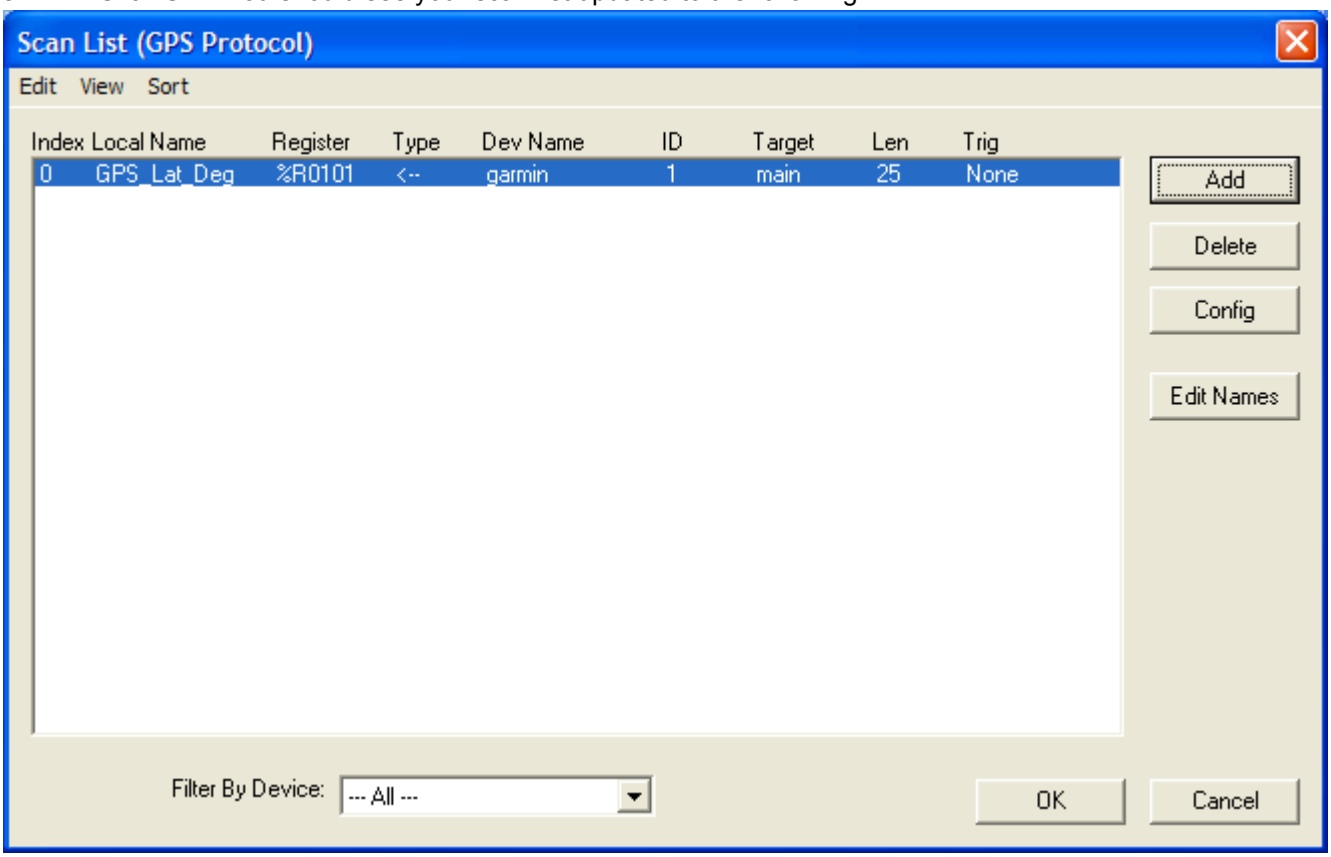


6. The second tab is to configure the device. In this case there is only one device and this has been done for you. With the GPS protocol selected, **you will not be able to select this tab**.



7. The last step in the protocol setup is to set the scan list.
Click this tab and select the **Add Button**.
You only need to fill in two fields in this area.
Set the Length (number of words) to 25
Set the Local Register Address (I used %R101).
Note that the Target-Device Register defaults to main. You do not need to fill this in

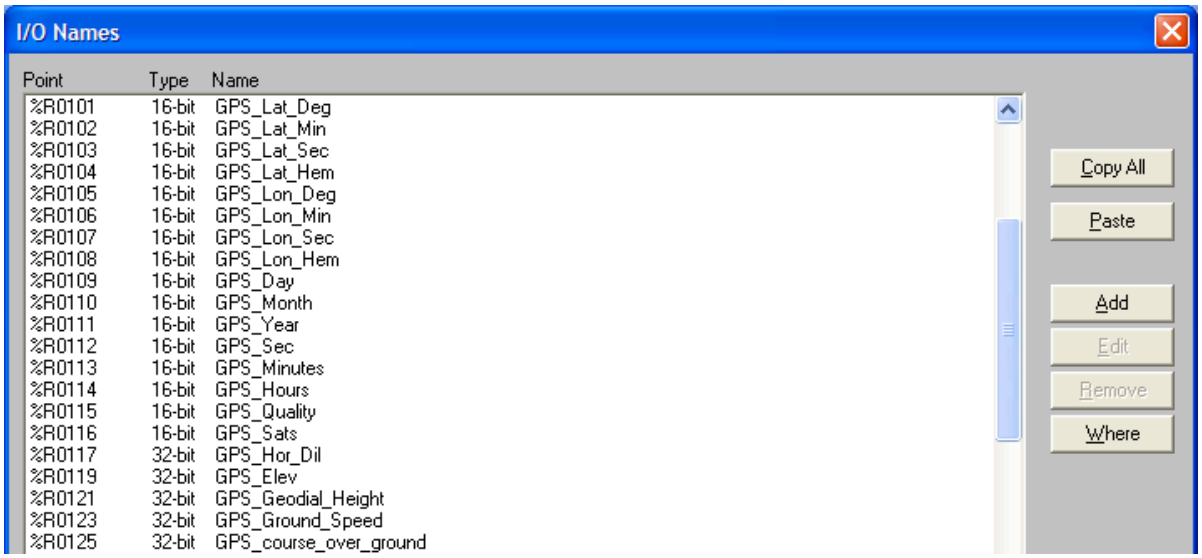
8. Click **OK**. You should see your scan list updated to the following



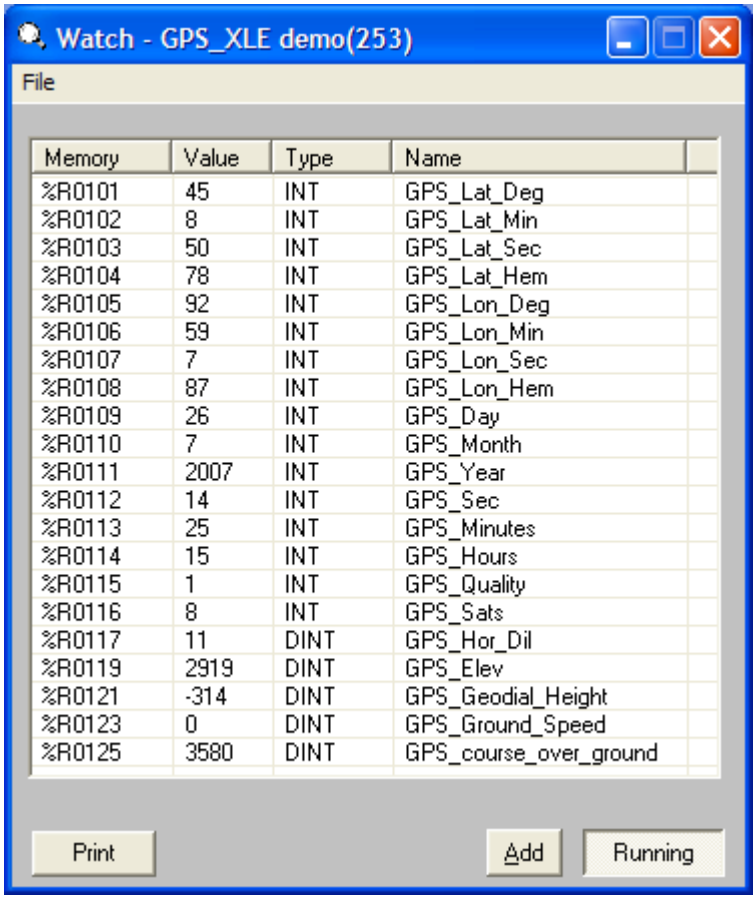
9. Click **OK** to accept the Scan List

10. Click **OK** to Accept the Protocol Configuration.
You are now done with the protocol setup

11. The next step is to **do the I/O Name setup** for all of the GPS data. This data will start at %R101 and go through %R125.
See Table below for actual GPS data descriptions: (The GPS Manual will also give you detailed descriptions, Ranges, and engineering units for each data point)

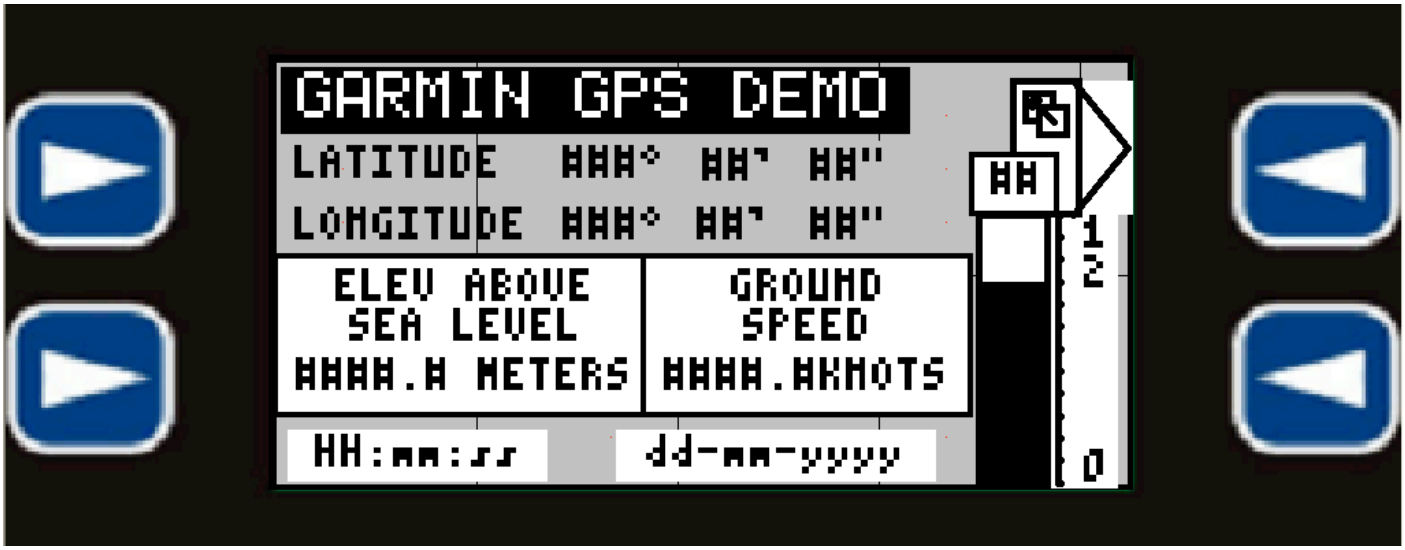


12. **Create a Data Watch** window with all of the GPS data in it.
See this to the right:



13. The last step is to **use the GPS data in your Relay Ladder Logic, Data Logging or Display Screens**.

See Examples of GPS Data on the XLe Screens Below:



Additional Information to Connect GPS to other OCS X Products (see Below table)

Pin	Color	GPS183 Signal Name	XLe MJ2 RJ45	NX CN1 10-pos terminal	LX CN1 25-pin Dsub	QX CN1 25-pin Dsub	QX MJ2 RJ45
2	Red	Supply Voltage In (5V)	Ext. P/S*	9	9	9	3 or 4
3	Black	Signal Common (0V)	6	6**	7	7	5
4	White	Transmit Data Out (TXD)	7	7	3	3	7
5	Black	Supply Voltage Common (0V)	Ext. P/S*	6**	10	10	6
6	Green	Receive Data In (RXD)	8	5	2	2	8

Summary

Horner APG wrote this document on August 3, 2007. Questions or comments can be directed to the Tech Support Department by phone at 317-916-4274 or email techsppt@heapg.com.