



GPS Tracking with Garmin GPSMAP 557 Display

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Overview

The M7 GX series of GPS transponders may be directly connected to a **Garmin GPSMAP 557** marine navigation display. When connected, the Garmin display map will show the location of the vessel in addition to the location of all other M7 transponders within radio range. This unique feature allows the user to quickly, easily, and inexpensively make a mobile AVL system for tracking marine vessels, or anything where a Raveon M7 GX transponder is installed.

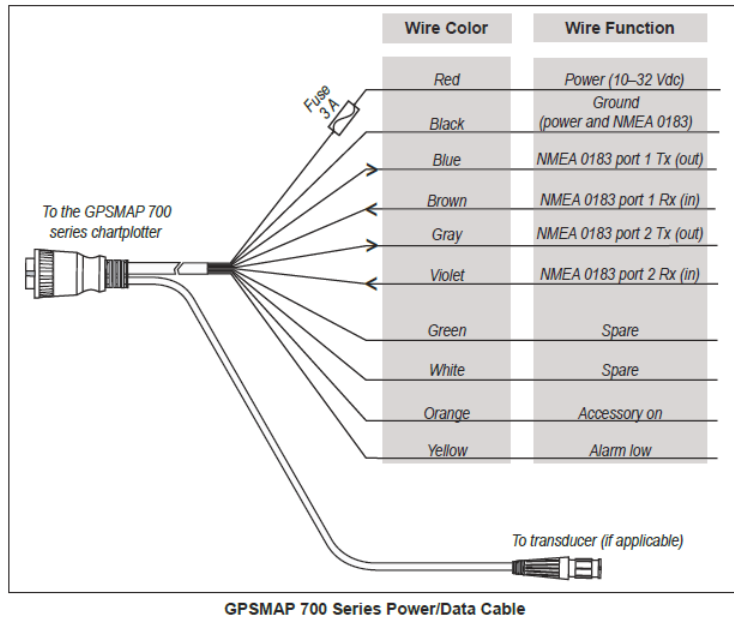
The GPSMAP 557 has a built-in interface for **NMEA 0183** devices. The NMEA 0183 is an RS232 serial connection that typically operates at 4800 baud (settings are available to use 38400 baud rate). It is used to exchange waypoint and other information such as water temperature or wind speed.

When Raveon's M7 GX transponder is connected to the Garmin display using the NMEA 0183 connection, the M7 transponder can put icons on the screen of the Garmin display. As the transponder receives updated positions from other vehicles, it updates the position of the icons on the Garmin display.

This technical brief is written specifically for the GPSMAP 557. The Garmin GPSMAP 527 has also been found compatible per these guidelines. It is anticipated that any unit of the Garmin GPSMAP 500/700 series will integrate with an M7 as described. However, as individual display characteristics may vary, the user is strongly encouraged to not assume full functionality but should any displays being considered.

Portions of the information and diagrams below were taken directly from the Garmin manuals supplied with the 557 display.

Garmin GPSMAP 500/700 Wiring



Notes:

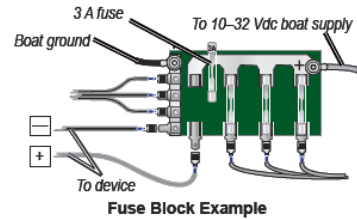
- Use an AGC/ 3AG - 3 Amp replacement fuse.
- If it is necessary to extend the power and ground wires, use 16 AWG wire.
- You can wire the cable directly to the battery, or if your boat has an electrical system, you might be able to wire the cable to an unused holder on the fuse block. If you use the boat fuse block, remove the in-line fuse holder on the power wire of the cable.
- Do not cut the transducer cable, because this voids your warranty.

NOTICE

The maximum input voltage is 32 Vdc. Do not exceed this voltage because this can damage the chartplotter and void the warranty.

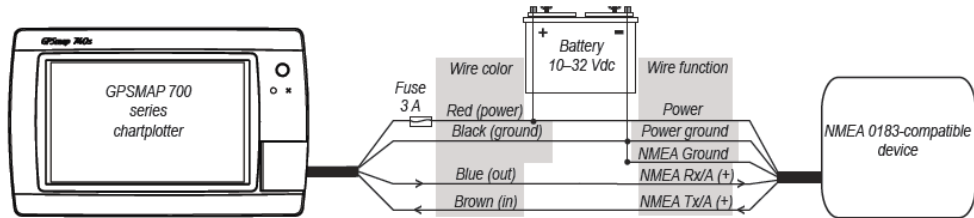
Connecting the Power/Data Cable to Power

1. Use a test light or a voltmeter to determine the polarity of the voltage source.
2. Connect the red (+ or positive) wire to the positive voltage terminal. (If you use the fuse block on the boat, route the positive connection through the fuse, as shown on the diagram.)
3. Connect the black (- or ground) wire to the negative voltage terminal.
4. Install or check the 3 A fuse (in the in-line fuse holder, or on the fuse block of the boat).



Connecting the Power/Data cable to a NMEA 0183 Device (Optional)

You can connect the GPSMAP 700 series chartplotter to other NMEA 0183-compatible equipment, such as a DSC or AIS device. Refer to the wiring diagram for connecting the chartplotter to NMEA 0183-compatible devices.



Wiring a GPSMAP 700 Series Chartplotter to a Standard NMEA 0183 Device

To connect the power/data cable to a NMEA 0183 device:

1. For Garmin devices, the ground (black) wires serve as NMEA 0183 ground and must be attached together or on the same terminal as the NMEA 0183 ground on your NMEA 0183 device. Refer to the wiring diagram of your NMEA 0183 device for wire identification.
2. Connect the blue (NMEA 0183 port 1 out) wire from the GPSMAP 700 power/data cable to the NMEA 0183 in (or Rx/A +) wire from the NMEA 0183 device, and the brown (NMEA 0183 port 1 in) wire to the NMEA out (or Tx/A +) wire from the NMEA 0183 device.
3. Repeat step 2 using the gray (NMEA 0183 port 2 out) and violet (NMEA 0183 port 2 in) wires for an additional NMEA 0183 device.
4. Set the serial port (or ports) on the chartplotter to use NMEA 0183 data (standard or high-speed). See the *GPSMAP 700 Series Owner's Manual* for more information.

NMEA 0183 Cable Connections

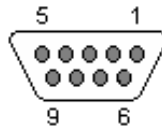
NMEA 0183 is a standard communications format for marine electronic equipment. For example, an autopilot can connect to the NMEA interface on the GPSMAP 500/700 and receive positioning information. The GPSMAP 500/700 can exchange information with any device that transmits or receives NMEA 0183 data. See the following diagram for general wiring connections. Read your other product's owner's manual for more wiring information.

NMEA 0183 Wiring (Data cable)

To exchange NMEA 0183 data, the Garmin GPSMAP 500/700 has two NMEA 0183 communication ports. Com port one (Com-1) can be used to receive NMEA formatted GPS data. The com port can also transmit NMEA format GPS data to another device via an RF data radio, or other NMEA 0183 modules by directly wiring them together. Com-1 uses the brown wire to transmit, the black wire to receive and the black wire for signal ground.

The M7 DB9 Serial Connector

The 9-pin serial I/O connector to the M7 is a female 9-p D-subminiature connector having the following pins configuration.



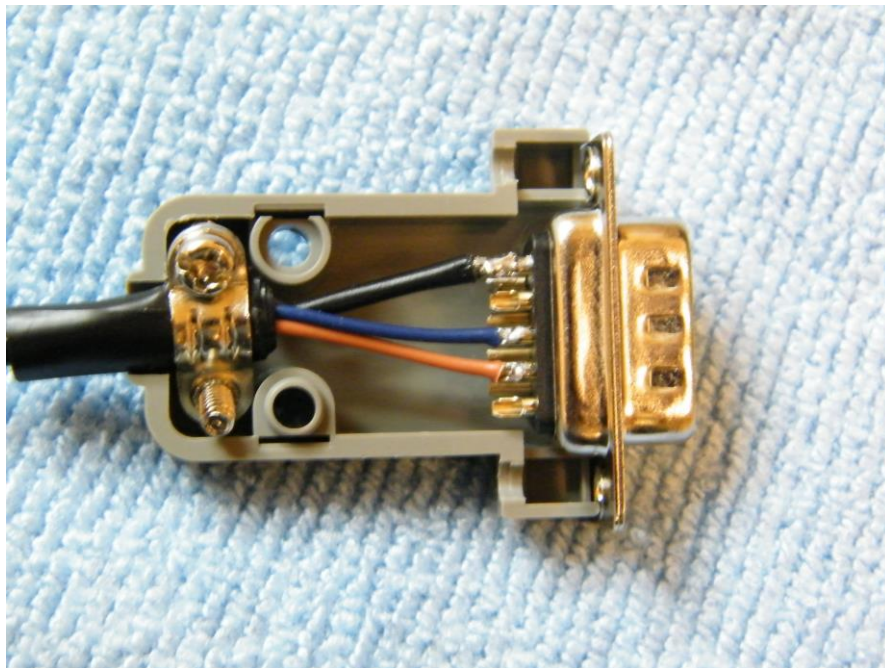
Front-view of DB-9 connector on modem (female)

Pin #	Name	Dir	Function	Level / Specification
1	CD	out	Carrier detect	
2	RxD	out	Receive data	Data out of the modem.
3	TxD	in	Transmit data	Data into the modem.
4	DTR	in	Data terminal ready	
5	GND		Ground connection	Signal and power ground
6	DSR	out	Data Set Ready	
7	RTS	in	Request to send	
8	CTS	out	Clear to send	
9	Power	In/out	DC power	User may supply the DC power to the modem on this pin.

Configuration

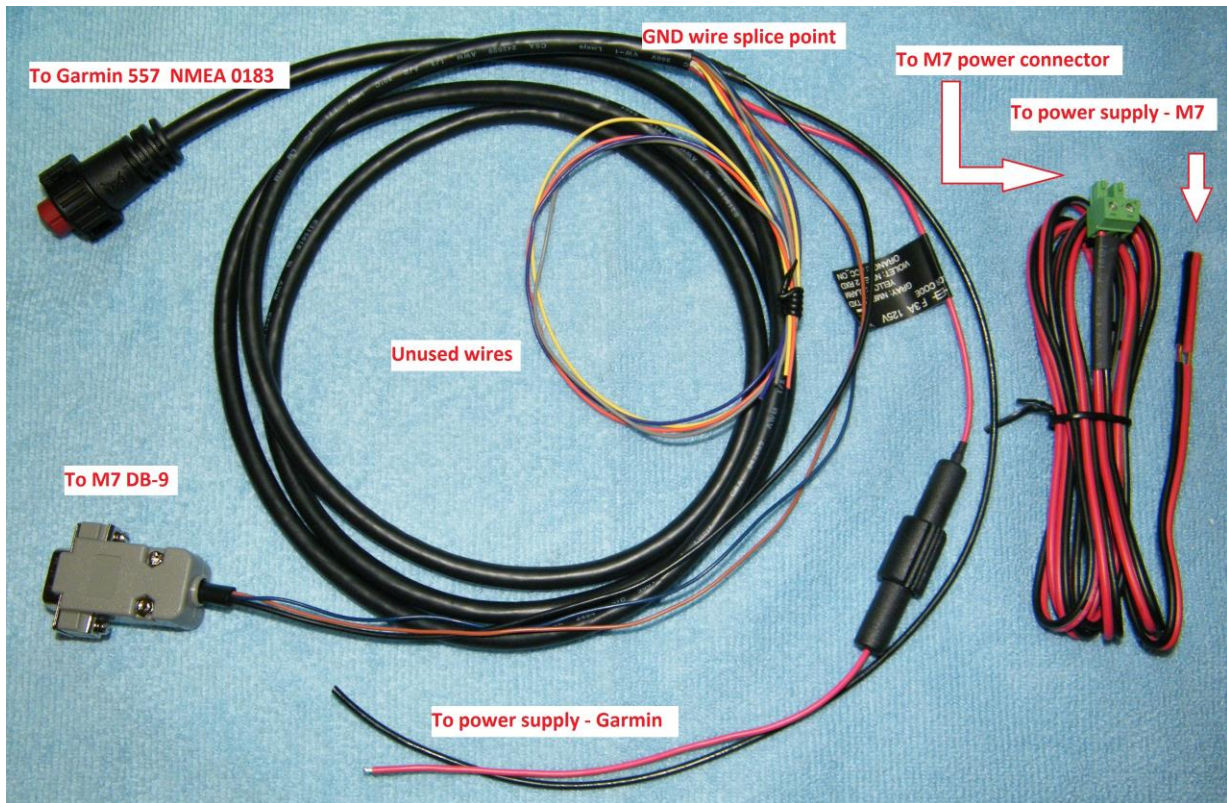
Wiring the DB9

The Garmin's "Data Cable" must be connected to the M7 transponder. This connection will allow the M7 to put icons on the screen of the Garmin display, showing the location of other tracked vehicles. The Raveon M7 GPS transponder uses a 9-pin DB9 connector to connect to the Garmin. Solder the Garmin data cable wires onto a DB9-male connector as shown below:



Connect the **brown wire** to pin 2 of the DB9, the **blue wire** to pin 3, and the **black wire** connects to pin 5 of the DB9. In this example, electrical tape was used to keep the wires together and to provide a clamping point for the strain relief clamp for the DB9 shell.

**Note: typically a straight serial cable is used when connecting an M7 to other devices. The above configuration is a direct connection to the radio and already accounts for swapping TX and RX. The naming of these wires might be confusing, but wiring by colors will be correct.*



To power the Garmin, use the provided red wire with the in-line fuse. However, as we used the black wire in the DB9 connector, a second ground wire will need to be spliced off of the existing black ground wire. 16AWG wire is recommended. Be sure to use shrink tubing to cover any solder joints.

The remaining wires on the Garmin GPSMAP 500/700 display are not used in this example, and may be wrapped up with electrical tape and tucked away.

Configuring the Garmin

Set the NMEA communication of the Garmin to 4800 baud by navigating the menus through **Settings > Communications > NMEA 0183 Setup**.

Configuring the M7 GX Transponder

Raveon has designed the M7 GX transponder to work with the Garmin display or any other NMEA 0183 display that can accept the "\$GPWPL" NMEA message. The Raveon M7 is able to accept 'WPL' messages from multiple units all with unique IDs and output them to the GPSMAP 557. The GPSMAP 557 is able to accept these 'WPL' messages from multiple IDs and simultaneously track and display each individual unit in real-time. The \$GPWPL is an industry standard message that the Garmin displays and many other GPS displays interpret as a waypoint command.

To configure the M7 transponder to output the \$GPWPL message, the M7 GX will need to be set to GPS mode 4. To do this, put it into command mode by sending +++ into the serial port. The M7 will respond with an OK. Type 'GPS 4' and press enter to put it into GPS 4 mode. The unit will automatically switch the baud rate to 4800 upon exiting command mode if it was set to another rate (use the command 'EXIT'). GPS 4 is the mode that causes the M7 GX to output \$GPWPL messages whenever it receives a status/position message over the air.

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