

CompetitionPilot Connector Set

by Patrick Townsend-Wells

Pilots using out-of-the-box cables to connect their CompetitionPilot (CP) devices take along a lot of needless gear. Eliminate excess cable and adapters by making an efficient connector set using common stereo cable and connectors that cost about \$10 USD (less than a Foretrex-to-computer cable).

This article describes how to make a connector set to join any two common CP devices at one time: Palm PDAs (series III to VIIx, M, or T), GPS units with a round Garmin plug, and computers with an RS-232 serial port. Optionally, a Garmin Foretrex can be connected to a computer. The wiring connects Transmit Data (TXD or Data Out) from one device to Receive Data (RXD or Data In) of the other device, and ground to ground for both devices.

Based on 3-wire stereo connectors, sets for different GPS and PDA models may be similar.

Planning

You have three options in making the connector set:

- Option 1 You want the least in-flight clutter, the GPS and Palm are close together in flight (on a flight deck), and you will download from a computer to a Garmin using a USB cable (not in the set) and from a Garmin to a Palm (with CP version 1.5.4 and later). The GPS and Palm adapters are connected by stereo jacks.
- Option 2 You want low in-flight clutter, the GPS and Palm are close together in flight (on a flight deck), and more download methods than option 1. The main adapter connects the end adapters.
- Option 3 You want the fewest parts in a complete set, or the GPS and Palm are not close together in flight. The main cable provides most of the length needed to connect the end adapters.

The required parts depend on your chosen option and how you download waypoints/routes:

Use Scenario	Option 1		Option 2					Option 3					
	GPS Adapter	Palm Adapter	Main Adapter	GPS Adapter	Palm Adapter	Computer Adapter	Inverter Adapter	Foretrex Adapter	Main Cable	GPS Adapter	Palm Adapter	Computer Adapter	Foretrex Adapter
A) Use GPS and Palm for in-flight ops.	✓	✓	✓	✓	✓				✓	✓	✓		
B) Download from a computer USB port to a GPS using a Garmin USB cable (not in the set). Download from a GPS to a Palm unit.	✓	✓	✓	✓	✓				✓	✓	✓		
C) Download from a computer serial port to a GPS. Download from a GPS to a Palm.		Garmin cable	✓	✓	✓	✓			✓	✓	✓	✓	
D) Download from a computer serial port to a GPS and a Palm.		Garmin and Palm cables	✓	✓	✓	✓	✓		✓	✓	✓	✓	
E1) Download from a computer serial port to a Garmin Foretrex and stereo jacks are 2.5 mm.		Garmin cable	✓			✓		✓	✓			✓	
E2) Download from a computer serial port to a Garmin Foretrex and stereo jacks are bigger than 2.5 mm.		Garmin cable	✓			✓		✓	✓			✓	✓

Equipment and Parts

You need the following equipment: soldering iron, flux, cable cutters, electrical tape, and a *wet* sponge. You need the following parts:

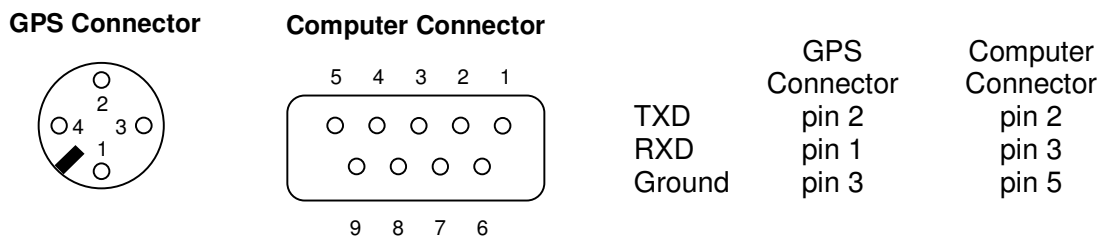
- All options:
 - A Garmin GPS-to-computer round plug cable
 - A Palm-to-computer cradle/cable
- Option 1:
 - Female stereo jack (1), male stereo jack (1)
- Option 2:
 - A female-to-female stereo adapter
 - For use scenario:

	A&B	A&C	A&D	E1 or E2
Female stereo jacks:	(0)	(0)	(1)	(1)
Male stereo jacks:	(2)	(3)	(4)	(1)
- Option 3:
 - A male-to-male stereo cable of suitable length
 - For use scenario:

	A&B	A&C	A&D	E2
Female stereo jacks:	(2)	(3)	(3)	(1)
Male stereo jacks:	(1)	(1)	(1)	(1)
 - If a Foretrex adapter is purchased instead of made, E2 doesn't require additional female or male jacks

Garmin GPS-to-Computer Cable

The out-of-the-box cable has a GPS round plug and computer connector, illustrated below as you look at their ends and connected as below. In the set, both connectors will be used.

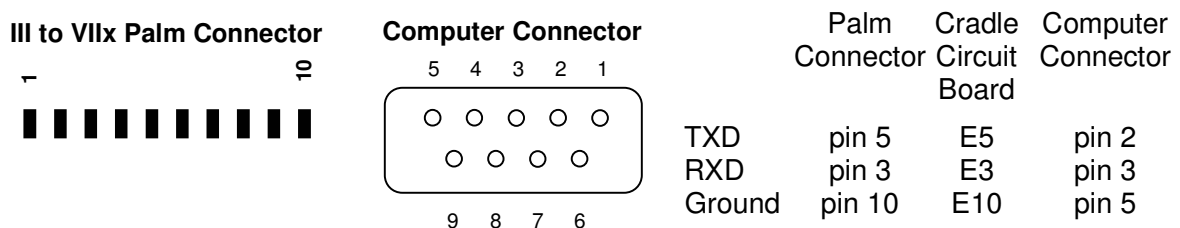


Palm-to-Computer Cable

There are two types of Palm cables: one for the III to VIIx series and another for the M and T series.

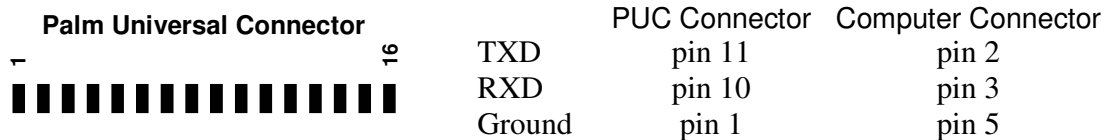
III to VIIx Series Palm

The out-of-the-box cable has a 10-pin Palm connector and an RS-232 computer connector, illustrated below as you look at their ends (cradle pin 1 is the farthest left) and connected as below. In the set, the Palm connector is used and the computer connector is not used.



M and T Series Palm

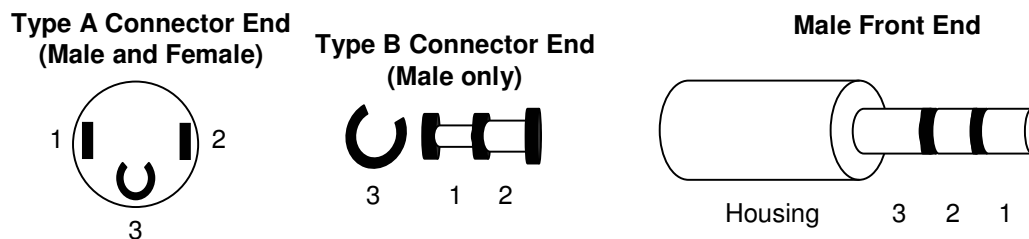
The out-of-the-box cable has a 16-pin Palm Universal Connector (PUC) and a USB computer connector, illustrated as you look at their ends (PUC pin 1 is the farthest left) and connected as below. In the set, the PUC connector is used and the USB connector is not used. PUC pins that were not connected to the USB connector will be connected to a stereo jack.



Stereo Jacks

All stereo jacks, except the Foretrex male jack to the GPS, must be the same size, typically 2.5 mm, 3.5 mm, or 1/8 inch. If you use 2.5 mm in option 3, you can connect a Foretrex to a computer without an adapter. The Foretrex adapter must be used in option 2 even with 2.5 mm jacks. However, typical 2.5 mm jacks are more difficult to solder than larger sizes. If you use a larger jack size, you can buy or make an option 3 Foretrex adapter.

Only three wires from the Palm, GPS, and computer connectors are connected to the coaxial stereo jacks. All unused wires will end up unconnected inside the jack housing.



There are two common types of male connector ends. Pin 3 is always connected to the ground wire. Pins 1 and 2 always connect TXD from one device to RXD of the other device.

Assembling the Connector Set

Some assembly procedures are common to all options and some are specific to your chosen option.

All Options

For the Palm cable: cut the cable so it is just long enough to easily bend.

For the GPS cable: remove the two screw connectors from the molded computer connector, cut off the car power wire (if attached) and tape the wire end, cut the main cable so the plastic cylinder stays with the GPS connector (to minimize interference) and long enough to easily bend.

The following are the general steps to solder a stereo jack onto a cable end:

- Remove the outer insulation from the cable, far enough back to easily work with the individual wires but short enough so the jack housing can cover the wires.
- Cut back the unused wires so that their ends are away from the connection area.
- Cut the wires to be connected to suitable lengths and strip the ends.
- Put the jack housing on the cable away from the connection area BEFORE soldering.
- Solder the wires to the indicated pins on the jack.
- Screw the jack housing onto the jack to complete the assembly.

Palm Cradle Modification

You can take apart a III to VIIx series cradle and use the piece that holds the Palm and the base that holds the connector circuit board and connector. At a minimum, the Palm connector and the larger circuit board are needed. M and T series cradle modifications may be similar.

Remove plastic to make the cradle was relatively flat and still hold the Palm unit. Remove the HotSync button and its small circuit board, since HotSync is not needed for CP operations or waypoint/route download. Remove the base plastic that makes up the strain relief for the cable; put two holes in the remaining base plastic and use a cable tie to secure the cable to the base.

Option 1

A main adapter or cable is not used as in the other options. The GPS and Palm adapters are connected by female and male stereo jacks.

For the GPS cable, solder a female jack onto bare wire ends. For the Palm cable, solder a male jack onto the bare wire ends. The following illustrate and list the pin connections:



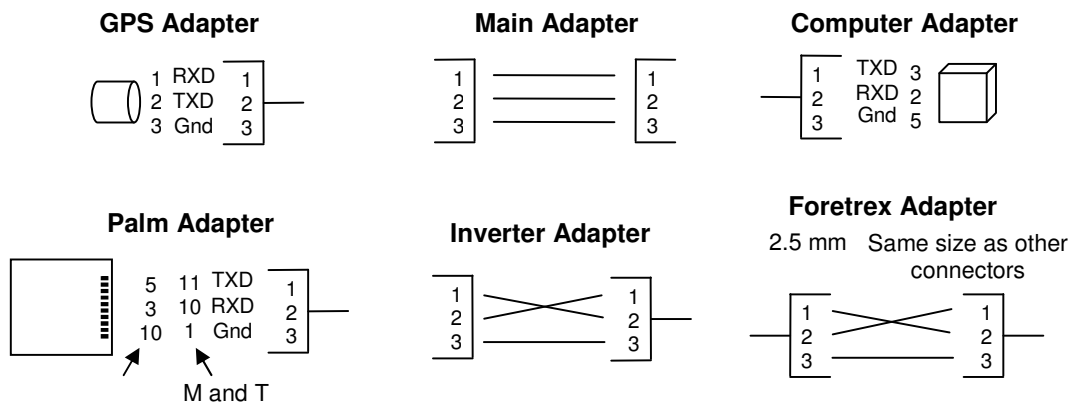
GPS Adapter		III to VIIx Palm Adapter		M and T Palm Adapter	
GPS connector	Male jack	Palm connector	Male jack	Palm connector	Male jack
pin 1	pin 1	pin 3	pin 2	pin 1	pin 3
pin 2	pin 2	pin 5	pin 1	pin 10	pin 2
pin 3	pin 3	pin 10	pin 3	pin 11	pin 1

Option 2

Buy a female-to-female stereo adapter to use as the main adapter. Since it has straight-through connections that cannot be inverted, an inverter adapter must be made for connecting the Palm unit to a computer. GPS adapter wiring makes the inverter adapter unnecessary when connecting a GPS unit to a computer or a GPS unit to a Palm unit.

For the GPS, Palm, and computer cables, solder a male jack onto the bare wire ends. For the inverter and Foretrex adapters, use excess cable and solder a female jack and a male jack onto bare cable ends.

The following illustrate and list the pin connections:



GPS Adapter		Main Adapter		Computer Adapter	
GPS connector	Male jack	Female jack 1	Female jack 2	RS-232 connector	Male jack
pin 1	pin 1	pin 1	pin 1	pin 2	pin 2
pin 2	pin 2	pin 2	pin 2	pin 3	pin 1
pin 3	pin 3	pin 3	pin 3	pin 5	pin 3

III to VIix Palm Adapter		M and T Palm Adapter	
Palm connector	Male jack	Palm connector	Male jack
pin 3	pin 2	pin 1	pin 3
pin 5	pin 1	pin 10	pin 2
pin 10	pin 3	pin 11	pin 1

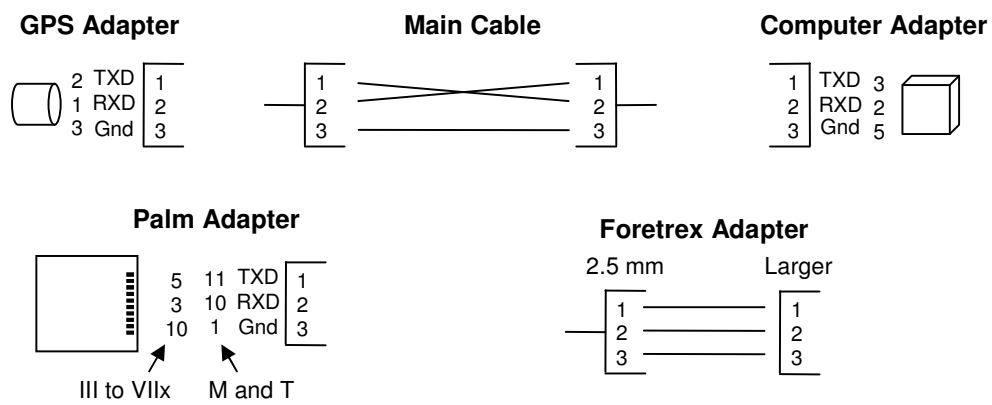
Inverter Adapter		Foretrex Adapter	
Female jack	Male jack	Male jack	2.5 mm male jack
pin 1	pin 2	pin 1	pin 2
pin 2	pin 1	pin 2	pin 1
pin 3	pin 3	pin 3	pin 3

Option 3

For the stereo cable, cut off one jack so the cable spans the distances required for your device layout.

For the stereo cable, solder a male jack onto the bare wire end. For the Palm, GPS, and computer connector/cables, solder a female jack onto the bare wire end to complete the adapters.

The following illustrate and list the pin connections:



GPS Adapter		Main Cable		Computer Adapter	
GPS connector	Female jack	Male jack 1	Male jack 2	RS-232 connector	Female jack
pin 1	pin 2	pin 1	pin 2	pin 2	pin 2
pin 2	pin 1	pin 2	pin 1	pin 3	pin 1
pin 3	pin 3	pin 3	pin 3	pin 5	pin 3

III to VIix Palm Adapter		M and T Palm Adapter		Foretrex Adapter	
Palm connector	Female jack	Palm connector	Female jack	Larger female jack	2.5 mm male jack
pin 3	pin 2	pin 1	pin 3	pin 1	pin 1
pin 5	pin 1	pin 10	pin 2	pin 2	pin 2
pin 10	pin 3	pin 11	pin 1	pin 3	pin 3

Using the Connector Set

Use the following cable/adapter combinations to perform the indicated operations, depending on your chosen option:

Option 1

GPS-to-Palm for flight ops	GPS adapter / Palm adapter
GPS-to-computer for downloading	Garmin USB cable or Garmin Serial cable
GPS-to-Palm for downloading	GPS adapter / Palm adapter
Palm-to-computer for downloading	Palm cable
Foretrex-to-computer for downloading	Garmin Foretrex cable

Option 2

GPS-to-Palm for flight ops	GPS adapter / main adapter / Palm adapter
GPS-to-computer for downloading	GPS adapter / main adapter / computer adapter or Garmin USB cable
GPS-to-Palm for downloading	GPS adapter / main adapter / Palm adapter
Palm-to-computer for downloading	Palm adapter / main adapter / computer adapter
Foretrex-to-computer for downloading	Foretrex adapter / main adapter / computer adapter

Option 3

GPS-to-Palm for flight ops	GPS adapter / main cable / Palm adapter
GPS-to-computer for downloading	GPS adapter / main cable / computer adapter or Garmin USB cable (scenario A)
GPS-to-Palm for downloading	GPS adapter / main cable / Palm adapter
Palm-to-computer for downloading	Palm adapter / main cable / computer adapter
Foretrex-to-computer for downloading	(2.5 mm) Main cable / computer adapter (Bigger) Foretrex adapter / main cable / computer adapter