

Wiring an Owner Supplied GPS to the KIWI-OSD

PFD Systems, LLC
5900 Rudyard Dr
Bethesda, MD 20814-2234
kiwiosd@pfdsystems.com

This document describes the steps required to wire a GPS unit to a KIWI-OSD. The GPS of choice for use with the KIWI-OSD is the Garmin 18 LVC. This is the ONLY model of the “18” series that will work with the KIWI-OSD. Other makes and models of GPS may work with the KIWI-OSD as long as they have a 1PPS (1 pulse per second) output, but other models other than the Garmin 18 LVC have known problems that may interfere with proper operation. More information about this subject can be found on the following webpage.

http://www.geocities.com/kiwi_36_nz/kiwi_osd/kiwi_osd.htm

Instructions are given on how to wire a Garmin 18 LVC or the Garmin 16 LVS or 16 HVS. The Garmin 16 HVS is the only other Garmin model that has been tested with the KIWI-OSD by PFD Systems. The Garmin 16 LVS model should also work but has not been tested.

GPS Wiring Options

If you purchase a KIWI-GPS unit from PFD Systems, it is shipped pre-wired with a male DIN-5 connector. This connector mates to the female DIN-5 connector on the KIWI-OSD. No further wiring is needed.

When you purchase a KIWI-OSD, it arrives pre-wired with either a DIN-5 or a DIN-6 connector. The DIN-5 connector supports GPS units that require regulated 5.0V DC voltage such as the Garmin 18 LVC or the Garmin 16 LVS. The KIWI-OSD with a DIN-6 connector supports GPS units that require unregulated DC voltage (provided by the input voltage source). The Garmin 16 HVS should be wired to the DIN-6 connector, for example.

NOTE: A single KIWI-OSD cannot support both types of GPS at the same time. When you place an order, the OSD is configured to meet your specific needs.

There are various scenarios where the user will need to wire the male, female, or both DIN-5 or DIN-6 connectors. The table below outlines the possible scenarios:

KIWI-OSD Purchase Option	GPS Purchase Option	DIN-5 Wiring Requirements
KIWI-OSD RTG	KIWI-GPS (Garmin 18 LVC)	No wiring is necessary, both the KIWI-OSD RTG and the KIWI-GPS are shipped pre-wired with complementary DIN-5 connectors.

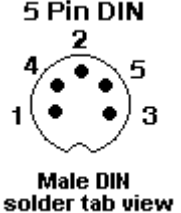

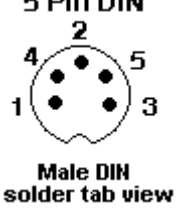
V1.04
9/15/2005

KIWI-OSD Purchase Option	GPS Purchase Option	DIN-5 Wiring Requirements
KIWI-OSD KIT	KIWI-GPS	The GPS unit does not require any additional wiring, but as part of the assembly of the kit, the customer will wire the a female DIN-5 connector to the OSD. See the “KIWI-OSD KIT Assembly Manual” for further information.
KIWI-OSD RTG Or KIWI-OSD KIT (A male DIN-5 connector, multi-connector cable, and heat shrink tubing is included with each KIWI-OSD if purchased without a KIWI-OSD GPS)	Customer provides their own Garmin 18 LVC or Garmin 16 LVS GPS	Three wiring choices are possible. <ol style="list-style-type: none"> 1. Wire a male DIN-5 connector (provided) to your GPS unit. See “Wiring the Male DIN-5 Connector (Step by Step)” below. 2. Fabricate an interface cable if your GPS already has an integrated connector that you wish to retain. See “Creating an Interface Cable for the Male DIN-5 Connector” below. 3. Wire the GPS directly to the KIWI-OSD unit. Note: The KIWI-OSD RTG ships with a DIN-5 female connector pre-wired on a cable that is attached to the KIWI-OSD. Although it is possible to unsolder this cable inside the OSD unit and directly wire the GPS unit directly, it is not recommended that the customer do so. Option 1 should be used instead.

KIWI-OSD Purchase Option	GPS Purchase Option	DIN-5 Wiring Requirements
<p>KIWI-OSD RTG</p> <p>Or</p> <p>KIWI-OSD KIT</p> <p>(A male DIN-6 connector, multi-connector cable, and heat shrink tubing is included with each KIWI-OSD)</p>	<p>Customer provides their own Garmin 16 HVS GPS</p>	<p>Three wiring choices are possible.</p> <ol style="list-style-type: none"> 1. Wire a male DIN-6 connector (provided) to your GPS unit. See “Wiring the Male DIN-6 Connector (Step by Step)” below. 2. Fabricate an interface cable if your GPS already has an integrated connector that you wish to retain. See “Creating an Interface Cable for the DIN Connector” below. 3. Wire the GPS directly to the KIWI-OSD unit. Note: The KIWI-OSD RTG ships with a DIN-6 female connector pre-wired on a cable that is attached to the KIWI-OSD. Although it is possible to unsolder this cable inside the OSD unit and directly wire the GPS unit directly, it is not recommended that the customer do so. Option 1 should be used instead.

GPS Wiring Overview

The following table outlines the wiring requirements for the Garmin GPS units that can be used with the KIWI-OSD.


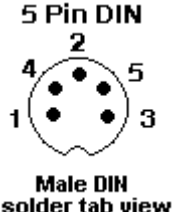
GPS Make/Model	GPS Connector Type (out of the box)	Required Connector Type for use with the KIWI-OSD	Connector Pin-outs	GPS Cable Color Guide
Garmin 18 LVC	A small test connector	Male DIN-5	 <p>5 Pin DIN Male DIN solder tab view</p>	<ol style="list-style-type: none"> 1. Green 2. Black/Black * 3. Yellow 4. White 5. Red
Garmin 16 LVS	RJ-45 plug	Male DIN-6	 <p>6 Pin DIN Male solder tab view</p>	<ol style="list-style-type: none"> 1. Blue 2. Black/Yellow ** 3. Gray 4. White 5. Red
Garmin 16 LVC	RJ-45 plug	Male DIN-5	 <p>5 Pin DIN Male DIN solder tab view</p>	<ol style="list-style-type: none"> 1. Blue 2. Black/Yellow ** 3. Gray 4. White 5. Red

* Both black wires on the Garmin 18 LVC must be soldered to pin #2.

** Both the black and yellow wires on the Garmin 16s must be soldered to pin #2.

Wiring the Male and Female DIN-5 Connectors (for use with the Garmin 18 LVC and Garmin 16 LVS GPSs)

The table below describes the wiring requirements for both the male and female DIN-5 connectors. If you purchased a KIWI-OSD RGT then you will not need to wire the female DIN-5 connector.

Wiring Requirement for the Male and Female DIN-5 Connectors					
Female DIN-5 Pin-outs	Pin #	Function	GPS Cable Color **	OSD Cable Color ***	Male DIN-5 Pin-outs
 <p>5 Pin DIN Female DIN solder tab view</p>	1 2 3 4 5	RCV GND 1PPS TXD 5V DC	Green Black/Black * Yellow White Red	Green Black Brown White Red	 <p>5 Pin DIN Male DIN solder tab view</p>

* The two black wires on the GPS both must be soldered to pin #2.

** The wire colors are shown for the Garmin 18 LVC. For the Garmin 16 LVS, use the cable colors listed in the “Wiring the Male and Female DIN-6 Connectors” section below but use the DIN-5 connector.

*** These colors are shown for the interface cable provided in the KIWI-OSD KIT. If the customer provides their own cable, they should be aware of any color differences.

Be very careful of the orientation of the connectors with regard to wire placement. The diagrams above show the wiring from the solder side of the DIN connectors. When you are soldering, you will be viewing the connectors from this viewpoint. Warning: Always verify that the cables you wire are done correctly before you attach them to any devices.

The Garmin 16 LVS GPS ships with a RJ-45 connector attached to the end of the interface cable. If you plan to wire the male DIN-5 connector directly to the GPS, then this connector must be cut. There are two additional wires on the Garmin 16 LVS cable that are not needed with the KIWI-OSD and should be cut off flush with the end of the cable shielding.

NOTE: If the user provides their own Garmin 18 LVC GPS, note that it ships with a small test connector attached to the end of the interface cable. This connector must be cut off and replaced with the male DIN-5 connector. Once cut off, you will find two black wires, one slightly thicker than the other. Both of these wires should be soldered to Pin 2 of the connector. This only applies to those who purchase their own Garmin 18 LVC GPS. GPS units purchased from PFD Systems are pre-wired with the DIN-5 male connector. Likewise, the Garmin 16 LVS GPS ships with a RJ-45 connector. You will either need to cut this connector off and attach the male DIN-5

connector or fabricate an interface cable (see “Creating an Interface Cable for the Male DIN-5 Connector”, below).

Wiring the Male DIN-5 Connector (Step by Step)

The following pictorial describes the procedure of how the DIN-5 connector should be attached to the Garmin 18 LCV GPS. The same basic steps apply to both the Garmin 16 units with the notable differences of the connector, wire colors, and DIN connector.



← Locate the small test connector at the end of the cable and snip it off using wire cutters.

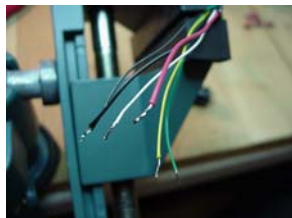
Disassemble the DIN-5 connector and set aside the parts. →



← Slide the DIN-5 jacket over the free end of the cable. Be sure that the large opening of the jacket is oriented toward the end of the cable.

Using wire strippers, strip ~ ¼” of insulation from each of the 6 wires. Note that there are 2 wires (one red and one black) that are slightly

thicker than the others. →



← Twist the ends of the two black wires together.

“Tin” the ends of the bare wires with solder.

Apply solder to the holes of each of the solder posts on the male DIN-5 connector. →

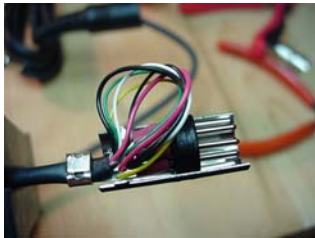


← Place a short piece of heat shrink tubing (supplied) over the ends of each of the 5 wires. Before soldering, refer to the table above to insure you are attaching the proper wire to the proper post. Using a soldering pencil, heat each solder post and once the solder is melted, slide the correct wire into the hole in the solder post. Remove the heat and allow the wire to cool a few seconds before you release it. Be very careful not to create a “jumper” between posts or burn your fingers!

At this point it is a good idea to carefully review the connections prior to continuing the assembly process. If you are confident that the wires were connected properly, connect the GPS to the OSD and test that they work together. If you find you have made a wiring error, correct it and repeat the test.



← Slide each of the pieces of heat shrink tubing down over its respective solder post. Using a heat gun (some hair dryers may work on the hottest setting), apply heat till the heat shrink tubing contracts. Be careful handling the connector at this time since the metal connectors can become quite hot. **WARNING:** Do not overheat as the thin wires could be damaged. →



← Locate the larger of the two metal connection enclosures and place it on the connector using the detents on the connector as a guide. Position the black shielded covered cable so it is overlapping the crimping fingers by $\sim 1/4$ ". Using needle nose pliers, bend one of the crimping fingers over the cable, then the other. Do not over tighten as this can break the crimping fingers.



Take the remaining short connection enclosure and place it over the male connector. Tuck the wires between the connection enclosures being careful not to pinch any of the wires →



← Holding the pair of connection enclosures together, slide the rubber jacket up the cable and over the connection enclosures insuring that they remain as one. Note that there is a cutout on the jacket that must be placed over the small tab that is on the smaller of the two connection enclosures. Continue sliding the jacket over the connection

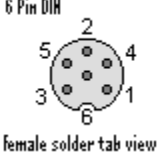



enclosures until the jacket is even with the tab. →

Congratulations, you have successfully attached the connector!

Wiring the Male and Female DIN-6 Connectors (for use with the Garmin 16 HVS GPS)

The table below describes the wiring requirements for both the male and female DIN-6 connectors. If you purchased a KIWI-OSD RGT then you will not need to wire the female DIN-6 connector.

Wiring Requirement for the Male and Female DIN-6 Connectors					
Female DIN-6 Pin-outs	Pin #	Function	GPS Cable Color **	OSD Cable Color ***	Male DIN-6 Pin-outs
 <p>6 Pin DIN female solder tab view</p>	1	RCV	Blue	Green	 <p>6 Pin DIN Male solder tab view</p>
	2	GND	Black/Yellow *	Black	
	3	1PPS	Gray	Brown	
	4	TXD	White	White	
	5	12V DC	Red	Red	

* The black and yellow wires on the GPS cable both must be soldered to pin #2.

** The wire colors are shown for the Garmin 16 HVS GPS.

*** These colors are shown for the interface cable provided in the KIWI-OSD KIT. If the customer provides their own cable, they should be aware of any color differences.

Be very careful of the orientation of the connectors with regard to wire placement. The diagrams above show the wiring from the solder side of the DIN connectors. When you are soldering, you will be viewing the connectors from this viewpoint. Warning: Always verify that the cables you wire are done correctly before you attach them to any devices.

The Garmin 16 HVS GPS ships with a RJ-45 connector attached to the end of the interface cable. If you plan to wire the male DIN-6 connector directly to the GPS, then this connector must be cut. There are two additional wires on the Garmin 16 HVS cable that are not needed with the KIWI-OSD and should be cut off flush with the end of the cable shielding..

Creating an Interface Cable for the Male DIN-5 Connector

This section applies to those who want to use their own Garmin 18 LVC GPS unit with the KIWI-OSD and want to retain the interface connector that is currently wired to it. Three items are needed to complete this cable:

- A Male DIN-5 connector (provided)
- A length of 5-conductor cable (provided)
- An opposite sex connector that matches to the connector currently attached to the users GPS

Follow the steps for “Wiring the Male DIN-5 Connector (Step by Step)” above substituting the 5-conductor cable for the GPS cable. The free end of the 5-conductor cable is then soldered to the opposite sex connector that will mate to the current connector attached to the user’s GPS. It is the responsibility of the user to properly solder the 5-conduction cable to the connector of their choice.

Once completed, the GPS and KIWI-OSD can be tested by attaching the interface cable to both components.

Creating an Interface Cable for the Male DIN-6 Connector

This section applies to those who want to use their own Garmin 16 HVS GPS unit with the KIWI-OSD and want to retain the RJ-45 connector that is currently attached to it. Three items are needed to complete this cable:

- A Male DIN-6 connector (provided)
- A length of 5-conductor cable (provided)
- An opposite sex connector that matches to the connector currently attached to the users GPS

Follow the steps for “Wiring the Male DIN-5 Connector (Step by Step)” above substituting the DIN-5 with the DIN-6 connector. Substitute the 5-conductor cable for the GPS cable. The free end of the 5-conductor cable is then soldered to the opposite sex connector that will mate to the current connector attached to the user’s GPS. It is the responsibility of the user to properly solder the 5-conduction cable to the connector of their choice.

Once completed, the GPS and KIWI-OSD can be tested by attaching the interface cable to both components.