



Protocol Insight[®] Solder-down Probe Quickstart Guide

Covers:

FG4PSD2B HS-G4B/HS-G3 x2 Bundle for Falcon B and Raptor

FG4PSD3 HS-G4B/HS-G3 x2 optional Multi-Lead Pod Configuration for Falcon B and Raptor

FG4PSD2 HS-G4B/HS-G3 x2 Bundle for original Falcon non-B instruments

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Probe overview

There are three different solder-down probing options for the Falcon and Raptor instruments.

FG4PSD2B x2 Bundle for Falcon B and Raptor

For HS-G4B and HS-G3 solder-down probing, this configuration includes a front panel power connector and pig-tail cables.

FG4PSD3 optional Multi-Lead Pod x2 Configuration for Falcon B and Raptor

For enhanced probing in demanding test environments with less than optimal signal integrity, the FG4PSD3 adds a multi-lead pod and SSMP-to-SMP cables to the FG4PSD2B x2 Bundle for additional conditioning of the DUT signal.

FG4PSD2 x2 Bundle for original Falcon non-B instruments

For HS-G4B/HS-G3 solder-down probing, this configuration includes Carlisle cables, a multi-lead pod, SSMP-to-SMA cables and a power supply.

Compatibility

The FG4PSD2B x2 Bundle is only compatible with the Falcon B and Raptor instruments, it is not compatible with the original Falcon non-B instruments.

The optional FG4PSD3 Multi-Lead Pod x2 Configuration is intended for use with the Falcon B and Raptor instruments and the FG4PSD2B x2 Bundle. It can be reconfigured for use with the original Falcon non-B instruments by swapping out the phase-matched SSMP-to-SMP back-end cables with SSMP-to-SMA cables.

The FG4PSD2 x2 Bundle is intended for use with the original Falcon non-B instruments. It can be reconfigured for the Falcon B and Raptor instruments by swapping out the phase-matched SSMP-to-SMA back-end cables with SSMP-to-SMP cables.

The existing HS-G4B and HS-G3 solder-down probe tips are compatible with all three of the probing configurations above.

What's in the box

The FG4PSD2B x2 bundle has the following components (see pictures below):

<u>Qu</u>	<u>Part Number</u>	<u>Description</u>
2	FG4PSD07	x1 pigtail cable with power connector
4	FG4PSD05	HS-G4B Coax Multi-lead Probe Tip (6 inch)

The optional FG4PSD3 Multi-Lead Pod x2 Configuration has the following (see pictures below):

<u>Qu</u>	<u>Part Number</u>	<u>Description</u>
1	FG4PSD01	Multi-Lead Pod
4	FG4PSD04	Carlisle cable
4	FG4PSD08	Phase-matched SSMP-to-SMP cable pair
1	NA	Power supply

Note that solder-down probe tips are not included.

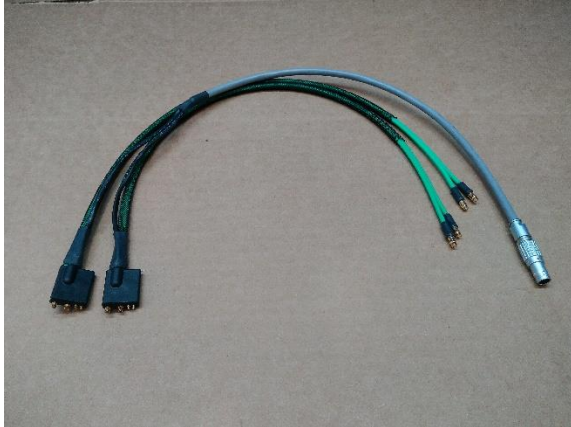


The **FG4PSD2** Solder-down probe HS-G4B x2 bundle has the following components (see pictures below):

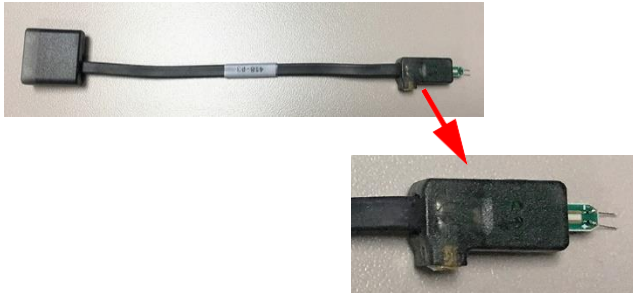
<u>Qu</u>	<u>Part Number</u>	<u>Description</u>
1	FG4PSD01	Multi-Lead Pod
4	FG4PSD04	Carlisle cable
4	FG4PSD05	HS-G4B Coax Multi-lead Probe Tip (6 inch)
4	FG4PSD06	Phase-matched SSMP-to-SMA cable pair
1	NA	Power supply

Components

FG4PSD07 x1 pigtail cable with power connector



FG4PSD05 HS-G4B Coax Multi-lead Probe Tip (6 inch)



FG4PSD01 Multi-Lead Pod



FG4PSD04 Carlisle cable



FG4PSD06 and FG4PSD08 phase matched SSMP-to-SMA and SSMP-to-SMP cable pairs



Power Supply



Preparing probe tips for installation

The first step in preparing for installation is to ensure that the probe tips are in good condition. If you are using new probe tips for the first time, examine the leads under magnification to ensure the leads are clean and secure, and then proceed to step 7.

If the probe tips have been used previously, it may be necessary to clean the leads of excess solder or to remove and replace the leads. A small spool of wire is included with each probe tip to be used in replacing broken or damaged tip leads. To replace the tip leads, follow this procedure:

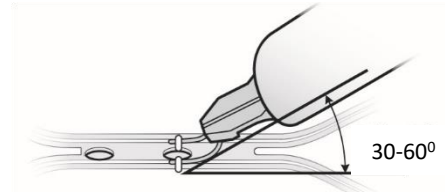
1. Using a soldering iron, heat the existing lead wire at the via where the lead enters the probe tip. Carefully remove the existing wire segment from the via.
2. Clean the via barrel of any excess solder.
3. Cut a new length of wire of approximately 2-3" from the wire spool supplied with the probe tip.
4. Thread the wire segment through the clean via located at the tip of the probe.
5. Heat with a soldering iron and apply small amounts of solder on the under-side of the tip at the via until the wire is secured within the via.
6. Trim the excess wire on the top of the probe tip as closely as possible to the surface of the probe tip.
7. Trim the lead wire on the underside of the probe tip to a maximum length of 2.5 mm (0.1").
8. Repeat steps 1-7 with the other lead wire.
9. Trim the final lead lengths as short as possible to improve signal fidelity while allowing sufficient room to attach the leads to the signal test point and maintaining equal lengths of the two leads [to within 0.25 mm (0.01") if possible to improve signal fidelity—use calipers to measure lead length.
10. Trim the probe wire to a maximum length of 0.1 ± 0.01 inches.

Installing the probe tip

To install the M-PHY solder-down probe tip, attach the probe tip leads to the signal of interest on the device under test (DUT), connecting each probe tip to the two differential sampling points for that signal.

1. Use probe tip leads that are of equal length, and are not longer than 2.5 mm (0.1"). The flex tip is pre-installed with 0.1 inch long leads. It is recommended to trim the length of the tip as short as possible to improve signal fidelity margin at the analyzer. The two leads must be cut to the length of ± 0.01 inches.

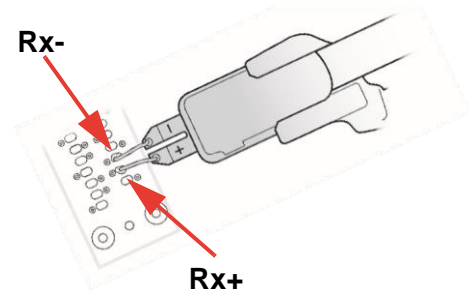
2. Solder the leads to the appropriate sampling points using the minimum amount of solder necessary to maintain a secure connection.
3. Once soldered, the probe tip should be angled at 30-60 degrees to the plane of the PCB under test, as shown in the figure to the right.
4. Avoid placing the tip over any PCB components.



For more information see [ERROR! REFERENCE SOURCE NOT FOUND.](#) below.

Determining the best sampling points

The solder-down probe tip is designed to sample two points in close proximity, either the Rx+ and Rx- differential pair, or the Tx+ and Tx- differential pair. Each bi-directional lane requires two probe tips, one for each direction (or up to 4 probe tips for a x2 design).

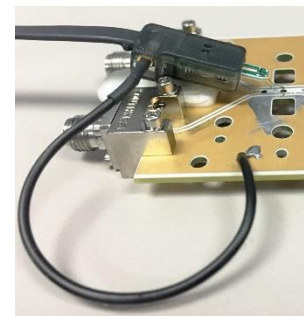
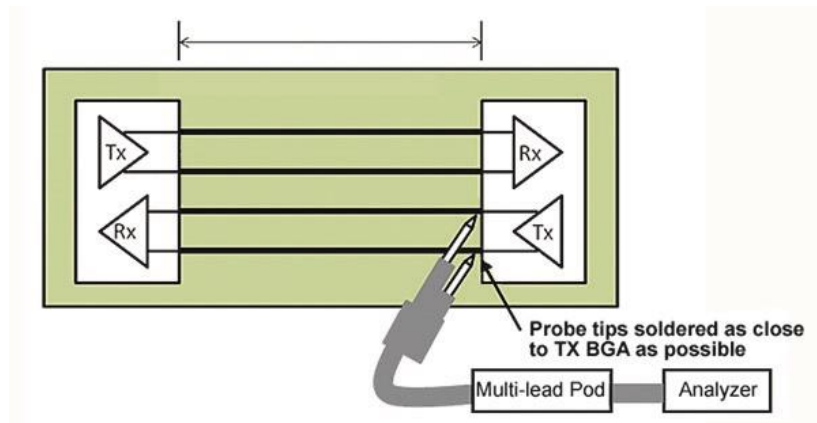


Note that the positive tip is located on the same side of the probe as the ground port.

Typical probe points might include exposed pins of components, or exposed traces or vias on the board along the M-PHY channel. For each bi-directional lane of a M-PHY bus, the probe tips need to make contact with four signals, Rx+, Rx-, Tx+ and Tx- to capture data traffic going in each direction.

The locations for the probe points must be selected considering the following criteria:

1. The probe locations must be within sufficient physical proximity to each other that the probe cables and probe tips can easily reach back to the probe pod, which gathers and amplifies the signals prior to passing them along to the analyzer. The probe pods are then connected back to the analyzer using SSMP to SMA cables. The dimensions of the probe components are as follows:
 - Probe Pod: 163 x 37 x 106 mm (6.4" x 1.5" x 4.2")
 - Probe Cable: 294 mm (11.6")
 - Probe Tip: 71 mm (2.8")
2. The probe locations should be selected to provide the best possible signal with minimum distortion along the M-PHY channel. As a general rule of thumb, this location is typically as near as possible to the Tx component pins (see illustration below).



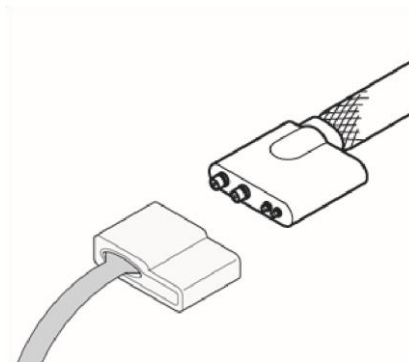
Ground wire installation

All the set up must have the GND wire installed. Use the supplied straight pin wire Long/Short GND wire and install the male pin end to the Probe GND connector and the female pin to any available GND test pin on the PCB under test as shown in the figure below. Use the short wire as much as possible to reduce the GND loop inductance.

Connecting FG4PSD2B HS-G4B/HS-G3 x2 Bundle to the FalconB/Raptor

After the tips have been soldered to the signals of interest on the DUT, the tips should then be connected to the instrument.

1. Connect the probe tip to the high bandwidth coax cables by plugging the probe tip into the mating connector on the probe cable:



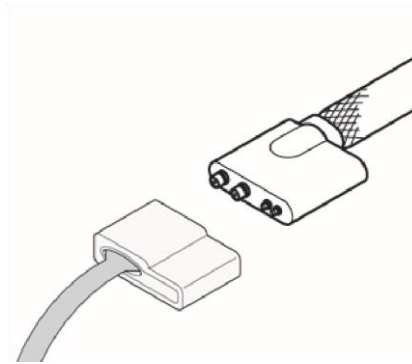
2. Connect the other end of the coax cables, the SMP connectors, to the Falcon or Raptor front panel, making sure to connect the soldered Lane 0 of the coaxial pair to Lane 0 on the front panel and so on.
3. Connect the power connectors to the front panel.

4. Power on the instrument.
5. If the probe system is properly set up a blue light will illuminate on the probe tip connector.

Connecting the FG4PSD3 HS-G4B/HS-G3 x2 Multi-Lead Pod and the FG4PSD2 HS-G4B/HS-G3 x2 Bundle

After the tips have been soldered to the signals of interest on the DUT, the tips should then be connected to the instrument.

1. Connect the probe tip to the high bandwidth coax cables by plugging the probe tip into the mating connector on the probe cable:



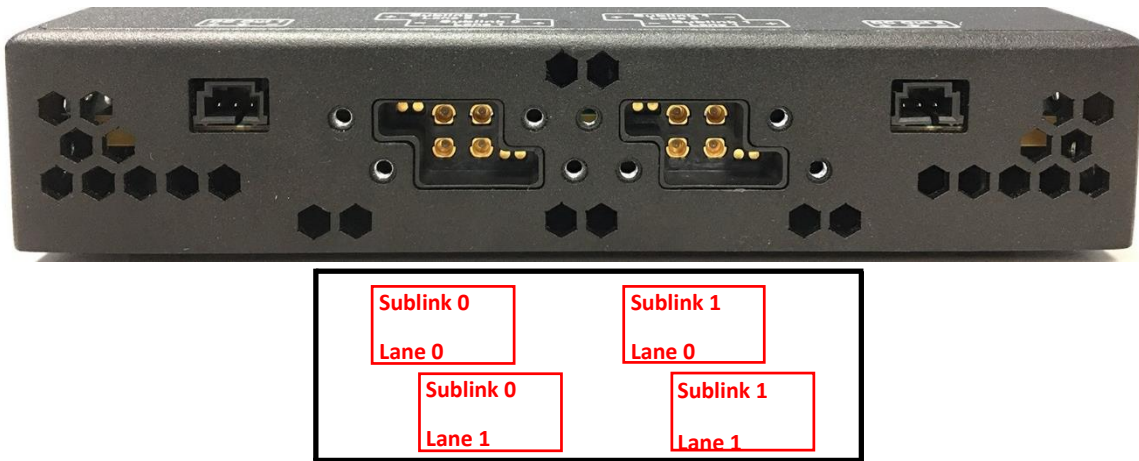
2. Connect the other end of the coax cables into the probe pod, starting with the lowest left port as shown in the illustration below. Make sure you connect the soldered Lane 0 to the coaxial pair connected to Lane 0 in the pod and so on. For more information, see [MULTI-LEAD POD – more](#) .



3. With the probe cables plugged into the multi-lead pod, connect the multi-lead pod to the Falcon or Raptor instrument using the 4 pairs of phase-matched SSMP-to-SMP or SSMP-to-SMA cables.
4. Power up the multi-lead pod by plugging in the power supply. If the probe system is properly set up a blue light will illuminate on the probe tip connector.

Multi-lead pod – more configuration information

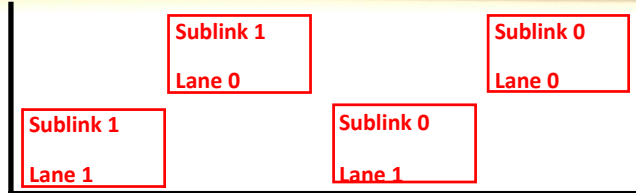
M-PHY designs that use x1 through x2 designs use one Probe POD. The Carlisle probe cables are connected to the probe pod as shown in the table below:



So for a x1 design, the two probe cables would be plugged into Sublink 0 Lane 0 and Sublink 1 Lane 0. For a x2 design, the four probe cables would be plugged into Sublink 0 Lane 0 and Lane 1, Sublink 1 Lane 0 and 1 ports.

The output SSMP ports to the Analyzer on the rear side of the POD are marked in the figure below. Use Two matched pairs of the SSMP-to-SMP or SSMP-to-SMA cables to connect the Analyzer Sublink 0 Lane 0 and Sublink 1 Lane 0 to the corresponding connectors on the Analyzer in x1 configuration.

For x2 configuration use four phase matched pairs of the SSMP to SMA cables to connect to the Analyzer Sublink 0 Lane 0 and Lane 1 and Sublink 1 Lane 0 and Lane 1 to the corresponding connectors on the Analyzer.



Contact information

For additional information, to request a demonstration or quote, or place an order, please contact your local Protocol Insight representative or sales@protocolinsight.com

Support materials and examples files are available at www.protocolinsight.com/support

For technical support please contact your local Protocol Insight representative or support@protocolinsight.com