

Instructions

Tektronix

P6419
Logic Analyzer Probe
071-1303-00

www.tektronix.com



071130300

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General Safety Summary

Review the following safety precautions to avoid injury and prevent damage to this product or any products connected to it.

To avoid potential hazards, use this product only as specified.

Only qualified personnel should perform service procedures.

While using this product, you may need to access other parts of the system. Read the *General Safety Summary* in other system manuals for warnings and cautions related to operating the system.

Connect and Disconnect Properly. Do not connect or disconnect probes or test leads while they are connected to a voltage source.

Connect and Disconnect Properly. Connect the probe output to the measurement instrument before connecting the probe to the circuit under test. Disconnect the probe input and the probe ground from the circuit under test before disconnecting the probe from the measurement instrument.

Observe All Terminal Ratings. To avoid fire or shock hazard, observe all ratings and markings on the product. Consult the product manual for further ratings information before making connections to the product.

Connect the ground lead of the probe to earth ground only.

Do not apply a potential to any terminal, including the common terminal, that exceeds the maximum rating of that terminal.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Avoid Exposed Circuitry. Do not touch exposed connections and components when power is present.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in an Explosive Atmosphere.

Keep Product Surfaces Clean and Dry.

Symbols and Terms

Terms in this Manual. These terms may appear in this manual:



WARNING. *Warning statements identify conditions or practices that could result in injury or loss of life.*



CAUTION. *Caution statements identify conditions or practices that could result in damage to this product or other property.*

Terms on the Product. These terms may appear on the product:

DANGER indicates an injury hazard immediately accessible as you read the marking.

WARNING indicates an injury hazard not immediately accessible as you read the marking.

CAUTION indicates a hazard to property including the product.

Symbols on the Product. The following symbols may appear on the product:



Preface

This document provides information on using and servicing the P6419 logic analyzer probe.

Related Documentation

In addition to these probe instructions, the following documentation is available for your Tektronix logic analyzer:

- The *Tektronix Logic Analyzer Family User Manual* provides overall user information for the Tektronix logic analyzer family.
- The online help provides information about the TLA user interface and the TLA Programmatic Interface (TPI). To view the online help, select Help Topics from the Help menu.
- A series of instruction manuals for microprocessor support that provide operating and service instructions for the individual microprocessor support packages that are available for use with the TLA logic analyzer.
- A series of service manuals that provide board-level service information for major components of the logic analyzer.

Contacting Tektronix

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Technical support	Email: techsupport@tektronix.com 1-800-833-9200, select option 3* 6:00 a.m. - 5:00 p.m. Pacific time

* **This phone number is toll free in North America. After office hours, please leave a voice mail message. Outside North America, contact a Tektronix sales office or distributor; see the Tektronix web site for a list of offices.**

Operating Basics

This section provides a brief description of the P6419 logic analyzer probe, instructions for attaching and using color-coded probe labels, and information about connecting the probe from between the logic analyzer and your target system.

Product Description

The P6419 logic analyzer probe connects a Tektronix TLA520x mainframe, TLA6xx mainframe, or a TLA7Lx/Mx/Nx/Px/Qx logic analyzer module to your target system. The P6419 Probe is a high-density probe (see Figure 1) consisting of a single independent probe head of 17 channel connectors each (16 data and 1 clock/qual).

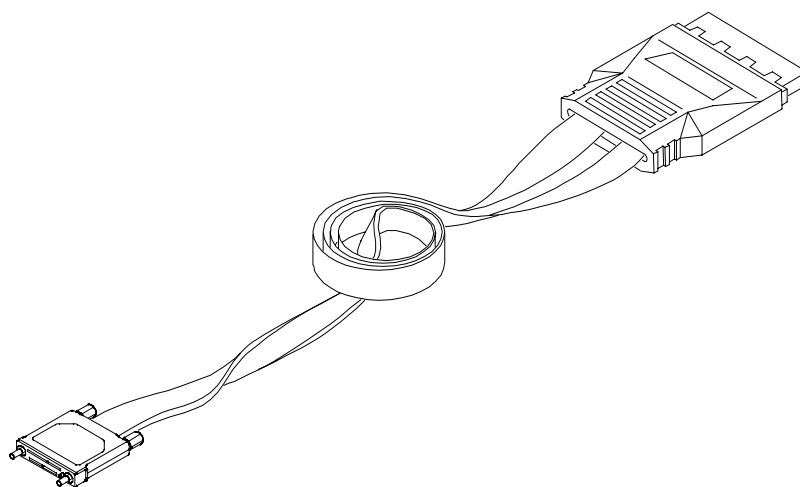


Figure 1: P6419 logic analyzer probe

The following list details the capabilities and qualities of the P6419 Probe:

- Single-ended clock and qualification inputs
- Single-ended data inputs
- Compression contact (eliminates need for built-in connector)
- Land pattern (supports direct signal pass-through)
- Supports PCB thickness of 1.27 mm to 6.35 mm (0.050 in to 0.258 in)

- Narrow 17-channel probe head (for easier placement and layout)
- 2X mode (for example, 1:2 demultiplexing) uses single-probe head
- Approximately 20% less channel density than current Mictor connectors
- Color-coded keyed signal connectors
- Adapter supports Mictor-based connections
- -3.5 V to +6.5 V input operating range
- -2.0 V to +4.5 V threshold range
- 500 mV minimum single-ended signal amplitude
- Minimal loading of < 0.7 pF @ 20 kΩ to ground loading

Mictor-on-PCB to Compression Adapter

The Mictor-on-PCB to Compression adapter (see Figure NO TAG) allows existing microprocessor support packages and your hardware designs with embedded Mictor connectors to be connected to the P6419 High-Density Probe.

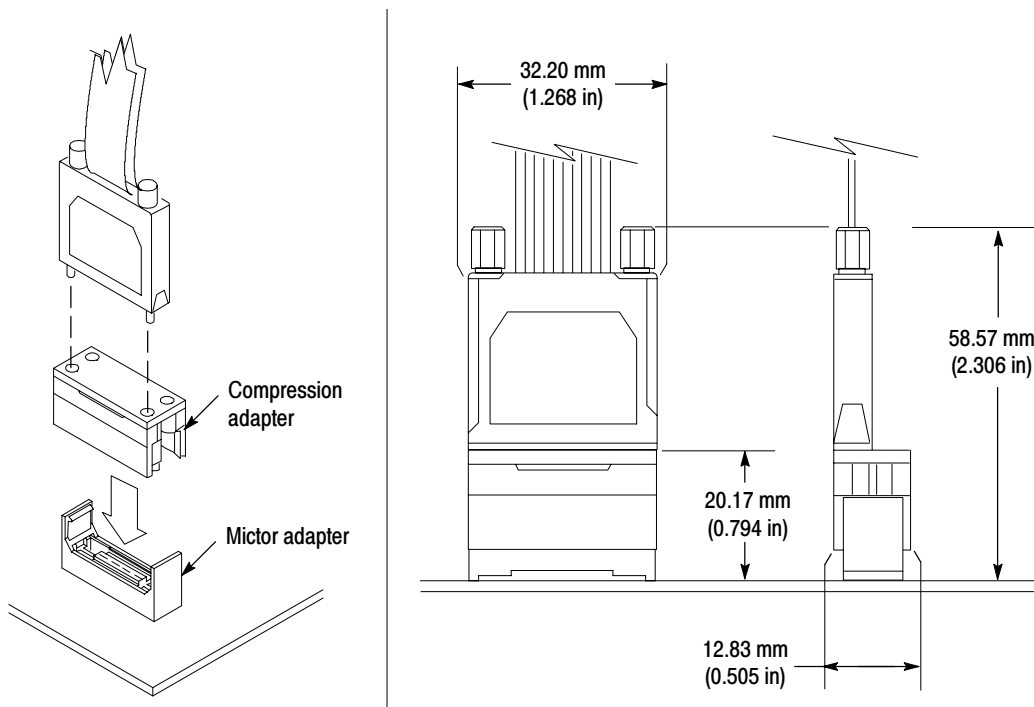


Figure 2: Mictor-on-PCB to Compression adapter

This adapter supports standard Mictor connector footprints and signal connections on older logic analyzer designs.

The Mictor adapter adds 2.7 pF to the high-density compression probe load of 0.7 pF for a combined adapter and probe capacitance load of 3.4 pF.

See Figure 4 on page 4 for comparing the clearances between the P6434 and compression probe adapters.

Compression-on-PCB to P6434 Mictor Adapter

The Compression-on-PCB to P6434 Mictor adapter (see Figure 3) allows the TLA520x mainframe, the TLA6xx mainframe, and TLA7Lx/Mx/Nx/Px/Qx logic analyzer modules using a P6434 Probe to take advantage of the new compression footprint and eliminate the need for Mictor connectors in your target system.

NOTE. To use the P6434 adapter, do not install press-in nuts. However, if board thickness is > .093 in, you will need to install press-in nuts before migrating to P6419 probes.

Two different screw lengths are required to accommodate the 1.27 mm to 6.35 mm (0.050 in to 0.250 in) PCB thickness range.

This adapter requires the use of the Compression-on-PCB to P6434 Mictor adapter land footprint. See Figure 15 on page 33 for further information.

The Compression-on-PCB to Mictor adapter adds 1.5 pF to the P6434 probe load of 2.0 pF for a combined adapter and probe capacitance load of 3.5 pF.

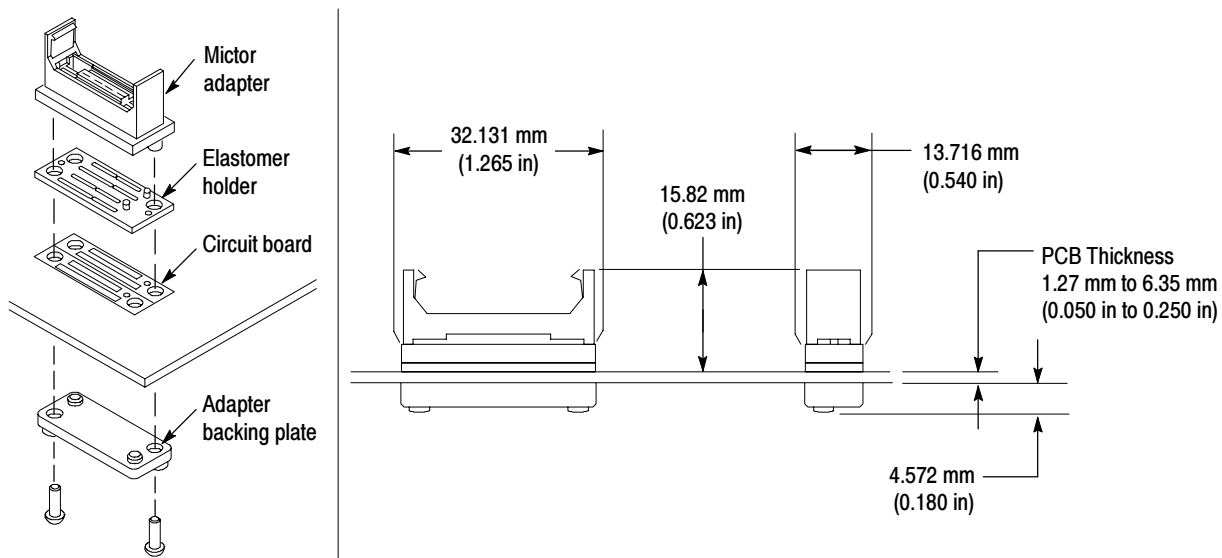


Figure 3: Compression-on-PCB to P6434 Mictor adapter

To compare the clearance between the P6434 Probe connection and the P6434 Probe connection via the Compression-on-PCB to P6434 Mictor adapter, refer to Figure 4. Note that the mictor adapter adds 0.145 inches to the height of the P6434 probe.

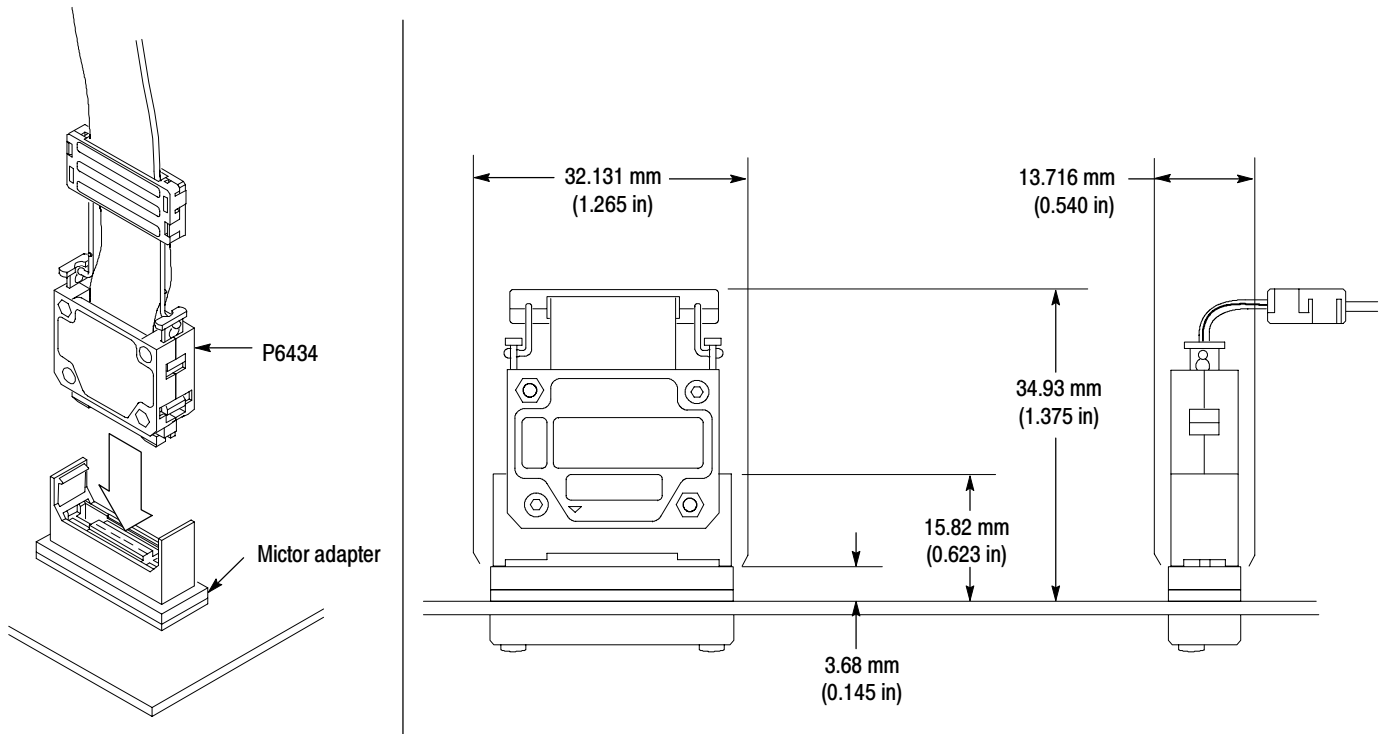


Figure 4: Clearance for probe connection using Compression-on-PCB to P6434 Mictor adapter

Attaching Probe Labels

When you purchase one or more P6419 logic analyzer probes with a TLA520x logic analyzer mainframe or TLA7Nx/Px/Qx logic analyzer module, all labels are already attached. If you purchase the probe separately from the logic analyzer, you must apply the color-coded labels as described in this section. The labels help you identify the probe connections at the logic analyzer end and at the target system end.

Table 1 lists the probe section and label color combinations. Refer to Table 1 and to Figure 5 when you attach the probe labels.

Table 1: Probe section and label combinations

Probe section	Channels	Label color	Probe section	Channels	Label color
A3-A2	CK0, A3:7-0, A2:7-0	Brown	A1-A0	CK1, A1:7-0, A0:7-0	Orange
D3-D2	QUAL0, D3:7-0, D2:7-0	Blue	D1-D0	CK2, D1:7-0, D0:7-0	Yellow
C3-C2	CK3, C3:7-0, C2:7-0	White	C1-C0	QUAL1, C1:7-0, C0:7-0	Gray
E3-E2	QUAL3, E3:7-0, E2:7-0	Green	E1-E0	QUAL2, E1:7-0, E0:7-0	Violet

P6419 Labels

Use the following instructions to attach probe labels to your Tektronix P6419 Logic Analyzer Probe.

NOTE. Always use flat-nosed tweezers to remove the labels from the sheet of labels. Never peel labels with your fingers. The labels are made of soft vinyl and can stretch and distort easily. To avoid stretching the label, always grasp it from the top right corner while removing it from the sheet of labels.

The adhesive on the vinyl labels is extremely strong. Carefully align each label to the intended outline on the module end and probe head before attaching it to the probe. Once labels are placed on the probe, they become very difficult to remove.

You will be attaching labels to the module end and both sides of the probe head. Refer to Figure 5 and use the following steps to attach the probe labels:

1. Identify the module end of the probe cable.
2. From the sheet of labels, locate the color-coded label for the module end of the probe cable.
3. Attach the matching colored labels to the probe head on the other end of the probe cable.

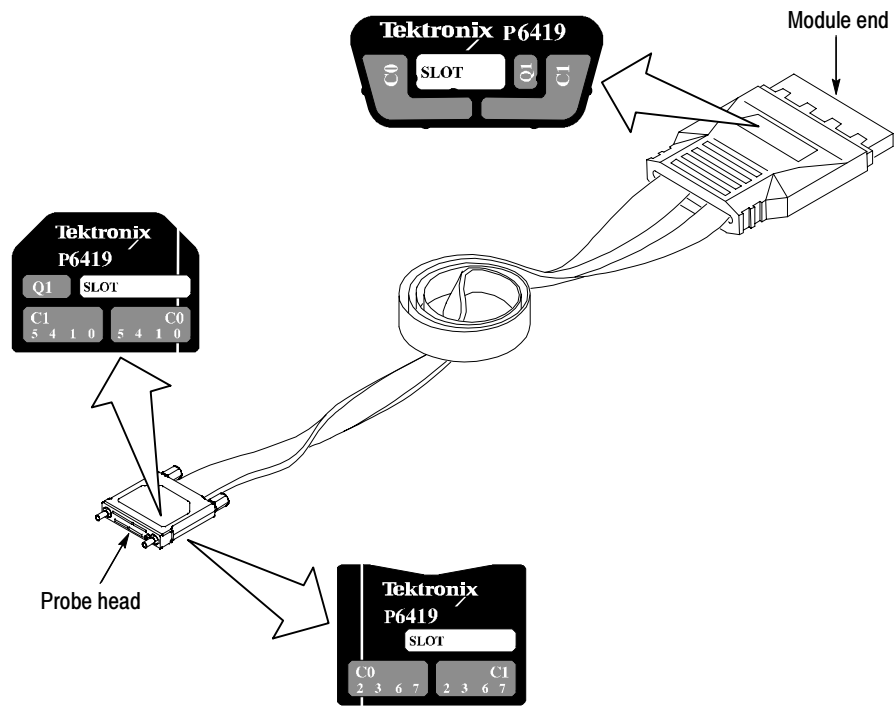


Figure 5: Attaching labels to the P6419 probe

Connecting the Probes to the Logic Analyzer

Connect the logic analyzer probes and the optional retaining brackets as shown in Figure 6. The retaining brackets and hardware ship with the logic analyzer.

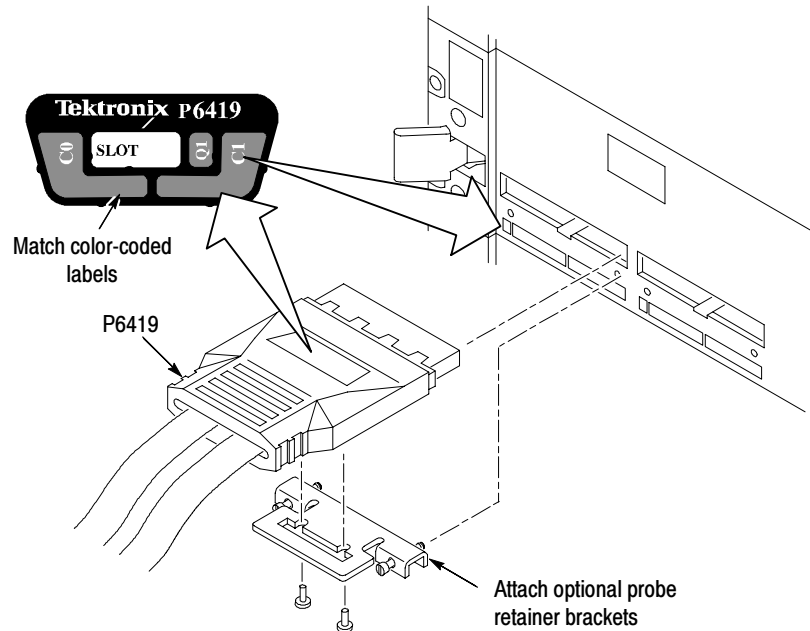


Figure 6: Connecting the probes to the logic analyzer

Refer to Figure 10 and connect the probe to the target system. You can connect the probes to the target system without turning off the target system.

Cleaning the P6419 Compression Footprints



CAUTION. *To avoid electrical damage, always turn off the power of your target system before cleaning the compression footprint.*

Before connecting the probe to the target system, you must clean the compression footprints on your board according to the following steps:

1. Use a lint-free cloth moistened with isopropyl alcohol and gently wipe the footprint surface.
2. Remove any remaining lint using a nitrogen air gun.

NOTE. *Use alcohol sparingly and be sure that you have removed any remaining lint or residue with a nitrogen air gun.*

Cleaning the P6419 Probe Heads

Before connecting P6419 probes to the target system, ensure that the probe heads are free from dust, dirt, and contaminants. If necessary, clean the probe heads according to the following steps.



CAUTION. *Static discharge can damage semiconductor components in the probe head. Always wear a grounded antistatic wrist strap whenever handling the probe head. Also verify that the probe head is not connected to anything that carries a static charge.*

NOTE. *Never clean the elastomers. Always replace them instead. Refer to the Replaceable Parts section of this manual for information on ordering parts.*

To clean probe heads:

1. Remove elastomer holder.
2. Moisten a cotton swab with isopropyl alcohol.

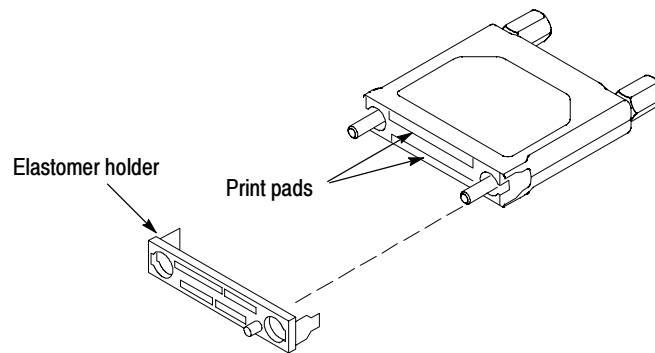


Figure 7: Cleaning the probe heads

3. Gently wipe the edge print pads of the circuit board.
4. Remove any remaining lint using a nitrogen air gun.
5. Put the elastomer holder back in place.



CAUTION. To avoid damaging the probe contacts, do not touch the elastomer. In addition, do not reverse the elastomer because this will transfer contaminants.

Storing the P6419 Probe Heads

To protect the elastomer, it is important to properly store the probe heads when the probes are not in use. While holding the probe end at a perpendicular angle to the nut bar, loosely attach both probe head screws. For further details, see Figure 8.

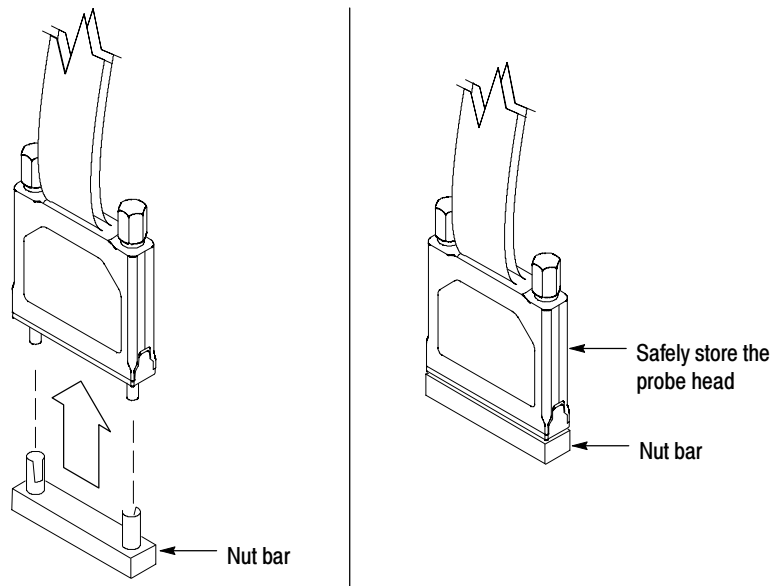


Figure 8: Storing the probe heads

Connecting the Probes to the Target System

Connecting the P6419 High Density Probes

Connect the P6419 High-Density Probes (see Figure 10 on page 12) to the target system. You can connect the probes to the target system without turning off the power to the target system.

Installing the Correct Elastomer Holder. If the PCB is $\leq .093$ in, use the thin elastomer holder with a nut bar. If the PCB is $> .093$, use the thick elastomer holder with a press-in nut.

1. Nut Bar.

- a. Press the nut bar backing plate into the two holes on the underside of the compression footprint on the PCB.
- b. Locate the keying pin on the probe end and align it to the keying pin hole on the PCB.
- c. While holding the probe end at a perpendicular angle to the PCB, finger-tighten both probe head screws until snug, not to exceed 1 in-lbs. You are encouraged to use a torque wrench to ensure proper tightness of the probe head screws.



CAUTION. When attaching the probe head to the target system, you must use care to evenly tighten probe head screws until they are snug. First tighten both screws until the nut bar makes contact with the board surface, then snug each screw to 1 in-lbs (max). Under-tightening the probe head screws can result in intermittence. Over-tightening can damage the elastomer holder and strip the screws.

2. Press-in Nut.

- a. Install the press-in nuts on the PCB by following the Manufacturer's installation procedure. Refer to Figure 9 for press-in nut installation details.

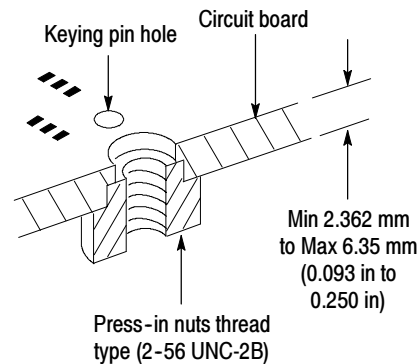


Figure 9: Press-in Nuts installation

- b. Locate the keying pin on the probe end and align it to the keying pin hole on the PCB.



CAUTION. When attaching the probe head to the target system, you must use care to evenly tighten probe head screws until they are snug. First slightly tighten both screws, then snug each screw to 1 in-lbs (max). Under-tightening the probe head screws can result in intermittence. Over-tightening can damage the elastomer holder and strip the screws.

- c. While holding the probe end at a perpendicular angle to the PCB, finger tighten both probe head screws until snug, not to exceed 1 in-lbs. You are encouraged to use a torque wrench to ensure proper tightness of the probe head screws.

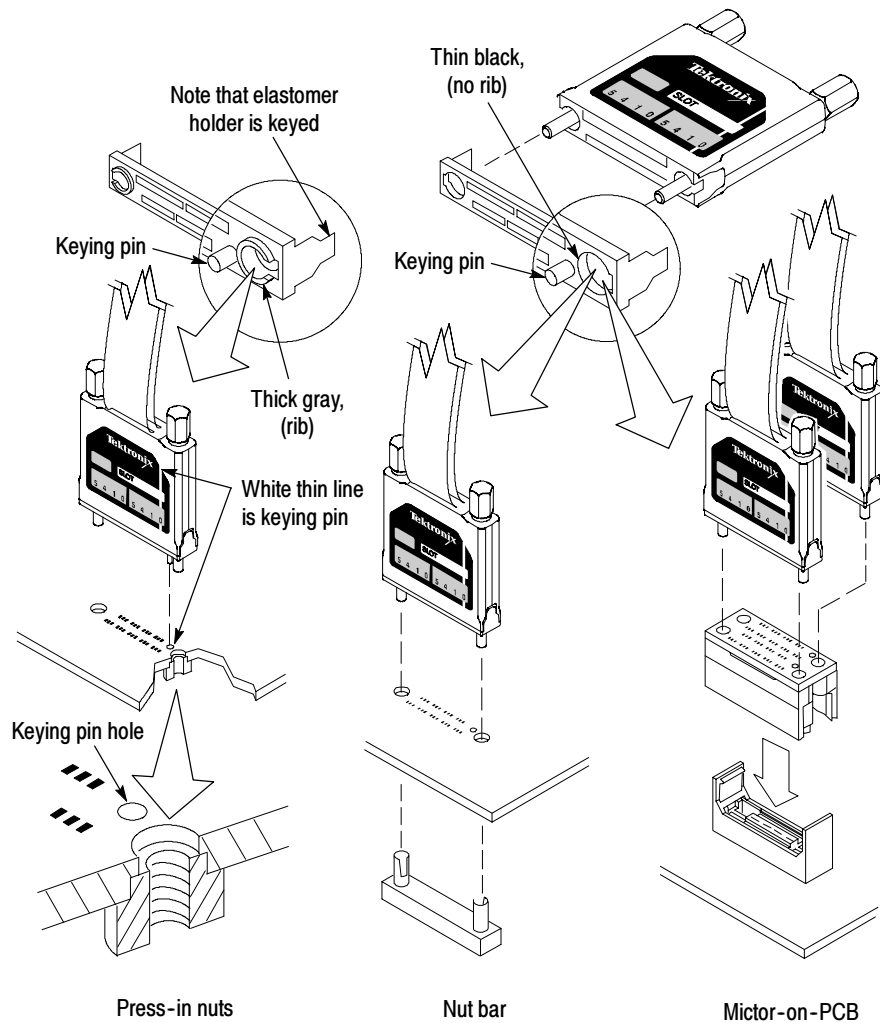


Figure 10: Connecting the P6419 probe to the target system

NOTE. The Mictor-on-PCB adapter is labeled with J1 and J2 signal identifiers to assist you with correctly locating each probe head on the adapter. Each probe head label contains channel information that you compare with information contained in the Signal Name column of Table 7 on page 23 to determine the signal to which you connect the probe head.

Connecting the Mictor-on-PCB to Compression Adapter

The Mictor-on-PCB to compression adapter allows existing applications of older logic analyzer modules and probes to connect to the compression footprint. You can connect the adapter to the target system without turning off the target system. Connect the adapter according to the following steps:

NOTE. *Be sure to use a thin elastomer holder. The thin elastomer is black and does not have the protruding rib (see Figure 10).*

1. While holding the first probe end at a perpendicular angle to the adapter, place the probe end into the adapter and finger-tighten the screws until snug, not to exceed 1 in-lbs.
2. Connect the second probe end to the adapter in the same manner.
3. Press the connected probe ends and adapter into the existing Mictor connector on the PCB.

This adapter supports standard Mictor connector footprints and signal connections on older logic analyzer designs.

The Mictor adapter adds 2.7 pF to the high-density compression probe load of 0.7 pF for a combined adapter and probe capacitance load of 3.4 pF.

Connecting the Compression-on-PCB to P6434 Mictor Adapter

The Compression-on-PCB to P6434 Mictor adapter (see Figure 3 on page 3) allows you to connect the compression footprint to the Mictor connector pins used by the P6434 Probe. You can connect the adapter to the target system without turning off the target system. Connect the adapter according to the following steps:

NOTE. *To use this adapter, do not install press-in nuts. However if board thickness is $>.093$ in, you will need to install press-in nuts before migrating to P6419 probes.*

1. Place the adapter at a perpendicular angle on top of the compression footprint.
2. Place the backing plate on the underside of the PCB.
3. Connect the backing plate by sliding the two screws into the existing screw holes from the underside of the PCB and finger-tighten the screws until snug, not to exceed 1 in-lbs (typically, 1/2 in-lbs. You are encouraged to use a torque wrench to ensure proper tightness of probe head screws.



CAUTION. *When attaching the probe head to the target system, you must use care to evenly tighten probe head screws until they are snug. First slightly tighten both screws, then snug each screw to 1 in-lbs (max). Under-tightening the probe head screws can result in intermittence. Over-tightening can damage the elastomer holder and strip the screws.*

4. Plug the P6434 Probe into the adapter.

Screws of two different lengths are provided to attach the adapter to your PCB. The length of screw you need depends on the thickness of the PCB (0.050 in to 0.250 in).

This adapter requires use of the Compression-on-PCB to P6434 Mictor adapter land footprint. For further dimensional information, refer to the Compression-on-PCB to P6434 Mictor adapter land footprint (see Figure 15 on page 33).

Reference

This section provides reference information and specifications for the P6419 high-density probe. Topics include the following:

- Designing an interface between the probe and a target system
- Specifications

Designing an Interface Between the P6419 Probe and a Target System

Once you have determined which probe is required, use the following information to design the appropriate connector into your target system board. The following topics are in this section:

- Signal fixturing considerations
- Signal connections (signal names and land footprint)
- Mechanical considerations
- Electrical considerations

Signal Fixturing Considerations

This section contains the following information to consider for signal fixturing:

- Clocks and qualifiers
- Merged modules and source synchronous clocking
- Demultiplexing multiplexed buses
- 2X high resolution timing modes (Internal 2X)
- 4X high resolution timing modes (Internal 4X - TLA520x logic analyzer mainframes only)
- Range recognition

Clocks and Qualifiers. Every logic analyzer has some special purpose input channels. Inputs designated as clocks can cause the analyzer to store data. Qualifier channels can be logically AND'ed and OR'ed with clocks to further define when the analyzer should latch data from the system under test. Routing the appropriate signals from our design to these inputs will ensure that the analyzer can acquire data correctly.

Depending on the channel width, each TLA520x mainframe, TLA6xx mainframe, and TLA7Lx/Mx/Nx/Px/Qx module will have a different set of clock and qualifier channels. Table 2 shows the clock and qualifier channels available for each instrument.

Table 2: Logic analyzer clock and qualifier availability

TLA Mainframe	Clock Inputs				Qualifier Inputs			
	CLK:0	CLK:1	CLK:2	CLK:3	QUAL:0	QUAL:1	QUAL:2	QUAL:3
TLA5201 TLA7L1/M1/N1 TLA601/11/21	✓			✓				
TLA5202 TLA7L2/M2/N2/P2/Q2 TLA602/12/22	✓	✓	✓	✓				
TLA5203 TLA7L3/M3/N3 TLA602/13/23	✓	✓	✓	✓	✓	✓		
TLA5204 TLA7L4/M4/N4/P4/Q4 TLA604/14/24	✓	✓	✓	✓	✓	✓	✓	✓

All clock and qualifier channels are stored. The analyzer stores the logic state of these channels every time it latches data.

Since clock and qualifier channels are stored in the logic analyzer's memory, there is no need to double probe these signals for timing analysis. When switching from state to timing analysis modes, all of the clock and qualifier signals are visible. This also allows you to route regular signals, those not needed for clocking, to these channels when they are not being used for their special purpose.

It is good practice to take advantage of these channels to increase your options for when you will latch data. Routing several of your design's clocks and strobes to the logic analyzer clock inputs provides you with greater flexibility in the logic analyzer clocking setup menus.

As an example, look at a microprocessor with a master clock, data strobe, and an address strobe. Routing all three of these signals to analyze clock inputs enables you to latch data on the processor master clock, only when data is strobes or only when address is strobed. Some forethought in signal routing can greatly expand the ways in which you can latch and analyze data.

A microprocessor also provides a good example of signals that can be useful as qualifiers. There are often signals that indicate data reads versus data writes (R/W), signals that show when alternate bus masters have control of the processor buses (DMA), and signals that show when various memory devices are being used (ChipSel). All of these signals are good candidates for assignment to qualifier channels.

By logically AND'ing the clock with one of these qualifiers, you can program the analyzer to store only data reads or data writes. Using the DMA signal as a qualifier provides a means of filtering out alternate bus master cycles. Chip selects can limit data latching to specific memory banks, I/O ports, or peripheral devices.

Demultiplexing Multiplexed Buses. TLA7Nx/Px/Qx modules and TLA6xx mainframes support 2X demultiplexing. However, only TLA520x mainframes support 4X demultiplexing. Each signal on a dual multiplexed bus can be demultiplexed into its own logic analyzer channel. See Table 3 and Table 4 to determine which channel groups to connect to feed channels in the target system the test data.

Table 3: 2X Demultiplexing source-to-destination channel assignments

Source connecting channel groups	Destination channels receiving target system test data			
	TLA5204 TLA7N4/P4/Q4 TLA604/14/24	TLA5203 TLA7LN3 TLA602/13/23	TLA5202 TLA7LN2/P2/Q2 TLA602/12/22	TLA5201 TLA7N1 TLA601/11/21
A3:7-0	D3:7-0	D3:7-0	C3:7-0	C3:7-0
A2:7-0	D2:7-0	D2:7-0	C2:7-0	C2:7-0
A1:7-0	D1:7-0	D1:7-0	D1:7-0	
A0:7-0	D0:7-0	D0:7-0	D0:7-0	
C3:7-0	C1:7-0	C1:7-0		
C2:7-0	C0:7-0	C0:7-0		
E3:7-0	E1:7-0			
E2:7-0	E0:7-0			
CLK:0	QUAL:1	QUAL:1		
CLK:1	QUAL:0	QUAL:0		
CLK:2	QUAL:3			
CLK:3	QUAL:2			

Table 4: 4X Demultiplexing source-to-destination channel assignments

Source connecting channel groups	Destination channels receiving target system test data			
	TLA5201	TLA5202	TLA5203	TLA5204
C3:7-0	C2:7-0 C1:7-0 C0:7-0	C2:7-0 C1:7-0 C0:7-0	A3:7-0 A2:7-0 C2:7-0	A3:7-0 A2:7-0 C2:7-0
A1:7-0	A0:7-0 D1:7-0 D0:7-0	A0:7-0 D1:7-0 D0:7-0	A0:7-0 D1:7-0 D0:7-0	
A3:7-0	A2:7-0 D3:7-0 D2:7-0	A2:7-0 D3:7-0 D2:7-0		
E3:7-0	E2:7-0 E1:7-0 E0:7-0			
CLK:3	CLK:2 QUAL:3 QUAL:2			
CLK:1	CLK:0 QUAL:1 QUAL:0	CLK:0 QUAL:1 QUAL:0		

When demultiplexing data, there is no need to connect the destination channels to the multiplexed bus. Data from the source channels are routed to the destination channels internal to the logic analyzer. Table 3 and Table 4 show the mapping of source channels to destination channels.

Demultiplexing affects only the main memory for the destination channels. This means that the MagniVu memory is filled with data from whatever is connected to the demultiplexing destination channel probe inputs. This provides an opportunity to acquire high resolution MagniVu data on a few extra channels. Connecting the demultiplexing destination channels to other signals will allow viewing of their activity in the MagniVu memory but not the main memory.

2X and 4X High Resolution Timing Modes. 2X high resolution timing mode provides double the normal 500 MHz sample rate on one-half of the channels. By trading half of the analyzers channels, the remaining channels can be sampled at a 1 GHz rate with double the memory depth. 4X high resolution timing mode provides quadruple the normal 500 MHz sample rate on one-fourth of the channels. By trading three-fourths of the analyzer's channels, the remaining channels can be sampled at 2 GHz with quadruple the memory depth.

Both of the high resolution timing modes use the same demultiplexing channel routing as shown in Tables 3 and 4. By taking care to assign critical signals to the demultiplexing source channels, you can obtain extra timing resolution where most needed. Since demultiplexing affects only the main memory, you will still have the MagniVu data available for all of the signals that are disconnected from the main memory when you switch to the high resolution timing modes.

Range Recognition. When using range recognizers, the probe groups and probe channels must be in hardware order. Probe groups must be used from the most-significant probe group to the least-significant probe group based on the following order:

C3 C2 C1 C0 E3 E2 E1 E0 A3 A2 D3 D2 A1 A0 D1 D0 Q3 Q2 Q1 Q0 CK3
CK2 CK1 CK0

Probe channels must be from the most-significant channel to the least-significant channel, based on the following order:

7 6 5 4 3 2 1 0

The above examples apply to a 136-channel logic analyzer module. The missing channels in LA modules with fewer than 136 channels are ignored. With merged modules, range recognition extends across the first three modules: the master module contains the most-significant channels.

Signal Names See Tables 5 through 8 for the P6419 probe and adapter signal connections.

Table 5: P6419 High-Density Probe channel mapping on 136 and 102 channel TLA7Lx/Mx/Nx/Px/Qx modules and both TLA6xx and TLA520x mainframes

Signal name	Pad name	Probe Q3, E3, E2	Probe Q2, E1, E0	Probe CK0, D3, D2	Probe Q0, D3, D2	Probe CK1, A1, A0	Probe CK2, D1, D0	Probe CK3, C3, C2	Probe Q1, C1, C0
Clk/Qual-	NC	NC	NC	NC	NC	NC	NC	NC	NC
GND	A14	GND	GND	GND	GND	GND	GND	GND	GND
Clk/Qual+	A13	Q3+	Q2+	CK0+	Q0+	CK1+	CK2+	CK3+	Q1+
Data 15	B12	E3:7	E1:7	A3:7	D3:7	A1:7	D1:7	C3:7	C1:7
GND	B11	GND	GND	GND	GND	GND	GND	GND	GND
Data 14	B10	E3:6	E1:6	A3:6	D3:6	A1:6	D1:6	C3:6	C1:6
Data 13	A12	E3:5	E1:5	A3:5	D3:5	A1:5	D1:5	C3:5	C1:5
GND	A11	GND	GND	GND	GND	GND	GND	GND	GND
Data 12	A10	E3:4	E1:4	A3:4	D3:4	A1:4	D1:4	C3:4	C1:4
Data 11	B9	E3:3	E1:3	A3:3	D3:3	A1:3	D1:3	C3:3	C1:3
GND	B8	GND	GND	GND	GND	GND	GND	GND	GND
Data 10	B7	E3:2	E1:2	A3:2	D3:2	A1:2	D1:2	C3:2	C1:2
Data 9	A9	E3:1	E1:1	A3:1	D3:1	A1:1	D1:1	C3:1	C1:1
GND	A8	GND	GND	GND	GND	GND	GND	GND	GND
Data 8	A7	E3:0	E1:0	A3:0	D3:0	A1:0	D1:0	C3:0	C1:0
Data 7	B6	E2:7	E0:7	A2:7	D2:7	A0:7	D0:7	C2:7	C0:7
GND	B5	GND	GND	GND	GND	GND	GND	GND	GND
Data 6	B4	E2:6	E0:6	A2:6	D2:6	A0:6	D0:6	C2:6	C0:6
Data 5	A6	E2:5	E0:5	A2:5	D2:5	A0:5	D0:5	C2:5	C0:5
GND	A5	GND	GND	GND	GND	GND	GND	GND	GND
Data 4	A4	E2:4	E0:4	A2:4	D2:4	A0:4	D0:4	C2:4	C0:4
Data 3	B3	E2:3	E0:3	A2:3	D2:3	A0:3	D0:3	C2:3	C0:3
GND	B2	GND	GND	GND	GND	GND	GND	GND	GND
Data 2	B1	E2:2	E0:2	A2:2	D2:2	A0:2	D0:2	C2:2	C0:2
Data 1	A3	E2:1	E0:1	A2:1	D2:1	A0:1	D0:1	C2:1	C0:1
GND	A2	GND	GND	GND	GND	GND	GND	GND	GND
Data 0	A1	E2:0	E0:0	A2:0	D2:0	A0:0	D0:0	C2:0	C0:0

Refer to Table 3 on page 17 for 2X demultiplexing channel assignments.

Table 6: Recommended Compression-on-PCB to P6434 Mictor adapter and Mictor-on-PCB to Compression adapter channel mapping for 136 and 102 channel modules

			136 channel module			
			102 channel module			
Signal name	Pad name	Mictor pin number	Adapter #4/ probe head #4	Adapter #3/ probe head #3	Adapter #2/ probe head #2	Adapter #1/ probe head #1
J1 Clk/Qual-	A15	NC	NC	NC	NC	NC
GND	A14	GND	GND	GND	GND	GND
J1 Clk/Qual+	A13	5	Q3	Q0	CK0	CK3
J1 Data 15	B12	7	E3:7	D3:7	A3:7	C3:7
GND	B11	GND	GND	GND	GND	GND
J1 Data 14	B10	9	E3:6	D3:6	A3:6	C3:6
J1 Data 13	A12	11	E3:5	D3:5	A3:5	C3:5
GND	A11	GND	GND	GND	GND	GND
J1 Data 12	A10	13	E3:4	D3:4	A3:4	C3:4
J1 Data 11	B9	15	E3:3	D3:3	A3:3	C3:3
GND	B8	GND	GND	GND	GND	GND
J1 Data 10	B7	17	E3:2	D3:2	A3:2	C3:2
J1 Data 9	A9	19	E3:1	D3:1	A3:1	C3:1
GND	A8	GND	GND	GND	GND	GND
J1 Data 8	A7	21	E3:0	D3:0	A3:0	C3:0
J1 Data 7	B6	23	E2:7	D2:7	A2:7	C2:7
GND	B5	GND	GND	GND	GND	GND
J1 Data 6	B4	25	E2:6	D2:6	A2:6	C2:6
J1 Data 5	A6	27	E2:5	D2:5	A2:5	C2:5
GND	A5	GND	GND	GND	GND	GND
J1 Data 4	A4	29	E2:4	D2:4	A2:4	C2:4
J1 Data 3	B3	31	E2:3	D2:3	A2:3	C2:3
GND	B2	GND	GND	GND	GND	GND
J1 Data 2	B1	33	E2:2	D2:2	A2:2	C2:2
J1 Data 1	A3	35	E2:1	D2:1	A2:1	C2:1
GND	A2	GND	GND	GND	GND	GND
J1 Data 0	A1	37	E2:0	D2:0	A2:0	C2:0

Table 6: Recommended Compression-on-PCB to P6434 Mictor adapter and Mictor-on-PCB to Compression adapter channel mapping for 136 and 102 channel modules (Cont.)

			136 channel module			
			102 channel module			
Signal name	Pad name	Mictor pin number	Adapter #4/ probe head #4	Adapter #3/ probe head #3	Adapter #2/ probe head #2	Adapter #1/ probe head #1
J2 Clk/Qual-	A15	NC	NC	NC	NC	NC
GND	A14	GND	GND	GND	GND	GND
J2 Clk/Qual+	A13	6	Q2	CK2	CK1	Q1
J2 Data 15	B12	8	E1:7	D1:7	A1:7	C1:7
GND	B11	GND	GND	GND	GND	GND
J2 Data 14	B10	10	E1:6	D1:6	A1:6	C1:6
J2 Data 13	A12	12	E1:5	D1:5	A1:5	C1:5
GND	A11	GND	GND	GND	GND	GND
J2 Data 12	A10	14	E1:4	D1:4	A1:4	C1:4
J2 Data 11	B9	16	E1:3	D1:3	A1:3	C1:3
GND	B8	GND	GND	GND	GND	GND
J2 Data 10	B7	18	E1:2	D1:2	A1:2	C1:2
J2 Data 9	A9	20	E1:1	D1:1	A1:1	C1:1
GND	A8	GND	GND	GND	GND	GND
J2 Data 8	A7	22	E1:0	D1:0	A1:0	C1:0
J2 Data 7	B6	24	E0:7	D0:7	A0:7	C0:7
GND	B5	GND	GND	GND	GND	GND
J2 Data 6	B4	26	E0:6	D0:6	A0:6	C0:6
J2 Data 5	A6	28	E0:5	D0:5	A0:5	C0:5
GND	A5	GND	GND	GND	GND	GND
J2 Data 4	A4	30	E0:4	D0:4	A0:4	C0:4
J2 Data 3	B3	32	E0:3	D0:3	A0:3	C0:3
GND	B2	GND	GND	GND	GND	GND
J2 Data 2	B1	34	E0:2	D0:2	A0:2	C0:2
J2 Data 1	A3	36	E0:1	D0:1	A0:1	C0:1
GND	A2	GND	GND	GND	GND	GND
J2 Data 0	A1	38	E0:0	D0:0	A0:0	C0:0

Refer to Table 3 on page 17 for 2X demultiplexing channel assignments.

Any differential input, either the differential clock/qualifiers or the P6419 high-density probe, may have its negative input pin grounded and be used as a single-ended input.

Table 7: Recommended Compression-on-PCB to P6434 Mictor adapter and Mictor-on-PCB to Compression adapter channel mapping for 68 channel module

Signal name	Pad name	Mictor pin number	Adapter #1/ probe head #1	Adapter #2/ probe head #1
J1 Clk/Qual-	A15	NC	NC	NC
GND	A14	GND	GND	GND
J1 Clk/Qual+	A13	5	CK0	CK3
J1 Data 15	B12	7	A3:7	C3:7
GND	B11	GND	GND	GND
J1 Data 14	B10	9	A3:6	C3:6
J1 Data 13	A12	11	A3:5	C3:5
GND	A11	GND	GND	GND
J1 Data 12	A10	13	A3:4	C3:4
J1 Data 11	B9	15	A3:3	C3:3
GND	B8	GND	GND	GND
J1 Data 10	B7	17	A3:2	C3:2
J1 Data 9	A9	19	A3:1	C3:1
GND	A8	GND	GND	GND
J1 Data 8	A7	21	A3:0	C3:0
J1 Data 7	B6	23	A2:7	C2:7
GND	B5	GND	GND	GND
J1 Data 6	B4	25	A2:6	C2:6
J1 Data 5	A6	27	A2:5	C2:5
GND	A5	GND	GND	GND
J1 Data 4	A4	29	A2:4	C2:4
J1 Data 3	B3	31	A2:3	C2:3
GND	B2	GND	GND	GND
J1 Data 2	B1	33	A2:2	C2:2
J1 Data 1	A3	35	A2:1	C2:1
GND	A2	GND	GND	GND
J1 Data 0	A1	37	A2:0	C2:0

Table 7: Recommended Compression-on-PCB to P6434 Mictor adapter and Mictor-on-PCB to Compression adapter channel mapping for 68 channel module (Cont.)

Signal name	Pad name	Mictor pin number	Adapter #1/ probe head #1	Adapter #2/ probe head #1
J2 Clk/Qual+	A15	NC	NC	NC
GND	A14	GND	GND	GND
J2 Clk/Qual+	A13	6	CK1	CK2
J2 Data 15	B12	8	A1:7	D1:7
GND	B11	GND	GND	GND
J2 Data 14	B10	10	A1:6	D1:6
J2 Data 13	A12	12	A1:5	D1:5
GND	A11	GND	GND	GND
J2 Data 12	A10	14	A1:4	D1:4
J2 Data 11	B9	16	A1:3	D1:3
GND	B8	GND	GND	GND
J2 Data 10	B7	18	A1:2	D1:2
J2 Data 9	A9	20	A1:1	D1:1
GND	A8	GND	GND	GND
J2 Data 8	A7	22	A1:0	D1:0
J2 Data 7	B6	24	A0:7	D0:7
GND	B5	GND	GND	GND
J2 Data 6	B4	26	A0:6	D0:6
J2 Data 5	A6	28	A0:5	D0:5
GND	A5	GND	GND	GND
J2 Data 4	A4	30	A0:4	D0:4
J2 Data 3	B3	32	A0:3	D0:3
GND	B2	GND	GND	GND
J2 Data 2	B1	34	A0:2	D0:2
J2 Data 1	A3	36	A0:1	D0:1
GND	A2	GND	GND	GND
J2 Data 0	A1	38	A0:0	D0:0

1/2 channel mode may use Adapter #1 connection signals as source.

Refer to Table 3 on page 17 for 2X demultiplexing channel assignments.

Any differential input, either the differential clock/qualifiers or the P6419 high-density probe, may have its negative input pin grounded and be used as a single-ended input.

Table 8: Recommended Compression-on-PCB to P6434 Mictor adapter and Mictor-on-PCB to Compression adapter channel mapping for 34 channel module

Signal name	Pad name	Mictor pin number	Adapter #1/probe head #1
J1 Clk/Qual-	A15	NC	NC
GND	A14	GND	GND
J1 Clk/Qual+	A13	5	CK3
J1 Data 15	B12	7	C3:7
GND	B11	GND	GND
J1 Data 14	B10	9	C3:6
J1 Data 13	A12	11	C3:5
GND	A11	GND	GND
J1 Data 12	A10	13	C3:4
J1 Data 11	B9	15	C3:3
GND	B8	GND	GND
J1 Data 10	B7	17	C3:2
J1 Data 9	A9	19	C3:1
GND	A8	GND	GND
J1 Data 8	A7	21	C3:0
J1 Data 7	B6	23	C2:7
GND	B5	GND	GND
J1 Data 6	B4	25	C2:6
J1 Data 5	A6	27	C2:5
GND	A5	GND	GND
J1 Data 4	A4	29	C2:4
J1 Data 3	B3	31	C2:3
GND	B2	GND	GND
J1 Data 2	B1	33	C2:2
J1 Data 1	A3	35	C2:1
GND	A2	GND	GND
J1 Data 0	A1	37	C2:0

Table 8: Recommended Compression-on-PCB to P6434 Mictor adapter and Mictor-on-PCB to Compression adapter channel mapping for 34 channel module (Cont.)

Signal name	Pad name	Mictor pin number	Adapter #1/probe head #1
J2 Clk/Qual+	A15	NC	NC
GND	A14	GND	GND
J2 Clk/Qual+	A13	6	CK0
J2 Data 15	B12	8	A3:7
GND	B11	GND	GND
J2 Data 14	B10	10	A3:6
J2 Data 13	A12	12	A3:5
GND	A11	GND	GND
J2 Data 12	A10	14	A3:4
J2 Data 11	B9	16	A3:3
GND	B8	GND	GND
J2 Data 10	B7	18	A3:2
J2 Data 9	A9	20	A3:1
GND	A8	GND	GND
J2 Data 8	A7	22	A3:0
J2 Data 7	B6	24	A2:7
GND	B5	GND	GND
J2 Data 6	B4	26	A2:6
J2 Data 5	A6	28	A2:5
GND	A5	GND	GND
J2 Data 4	A4	30	A2:4
J2 Data 3	B3	32	A2:3
GND	B2	GND	GND
J2 Data 2	B1	34	A2:2
J2 Data 1	A3	36	A2:1
GND	A2	GND	GND
J2 Data 0	A1	38	A2:0

Refer to Table 3 on page 17 for 2X demultiplexing channel assignments.

Any differential input, either the differential clock/qualifiers or the P6419 high-density probe, may have its negative input pin grounded and be used as a single-ended input.

Special Considerations for the Adapters. Consider the following issue when you use either the Compression-on-PCB to P6434 Mictor adapter or the Mictor-on-PCB to Compression adapters:

- Use of the Compression-on-PCB to P6434 Mictor and Mictor-on-PCB to Compression adapters on existing 68 and 34 channel embedded configurations and supports may require exchanging the P6419 Probe heads or P6434 module connector ends to accommodate all older Tektronix logic analyzer signal connection alternatives.

Land Footprints

The following section shows the land footprints for the P6419 probe. The figures contain the signal to land pattern assignments.

P6419 Probe Land Footprint. See Figure 11 for the land footprint for the P6419 High-Density Probe. See Figure 12 for an example of the high-density probe land footprint in a typical pass-through signal path layout configuration. This type of configuration optimizes minimal probe loading. Figure 13 contains example layouts of the high-density compression and mictor land footprints.

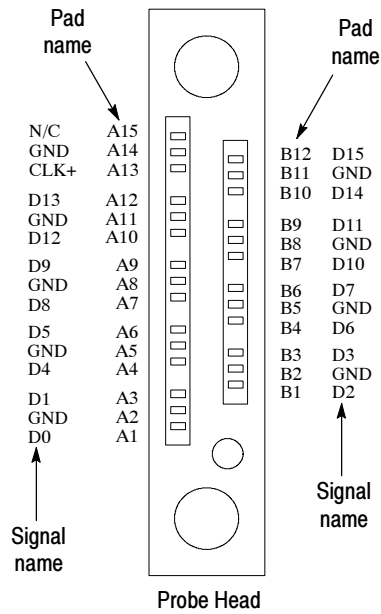


Figure 11: P6419 High-Density probe land footprint

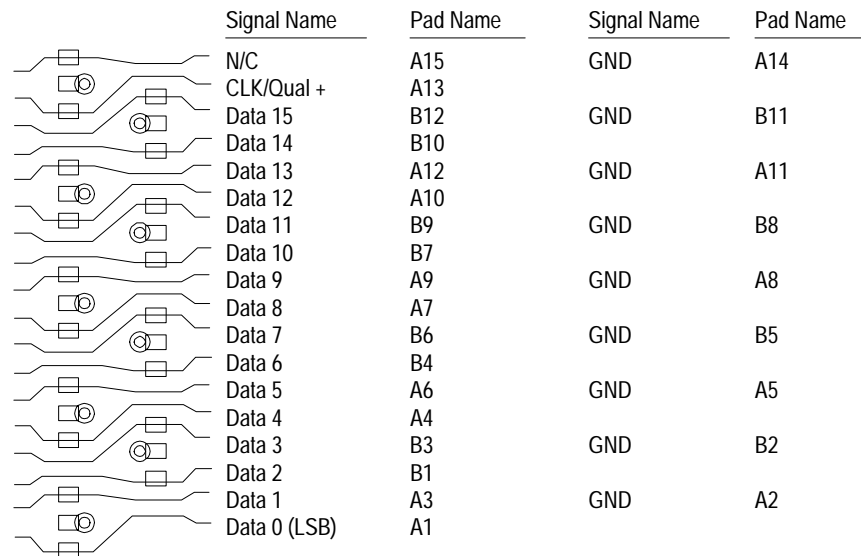


Figure 12: High-Density probe land footprint in a typical pass-through signal path layout configuration

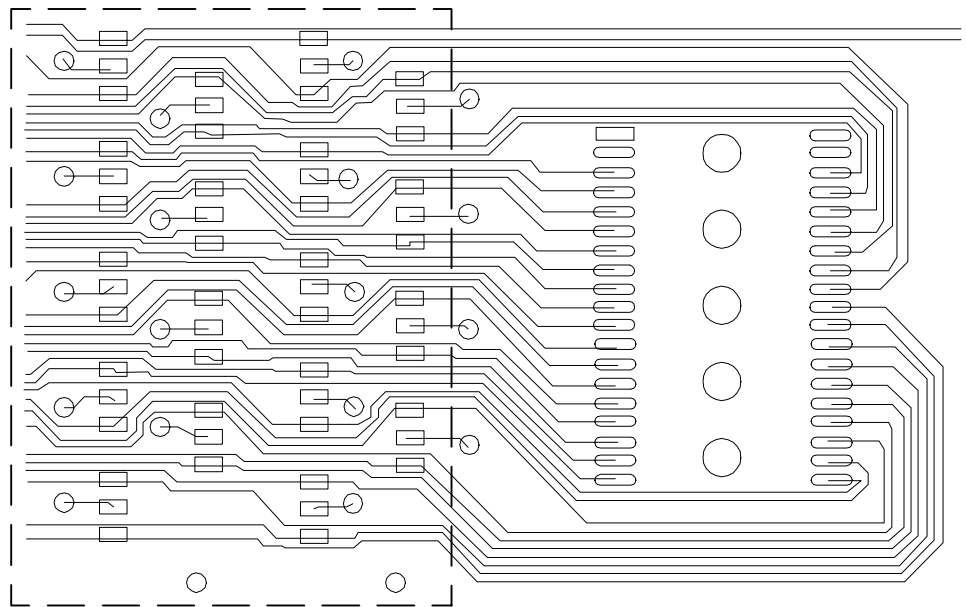


Figure 13: Example layout of the High-Density compression compared to the micror land footprints

**Mechanical
Considerations**

This section provides information on compression land footprint requirements and physical attachment requirements.

The PCB holes, in general, do not have an impact upon the integrity of your signals. Signal integrity impact is eliminated when the signals you route around the holes have the corresponding return current plane immediately below the signal trace (for the entire signal path from driver to receiver).

NOTE. *For optimum signal integrity, there should be a continuous, uninterrupted ground return plane along the entire signal path.*

Land Footprint Requirements for P6419 Probes. See Figure 14 for the compression land footprint requirements for P6419 probes.

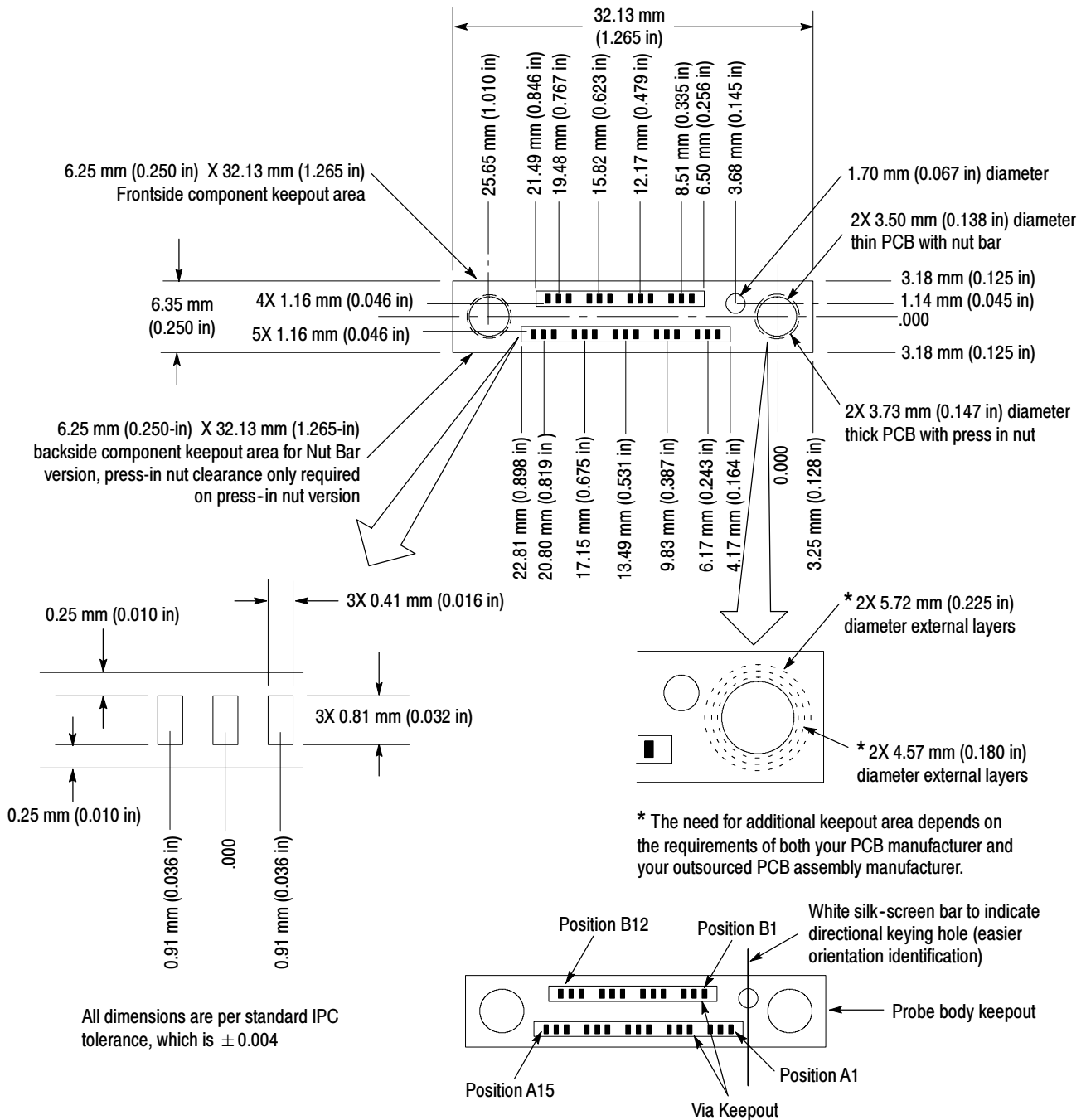


Figure 14: Land footprint requirements for P6419 probes (top view)

Special Considerations



WARNING. To avoid personal injury due to electric shock, always turn off the power on your target system before cleaning the compression footprint.

- Cleanliness is important for a reliable connection. Refer to *Cleaning the P6419 Compression Footprints*, located on page 8.
- Line boxes around the pin groupings are the via keepout areas (not part of the actual land footprint).
- Solder mask is required between all land pads in the component keepout area.
- Maintain PCB and solder mask tolerances for all signal runs in the keepout areas to ensure that no exposed runs or metal exist between pads. This prevents shorted signal runs.
- Solder mask hardness of at least 8H (pencil hardness) and thickness of at least 0.0762 mm to 0.1270 mm (0.0003 to 0.0005 in) has been verified for several hundred cycles without appreciable wear from the compression contact cycling.
- The compression land footprint design was verified on the immersion gold process.

Land Footprint Requirements for the Compression-on-PCB to P6434 Mictor Adapter. See Figure 15 for the land footprint requirements for the Compression-on-PCB to P6434 Mictor adapter. This compression adapter converts from the new compression footprint to the existing P6434 Mictor-based 34-channel probe.

Refer to the *P6434 Mass Termination Probe Manual* for the Mictor land footprint specification. Refer to Table 6 for the recommended channel mappings for the Compression-on-PCB to P6434 Mictor adapter and Mictor-on-PCB to Compression adapter.

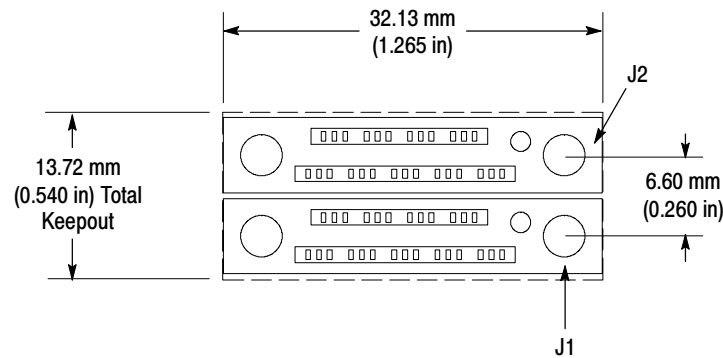


Figure 15: Land footprint requirements for the Compression-on-PCB to P6434 Mictor adapter

Special Considerations

- Two compression land footprints must be spaced as per the mechanical dimensions specified to support the compression adapter.
- Placement of the compression land footprints is only constrained with use of the compression adapter, not in normal usage of the TLA7Nx/Px/Qx logic analyzer module, the TLA600 series mainframes, or the TLA5000 series mainframes with a high-density probe.
- The P6434 Probe and older logic analyzer modules do not support differential signals. Therefore, the compression adapter cannot be used to support differential signals beyond capturing each side of the differential signal independently in a single-ended manner. Note that the connection to the CLK/QUAL signal is only connected to the positive side of the signal.
- The compression adapter will add capacitance to the P6434 probe input capacitance. The Mictor adapter adds 2.7 pF to the high-density compression probe load of 0.7 pF for a combined adapter capacitance load of 3.4 pF.
- The TLA7Lx/Mx/Nx/Px/Qx logic analyzer module, TLA600 series mainframe, and TLA5000 series mainframe with a P6419 High-Density Probe will connect directly to the compression land footprint to support high performance data capture and viewing needs.

Physical Attachment Requirements for P6419 probes. The connector-less P6419 High-Density Probe interconnects are designed to accommodate PCB thickness ranging from 1.27 mm to 6.35 mm (0.050 in to 0.250 in). To accommodate this range, there are two versions of the design:

- Nut bar
- Press-in nut

If the PCB thickness is 1.27 mm to 2.36 mm (0.050 in to 0.093 in), use the nut bar with the thin elastomer (see Figure 16).

If the PCB thickness is 2.36 mm to 6.35 mm (0.093 in to 0.250 in), use the press-in nut with the thick elastomer (see Figure 17).

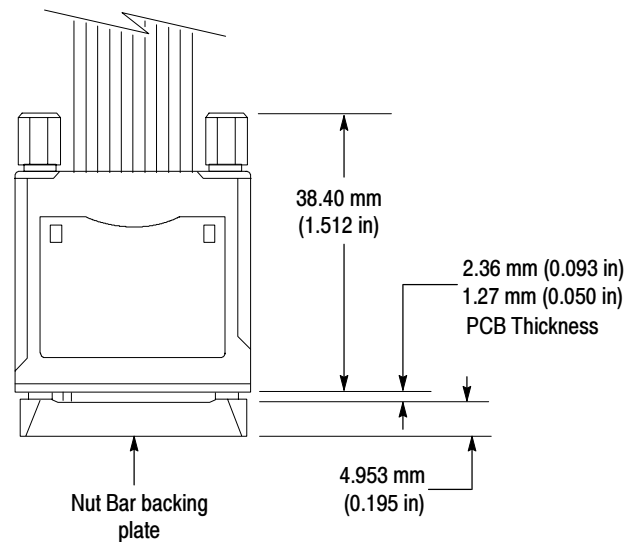


Figure 16: Nut bar design

Special Considerations for the Nut Bar Design

- The nut bar backing plate is required to maintain PCB flatness, which supports the compression connection.
- The nut bar snaps in and out of the PCB without the use of tools.
- Nut bars are reusable and are not required to be a permanent part of the PCB.
- The elastomer is independent and replaceable.
- Additional nut bars and both thick and thin elastomer holders may be ordered from Tektronix.

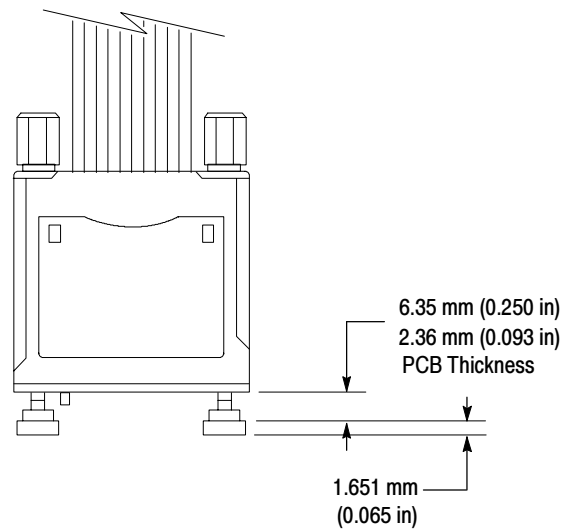


Figure 17: Press-in Nut design

Special Considerations for the Press-in Nut Design

- The PEM[®] KF2 2-56 or equivalent press-in nut must be inserted into the PCB.
- The elastomer is independent and replaceable.

Physical Attachment Requirements for the Compression-on-PCB to P6434 Mictor and Mictor-on-PCB to Compression Adapters. See Figure 3 on page 3 for the mechanical dimensions of the adapters.

Electrical Considerations

This section provides information on transmission lines and load models for the P6419 High-Density Probes.

The low frequency model is typically adequate for rise and fall times of 1 ns or greater in a typical 25 Ω source impedance environment (50 Ω runs with 50 Ω terminations on the line). For source impedance outside this range, and/or rise and fall times less than 1 ns, use the high frequency model to determine if a significant difference is obtained in the modeling result.

The compression land pattern pad is not part of the load model. Make sure that you include the compression land pad in the modeling.

Transmission Lines. Due to the high performance nature of the interconnect, ensure that stubs, which are greater than 1/4 length of the signal rise time, are modeled as transmission lines.

P6419 High-Density Probe Load Model. The following electrical model (see Figure 18) includes a low-frequency and high-frequency model of the high-density probes.

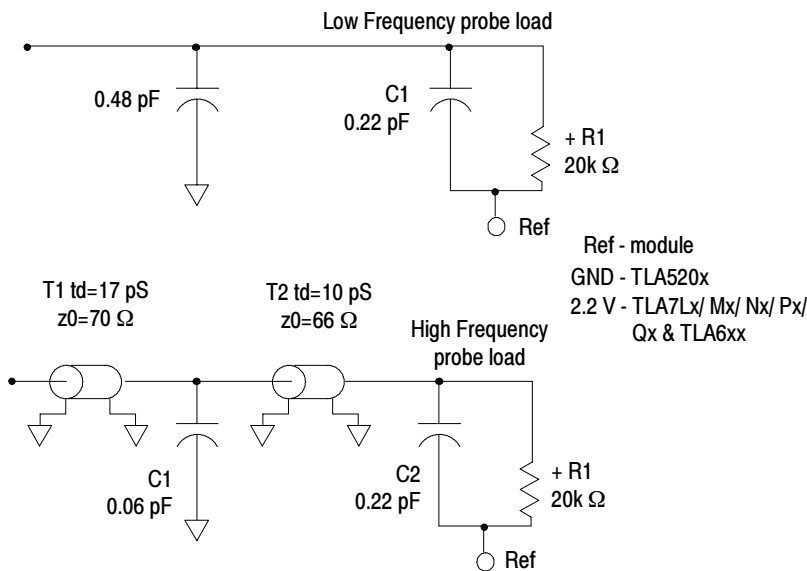


Figure 18: High-Density probe load model

Mictor-on-PCB to Compression Adapter Load Model. Refer to Figure 19 for an electrical model of the Mictor-on-PCB to Compression adapter. The pad cap is the capacitance of the 0.016 in x 0.032 in pad of the P6419 compression land footprint. The capacitive load depends upon the distance to the underlying conductors.

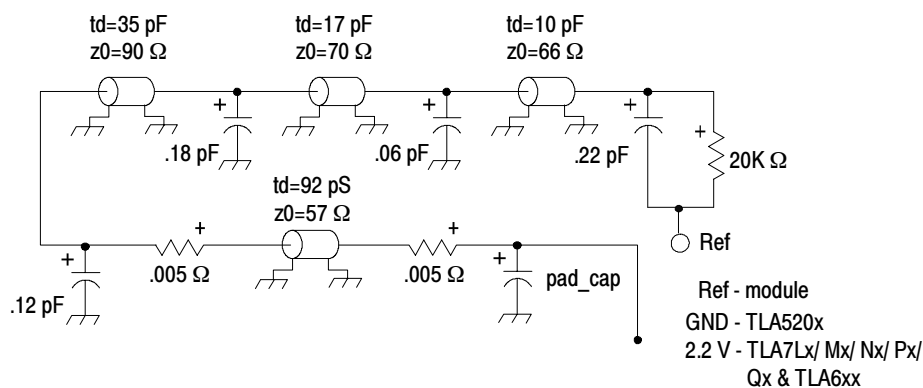


Figure 19: Mictor-on-PCB to Compression adapter load model

Compression-on-PCB to P6434 Mictor Adapter Load Model. Refer to Figure 20 for an electrical model of the Compression-on-PCB to P6434 Mictor adapter. The pad cap is the capacitance of the 0.016 in x 0.032 in pad of the P6419 compression land footprint. The capacitive load depends upon the distance to the underlying conductors.

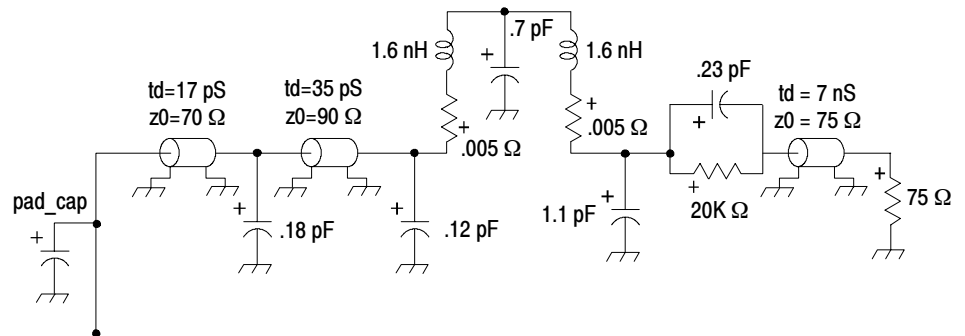


Figure 20: Compression-on-PCB to P6434 Mictor adapter load model

Specifications

Table 9 lists the electrical and mechanical specifications for the P6419 probe. The electrical specifications apply when the probe is connected between a compatible logic analyzer and a target system.

Table 9: Electrical and mechanical specifications

Characteristics	Description	
Number of input channels	17 (16 data channels, 1 clock/qualifier channel)	
Threshold accuracy	± 100 mV	
Channel-to-channel skew	< 100 ps	
Input resistance	20 K Ω	
Input capacitance	0.7 pF (typical)	
Maximum operating signal	8V _{p-p}	
Maximum nondestructive input signal to probe	± 15 V	
Probe overdrive	± 300 mV or $\pm 25\%$ of signal swing, whichever is greater.	
Minimum sampling period	TLA7Lx, Mx, Nx, Px, Qx and TLA60x, 61x, 62x	TLA520x
	4 ns	2.22 ns
Maximum synchronous clock rate	TLA7Lx, Mx, Nx, Px, Qx and TLA60x, 61x, 62x	TLA520x
	200 MHz	235 MHz
Delay from probe tip to module input connector	7.33 ns	
Probe length	1.9 m (75 in)	

Table 10 shows the environmental specifications for the P6419 probe. The probe is designed to meet Tektronix standard 062-2847-00 class 5.

Table 10: Environmental specifications

Characteristics	Description
Temperature	
Maximum operating	+ 50 °C (+122 °F)
Minimum operating	+ 0 °C (+ 32 °F)
Non-operating	-55 °C to +75 °C (-67 °F to +167 °F)
Humidity	
Operating	5% to 95% relative humidity at up to +30 °C 5% to 75% relative humidity above +30 °C up to +50 °C
Non-operating	5% to 95% relative humidity at up to +30 °C 5% to 75% relative humidity above +30 °C up to +60 °C
Altitude	
Operating	4.6 km (15,092 ft)
Non-operating	4.6 km (15,092 ft)

Maintenance

The P6419 probe does not require scheduled or periodic maintenance. Use the procedures listed under Functional Check to check the basic functionality of the probe.

To confirm that the probes meet or exceed the performance requirements for published specifications with a compatible TLA7Lx/Mx/Nx/Px/Qx module, TLA6xx logic analyzer or TLA520x logic analyzer, refer to the *Performance Verification Procedures* in the appropriate logic analyzer service manual.

Probe Calibration

If performing the probe calibration yourself, refer to the appropriate logic analyzer service manual for the complete calibration procedure. Otherwise, return the probe to the local Tektronix service center.

Functional Check

NOTE. For the default setup, if you connect probes to any channels other than the A2 or A3 groups, you must define the groups and channels in the Setup window before acquiring data on other probe channels.

Connect the logic analyzer probes to a signal source, start an acquisition, and verify that the acquired data is displayed in either the Listing or Waveform windows.

If available, use the TLACAL1 fixture to run the performance verification. For further details, refer to the performance verification procedure in the appropriate logic analyzer service manual.

Inspection and Cleaning



CAUTION. To prevent damage during the probe connection process, do not touch the exposed edge of the elastomer.

To maintain a reliable electrical contact, keep the probes free of dirt, dust, and contaminants. Remove dirt and dust with a soft brush. For more extensive cleaning, use only a damp cloth. Never use abrasive cleaners or organic solvents.

P6419 Probe Service Procedures

Except for the elastomer holders, the P6419 probe contains no user-replaceable parts. If probe failures occur, return the entire probe to your Tektronix service representative for repair.

Repackaging Instructions

If at all possible, use the original packaging to ship or store the probes. If the original packaging is not available, use a corrugated cardboard shipping carton. Add cushioning material to prevent the probes from moving around in the shipping container.

Enclose the following information when shipping the probe to a Tektronix Service Center:

- The owner's address
- Name and phone number of a contact person
- Type of probe
- Reason for returning
- A complete description of the service required

Seal the shipping carton. Mark the address of the Tektronix Service Center and your own return address on the shipping carton in two prominent locations.

Replaceable Parts

This chapter contains a list of the replaceable components for the P6419 probe. Use this list to identify and order replacement parts.

Parts Ordering Information

Replacement parts are available through your local Tektronix field office or representative.

Changes to Tektronix products are sometimes made to accommodate improved components as they come available and to give you the benefit of the latest improvements. Therefore, when ordering parts, it is important to include the following information in your order.

- Part number
- Instrument type or model number
- Instrument serial number
- Instrument modification number, if applicable

If you order a part that has been replaced with a different or improved part, your local Tektronix field office or representative will contact you concerning any change in part number.

Using the Replaceable Parts List

Replaceable Parts The P6419 probe contains only the elastomers and nut block as replaceable parts. If probe failure occurs, return the entire probe to your Tektronix service representative for repair.

Refer to the following list for replaceable items:

Table 11: Parts list column descriptions

Column	Column name	Description
1	Figure & index number	Items in this section reference figure and index numbers to the exploded view illustrations that follow.
2	Tektronix part number	Use this part number when ordering replacement parts from Tektronix.
3 and 4	Serial number	Column three indicates the serial number at which the part was first effective. Column four indicates the serial number at which the part was discontinued. No entries indicate the part is good for all serial numbers.
5	Qty	This indicates the quantity of parts used.
6	Name & description	An item name is separated from the description by a colon (:). Because of space limitations, an item name may sometimes appear as incomplete. Use the U.S. Federal Catalog handbook H6-1 for further item name identification.
7	Mfr. code	This indicates the code of the actual manufacturer of the part.
8	Mfr. part number	This indicates the actual manufacturer's or vendor's part number.

Abbreviations Abbreviations conform to American National Standard ANSI Y1.1-1972.

Mfr. Code to Manufacturer Cross Index The table titled Manufacturers Cross Index shows codes, names, and addresses of manufacturers or vendors of components listed in the parts list.

Table 12: Manufacturers cross index

Mfr code	Manufacturer	Address	City, state, zip code
80009	TEKTRONIX	14150 SW KARL BRAUN DR PO BOX 500	BEAVERTON, OR 97077-0001

Table 13: P6419 replaceable parts list

Figure & Index number	Tektronix part number	Serial no effective	Serial no discount'd	Qty	Name & description	Mfr. code	Mfr. part number
21							
-1	010-6419-10			1	P6419 PROBE (INCLUDES SHEET OF LABELS AND PROBE LABELING INSTRUCTIONS)	80009	010-6419-10
					P6419 STANDARD ACCESSORIES		
	020-2451-00			1	P6419 THIN ELASTOMER HOLDER ASSEMBLY, (USED WITH NUT BAR), BAG OF 2 (BLACK) (TOTAL OF 2 ELASTOMER ASSEMBLIES)	80009	020-2451-00
	020-2452-00			1	P6419 THICK ELASTOMER HOLDER ASSEMBLY, (USED WITH PRESS-IN NUT), BAG OF 2 (GRAY) (TOTAL OF 2 ELASTOMER ASSEMBLIES)	80009	020-2452-00
	071-1303-XX			1	MANUAL, TECH:INSTRUCTIONS, P6419	80009	071-1303-XX
	335-1007-00			1	P6419 PROBE, SHEET OF LABELS	80009	335-1007-00
	061-4254-01			1	DATA SHEET; READ THIS FIRST, PRECAUTIONS FOR HANDLING ELASTOMER BASED COMPRESSION PROBES, GOLDEN ROD;DP	80009	061-4252-01
	220-0255-00			1	NUT BAR ASSEMBLY	80009	220-0255-00

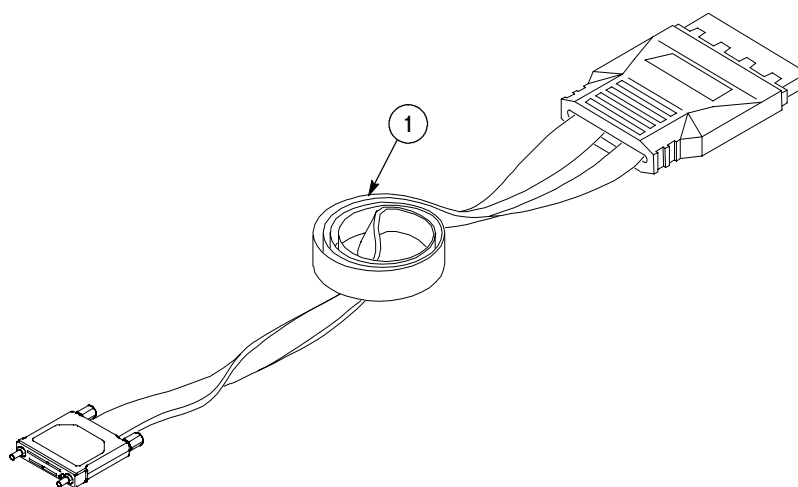


Figure 21: P6419 logic analyzer probe

Table 14: Adapter replaceable parts list

Figure & Index number	Tektronix part number	Serial no effective	Serial no discont'd	Qty	Name & description	Mfr. code	Mfr. part number
22					P6419 OPTIONAL ACCESSORIES		
-1	020-2453-00			1	NUT BAR ASSEMBLY, BAG OF 2	80009	020-2453-00
-2	020-2455-00			1	17 CH COMPRESSION-ON-PCB TO P6434 MICTOR ADAPTER	80009	020-2455-00
-3	020-2456-00			1	34 CH COMPRESSION-ON-PCB TO P6434 MICTOR ADAPTER	80009	020-2456-00
-4	020-2457-00			1	34 CH MICTOR-ON-PCB TO COMPRESSION ADAPTER	80009	020-2457-00
-5	352-1095-00			1	ELASTOMER ASSEMBLY	80009	352-1095-00

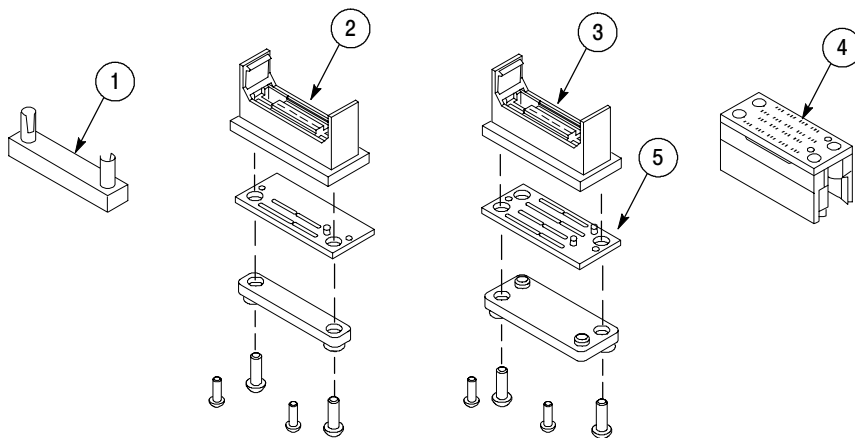


Figure 22: Compression-on-PCB to P6434 Mictor adapter



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