



# Low Profile Distributed Probes

Covers:

NEX-PRB1X

NEX-PRB2X

NEX-PRB1X-T

NEX-PRB2X-T

NEX-PRB4X

NEX-PRBDBL

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## **1.0 Overview**

### **1.1 General Information**

The Low Profile Probe family is a collection of distributed probes designed to be used with Tektronix TLA7Axx modules. These probes provide the following advantages over existing Tektronix probes:

- Probes connect at a right angle to the target providing a significantly reduced keep-out volume compared to Tektronix P686x and P696x probes.
- Probes provide increased fidelity of signals at +800MT data rates
  - Unique distributed termination brings the electrical effect of the probe to the signal probe point, minimizing the stub length on the target.
- Probes utilize a smaller footprint using up less area on the target (compared to Tektronix P68xx and P69xx probes)

All Low-Profile probes are distributed probes which greatly reduce the effect of the probe by requiring the placement of the probe input resistor on the adapter or target. The probe input resistor can be placed very close to the probe point, reducing the electrical stub length as seen by the target. This also provides the ability to customize the signal amplitude presented to the logic analyzer for capture by adjusting the size of the input resistor.

#### **Important**

It is critical to realize that termination must be used on the target and must be an appropriate value to insure the maximum input voltage to the logic analyzer is not exceeded. Failure to do so will damage the logic analyzer acquisition module.

The Low Profile Probe family consists of:

NEX-PRB1X(-T)	Direct connection of 34-channels to a single probe input on the TLA
NEX-PRB2X(-T)	2x-demux of 34-channels to two probe inputs on the TLA
NEX-PRB4X	4x-demux of 34-channels to four probe inputs on the TLA
NEX-PRBDBL	4x-demux of 34-channels to eight probe inputs on the TLA, though double-probing with a single probe head

## 2.0 Design Parameters

### 2.1 Keep-out Information

Below are the keep-out requirements for the low-profile probe family. The NEX-PRB1X, NEX-PRB2X and NEX-PRB4X require a keep-out depth of 0.400" as measured from the base of the target PCB. The NEX-PRBDBL requires a keep-out depth of 0.500". The "-T" probes are as shown, the non-T probes do not include the outer screw down holes and are only 1.15" wide.

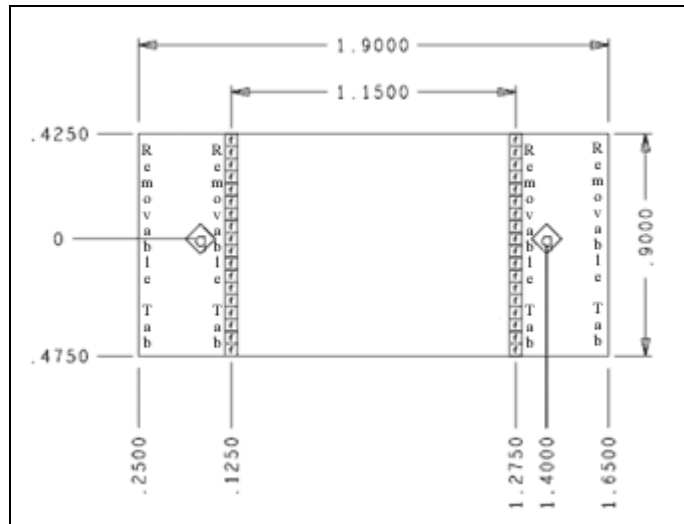


Figure 1 - Probe Dimensions (NEX-PRB1X(-T), NEX-PRB2X(-T), NEX-PRB4X)

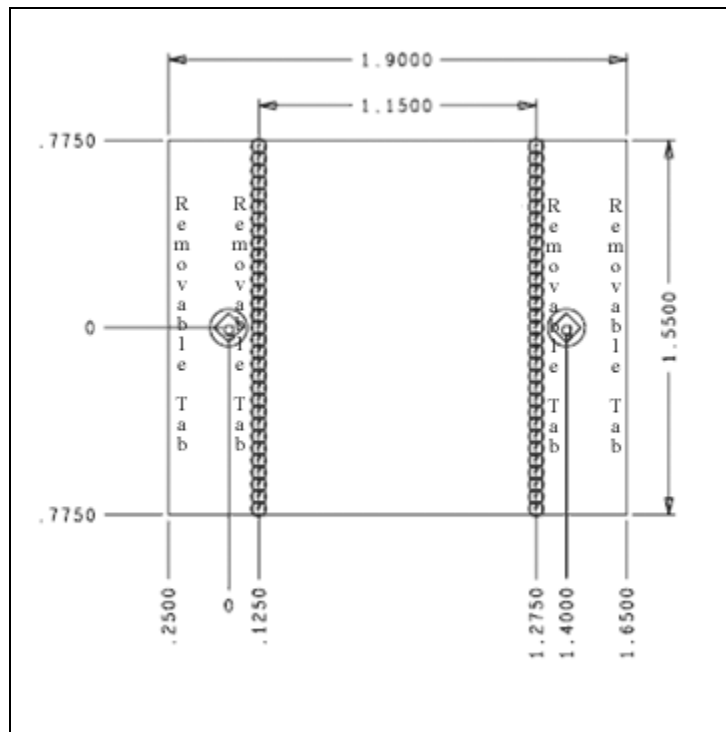


Figure 2 - Probe Dimensions (NEX-PRBDBL), 1.15 wide as shown in the center portion

## 2.2 Required Footprint & Probe Egress

All low profile probes require the same mating connector. This connector is a Samtec, Inc. part number QSH-030-01-L-D-A. Please contact Samtec to acquire these mating connectors. The PCB layout information for this part can be found on the Samtec website at [www.samtec.com](http://www.samtec.com). The center pins (sometimes called the ground blade) do not have assigned pin numbers and must be tied to ground on the PCB.

Depending on the probe egress off the PCB target, the probe cables may be capable of pulling the mating connectors apart (see Figure 5). If this is the case, Nexus Technology recommends that the mating connector's PCB footprint also include through-holes so that tie-wraps can be used to properly secure the attachment of the low profile probes to the mating connector. The dimensions of these through-holes should be center-aligned to the PCB footprint with the dimensions below.

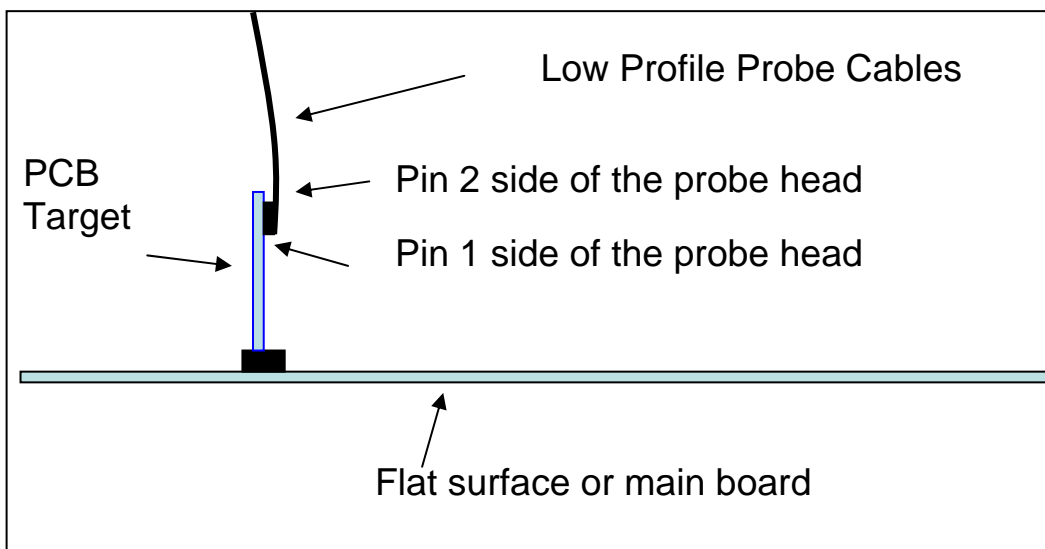


Figure 3 - Cable Egress Which Would Typically Require Tie-Downs

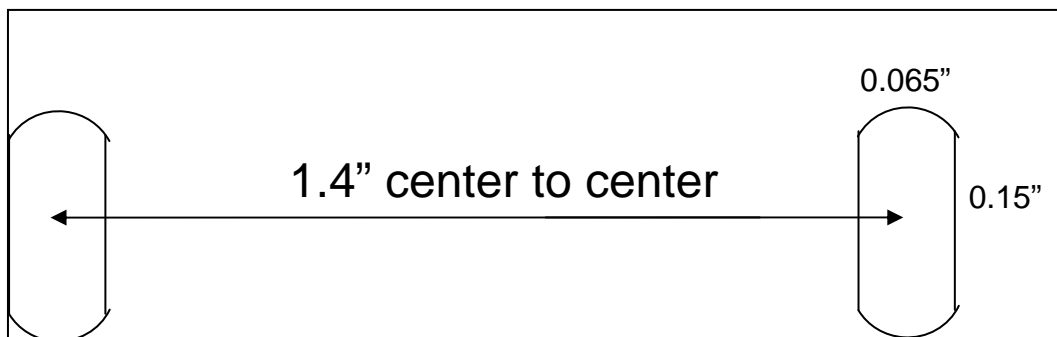


Figure 4 - Probe Retention Dimension when using the non-T versions

### **3.0 Channel Mapping**

The channel mapping for each of the low profile probes follows. Unspecified pins can be left floating or tied to ground.

#### **3.1 NEX-PRB1X Channel Mapping**

Pin#	Logic Analyzer Channels			
	D2:D3 & A2:A3	D0:D1 & A0:A1	C0:C1 & C2:C3	E0:E1 & E2:E3
03	D2:0	D0:0	C0:0	E0:0
04	D2:2	D0:2	C0:2	E0:2
05	D2:1	D0:1	C0:1	E0:1
06	D2:3	D0:3	C0:3	E0:3
09	D2:4	D0:4	C0:4	E0:4
10	D2:6	D0:6	C0:6	E0:6
11	D2:5	D0:5	C0:5	E0:5
12	D2:7	D0:7	C0:7	E0:7
15	Qual0	CLK2	Qual1	Qual2
16	D3:0	D1:0	C1:0	E1:0
19	D3:2	D1:2	C1:2	E1:2
20	D3:1	D1:1	C1:1	E1:1
21	D3:3	D1:3	C1:3	E1:3
24	D3:4	D1:4	C1:4	E1:4
25	D3:6	D1:6	C1:6	E1:6
28	D3:5	D1:5	C1:5	E1:5
29	D3:7	D1:7	C1:7	E1:7
32	A3:7	A1:7	C3:7	E3:7
33	A3:5	A1:5	C3:5	E3:5
36	A3:6	A1:6	C3:6	E3:6
37	A3:4	A1:4	C3:4	E3:4
40	A3:3	A1:3	C3:3	E3:3
41	A3:1	A1:1	C3:1	E3:1
42	A3:2	A1:2	C3:2	E3:2
45	A3:0	A1:0	C3:0	E3:0
46	CLK0	CLK1	CLK3	Qual3
49	A2:7	A0:7	C2:7	E2:7
50	A2:5	A0:5	C2:5	E2:5
51	A2:6	A0:6	C2:6	E2:6
52	A2:4	A0:4	C2:4	E2:4
55	A2:3	A0:3	C2:3	E2:3
56	A2:1	A0:1	C2:1	E2:1
57	A2:2	A0:2	C2:2	E2:2
58	A2:0	A0:0	C2:0	E2:0

**Table 1 - NEX-PRB1X(-T) Channel Mapping**

### 3.2 NEX-PRB2X Channel Mapping

Pin #	Logic Analyzer Channels	
	A0:A1 & A2:A3	C2:C3 & E2:E3
03	A0:0	E2:0
04	A0:2	E2:2
05	A0:1	E2:1
06	A0:3	E2:3
09	A0:4	E2:4
10	A0:6	E2:6
11	A0:5	E2:5
12	A0:7	E2:7
15	CLK1	Qual3
16	A1:0	E3:0
19	A1:2	E3:2
20	A1:1	E3:1
21	A1:3	E3:3
24	A1:4	E3:4
25	A1:6	E3:6
28	A1:5	E3:5
29	A1:7	E3:7
32	A3:7	C3:7
33	A3:5	C3:5
36	A3:6	C3:6
37	A3:4	C3:4
40	A3:3	C3:3
41	A3:1	C3:1
42	A3:2	C3:2
45	A3:0	C3:0
46	CLK0	CLK3
49	A2:7	C2:7
50	A2:5	C2:5
51	A2:6	C2:6
52	A2:4	C2:4
55	A2:3	C2:3
56	A2:1	C2:1
57	A2:2	C2:2
58	A2:0	C2:0

**Table 2 - NEX-PRB2X(-T) Channel Mapping**

### 3.3 NEX-PRB4X Channel Mapping

Pin #	Logic Analyzer Channels
03	A1:7
04	A3:0
05	A1:6
06	A3:1
09	A1:5
10	A3:2
11	A1:4
12	A3:3
15	CK2
16	A3:4
A1	A1:3
20	A3:5
21	A1:2
24	A3:6
25	A1:1
28	A3:7
29	A1:0
32	C3:0
33	E3:7
36	C3:1
37	E3:6
40	C3:2
41	E3:5
42	C3:3
45	E3:4
46	CK1
49	E3:3
50	C3:4
51	E3:2
52	C3:5
55	E3:1
56	C3:6
57	E3:0
58	C3:7

**Table 3 - NEX-PRB4X Channel Mapping**

### 3.4 NEX-PRBDBL Channel Mapping

Pin #	Logic Analyzer Channels	
	Module 1	Module 2
03	A1:7	A1:7
04	A3:0	A3:0
05	A1:6	A1:6
06	A3:1	A3:1
09	A1:5	A1:5
10	A3:2	A3:2
11	A1:4	A1:4
12	A3:3	A3:3
15	CK2	OPEN
16	A3:4	A3:4
19	A1:3	A1:3
20	A3:5	A3:5
21	A1:2	A1:2
24	A3:6	A3:6
25	A1:1	A1:1
28	A3:7	A3:7
29	A1:0	A1:0
32	C3:0	C3:0
33	E3:7	E3:7
36	C3:1	C3:1
37	E3:6	E3:6
40	C3:2	C3:2
41	E3:5	E3:5
42	C3:3	C3:3
45	E3:4	E3:4
46	CK1	OPEN
49	E3:3	E3:3
50	C3:4	C3:4
51	E3:2	E3:2
52	C3:5	C3:5
55	E3:1	E3:1
56	C3:6	C3:6
57	E3:0	E3:0
58	C3:7	C3:7

**Table 4 - NEX-PRBDBL Channel Mapping**

## **4.0 General Use**

### **4.1 Distributed Probe Warning**

#### **WARNING!**

The low-profile family of probes are distributed probes which require  $\pm 5\%$ , 1,430-ohm series input resistors on the target PCB. Failure to use these resistors or to use resistors with incorrect values and/or tolerances may cause permanent damage to the logic analyzer module. Series resistors with a value of 1,430-ohms with a tolerance no greater than  $\pm 5\%$  must be used.

#### **WARNING!**

All Nexus Technology products that use low profile probes are designed with these resistors already in place. This warning only applies to applications where the customer is designing a PCB which will use the low-profile probe directly.

### **4.2 Care and Handling of Distributed Probes**

Care must be taken when handling the low-profile probes. Avoid parallel or lateral forces where the coax cable attaches to the probe head or probe tail. Failure to do so may cause damage and will decrease the life of the probe.

Disconnect the probe from the product under test before handling or moving it.

### **4.3 Label Application to the NEX-PRB1X and NEX-PRB2X(-T) products**

Each low-profile probe comes with labels to help properly connect the probes to the Tektronix logic analyzer. The NEX-PRB4X and NEX-PRBDBL probes can only be connected to one particular set of channel groups on the TLA. Therefore, these probes come with the channel group labels already attached. The NEX-PRB1X and NEX-PRB2X probes can be connected to two or more different channel groups on the Tektronix logic analyzer. For this reason, a variety of channel group labels are supplied so that they can be properly applied by the customer for their given application. To apply the channel group labels to the NEX-PRB1X and NEX-PRB2X probes, please follow the directions in the following sections.



#### **4.3.1 NEX-PRB1X(-T) Channel Group Labeling**

The NEX-PRB1X probe has one connection to the Tektronix logic analyzer and can be connected to any available channel group. Channel group labels are provided for each of the four possible channel group connections to the logic analyzer.

### 4.3.2 NEX-PRB2X(-T) Channel Group Labeling

There are two possible connection schemes for the NEX-PRB2X. The first utilizes the following channel groups on the logic analyzer: A0:A1, A2:A3, D0:D1, D2:D3. The alternate connection scheme utilizes the C0:C1, C2:C3, E0:E1, E2:E3 channel groups. To utilize either connection scheme, two connections to the logic analyzer are required per probe. To differentiate between these two connections please see Figure 5 which defines the “left” cable and connector as the cable on the left when to probe is face up and the probe connection is visible.

For the first connection scheme the left connector to the logic analyzer connects to the A0:A1/D0:D1 channel groups. The right connector must then connect to the A2:A3/D2:D3 channel groups. Attach the provided labels as described for future reference if this connection scheme is desired.

For the alternate connection scheme, the left connector to the logic analyzer connects to the E0:E1/E2:E3 channel groups. The right connector must then connect to the C0:C1/C2:C3 channel groups. Attach the provided labels as described for future reference if this connection scheme is desired.

Please note that two NEX-PRB2X probes can be used to fully utilize all available channels on a 136-channel module running in 2x demultiplexing mode.

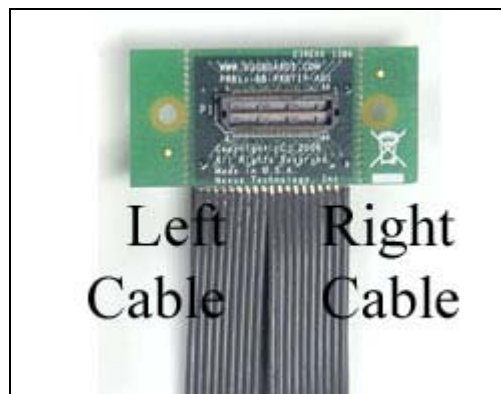


Figure 5 - NEX-PRB2X Orientation for Label Application

### 4.4 Connecting the Probe to the Tektronix Logic Analyzer

The probe head should be removed from the target before connecting or disconnecting the probe connections to the Tektronix logic analyzer. Connect the probe to the appropriate channel groups on the logic analyzer by observing the labels on the probe to match the correct channel groups of the logic analyzer inputs to the correct channel groups of the probe. If the probe does not have the channel grouping labels applied to them, please refer to Section X.X to properly apply the channel group labels to the probe. The Low Profile probes connect in the same manner as any P68xx or P69xx series probe. For more detailed information on probe connection to the logic analyzer, please see the P68XX Series Logic Analyzer Probes Manual, available from Tektronix (Tek. P/N 071-1059-04).

## **4.5 Connecting the Probe to the Target System**

Note the keying of the mating connector on the probe head. Press the probe into the connector on the target system. Care must be taken to support the weight of the acquisition probes. If through-holes are available on the target system and the break-away tabs are not removed from the probe, secure the probe head using the provided tie-down cables.

## **APPENDIX A - References**

Tektronix TLA700/7000 System User's Manual

Tektronix TLA700/7000 Logic Analyzer User's Manual

P68XX Series Logic Analyzer Probes Manual  
Tektronix P/N 071-1059-04

P6960/P6964 Tektronix Logic Analyzer Service Manual  
Tektronix part number 071-1528-02

## **APPENDIX B - Support**

### **About Nexus Technology, Inc.**



Established in 1991, Nexus Technology, Inc. is dedicated to developing, marketing, and supporting Bus Analysis applications for Tektronix Logic Analyzers.

We can be reached at:

Nexus Technology, Inc.  
78 Northeastern Blvd. #2  
Nashua, NH 03062

TEL: 877-595-8116  
FAX: 877-595-8118

Web site: <http://www.nexustechnology.com>

### **Support Contact Information**

Technical Support	<b><a href="mailto:techsupport@nexustechnology.com">techsupport@nexustechnology.com</a></b>
General Information	<b><a href="mailto:support@nexustechnology.com">support@nexustechnology.com</a></b>
Quote Requests	<b><a href="mailto:quotes@nexustechnology.com">quotes@nexustechnology.com</a></b>

We will try to respond within one business day.

### **If Problems Are Found**

Document the problem and e-mail the information to us. If at all possible please forward a Saved System Setup (with acquired data) that shows the problem. Do not send a text listing alone as that does not contain enough data for analysis. To prevent corruption during the mailing process it is strongly suggested that the Setup be zipped before transmission.