Connecting Probes

Online Help

KEYSIGHT
TECHNOLOGIES

Notices

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Safety Notices

CAUTION

A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

WARNING

A WARNING notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in personal injury or death. Do not proceed beyond a WARNING notice until the indicated conditions are fully understood and met.

Safety Summary

The following general safety precautions must be observed during all phases of operation of this instrument. Failure to comply with these precautions or with specific warnings or operating instructions in the product manuals violates safety standards of design, manufacture, and intended use of the instrument. Keysight Technologies assumes no liability for the customer's failure to comply with these requirements. Product manuals are provided with your instrument on CD-ROM and/or in printed form. Printed manuals are an option for many products. Manuals may also be available on the Web. Go to www.keysight.com and type in your product number in the Search field at the top of the page.

General Do not use this product in any manner not specified by the manufacturer. The protective features of this product may be impaired if it is used in a manner not specified in the operation instructions.

Before Applying Power Verify that all safety precautions are taken. Make all connections to the unit before applying power. Note the instrument's external markings described in "Safety Symbols".

Ground the Instrument If your product is provided with a grounding type power plug, the instrument chassis and cover must be connected to an electrical ground to minimize shock hazard. The ground pin must be firmly connected to an electrical ground (safety ground) terminal at the power outlet. Any interruption of the protective (grounding) conductor or disconnection of the protective earth terminal will cause a potential shock hazard that could result in personal injury.

Fuses See the user's guide or operator's manual for information about line-fuse replacement. Some instruments contain an internal fuse, which is not user accessible.

Do Not Operate in an Explosive Atmosphere Do not operate the instrument in the presence of flammable gases or fumes.

Do Not Remove the Instrument Cover Only qualified, service-trained personnel who are aware of the hazards involved should remove instrument covers. Always disconnect the power cable and any external circuits before removing the instrument cover.

Cleaning Clean the outside of the instrument with a soft, lint-free, slightly dampened cloth. Do not use detergent or chemical solvents.

Do Not Modify the Instrument Do not install substitute parts or perform any unauthorized modification to the product. Return the product to an Keysight Sales and Service Office for service and repair to ensure that safety features are maintained.

In Case of Damage Instruments that appear damaged or defective should be made inoperative and secured against unintended operation until they can be repaired by qualified service personnel.

> **CAUTION** A CAUTION notice denotes a hazard. It calls attention to an operating procedure, practice, or the like that, if not correctly performed or adhered to, could result in damage to the product or loss of important data. Do not proceed beyond a CAUTION notice until the indicated conditions are fully understood and met.

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Safety Symbols

Table 1   Safety Symbol

Symbol	Description
$\overline{\underline{\overline{}}}$	Direct current
$\sim$	Alternating current
$\overline{\sim}$	Both direct and alternating current
$3\sim$	Three phase alternating current
$3\sim$	Three phase alternating current
⏚	Earth ground terminal
⏚ (circled)	Protective earth ground terminal
⏚ (chassis)	Frame or chassis ground terminal
⏛	Terminal is at earth potential
▽	Equipotentiality
N	Neutral conductor on permanently installed equipment
L	Line conductor on permanently installed equipment
I	On (mains supply)
O	Off (mains supply)
⏻	Standby (mains supply). The instrument is not completely disconnected from the mains supply when the power switch is in the standby position
▬	In position of a bi-stable push switch

Symbol	Description
	Out position of a bi-stable push switch
	Equipment protected throughout by DOUBLE INSULATION or REINFORCED INSULATION
	Caution, refer to accompanying documentation
	Caution, risk of electric shock
	Do not apply around or remove from HAZARDOUS LIVE conductors
	Application around and removal from HAZARDOUS LIVE conductors is permitted
	Caution, hot surface
	Ionizing radiation
CAT I	IEC Measurement Category I
CAT II	Measurement Category II
CAT III	Measurement Category III
CAT IV	Measurement Category IV

Compliance and Environmental Information

Table 2   Compliance and Environmental Information

Safety Symbol	Description
CSA	CSA is the Canadian certification mark to demonstrate compliance with the Safety requirements.
N10149	The C-tick mark is a registered trademark of the Spectrum Management Agency of Australia. This signifies compliance with the Australia EMC Framework regulations under the terms of the Radio Communication Act of 1992.
CE	CE compliance marking to the EU Safety and EMC Directives. ISM GRP-1A classification according to the international EMC standard. ICES/NMB-001 compliance marking to the Canadian EMC standard.

Connecting Probes Using the Probe Summary

Use the Probe Summary to figure out how to connect logic analyzer probes to your target system. It is essential to connect the logic analyzer pods to the right probes, then to the right connectors on your target system. The XML configuration files for some inverse assemblers contain information to help you make the right connections.

To use the probe summary information, you must load a configuration file which contains the appropriate information (such information may not be included with every inverse assembler). In addition, you must use the signal-to-connector mapping recommended by Keysight.

There are two ways to view information from the configuration file about where to plug the logic analyzer pods, depending on the kind of probe you are using:

To connect a general-purpose probe (see page 11) takes you straight to the connection information, using the Properties button of the General Purpose Probe tool.

To connect an analysis probe (see page 13) takes you to the System Summary dialog, which provides less detail, but which is available regardless of which probe tool is used.

See Also
- To calculate pod indexes (see page 17)
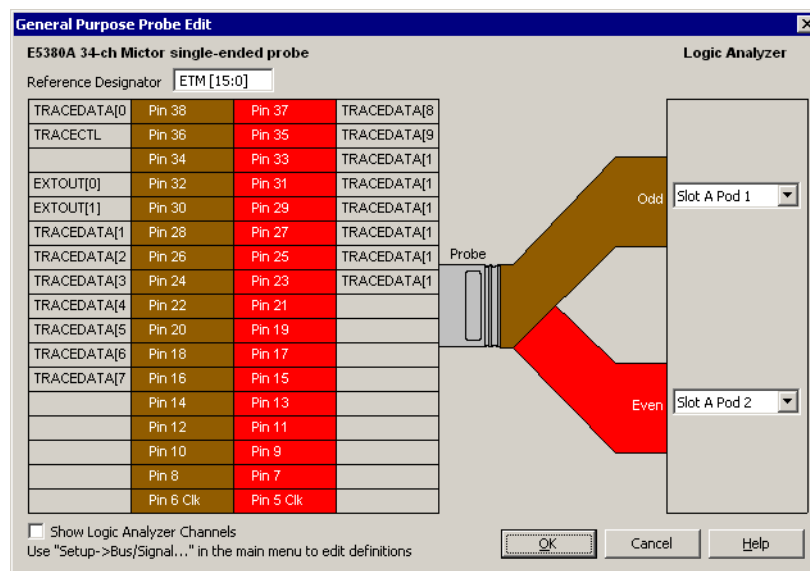- To add probe information to a configuration file (see page 15)

Contents

1
To connect a general-purpose probe

To view information from the configuration file about where to plug the logic analyzer pods into your target system:

1 Load the XML configuration file.

2 Select **Setup>General Purpose Probe Set>Properties**.

3 Select the the type of probe you are using.

4 Click **Edit Probe...**.

5 Connect the pods as shown.
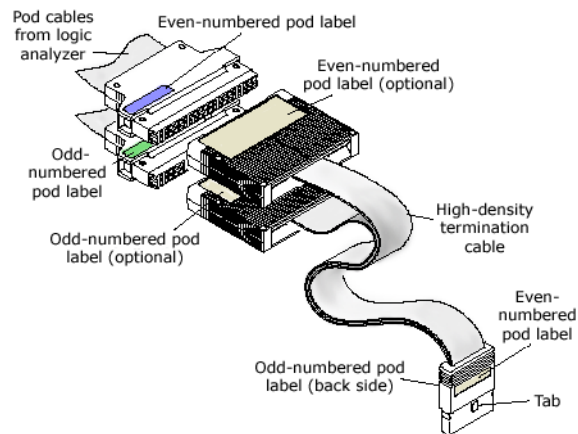

Note that the screen shown above is a generic example--the connections for your analysis probe will be different.

To connect the probes to the target system
The probes include labels to identify them. The labels can be attached to the cables after the cables have been connected to the target system and logic analyzer. Some probes are also known as "high-density termination cables".

Pod cables from logic analyzer

Even-numbered pod label

Even-numbered pod label (optional)

Odd-numbered pod label

Odd-numbered pod label (optional)

High-density termination cable

Even-numbered pod label

Odd-numbered pod label (back side)

Tab

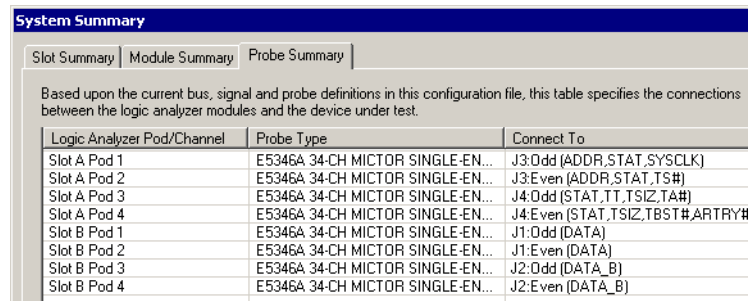**See Also**
- To connect an analysis probe (see page 13)
- To calculate pod indexes (see page 17)
- To add probe information to a configuration file (see page 15)
- "Using General Purpose Probes" (in the online help)

2
To connect an analysis probe

To view information from the configuration file about where to plug the logic analyzer pods into an analysis probe:

1 Load the XML configuration file.

2 Open the bus/signal setup window for the logic analyzer module you will be using.

3 Select the **System Summary...** button.

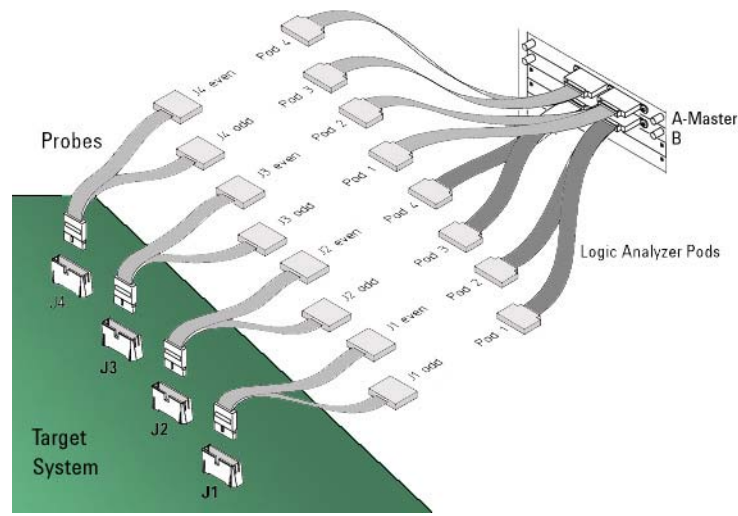**4** Select the **Probe Summary** tab.

Note that the screen shown above is a generic example--the connections for your analysis probe will be different.

5 Connect the pods as shown.

To connect the probes to the target system The probes include labels to identify them. The labels can be attached to the cables after the cables have been connected to the target system and logic analyzer, as shown in the following illustration. Some probes are also known as "high-density termination cables".
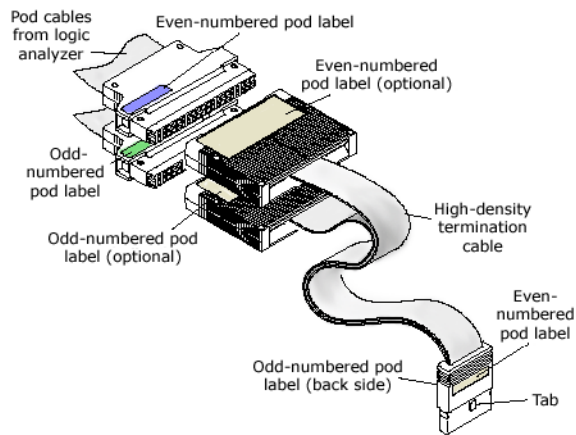
See Also • To connect a general-purpose probe (see page 11)

• To calculate pod indexes (see page 17)

• To add probe information to a configuration file (see page 15)

3
To add probe information to a configuration file

If your configuration file does not contain probe summary information for your particular setup, it is possible to add this information to the configuration file. Doing this is especially useful if you will be sharing the configuration file with other users who will need to make connections to the same target system you are probing.

It is easiest to use the logic analyzer software to define probes for an inverse assembler, unless the pods will be connected directly to an analysis probe without using a probe cable.

1   Load an XML configuration file. This configuration file needs to map each required bus or signal to a logic analyzer pod.

2   Decide what kind of probe you will use to connect the pod to the connector on the target system (or analysis probe).

3   For each pod defined in the configuration:

   a   Find the pod index (see page 17) of the pod.

   b   Find the same information for any other pods which connect to the same probe.

   c   Find where the probe connects (see page 16) to the target system.

   d   "Define" (in the online help) the probe.

4   Save the configuration file.

5   Verify (see page 19) the changes you made.

See Also   •   To add probe information to a configuration file using XML (see page 21)

To find where a probe connects

There are several ways to find out where a particular probe should be connected, so that you can add this information to the Probe Summary tab:

- If you have successfully connected the logic analyzer to your target system, look at where the cables are actually connected.

- If your target system uses the connector definitions recommended by Keysight, look at the data sheet, User's Guide or Design Guide for your inverse assembler. In most cases, these documents can be found at www.keysight.com.

- Choose any bus or signal which is mapped to the pod in the **Buses/Signals** setup window, or in the XML configuration file. Next, look at the design of your board to find out which connector carries that signal.

To calculate pod indexes

Configuration files for inverse assemblers use pod indexes to map signals and buses to the pods of the logic analyzer cards.

To calculate the index of a pod when a configuration is loaded

1   Open the the **Buses/Signals** setup window.

2   Scroll to the pod on the far right, and count pods toward the left.

To calculate the index of a pod by looking at cards

1   Find the master card. If there is only one card, that is the master card. If there are several cards connected together as a module, you can look at the "Slot Summary" (in the online help) tab.

2   On the master card, the pods are numbered beginning with 1.

3   Continue counting with the bottom card in the module, then continue counting upwards.

See the Example (see).

To look up the index of a pod in an XML file

If you have an XML file which maps buses and signals to logic analyzer pods, you can find find the index of the pod which carries any particular bus or signal.

1   Open the XML file in a text editor.

2   Find the <BusSignal> line for the bus or signal.

3   Look at the corresponding <Channels> line to see the pod index.

Why pod indexes are needed

Normally, pods are referred to using their physical names, such as "Slot A Pod 4." This can make it difficult to refer to a particular pod, when nothing is known about the actual setup of the logic analyzer. Logic analyzer cards can be installed in different slots. Different model cards can also have different numbers of pods per card. Pod indexes provide a way to refer to the pods on a card (or in a multi-card module) without worrying about these factors.

Pod Indexes Example

Here is an example of a 3-card module, along with the pod indexes for each pod. The picture of the cards in your system can be found on the "Slot Summary" (in the online help) tab.

Slots	Cards	Modules
A	16753-16756 300MHz State/1 GHz Timing Analyzer Pod 1 Pod 2 Pod 3 Pod 4 **Pod index 9,10,11,12**	
B	16753-16756 300MHz State/1 GHz Timing Analyzer **Master** Pod 1 Pod 2 Pod 3 Pod 4 **Pod index 1,2,3,4**	My 16753-56-1
C	16753-16756 300MHz State/1 GHz Timing Analyzer Pod 1 Pod 2 Pod 3 Pod 4 **Pod index 5,6,7,8**	
D	Empty	
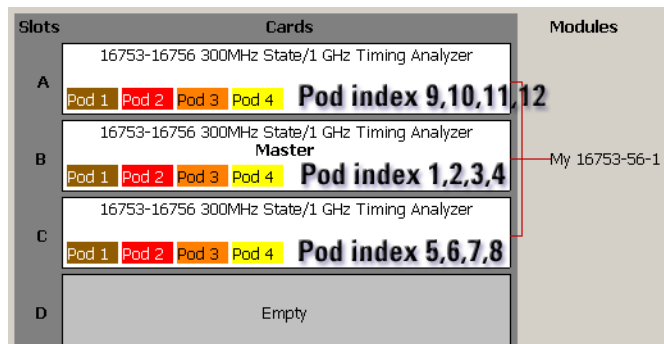
To verify probe definitions

1 Open the XML file in a web browser. If there are any errors in the XML syntax, these will be displayed in the browser.

2 Open the XML file using the logic analyzer software.

3 Verify that the information in the Probe Summary tab of the System Summary dialog is correct. Verify that all of the connections shown in this tab match the actual physical connections.

3   **To add probe information to a configuration file**

4

To add probe information to a configuration file using XML

1 Begin with an XML configuration file which maps each required bus or signal to a logic analyzer pod.

2 Add a <Probes> section (see page 22) to the XML file.

3 Decide what kind of probe you will use to connect the pod to the connector on the target system (or analysis probe).

4 For each pod defined in the configuration:

   a Find the pod index (see page 17) of the pod.

   b Find the same information for any other pods which connect to the same probe.

   c Find where the probe connects (see page 16) to the target system.

   d Define (see page 24) the probe.

5 Save the configuration file.

6 Verify (see page 19) the changes you made.

To add a probes section

Where to place the Probes section

Place the Probes section in the <BusSignalSetup> section of <Module>. Make sure that you do not confuse the <BusSignalSetup> section with <BusSignals>, which is a section within <BusSignalSetup>.

```
- <Configuration>
    <Clear />
  - <Setup>
    + <Overview>
    - <Module Name='Module 1'>
      + <PodAssignment>
      + <SamplingSetup>
      - <BusSignalSetup>
        + <PodSettings>
        + <BusSignals>
        + <Probes>
        </BusSignalSetup>
```

Clear

The Probes section begins with a "<Clear/>" in order to be sure that any existing definition of probes is cleared out. Then each probe is defined in its own <Probe> section. The parameters for <Probe> are "Name", "Type", and "NumberOfPods".

Name

The "Name" is the name of the Probe or pad and it is used to distinguish between other probes that may be the same type as this one. (For example, it will be quite common for users to have several Soft Touch probes on their board at one time.) This is the name of the Probe or pad on the user's board. (Make sure that this name and the name defined in the documentation is the same). If this is an analysis probe, there may not be an obvious name for the Probe. Do not just use the part number for the probe because this is the "Type". If there isn't an obvious Probe name, just use the name of the processor or bus that is being probed.

Type

The "Type" is the part number of the probe and should include a short text description, such as "E5394A – Soft touch single-ended probe". The "Type" does not need to be unique. Indeed, if more than one probe of the same type is used it is important that they all use exactly the same name. For general-purpose probes, use the strings from the following list.

```
E5339A - MICTOR Adapter
E5351A - MICTOR Adapter
E5346A - MICTOR Adapter
E5378A - 100 pin single-ended Samtec probe
E5379A - 100 pin differential Samtec probe
E5380A - 38 pin single-ended Samtec probe
E5385A - 100 pin single-ended Samtec probe
E5378A connected to two E5386A adapters
E5379A connected to one E5386A adapter
E5390A connected to two E5386A adapters
E5387A connected to one E5386A adapter
E5387A - Soft touch differential probe
E5390A - Soft touch single-ended probe
E5394A - Soft touch single-ended probe
```

NumberOfPods   The "NumberOfPods" refers to the number of pods that plug into this probe, which could be one or more. For example, some analysis probes may require as many as six or more pods but a general-purpose probe might only require one pod.

Example   If you use the logic analyzer software to create the XML, you may see an additional "NumberOfPins" parameter. It is fine to leave this in.

```
- <Probes>
    <Clear />
 + <Probe Name='J2' Type='E5394A - Soft touch single-ended probe'
     NumberOfPods='2'>
 + <Probe Name='J1' Type='E5394A - Soft touch single-ended probe'
     NumberOfPods='2'>
   </Probes>
```

To define probes in XML

Each probe needs to have one or more pods defined for it. These are defined within the <Probes> section. Each Pod is defined with an Index and a Prompt.

Index   The Index is the Pod Index which was discussed earlier.

Prompt   The Prompt is whatever is silkscreened on the probe to differentiate between the pods.

For example, on general-purpose probes with two pods, there is an "Even" and an "Odd". (The "Even" pod is generally A2, A4, A6, etc. and the "Odd" pod is "A1", "A3", "A5", etc.). For analysis probes, sometimes there are "P1", "P2", etc. The point is that the user will need to match up a pod with something physical on the probe. Remember that if a user makes a single mistake in connecting the probes, the measurements will not be accurate. It' s important to give the user as much help as you can in getting the probes connected properly.

Example

```
- <Probe Name='J1' Type='E5394A - Soft touch single-
    ended probe' NumberOfPods='2'>
    <Pod Index='1' Prompt='Odd' />
    <Pod Index='2' Prompt='Even' />
  </Probe>
```

Index