

Summit T28 PCI Express Protocol Analyzer Quick Start Guide

1 Introduction

The compact Summit T28 Protocol Analyzer features a small form factor supporting PCI Express data transmission rates up to 5.0 GT/s and data link widths up to x8 with 2GB trace buffer in a single unit. The Summit T28 protocol analyzer can support multiple PCIe storage protocols such as SATA Express, NVMe Express and SCSI Express.

Use this document for quick installation and setup. If you experience problems or need more information, see the *PCIe Gen3 Summit T3/T2 Protocol Analyzer User Manual* at the Teledyne LeCroy web site.

teledynelecroy.com/protocolanalyzer/pci-express



Summit T28 PCIe Protocol Analyzer

2 Components

The analyzer package includes the following components:

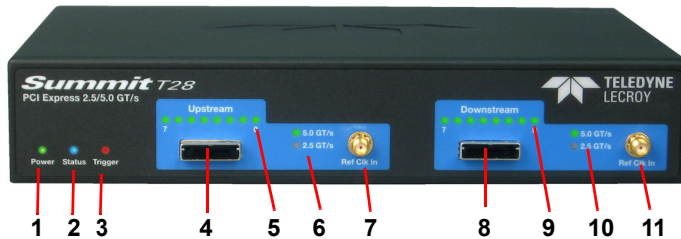
- Summit T28 analyzer system
- DC Power Adapter, 12 volts, and AC power cable
- USB cable
- PCIe Protocol Suite Software program DVD-ROM
- Quick Start Guide (this document)

Inspect the received shipping container for any damage. Unpack the container and account for each of the system components listed on the accompanying packing list. Visually inspect each component for absence of damage. In the event of damage, notify the shipper and Teledyne LeCroy. Retain all shipping materials for shipper's inspection.

Please see the *PCIe Gen3 Summit T3/T2 Protocol Analyzer User Manual* on the Teledyne LeCroy website for component specifications and further details. teledynelecroy.com/protocolanalyzer/pci-express

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Front Panel Description

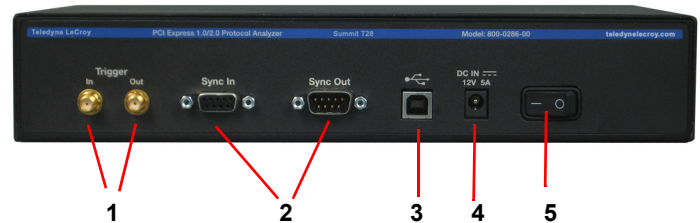


The Analyzer has the following features on the front panel:

- [1] **Power LED:** Lights when power is On.
- [2] **Status LED:** Displays the connection status of the Link.
 - Red - Error condition. Try using the PCIe Protocol Analysis application to clear the error. Please contact the factory if this does not work.
 - Green - Configuring system.
 - Purple - Waiting for connection.
 - Blue - Unit ready/connected.
- [3] **Trigger LED:** Lights when Summit T28 triggers on an event.
- [4] **Upstream [7:0] connector:** Connection to the probe for the capture of upstream direction of the link.
- [5] **Upstream [7:0] Link Activity LEDs:** Indication per link of activity. Off during electrical idle, orange for link active but errors detected, green for normal operation.
- [6] **Speed LEDs:** Indicates current speed the analyzer is using for the Upstream direction.
- [7] **Ref Clk In (Reference Clock In):** Provides an optional alternative connection from an external reference clock source to the Summit T28 analyzer.

Note: In standard configuration, the Summit T28 analyzer uses the reference clock from a probe cable from the interposer.
- [8] **Downstream [7:0] connector:** Connection to the probe for the capture of downstream direction of the link.
- [9] **Downstream [7:0] Link Activity LEDs:** Indication per link of activity. Off during electrical idle, orange for link active but errors detected, green for normal operation.
- [10] **Speed LEDs:** Indicates current speed the analyzer is using for the Downstream direction.
- [11] **Ref Clk In (Reference Clock In):** See [7] above.

Rear Panel Description



The Analyzer has the following features on the rear panel:

- [1] **Trigger In and Out:** Provide external trigger capabilities. You can configure Summit T28 to trigger external equipment using Trigger Out. You can use Trigger In to trigger the Analyzer from another device.
- [2] **Sync In and Sync Out:** Allows multiple Teledyne LeCroy analyzers to send synchronization and control messages to one another.
- [3] **USB Type B Host Machine Connector:** To connect the Analyzer to the host machine using a USB connection.
- [4] **DC IN:** 12 V, 5 A
- [5] **Power Switch** (black): 1 = On and 0 = Off.

Warning! Do not open the enclosure. No operator serviceable parts are inside.



4 Interposers and Probes

The Summit T28 supports a full range of Teledyne LeCroy PCIe Interposers and Probes.

Gen2 MidBus Probe: The Gen2 MidBus Probe is designed for use with the Summit T28 Analyzer and supports link widths from x1 to x8 at data rates of 2.5 GT/s (Gen1) or 5.0 GT/s (Gen2).

Gen2 Multi-lead Probe: The Summit Multi-lead Probe is designed for use with the Summit T28 Analyzer. The probe consists of 1 to 4 probe pods, which are connected to the analyzer using either iPass Y-Cables (for x1 and x4) or straight x4-to-x8 iPass cables (for x8). Each probe pod supports up to 8 Flex Tips, with each Flex Tip connected via two coax cables.

Gen2 Passive Slot Interposer: The Gen2 Passive Slot Interposer is designed for use with the Summit T28 Analyzer and supports link widths from x1 to x8 at data rates of 2.5 GT/s (Gen1) or 5.0 GT/s (Gen2). For link widths up to x8, one iPass Y-cable is required.

Gen2 Active Slot Interposer: The Gen2 Active Slot Interposer is designed for use with the Summit T28 Analyzer and supports link widths from x1 to x8 at data rates of 2.5 GT/s (Gen1) or 5.0 GT/s (Gen2). For link widths up to x8, one iPass Y-cable is required.

Gen2 XMC Module Interposer: PE048UIA-X. The XMC Interposer Card supports PCI Express link widths up to x8 at data rates of 2.5 GT/s.

Gen2 AMC Interposer: PE060UIA-X. The AMC Interposer Card supports PCI Express link widths up to x8 at data rates of 2.5 GT/s and 5 GT/s.

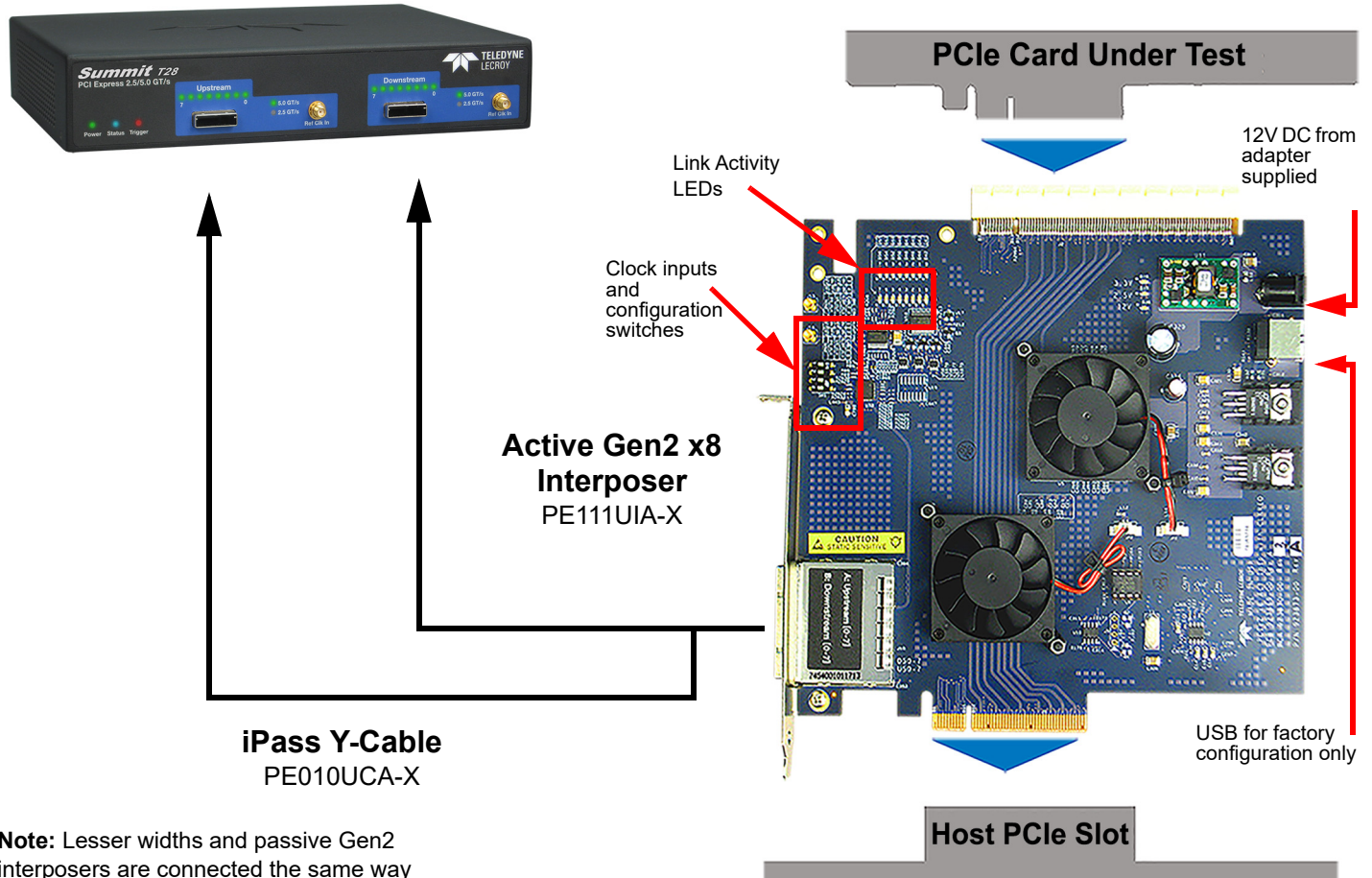
Gen2 VPX Interposer: PE070UIA-X. The VPX Interposer Card supports PCI Express data channels with link widths up to x16, at PCIe® 2.0 data rates up to 5 GT/s.

Warning! Interposer has electrostatic-sensitive components. Handle only at static-safe work stations.



5 Connecting Interposers to the Summit T28 Analyzer

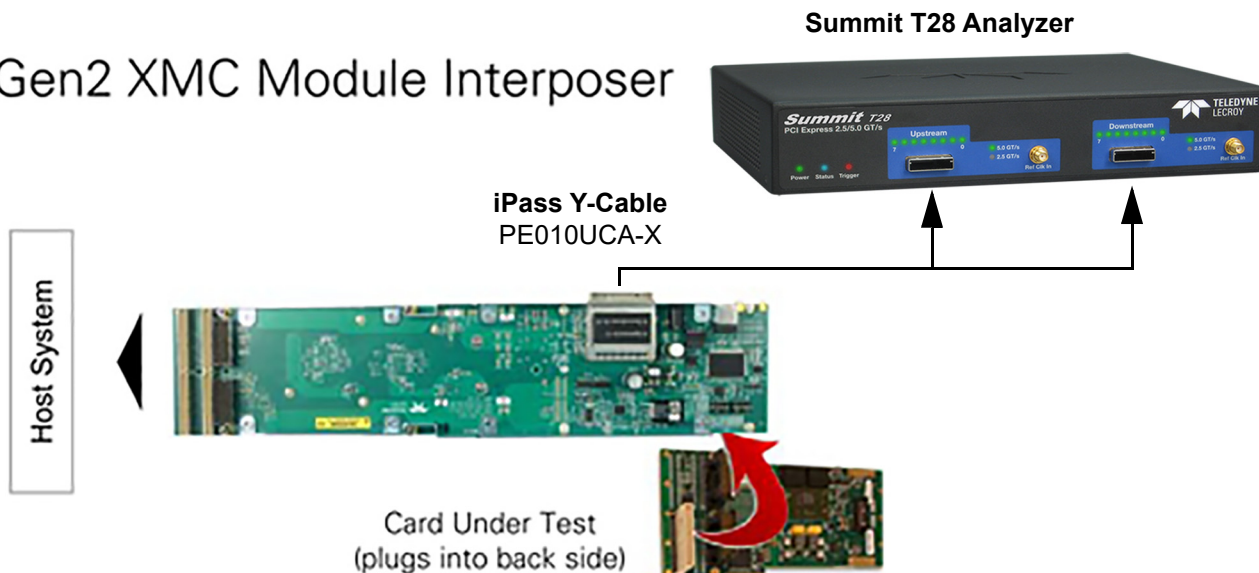
Summit T28 PCIe Protocol Analyzer



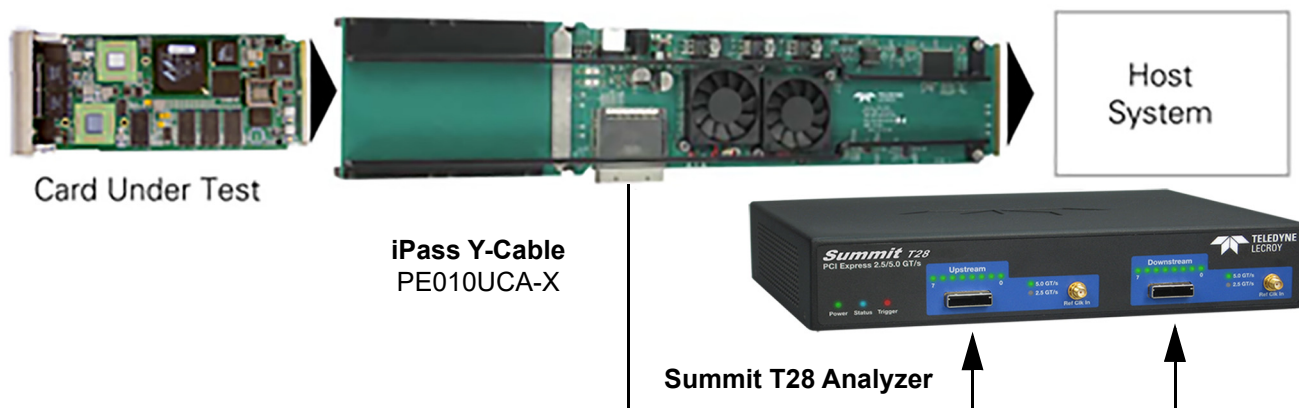
Note: Lesser widths and passive Gen2 interposers are connected the same way

Connection diagram for a single port up to x8 using a Gen2 x8 Interposer

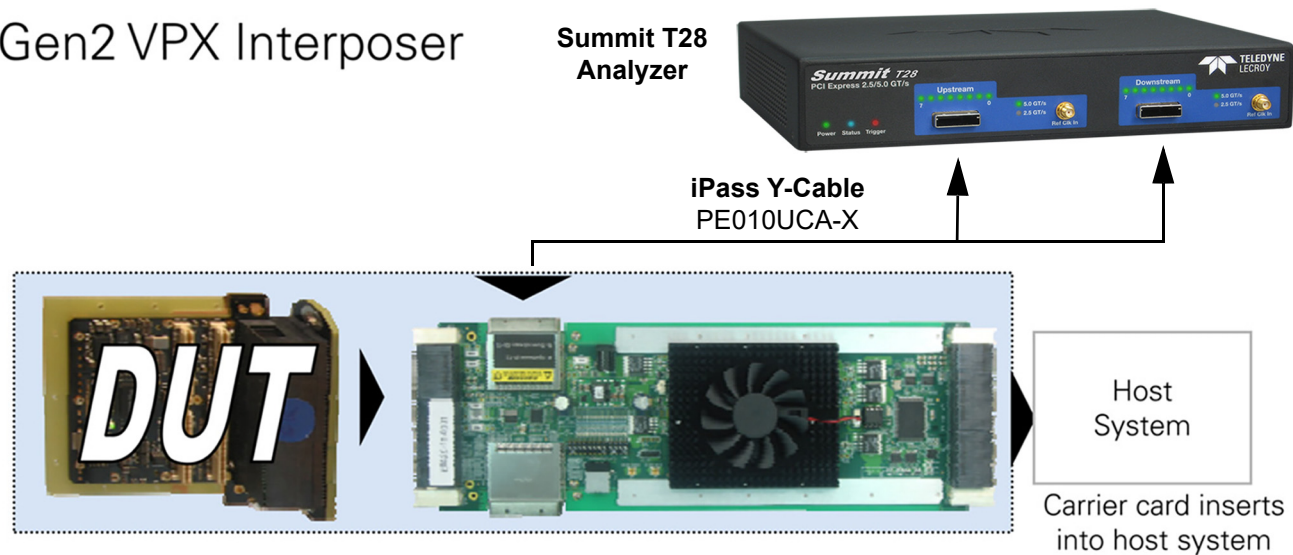
Gen2 XMC Module Interposer



Gen2 AMC Interposer



Gen2 VPX Interposer



6 Installing the Software

The PCIe Protocol Analysis operates all of Teledyne LeCroy's PCI Express Protocol Analyzer and Exerciser products and should be installed on a Microsoft® Windows®-based host machine. You need to install the PCIe Protocol Analysis on the host machine before attaching the Analyzer to the system.

The minimum requirements for the host machine are:

- Windows 10, Windows 8 (x64), Windows Server 2012 (x64), Windows 7 (x64), Windows Server 2008R2 (x64).
- The latest Service Pack available for the Windows OS in use is required.
- It is required that you use one of the supported 64-bit Windows versions listed above.
- Processor with clock speed of 1 GHz or higher.
- This software application may use up to 4GB of the RAM in the host machine. For improved performance of the software, it is recommended that 16GB of RAM is installed on the host machine. Memory as little as 2GB would still allow the software to function, but would limit its performance and user experience.
- Storage space of 1GB is required for installing the PCIe Protocol Analysis on the host machine.
- Additional storage space is needed for the operation of the software application and for storing recorded data in files.
- Please remember that storing large captured traces can result in multiple gigabytes of file sizes and can quickly fill your available storage space.
- To take full advantage of the rich visualization and analysis of Teledyne LeCroy software it is recommended that the display is set to at least 1050 lines of vertical resolution with at least 24-bit color depth.
- Display with resolution of at least 1024 x 768, with 16-bit color.
- It is recommended that a Gigabit (1000Mbps) Ethernet or a USB3.0 link is used for the connection with the Summit analyzers.
- At minimum the host machine should have either a 100/1000Mbps Ethernet connection to the network or a USB2.0 port. For optimal performance, please refer to our recommended configuration in the product documentation.

To install the software, follow the steps below:

Note: You must install the software before connecting the Analyzer to the host machine for the first time.

[Refer to the System Requirements in the readme file for information about the exact Windows operating systems supported.](#)

1. Software installation can also be downloaded from the Teledyne LeCroy website:
teledynelecroy.com/tm/software/PCIe
2. Typically, the installation process will automatically start. If it doesn't, browse to the 'Autorun' folder on the installation folder, then double-click the 'autorun.exe' file.
3. Follow the on-screen instructions to complete the installation.

Note: If you get an error message during installation of the drivers, consult your system administrator.

Select **Start > All Programs > LeCroy > PCIe Protocol Suite** to run the software.

In general, the higher the performance of the host machine, the better user experience you get. Please refer to the **Readme** file located at \Program Files\LeCroy\PCIe Protocol Suite\Readme and the *PCIe Gen3 Summit T3/T2 Protocol Analyzer User Manual* for recommended configurations and additional information. User manuals for your Teledyne LeCroy products can be found in:

\Program Files\LeCroy\PCIe Protocol Suite\Documents

7 Using a USB Connection

To set up the Analyzer using a USB connection:

1. Install PCIe Protocol Analysis on the host machine.
2. Connect the Analyzer to the 12-volt DC Adapter provided in the box.
3. Connect the USB port to a USB port on the host machine using a USB cable.
4. Turn on the power switch on the back of the Analyzer.
5. Summit T28 will be recognized by the host machine as a USB device.
6. Follow the Microsoft® Windows® on-screen Plug-and-Play instructions for the automatic installation of the Analyzer as a USB device on your analyzing host machine. (The required USB drivers were installed on your system when you installed the software.)
7. Click Finish when you see the message that says "Windows has finished installing the software that your new hardware requires" and the file has been installed in your host machine.
8. Start the PCIe Protocol Analysis, so you can start working with Summit T28.

8 Making Your First Recording

Connect Summit T28 to the system under test using an interposer or probe, and then configure the Recording Options. You can then test the Analyzer by creating a short snapshot recording.

Connect Summit T28 to System under Test using an Interposer or Probe


For a slot interposer, do the following:

1. Insert the slot interposer into a PCI Express slot that you want to monitor.
2. Insert the PCI Express device into the PCIe connector on top of the interposer.
3. Connect Summit T28 to the interposer with Analyzer Y cables. Connect cable Side A to the Upstream port of the Analyzer, and connect cable Side B to the Downstream port.
4. Connect power to the interposer using the provided 12-V power adapter. For Mid Bus Probe or other types of probes and interposers, please see the *PCIe Gen3 Summit T3/T2 Protocol Analyzer User Manual*.

Configure Recording Options

1. From the **Setup** menu, select **Recording Options**.
2. Select the **General** tab and then choose **Summit T28** as the Analyzer type.
3. In the **Link** section, specify the link width of the PCI Express link to be analyzed. The rest of the settings in this section can be left at the factory defaults for most PCI Express systems.
4. For multi-link PCI Express links, the Analyzer needs to observe link training to record link traffic correctly.
5. Click **OK** at the bottom of the Recording Options dialog box to apply the Analyzer recording settings specified.

Start Recording

1. Start a recording session by clicking the **Record**  button in the toolbar. Recording is tracked and reported on an activity meter in the status bar.
2. After the recording buffer fills, uploading starts automatically. PCI Express traffic is saved to the hard drive as the file specified in the recording options, and this file is opened in the application for you to view the traffic.

Note: You can interrupt a session by pressing the **Stop** button. If Recording is finished and Upload has started but has not finished, a message box appears. You can:

- Continue uploading.
- Abort the upload and flush the data.
- Abort the upload and preserve all the previously saved data.

9 Environmental Conditions

- Temperature: Operating 32° F to 122° F (0° C to 50° C)
- Temperature: Non-Operating 14° F to 176° F (-10° C to 80° C)
- Humidity: Operating 10% to 90% RH (non-condensing)

Teledyne LeCroy Customer Support

Online Download

Periodically check the Teledyne LeCroy Protocol Solutions Group web site for software updates and other support related to this product. Software updates are available to users with a current Maintenance Agreement.

Web: teledynelecroy.com/tm/software/PCle
E-mail: psgsupport@teledyne.com
Support: teledynelecroy.com/support/contact



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