Before Starting
Use this document for quick installation and setup. If you experience problems or need more information, see the product manuals available at the Teledyne LeCroy web site or in the Documents folder in the PCIe Protocol Suite installation DVD.

Introduction
The Teledyne LeCroy PCIe 3.0 M.2 Interposer, which is used with Summit™ Protocol Analyzers, enables PCIe® bus traffic between a system board or tablet and a M.2/NGFF connector on a PCIe M.2 device to be monitored, captured, and recorded for protocol analysis. The M.2 interposer will support analysis for PCIe host interfaces such as SATA Express (AHCI/PCIe) and NVM Express (NVMe) at data rates from 2.5 GT/s up to 8.0 GT/s and link widths of up to x2 or up to x4 depending on the key type.
The M.2 technology specification includes two connector definitions: Socket 2 and Socket 3. Socket 2 keyed as "B" allows for PCIe x2 interface for SSDs, WWAN or other non-storage devices. Socket 3 keyed as "M" is strictly for high-performance storage, offering x4 lanes of bandwidth in this form factor. In some cases a “B/M” keyed SSD will also be available and it is both a Socket 2 and 3 type. A “B”, “M” or a “B/M” keyed memory SSD can then be connected to a host based B or M connector which is capable of supporting any of the devices mentioned above.

Teledyne LeCroy provides two configurations of the M.2 Interposer to support these three types of devices. One interposer is for use with B and B-M type memory modules and a second interposer is for use with M and B-M type M.2 memory modules. Both interposers support the common 42mm, 60mm, 80mm, and 110mm SSD lengths.

**Components**

The Teledyne LeCroy Gen3 M.2 Interposer kit has the following components:

- M.2 Interposer with Carrier board
- Connector cable assembly 18 inches for connection to host slot
- Power supply
- Extension bracket kit (three metal brackets and six screws)
- Stand off screw and nut
- User Manual and Quick Start Guide (this document)
Interposer Cable Assembly Installation

Installation Instructions:
1. Install the proper extension bracket to the small PCB at the end of the cable (procedure explained below).
2. Connect the cable ends to the interposer pod. There is a power cable, a sideband signals cable and a high speed signals cable. These three cables have different connectors and are keyed. Be careful to install the connectors in the right orientation (following labels) and do not force them.

The Extension brackets are provided to allow the user to attach and secure the Teledyne LeCroy M.2 interposer cable on the host system which usually supports different M.2 card form factors. The Teledyne LeCroy M.2 Interposer Extension Bracket Kit contains the items listed below. The items are shown in Figure 1.

- Type 2260 Extension bracket
- Type 2280 Extension bracket
- Type 22110 Extension bracket
- Screws to attach the Extension bracket to the interposer Cable Assembly

Figure 1: M2 Interposer Extension Bracket Kit
This procedure describes the assembly process for the Type 2260 bracket (to install the other types follow the same procedure):

1. Place the Extension bracket aligned with the counter sink screw holes.
2. Make sure the text "Type 2260" on the bracket is facing the top of the PCB where the cables are attached.
3. Insert the screws and tighten them using a 1.4mm Phillips or flat blade screw driver.

4. The view from the top side of the PCB is shown below. The text "Type 2260" is clearly visible.

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**Warning!** Attempting to use the board without the extension bracket and properly secured to the host will cause damage to the plug-in card of the interposer cable and warranty will be voided.

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**Interposer DUT Standoff Installation**

A flexible attachment M.2 standoff assembly is provided for the different types of DUTs supported which are 2240, 2260, 2280, and 22110. Move the M.2 standoff based on the DUT Type. The standoff will be attached to 2280 location by default. The standoff has a nut on the bottom side which can be removed by hand or with a nut driver (see drawings on next page).
### Hardware Installation

To use this interposer:

1. Set the SW1 DIP switches to the desired clock selection.
   **Note:** "HOST_CLK" should be the default setting unless you are using an external clock reference source.
2. Move the stand off from the default position to the position required by the DUT.
3. Install the M.2 SSD device under test (DUT) into the connector on the interposer as shown (will fit 42mm, 60mm, 80mm and 110mm).
4. Connect the Summit T3-8 Analyzer (or other compatible Teledyne LeCroy analyzer) to the interposer using the system iPass cable.
5. Connect the analyzer to a host machine using the USB port on the front panel of the Summit analyzer.
6. If not already done, install the PCIe Protocol Analysis on the host machine.
7. Connect 12V DC using the AC adapter supplied with the interposer. (Make sure that the AC adapter is powered on).
8. Power on the analyzer.
9. Power on the host machine.
10. Launch the Teledyne LeCroy software application to monitor, record and view PCI Express traffic passing through the M.2 Interposer.
11. Power on the system under test.

### M.2 Interposer Interconnection Overview

**Note:** M/B-M Type Interposer is shown below. The B/M-B Type is physically similar with a different keying in the slot for carrier board and host slot connector.

**Part No** Connector Key Slot Key B M B-M
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PE089UIA-X M-Key M-Key No Yes Yes
PE090UIA-X B-Key B-Key Yes No Yes

**Interposer Configurations**

<table>
<thead>
<tr>
<th>Part No</th>
<th>Connector Key</th>
<th>Slot Key</th>
<th>B</th>
<th>M</th>
<th>B-M</th>
</tr>
</thead>
<tbody>
<tr>
<td>PE089UIA-X</td>
<td>M-Key</td>
<td>M-Key</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PE090UIA-X</td>
<td>B-Key</td>
<td>B-Key</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Software Configuration

The maximum link width configuration to be used in the PCIe Protocol Analysis with the Gen3 M.2 Interposer is x4.

To set Recording Options:
1. Open the PCIe Protocol Analysis application on the host machine.
2. Open the Recording Options dialog.
3. In the Recording Type section (top left) your connected analyzer must be displayed.
4. In the Link section (on the right), select the appropriate link width.

<table>
<thead>
<tr>
<th>CABLE</th>
<th>Clock Source</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Clock Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>HOST_CLK</td>
<td>ON</td>
<td>ON</td>
<td>N/A</td>
<td>N/A</td>
<td>Downstream sourced with host clock.</td>
</tr>
<tr>
<td>B</td>
<td>DS_CLK</td>
<td>ON</td>
<td>OFF</td>
<td>N/A</td>
<td>N/A</td>
<td>Downstream sourced with external input DS_CLK</td>
</tr>
<tr>
<td>A</td>
<td>US_CLK</td>
<td>N/A</td>
<td>N/A</td>
<td>OFF</td>
<td>ON</td>
<td>Upstream sourced with external input US_CLK</td>
</tr>
<tr>
<td>A</td>
<td>HOST_CLK</td>
<td>N/A</td>
<td>N/A</td>
<td>ON</td>
<td>ON</td>
<td>Upstream sourced with host clock.</td>
</tr>
</tbody>
</table>

Note: Factory default is host clock SW1.1 = ON, SW1.2 = ON, SW1.3 = ON, SW1.4 = ON
Note: Other switch configurations (other than those shown in the table above) are invalid.
Note: External input clocks can be HCSL, LVPECL, LVDS or any single ended standard input voltage amplitude not to exceed 800mV.
Recording Traffic

After you have set up the hardware and software, you can record traffic. For instructions on setting up and implementing a recording, please refer to the *PCI Express Protocol Suite Summit Analyzer User Manual*.

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)