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# PCIe Protocol Analysis Software 11.42 -Beta- Release Notes

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This software is made available to allow for early evaluation and testing of new functionality and enhancements before it is formally released. The software is still under active development and has not completed product design verification, or quality assurance. This software is intended for use only by the person or organization that Teledyne LeCroy had provided the software to, and only for the purpose of evaluation. Please do not distribute this software to other people inside or outside your organization.

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## 1. Overview

This Read Me file contains last-minute product information for the PCIe Protocol Analysis Software for Microsoft Windows. For full instructions on using the software and the hardware, please see the User's Manual and other documents provided with this product.

## 2. System Requirements

The following is a list of recommendations for the host machine that runs the PCIe Protocol Analysis Software application and that is connected to the Summit systems.
For optimal performance, it is recommended that the software is installed and operated on a host machine that is of a recent generation of personal computers architecture. However, the software should also operate on machines that are below the minimum requirements specified here, at the cost of slower performance, provided that memory, storage and display requirement are kept.

### *2.1. Software*

**Operating System:**

- Windows 10, Windows 8 (x64 only), Windows Server 2012 (x64), Windows 7 (x64 only), Windows Server 2008R2 (x64).
- The latest Service Pack available for the Windows OS in use is required.

**Required applications:**
Microsoft Internet Explorer, version 6 or newer. To view the manuals, datasheets and other documents, you would need to install 'Adobe Acrobat Reader' (http://get.adobe.com/reader).

### *2.2. Hardware*

**Memory (RAM):**
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.

**Non-volatile Storage (SDD or Hard Disk):**
- Storage space of 1GB is required for installing the PCIe Protocol Suite software 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.

**Display:**
- 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.
- The minimum requirement for the display is a resolution of 1024x768 with at least 16-bit color depth.

**Connectivity:**
- 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.
- If multiple analyzers are daisy chained and connected to the same host machine, one Ethernet connection or one USB port is required for each analyzer.
- Please note that there is no connectivity requirement if the analysis application is used to only view pre-recorded traces.
- For tips as for how to improve on the performance of the Teledyne LeCroy analysis system and more specifically on the performance of the software, please refer to the User Manual.

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# 3. Release Notes

## *3.1. What's New*

- Support for Summit Z58 Gen5 x8 Analyzer/Exerciser (Basic generation, recoding and triggering)
- Support for Gen5 Slot Interposers in Summit M5x
- Support for other Gen5 CEM Interposers x4, x8, x16
- Support for Gen4 OCP Interposer
- Support for Summit T54 Gen4 x4 U.3 Straight Cable
- Added field upgradability for Gen4 Interposers
- Support in Summit M5x Jammer for RAS (Reliability, Availability and Serviceability) Tests
- Miscellaneous bug fixes and enhancements

## *3.2. Notes*

- Notes for PCIe Protocol Analysis Software Application
    - **Supported Products** – PCIe Protocol Suite version 8.15 and higher supports the following products: Summit Z4-16, Summit T34, Summit T3-16, Summit T3-8, Summit T28, Summit T24 and Summit Z3-16.
    - **Local Timers** – Timers defined in the sequencer states can only be controlled by events from either downstream or upstream directions but not both at the same time.
    - **Storage Command Emulation** – Refer to \Public\Documents\LeCroy\PCIe Protocol Suite\Sample Files\Z3-16TrainerScripts for examples on how to create PQI/SOP commands. Use this as guide to create other commands not currently supported by the trainer.
    - **NVMe Drive Emulation** – Drivers and instructions for different OS versions can be found at Users\Public\Documents\LeCroy\PCIe Protocol Suite\Sample Files\Z3-16TrainerScripts\NVMe_DriveEmulation\Drivers. You can find more information about drive emulation in manual PETrainerScriptManual.pdf "Config = NVMe" section. Specification level currently supported for NVMe drive emulation is 1.1a. Linux test and validation were performed only on Ubuntu 14.10.
    - **Export to CSV/Text** – Starting with version 7.15 when exporting a trace to CSV or text formats the PCIe Protocol Analysis Software will include time delta field. Starting from 7.38 Beta, there is a new legacy option for export menu, see manual for details.
    - **Summit Z3-16 with CLKREQ# support** – This exerciser is supported starting from PETracer 7.00 and newer application versions.
    - **Real Time Statistics** –In order to run this utility, perform a recording with recording options properly set for your link and then run Real Time Statistics. The RTS feature is not supported by Summit T24.
    - **Long Trace** – For Summit T34 Expansion mode, traces can grow as large as 80GB for bit tracer mode when utilizing entire buffer (32 GB). The minimum hard disk space must be able to store this trace sizes. To improve performance when analyzing large trace files, please use the highest performance system available to you. It is strongly

recommended to have the host Machine's Physical System RAM and free disk space be at least three times the size of the recording buffer you select. This will allow the application to perform best. Example: If Max Analyzer Buffer Size is 32GB you will need 96 GB in System RAM
You should have at least as much physical RAM in the host as the size of your trace file plus the size of the folder of metadata for that trace file (Identified by having the same filename). You can find this value by checking the File Properties of the folder in Windows Explorer. If your physical RAM is smaller than this, lots of swapping to disk will occur, decreasing the performance greatly.

- **Application Name Change** – As of version 8.20, PCIe Protocol Suite is renamed as PCIe Protocol Analysis Software. Directories for sample traces, scripts and drivers will remain in the same folder path.
- **NVMe Enhanced Mode** – Please read analyzer manual for description of this recording mode. We have added a section in the analyzer manual about the recommended settings in NVMe enhanced mode to record the multiple controller resets.
- **Gen1/Gen2 Compliance Filter Option in Analyzers** – When checked this option will filter Gen1 and Gen2 compliance pattern but not Gen2 Modified compliance pattern or Gen3 compliance patterns. For the standard compliance pattern any errors detected or extra delay symbols showing up in Lane0 will leak. Using this option, it may remove some training sequences just after link comes out of electrical idle.
- **Precision Timestamp Measurement** – Current implementation in Summit Z3 is intended for functional verification.
- **Summit Z3-16 NVMe Host Emulation** – NVMe script structures are updated to NVMe specification 1.2
- **Windows 7 and Windows Server 2008 R2** – These operating systems may report the Teledyne LeCroy USB device drivers as being unsigned or untrusted. In fact, the drivers are signed with a newer, more secure signing mechanism that is not recognized by these operating systems. Refer to the following article for more information: https://support.microsoft.com/en-us/kb/3025925
- **Windows XP/Window Server 2003** – We are committed to always supporting the latest host-machine technologies. Since Windows 10 was introduced, we no longer test on nor develop fixes for Windows XP nor Windows Server 2003.
- **Opening Traces Through Network** – Opening traces from an unreliable network location is not recommended. PCIe Protocol Analysis Software application requires a good quality high-performance connection to the network location in order to correctly load and decode a trace. Instead, the trace can be copied to a host hard drive and perform decoding from this location.
- **Storage Decodes Supported** – PCIe Protocol Analysis Software currently supports decoding for: NVMe 1.4; AHCI 1.3.1; ATA 2.6, PQI R7; SOP Level 5 and SCSI T10 (SPC-4 Rev. 14, SBC-3 Rev. 13, SMC-3 Rev. 11, MMC-6 Rev. 01, SSC-2 Rev. 04, SES-2 Rev. 19b); TCG Core Architecture V2.01 Rev 1.00 (08/05/2015); TCG Enterprise SSC Version 1.01 Revision 1.00 subset for NVMe; Opal Specification V2.01 Revision 1.00 (08/05/2015); TCG Pyrite v2.00 Rev 1.16.
- **MCTP Specifications supported in CATC Trace**
    1. DSP0236 Base & Control: ver 1.3.0, November 24, 2016
    2. DSP0239 Ids and Codes: ver 1.6.0, July 16, 2019
    3. DSP0238 PCIe VDM binding ver 1.1.0, November 29, 2018
- **PLDM Specifications supported in CATC Trace**
    1. DSP0218 Platform Level Datat Model (PLDM) for Redfish Device Enablement Specification 1.0.0
    2. DSP0218 PLDM for Redfish Device Enablement Specification 1.0.0DSP0240 PLDM Base Specification: ver 1.0.0, April 23, 2009 excluding PLDMVersionData
    3. DSP0245 PLDM IDs and Codes Specification: ver 1.1.0, January 26, 2011
    4. DSP0246 PLDM for SMBIOS Data Transfer: ver 1.0.1, December 11, 2009 excluding SMBIOSStructureData
    5. DSP0248 PLDM for Platform Monitoring and Control: ver 1.1.0, November 8, 2011 excluding PLDMEventLogData and PDR data
    6. DSP0247 PLDM for BIOS Control and Configuration: ver 1.0.0, April 23, 2009 excluding TableData, BIOSAttributesHandles, AttributeData
    7. DSP0257 PLDM for FRU Data: ver 1.0.0, 26 October 2011 excluding FRU Record Table
    8. DSP0267 PLDM Decoding
- **NC-SI Specifications supported in CATC Trace**
    1. DSP0222 NC-SI (Network Controller Sideband Interface): ver 1.1.0, September 23, 2015
    2. DSP0261 NC-SI over MCTP Binding: ver 1.1.0, March 21, 2015 only NC-Si over MCTP, no Ethernet over MCTP
- **NVMe-MI Specification supported in CATC Trace** – Revision 1.1
- **SMBus binding supported in CATC Trace** – Version 1.1.0, May 21, 2017
- **Eclipse X34 with MPCIe** – Keep using PCIe Protocol Suite Software version 7.41 to work with the Eclipse X34 System.
- **Using Microsoft Edge to open Documentation** – Due to a known bug in some versions of Microsoft Edge, it displays some user manuals incorrectly (e.g., solid black boxes where images should be). Teledyne LeCroy recommends Adobe Reader for viewing the user manuals.
- **MultiPort** – New license is needed in order to access this new feature for Summit T48 and Summit T416, the unit needs to be licensed for maximum link width support (x8 for Summit T48 and x16 for Summit T416). Support for MultiPort in current Summit T416 units will be added in the next software release. Bit Tracer Mode has a limit of 4 matcher resources for triggering and filtering. For 4 x4 Port configuration in Summit T416 or 2 x4 Port configuration in Summit T48, Protocol Mode is limited to 6 matching resources for filtering and triggering.
- **64 Bit support** – PCIe Protocol Analysis version 8.78 is supported only on 64-bit systems.
- **Support in Protocol Analysis Software version 9.0** – Only Summit M5x Analyzer/Jammer is supported with version 9.0. For support of other Teledyne LeCroy systems use older or newer than 9.0 software releases.
- **Summit M5x - General Procedure to Start using Analyzer/Jammer Configuration** – When M5x attached between a HOST and Device in Analyzer / Jammer configuration always power ON M5x system first and once you see the system

is connected and shows in your application then start recording in M5x. After this power ON the Host system and the Device system.

- **Gen4 Interposer calibration** – The Protocol Analysis 9.3 Beta application has a dialog (Interposer Programmer) that allows for two ways of calibrating a Gen4 interposer:
  1. Using a USB FTDI cable
  2. Through the cable that is already connected between the interposer and the Summit T4 analyzer (default).

  For software version 9.3 Beta and earlier versions, interposer calibration can only be done using the USB FTDI cable. For software 9.31 Beta and newer versions, the interposer calibration can be done through the interposer cable for single port mode only. In multiport mode, the USB FTDI cable must be used.
- **PCIe Compliance Suites** – All compliance suites (PCIe Gen3, Gen4, NVMe-MI) as well as other example tests from the PCI Express Script Automation Test Tool have been migrated to LinkExpert. Please use the LinkExpert application and documentation going forward as Script Automation Test Tool application will be phased out.

## 3.3. Known Issues

- Known Problems and Issues with the Protocol Analysis Suite Installer
  - **Internet Explorer 11** – PCIe Protocol Analysis Software requires Microsoft patch 2987107 for Internet Explorer, application faults have been observed without this update. Refer to http://answers.microsoft.com/thread/de92c06f-8962-46e7-b38e-3d49dc21e6ea
  - **Uninstalling the application** – After uninstalling Protocol Analysis Suites with Protocol Analysis Software versions 9.1 or 9.3 you may get an error prompt "No SysWOW64\catcshell64.dll", please disregard this message.
  - **Windows 7 may not be able to verify installer certificate starting 2017** – On some Windows 7 systems not connected to the Internet, after running the installer for PCIe Protocol Suite, Windows may prompt with a message saying the Publisher is Unknown. This happens when Windows has outdated root certificates. To avoid this situation, connect the PC to the Internet, open a web browser, visit the website "https://www.symantec.com" and verify that the browser recognizes it as a secure website; that is an indication that Windows successfully updated its root certificates database. Close the web browser and then re-run the PCIe Protocol Suite Software installer. Windows will then correctly recognize the Publisher as Teledyne LeCroy, Inc.
  - **Missing DLL on Win Server 2012 R2 Standard** – After installing the software and trying to launch it, you may see the following error: “The Program can't start because api-ms-win-crt-runtime-l1-1-0.dll is missing from your computer. Try reinstalling the program to fix this problem.” If this occurs do the following:
    1. Uninstall the PCIe Protocol Suite software.
    2. Run Windows Update and install all critical and recommended items, especially “Update for Universal C Runtime in Windows” (KB2999226).
    3. Re-install the PCIe Protocol Suite software.
  - **Trend Micro Users** – On certain systems running Trend Micro anti-virus software, Trend Micro’s Ransomware and/or Predictive Machine Learning features might improperly interfere with the installation process, causing some or all of the following issues:
    - “Driver Installer” error during the installation.
    - Application fails to launch after installation.
    - CrossSync application fails to launch after installation.

    Software packages signed by Teledyne LeCroy, Inc., do not contain any malware nor viruses. If you encounter any of these issues, please contact your IT administrator about disabling Trend Micro’s Ransomware and/or Predictive Machine Learning features, and then re-install the Teledyne LeCroy software.
  - **Protocol Suite versioning** – For 2018 software releases, the Suite has versions such as 2018.10, 2018.11 and then it continues as 2018.30. For 2019 software releases, the Suite has versions such as 2019.1, 2019.2 and then continues to 2019.21.There are no other versions in between.
  - **Missing mfc140.DLL on Windows 7/8.1/10** – After installing the software and trying to launch it, you may see the following error: “The code execution cannot proceed because mfc140.dll was not found. Reinstalling the program may fix this problem.” If this occurs do the following:
    1. Run Windows Update and install all critical and recommended items, especially “Update for Universal C Runtime in Windows” (KB2999226).
    2. Download the "Microsoft Visual C++ 2015 Redistributable (x64) from https://www.microsoft.com/en-us/download/details.aspx?id=52685. Note: download the x64 version i.e. vc_redist.x64.exe
    3. Install the package, if the prompt gives the option to repair, please select repair.

- Known Problems and Issues PCIe Protocol Analysis Software Application
  - **CATC Walk Enhanced Markers playback of audio/video files** – On some systems, the PCIe Protocol Analysis Software application may not be able to playback audio/video files embedded in markers even if the appropriate media codecs are installed. The root cause is usually a 3rd-party application that installed a faulty filter that prevents the Microsoft DirectShow subsystem from loading the required audio/video filters. One known 3rd-party application that causes this problem is Corel WinDVD v10. The recommended solution is to uninstall Corel WinDVD v10 if it is not being used. If 3rd-party driver is not uninstalled, the PCIe Protocol Analysis Software application will issue a warning message when opening a trace.
  - **CATC Walk on Windows 10 –** When an image is set as a marker, this image can't be previewed when mouse is hovered on packet header or while opening manage playlists from View -> CATC Walk and choosing the target image under Markers.

- **Transaction Level decode** – When decoding a CATC Trace for Link, Split or any storage commands, if the process is interrupted before the trace has been completely processed, the trace must be closed then re-opened to restart the decoding process. This will be corrected in future releases.
- **PETracer 7.10 Capturing a Full Buffer Trace** – The PETracer will upload the trace but only few segments may be displayed instead of more segments amounting to the total buffer selected. Do a file "Save as", close the trace and open it again, all the segments will show. This is not a problem for later releases because large buffer support feature added does not need segmentation upload for traces.
- **RRAP Items** – Starting with PCIe Protocol Suite 7.30 RRAP tags will show in some of the GUI views for PCIe Analyzer products. This correspond to M-PCIe ECN updates to the PCI Express Specification but do not apply to PCIe Express protocol. These items will be removed for PCIe Analyzers in the future releases.
- **Trigger on Lane Change** – In certain occasions this trigger on Summit analyzers will misfire during speed switch. This will be corrected in the next release.
- **Filtering SKPs** – When filtering out SKP ordered sets along with TS1 or TS2 ordered sets in the advanced sequencer the SKPs will leak when it comes in between TS sequences and will show up in the trace.
- **Traces with many errors** – When the analyzer has not been calibrated or properly configured and lots of errors show in the trace, manipulating such trace may cause the application to fault. This will be corrected in future releases.
- **Higher Level Transaction Decoding** – For some situations when link retrain with electrical idle period happens in the middle of a trace it may cause the split-level decoding (or storage decoding) to report incorrect transactions. The work around is to split the trace in two parts containing traffic before Link Down and after Link Up events. This will be corrected in future releases.
- **Auto LinkWidth in Recording Options** – When used in conjunction with AutoSpeed under L0s traffic, the link width will not be determined correctly. To avoid this issue, use fixed speed or fixed link width option when traffic is L0s. This will be corrected in coming releases.
- **Documentation for NVMe XSD Schema** – The Tech Brief available in \Program Files (x86)\LeCroy\PCIe Protocol Suite\AppNotes\TechBrief_Use_of_NVMe_xml_schema.pdf provides guidelines to use XSD approach for decoding NVMe traces and provides an example.
- **NMVe Decoding for Older Traces** – As part of our continual improvement plan, we have enhanced the error detection capability and can now detect a broader range of errors. This may result in highlighting some additional errors (particularly in our storage targeted protocols). To ensure that the identified high-level errors are truly valid issue, please make sure that the information contained in the PCIe SSD Base Address Mapping (found in the Tools menu) is both complete and correct.
- **Gen2 Active Interposer** – Summit T3 and Summit T2 analyzers require the original “Gen2 Active Interposer” x8 or x16 to be revision G or higher. The analyzers will not have a problem when operating with the “Gen2 Active Interposer with SRIS”.
- **Recording Options for NVMe debug** – When using the Protocol Recording option in Recording Mode to debug NVMe, make sure the “Ignore Idle Errors” filter is unchecked.
- **SW Application may fault under the following situations:**

  Opening a second trace while a previous trace is open and using timing calculator.

  Saving As for a trace right after uploading from analyzer and while progress bar indicates the navigator still updating.

  Connecting two Summit Z416 using Ethernet.

  Coming releases will resolve these problems.
- **Hide Sideband** – Hide sideband and hide sideband per direction controls do not work in the viewer. This will be addressed in the coming releases.
- **Recording Options** – New SigDet threshold has been added for Summit T4 analyzers in recording options probe settings. This should have a default value of 60mV for all the lanes for normal operation. If a previously saved recording option files is not showing this the actual recording may end up corrupted. Set all the lanes to 60mV and save the recording options files, perform the recording again and it should look correct.
- **Summit T4 recording with Gen1/Gen2 fixed speed** – Some bit errors may show during link training sequences. Use Auto speed for a cleaner recording. This problem will be addressed in the following release.
- **Traces in Network Drives** – When working with CATC Traces (opening, recording, postprocessing) make sure the trace is in the host system local directory. If the trace is in a network drive the Protocol Analysis application may fault when network connectivity is intermittent or not optimal. Also please note using a networked mapped drive to save the trace is not recommended, the PCIe Protocol Analysis application uses the drive heavily while uploading as well as while analyzing the trace.
- **Gen4 Interposers calibration** – The Protocol Analysis 9.30 Beta application has a dialog (Interposer Programmer) that allows for two ways of calibrating a Gen4 interposer: using a USB FTDI cable and through the cable that is already connected between the interposer and the Summit T4 analyzer (default). For 9.30 Beta and earlier versions, calibrate interposers using only the USB FTDI cable.
- **Switching between Standard and Multiport modes** – For PCIe Protocol Analysis Software version 9.32 and later: When switching from standard to multiport mode (or the other way around) with Summit T4 systems the unit(s) may disconnect or not work properly. To continue normal operation a power cycle for the Summit T4 unit(s) is required. After the power cycle the unit(s) will comeback in the selected mode and analyzer operation may proceed as required.
- **Upgrading Summit T48 for 9.32 version and later** – If upgrading the Summit T48 system while in Multiport configuration using Ethernet connection, the application may report a failure during firmware update. In this case, update the system using a USB connection instead.
- **Upgrading Summit T34 for 9.32 version and later** – A message may pop up: "Device is not responding" during Summit T34 restarting process. Just close the message, the system should be updated properly and operational. In case of any malfunction just power cycle the unit.

- **Saving Files on the network** – The file name for trace files is restricted to 256 characters. When saving a trace file over the network long path names for traces may cause the application to fault. This will be addressed in future releases.
- **Expanded Mode using Summit T48 or Summit T54** – For correct operation use only USB connection. Operation with Ethernet port will be working for 11.38 Beta Protocol Analysis Software.
- **Protocol Analysis Software Version 11.42 Release** – This software version is made available as a formal release for Summit Z58 product. The operation with all other products and this software version stands at beta level.

- Known Problems and Issues Summit T54
  - **Speed Changes** – Currently Summit T54 system will slowly lock to the new speed and training sequences may be missing from the trace. This will be improved in releases to follow.
  - **Low Power States** – Currently Summit T54 system will slowly lock out of low power state and training sequences may be missing from the trace. This will be improved in releases to follow.
  - **SSC Support** – Turn off SSC when doing recordings with Summit T54 system and PCIe Protocol Analysis Software version 11.00. SSC will be supported in the following releases.

- Known Problems and Issues Summit M5x
  - **Speed Change** – M5x system sometime fails during Speed change from 8 GT/s to 16 GT/s and this makes M5x system into bad state. Power Cycle of the M5x system is required to get into a good working condition.
  - **License Update** – If for any reason License is updated in M5x system then we need to power cycle the unit.
  - **Trigger Position** – In the Analyzer in A/J configuration the trigger position will be off by few packets in either direction due real-time constraints.
  - **SMBus Jam** – This feature is still not supported.
  - **SideBand Jam** – To do Jam on SideBand signals PERST#, CLKREQ#, WAKE#, PWRBRK# use the “De-assert” option in Jam action box. This will be changed to “Assert” action in next release.
  - **TLP Triggering**– In certain cases when trigger is set on a particular TLP type the trigger may not happen on programmed TLP but may trigger on different TLP type. This will be fixed in next release.
  - **Unexpected behavior when switching the Recording type** – Software Version 9.00, Build 5027 is strictly advised to use only with M5x System.
  - **Gen5 x8 Recording** – A. The analyzer is performing 32.0 GTps recording assuming precoding is disabled. An option to enable it or disable it will be available in the next release. B. The analyzer works using internal clock option, external clock option will be added in the next release, it is recommended to disable SSC when performing recordings for now.

- Known Problems and Issues Summit T416
  - **Recording for L1 Substates –** For links that implement L1 Substates aggressive policy the analyzer may not record the traffic completely due to date locking time. Also, to avoid false autopspeed determination in such links fixed speed option can be used for recording.

- Known Problems and Issues Summit T48
  - **Recording for L1 Substates –** For links that implement L1 Substates aggressive policy the analyzer may not record the traffic completely due to date locking time. Also, to avoid false autopspeed determination in such links fixed speed option can be used for recording.

- Known Problems and Issues Summit Z416
  - **Update Device** – With software 8.06 and previous releases after performing Update Device you will need to power cycle the Z416 unit.
  - **Z416 operation with v8.50 or older software** – If you have been using Summit Z416 with v8.50 or older PCIe Protocol Analysis software, power OFF the unit before installing v8.60 software or newer. After software is installed, power ON the Summit Z416 and configure the unit with the latest firmware files.
  - **Enabled Feature Licenses** – API for In-band Programmability and High Performance features will be made available in future releases.
  - **Summit Z416 Analysis Mode in Multiple Analyzer Configurations** – If a Summit Z416 exerciser licensed with analysis is used with a Summit T416 analyzer or another Summit Z416 exerciser licensed with analysis using the same PCIe Protocol Software please do the following:
    In the PCIe Protocol Analysis application, enter Setup -> All Connected Devices menu and remove one of the Summit Z416 with analysis license from the list of connected devices so that only one analyzer is active. Only one analyzer should be active in the connected devices list for a Summit Z416 configuration.
  - **Speed Changes** – After several iterations of speed changes, the Summit Z416 may stop switching to 8.0 GT/s or 16.0 GT/s, if this happens power cycle the unit. This problem will be addressed in the coming release.
  - **Update Device** – If IOHUB BusEngine file needs to be updated by the application please power cycle the Summit Z416 once all the updates have been performed. After the Z416 is back ON, the files must show the new version when checking the Update Device dialog.

- Known Problems and Issues Summit T3-16
  - **Auto-Configure Lane Polarity** – For correct polarity detection Summit recording settings has to be initialized before the monitored link is trained.
    If performing 8.0 GT/s calibration the polarity results will be lost. The link has to be retrained at Gen1 or Gen2 for polarity of lanes to be recalculated or simply enter the polarity values manually.
  - **EIOS errors** – Errors found in the EIOS packets as the system goes into low power state can be expected and are to be considered a normal part of operation
  - **Trigger Position** – Trigger positioning can be off by a few (up to 6) packets in either direction due to certain real-time constraints with heavy packet loading.
    When setting a trigger such as "Enter Electrical Idle" or "Switch to ..." and the Trigger Position marker is set below 50% in the recording options dialog, the downstream direction may be missing traffic in the CATC Trace when there is a speed switch event from Gen1 to Gen2 or Gen3. This condition will be corrected in next releases.
  - **Ethernet to USB switch** – After Summit T3 has been connected to the Ethernet in the PCIe Protocol Analysis Software application, user should go through the process of disconnecting the unit from the network using the PCIe Protocol Analysis Software menu before connecting it back using USB; otherwise the next recording taken may fault the application. This issue would be addressed in coming releases.
  - **Short Electrical idle periods** may not be detected by the analyzer and as a result Link Up/Link Down blocks may not appear in the trace.
  - **Functionality limitations** – Protocol trace mode no longer keeps 10-bit code symbols in the trace file. Use BitTracer mode to see scrambled/encoded symbol values.
  - **Power Off / On** – Once analyzer is powered off you need to wait at least 10 seconds before you power it back on, otherwise the analyzer may not initialize properly.
  - **Connection through USB HUB** – Summit T3 may require manual restart after BusEngine or Firmware update when it is connected to the host PC via USB Hub. Power the unit down and power it back up if software does not see the unit after the update.
  - **Gen3 Skips from Retimers** – When the SKP size is different than 130bits the SKP size displayed in the viewers may not be the exact same size as the one present in the bus. Also, the 24 bits following the SKP end symbol may not reflect actual bits in the bus, this will be noticeable in G3 Polling.Compliance and during G3 L0 if previous block is a data block.
  - **Overclocking** – Only standard PCIe clocking is supported by the analyzers. No overclocking.
  - **Auto Options** – Autospeed will not work properly for links already in low power states. Autoswizzle needs to see link training sequences (from configuration or recovery) in order to work. Also use fixed link width if the bus is in L0s state, this will be corrected in next releases.
  - **Low power states** – For L0s, the analyzer will filter out about 16 FTS due to lock, deskew and synchronization. If deskew is bypassed extra 3 to 4 FTS can be seen as being recovered only in bit tracer mode. During L0s low power traffic some LinkDwn/LinkUp packets might be missing from the trace when the electrical idle period is under 200ns. During L0s low power traffic some of the FTS packets may show with error marks. The PCIe Protocol Analysis Software tries to show as much data as possible after link comes out of electrical idle, this has the side effect of showing packets with errors until the analyzer has locked properly to the data. For L1, for devices that send less than 9 TS1s after exit of L1 these may not be recorded in the trace and sometimes deskew will be an issue if no SKP is part of the training sequence.
  - **Power Save Mode** – USB will not automatically reconnect after host system comes back from power save mode. Perform manual connection for the analyzer or turn off the power savings mode.
  - **EIOS** – When entering electrical idle during L0s, L1 or speed change, the Electrical Idle Ordered Set may be missing from the CATC trace in some recordings.
  - **Negative Time Stamps** – Precision of packet timestamp is 2ns and accuracy is measured as 3.75ns. Traces may show negative idle time periodically in the trace. This is due to minor periodic adjustments in timestamp to prevent drift.
  - **Interrupting USB connection** – While PCIe Protocol Analysis Software is running calibration do not unplug the USB cable as application may fault.
  - **Gen2 Active Interposer** – Summit T3 and Summit T2 analyzers requires the original “Gen2 Active Interposer” x8 or x16 to be revision G or higher. The analyzers will not have a problem when operating with the new “Gen2 Active Interposer with SRIS”.

- Known Problems and Issues Summit T3-8
  - **Auto-Configure Lane Polarity** – For correct polarity detection Summit recording settings has to be initialized before the monitored link is trained.
    If performing 8GT/s calibration the polarity results will be lost. The link has to be retrained at Gen1 or Gen2 for polarity of lanes to be recalculated or simply enter the polarity values manually.
  - **EIOS errors** – Errors found in the EIOS packets as the system goes into low power state can be expected and are to be considered a normal part of operation
  - **Trigger Position** – Trigger positioning can be off by a few (up to 6) packets in either direction due to certain real-time constraints with heavy packet loading.
    When setting a trigger such as "Enter Electrical Idle" or "Switch to ..." and the Trigger Position marker is set below 50% in the recording options dialog, the downstream direction may be missing traffic in the CATC Trace when there is a speed switch event from Gen1 to Gen2 or Gen3. This condition will be corrected in next releases.
  - **Ethernet to USB switch** – After Summit T3 has been connected to the Ethernet in the PCIe Protocol Analysis Software application, user should go through the process of disconnecting the unit from the network using the PCIe Protocol

Analysis Software menu before connecting it back using USB; otherwise the next recording taken may fault the application. This issue would be addressed in coming releases.

- **Short Electrical idle periods** – May not be detected by the analyzer and as a result Link Up/Link Down blocks may not appear in the trace.
- **Functionality limitations** – Protocol trace mode no longer keeps 10-bit code symbols in the trace file. Use BitTracer mode to see scrambled/encoded symbol values.
- **Power Off / On** – Once analyzer is powered off you need to wait at least 10 seconds before you power it back on, otherwise the analyzer may not initialize properly.
- **Connection through USB HUB** – Summit T3 may require manual restart after BusEngine or Firmware update when it is connected to the host PC via USB Hub. Power the unit down and power it back up if software does not see the unit after the update.
- **Buffer Size** – The buffer capacity while using the Summit T3-8 in Expanded mode with link width option set to fixed X8/X4/X2 or X1 is less than the Summit T3-16 buffer capacity using the same link width option settings.
- **Gen3 Skips from Retimers** – When the SKP size is different than 130bits the SKP size displayed in the viewers may not be the exact same size as the one present in the bus. Also, the 24 bits following the SKP end symbol may not reflect actual bits in the bus, this will be noticeable in G3 Polling.Compliance and during G3 L0 if previous block is a data block.
- **Overclocking** – Only standard PCIe clocking is supported by the analyzers. No overclocking.
- **Auto Options** – Autospeed will not work properly for links already in low power states. Autoswizzle needs to see link training sequences (from configuration or recovery) in order to work. Also use fixed link width if the bus is in L0s state, this will be corrected in next releases.
- **Low power states** – For L0s, the analyzer will filter out about 16 FTS due to lock, deskew and synchronization. If deskew is bypassed extra 3 to 4 FTS can be seen as being recovered only in bit tracer mode. During L0s low power traffic some LinkDwn/LinkUp packets might be missing from the trace when the electrical idle period is under 200ns. During L0s low power traffic some of the FTS packets may show with error marks. The PCIe Protocol Analysis Software tries to show as much data as possible after link comes out of electrical idle, this has the side effect of showing packets with errors until the analyzer has locked properly to the data. For L1, for devices that send less than 9 TS1s after exit of L1 these may not be recorded in the trace and sometimes deskew will be an issue if no SKP is part of the training sequence.
- **Power Save Mode** – USB will not reconnect after automatically when host system comes back from power save mode. Perform manual connection for the analyzer or turn off the power savings mode.
- **Update Bus Engine in Expanded Mode** – While T3-8 unit is reinitialized after it has been updated for bus engine the PCIe Protocol Analysis Software application may fault for certain T3-8 units. When this happens just restart the application, the T3-8 unit was successfully updated. This issue would be addressed in coming releases.
- **EIOS** – When entering electrical idle during L0s, L1 or speed change, the Electrical Idle Ordered Set may be missing from the CATC trace in some recordings.
- **Negative Time Stamps** – Precision of packet timestamp is 2ns and accuracy is measured as 3.75ns. Traces may show negative idle time periodically in the trace. This is due to minor periodic adjustments in timestamp to prevent drift.
- **Expansion Mode Operation** – X16 Expansion Mode Operation is not currently supported in the API or for Automated Test Script application.
- **Interrupting USB connection** – While PCIe Protocol Analysis Software is running calibration do not unplug the USB cable as application may fault.
- **Gen2 Active Interposer** – Summit T3 and Summit T2 analyzers requires the original “Gen2 Active Interposer” x8 or x16 to be revision G or higher. The analyzers will not have a problem when operating with the new “Gen2 Active Interposer with SRIS”.

- Known Problems and Issues Summit T34
  - **Auto-Configure Lane Polarity** – For correct polarity detection Summit recording settings has to be initialized before the monitored link is trained.
    If performing 8GT/s calibration the polarity results will be lost. The link has to be retrained at Gen1 or Gen2 for polarity of lanes to be recalculated or simply enter the polarity values manually.
  - **EIOS errors** – Errors found in the EIOS packets as the system goes into low power state can be expected and are to be considered a normal part of operation
  - **Trigger Position** – Trigger positioning can be off by a few (up to 6) packets in either direction due to certain real-time constraints with heavy packet loading.
    When setting a trigger such as "Enter Electrical Idle" or "Switch to ..." and the Trigger Position marker is set below 50% in the recording options dialog, the downstream direction may be missing traffic in the CATC Trace when there is a speed switch event from Gen1 to Gen2 or Gen3. This condition will be corrected in next releases.
  - **Ethernet to USB switch** – After Summit T34 has been connected to the Ethernet in the PCIe Protocol Analysis Software application, user should go through the process of disconnecting the unit from the network using the PCIe Protocol Analysis Software menu before connecting it back using USB; otherwise the next recording taken may fault the application. This issue would be addressed in coming releases.
  - **Short Electrical idle periods** may not be detected by the analyzer and as a result Link Up/Link Down blocks may not appear in the trace.
  - **Power Off / On** – Once analyzer is powered off you need to wait at least 10 seconds before you power it back on, otherwise the analyzer may not initialize properly.

- **Connection through USB HUB** – Summit T34 may require manual restart after BusEngine or Firmware update when it is connected to the host PC via USB Hub. Power the unit down and power it back up if software does not see the unit after the update.
- **Gen3 Skips from Retimers** – When the SKP size is different than 130bits the SKP size displayed in the viewers may not be the exact same size as the one present in the bus. Also, the 24 bits following the SKP end symbol may not reflect actual bits in the bus, this will be noticeable in G3 Polling.Compliance and during G3 L0 if previous block is a data block.
- **Overclocking** – Only standard PCIe clocking is supported by the analyzers. No overclocking.
- **Auto Options** – Autospeed will not work properly for links already in low power states. Autoswizzle needs to see link training sequences (from configuration or recovery) in order to work. Also use fixed link width if the bus is in L0s state, this will be corrected in next releases.
- **Low power states** – For L0s, the analyzer will filter out about 16 FTS due to lock, deskew and synchronization. If deskew is bypassed extra 3 to 4 FTS can be seen as being recovered only in bit tracer mode. During L0s low power traffic some LinkDwn/LinkUp packets might be missing from the trace when the electrical idle period is under 200ns. During L0s low power traffic some of the FTS packets may show with error marks. The PCIe Protocol Analysis Software tries to show as much data as possible after link comes out of electrical idle, this has the side effect of showing packets with errors until the analyzer has locked properly to the data. For L1, for devices that send less than 9 TS1s after exit of L1 these may not be recorded in the trace and sometimes deskew will be an issue if no SKP is part of the training sequence.
- **Power Save Mode** – USB will not reconnect after automatically when host system comes back from power save mode. Perform manual connection for the analyzer or turn off the power savings mode.
- **Update Bus Engine in Expanded Mode** – While T34 unit is reinitialized after it has been updated for bus engine the PCIe Protocol Analysis Software application may fault for certain T34 units. When this happens just restart the application, the T34 unit was successfully updated. This issue would be addressed in coming releases.
- **EIOS** – When entering electrical idle during L0s, L1 or speed change, the Electrical Idle Ordered Set may be missing from the CATC trace in some recordings.
- **Negative Time Stamps** – Precision of packet timestamp is 2ns and accuracy is measured as 3.75ns. Traces may show negative idle time periodically in the trace. This is due to minor periodic adjustments in timestamp to prevent drift.
- **Expansion Mode Operation** – Mode operation is not currently supported in the API or for Automated Test Script application.
- **Interrupting USB connection** – While PCIe Protocol Analysis Software is running calibration do not unplug the USB cable as application may fault.
- **Gen2 Active Interposer** – Summit T3 and Summit T2 analyzers requires the original “Gen2 Active Interposer” x8 or x16 to be revision G or higher. The analyzers will not have a problem when operating with the new “Gen2 Active Interposer with SRIS”.
- **Updating Bus Engines** – When installing a new software release, a dialog may pop up asking to update FW and bus engines. After selecting OK the application will update the flash in the Summit T34 system and may prompt an error message. At this point, close the dialog, power cycle the Summit T34 system and after the system is ready the dialog asking to update FW and bus engines will pop up again. Select OK to proceed and the application will continue normally.
- **SMBus/MCTP Trigger Offset** – After triggering on SMBus or MCTP event the trigger for simultaneous PCIe/SMBus traffic the trigger mark will be placed at the correct time where it occurred but it will show several packets after the actual triggering event in the trace. This will improve in coming releases.

- Known Problems and Issues Summit T28
  - **Auto-Configure Lane Polarity** – for correct polarity detection Summit recording settings has to be initialized before the monitored link is trained.
  - **EIOS errors** – Errors found in the EIOS packets as the system goes into low power state can be expected and are to be considered a normal part of operation
  - **Trigger Position** – Trigger positioning can be off by a few (up to 6) packets in either direction due to certain real-time constraints with heavy packet loading.
    When setting a trigger such as "Enter Electrical Idle" or "Switch to ..." and the Trigger Position marker is set below 50% in the recording options dialog, the downstream direction may be missing traffic in the CATC Trace when there is a speed switch event from Gen1 to Gen2 or Gen3. This condition will be corrected in next releases.
  - **Short Electrical idle periods** – May not be detected by the analyzer and as a result Link Up Link down blocks may will not appear in the trace.
  - **Overclocking** – Only standard PCIe clocking is supported by the analyzers. No overclocking.
  - **Auto Options** – Autospeed will not work properly for links already in low power states. Autoswizzle needs to see link training sequences (from configuration or recovery) in order to work. Also use fixed link width if the bus is in L0s state, this will be corrected in next releases.
  - **Low power states** – For L0s, the analyzer will filter out about 16 FTS due to lock, deskew and synchronization. If deskew is bypassed extra 3 to 4 FTS can be seen as being recovered only in bit tracer mode. During L0s low power traffic some LinkDwn/LinkUp packets might be missing from the trace when the electrical idle period is under 200ns. During L0s low power traffic some of the FTS packets may show with error marks. The PETracer tries to show as much data as possible after link comes out of electrical idle, this has the side effect of showing packets with errors until the analyzer has locked properly to the data. For L1, for devices that send less than 9 TS1s after exit of L1 these may not be recorded in the trace and sometimes deskew will be an issue if no SKP is part of the training sequence.

- **Gen3 Options** – PETracer application shows Gen3 options as available for selection in some of the dialogs. T28 does not support these and they will be unavailable in future releases.
- **EIOS** – When entering electrical idle during L0s, L1 or speed change, the Electrical Idle Ordered Set may be missing from the CATC trace in some recordings.
- **Negative Time Stamps** – Precision of packet timestamp is 2ns and accuracy is measured as 3.75ns. Traces may show negative idle time periodically in the trace. This is due to minor periodic adjustments in timestamp to prevent drift.
- **Gen2 Active Interposer** – Summit T3 and Summit T2 analyzers requires the original “Gen2 Active Interposer” x8 or x16 to be revision G or higher. The analyzers will not have a problem when operating with the new “Gen2 Active Interposer with SRIS”.
- **Buffer Size with Fixed LinkWidth** – When Link Width is selected as X1, X2 or X4 in recording options, the maximum buffer size available is half of the maximum size available for X8 or Auto.

- Known Problems and Issues Summit T24
  - **Auto-Configure Lane Polarity** – for correct polarity detection Summit recording settings has to be initialized before the monitored link is trained.
  - **EIOS errors** – Errors found in the EIOS packets as the system goes into low power state can be expected and are to be considered a normal part of operation
  - **Trigger Position** – Trigger positioning can be off by a few (up to 6) packets in either direction due to certain real-time constraints with heavy packet loading.
  - **Short Electrical idle periods** may not be detected by the analyzer and as a result Link Up/Link Down blocks may not appear in the trace.
  - **Overclocking** – Only standard PCIe clocking is supported by the analyzers. No overclocking.
  - **Auto Options** – Autospeed will not work properly for links already in low power states. Autoswizzle needs to see link training sequences (from configuration or recovery) in order to work. Also use fixed link width if the bus is in L0s state, this will be corrected in next releases.
  - **Low power states** – For L0s, the analyzer will filter out about 16 FTS due to lock, deskew and synchronization. If deskew is bypassed extra 3 to 4 FTS can be seen as being recovered only in bit tracer mode. During L0s low power traffic some LinkDwn/LinkUp packets might be missing from the trace when the electrical idle period is under 200ns. During L0s low power traffic some of the FTS packets may show with error marks. The PETracer tries to show as much data as possible after link comes out of electrical idle, this has the side effect of showing packets with errors until the analyzer has locked properly to the data. For L1, for devices that send less than 9 TS1s after exit of L1 these may not be recorded in the trace and sometimes deskew will be an issue if no SKP is part of the training sequence.
  - **Gen3 Options** – PETracer application shows Gen3 options as available for selection in some of the dialogs. T24 does not support these and they will be unavailable in future releases.
  - **EIOS** – When entering electrical idle during L0s, L1 or speed change, the Electrical Idle Ordered Set may be missing from the CATC trace in some recordings.
  - **Negative Time Stamps** – Precision of packet timestamp is 2ns and accuracy is measured as 3.75ns. Traces may show negative idle time periodically in the trace. This is due to minor periodic adjustments in timestamp to prevent drift.
  - **Gen2 Active Interposer** – Summit T3 and Summit T2 analyzers requires the original “Gen2 Active Interposer” x8 or x16 to be revision G or higher. The analyzers will not have a problem when operating with the new “Gen2 Active Interposer with SRIS”.

- Known Problems and Issues Summit Z3-16
  - **Bus engine update using USB HUB** – When updating the bus engine image while the host machine is connected to the Z3 through a USB HUB the PCIe Protocol Analysis Software application may keep waiting more than a minute for Z3 to restart. If this happens, simply unplug and plug back the USB cable. Another solution to this problem is to connect Z3 directly to the host machine USB port rather than through a HUB.
  - **Using Z3 with T3 Analyzer** – At 8.0 GT/s rate, Preset 7 is the default for TX Emphasis in the Generation Options for all lanes in the Summit Z3 Trainer. When using a Summit T3 to analyze the traffic, the DC Gain must be set to 3 dB in the Probe setting dialog on all the lanes for the traffic direction from the Z3 trainer. If you need to calibrate the link, select only the direction to be calibrated and skip the direction from the Z3 since that portion will be clean using the suggested DC Gain setting.
  - **ACK Latency** – Z3 will acknowledge a TLP after a minimum of 1 microsecond, this may more than the latency timeout for some devices in some configurations, a replay of the TLP may be generated by the DUT.
  - **Sending TLPs after Speed Change command when using scripts** – Add a command to wait for the link to be ready after a speed switch command and before transmitting any other packets.
  - **PERST# Assertion** – This signal can be driven per user command in both Host and Device modes. When the Z3 Trainer is plugged in to a host system and in Device Mode, do not run a script to drive PERST#.
  - **Script Automation Test Tool Root Complex Test Group** – Test 41-20 may fail for systems. This will be corrected in future releases.
  - **NVME Drive Emulation in Windows 7** – Read commands generated by NVMe device emulation with the example driver are incomplete as shown by the CATC Trace. To correct this, change the trace decoding xml and edit the correct sizes for the IO completion and submission queues. Another way to correct this is to use Window 8.

## 3.4. API

**Automation:**

- There are several sample projects included with the application. To run them, you should make sure that the PCIe Protocol Analysis Software application is already installed.
- The library file name to be used is: ***PEAutomation.tlb***.
- **HTML Sample:**
- For editing the HTML sample code you can use a text editor or other HTML-editing tools.
- **CPP sample:**
  1. To compile the Visual C++ sample project you first need to install the Microsoft Visual Studio.
  2. You can select to install the PCIe Protocol Analysis Software software in a directory different than the default one. If you choose to do so, make sure you add a path to the installation directory in your project's paths list. You can find the ***PEAutomation.tlb*** file in the installation directory. When using Microsoft Visual Studio, the path to the installation directory should be added to the following places in the 'Project Settings' property sheet:
     (1) Under 'C/C++' tab, 'Preprocessor' category in the 'Additional include directories'.
     (2) Under 'Resources' tab, in the 'Additional resource include directories'.
- When a remote server is disconnected abruptly while a client application is still connected, the client application might hang up for several minutes. At the end of this timeout, the client would be released with a "The RPC server unavailable" notification. This is due to Windows conduct. [C0004997]

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# 4. Previous Releases

The following is a summary of previous releases of PCIe Protocol Analysis Software, PCIe Protocol Suite and PETracer™:

## 4.1. Version 11.37

- Support for Summit T54 Gen5 Phy Module and Gen5 x8 Interposer
- Dual Port Mode for Summit T54
- Expanded Mode for Summit T54
- Support for Summit M5x Gen5 Analysis using Gen5 x8 TAP5 Interposers
- Added Calibration Wizard
- Added compliance patterns for Summit M5x Jammer
- Added exported USB4 tunneled data
- Added CCIX Decoding for Summit T3/T2 products
- Implemented NVMe Log Page View
- SFI (System Firmware Intermediary), Conventional PCI Advanced Features, Subsystem ID and Subsystem Vendor ID Capabilities for PCIe Configuration Space decoding
- Enhanced calibration for Summit T34 to use logical lanes rather than physical lanes
- Miscellaneous bug fixes and enhancements

## 4.2. Version 11.10

- Support for Summit T54 PCIe Gen5 Protocol Analyzer
- Support for Summit M5x Gen5 x8 Analyzer triggering, filtering and sequencing options
- Lane margining options added in searches
- Gen4 Compliance Suite: added lane margining tests in LinkExpert
- PCIe Lightweight Notification Protocol added to: Searches, Traffic Summary, Trace Expert, triggering on LN Message
- Support for Gen4 Interposers with dual ports
- Separate clocks options per direction in recording options settings
- Support for Opalite in TCG decoder
- NVMe-MI Compliance Suite updated to specification v1.1
- Added license for CCIX compatibility and optimized modes
- Added decoding support for DSP0218 PLDM version 0.9.0a in CATC Trace
- Support for non-contiguous submission and completion queues in NVMe decoding
- Improved trace uploading performance for analyzers
- Summit M5x Jammer: Added x8 AJA mode (Analyzer-Jammer-Analyzer)
- Provided sample script for Summit Z3-16 to control the DUT slot power in Summit Z3 Test Platform latest version
- Added "Filter In" capabilities in Find menu for CATC Trace
- Improved performance for Summit Z416 Fast Transmit feature in x16
- Miscellaneous bug fixes and enhancements

## 4.3. Version 9.32

- 64bit support for Protocol Analysis and LinkExpert applications

- Support for Summit T48 Expansion Mode to x16
- Added calibration for Gen4 Interposers using the analyzer cable
- Support for DSP0218 PLDM decoding
- Added PCIe LightWeigth Notification decoding
- Update NVMe decoding to 1.3c version
- Added TCG support of Pyrite
- Trigger for ATOMIC Operation, Triggering for all transports
- API call to export trace to csv
- Added Dynamic Equalization View to CATC Trace
- CCIX decoding using file base decode (Compliant TLP Format only)
- Support for Optimized TLP Format of CCIX
- Added Export/Import mechanism for PCIe configuration recording in trace
- Improved performance for browsing traces with NVMe decoding
- Added Recording Options scripting for Summit T4 products
- External clock options for T4 GUI in MultiPort Mode
- Summit T34 New NVMe Enhanced mode for x1/x2
- Summit Z416 Gen4 Compliance speed up
- High Performance Completer for Summit Z416
- Added Gen4 features to Summit Z3-16
- Added more tests and test speed optimization for Gen4 Compliance in Summit Z416
- Simulated eye diagram reflecting Rx Lane margining in Summit Z416
- Low Power modes accessible from scripting for Summit Z3 and Z4
- Miscellaneous bug fixes and enhancements

## 4.4. Version 9.00

- Support for Summit M5x Analyzer/Jammer

## 4.5. Version 8.78

- File-based decoding for NVMe
- Support for SMBus ARP (Address Resolution Protocol) in CATC Trace
- Support for DSP0267 PLDM Decoding
- Programmable L0s timing for Summit Z416
- Added MultiPort feature for Summit T416 and Summit T48
- NVMe Enhanced Mode for Summit T416 and Summit T48
- NVMe Enhanced Mode 2 for Summit T34
- Added Tx lane margining as host for Summit Z416
- Added Gen4 Compliances test cases: 57-11, 58-11, 53-40 and 54-30
- Updates for NVMe decoding specification 1.3
- Added SR-IOV for NVMe 1.3
- New triggers, Searches for NVMe Controller Memory Buffer
- NVMe-MI commands updates for NVMe 1.3
- Miscellaneous bug fixes and enhancements

## 4.6. Version 8.73

- Added programmable TLP, DLLP and OS events for triggering and filtering on Summit T416 and Summit T48
- Added sequencer to create complex triggering/filtering scenarios on Summit T416 and Summit T48

- Added triggering per packet type and basic filtering on Summit Z416
- Enabled Gen3 Compliance in Summit T416, Summit T48 and Summit Z416.
- Enabled NVMe-MI Compliance Suite for Summit T416, Summit T48 and Summit Z416.
- Checking Link Speed and Link Width through COM Automation API for Summit Z3-16 and Summit Z416
- Filter NVMe CSTS accesses
- NVMe-MI Compliance Suite: Added auto detection for SMBus port ID.
- Miscellaneous bug fixes and enhancements

## 4.7. Version 8.70

- Support for Summit T48 Platform
- Bit Tracer Support for T416 and T48
- Controller Memory Buffer decoding for NVMe in Protocol Mode
- Adding Summit T416/T48 support to CrossSync.
- Added support for Gen4 revision 0.7 at Physical, Data and Transaction Link Layers for Summit Z416 and Summit T416/T48.
- Miscellaneous Enhancements to GUI and Bug Fixes for Protocol Analysis software.

## 4.8. Version 8.60

- Frontend receiver settings in recording options for Summit T416 and Summit Z416.
- Summit Z416 Fast Transmit.
- Miscellaneous Enhancements to GUI and Bug Fixes for Protocol Analysis software.

## 4.9. Version 8.58

- Enhancement for Summit Z416 : Host and Device emulation, SMBus generation and recording.
- Enhancement for Summit T416 : SMBus recording.
- Modified Automation Tool to support Z416 and T416.
- Fixed problem with MCTP Decoding for SMBus Licenses for Analyzers.
- Miscellaneous Enhancements to GUI and Bug Fixes for Protocol Analysis software and LinkExpert.

## 4.10. Version 8.50

- Summit T416 Analyzer support
- Application name change
- LinkExpert software support enabled
- Added more test cases NVMe-MI Compliance Test Suite in Script Automation Test Tool
- New MCTP Command Level Decoding in CATC Trace
- New NVMe-MI over MCTP Command Level Decoding in CATC Trace
- Enhancement for Summit Z416: Transaction Layer and Data Link Layer Functionality up to x8.

- Enhancement for Summit Z416: Physical Layer Link Width Extension up to x8 2.5Gbps/5.0Gbps/8.0Gbps, up to x4 16.0Gbps
- Enhancement for Summit Z416: Enabled more TestArcs
- Enhancement for Summit Z416: Programmable LTSSM
- Support for latest CATC Sync Bus Engine version 9 on Summit T3-16 and T3-8
- Miscellaneous Enhancements to GUI and Bug Fixes

## 4.11. Version 8.10

- Support for All Analyzers/Exercisers and Z416.
- Support for SMBus/MCTP/NVMe-MI recording in Summit T34.
- Support for SMBus/MCTP/NVMe-MI command generation in Summit Z3-16 with SMBus Support.
- Added NVMe-MI Compliance Test Suite in Script Automation Test Tool.
- Adding new features for Z416 : More trigger options added, LTSSM Control GUI (LTSSM Log, Test Arcs, speed change, LTSSM Control options) and Error Injection script.
- New PLDM and NC-SI decoding in CATC Trace for MCTP based on specifications:
    a. DSP0236 Base & Control None : ver 1.2.1, December 3, 2014
    b. DSP0239 Ids and Codes : ver 1.3.0, March 6, 2015
    c. DSP0238 PCIe VDM binding ver 1.0.2, December 7, 2014
    d. DSP0240 PLDM Base Specification: ver 1.0.0, April 23, 2009 excluding PLDMVersionData
    e. DSP0245 PLDM IDs and Codes Specification : ver 1.1.0, January 26, 2011
    f. DSP0246 PLDM for SMBIOS Data Transfer : ver 1.0.1, December 11, 2009 excluding SMBIOSStructureData
    g. DSP0248 PLDM for Platform Monitoring and Control : ver 1.1.0, November 8, 2011 excluding PLDMEventLogData and PDR data
    h. DSP0247 PLDM for BIOS Control and Configuration : ver 1.0.0, April 23, 2009 excluding TableData, BIOSAttributesHandles, AttributeData
    i. DSP0257 PLDM for FRU Data : ver 1.0.0, 26 October, 2011 excluding FRU Record Table
    j. DSP0222 NC-SI (Network Controller Sideband Interface) : ver 1.1.0, September 23, 2015
    k. DSP0261 NC-SI over MCTP Binding : ver 1.1.0, March 21, 2015 only NC-Si over MCTP, no Ethernet over MCTP
- Enhancements to Gen3 calibration.
- Enhancements to VSE: New math operators.
- Enhancements to Traces Views.
- Enhancements to NVMe decoding and utilities.
- Miscellaneous Enhancements to GUI.
- Bug Fixes.

## 4.12. Version 8.00

- PCIe Protocol Suite 8.0 version supports only Summit Z416.

## 4.13. Version 7.42/7.43

- MCTP over PCIe
  - New decoding level for MCTP Messages
  - CATC View, Detail View, Spreadsheet view cells for MCTP Messages
  - Basic error checking for MCTP Messages (packet presence, reserved fields, values validation)
  - Traffic Summary report (Message Types, Control Command Codes, Control Completion Codes)
  - Searches (Message Types, Control Command Code, Control Completion Code, Control Instance ID)
  - MCTP Trigger template update
  - VSE For MCTP messages
- Updates for NVMe 1.2 specification and improvements
  - Shared namespaces and controller id
    - ✓ Updated decoding
    - ✓ Added SSD base address dialog support
    - ✓ Updated command and payload cells
  - CATC Trace cells updates
    - ✓ Added and handled new SQE PSDT SGL codes, created proper cells for SGL descriptors.
    - ✓ Added new log pages, features, Identify CNS codes.
    - ✓ Added Controller List structure.
    - ✓ Now NVMe Transaction and Command levels use the same command specific and payload cells.
- Update to TCG decodes and added Opal decodes.
- Performance improvements for NVMe decodes and reports
- Search within NVMe Payload
- Search for NVMe LBA range
- IOPS utilization chart classified by device
- PMUX Decoding
  - New PMUX packet type and decodes for CATC Trace
  - Searches for PMUX on packet level
  - VSE support and examples
  - Error handling
  - Handling for TLP/PMUX short nullified packet
- Emulation of PCIe MCTP commands as host in Summit Z3
- Bug Fixes.

## 4.14. Version 7.40/7.41

- Decode for Multiple NVMe commands in single PCIe MemRd transfer
- Added search for NVMe command fields

- Graph NVMe queue depths
- NVMe controller map display
- Adding PERST signal to PETracer, display, triggering, searches
- Support for high efficiency memory for T34 expansion mode
- Enhancement to trace export
- Enhancements to decoding: Check validity of Vendor Specific Command Configuration
- GUI improvements : Sorting bookmarks by timestamp
- PCIe Vendor Defined Messages with MCTP content : Decodes, Triggers, Searches, VSE
- Result summary list for ATS
- Enhancements to Summit Z3 scripts : Enhanced control for TD bit
- NVMe 1.2 specification commands for Z3 NVMe Host Controller emulation
- NVMe 1.2 specification update for Z3 Drive emulation
- Bug Fixes.

## 4.15. Version 7.35

- Bug Fixes.

## 4.16. Version 7.34

- Added T34 memory high efficiency mode for X1 and X2
- Enabled T34 expansion mode for X8 recording
- PCIe ECN update : Precision Time Measurement
- New USB driver for T34
- New Trace Expert feature for NVMe
- New NVMe mode for long recording
- Added per lane triggering to analyzers
- Modified selection for LinkWidth recording option in analyzer
- Enabling license keys for TCG decoding
- Miscellaneous Enhancements for NVMe and Storage Decodes
- Bug Fixes.

## 4.17. Version 7.30

- T34 Support
- X34 Support
- New high level decode for NVMe Transactions
- TCG Decodes for NMVe: TCG Enterprise SSC Version 1.0 Revision 0.9

- Traffic Summaries for NVMe, AHCI, ATA
- Error Reports for NVMe, AHCI, ATA
- VSE for NVMe, AHCI, ATA
- Decoding for multiple NVMe devices in the same bus
- New capabilities for spreadsheet view for improved usability
- Triggers added to analyzers: LinkWidth Change, Compliance Pattern.
- Triggers and filters added to analyzers: CLKREQ#, WAKE#.
- Update Z3 Trainer NVMe drive emulation to 1.1a specification adding Get Log Page, Security Send and Security Receive Admin, Dataset Management Commands
- New Z3 Trainer capabilities : Freeze flow control, insert TLP Prefixes types, disable Power Management DLLPs auto mode, TD bit corruption
- Bug Fixes.

## 4.18. Version 7.20

- Gen3 Compliance Package for Z3.
- Support for Large Traces.
- Update for Z3 NVMe drive emulation.
- Bug Fixes.

## 4.19. Version 7.10

- Updates for storage protocol specifications in display, search, and triggers.
- SCSI command decodes to trace view.
- Spreadsheet view for PQI/SOP control registers.
- Spreadsheet view for SCSI commands.
- Trigger Templates for PQI/SOP control registers.
- Trigger Templates for PQI/SOP/SCSI commands.
- Search for PQI/SOP control registers.
- Search for SCSI commands.
- Z3 Host emulation scripts PQI/SOP control registers.
- Z3 Host emulation scripts SCSI commands.
- Added SRIS Support to Z3.
- OBFF decode based on WAKE#.
- Bug Fixes.

## 4.20. Version 7.00

- Spreadsheet view supporting storage decodes for NVMe, AHCI and ATA.
- Search functionality for NVMe and ATA commands in decoded traces.
- Trigger options for NVMe, AHCI and ATA commands.
- Added support for CLKREQ# for Summit Analyzers.
- Option ROM capability added to Z3 Trainer.
- Storage scripts for Z3 Trainer NVMe and AHCI structures.

- Added support for new Summit Z3 with CLKREQ# support.
- Bug fixes.

## 4.21. Version 6.75

- New functionality added to Summit T3-16, T3-8 and T28: Five DW floating payload match.
- PQI 6i decode for CATC Trace viewer.
- SATA 2.6 decode for CATC Trace viewer.
- Improvements to Automated Test Script.
- Enhancements to API.
- Bug fixes.
- Last release supporting Edge, ML and EML products.

## 4.22. Version 6.71

- AHCI 1.3 decoding improvements.
- PQI dialog box updates.
- PQI decoding: XML Export/Import.
- AHCI Sample scripts for Summit Z3.
- Bug fixes.

## 4.23. Version 6.70

- Added support for Summit T24 analyzer.

## 4.24. Version 6.65

- Improved memory efficiency for Summit T3 recordings.
- SSD protocol decoding improvements.
- Bug fixes.

## 4.25. Version 6.63

- Improved memory efficiency for x1, x2, x4 recordings for Summit T3-16.
- NVMe protocol decoding improvements.

## 4.26. Version 6.60

- AHCI 1.3 decoding support.
- PQI decoding support.
- Dashboard view is enhanced with additional link information.
- CATC Walk support added.
- Summit T3 calibration procedure improvements.
- Host memory spaces support for Summit Z3.
- Summit Z3 NVMe device emulation support added.

## 4.27. Version 6.53

- Dashboard functionality for Summit T3-8, Summit T3-16 and Summit T28.
- Real Time Statistics display is fixed.

## 4.28. Version 6.51

- Expansion Recording support for Summit T3-8 is fixed
- Real Time Statistics display is fixed

## 4.29. Version 6.50

- Added support for CrossSync in Summit T28
- The software application now supports the connectivity of multiple LeCroy PCIe analyzers
- Added support for L0s/L1 LTSSM states on Summit Z3
- Added support for Summit T28 calibration

## 4.30. Version 6.45

- Support for Real Time Statistics (RTS) on Summit T3-8/T3-16
- Support for CrossSync on Summit T3-8/T3-16 (restricted to operation with other LeCroy analyzer, but not additional PCIe products)
- Support for ATS (Address Translation Services)

## 4.31. Version 6.40

- Summit T28 Analyzer support
- Summit T3-8 Expansion support

## 4.32. Version 6.30

- Summit T3-8 Analyzer support
- Summit Z3-16 Exerciser full gen3 support

## 4.33. Version 6.23

- Summit T3 support for AutoSwizzling
- NVMHCI transaction decoding
- Summit Z3 support for script based generation at gen1 and gen2 speeds
- New Summit Z3 LTSSM control dialog
- Bug fixes

## 4.34. Version 6.2

- Summit T3 Advanced Triggering options added.
- Bug Fixes

## 4.35. Version 6.1

- Added support for Summit Z3-16 PCI Express exerciser product.

## 4.36. Version 6.0

- Added support for Summit T3-16 PCI Express analyzer product.

## 4.37. Version 5.73

- Bug Fixes

## 4.38. Version 5.72

- ProtoSync support added. ProtoSync allows PETracer to import data from LeCroy scopes and synchronize protocol views with the scope waveform.
- TraceView packet selection implemented.
- Bug Fixes

# 5. Support

## Online Download

Please periodically check Teledyne LeCroy Protocol Solutions Group's web site for software updates and other support related to this product. Software updates are available to those users with current Maintenance Agreements.

**Web (SW downloads):** http://teledynelecroy.com/support/softwaredownload

## Online Support

**Web:** http://teledynelecroy.com/support/contact
**E-Mail:** psgsupport@teledyne.com

## Sales Information

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