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# USB Advisor™ 2.60 - Release Notes

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## 1. Overview

This Read Me file contains last-minute product information for the USB Advisor™ software for Microsoft Windows. For full instructions on using the USB Advisor™ please see the User's Manual and other documents provided with this product.

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## 2. System Requirements

The following is a list of recommendations for the configuration of the host machine that runs the USB Advisor™ application and that is connected to the USB Advisor™ system. Please note that the application would operate on systems with less memory and slower CPU rate than the recommended; however, for best results it is recommended that the host machine meets or exceeds the suggested configuration.

### 2.1. Software

#### **Operating System:**

Microsoft Windows XP, Windows Vista 32, or Windows Vista 64.

*Note: Effective January 1, 2008, LeCroy no longer supports Microsoft Windows 2000 with the Protocol Solutions Group product line. After January 1, 2008, the LeCroy software is tested for compatibility with*

*the latest releases of Microsoft Windows XP and Microsoft Windows Vista only (Windows 2000 users may continue to use legacy software released prior to January 2008).*

**Required setup:**

Microsoft Internet Explorer, version 6 or newer.

## 2.2. Hardware

**Processor:**

For optimum performance, use processors of Intel's PentiumIII/Pentium4 family, AMD's Athlon/Duron family, or other compatible processors with clock speed of 500MHz or higher (Processors of Intel's Pentium II/Celeron family or AMD's K6 family with clock speed of 300MHz is a minimum).

**Memory:**

For the best performance, it is recommended to have physical RAM twice the size of the recording buffer setup - 256MB or more (minimum of 128MB of RAM).

**Hard Disk:**

At least 20MB of free hard disk space is required for the installation. Additional disk space is needed for the operation of the applications and for storing the recorded data in files during the recordings process (can be as much as 150MB when recording a full buffer size).

**Display:**

Resolution of at least 1024 x 768 with at least 16-bit color depth is recommended (resolution of 800 x 600 with 16-bit color is a minimum).

**Connectivity:**

USB 1.1 or USB 2.0 interface is required to connect the analyzer to the host PC. This is not a requirement if the analyzer application is used only to view pre-recorded traces.

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## 3. Release Notes

### 3.1. What's New

- This is version 2.60 of the USB Advisor™ protocol analyzer.
- This release contains the following components, which are necessary for the operation of the product:
  - USB Advisor™ Application Version 2.60.
  - USB Advisor™ Bus Engine Version 2.02/1.67.
  - USB Advisor™ Firmware Version 1.07.
- This release includes the following updates:
  - Link Power Management support (USB 2.0 Specification Update)
  - Improved Vista compatibility
  - The following USB Class decoding is now supported:
    - § Personal Healthcare
    - § Content Security
  - Automation Command Line sample added
- This release includes the following fixes:
  - Incorrect decoding in Get Descriptor [1261]

## 3.2. Known Issues

- The integrated Generation File (.utg file) Editor does not work with Windows 98 or Windows ME. You can either edit the .utg files with your own text editor, or upgrade to Windows 2000 or XP.
- In rare circumstances, the search feature may fail to find items that exist. If this occurs, close the application and start it again.
- Errors may appear in the last couple of packets of a recording that are not real errors. They are a side effect of the recording terminating during the middle of a packet.
- When uninstalling version 1.60, you may get a dialog asking: "! This will remove InstallShield Dialog Sampler from your computer. Do you wish to proceed?" Just click on "Yes". The correct application WILL be uninstalled (The phrase in the InstallShield script should have contained the string "USB Advisor" in the place of "InstallShield Dialog Sampler").
- According to the MTP Specification Revision 0.83 by Microsoft Corp., NumberOfInterdependencies and NumberOfPropDescs in InterdependentPropDescDataset are UINT16 value with size of 2 bytes. However, we have encountered some products on the market that are using UINT32 instead, which could mess up the whole InterdependentPropDesc Dataset decoding. If you have decoding problems with the GetInterdependentPropDesc operation, set the variable '*InterdependentPropDescDatasetSizeBytes*' equal to 4 in the **\Scripts\StillImageClass\PTPUserEditParams.inc** script file. [275]
- For PTP Transactions that would decode into a very large number of fields, the script decoding will automatically stop creating display fields after a user-configurable amount of fields have been processed. By default, once this limit has been reached, the script decoding will also stop processing the rest of the data, meaning it will not discover any more errors that might occur deeper in the data. You can configure these behaviors by changing the variables '*MAX\_CELLS\_TO\_DISPLAY*' and '*IF\_CONTINUE\_ON\_PROCESSING\_DATA*' in the **\Scripts\StillImageClass\PTPUserEditParams.inc** script file.
- When invoking the View Decoded Fields dialog for a large PTP Transaction, the application may appear to hang and become unresponsive while it processes the data. Once the application finishes processing the data, it will display the dialog. [321]
- The Microsoft driver stack that is required for the Intel WUSB PDK is not compatible with the USB Advisor device driver. The Intel WUSB PDK must be installed on a computer separate from the host controlling the USB Advisor analyzer. For details, refer to the Intel PDK documentation. [638]

## 3.3. API

### Automation:

- **Sample files Installation:** To install the sample files, please select the 'Custom' installation option and select the 'Automation' group. The samples are suitable for the USB Advisor™ analyzer. Please refer to the Automation manual for additional information.
- To run the sample files, you should make sure that the USB Advisor™ software is already installed.
- The library file name to be used is: **USBAutomation.tlb** for the USB Advisor™ analyzer.
- **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 USB Advisor™ 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 **USBAutomation.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

### 4.1. *Version 2.50, Build 421*

#### **New Features:**

- Windows Vista 32 and Windows Vista 64 support added
- The following USB Class decoding is now supported:
  - § IrDA
  - § ATAPI
  - § HTTP
  - § IP

#### **Bug Fixes:**

- Separate Mass Storage SCSI Status Transfer from Data Transfer [619]
- Export of HiEOP value from Advisor to Generator Text file fixed [500]
- HID report descriptor decoding fix [709]

### 4.2. *Version 2.32, Build 418*

#### **New Features:**

- The following USB Class decoding is now supported:
  - Video Class 1.1
  - Communications Data Interface Class
  - Cable Based Association Framework (WUSB implementation)
  - Smart-Card Class (CCID + ICCD)
  - RNDIS

#### **Bug Fixes:**

- wChannelConfig standard audio descriptor incorrect decoding in description [362]
- iTerminal text for standard audio descriptor says input when it is an output terminal [363]
- HID report descriptor parser incorrectly decodes 32-bit tags [605]

### 4.3. *Version 2.30, Build 388*

**New Features:**

- Three new Transaction Levels were added: PTP Transaction, PTP Object and PTP Session.
- With the introduction of these new Transaction Levels the following decodes are now supported:
  - PictBridge
  - MTP
  - PTP
- The following decodes were updated to match the latest specifications:
  - Monitor (HID extension)
  - Physical Interface (force-feedback extension to HID)
  - Power (HID extension)
  - HUT (HID)
  - Point of sale Devices (HID extension)

**Bug Fixes:**

- Fix Wire Adapter decoding problems.
- Fix failure of Legacy Descriptor decoders in Transfer view.
- Fix Audio Class Decoding problems.
- Fix inability to update FW and Bus Engine in Advisor in versions 2.15 and 2.2x.
- Fix msb<->lsb incorrect order in Transfer Level Request Field display.
- Fix crash when hitting Intelliframe/Bitstream button in Gen file.
- Fix hiding by host/address/endpoint for control transactions and transfers.
- Fix crash when opening of USB Gen Files from Automation client. They now open explicitly when you start generation.

## 4.4. *Version 2.20, Build 366*

**New Features:**

- Certified Wireless USB Host and Device Wire Adapter (HWA & DWA) Transfer decoding. This gives the user a high-level view of the transfers passing through a Wire Adapter RPipe.
- Decoding assignment feature now includes support for Class/Vendor Request and Endpoint assignment to Certified Wireless USB HWA & DWA RPipes.
- Support for the Automation Analyzer Adapter.

**Bug Fixes:**

- Correct the totals on some reports in Traffic Summary. [C0006930]
- Fix software hang when trying to hide NAKs during transaction decoding. [C0006960]
- Fix software crash when decoding a trace file of a Low Speed enumeration through a High Speed hub. [C0006954]
- Fix software bug that caused decoding of certain trace files to take a very long time. [C0006943]

## 4.5. *Version 2.15, Build 358*

**New Features:**

- Enhanced Navigator functionality.
- High Level Decoding Mapping User Interface Enhancements:
  - Access Decoding Dialog via "Decode" Button in Toolbar (Always available)
  - Access Decoding Dialog from ANY packet, transaction, or transfer (You previously had to look for an appropriate entry!)
  - Single click selection of decoders (was select then apply)

- Selection choices now direction-aware (only applicable ones added to selection list)
- CCID Messages for Bulk Endpoint decoding were added
- Improved the Hub Class Decoding.
- Toggle Analysis improvements. (C0005148)

**Bug Fixes:**

- Fixed ACK direction field after tokens in splits. (C0005278)
- Fixed false incomplete for split IN transactions. (C0005322)
- Fixed issue with Standard Requests not being decoded when in Video Decode Script Decoding mode. (C0005399)
- Fixed issue with Data toggle and display errors when Control Endpoint is not endpoint 0. (C0006322)
- When converting from Interrupt Transfer to Bulk Transfer, data payload loses one byte of data. This was fixed in this release. (C0006508)
- Fixed issue with Mass Storage decoding (Incorrect data size when CSW is at end of transfer). Fixed issue with PTP decoding (Incorrect container length displayed). (C0006853)
- Now, 16 view flags are allowed compared to previously only 5 flags. (C0006855)
- Fixed bandwidth calculation to include NYET'ed traffic. (C0006044)
- Fixed issue of not marking incorrect packet length if data length is larger than speed and transfer type allows. (C0006343)

## 4.6. *Version 2.12, Build 327*

**New Features:**

- Video Class decoding of Descriptors, Requests, and data headers
- Supports Transaction level decoding for Isoch Video Data Headers
- Add shortcuts for Hiding SOF, NAK, Chirp
- Add shortcuts for Display and Recording Options and Generate start/stop
- Add menu selection to load the most recently assigned decoding mapping to a trace file, saving time from having to map each endpoint explicitly
- Endpoint Data Compare feature allows user to select 2 endpoints in a trace and verify that the data in one-direction matches the data echoed back.
- Selection of an endpoint for Search, Hide, etc. now includes the direction, so (for example) Endpoint 3 OUT and Endpoint 3 IN are treated separately
- Separate USBTracer API library from Advisor API library so they can be used by themselves
- File Open dialogs now include BOTH .usb and .utg files

**Bug Fixes:**

- PTP/Still Image decoding bug fixes
- Add "Complete No" field to show transactions which are not completed, as is done in USB Chief
- Remove extraneous data that was occurring during Export Data feature.
- Fix Timing Calculator time base default behavior
- Allow decoding of captures that have truncated data, as best as we can.
- Fix erroneous Toggle Violation Error that occurred after a SET\_INTERFACE command
- Fix Bandwidth calculation error when small number of packets being measured
- Fix minor PTP and OTG Decoding errors
- Fix truncated export of Transactions to .CSV files

## 4.7. *Version 2.03, Build 286*

### **New Features:**

- Picture Transfer Protocol /Still Image Class Decoding
- Trigger Timestamp added to File Information

### **Bug Fixes:**

- Fix turnaround violation trigger when it is the last packet before suspend
- Fix Mass Storage Decoding bug that prevented complete decoding in cases where Writes were started very quickly after the previous one completed.
- Fix crash that happened when around 10,000 errors of the same type occur.
- Add more tolerance for SE1 conditions
- Filter SE0 conditions better (Don't report them if marginal)
- Fix search for data pattern in Transfer bug

## 4.8. *Version 2.00, Build 235*

### **New Features:**

- 2-Stage SOF Hiding Option, allowing the hiding of only empty-frame SOF packets
- User can select Timestamp to be displayed at beginning or end of packet
- Timestamp now shown for Transactions and Transfers
- Export to CSV file for Excel, etc.
- Keyboard Shortcuts for changing levels: CTRL-<1,2,3,4>
- Support new Advisor hardware revision

## 4.9. *Version 1.92, Build 204*

### **Bug Fixes:**

- Disallow Toggle Error Detection on Control Endpoints
- Fix false detection of turnaround violation after a complete split Data In (Host doesn't ACK these)
- Assorted Bluetooth Decoding file fixes and updates
- Hub Decoding file fixes
- Show error for script decoder files that don't have UsbClassCode or UsbVendorId declared
- Fix improper decoding of Hi-Speed bulk due to packet length assumption of 64 bytes (its 512 on HiSpeed)
- Fix occasional hang when applying Mass Storage decoding to an endpoint
- SCSI Mass Storage decoding file fixes and enhancements
- Fix Low Speed Capture problem where packets are missed due to intermingled SE0 signals of less than 210ns between packet bits.
- Fix inability to search for or hide any addresses over 63
- Fix improper toggle triggering on SPLIT packets
- During OTG SRP analysis, show premature SOF's before Bus Reset as an error
- Don't show false Data Toggle violations when Data Truncation is enabled

## 4.10. *Version 1.91, Build 200*

### **New Features:**

- Advanced Script-Based Decoding
- Mass Storage Bulk-Only SCSI Decode
- Updated Hub Decoder
- Update Bluetooth HCI decoder
- Preserve user overrides on Transfer Types (Interrupt vs Bulk assignment)

### **Bug Fixes:**

- Timing Calculator can now be closed when it's pinned
- Search for Frame Number, Empty Frames, and non-empty frames fixed

## 4.11. *Version 1.81, Build 164*

### **New Features:**

- Navigator Window to help define areas of interest for scrolling within a trace file
- Dockable Bandwidth Calculator
- Descriptor Decoding window is now sizeable
- .VCD file importing function
- Marker dialog can remain open while navigating through trace file
- Search for Transfer Data Length
- View Transfer Data Block
- Trigger on Data Length Equals, Less than, Greater than, and Not Equal to a value
- F1 key-based Help
- Explorer plug-in for previewing .usb files
- Faster Hiding of Packets
- Vendor ID's Decoded into their company name
- Hide Chirps button (for use when viewing USBTracer trace files)

### **Bug Fixes:**

- Next and Previous buttons in Decoding Dialog fixed
- Fix crash when hitting Hide Devices button after previously closing it with the close box (rather than the Apply button)
- Fix ability to hide packets based on speed
- MDATA Packet Direction fixed
- Formulas now shown for Timing Calculator
- Fix Export Data bug which exported data from NAK'ed transactions
- Export Data now works on transfers over 1 million
- Fix decoding of High Bandwidth Isoch Transfers
- Fix false toggle violation when GET Control Transfer returns no data
- Fix incorrect identification of Bulk transfer on low speed branch
- Fix incorrect toggle violation after Chirp Sequence
- Fix misc. bugs in Timing Calculator
- Fix bug which prevented partial nibble mask/match values in data related Recording Resources (Data Pattern, Transactions, Device Requests)



## 4.12. *Version 1.71, Build 137*

### **New Features:**

- Transaction Decoding in Background allows quicker access to viewing traces
- Search for Splits
- Performance Enhancements
- Updating older files to current versions is now under User's control
- User can override transfer types identified for some Interrupt and Bulk transfers, in case analyzer was not able to distinguish them properly
- User can choose Quick Search for Pid's and some Bus Conditions, at the cost of greater memory use. Also speeds up SOF/NAK hiding.
- Quick search for ANY Errors
- Add ability to default to Data Fields Expanded

### **Bug Fixes:**

- Installation fixed to avoid possibility of accidental deletion of user's trace files or other files in the Advisor directory during uninstall,
- Fix crash upon loading previous version files that contain Markers
- Fix decoding of OTHER\_SPEED\_CONFIGURATION descriptor
- Fix crash when doing time calculations on Empty trace
- Fix bug that prevented USBChief files of release 1.33 from being converted to current format.
- Fix Auto-Merge recording options feature
- Improve Transfer Decoding algorithms to better identify transfer types
- Fix virtual memory problem in Export to Generator Text feature
- Fix crash when double-clicking on a .usb file

## 4.13. *Version 1.70, Build 111*

### **New Features:**

- Trigger Sequence Enhancements: Up to 7 levels of trigger event sequencing for ALL event types. In addition, up to 2 of these events can utilize Counters.
- New, more complete, easier to use Display Options Dialog.
- Automation (Remote Control) Interface and API available
- Search in Hidden Elements
- Find All search function
- Licensing and Maintenance infrastructure
- Split Token trigger
- Packet Direction field in Packet View
- Identify and report incomplete byte errors
- Trigger on incomplete bytes
- Bluetooth Decoding file is now 1.1 compliant
- Go To Channel implemented
- Windows: Tile Vertical as well as Horizontal
- Performance Enhancements

### **Bug Fixes:**

- Fix crash when hitting Device button in Bandwidth Calculator

- Channel in Recording Options dialog not set correctly after saving .rec file
- Toolbar icons now correct after an install
- Fix 2.0 GetDescriptors and SetDescriptors decoding
- Fix crash when scrolling an empty trace window
- Fix false toggle errors after a Bus Reset condition

## *4.14. Version 1.60, Build 90*

### **New Features:**

- Bus Utilization view
- Drop-down display option menus on Packet Fields
- Trigger on Data Length
- Markers are now supported for Transactions
- Option of displaying Timestamp in Nanoseconds

### **Bug Fixes:**

- Fix idle time calculations when packets are preceded by or follow bus conditions and/or packets of different speeds (low speed on full speed branch)
- Fix error in Suspend Detection
- Fix error which caused faulty data to be displayed in the transaction view of a packet which had errors
- SplitTransaction faulty toggle violations fixed
- Export Data works on Control Transfers now.

## *4.15. Version 1.50, Build 65*

### **Bug Fixes:**

- Fix incorrect toggle errors on ISOC split transaction
- Fix problem where ISOC transactions were being misinterpreted as BULK transactions, and vice-versa
- Fix problem with doing a 'SaveAs' from Advisor on an Advisor file (and vice-versa) was reporting numerous errors incorrectly.
- Fix bug where toggle/timeout errors were being reported on addresses that were not on the USB wire under test.
- Fix bug which caused dropped trace data blocks ~30 packets before the end of a trace after stop button is hit. Generally causes a false CRC problem, but could be others. Effects only high speed traces.
- Add checking for ENDPOINT\_HALT to reset toggle state of an endpoint. Prior to this, toggle state was incorrectly shown as being an error in half of the cases.
- Fix bug that would cause incorrect data toggle and timeout error analysis on devices with addresses above 63.

## *4.16. Version 1.42, Build 63*

### **Bug Fixes:**

- Fix Ping output in Export to Gen File

- Framing error in High Speed during reset: was showing errors on 2 packets, should have been 1.
- Use better filter for transceiver glitches to prevent regular Bad Packets from being filtered
- Show missing NAKs as errors (They were not being shown at any level)
- Fix various toggle violation errors: show ones that were being missed, remove false reports.
- Fix various turnaround/timeout violation errors: show ones that were being missed, remove false reports.
- Make turnaround violation visible at Transaction level
- Fix exporting Low Speed trace to Gen File
- Make Timestamps on Consecutive Packets which are the same an Internal Error
- Fix bug that caused bad data packets to be generated sometimes when bit stuffing had occurred.
- Fix Bus Conditions timestamp and duration precision.
- Fix tooltip/taskbar interference bug in Windows NT/2K
- Truncate Data feature fixed
- False Turnaround Violations fixed
- Fixed RESTART Recording Option Action for Counters and Sequencers.
- Timestamp precision improvements
- Fix bug in Suspend and Resume duration calculations.

## *4.17. Version 1.41, Build 61*

### **New Features:**

- Traffic Summary Report
- Bandwidth Calculator
- Enhanced Search capabilities
- Data Export (ASCII or Binary)
- Enhanced Transfer Decoding
- Data Cell View at all levels
- Right button support

## *4.18. Version 1.32, Build 46*

### **Bug Fixes:**

- Garbage Trace data on Full Speed traces when disconnecting then reconnecting. New Bus Engine (1.30) fixes this bug.
- Decoding from the Setup packet field was causing hangs, crashes, and/or incorrect data to be displayed. Fixed in this release.
- Recording Options trigger out conditions were changing which resource they were associated with. Fixed.

## *4.19. Version 1.31, Build 44*

- New bus engine (1.23) fixes a bug that was preventing "Filter In" recording option function.
- New Advisor.sys driver file fixes a bug that prevented it from working on systems with a VIA-based host controller, and on some Intel systems.
- Fixes crash that occurred when selecting Window/Windows... menu item.
- Fix checkboxes losing their checked state in "RecordingOptions/Events/Errors" and "RecordingOptions/Events/External Input signals" dialogs.

## 4.20. *Version 1.30, Build 41*

- A new version of the BusEngine, 1.22 is included with this release. Please update the BusEngine for your analyzer after installing the software. Use the "Update BusEngine" button in the Setup Analyzer dialog window for this purpose.
- Firmware version remains 1.02 as in Release 1.2.
- Merging of dual trace traces (which were recorded simultaneously) into one file. If recorded above and below a High-speed Hub, the classic branch packets are incorporated into the decoding of the split transaction and transfer viewing levels.
- Configurable trigger output (to the breakout board)
- Setup data trigger/filter capability
- Conversion of Inspector/Detective trace files, as well as better conversion of USB Chief files.
- Support for tracing operations on Windows NT 4.0, (requires the addition of a USB for NT stack)
- BusEngine/Firmware/Software version compatibility enforcement: Recording is not allowed unless all three components are determined by the software to be compatible.
- Transaction/Transfer analysis speed-up. Under certain conditions, the previous release would appear to be hung during the automatic decoding stage when a file was loaded, when in reality it was slowly working. The algorithms have been optimized to speed this up greatly.
- View Data Block pops up a dialog showing all the data bytes of a packet to allow scrolling through the data of large packets, in addition to providing cut & paste support.
- Time between transactions, transfers, etc is calculated and displayed.

## 4.21. *Version 1.20, Build 23*

- A new version of the BusEngine, 1.10 is included with this release. Please update the BusEngine for your analyzer after installing the software. Use the "Update BusEngine" button in the Setup Analyzer dialog window for this purpose.
- A new version of the Firmware, 1.02 is included with this release. Please update the Firmware for your analyzer after installing the software. Use the "Update Firmware" button in the Setup Analyzer dialog window for this purpose.

### **New Features:**

- Transaction, Split Transact, and Transfer views.
- Class/Vendor request decoding
- Additional error detection & display: microframe errors, babble, handshake violations, data toggle, illegal EOP sequence
- Hide Nak Transactions with 1 button
- Enumerate & Display Microframes
- Data Truncation (saves analyzer memory to allow recording of more packets)
- Capture external signal values during recording for later display
- Greatly enhanced Triggering and Filtering (Trigger on Errors, handshake, token, data-qualified transactions, etc.)
- Trigger sequencing and counters
- Triggers on external input
- Trigger Out signal available on Breakout Board
- Hide devices (addr & endp) toolbar button for uncluttered trace viewing

## 4.22. Version 1.00

- A new version of the BusEngine, 1.0 is included with this release. Please update the BusEngine for your analyzer after installing the software. Use the "Update BusEngine" button in the Setup Analyzer dialog window for this purpose.
- A new version of the Firmware, 1.0 is included with this release. Please update the Firmware for your analyzer after installing the software. Use the "Update Firmware" button in the Setup Analyzer dialog window for this purpose.

### Application

- Added support for the classic-speeds recording channel. When you have traffic on both channels, two trace views windows will open tiled.
- Added improvements to recording options, display options, and search.
- Added error summary report and a limited timing calculator.

### Firmware

- Added support for new hardware and classic-speeds recording channel.

### BusEngine

- Added support for new hardware and classic-speeds recording channel.

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## 5. Support

### Online Download

Please periodically check 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.

### Online Support

**Web:** <http://www.lecroy.com/>  
**E-Mail:** <mailto:support@catc.com>

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