

# Keysight Sampling Oscilloscope Firmware

Keysight FlexDCA, FlexPLL, and FlexOTO Digital Communication Analyzer Software Version A.07.60 and prior releases.

Released Version:	A.07.60
Released Date:	June 2024
Requirements category (e.g., operating system):	Windows 7/8/10, 64-bit
Requirements category (e.g., instrument software):	N1000A DCA-X, N1010A FlexDCA, FlexPLL, FlexOTO
File Name:	Keysight.FlexDCA_A.07.60.exe
License:	N1010100A N1010200A N1010300A N1002000A N1002014A N1002048A N1002128A

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### Manual Part Number

Digital Format Only

### Edition

June 2024, 48th Edition

Designed in USA

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Santa Rosa, CA 95403

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# 1

## Revision A.07.60, June 2024

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### Features

#### New Licensed Features

- Extended S-Parameters feature (F-ESP) added to allow calculation of TDR S-Parameters beyond the module bandwidth.
- Instrument Report feature (F-IREP) added to FlexDCA and FlexPLL which saves an instrument report to a XPS file (XML Paper Specification format).

#### FlexOTO Improvements

- Added the ability to view the optical path loss data during calibration.
- Added optical calibration capability to FlexOTO Stations. This calibration includes the switch connections that can be used by DUT fixtures in that station.
- Added the ability to perform and save partial optical path calibrations for both the Hardware Diagram or Stations.
- Support information for Hardware Diagram and Stations now include a screen capture (png formatted image) of the full Hardware Diagram.
- Added the ability to query over SCPI the status of a clock recovery calibration for an N107x-series DCA-M module or N1092A/B option CDR DCA-M module.

#### Measurement Improvements

- Added 50G upstream PON mask per ITU-T G.9804.3.
- Added support for Outer Extinction Ratio measurement on NRZ signals for 50G PON.
- Added Power (minimum) and Power (maximum) measurements results from PAM Pk-Pk Amplitude measurement.
- Improved Jitter mode Random Noise / Periodic Interference (RN/PI) measurement accuracy.
- Created a new TDECQ Equalizer and CTLE Measurement presets for CEI-112G-Linear.
- Added a new 800G FEC rate, 113.3457 GBd.

### Graphical User Interface Improvements

- Added the Clock Recovery baud rate measurement display to the Clock Recovery dialog.

### Other Improvements

- Marked the quadrature reference as lost whenever a CDR reset is performed, so that the PTB will be reset upon the next Autoscale.
- Added ability to enable the **Ref Clk Out 16G** port on an M8199A/B AWG and view its frequency.
- Added ability to generate clock signals with the M8199A/B's **Sample Marker Out** port.
- Factory Preset now also clears the most-recently-used lists. This includes recent setup files and DCA-X hosts.
- FlexOTO now requires a minimum of an 8-core CPU with 16 GB RAM to ensure acceptable performance.

### FlexPLL Fixes

- Made the response calibration timeout increase with the number of averages.
- Fixed an issue where the BERT pattern generator data format was set to PAM4 when a Clock pattern was selected.

### Issue Fixes

- Added questionable status to TDECQ measurement results (Low-SNR on) whenever precision timebase is enabled.
- Enabled Pattern Distortion Compensation in FlexEye, when it is enabled in FlexDCA.
- Fixed a No File Selected error that was occurring after default setup when a file had previously specified the pattern.
- Fixed the AWG optimization routine where the GUI would show the wrong symbol rate and pattern length in the AWG status control.

### Other Changes

- Provided the location for viewing the End-User License Agreement (EULA) to the More Information dialog in the **Help > About**.

### Installer Improvements

- Installer now disables CPU power throttling of FlexDCA. This ensures FlexOTO analysis isn't limited only to a CPU's set of efficiency cores.
- Installer now logs a list of the installed software for customer support troubleshooting use.
- Reduced the number of prompts and reboots during the installation process.

## SCPI Commands

### :CALibrate Subsystem

- `:CALibrate:MODule:CREcovery:STATus?` (*new, FlexOTO*)
- `:CALibrate:MODule:CREcovery:STATus:DEtails?` (*new, FlexOTO*)
- `:CALibrate:MODule:CREcovery:STATus:DTEmpErature?` (*new, FlexOTO*)
- `:CALibrate:MODule:CREcovery:STATus:TIME?` (*new, FlexOTO*)
- `:CALibrate:OPTical:CONFirm` (*new, FlexOTO*)



- :CALibrate:OPTical:PREVIOUS:MPower? (*new, FlexOTO*)
- :CALibrate:OPTical:PREVIOUS:PLOs? (*new, FlexOTO*)
- :CALibrate:OPTical:RCAMeasure (*new, FlexOTO*)
- :CALibrate:OPTical:SPARtial (*new, FlexOTO*)
- :CALibrate:OPTical:UCURrent (*removed, FlexOTO*)
- :CALibrate:OPTical:UPDate (*new, FlexOTO*)

#### :DISK Subsystem

- :EMODules:IREPort:FNAME (*new, FlexDCA & FlexPLL*)
- :EMODules:IREPort:FNAME:AUPDate (*new, FlexDCA & FlexPLL*)
- :EMODules:IREPort:FNAME:USTandard (*new, FlexDCA & FlexPLL*)
- :EMODules:IREPort:SAVE (*new, FlexDCA & FlexPLL*)

#### :EMODules Subsystem

- :EMODules:AWGenerator:CLOCK:RC16G:FREQuency? (*new, FlexDCA*)
- :EMODules:AWGenerator:CLOCK:RC16G:OENabled (*new, FlexDCA*)
- :EMODules:AWGenerator:CLOCK:SAMPle:FREQuency? (*new, FlexDCA*)
- :EMODules:AWGenerator:CLOCK:SMARker:FREQuency? (*new, FlexDCA*)
- :EMODules:AWGenerator:CLOCK:SMARker:OENabled (*new, FlexDCA*)
- :EMODules:AWGenerator:CLOCK:SMARker:RATio? (*new, FlexDCA*)

#### :MEASure Subsystem

- :MEASure:EYE:PAM:PMAX (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMAX:LOCation (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMAX:SOURce (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMAX:STATus? (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMAX:STATus:DETailS? (*new, FlexDCA*)
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- :MEASure:EYE:PAM:PMIN (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMIN:LOCation (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMIN:SOURce (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMIN:STATus? (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMIN:STATus:DETailS? (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMIN:STATus:REASon? (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMIN:THRatIo (*new, FlexDCA*)
- :MEASure:EYE:PAM:PMIN:UNITs (*new, FlexDCA*)
- :MEASure:TDEC:LMLength (*new, FlexDCA*)

#### :TDR Subsystem

- :TDR:ESParameters (*new, FlexDCA*)

# 2

## Revision A.07.50, November 2023

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### Features

#### New Licensed FlexDCA features

- Added a Low SNR measurement mode feature (licensed feature F-LSNR) to the TDECQ Equalizer.
- Added a Pulse Fit signal processing operator (licensed feature F-PFIT) which performs the linear fit defined in IEEE 802.3 Clause 85.8.3.3.5.

#### New Licensed FlexOTO features

- New fast tuning mode for measurements to facilitate DUT power tuning. Supported measurements include Outer OMA/ER, Levels, Linearity, and Average Power (licensed feature F-FTUNE).

#### FlexDCA Improvements

- Added support for the M8199B Arbitrary Waveform Generators (AWG).
- Updated TDR Mode Automatic Fixture Removal (AFR) wizard to version 2022.1.0.
- Added field-upgradable hardware option CRX to the N1092-CDR devices. This option extends the CDR data rate to span rates between 125 MBd to 64 GBd.
- Added 12-edge jitter improvements to noise handling and edge modeling to accommodate degraded 112 GBd signals.
- For TDECQ measurements, added ability to define minimum number of allowed lower- and upper-level UI runs. This supports the PON TDEC standard which requires a run of 72 ones and 72 zeros for the level measurements. These settings are saved in TDECQ measurement configuration presets (TDEC ITU 50G PON and TDEC ITU 50G PON ONU) that are located in:
  - PAM-N Analysis Setup dialog (*PAM4 TDECQ measurements*).
  - TDECQ Reference Equalizer Setup dialog (*PAM4 TDECQ measurements*).
- Added the ability to apply Extinction Ratio Correction Factors (ERCF) to input waveform memories, eye memories, and waveform signal processing math functions. This is configured in Eye/Mask mode's Configure Measurements dialog.

- Added a More message dialog to the About dialog. The new dialog shows information about third-party software licensing.

#### FlexOTO Improvements

- Added a "Fast Tuning" mode to facilitate DUT power tuning. This mode reduces the measurement time threefold for Outer OMA/ER, Levels, Linearity, and Average Power.
- Added the ability to apply Extinction Ratio Correction Factors (ERCF) to N1092x-series DCA-M input channels. In FlexOTO's Hardware Diagram, click on a N1092x block to open the N1092x Setup dialog.
- For an Optical Calibration, the maximum Average Optical Power setting has been increased to 5 mW.
- A list of measurement results is now embedded in eye diagram images.
- Multiple improvements to Job Timing diagram usability.
- Gridline background added to hardware diagram. Use the Display Setup dialog to hide or show the grid.
- FlexOTO's DUT Fixture blocks on the hardware diagram now indicate the assigned Station number.
- The \*OPT? SCPI query now returns options for both FlexOTO *and* FlexDCA.

#### FlexPLL Fixes

- JSA Spectrum display in FlexDCA no longer hidden after relocking the CDR from FlexPLL.
- Low frequency corrected data was being saved to memories no longer causes the correction to be being doubly calculated and applied for response memories.
- Calibration status no longer gives error "*No remote DCA connected*" after one was connected.
- Using N8020A / M8040A as FlexPLL Jitter Source with M8070B version 10.0.110.4 now supported.

#### FlexDCA Issue Fixes

- Corrected Mask margin for 50G PON - ITU G.9804.3.
- Changed AWG automatic update default setting to off to prevent an AWG update from being triggered when FlexDCA performed a default setup.
- Improved alignment of Feed Forward equalizer input to output.
- Added a DTA message (213) and module status to indicate when an upgrade is available for "CDR 2019," the FPGA update that allows fast JSA and loop tuning.

## SCPI Commands

#### :Common Commands

- \*OPT? (*changed, FlexOTO*)

#### :DISPlay Subsystem

- :DISPlay:HWDiagram:GRID (*new, FlexOTO*)

#### :EMODules Subsystem

- :EMODules:AWGenerator:AUPDate (*changed, FlexDCA*)

#### :JOBS Subsystem

- :JOBS:CONFig:FTUNing? (*new, FlexOTO*)

:MEASure Subsystem

- :MEASure:ERATio:FUNCTio:ACFactor (*new, FlexDCA*)
- :MEASure:ERATio:FUNCTio:CFACTOR (*new, FlexDCA*)
- :MEASure:ERATio:FUNCTio:OERFactor (*new, FlexDCA*)
- :MEASure:ERATio:WMEMory:ACFactor (*new, FlexDCA*)
- :MEASure:ERATio:WMEMory:CFACTOR (*new, FlexDCA*)
- :MEASure:ERATio:WMEMory:OERFactor (*new, FlexDCA*)
- :MEASure:ERATio:CGMemory:ACFactor (*new, FlexDCA*)
- :MEASure:ERATio:CGMemory:CFACTOR (*new, FlexDCA*)
- :MEASure:ERATio:CGMemory:OERFactor (*new, FlexDCA*)
- :MEASure:TDEC:MRUN:ONE (*new, FlexDCA*)
- :MEASure:TDEC:MRUN:ZERO (*new, FlexDCA*)
- :MEASure:TDEQ:MRUN:THRee (*new, FlexDCA*)
- :MEASure:TDEQ:MRUN:ZERO (*new, FlexDCA*)

:SPRocess Subsystem

- :SPRocess:PFIT:DELay (*new, FlexDCA*)
- :SPRocess:PFIT:DISPlay (*new, FlexDCA*)
- :SPRocess:PFIT:LENGth (*new, FlexDCA*)
- :SPRocess:PFIT:ZPAD (*new, FlexDCA*)
- :SPRocess:TEQualizer:LSNR (*new, FlexDCA*)

:TPRogram Subsystem

- :TPRogram:SETUP:FTUNing (*new, FlexOTO*)
- :TPRogram:SETUP:EDIMage:SRESuLts (*new, FlexOTO*)
- :TPRogram:SLINe:FTUNing (*new, FlexOTO*)
- :TPRogram:SLINe:EDIMage:SRESuLts (*new, FlexOTO*)

# 3

## Revision A.07.41, June 2023

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### FlexDCA Issues Fixed

- Pattern detection failed intermittently for 12-edge jitter measurements.
- AFR Wizard dialog controls now operate correctly.
- Fixed an issue where the help button on the AFR dialog was showing the incorrect help topic.

### FlexPLL Issues Fixed

- FlexPLL Calibration would not successfully run in A.07.40 due to JSA not being re-enabled after CDR relock.
- FlexPLL would incorrectly limit the 81160A channel 2 maximum frequency to 50 MHz.

### FlexOTO Issues Fixed

- Improved the acquisition time when making average power and TDECQ measurements together.
- FlexOTO switch connection would sometimes timeout during startup for N1002A demo units with the internal optical switch.

### Compatibility Fixes

- Added compatibility to FlexDCA for the CCL v5.5.2 Keysight License Service.

# 4

## Revision A.07.40, April 2023

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### Features

#### New features

- Added new FlexOTO (Optical Test Optimizer) application with support for optical switches. Requires a L-OTO17, L-OTO48, or L-OTO128, or L-OTO package license and a Manufacturing (L-MFG) or Research and Development (L-RND) package license.
- Added new Raised Cosine Signal Processing operator.
- Added support for the M8199A arbitrary waveform generator.
- For FlexPLL, added PCIe Gen6 System Setup Presets.

#### New licensed features for FlexDCA application

- Feature-JSA, Jitter Spectrum Analysis and SW Clock Recovery Emulation, for the Research and Development (L-RND) and Signal Integrity (L-SNT) package licenses. Feature-JSA replaces the JSA hardware option which will continue to be honored.
- Feature-SKP (Specified Known Pattern), provides the ability to specify the pattern for equalizers and jitter mode. This feature is available with the Manufacturing (L-MFG) and Research and Development (L-RND) package licenses.
- Feature F-SWITCH direct control of an optical switch.

#### New licenses to support new FlexOTO application

- Licenses L-OTO17 and L-OTO17T N1002014A *17-Port Switch Package Licenses* that enables the use of an optical switch (*up to 17 ports*) with FlexOTO.
- Licenses L-OTO48 and L-OTO48T N1002048A *48-Port Switch Package Licenses* that enables the use of an optical switch (*up to 48 ports*) with FlexOTO.
- Licenses L-OTO128 and L-OTO128T N1002128A *128-Port Switch Package Licenses* that enables the use of an optical switch (*up to 128 ports*) with FlexOTO.
- License L-OTO and L-OTOT N1002000A without switch control.

## Measurement Improvements

- Improved FlexDCA Clock Distortion Compensation for TDECQ and other eye diagram measurements. Requires Pattern Lock and acquire Entire Pattern and clock recovery in one of the following modules: N1092x-CDR, N1076B, N1077B, N1078A, N1078B, N1060A.
- Increased significant digits in the Timebase Position and Function Horizontal Position, which required increased significant digits in the horizontal aspects of Markers, Measurement Regions, Histograms, and Limit Lines. Updated associated GUI numeric entry controls and corresponding SCPI commands.
- Added the IEEE 802.3bs amendment presets to TDECQ and TDECQ equalizer.

## Issues Fixed

- Fixed the *"Unable to load the AFR Wizard"* error.
- Fixed Autoscale detecting an incorrect symbol rate until the PTB Reset Time Reference is clicked.
- Fixed an issue in the FlexDCA measurement results list where the channel source icon would not respond to mouse clicks if the measurement result item happened to be selected.
- Fixed Oscilloscope Mode Frequency measurement that did not take into account the proper resolution from the *Time At Edge* measurement.
- Fixed the invalid calibration time and temperature values being returned by the SCPI `:CALibrate:OPTical:FACTory:CHANnel:STATus:TIME?` and `:CALibrate:OPTical:FACTory:CHANnel:STATus:DTEMPerature?` queries.

## User Interface Improvements

- Updated FlexDCA's trace colors in response to research on color perception including the common forms of color blindness.
- FlexDCA's Waveform Pixel Intensity feature can now be applied to charts and graphs. For example, S-Parameters, T-Parameters, and the output of the FFT Transforms math operator can now benefit from the setting.
- Numeric entry controls now scale the displayed numeric value to avoid any "clipping" of the displayed value.
- Updated style used in measurement results windows, marker windows, and SCPI server setup dialogs.
- Updated the scroll bar look and feel for all applications.

## Installer Updates

- Updated Keysight Host Processor Platform version to 5.4.28818.10257.
- Updated Keysight License Manager and Keysight License Service to version 5.5.1.
- Added installer check for the Sectigo Intermediate Certificate.
- To avoid duplicate firewall rules, the installer now removes all existing FlexDCA firewall rules before creating the ones needed.

## SCPI Commands

- Changed the SCPI for the noise processing settings (noise processing mode, bandwidth, and bandwidth/auto) to be auto-generated for each relevant operator.
- The SCPI parser now uses 15 significant digits when representing floating-point numbers.

## :FRAMe Subsystem

- :FRAMe:SWITch:ROUte (*new, FlexDCA*)
- :FRAMe:SWITch:ROUte:LIST? (*new, FlexDCA*)
- :FRAMe:SWITch:ROUte:VSET? (*new, FlexDCA*)
- :FRAMe:SWITch:VERify:CANce1 (*new, FlexDCA*)
- :FRAMe:SWITch:VERify:CHANnel (*new, FlexDCA*)
- :FRAMe:SWITch:VERify:CONTinue (*new, FlexDCA*)
- :FRAMe:SWITch:VERify:SDONE? (*new, FlexDCA*)
- :FRAMe:SWITch:VERify:STARt (*new, FlexDCA*)
- :FRAMe:SWITch:WAVelength (*new, FlexDCA*)

## :FUNction Subsystem

- :FUNction:FOPerator (*changed, FlexDCA*)
- :FUNction:PATTern:FILE:GCODe (*new, FlexDCA*)
- :FUNction:PATTern:FILE:NAME (*new, FlexDCA*)
- :FUNction:PATTern:FILE:RELoad (*new, FlexDCA*)
- :FUNction:PATTern:FORMat (*new, FlexDCA*)
- :FUNction:PATTern:KPATtern (*new, FlexDCA*)
- :FUNction:PATTern:MODE (*new, FlexDCA*)
- :FUNction:PATTern:TRACKing (*new, FlexDCA*)

## :MEASure Subsystem

- :MEASure:JITTer:DEFine:PATTern:FILE:GCODe (*new, FlexDCA*)
- :MEASure:JITTer:DEFine:PATTern:FILE:NAME (*new, FlexDCA*)
- :MEASure:JITTer:DEFine:PATTern:FILE:RELoad (*new, FlexDCA*)
- :MEASure:JITTer:DEFine:PATTern:FORMat (*new, FlexDCA*)
- :MEASure:JITTer:DEFine:PATTern:KPATtern (*new, FlexDCA*)
- :MEASure:JITTer:DEFine:PATTern:MODE (*new, FlexDCA*)
- :MEASure:JITTer:DEFine:PATTern:TRACKing (*new, FlexDCA*)

## :SLOT Subsystem

- :SLOT:SWITch:VERify:CANce1 (*new, FlexDCA*)
- :SLOT:SWITch:VERify:CHANnel (*new, FlexDCA*)
- :SLOT:SWITch:VERify:CONTinue (*new, FlexDCA*)
- :SLOT:SWITch:VERify:SDONE? (*new, FlexDCA*)
- :SLOT:SWITch:VERify:STARt (*new, FlexDCA*)

## :SPRocess Subsystem

- :SPRocess:RCOSine:FSTARt (*new, FlexDCA*)
- :SPRocess:RCOSine:FEND (*new, FlexDCA*)
- :SPRocess:RCOSine:PNOise (*new, FlexDCA*)
- :SPRocess:RCOSine:PNOise:BANDwidth (*new, FlexDCA*)
- :SPRocess:RCOSine:PNOise:BANDwidth:AUTO (*new, FlexDCA*)



# 5

## Revision A.07.00, September 2022

### Features

#### New features

- Added support for the new N1032A (single channel) and N1032B (dual channel) optical DCA-X modules with 120 GHz optical bandwidth.
- Added support for device-locked licenses.

#### New measurement improvements

- Added direct support within FlexDCA for controlling optical switch paths on supported switches. Requires a Manufacturing (L-MFG) or Research and Development (L-RND) package license.
- Added support for Jnu<sub>03</sub>, a new Output Jitter measurement definition for TP2 (Clause 162, 163) per IEEE 802.3ck Draft 3.1. The new measurement is on by default but requires licensed feature "F-C03", Output Jitter Measurements on Composite Histogram of R03/F30 Edges.
- Added clock pattern distortion compensation feature "F-PCOM" which can be applied to jitter measurements and TDECQ acquisition corrections.
- Added the 50G PON mask files for G.9804.3.

#### New FlexPLL improvements

- Fixed BERT connection timeout issue if there was also an Error Detector in the same AXIe chassis.
- Added dB representation of response magnitude to .csv response files.
- Added *Peaking Frequency* measurement to FlexPLL for responses and response memories. Renamed *Peaking* measurement to *Peaking Magnitude*.

#### Installer Updates

- Keysight License Manger updated to v5.4.1.1509 to support device-locked licenses.
- Pathwave License Manger updated to v2.6.0 to support device-locked licenses.

## Issues Fixed

- Fixed issue causing “Noise processing not configured correctly or insufficient samples per UI” error message to be displayed.
- Fixed N1060A Dark Level Calibration when in differential mode causing NaN to be displayed.
- Added gridlines to the Jitter Mode SER Jitter Bathtub and SER Amplitude Bathtub graphs.
- Fixed a problem with the transition times measurement causing bad results with closed eyes.
- Fixed screen capture to bring the main window into focus.

## SCPI Commands

### :EMODules Subsystem

- :EMODules:SWITch:PORT (*new, FlexDCA*)
- :EMODules:SWITch:SADdress (*new, FlexDCA*)
- :EMODules:SWITch:VADdress (*new, FlexDCA*)

### :MEASure Subsystem

- :MEASure:OSCilloscope:PPHRatio (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:LOCation? (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:REGion (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:SOURce (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:STATus? (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:STATus:DETailS? (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:STATus:REASon? (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:THRatio (*new, FlexDCA*)
- :MEASure:OSCilloscope:PPHRatio:UNITs (*new, FlexDCA*)
- :MEASure:RESPonse:PFRequency (*new, FlexPLL*)
- :MEASure:RESPonse:PFRequency:STATus? (*new, FlexPLL*)
- :MEASure:RESPonse:PFRequency:STATus:REASon? (*new, FlexPLL*)
- :MEASure:RMEMemory:PFRequency (*new, FlexPLL*)
- :MEASure:RMEMemory:PFRequency:STATus? (*new, FlexPLL*)
- :MEASure:RMEMemory:PFRequency:STATus:REASon? (*new, FlexPLL*)

### :SLOT Subsystem

- :SLOT:SWITch:ROUte (*new, FlexDCA*)
- :SLOT:SWITch:ROUte:LIST (*new, FlexDCA*)
- :SLOT:SWITch:ROUte:VSET (*new, FlexDCA*)
- :SLOT:SWITch:WAVElength (*new, FlexDCA*)

### :TIMebase Subsystem

- :TIMebase:PDCompensate (*new, FlexDCA*)

# 6

## Revision A.06.92, May 2022

### Measurement Improvements

- Changed the Baud rate for 128G Fibre Channel from 56.6 GBd to 56.1 GBd, per draft 0.4 of FC-PI-8.
- Added 18.75 GHz as a SIRC filter option for 50G PON TDEC.

### Issues Fixed

- Resolved a FlexPLL connection timeout issue for the Keysight M8070B BER Test System Software.
- Updated the names of the 802.3db TDECQ presets so that the VR wavelength ranges begin at 842 nm.
- Corrected precursor limit for the 802.3db presets to be 3 instead of 4.
- The TDEC OMA calculation now works correctly for NRZ signals.
- TDEC now properly provides invalid or questionable statuses when the intrinsic noise makes the result unreliable.
- N1076A, N1076B, N1077A, and N1078A DCA-M modules with serial prefix MY62290101 and above require FlexDCA revision A.06.92 or later.

# 7

## Revision A.06.91, March 2022

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### Features

- Added support for the new N1077B 64 GBd Multimode Optical/Electrical Clock Recovery DCA-M.

### Issues Fixed

- Optional user calibrations (Timebase, Dark, and Optical) now use the Info icon instead of the Error icon if these calibrations have never been performed.
- FlexPLL now extends the maximum swept jitter frequency from 40 MHz to 100 MHz.
- An eye mask test did not properly work if the mask file contained only one region.

### SCPI Commands

:DISPlay Subsystem

- :DISPlay:GRAPh:X:STOP (*FlexPLL, changed*)

# 8

## Revision A.06.90, January 2022

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### Features

#### New licensed features under N1010100A and N1010200A

- New licensed feature F-MMFE for the multimode fiber emulation in TDECQ for 802.3db. Configure by selecting the modal dispersion filter in the TDECQ operator.

#### New features and measurement improvements

- Enhanced TDEC measurement to support ITU 50G PON including the ability to set the One Level Noise Gain.
- Enhanced TDEC measurement by adding a selection to measure OMA on a waveform that is the output of an equalizer.
- Jitter Mode's amplitude level width threshold settings for PAM4 signals now include the ability to select a Boxcar or Gaussian window shape per IEEE 802.3ck. Gaussian windows can be defined by standard deviation.
- In Jitter mode, added Gaussian window support for eye height and VEC, required for IEEE 802.3ck Draft 2.3.
- Improved the consistency of the pulse-response-based DFE optimization, leading to significantly better VEC repeatability downstream.
- Improved consistency of Jnu measurement on stressed eyes (with added sinusoidal jitter).
- Improved the agreement between the per-edge J3u/J4u and the "All" result when doing noise compensation.
- Added SINC interpolation of the pulse response to the DFE optimization.
- Updated IEEE 802.3ck demo setup file to match Draft 2.3.

### CDR Improvements

- Improved the accuracy of loop bandwidth tuning for the N1076B, N1078A, N1060A, and N1092A/B clock recovery modules.

## Issues Fixed

- Added new error message 47 indicating that a screen image capture failed because the resulting bitmap image is blank (all one color).
- In Jitter Mode, removed the **Average** selection for smoothing from the Acquisition dialog.
- Fixed FlexPLL Peaking measurement reporting a questionable value (“---“) for devices with 0 dB of peaking.
- A required change to the following current production products resulted in a requirement that, for these module versions, FlexDCA be updated to firmware version A.06.90. The serial numbers for the effected products:
  - N1000A DCA-X serial number  $\geq$  MY62100101
  - N1092A/B/C/D/E serial number  $\geq$  MY62100101
  - N1094A/B serial number  $\geq$  MY62100101
  - N1060A serial number  $\geq$  MY62100101 or  $\geq$  US62100101
  - N1046A serial number  $\geq$  US62100101
  - N1045B serial number  $\geq$  MY62100101
  - N1040A serial number  $\geq$  US62100101
  - N1030A/B serial number  $\geq$  US62100101

## Additional Updates

- Ended support for 86100D's Compatibility mode.
- Ended support for a remote connection from a PC (N1010A) to an 86100D running the legacy user interface.

## SCPI Commands

### :MEASure Subsystem

- :MEASure:JITTer:DEFine:LWIDth:WINDow (*new, FlexDCA*)
- :MEASure:JITTer:DEFine:LWIDth:WINDow:GSDPercent (*new, FlexDCA*)
- :MEASure:TDEC:OLNGain (*new, FlexDCA*)

### :SPRocess Subsystem

- :SPRocess:TEQualizer:FIBer:BANDwidth (*new, FlexDCA*)
- :SPRocess:TEQualizer:FIBer:ENABle (*new, FlexDCA*)

# 9

## Revision A.06.81, September 2021

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### Issues Fixed

- Fixed index out of range exception that could occur in the DFE pulse response optimization.
- Resolved a null reference due to 802.3ck noise handling changes during certain signal processing network changes while in jitter mode.
- Cleaned up exception handling and added cases for an Unauthorized Access Exception in the SIRC file loading code.
- Fixed the transparent dialog background feature which was not working properly.
- Re-formatted the updated Keysight End User License Agreement for better readability

### Measurement Improvements

- Improved the DFE optimization to reduce the VEC measurement variability.
- CDR Lock: Changed the amount of Offset DAC movement when trying to detect/reject a frequency lock condition.
- Fixed a slight error in the propagation of intrinsic noise from the sampler and SIRC when the ACGain term is used.

### FlexPLL Fixes and Improvements

- Changed the Jitter Pk-Pk value in all Gen4 and Gen5 presets to 7ps per the PCIe Test Specification.
- Fixed an issue where the jitter source settings were getting defaulted after restart.
- FlexPLL now resets the M8020A BERT global output, global impairments, and global SSC whenever acquisition is restarted, a calibration is started, or the CDR relocks.

## SCPI Commands

### :CALibrate Subsystem

In FlexPLL, added the following SCPI queries to determine if there are any clock data recovery settings that need to be updated to match the loaded calibration.

- `:CALibrate:RESPonse:CREcovery:LOAD:ENABled?` (*new, FlexPLL*)
- `:CALibrate:RESPonse:JSOurce:LOAD:ENABled?` (*new, FlexPLL*)

### :DISK Subsystem

In FlexPLL, added the ability to query screen capture data over SCPI in specified file format.

- `:DISK:SIMage:SAVE:BINary?` (*new, FlexPLL*)

### :SYSTem Subsystem

IN FlexDCA and FlexRT, added the following command to delete all defined Waveform Signal Processing functions.

- `:SYSTem:FUNCTions:OFF` (*new, FlexDCA and FlexRT*)



# 10

## Revision A.06.80, July 2021

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### Features

- Installs Keysight's Pathwave License Manager to manage server-based (floating) licenses and USB dongle-based licenses.

New licensed measurements to support IEEE 802.3ck under N1010100A:

- New FlexDCA support for 802.3ck extension Draft 2.0:
  - Allows DFE sampling phase (ts) to be used in jitter mode as the timing threshold
  - Allows maximum and minimum limits on taps (bbmin(n) and bbmax(n)) on Decision Feedback Equalizer operator
  - Enhanced demo setup file to use the new jitter threshold preset and Decision Feedback Equalizer operator's preset

New standard features to support other applications under N1010100A:

- New FlexDCA transition time measurements for electrical signals for compliant "112G" measurements, based on the methodology described by IEEE 802.3-2018 Annex 120E.3.1.5.
- New FlexDCA 12-Edge Output Jitter support for Jnu measurement probabilities down to J9u.

New standard features under N1010100A and N1010200A:

- Improved the speed of the TDECQ calculations. On most systems the TDECQ calculations can be performed in less than half the time of prior releases. Note that the time it takes to acquire the waveform is unchanged.
- New FlexDCA feature (F-FDR) for pattern lock divide ratios that are not integer divisors of the symbol rate. This capability is supported by N1000A and DCA-M modules with regular pattern lock (not RapidEye or FlexEye). While using this feature, pattern parameters cannot be autodetected. F-FDR is included in both the Manufacturing (N1010200A) and Research and Development (N1010100A) package licenses.

New licensed feature FlexPLL under N1010300A:

- New ability of FlexPLL to select PAM4 modulation on the source signal when using a supported M8000 series BERT.
- New Documentation Wizard for FlexPLL.
- New support for 81150A jitter source.
- New 01010 and SSPRQ patterns added to the BERT patterns list.
- Expanded FlexPLL's reporting of messages on the display and messages returned over remote SCPI queries.

## Notes

- New FlexDCA ability, over the remote SCPI interface, to perform an autoscale of only the waveform's vertical axis or horizontal axis.
- The OMA at Crossing measurement can now be reported in dBm.

## Issues Fixed

- Fixed a FlexDCA issue if you attempted to load the same limit line file after a default setup from remote, it would not load.
- Fixed a FlexDCA display issue where graticule labels in Eye mode measurements would have black backgrounds when the graticule colors were inverted.
- Fixed a display issue that would sometimes clip the bottom of descender letters in the header text.
- Fixed FlexDCA issues in FlexEye session startup/shutdown that could have caused orphaned sessions of FlexDCA on a PC.
- Fixed an intermittent connection loss issue with the HiSLIP SCPI Server when starting multiple FlexEye sessions.
- Changed the DDJ (Data Dependent Jitter) and TJ (Total Jitter) histograms to align based on the eye center threshold time. This fixed some cases where the histograms would clip unexpectedly for PAM4 signals.
- Fixed an issue causing the PJ (**δ-δ**) to be under reported due to amplitude noise present in RJ (rms).
- Fixed FlexPLL issue where FlexPLL would get desynchronized with the BERT, if the user tried to set the System Clock Rate to a value > 12 GHz.
- Fixed FlexPLL setting the upper limit on Number of Averages during a calibration to four.
- Changed FlexPLL's calibration to acquire points from left to right.
- Fixed FlexPLL graph legend to show correct icon when Response1 is uncalibrated.
- Improved repeatability of the pulse optimization step to find (ts). Typically this change will only affect relatively clean or over-equalized signals.
- On FlexPLL, modified the name of all 81160 presets to 81150A-60A to indicate that they also work with the Keysight 81150A Pulse Function Arbitrary Noise Generator.
- N1000A would display a warning message in clock trigger if the trigger frequency was below 100 MHz. This was incorrect, the limit is 50 MHz.

## Additional Updates

- FlexPLL now uses Averaging during calibration, even if Averaging setting is disabled.
- FlexPLL now clears the graph when a setup is recalled or CDR is relocked.

- FlexPLL's PLL manual loop parameters (Gain Frequency, Zero Frequency, and Pole Frequency) now have a minimum value of 1 Hz.
- Removed the visual in the **About** dialog that displayed a miniature image of the currently running application. When possible, increased the height of the scrollable areas that show System Info, etc.
- The Alt+F4 keyboard shortcut for FlexEye is now ignored.
- Removed menu item to exit FlexEye sessions.
- Changed the Event log size to 32 MB maximum size for all three Flex event logs.
- Added the following new instrument messages. Instrument messages are displayed at the bottom of the display and are returned by the `:SYSTEM:ERROR:NEXT?` command.
  - 164. The PathWave License Service is still initializing. This can take a few minutes.
  - 165. PathWave License Service Error.

## SCPI Commands

### :CALibrate Subsystem

- `:CALibrate:CHANnel:NOISe?` (*new, replaces :CHANnel:NOISe?, FlexDCA and FlexRT*)

### :CHANnel Subsystem

- `:CHANnel:NOISe?` (*deprecated, FlexDCA and FlexRT*)

### :CRECovery Subsystem

- `:CRECovery:MNUMber` (*new, FlexPLL*)
- `:CRECovery:SNUMber` (*new, FlexPLL*)

### :DISK Subsystem

- `:DISK:DWIZard:FNAME` (*new, FlexPLL*)
- `:DISK:DWIZard:SAVe` (*new, FlexPLL*)
- `:DISK:DWIZard:SMResults` (*new, FlexPLL*)
- `:DISK:DWIZard:SRESponses` (*new, FlexPLL*)
- `:DISK:DWIZard:SSCREEN` (*new, FlexPLL*)
- `:DISK:DWIZard:SSETup` (*new, FlexPLL*)
- `:DISK:DWIZard:SSINfo` (*new, FlexPLL*)
- `:DISK:DWIZard:WAVE:IINTERNAL` (*new, FlexPLL*)

### :JSORce Subsystem

- `:JSORce:FORMat` (*new, FlexPLL*)
- `:JSORce:MNUMber` (*new, FlexPLL*)
- `:JSORce:MODuLe:MNUMber` (*new, FlexPLL*)
- `:JSORce:MODuLe:SNUMber` (*new, FlexPLL*)
- `:JSORce:SNUMber` (*new, FlexPLL*)

### :MEASure Subsystem

- `:MEASure:EYE:OMAXp:UNITs` (*new, FlexDCA and FlexRT*)

:SPROcess Subsystem

- :SPROcess:DFEQualizer:PROPTimize:BMIN (*new, FlexDCA and FlexRT*)
- :SPROcess:DFEQualizer:PROPTimize:LTMagnitudes (*new, FlexDCA and FlexRT*)

:SYSTem Subsystem

There is no equivalent graphical user interface menu items for the new :SYSTem:AUToscale:HORizontal and :SYSTem:AUToscale:VERTical SCPI commands.

- :SYSTem:AUToscale:HORizontal (*new, FlexDCA and FlexRT*)
- :SYSTem:AUToscale:VERTical (*new, FlexDCA and FlexRT*)
- :SYSTem:SOFTware:LICenses:BORRow? (*new, FlexDCA, FlexRT, and FlexPLL*)
- :SYSTem:SOFTware:LICenses:REFresh (*new, FlexDCA, FlexRT, and FlexPLL*)
- :SYSTem:SOFTware:LICenses:RETurn? (*new, FlexDCA, FlexRT, and FlexPLL*)

:TRIGger Subsystem

- :TRIGger:CRATe (*new, FlexDCA and FlexRT*)
- :TRIGger:DCDRatio:FRACTion (*new, FlexDCA and FlexRT*)
- :TRIGger:DCDRatio:TYPE (*new, FlexDCA and FlexRT*)

# 11

## Revision A.06.71, February 2021

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### New Features

- Support for 50G PON LPRC filter for N109x-40A.

### Other Updates

- Changed the lower bound of the 225 band for the N107x-series CDR from 25.6 GBd to 25.0 GBd.
- Changed the way Flex determines which browser to use when displaying the Help files.
- Updated FlexRT maximum filter rate with a Bessel to 66% of the scope bandwidth.
- Updated FlexRT for required Infiniium version of 10.25.1302.

### Measurement Improvements

- Changed the CDR PLL loop bandwidth model to address loop bandwidth accuracy divergence.

### Customer Issues Fixed

- Fixed a crash when a mask definition file is loaded with mismatch in number of vertices between the mask and margin definitions.
- Fixed an issue where graticule labels in Eye mode measurements would have black backgrounds when the graticule colors were inverted
- For FlexPLL, fixed an issue where FlexPLL would lose synchronization with the BERT if the user tried to set the System Clock Rate to a value greater than 12 GHz.

## :SLOT Subsystem (*FlexDCA*)

Added `:SLOT:TRIGger:RSYMBOL:AUTodetect` and `:SLOT:TRIGger:RSYMBOL:SCTimebase` commands for DCA-M modules that have triggering capability.

- `:SLOT:TRIGger:RSYMBOL:AUTodetect.htm` (*new*)
- `:SLOT:TRIGger:RSYMBOL:SCTimebase.htm` (*new*)

## :TRIGger Subsystem (*FlexDCA and FlexRT*)

Deprecated the `:TRIGger:PALign` and `:TRIGger:SRSYMBOL` commands and replaced them with the equivalent `:TRIGger:RSYMBOL:AUTodetect` and `:TRIGger:RSYMBOL:SCTimebase` commands.

- `:TRIGger:RSYMBOL:AUTodetect.htm` (*new*)
- `:TRIGger:RSYMBOL:SCTimebase.htm` (*new*)
- `:TRIGger:PALign` (*deprecated*)
- `:TRIGger:SRSYMBOL` (*deprecated*)

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## Revision A.06.70, December 2020

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### New Licensed Features (Feature Date: 2020.1215)

#### N1010100A R&D SW Package

- New FlexRT feature (F-INF) in FlexDCA that enables FlexDCA on a PC to connect to a Keysight UXR oscilloscope and perform TDECQ, Eye mode measurements, and Scope mode measurements on the oscilloscope's waveforms. You can take advantage of Keysight's new N7005A 60 GHz optical-to-electrical converter to perform optical measurements such as TDECQ (Transmitter and Dispersion Eye Closure Quaternary).

**NOTE**

A license is not required when FlexRT is run on a UXR-series oscilloscope.

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- New 802.3cu Transmitter Power Excursion measurement for Eye mode.

#### N1010200A MFG SW Package

- New 802.3cu Transmitter Power Excursion measurement for Eye mode.

#### N1010300A SI SW Package

- New FlexPLL jitter transfer measurement application for characterizing the jitter response of a Device Under Tests (DUT) PLL.

### Measurement Improvements

- Updated TDECQ measurement in Open Eye MSA/request to support Revision 3.0 of std of MSA
- Made the AWG Optimize routine use parallel processing. Improves the speed of an SSPRQ optimization
- Added support for the following standard data rates (50G PON line rates):
  - ITU-T PON (12.44160000 GBd)
  - ITU-T PON (24.88320000 GBd)
  - ITU-T PON (49.76640000 GBd)

## Defects Fixed

- Fixed a problem with the align operator and the SSPRQ

## Other Updates

- Updated On-Screen Keyboard for easier use
- N1000A now defaults to use the Microsoft Edge browser (if installed) to view Help files

## :CHANnel Subsystem

- :CHANnel:RTSCope:INTerpolate:FACTor (*new*)
- :CHANnel:RTSCope:INTerpolate:METHod (*new*)
- :CHANnel:RTSCope:INTerpolate:SPUI (*new*)
- :CHANnel:RTSCope:SPUI (*new*)
- :CHANnel:RTSCope:SRATe (*new*)
- :CHANnel:RTSCope:SRATe:AUTodetect (*new*)
- :CHANnel:RTSCope:TRACk (*new*)
- :CHANnel:SCRecovery:DEMethod (*new*)
- :CHANnel:SCRecovery:PLLoop:FGAIIn (*new*)
- :CHANnel:SCRecovery:PLLoop:FPOLe (*new*)
- :CHANnel:SCRecovery:PLLoop:FZERo (*new*)
- :CHANnel:SCRecovery:PLLoop:JTF:BANDwidth (*new*)
- :CHANnel:SCRecovery:PLLoop:JTF:PEAKing (*new*)
- :CHANnel:SCRecovery:PLLoop:MODE (*new*)
- :CHANnel:SCRecovery:PLLoop:OJTF:BANDwidth (*new*)
- :CHANnel:SCRecovery:PLLoop:OJTF:DFACTor (*new*)
- :CHANnel:SCRecovery:PLLoop:ORDer (*new*)
- :CHANnel:SCRecovery:STATe (*new*)

## :CRECovey Subsystem

- :CRECovey:JSANalysis:PLLoop:JTF:BANDwidth (*new*)
- :CRECovey:JSANalysis:PLLoop:OJTF:BANDwidth (*new*)
- :CRECovey:JSANalysis:PLLoop:JTF:BWIDth (*deprecated*)
- :CRECovey:JSANalysis:PLLoop:OJTF:BWIDth (*deprecated*)

## :JSAMemory Subsystem

- :JSAMemory:PLLoop:JTF:BANDwidth (*new*)
- :JSAMemory:PLLoop:OJTF:BANDwidth (*new*)



- :JSAMemory:PLLoop:JTF:BWIDth (*deprecated*)
- :JSAMemory:PLLoop:OJTF:BWIDth (*deprecated*)

## :MEASure Subsystem

- :MEASure:EYE:PAM:TPEXcursion (*new*)
- :MEASure:EYE:PAM:TPEXcursion:LOCation (*new*)
- :MEASure:EYE:PAM:TPEXcursion:SOURce (*new*)
- :MEASure:EYE:PAM:TPEXcursion:STATus (*new*)
- :MEASure:EYE:PAM:TPEXcursion:STATus:DETailS (*new*)
- :MEASure:EYE:PAM:TPEXcursion:STATus:REASon (*new*)
- :MEASure:EYE:PAM:TPEXcursion:THRatio (*new*)
- :MEASure:EYE:PAM:TPEXcursion:UNITs (*new*)

## :RTSCOpe Subsystem

- :RTSCOpe:CONNect (*new*)
- :RTSCOpe:CONNect:HOST (*new*)
- :RTSCOpe:CONNect:STATe (*new*)
- :RTSCOpe:DISConnect (*new*)

## :SYSTem Subsystem

- :SYSTem:HREVision? (*new*)

## :TIMEbase Subsystem

- :TIMEbase:RTSCOpe:INTerpolate:AUTO (*new*)
- :TIMEbase:RTSCOpe:INTerpolate:FACTor (*new*)
- :TIMEbase:RTSCOpe:INTerpolate:METHod (*new*)
- :TIMEbase:RTSCOpe:INTerpolate:SPUI (*new*)
- :TIMEbase:RTSCOpe:SPUI (*new*)
- :TIMEbase:RTSCOpe:UIRange (*new*)
- :TIMEbase:RTSCOpe:UIRange:AUTO (*new*)
- :TIMEbase:RTSCOpe:XRANge (*new*)
- :TIMEbase:RTSCOpe:XRANge:AUTO (*new*)
- :TIMEbase:SCRecovery:DEMethod (*new*)
- :TIMEbase:SCRecovery:PLLoop:FGAln (*new*)
- :TIMEbase:SCRecovery:PLLoop:FPOLe (*new*)
- :TIMEbase:SCRecovery:PLLoop:FZERo (*new*)
- :TIMEbase:SCRecovery:PLLoop:JTF:BANDwidth (*new*)
- :TIMEbase:SCRecovery:PLLoop:JTF:PEAKing (*new*)
- :TIMEbase:SCRecovery:PLLoop:MODE (*new*)

- :TIMebase:SCRecovery:PLLoop:OJTF:BANDwidth (*new*)
- :TIMebase:SCRecovery:PLLoop:OJTF:DFACTOR (*new*)
- :TIMebase:SCRecovery:PLLoop:ORDER (*new*)
- :TIMebase:SCRecovery:STATe (*new*)

# 13

## Revision A.06.61, October 2020

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### New Features

- Updated the Open Eye MSA preset file for TDECQ.

### Defects Fixed

- Fix for JSA Acquisition limits waveform count staying at zero under certain conditions.
- Fix for XY Format file save dialog defaulting the filename extension.
- Fix for saving a De-embedding file without a filename extension.

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## Revision A.06.60, August 2020

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### New Features

- PAM4 eye mask testing with four supplied Open Eye MSA PAM4 masks.
- New Eye Mode Measurements:
  - IEEE 802.3ck Vertical Eye Closure (VEC) PAM4 and NRZ measurement.
  - IEEE 802.3cu PAM4 overshoot measurement.
  - IEEE 802.3cu PAM4 undershoot measurements.
  - IEEE 802.3cu PAM Pk-Pk amplitude measurement.
- New Jitter Mode Measurements:
  - IEEE 802.3ck Vertical Eye Closure (VEC) PAM4 and NRZ measurement.
- Added Five new licensed features:
  - Pulse response optimization enhancements to Decision Feedback Equalizer operator (F-DFE)
  - New Eye and Jitter mode Vertical Eye Closure measurements (F-VEC)
  - Ability to apply eye masks to PAM waveforms (F-PMASK)
  - In Eye mode, ability to perform PAM4 Pk-to-Pk Amplitude, PAM4 Overshoot, and PAM4 Undershoot measurements at hit ratio (F-PEAK)
  - Enhancements to the Random Noise/Jitter Waveform Signal Processing math operator (F-RAN).
- For the following Waveform Signal Processing math operators, added ability to preserve a signal's input noise by selecting one of two methods:
  - Apply s2p
  - Remove s2p
  - Apply s4p
  - Remove s4p
  - Bessel
  - Butterworth

- CTLE
  - Linear Feedforward Equalizer Operator
  - De-Embedding
  - Differential De-Embedding
  - Gaussian
  - Sin(x)/x
  - TDECQ Equalizer Operator
- Added new definition to the CTLE signal processing operator for a *2 Gain Stage* equation, which is used for IEEE 802.3ck reference receiver.
  - For the Random Noise/Jitter Waveform Signal Processing math operator, added the following enhancements (licensed feature F-RAN):
    - In addition to Scope and Eye/Mask modes, the operator now works in Jitter Mode.
    - The operator can add band-limited noise in addition to white noise.
    - Bandwidth-limited noise can be specified either by spectral density ( $V^2/\text{GHz}$ ) or by RMS magnitude.
    - The operator can be used in conjunction with SIRC and the *Remove Intrinsic Noise* feature to create an IEEE 802.3ck reference receiver with a 4th order Butterworth response and a defined noise spectral density.
  - Added a feature that allows Jitter mode to automatically remove the intrinsic noise of the module from the measurements. The intrinsic noise is characterized during module calibration.
  - For the SIRC filter, added ability to select the method used to preserve noise.
  - For the SIRC filter, added ability to allow a Butterworth filter shape.
  - For Eye Mode TDECQ measurements sample time optimization, added the ability to establish an adjustment limit on moving the sample time from the standard definition. The adjustment limit is set as a fraction of the Symbol Period.
  - For TDECQ measurement, new preset added as specified by the Fiber Channel PI - 7 Rev 0.05 and 0.13.
  - To clock recovery dialog box, added the following presets:
    - IEEE 802.3bs/cd (NRZ and PAM4)
    - IEEE 802.3bs/cd/ck
    - CEI-56G-VSR/MR/LR
    - CEI-112G-VSR/MR/LR
  - Added ability to save waveforms into the ADS dataset format.
  - Added support for 2-channel mode with Keysight AWGs (M8194A, M8195A, and M8196A).
  - Improved File browsing dialogs within FlexDCA to allow the option of listing all files (\*.\*)
  - Addition of My Support ID and My Support Subscriptions dialogs to quickly identify important licensing information. Includes ability to check for updates.
  - Keysight USB device driver updated to version 1.4.2 (install requires a reboot).

## Defects Fixed

- Fixed an issue where an undocked results window would disappear after an autoscale.
- Fixed issues with window sizing, window positioning, DPI scaling, multi-monitor setups, and screen capture.

## :CHANnel Subsystem

- :CHANnel:SIRC:OPResets (*new*)
- :CHANnel:SIRC:OPResets:SElections (*new*)
- :CHANnel:SIRC:PNOise (*new*)

## :MEASure Subsystem

### Eye Mode PAM Pk-Pk Amplitude Measurement

- :MEASure:EYE:PAM:PPAMplitude (*new*)
- :MEASure:EYE:PAM:PPAMplitude:LOCation? (*new*)
- :MEASure:EYE:PAM:PPAMplitude:SOURce (*new*)
- :MEASure:EYE:PAM:PPAMplitude:STATus? (*new*)
- :MEASure:EYE:PAM:PPAMplitude:STATus:DETAils? (*new*)
- :MEASure:EYE:PAM:PPAMplitude:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:PPAMplitude:THRatio (*new*)

### Eye Mode PAM4 Overshoot Measurement

- :MEASure:EYE:PAM:OVERshoot (*new*)
- :MEASure:EYE:PAM:OVERshoot:LOCation? (*new*)
- :MEASure:EYE:PAM:OVERshoot:SOURce (*new*)
- :MEASure:EYE:PAM:OVERshoot:STATus? (*new*)
- :MEASure:EYE:PAM:OVERshoot:STATus:DETAils? (*new*)
- :MEASure:EYE:PAM:OVERshoot:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:OVERshoot:THRatio (*new*)

### Eye Mode PAM4 Undershoot Measurement

- :MEASure:EYE:PAM:UNDErshoot (*new*)
- :MEASure:EYE:PAM:UNDErshoot:LOCation? (*new*)
- :MEASure:EYE:PAM:UNDErshoot:SOURce (*new*)
- :MEASure:EYE:PAM:UNDErshoot:STATus? (*new*)
- :MEASure:EYE:PAM:UNDErshoot:STATus:DETAils? (*new*)
- :MEASure:EYE:PAM:UNDErshoot:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:UNDErshoot:THRatio (*new*)

### Eye Mode PAM4 Vertical Eye Closure Measurement

- :MEASure:EYE:PAM:VECLosure (*new*)
- :MEASure:EYE:PAM:VECLosure:DEFine:EOPening (*new*)
- :MEASure:EYE:PAM:VECLosure:DEFine:EOPening:PROBability (*new*)
- :MEASure:EYE:PAM:VECLosure:DEFine:EOPening:RJStabilize (*new*)
- :MEASure:EYE:PAM:VECLosure:DEFine:EOPening:RJStabilize:RJSValue:EYE (*new*)
- :MEASure:EYE:PAM:VECLosure:DEFine:EOPening:RNStabilize (*new*)

- :MEASure:EYE:PAM:VECLosure:DEFine:EOPening:RNSValue:LEVel (*new*)
- :MEASure:EYE:PAM:VECLosure:EYE (*new*)
- :MEASure:EYE:PAM:VECLosure:LOCation? (*new*)
- :MEASure:EYE:PAM:VECLosure:REFerence (*new*)
- :MEASure:EYE:PAM:VECLosure:SOURce (*new*)
- :MEASure:EYE:PAM:VECLosure:STATus? (*new*)
- :MEASure:EYE:PAM:VECLosure:STATus:DETails? (*new*)
- :MEASure:EYE:PAM:VECLosure:STATus:REASon? (*new*)

#### Jitter Mode NRZ Vertical Eye Closure Measurement

- :MEASure:AMPLitude:VECLosure (*new*)
- :MEASure:AMPLitude:VECLosure:EYE (*new*)
- :MEASure:AMPLitude:VECLosure:LOCation? (*new*)
- :MEASure:AMPLitude:VECLosure:SOURce (*new*)
- :MEASure:AMPLitude:VECLosure:STATus? (*new*)
- :MEASure:AMPLitude:VECLosure:STATus:DETails? (*new*)
- :MEASure:AMPLitude:VECLosure:STATus:REASon? (*new*)

#### Jitter Mode PAM4 Vertical Eye Closure Measurement

- :MEASure:PEYE:VECLosure (*new*)
- :MEASure:PEYE:VECLosure:EYE (*new*)
- :MEASure:PEYE:VECLosure:LOCation? (*new*)
- :MEASure:PEYE:VECLosure:SOURce (*new*)
- :MEASure:PEYE:VECLosure:STATus? (*new*)
- :MEASure:PEYE:VECLosure:STATus:DETails? (*new*)
- :MEASure:PEYE:VECLosure:STATus:REASon? (*new*)

#### TDECQ PAM4 Measurement

- :MEASure:TDEQ:OHTLimit (*new*)

## :FUNction Subsystem

- :FUNction:FOPerator (*new CDR argument*)

## :SPRocess Subsystem (Waveform Signal Processing)

#### Apply s2p Operator

- :SPRocess:CONVolve:PNOise (*new*)
- :SPRocess:CONVolve:PNOise:BANDwidth (*new*)
- :SPRocess:CONVolve:PNOise:BANDwidth:AUTo (*new*)

## Apply s4p Operator

- :SPRocess:DCONvolve:PNOise (*new*)
- :SPRocess:DCONvolve:PNOise:BANDwidth (*new*)
- :SPRocess:DCONvolve:PNOise:BANDwidth:AUTO (*new*)

## Bessel Operator

- :SPRocess:BESSel:PNOise (*changed*)

## Butterworth Operator

- :SPRocess:BUTTerworth:PNOise (*changed*)

## CTLE Operator

- :SPRocess:CTLequalizer:DEFinition (*new*)
- :SPRocess:CTLequalizer:FZP (*new*)
- :SPRocess:CTLequalizer:GDC (*new*)
- :SPRocess:CTLequalizer:PNOise (*changed*)

## Decision Feedback Equalizer (DFE) Operator

- :SPRocess:DFEQualizer:PROptimize (*new*)
- :SPRocess:DFEQualizer:PROptimize:BMAX (*new*)
- :SPRocess:DFEQualizer:PROptimize:DELay (*new*)
- :SPRocess:DFEQualizer:PROptimize:LENGth (*new*)
- :SPRocess:DFEQualizer:PROptimize:MCURsor (*new*)
- :SPRocess:DFEQualizer:PROptimize:SAMPLitude (*new*)
- :SPRocess:DFEQualizer:PROptimize:SAVE (*new*)
- :SPRocess:DFEQualizer:PROptimize:SAVE:FILE (*new*)
- :SPRocess:DFEQualizer:PROptimize:TAPS (*new*)

## De-Embedding Operator

- :SPRocess:DEMBed:PNOise (*new*)
- :SPRocess:DEMBed:PNOise:BANDwidth (*new*)
- :SPRocess:DEMBed:PNOise:BANDwidth:AUTO (*new*)

## Differential De-Embedding Operator

- :SPRocess:DDEMBed:PNOise (*new*)
- :SPRocess:DDEMBed:PNOise:BANDwidth (*new*)
- :SPRocess:DDEMBed:PNOise:BANDwidth:AUTO (*new*)

## Gaussian Operator

- :SPRocess:GAUSSian:PNOise (*changed*)

## Linear Feedforward Equalizer Operator

- :SPRocess:FFEQualizer:PNOise (*changed*)



#### Random Noise/Jitter Operator

- :SPRocess:RANDom:JITTer:RMS (*new*)
- :SPRocess:RANDom:NOISe:RMS (*new*)
- :SPRocess:RANDom:NOISe:BANDwidth (*new*)
- :SPRocess:RANDom:NOISe:BANDwidth:AUTo (*new*)
- :SPRocess:RANDom:NOISe:SDENSity (*new*)
- :SPRocess:RANDom:NOISe:SPECtrum (*new*)
- :SPRocess:RANDom:NOISe:UNITs (*new*)
- :SPRocess:RANDom:PRESets (*new*)
- :SPRocess:RANDom:PRESets:SELections (*new*)
- :SPRocess:RANDom:JITTer (*deprecated*)
- :SPRocess:RANDom:NOISe (*deprecated*)

#### Remove s2p Operator

- :SPRocess:DEConvolve:PNOise (*new*)
- :SPRocess:DEConvolve:PNOise:BANDwidth (*new*)
- :SPRocess:DEConvolve:PNOise:BANDwidth:AUTo (*new*)

#### Remove s4p Operator

- :SPRocess:DDEConvolve:PNOise (*new*)
- :SPRocess:DDEConvolve:PNOise:BANDwidth (*new*)
- :SPRocess:DDEConvolve:PNOise:BANDwidth:AUTo (*new*)

#### Sin(x)/x Operator

- :SPRocess:SINC:PNOise (*changed*)

#### TDECQ Equalizer Operator

- :SPRocess:TEQualizer:PNOise (*changed*)

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## Revision A.06.55, March 2020

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### New Features

- Support for N1030A optical mini module.
- Support for N1030B optical mini module.
- Support for N1040A electrical mini module.
- Ability to use Sinc or flat response with optical SIRC.
- Added support for clock recovery devices with multiple banded operating ranges. For example, N1078A 025,053.
- Added support for the features license, Feature Pack 2020 (F-ENH1). This feature provides additional FlexDCA capability when a valid license with support is present for the Research and Development Package, the Manufacturing Package, or the Signal Integrity Package. This release of Feature Pack 2020 includes the following:
  - Added new SCPI commands to change the measurement source. See the :MEASure subsystem commands listed in this section.

### Defects Fixed

- Fixed an issue with the Probe calibration dialog box causing FlexDCA to freeze.
- Fixed a "*Skew is set to limit*" message when setting up the initial state of fixture deskew.
- General improvements made to screen capture/dialog placement on multi-monitor/multi-DPI-scaling setups.
- Fixed an issue concerning the Waveform Memories window size.

### MEASure Subsystem

- :MEASure:EYE:LIST:ITEM:SOURce (*new*)
- :MEASure:OSCilloscope:LIST:ITEM:REGion (*new*)
- :MEASure:OSCilloscope:LIST:ITEM:SOURce (*new*)
- :MEASure:TDR:LIST:ITEM:REGion (*new*)
- :MEASure:TDR:LIST:ITEM:SOURce (*new*)

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## Revision A.06.50, December 2019

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### New Features

- Support for N1092-series DCA-M modules with option CDR (Clock Data Recovery).
- Added the ability to expand the Pattern Navigation Display as an aid to viewing and locating symbols in pattern waveforms. In the help, this feature was previously described as the *Pattern Acquisition Bar*. With the new expanded view, you can quickly zoom in on individual symbols and scroll through a pattern.
- When pattern lock is used, specify a pattern reference symbol for aligning the pattern. The reference symbol can either be automatically determined (based on longest "lowest-symbol" runs) or manually to the current timebase position.
- Added ability to configure the PAM4 Transition Time measurement in **Eye/Mask** mode by specifying the minimum number of *lagging* or *leading* Consecutive Identical Digits (CIDs).
- Added the ability to configure an input channel by copying channel settings from a different channel.
- Added Ethernet Tx mask file for IEEE 802.3cc: 25GBASE-LR-ER-Tx.
- Added the histogram locations of the TDECQ measurements to the status details.
- Added new clock recovery dialog box presets:
  - IEEE 802.3bs/cd (NRZ and PAM4)
  - IEEE 802.3bs/cd/ck
  - CEI-56G-VSR/MR/LR
  - CEI-112G-VSR/MR/LR
- To improve clock data recovery loop bandwidth accuracy on modules that have been programmed with custom NRZ and PAM4 parameters, added the ability to select the parameters by specifying the signal type (NRZ, PAM4).
- Added new error message: 195. "*Clipboard is unavailable.*"
- Internet Explorer users. With the new Help file format in A.06.50, Internet Explorer running on a PC may give the following prompt when viewing the FlexDCA Help files: *Internet Explorer restricted this webpage from running scripts or ActiveX controls*. Perform one of the following three actions to view the Help files:

- Click **Allow blocked content** at the prompt each time you need to view the FlexDCA Help files.
- Click **Tools > Internet Options**. In the **Internet Options** dialog, select the **Advanced** tab and under the **Security** settings, select **Allow active content to run in files on My Computer**. Restart Internet Explorer.
- Install a modern browser on your PC.

## Defects Fixed

- Fixed a memory leak when SIRC filter operations had Averaging applied.
- Autoscale didn't work with low frequency data signals.
- PAM Transition Time measurement didn't match the IEEE standard for 5 zeros and 6 threes.
- Fixed an issue with the Transition Times measurement when measuring a pattern with insufficient CID before or after the transition.
- Added a failure mechanism in Jitter mode that allows the DCA-X to return from an \*opc? remote command, rather than repeatedly failing without completing any limit test acquisitions.
- Changed Jitter mode signal-processed pattern detection to only try a maximum of 8 times.
- Fixed three issues when running FlexDCA on PCs with multi-monitors:
  - When maximizing FlexDCA, it would sometimes "jump" to the wrong monitor during the maximize process.
  - The on-screen keyboard would sometimes show itself on the wrong monitor.
  - FlexDCA would sometimes jump to a new location on screen when changes in the Windows "Display Settings" applet were applied.
- Fixed an issue with SI prefixes being added to External Attenuation dB values.

## CHANnel Subsystem

- :CHANnel:COPY (*new*)

## CRECcovery Subsystem

This is the only subsystem in FlexDCA where the subsystem's node can be issued as a query.

- :CRECcovery? (*new*)
- :CRECcovery:STYPe (*new*)
- :CRECcovery:JSANalysis:STYPe (*deprecated*)
- :CRECcovery:JSANalysis:STYPe:AUTomatic (*deprecated*)

## DIFF Subsystem

- :DIFF:COPY (*new*)

## DISPlay Subsystem

- :DISPlay:WINDow:AMPLitude:LOCation (*new*)
- :DISPlay:WINDow:AMPLitude:TWDouble (*new*)

- :DISPlay:WINDow:ECResults:LOCation (*new*)
- :DISPlay:WINDow:ECResults:TWDDouble (*new*)
- :DISPlay:WINDow:GDElay:LOCation (*new*)
- :DISPlay:WINDow:GDElay:TWDDouble (*new*)
- :DISPlay:WINDow:HISTograms:LOCation (*new*)
- :DISPlay:WINDow:HISTograms:TWDDouble (*new*)
- :DISPlay:WINDow:JGRaphs:LOCation (*new*)
- :DISPlay:WINDow:JGRaphs:TWDDouble (*new*)
- :DISPlay:WINDow:JITTer:LOCation (*new*)
- :DISPlay:WINDow:JITTer:TWDDouble (*new*)
- :DISPlay:WINDow:JPEYe:LOCation (*new*)
- :DISPlay:WINDow:JPEYe:TWDDouble (*new*)
- :DISPlay:WINDow:JPLevel:LOCation (*new*)
- :DISPlay:WINDow:JPLevel:TWDDouble (*new*)
- :DISPlay:WINDow:JSAResults:LOCation (*new*)
- :DISPlay:WINDow:JSAResults:TWDDouble (*new*)
- :DISPlay:WINDow:JSASpectrum:LOCation (*new*)
- :DISPlay:WINDow:JSASpectrum:TWDDouble (*new*)
- :DISPlay:WINDow:LLTResults:LOCation (*new*)
- :DISPlay:WINDow:LLTResults:TWDDouble (*new*)
- :DISPlay:WINDow:MAGNitude:LOCation (*new*)
- :DISPlay:WINDow:MAGNitude:TWDDouble (*new*)
- :DISPlay:WINDow:MARKers:LOCation (*new*)
- :DISPlay:WINDow:MARKers:TWDDouble (*new*)
- :DISPlay:WINDow:MTEST:LOCation (*new*)
- :DISPlay:WINDow:MTEST:TWDDouble (*new*)
- :DISPlay:WINDow:OJITter:LOCation (*new*)
- :DISPlay:WINDow:OJITter:TWDDouble (*new*)
- :DISPlay:WINDow:PHASe:LOCation (*new*)
- :DISPlay:WINDow:PHASe:TWDDouble (*new*)
- :DISPlay:WINDow:RESults:LOCation (*new*)
- :DISPlay:WINDow:RESults:TWDDouble (*new*)
- :DISPlay:WINDow:T:OHMS:LOCation (*new*)
- :DISPlay:WINDow:T:OHMS:TWDDouble (*new*)
- :DISPlay:WINDow:T:PERCent:LOCation (*new*)
- :DISPlay:WINDow:T:PERCent:TWDDouble (*new*)
- :DISPlay:WINDow:T:VOLTS:LOCation (*new*)
- :DISPlay:WINDow:T:VOLTS:TWDDouble (*new*)
- :DISPlay:WINDow:TIME:LOCation (*new*)
- :DISPlay:WINDow:TIME:TWDDouble (*new*)

## MEASure Subsystem

- :MEASure:PAM:TTIME:CIDigits:LAGGing (*new*)
- :MEASure:PAM:TTIME:CIDigits:LEADing (*new*)

## TRIGger Subsystem

- :TRIGger:PALign (*new*)
- :TRIGger:SRSYmbol (*new*)

## WMEMory Subsystem

- :WMEMory:PALign (*new*)
- :WMEMory:SRSYmbol (*new*)

# 17

## Revision A.06.40, August 2019

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

### NOTE

Starting with the A.06.40 software release, only the 64-bit FlexDCA installer will be available. Please plan to migrate to 64-bit Win7 or Win10 in order to continue to have access to the latest versions of FlexDCA. Older FlexDCA versions supporting 32-bit operating systems will continue to work. Going forward, Keysight will provide upgrades and defect fixes only for 64-bit operating systems.

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### New Features

- For Arbitrary Waveform Generator extended modules:
  - Added support for the M8194A Arbitrary Waveform Generator
  - Added ability to adjust symbol levels on Arbitrary Waveform Generators (AWG) and simulated modules. This new PAM Inner Level Amplitude Adjustment feature is part of the Research and Development Package.
  - Added signal optimization for arbitrary waveform generators.
- For locking clock recovery, added a **Loop Bandwidth Tuning** setting which increases the accuracy of the **Target LBW** (Loop Bandwidth). Selecting **Tune on Relock** in FlexDCA's Clock Recovery dialog increases the accuracy of the target loop bandwidth by appending tuning to the normal clock recovery relock algorithm.
- For waveform signal processing:
  - Added two custom chord signaling operators: CNRZ5 operator and ENRZ operator. This new feature is part of the Research and Development Package.
  - Increased the maximum function count for waveform signal processing to 64.
- Added the ability to establish a Flex-on-Flex remote connection to a DCA-X over USB.
- Added built-in System Impulse Response Correction (SIRC) files for the N1045A/B and the 86108B modules.
- In Jitter Mode, added a new Linearity scalar measurement for PAM4 signals.
- Added a new help topic with guidelines on network security.
- Improved TDECQ optimization.
- Improved Clock Data Recovery (CDR) calibration algorithm to improve locking behavior.
- Improved Jitter Mode signal processed pattern detection.
- Improved Jitter Mode measurements on closed eyes.

- Increased the number of samples acquired when measuring 12-edge output jitter, to get more consistent EOJ results.
- Improved offset alignment for LFE optimization.
- Added final versions of 802.3cd standard presets for TDECQ and TDECQ Equalizer.
- Added demonstration CNRZ5 and ENRZ waveform/setup files.
- FlexDCA running on a PC and connected to a DCA mainframe via Flex-On-Flex now honors package licenses (and package trials) that are installed on the DCA.
- The **Licenses** dialog now only displays the **Single Feature Licenses** category if a legacy single feature license is installed.
- Added *Aluminum* GUI theme for N1000A.
- Added new error message: "*The instrument user data partition does not exist. Please contact Keysight support.*"
- Added new error message: "*Loop bandwidth tuning: Unable to tune loop bandwidth (details).*"

## Recommended Action

- Disable Windows Server Message Block version 1 (SMBv1) File Sharing protocol per Microsoft's recommendation. On the DCA-X, use Windows Search and search for "*Turn Windows features on or off*". This opens the *Windows Features* dialog. In the dialog, clear the **SMB 1.0/CIFS File Sharing Support** feature.

## Defects Fixed

- When using the SCPI Recorder, fixed an issue where CDR auto relock was incorrectly recording the :ACQUIRE:STOP command.
- Fixed precision timebase sync to help prevent loss of sync due to substrate jitter.
- Changed the Dark Calibration so that limit tests and other features are turned off before performing the calibration.
- Fixed a bug where dialogs from other FlexEye sessions were still in the foreground after switching tabs.
- Fixed an issue with the example Python script that demonstrates the :DISK:FILE:READ query. An \*OPC? query was not appended to the :DISK:SIMAGE:SAVE command.
- Fixed an issue that caused "NaN" (Not A Number) to be reported in the measurement results for signals with very low jitter.
- Fixed an issue causing the :MEAS:EYE:TDECQ:STAT:DET query to return "?W" instead of " $\mu$ W".

Minor software revisions may not necessitate an update to the product's learning products. Similarly, changes to the learning products may not necessitate a change to the software revision.

## CRECOVERY Subsystem

- :CRECOVERY:LBWTuning:STATus? (*new*)
- :CRECOVERY:LBWTuning:TORelock (*new*)

## EMODULES Subsystem

- :EMODULES:AWGenerator:MODE (*new*)
- :EMODULES:AWGenerator:OPTimization:CHANnel (*new*)



- :EMODules:AWGenerator:OPTimization:FILE (*new*)
- :EMODules:AWGenerator:OPTimization:ITERations (*new*)
- :EMODules:AWGenerator:OPTimization:START (*new*)
- :EMODules:AWGenerator:OPTimization:STATus? (*new*)
- :EMODules:AWGenerator:OPTimization:STATus:REASon? (*new*)
- :EMODules:OPTimization:AWGenerator:CANCel (*new*)
- :EMODules:OPTimization:AWGenerator:CONTInue (*new*)
- :EMODules:OPTimization:AWGenerator:SDONe (*new*)

## FUNCTION Subsystem

- :FUNcTion:SECondary (*new*)

## MEASure Subsystem

- :MEASure:PLEVel:LINearity (*new*)
- :MEASure:PLEVel:LINearity:DEFinition (*new*)
- :MEASure:PLEVel:LINearity:LOCation? (*new*)
- :MEASure:PLEVel:LINearity:SOURce (*new*)
- :MEASure:PLEVel:LINearity:STATus? (*new*)
- :MEASure:PLEVel:LINearity:STATus:DETAils? (*new*)
- :MEASure:PLEVel:LINearity:STATus:REASon? (*new*)

## RDCA Subsystem

- :RDCA:CONNect:USB:SADDress (*new*)

## SOURce Subsystem

- :SOURce:LEVel (*new*)

## TIMebase Subsystem

- :TIMebase:DESKew:CSIGNaling (*new*)
- :TIMebase:DESKew:CSIGNaling:CANCel (*new*)
- :TIMebase:DESKew:CSIGNaling:CONTInue (*new*)
- :TIMebase:DESKew:CSIGNaling:FNAME (*new*)
- :TIMebase:DESKew:CSIGNaling:FUNcTion (*new*)
- :TIMebase:DESKew:CSIGNaling:SAVE (*new*)
- :TIMebase:DESKew:CSIGNaling:SDONe? (*new*)

# 18

Revision A.06.03, May 2019

## New Features

- Added new N1092A/B/C/D/E Option 40A, 40 GHz optical BW, to N1092A/B/C/D/E DCA-M optical sampling oscilloscopes.

# 19

## Revision A.06.02, January 2019

### New Features

- The FlexDCA KAP license is no longer required to use FlexDCA with the N8844A Data Analytics Web Service Software. FlexDCA no longer requires any FlexDCA license to use the N8844A.
- Added parameters to the `:MEASure:RESuIts?` query that select the number of results table fields that are returned.
- An N1076B, N1078A, or N1060A CDR calibration now prompts the user to remove or disable input signals during calibration.
- Automatic signal-type detection (NRZ or PAM4) now works for differential signals.

### Defects Fixed

- When using an N469xD series Electronic Calibration (ECal) module, fixed an issue that caused the a TDR/TDT calibration to fail and display an “unexpected problem” message.
- For N1076B, N1078A, and N1060A modules, CDR Calibration now allows wider variable-gain amplifier currents.
- Fixed an issue where the JSA Results table displayed the wrong CDR Source channel indicator when a N1060A module was present.

### MEASure Subsystem

- `:MEASure:RESuIts?` (*modified*)

# 20

## Revision A.06.01, December 2018

### New Features

- Updated the N1060A specifications and added important information on making 1 mm connections.
- When using Jitter Spectrum Analysis (JSA), calibration factors for phase detector gain correction are now applied based on either NRZ or PAM signal types. A new setting to control this is located in the Jitter Spectrum Analysis Setup dialog box. For remote control, two new CREcovery subsystem remote commands have been added as noted below.
- Added the ability to apply an extinction ratio correction factor to a PAM4 Outer Extinction Ratio measurement.
- Added the `:CHANne1:NOISe?` SCPI query that returns a channel's RMS noise for the current bandwidth, filter, and wavelength selection.
- System Impulse Response Correction (SIRC) will now be automatically re-enabled if SIRC was previously forced off because of an associated feature.

### Defects Fixed

- Fixes a problem where the Optical Modulation Amplitude (OMA) measurement's status was not being propagated to the TDECQ measurement.
- Fixed an issue that prevented PAM linearity RLM (Ratio Level Mismatch) measurements from being made in Oscilloscope mode *while* PAM linearity RLM could be measured in Eye mode.
- Fixed an issue where an autoscale incorrectly calculated the horizontal position in FlexEye.
- Fixed an issue that occurred when an N1055A module was installed in an 86100D option STR. The module's step calibration could fail if the cable used to connect the trigger signal was short.
- Fixed an issue that slowed down FlexEye throughput.
- Fixed an issue with differential deskew when FlexDCA was set to free run acquisition mode while using the precision timebase.
- Fixed a file load problem with ADS explicit-X waveforms.
- Fixed an issue with the `:MEASure:RESu1ts?` SCPI query that resulted in only Jitter and Amplitude measurements being returned.
- Fixed an issue with the Oscilloscope Mode PAM-N level measurements that was preventing the measurements from reporting a result if the input signal had too much over-shoot in the 0-3 transition or too much under-shoot in the 3-0 transition.

- Fixed an issue with the USB SCPI Server address of the N1000A DCA-X. The first component of the address is the *USB Vendor Identification Number*, which has been changed from 0x0957 (Agilent) to 0x2A8D (Keysight). The second component of the address is the *USB Product Identification Number*, which has been changed from 0xBE18 (86100D) to 0x7B01 (N1000A). The third component of the address is the *USB serial number*, which has been changed from the instrument DNS hostname to the instrument serial number.

## CHANnel Subsystem

- :CHANnel:NOISe? (*new*)

## CRECovery Subsystem

- :CRECovery:JSANalysis:STYPe (*new*)
- :CRECovery/JSANalysis:STYPe:AUTomatic (*new*)

## MEASure Subsystem

- :MEASure:ERATio:CHANnel:OERFactor (*new*)

# 21

## Revision A.06.00, October 2018

- Added support for new N1000A DCA-X sampling oscilloscope.
- Added support for new N1060A Precision Waveform Analyzer Module.
- Added support for new N1045B Electrical Remote Sampling Head Module.
- Added direct control of Keysight M8195A and M8196A arbitrary waveform generators as extended modules.
- For PAM4 waveforms in Eye/Mask mode, added two new measurements: Transition Time and Ceq.
- Changed the signal processing TDECQ equalizer operator's *IEEE 802.3cd Draft 3.2* preset to *IEEE 802.3cd Draft 3.5*.
- Rapid Eye Rapid Eye is provided *without* license in the software and no longer requires Productivity Package (Option 500).
- Added support for new Package licensing which reduces and simplifies the number of licenses required to increase instrument capability. The new package licenses are Research and Development Package, Manufacturing Package, and Signal Integrity Package.
- Added support for N4694D series Microwave Electronic Calibration (ECal) module.
- Optical user calibrations on optical modules can now be performed in 86100D's **Standard** configuration (normal mode). Supported module's for Standard configuration. Previously, the 86100D had to be placed in **Legacy** mode.
- Mainframe user timebase calibrations can now be exported and imported as an xml file. For example, if you operate your instrument at several different temperatures, you can save a calibration for each temperature. From remote control, use the `:CALibrate:FRAME:TIMEbase:USER:EXPort` command.
- Added the `:DISK:FILE:TIMestamp?` SCPI query that returns a file's date-time properties.
- To simplify the location of SCPI commands for scalar *Jitter-mode measurements* on PAM4 waveforms, two new SCPI nodes have been added to the `:MEASure` subsystem. The new nodes are `:MEASure:PEYE` (for PAM4 measurements that are displayed on the **Eye** panel) and `:MEASure:PLEVe1` (for PAM4 measurements displayed on the **Level** panel).
  - Commands in these two new nodes use the same measurement algorithms for PAM4 waveforms as their NRZ/PAM4 counterparts but cannot measure NRZ waveforms. You can still use the NRZ/PAM4 commands to measure PAM4 waveforms if you wish, however, switching to the new commands will make locating the commands easier as the new SCPI nodes correlate to the name of the measurement panels. This will also make your code easier to read. For example, the existing NRZ/PAM4 command `:MEAS:EYE:RJ` has a new PAM4 only version that is named `:MEAS:PEYE:RJ`.
- Added a Copy to Clipboard button to FlexDCA's About dialog box.
- Now displays de-embedded waveform if SIRC is active.
- The PRBS-31 pattern length is now only allowed with Rapid Eye enabled.

- In the help's SCPI subsystem introductions, added menus that group commands by function for easier access.

## Defects Fixed

- Fixed a *"GUI has recovered from an unexpected software problem"* error that was reported after JSA data was saved by the Documentation Wizard.
- Fixed two problems with saving VSA recording csv files:
  - Quadrature waveform was only saved if Interpolate was turned on.
  - Changing the filename resulted in the file type changing to pattern waveform (csv).
- Fixed intermittent problem where a Lissajous signal did not appear in PTB setup dialog.
- Updated the name of TDECQ standards-based presets (cd draft 3.2 to draft 3.5).
- Fixed an issue that caused the order of measurements in the 12-edge jitter comma-separated value file (\*.csv) to be incorrect.
- Improved data handling of implicit waveforms for binary operators.
- Improved iterative optimization for TDECQ measurements.
- Fixed a problem where the JSA Spectrum chart was missing Peak pop-ups.
- Fixed a problem with corrected display resolution of the JSA Spectrum chart.
- Fixed a problem with corrected resolution issue with 4k monitors.
- Fixed a Win10 x86 Keysight License Manager installation issue.
- Fixed an throughput issue, introduced in A.05.70, that increased the time required for an autoscale in FlexEye.

## CALibrate Subsystem

- :CALibrate:FRAME:TIMEbase:CHANnel (*new*)
- :CALibrate:FRAME:TIMEbase:USER:EXPort (*new*)
- :CALibrate:FRAME:TIMEbase:USER:IMPort (*new*)
- :CALibrate:OPTical:USER:CHANnel:WSElection (*new*)
- :CALibrate:TIMEbase:SLOT:CHANnel (*new*)
- :CALibrate:TIMEbase:SLOT:USER:EXPort (*new*)
- :CALibrate:TIMEbase:SLOT:USER:IMPort (*new*)

## DISK Subsystem

- :DISK:FILE:TIMestamp? (*new*)

## EMODules Subsystem

- :EMODules:AWGenerator:AUPDate (*new*)
- :EMODules:AWGenerator:CDIVide (*new*)
- :EMODules:AWGenerator:FNAME (*new*)
- :EMODules:AWGenerator:FORMat (*new*)
- :EMODules:AWGenerator:PATTern (*new*)

- :EMODules:AWGenerator:PLENght (*new*)
- :EMODules:AWGenerator:SADDress (*new*)
- :EMODules:AWGenerator:SEND (*new*)
- :EMODules:AWGenerator:SRATe (*new*)
- :EMODules:AWGenerator:STATus? (*new*)
- :EMODules:AWGenerator:STATus:REASon? (*new*)
- :EMODules:AWGenerator:VADDress (*new*)
- :EMODules:AWGenerator:WTYPe (*new*)

## MEASure Subsystem

- :MEASure:EYE:CEQ (*new*)
- :MEASure:EYE:CEQ:LOCation? (*new*)
- :MEASure:EYE:CEQ:SOURce (*new*)
- :MEASure:EYE:CEQ:STATus? (*new*)
- :MEASure:EYE:CEQ:STATus:DETAils? (*new*)
- :MEASure:EYE:CEQ:STATus:REASon? (*new*)
- :MEASure:EYE:TTIME (*new*)
- :MEASure:EYE:TTIME:LOCation? (*new*)
- :MEASure:EYE:TTIME:SOURce (*new*)
- :MEASure:EYE:TTIME:STATus? (*new*)
- :MEASure:EYE:TTIME:STATus:DETAils? (*new*)
- :MEASure:EYE:TTIME:STATus:REASon? (*new*)
- :MEASure:EYE:TTIME:TRANSition.html (*new*)
- :MEASure:JITTer:OJITter:LIST:SElect (*new*)
- :MEASure:JITTer:OJITter:SJNU (*new*)
- :MEASure:PEYE:DDJ (*new*)
- :MEASure:PEYE:DDJ:EYE (*new*)
- :MEASure:PEYE:DDJ:LOCation? (*new*)
- :MEASure:PEYE:DDJ:SOURce (*new*)
- :MEASure:PEYE:DDJ:STATus? (*new*)
- :MEASure:PEYE:DDJ:STATus:DETAils? (*new*)
- :MEASure:PEYE:DDJ:STATus:REASon? (*new*)
- :MEASure:PEYE:DJ (*new*)
- :MEASure:PEYE:DJ:EYE (*new*)
- :MEASure:PEYE:DJ:LOCation? (*new*)
- :MEASure:PEYE:DJ:SOURce (*new*)
- :MEASure:PEYE:DJ:STATus? (*new*)
- :MEASure:PEYE:DJ:STATus:DETAils? (*new*)
- :MEASure:PEYE:DJ:STATus:REASon? (*new*)
- :MEASure:PEYE:EHEight (*new*)
- :MEASure:PEYE:EHEight:EYE (*new*)
- :MEASure:PEYE:EHEight:LOCation? (*new*)



- :MEASure:PEYE:EHEight:SOURce (*new*)
- :MEASure:PEYE:EHEight:STATus? (*new*)
- :MEASure:PEYE:EHEight:STATus:DEtails? (*new*)
- :MEASure:PEYE:EHEight:STATus:REASon? (*new*)
- :MEASure:PEYE:ESKew (*new*)
- :MEASure:PEYE:ESKew:EYE (*new*)
- :MEASure:PEYE:ESKew:LOCation? (*new*)
- :MEASure:PEYE:ESKew:SOURce (*new*)
- :MEASure:PEYE:ESKew:STATus? (*new*)
- :MEASure:PEYE:ESKew:STATus:DEtails? (*new*)
- :MEASure:PEYE:ESKew:STATus:REASon? (*new*)
- :MEASure:PEYE:EWIDth (*new*)
- :MEASure:PEYE:EWIDth:EYE (*new*)
- :MEASure:PEYE:EWIDth:LOCation? (*new*)
- :MEASure:PEYE:EWIDth:SOURce (*new*)
- :MEASure:PEYE:EWIDth:STATus? (*new*)
- :MEASure:PEYE:EWIDth:STATus:DEtails? (*new*)
- :MEASure:PEYE:EWIDth:STATus:REASon? (*new*)
- :MEASure:PEYE:FOVer (*new*)
- :MEASure:PEYE:FOVer:EYE (*new*)
- :MEASure:PEYE:FOVer:LOCation (*new*)
- :MEASure:PEYE:FOVer:SOURce (*new*)
- :MEASure:PEYE:FOVer:STATus (*new*)
- :MEASure:PEYE:FOVer:STATus:DEtails (*new*)
- :MEASure:PEYE:FOVer:STATus:REASon (*new*)
- :MEASure:PEYE:ISI (*new*)
- :MEASure:PEYE:ISI:EYE (*new*)
- :MEASure:PEYE:ISI:LOCation? (*new*)
- :MEASure:PEYE:ISI:SOURce (*new*)
- :MEASure:PEYE:ISI:STATus? (*new*)
- :MEASure:PEYE:ISI:STATus:DEtails? (*new*)
- :MEASure:PEYE:ISI:STATus:REASon? (*new*)
- :MEASure:PEYE:JN (*new*)
- :MEASure:PEYE:JN:EYE (*new*)
- :MEASure:PEYE:JN:LOCation? (*new*)
- :MEASure:PEYE:JN:SJN (*new*)
- :MEASure:PEYE:JN:SOURce (*new*)
- :MEASure:PEYE:JN:STATus? (*new*)
- :MEASure:PEYE:JN:STATus:DEtails? (*new*)
- :MEASure:PEYE:JN:STATus:REASon? (*new*)
- :MEASure:PEYE:LEVel (*new*)
- :MEASure:PEYE:LEVel:EYE (*new*)
- :MEASure:PEYE:LEVel:LOCation? (*new*)

- :MEASure:PEYE:LEVel:SOURce (*new*)
- :MEASure:PEYE:LEVel:STATus? (*new*)
- :MEASure:PEYE:LEVel:STATus:DETAils? (*new*)
- :MEASure:PEYE:LEVel:STATus:REASon? (*new*)
- :MEASure:PEYE:LIST:CLEar (*new*)
- :MEASure:PEYE:LIST:DEFault (*new*)
- :MEASure:PEYE:LIST:REMOve (*new*)
- :MEASure:PEYE:LIST:SElect (*new*)
- :MEASure:PEYE:PJ (*new*)
- :MEASure:PEYE:PJ:EYE (*new*)
- :MEASure:PEYE:PJ:LOCation? (*new*)
- :MEASure:PEYE:PJ:SOURce (*new*)
- :MEASure:PEYE:PJ:STATus? (*new*)
- :MEASure:PEYE:PJ:STATus:DETAils? (*new*)
- :MEASure:PEYE:PJ:STATus:REASon? (*new*)
- :MEASure:PEYE:PJRMs (*new*)
- :MEASure:PEYE:PJRMs:EYE (*new*)
- :MEASure:PEYE:PJRMs:LOCation? (*new*)
- :MEASure:PEYE:PJRMs:SOURce (*new*)
- :MEASure:PEYE:PJRMs:STATus? (*new*)
- :MEASure:PEYE:PJRMs:STATus:DETAils? (*new*)
- :MEASure:PEYE:PJRMs:STATus:REASon? (*new*)
- :MEASure:PEYE:Q (*new*)
- :MEASure:PEYE:Q:EYE (*new*)
- :MEASure:PEYE:Q:LOCation? (*new*)
- :MEASure:PEYE:Q:SOURce (*new*)
- :MEASure:PEYE:Q:STATus? (*new*)
- :MEASure:PEYE:Q:STATus:DETAils? (*new*)
- :MEASure:PEYE:Q:STATus:REASon? (*new*)
- :MEASure:PEYE:RJ (*new*)
- :MEASure:PEYE:RJ:EYE (*new*)
- :MEASure:PEYE:RJ:LOCation? (*new*)
- :MEASure:PEYE:RJ:SOURce (*new*)
- :MEASure:PEYE:RJ:STATus? (*new*)
- :MEASure:PEYE:RJ:STATus:DETAils? (*new*)
- :MEASure:PEYE:RJ:STATus:REASon? (*new*)
- :MEASure:PEYE:SERFloor (*new*)
- :MEASure:PEYE:SERFloor:EYE (*new*)
- :MEASure:PEYE:SERFloor:LOCation (*new*)
- :MEASure:PEYE:SERFloor:SOURce (*new*)
- :MEASure:PEYE:SERFloor:STATus (*new*)
- :MEASure:PEYE:SERFloor:STATus:DETAils (*new*)
- :MEASure:PEYE:SERFloor:STATus:REASon (*new*)

- :MEASure:PEYE:SERLimit (*new*)
- :MEASure:PEYE:SERLimit:EYE (*new*)
- :MEASure:PEYE:SERLimit:LOCation (*new*)
- :MEASure:PEYE:SERLimit:SOURce (*new*)
- :MEASure:PEYE:SERLimit:STATus (*new*)
- :MEASure:PEYE:SERLimit:STATus:DEtails (*new*)
- :MEASure:PEYE:SERLimit:STATus:REASon (*new*)
- :MEASure:PEYE:TJ (*new*)
- :MEASure:PEYE:TJ:EYE (*new*)
- :MEASure:PEYE:TJ:LOCation? (*new*)
- :MEASure:PEYE:TJ:SOURce (*new*)
- :MEASure:PEYE:TJ:STATus? (*new*)
- :MEASure:PEYE:TJ:STATus:DEtails? (*new*)
- :MEASure:PEYE:TJ:STATus:REASon? (*new*)
- :MEASure:PEYE:UJ (*new*)
- :MEASure:PEYE:UJ:EYE (*new*)
- :MEASure:PEYE:UJ:LOCation? (*new*)
- :MEASure:PEYE:UJ:SOURce (*new*)
- :MEASure:PEYE:UJ:STATus? (*new*)
- :MEASure:PEYE:UJ:STATus:DEtails? (*new*)
- :MEASure:PEYE:UJ:STATus:REASon? (*new*)
- :MEASure:PLEVel:DI (*new*)
- :MEASure:PLEVel:DI:LEVel (*new*)
- :MEASure:PLEVel:DI:LOCation? (*new*)
- :MEASure:PLEVel:DI:SOURce (*new*)
- :MEASure:PLEVel:DI:STATus? (*new*)
- :MEASure:PLEVel:DI:STATus:DEtails? (*new*)
- :MEASure:PLEVel:DI:STATus:REASon? (*new*)
- :MEASure:PLEVel:HSYMBOL (*new*)
- :MEASure:PLEVel:HSYMBOL:LEVel (*new*)
- :MEASure:PLEVel:HSYMBOL:LOCation? (*new*)
- :MEASure:PLEVel:HSYMBOL:SOURce (*new*)
- :MEASure:PLEVel:HSYMBOL:STATus? (*new*)
- :MEASure:PLEVel:HSYMBOL:STATus:DEtails? (*new*)
- :MEASure:PLEVel:HSYMBOL:STATus:REASon? (*new*)
- :MEASure:PLEVel:ISI (*new*)
- :MEASure:PLEVel:ISI:LEVel (*new*)
- :MEASure:PLEVel:ISI:LOCation? (*new*)
- :MEASure:PLEVel:ISI:SOURce (*new*)
- :MEASure:PLEVel:ISI:STATus? (*new*)
- :MEASure:PLEVel:ISI:STATus:DEtails? (*new*)
- :MEASure:PLEVel:ISI:STATus:REASon? (*new*)
- :MEASure:PLEVel:LEVel (*new*)

- :MEASure:PLEVel:LEVel:LEVel (*new*)
- :MEASure:PLEVel:LEVel:LOCation? (*new*)
- :MEASure:PLEVel:LEVel:SOURce (*new*)
- :MEASure:PLEVel:LEVel:STATus? (*new*)
- :MEASure:PLEVel:LEVel:STATus:DETAils? (*new*)
- :MEASure:PLEVel:LEVel:STATus:REASon? (*new*)
- :MEASure:PLEVel:LIST:CLEar (*new*)
- :MEASure:PLEVel:LIST:DEFault (*new*)
- :MEASure:PLEVel:LIST:REMOve (*new*)
- :MEASure:PLEVel:LIST:SELEct (*new*)
- :MEASure:PLEVel:LSYMBOL (*new*)
- :MEASure:PLEVel:LSYMBOL:LEVel (*new*)
- :MEASure:PLEVel:LSYMBOL:LOCation? (*new*)
- :MEASure:PLEVel:LSYMBOL:SOURce (*new*)
- :MEASure:PLEVel:LSYMBOL:STATus? (*new*)
- :MEASure:PLEVel:LSYMBOL:STATus:DETAils? (*new*)
- :MEASure:PLEVel:LSYMBOL:STATus:REASon? (*new*)
- :MEASure:PLEVel:PI (*new*)
- :MEASure:PLEVel:PI:LEVel (*new*)
- :MEASure:PLEVel:PI:LOCation (*new*)
- :MEASure:PLEVel:PI:SOURce (*new*)
- :MEASure:PLEVel:PI:STATus (*new*)
- :MEASure:PLEVel:PI:STATus:DETAils (*new*)
- :MEASure:PLEVel:PI:STATus:REASon (*new*)
- :MEASure:PLEVel:PIR (*new*)
- :MEASure:PLEVel:PIR:LEVel (*new*)
- :MEASure:PLEVel:PIR:LOCation (*new*)
- :MEASure:PLEVel:PIR:SOURce (*new*)
- :MEASure:PLEVel:PIR:STATus (*new*)
- :MEASure:PLEVel:PIR:STATus:DETAils (*new*)
- :MEASure:PLEVel:PIR:STATus:REASon (*new*)
- :MEASure:PLEVel:RINoise (*new*)
- :MEASure:PLEVel:RINoise:LOCation? (*new*)
- :MEASure:PLEVel:RINoise:SOURce (*new*)
- :MEASure:PLEVel:RINoise:STATus? (*new*)
- :MEASure:PLEVel:RINoise:STATus:DETAils? (*new*)
- :MEASure:PLEVel:RINoise:STATus:REASon? (*new*)
- :MEASure:PLEVel:RN (*new*)
- :MEASure:PLEVel:RN:LEVel (*new*)
- :MEASure:PLEVel:RN:LOCation? (*new*)
- :MEASure:PLEVel:RN:SOURce (*new*)
- :MEASure:PLEVel:RN:STATus? (*new*)
- :MEASure:PLEVel:RN:STATus:DETAils? (*new*)

- :MEASure:PLEVel:RN:STATus:REASon? (*new*)
- :MEASure:PLEVel:SAMPlitude (*new*)
- :MEASure:PLEVel:SAMPlitude:LOCation? (*new*)
- :MEASure:PLEVel:SAMPlitude:SOURce (*new*)
- :MEASure:PLEVel:SAMPlitude:STATus? (*new*)
- :MEASure:PLEVel:SAMPlitude:STATus:DETailS? (*new*)
- :MEASure:PLEVel:SAMPlitude:STATus:REASon? (*new*)
- :MEASure:PLEVel:TI (*new*)
- :MEASure:PLEVel:TI:LEVel (*new*)
- :MEASure:PLEVel:TI:LOCation? (*new*)
- :MEASure:PLEVel:TI:SOURce (*new*)
- :MEASure:PLEVel:TI:STATus? (*new*)
- :MEASure:PLEVel:TI:STATus:DETailS? (*new*)
- :MEASure:PLEVel:TI:STATus:REASon? (*new*)
- :MEASure:PLEVel:UN (*new*)
- :MEASure:PLEVel:UN:LEVel (*new*)
- :MEASure:PLEVel:UN:LOCation? (*new*)
- :MEASure:PLEVel:UN:SOURce (*new*)
- :MEASure:PLEVel:UN:STATus? (*new*)
- :MEASure:PLEVel:UN:STATus:DETailS? (*new*)
- :MEASure:PLEVel:UN:STATus:REASon? (*new*)
- :MEASure:JITter:PAM:OJITter:LIST:SElect (*deprecated*)

## SOURce Subsystem

- :SOURce:CDIVide (*new*)
- :SOURce:FILTer:RISetime (*new*)
- :SOURce:SKEW (*new*)

## SYSTEM Subsystem

- :SYSTEM:LKEY:SOFTWARE:SUPPORT:EXPIration:DATE? (*new*)
- :SYSTEM:SOFTWARE:FEATures:ENABled? (*new*)
- :SYSTEM:SOFTWARE:FEATures:VERSion? (*new*)
- :SYSTEM:SOFTWARE:LICenses:FEATure? (*new*)
- :SYSTEM:SOFTWARE:LICenses:INSTalled? (*new*)
- :SYSTEM:SOFTWARE:LICenses:VERSion? (*new*)
- :SYSTEM:SOFTWARE:VERSion:DATE? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AEYE:ENABled? (*removed*)
- :SYSTEM:SOFTWARE:FEATures:AEYE:VERSion? (*removed*)
- :SYSTEM:SOFTWARE:FEATures:AFRemoval:ENABled? (*removed*)
- :SYSTEM:SOFTWARE:FEATures:AFRemoval:VERSion? (*removed*)
- :SYSTEM:SOFTWARE:FEATures:ATDR:ENABled? (*removed*)

- :SYSTem:SOFTware:FEATures:ATDR:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:AWANalysis:EQUalizers:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:AWANalysis:EQUalizers:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:AWANalysis:UDOPerations:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:AWANalysis:UDOPerations:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:FEYE:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:FEYE:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:FLEX:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:FLEX:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:ISIM:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:ISIM:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:JITTer:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:JITTer:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:MEASure:TDEC:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:MEASure:TDEC:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:PAMN:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:PAMN:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:REPository:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:REPository:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:TDCQ:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:TDCQ:VERSion? (*removed*)
- :SYSTem:SOFTware:FEATures:UDIMport:ENABled? (*removed*)
- :SYSTem:SOFTware:FEATures:UDIMport:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:OTHer:DEMO:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:OTHer:DEMO:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:OTHer:DEMO:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AEYE:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AEYE:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AEYE:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AFRemoval:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AFRemoval:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AFRemoval:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AMPLitude:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AMPLitude:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AMPLitude:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:ATDR:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:ATDR:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:ATDR:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AWANalysis:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AWANalysis:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:AWANalysis:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:FEYE:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:FEYE:INSTalled? (*removed*)

- :SYSTem:SOFTware:LICenses:SFEature:FEYE:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:FLEX:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:FLEX:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:FLEX:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:ISIM:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:ISIM:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:ISIM:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:JITTer:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:JITTer:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:JITTer:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:PAMN:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:PAMN:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:PAMN:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:PRODUctivity:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:PRODUctivity:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:PRODUctivity:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:RDCA:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:RDCA:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:RDCA:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:REPository:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:REPository:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:REPository:VERSion? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:TDCQ:FEATure? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:TDCQ:INSTalled? (*removed*)
- :SYSTem:SOFTware:LICenses:SFEature:TDCQ:VERSion? (*removed*)

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## Revision A.05.80, June 2018

### New Features

- The Documentation Wizard now includes the option to save Waveform Window Data (internal format of waveform file) in Oscilloscope and Eye/Mask modes.
- For the 86100D, added the ability to perform user timebase calibrations.
- Added support for new N1076B 56 GBd Electrical Clock Recovery DCA-M extended module.
- Added support for new N1078A 56 GBd Optical/Electrical Clock Recovery DCA-M extended module.
- For Eye Mode's TDEC measurement, added the ability to position the left and right histograms. Improved the measurement's waveform annotations.
- For Eye Mode's TDECQ measurement, the amplitude of decision thresholds can now be optimally determined within a specified percentage of the signal OMA, such that TDECQ is minimized. The timing of the histograms can also be optimized. The applicable settings are located in the **TDECQ Configuration** tab of the PAM-N Analysis Setup dialog box.
- Added three new 25.78125 GBd Ethernet masks for Eye/Mask testing:
  - 25GBASE-LR\_ER\_Rx.mskx (*IEEE802.3cc Draft 3.2*)
  - 100G-PSM4\_Rx.mskx (*100G PSM4 MSA rev 2*)
  - 100G-SWDM4-Rx.mskx (*100G SWDM4 MSA rev 2*)
- Eye mode's FlexEye application is now compatible with pattern lock, math functions, and more. TDECQ measurements can be made using FlexEye.
- Concerning System Impulse Response Correction (SIRC):
  - For Eye Mode's FlexEye Streaming application, documented the ability to use SIRC (System Impulse Response Correction) on N1092 M-series modules on a per-channel basis. SIRC is enabled within the FlexEye Streaming Setup dialog box.
  - Added several SIRC 10 ;Gb/s filter rates for N1092-series DCA-Ms.
  - The signal legend now indicates if SIRC has been applied to a channel.
- For clock recovery, the Clock Recovery Setup dialog box:
  - Includes the new **Spread Spectrum Clock** field where you can indicate that a Spread Spectrum Clock (SSC) is used.



- Internal waveform record data can now be directly transferred to and from FlexDCA's waveform memory or channels using the following SCPI commands. This saves time as the data does not need to be placed in a file.
  - :WAVEform:XML:READ? (*new*)
  - :WAVEform:XML:WRITE? (*new*)
- Internal color-grade gray-scale database data can now be directly transferred to and from FlexDCA's CGGS memory or channels using the following SCPI commands. This saves time as the data does not need to be placed in a file.
  - :WAVEform:EYE:XML:READ? (*new*)
  - :WAVEform:EYE:XML:WRITE? (*new*)
- The magnitude response of the Signal Processing FFT operator can be normalized to a frequency.
- An Autoscale now clears FlexDCA's display as a last step.
- Improved performance on multi-CPU PCs.
- Added the Unrestricted Data Import feature to option 200.
- Added a new example Python script that performs TDECQ measurement using TDECQ equalizer math function and new SIRC 10 Gb/s filter.
- Reduced and simplified the Python example scripts and module with the goal of simplicity.
- The Microsoft .NET Framework 4.7.1 is now included with the FlexDCA installation. Older versions of Windows may require the latest Microsoft Windows Updates, or that a LAN connection to the Internet is present during the installation. Microsoft .NET Framework is a required component and if this component fails to install, contact Key-sight support.

## New Instrument Messages

Added the following new instrument messages. Instrument messages are displayed at the bottom of the display and are returned by the `:SYSTEM:ERROR:NEXT?` command.

- 081. Unable to digitally sign exported data
- 332. CDR YIG Bias Calibration is required for *<identifier>*
- 333. The *<identifier>* device is not responding. Please cycle power.
- 334. The *<identifier>* does not have a valid digital certificate.
- 370. SIRC has been deactivated: *<identifier>*.

## CALibrate Subsystem

- :CALibrate:FRAME:TIMEbase:USER:CHANnel (*new*)
- :CALibrate:FRAME:TIMEbase:USER:DISCard (*new*)
- :CALibrate:FRAME:TIMEbase:USER:STARt (*new*)
- :CALibrate:FRAME:TIMEbase:USER:STATus? (*new*)
- :CALibrate:FRAME:TIMEbase:USER:STATus:DEtails? (*new*)
- :CALibrate:FRAME:TIMEbase:USER:STATus:DTEMPerature? (*new*)
- :CALibrate:FRAME:TIMEbase:USER:STATus:TIME? (*new*)
- :CALibrate:OPTical:USER:CHANnel:DISCard (*new*)
- :CALibrate:TIMEbase:SLOT:USER:CHANnel (*reserved*)

- :CALibrate:TIMebase:SLOT:USER:DISCard (*reserved*)
- :CALibrate:TIMebase:SLOT:USER:START (*reserved*)
- :CALibrate:TIMebase:SLOT:USER:STATus? (*reserved*)
- :CALibrate:TIMebase:SLOT:USER:STATus:DEtails? (*reserved*)
- :CALibrate:TIMebase:SLOT:USER:STATus:DTEMperature? (*reserved*)
- :CALibrate:TIMebase:SLOT:USER:STATus:TIME? (*reserved*)

## CHANnel Subsystem

- :CHANnel:SIRC:EPResets (*new*)
- :CHANnel:SIRC:EPResets:SElections? (*new*)

## CRECovey Subsystem

- :CRECovey:EHGain (*new*)
- :CRECovey:SSCLock (*new*)

## DISK Subsystem

Modified the method used to specify the file type and name when saving a screen image.

- :DISK:DWIZard:WAVE:IINTernal (*new*)
- :DISK:SIMage:FNAME (*modified*)
- :DISK:SIMage:FTYPE? (*modified*)

## FEYE Subsystem

- :FEYE:SPUI (*new*)
- :FEYE:UPLock (*new*)

## LTEST Subsystem

Modified the method used to specify the file type and name when saving a screen image file as a reporting action for an Acquisition Limit test, Measurement Limit test, Eye Mask Limit test, or Limit Line limit test.

- :LTEST:ACQuire:SIMage:FNAME (*modified*)
- :LTEST:ACQuire:SIMage:FTYPE? (*modified*)
- :LTEST:ACQuire:SWAVEform:CHANnel:FNAME (*modified*)
- :LTEST:ACQuire:SWAVEform:CHANnel:FTYPE (*new*)
- :LTEST:ACQuire:SWAVEform:CMODE:FNAME (*modified*)
- :LTEST:ACQuire:SWAVEform:CMODE:FTYPE (*new*)
- :LTEST:ACQuire:SWAVEform:DIFF:FNAME (*modified*)
- :LTEST:ACQuire:SWAVEform:DIFF:FTYPE (*new*)

- :LTEST:LLINE:SIMage:FNAME (*modified*)
- :LTEST:LLINE:SIMage:FTYPE? (*modified*)
- :LTEST:LLINE:SWAVEform:CHANnel:FNAME (*modified*)
- :LTEST:LLINE:SWAVEform:CHANnel:FTYPE (*new*)
- :LTEST:LLINE:SWAVEform:CMODE:FNAME (>*modified*)>
- :LTEST:LLINE:SWAVEform:CMODE:FTYPE (*new*)
- :LTEST:LLINE:SWAVEform:DIFF:FNAME (*modified*)
- :LTEST:LLINE:SWAVEform:DIFF:FTYPE (*new*)
- :LTEST:MEASure:SIMage:FNAME (*modified*)
- :LTEST:MEASure:SIMage:FTYPE? (*modified*)
- :LTEST:MEASure:SWAVEform:CHANnel:FNAME (*modified*)
- :LTEST:MEASure:SWAVEform:CHANnel:FTYPE (*new*)
- :LTEST:MEASure:SWAVEform:CMODE:FNAME (*modified*)
- :LTEST:MEASure:SWAVEform:CMODE:FTYPE (*new*)
- :LTEST:MEASure:SWAVEform:DIFF:FNAME (*modified*)
- :LTEST:MEASure:SWAVEform:DIFF:FTYPE (*new*)
- :LTEST:MTEST:SIMage:FNAME (*modified*)
- :LTEST:MTEST:SIMage:FTYPE? (*modified*)
- :LTEST:MTEST:SWAVEform:CHANnel:FNAME (*modified*)
- :LTEST:MTEST:SWAVEform:CHANnel:FTYPE (*new*)
- :LTEST:MTEST:SWAVEform:CMODE:FNAME (*modified*)
- :LTEST:MTEST:SWAVEform:CMODE:FTYPE (*new*)
- :LTEST:MTEST:SWAVEform:DIFF:FNAME (*modified*)
- :LTEST:MTEST:SWAVEform:DIFF:FTYPE (*new*)

## MEASure Subsystem

- :MEASure:EYE:OOMA:UNITs (*new*)
- :MEASure:EYE:TDEQ:OMA:METHod (*removed*)
- :MEASure:EYE:TDEQ:OMA:VALue (*removed*)
- :MEASure:JITTer:OJITter:JNU (*new*)
- :MEASure:JITTer:OJITter:JNU:DISPlay (*new*)
- :MEASure:JITTer:OJITter:JNU:ECATegory (*new*)
- :MEASure:JITTer:OJITter:JNU:LOCation? (*new*)
- :MEASure:JITTer:OJITter:JNU:SOURce (*new*)
- :MEASure:JITTer:OJITter:JNU:STATus? (*new*)
- :MEASure:JITTer:OJITter:JNU:STATus:DETAils? (*new*)
- :MEASure:JITTer:OJITter:JNU:STATus:REASon? (*new*)
- :MEASure:JITTer:OJITter:SNJU (*new*)
- :MEASure:JITTer:OJITter:J4U (*deprecated*)
- :MEASure:JITTer:OJITter:J4U:DISPlay (*deprecated*)
- :MEASure:JITTer:OJITter:J4U:ECATegory (*deprecated*)
- :MEASure:JITTer:OJITter:J4U:LOCation? (*deprecated*)

- :MEASure:JITTer:OJITter:J4U:SOURce (*deprecated*)
- :MEASure:JITTer:OJITter:J4U:STATus? (*deprecated*)
- :MEASure:JITTer:OJITter:J4U:STATus:DETAils? (*deprecated*)
- :MEASure:JITTer:OJITter:J4U:STATus:REASon? (*deprecated*)
- :MEASure:TDEC:LHTime (*new*)
- :MEASure:TDEC:RHTime (*new*)
- :MEASure:TDEQ:LHTime (*new*)
- :MEASure:TDEQ:OHSeparation (*new*)
- :MEASure:TDEQ:OHTHresholds (*new*)
- :MEASure:TDEQ:OHTime (*new*)
- :MEASure:TDEQ:RHTime (*new*)
- :MEASure:TDEQ:TALimit (*new*)

## SPRocess Subsystem

- :SPRocess:CONVolve:ALIGn (*new*)
- :SPRocess:DCONvolve:ALIGn (*new*)
- :SPRocess:DDEMBed:ALIGn (*new*)
- :SPRocess:DDECONvolve:ALIGn (*new*)
- :SPRocess:DECONvolve:ALIGn (*new*)
- :SPRocess:DEMBed:ALIGn (*new*)
- :SPRocess:FFT:NFRrequency (*new*)
- :SPRocess:TEQualizer:MNPRecursors (*new*)
- :SPRocess:TEQualizer:NPRecursors:AUTO (*new*)

## SYSTEM Subsystem

- :SYSTEM:LKEY:SOFTWARE:SUPPORT:EXPIration:DATE? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AEYE:ENABLEd? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AEYE:VERSion? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AFRemoval:ENABLEd? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AFRemoval:VERSion? (*new*)
- :SYSTEM:SOFTWARE:FEATures:ATDR:ENABLEd? (*new*)
- :SYSTEM:SOFTWARE:FEATures:ATDR:VERSion? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AWANalysis:EQUalizers:ENABLEd? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AWANalysis:EQUalizers:VERSion? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AWANalysis:UDOPerations:ENABLEd? (*new*)
- :SYSTEM:SOFTWARE:FEATures:AWANalysis:UDOPerations:VERSion? (*new*)
- :SYSTEM:SOFTWARE:FEATures:FEYE:ENABLEd? (*new*)
- :SYSTEM:SOFTWARE:FEATures:FEYE:VERSion? (*new*)
- :SYSTEM:SOFTWARE:FEATures:FLEX:ENABLEd? (*new*)
- :SYSTEM:SOFTWARE:FEATures:FLEX:VERSion? (*new*)
- :SYSTEM:SOFTWARE:FEATures:ISIM:ENABLEd? (*new*)

- :SYSTem:SOFTware:FEATures:ISIM:VERSion? (*new*)
- :SYSTem:SOFTware:FEATures:JITTer:ENABled? (*new*)
- :SYSTem:SOFTware:FEATures:JITTer:VERSion? (*new*)
- :SYSTem:SOFTware:FEATures:MEASure:TDEC:ENABled? (*new*)
- :SYSTem:SOFTware:FEATures:MEASure:TDEC:VERSion? (*new*)
- :SYSTem:SOFTware:FEATures:PAMN:ENABled? (*new*)
- :SYSTem:SOFTware:FEATures:PAMN:VERSion? (*new*)
- :SYSTem:SOFTware:FEATures:REPository:ENABled? (*new*)
- :SYSTem:SOFTware:FEATures:REPository:VERSion? (*new*)
- :SYSTem:SOFTware:FEATures:TDCQ:ENABled? (*new*)
- :SYSTem:SOFTware:FEATures:TDCQ:VERSion? (*new*)
- :SYSTem:SOFTware:FEATures:UDIMport:ENABled? (*new*)
- :SYSTem:SOFTware:FEATures:UDIMport:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:OTHer:DEMO:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:OTHer:DEMO:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:OTHer:DEMO:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AEYE:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AEYE:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AEYE:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AFRemoval:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AFRemoval:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AFRemoval:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AMPLitude:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AMPLitude:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AMPLitude:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:ATDR:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:ATDR:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:ATDR:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AWANalysis:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AWANalysis:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:AWANalysis:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:FEYE:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:FEYE:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:FEYE:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:FLEX:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:FLEX:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:FLEX:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:ISIM:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:ISIM:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:ISIM:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:JITTer:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:JITTer:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:JITTer:VERSion? (*new*)

- :SYSTem:SOFTware:LICenses:SFEature:PAMN:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:PAMN:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:PAMN:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:PRODUctivity:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:PRODUctivity:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:PRODUctivity:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:RDCA:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:RDCA:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:RDCA:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:REPository:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:REPository:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:REPository:VERSion? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:TDCQ:FEATure? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:TDCQ:INSTalled? (*new*)
- :SYSTem:SOFTware:LICenses:SFEature:TDCQ:VERSion? (*new*)
- :SYSTem:SOFTware:VERSion:DATE? (*new*)

## WAVEform Subsystem

- :WAVEform:EYE:XML:READ? (*new*)
- :WAVEform:EYE:XML:WRITe? (*new*)
- :WAVEform:XML:READ? (*new*)
- :WAVEform:XML:WRITe? (*new*)

# 23

## Revision A.05.71, January 2018

### New Features

- New TDECQ preset for Fiber Channel. Also changed the target SER and increased SER setting to three significant digits to reflect latest FC standard.
- Added Ethernet eye masks:
  - 100G 4WDM MSA Rx, rev 1.0 Mar 2017 (*Maskfile 025.78125 - 100G-4WDM\_Rx.mskx*)
  - 100G CWDM4 MSA Rx, rev 1.1 Nov 2015 (*Maskfile 025.78125 - 100G-CWDM4\_Rx.mskx*)

### Defects Fixed

- Fixed a bug where FlexEye SIRC didn't work when the channel wasn't displayed in the primary session.
- Fixed a bug where the Precision Timebase channels would be included in acquisition limits if "Show Precision Timebase Signals" was enabled.
- Fixed a bug in the `:MEAS:RESu1ts?` query for TDECQ and Partial TDECQ measurements.

# 24

## Revision A.05.70, December 2017

### New Features

- Support for the N8844A Data Analytics Web Service Software. The N8844A is a Keysight product that allows you to create a database repository server for storing FlexDCA scalar data and a data analytics web server for viewing, graphing, and sharing your data.
- For PAM4 waveforms in Eye mode, the TDECQ measurement now places more meaningful measurement annotations on the displayed waveform. In addition, pixels representing relative error contributions are colored red. Because TDECQ is a complicated measurement, four new complementary measurements have been added. These new measurements measure the contribution to TDECQ of *specific* portions of the PAM4 waveform:
  - Noise Margin (rms) used to perform a system-level test that is similar to TDECQ.
  - Partial SER used to inspect contributing sources of target Symbol Error Ratio (SER) for TDECQ.
  - Partial TDECQ used to inspect contributing sources of TDECQ.
  - Partial Noise Margin used to inspect contributing Noise Margin sources.
- The TDECQ equalizer now optionally supports *iterative optimization* as specified in the 802.3bs draft 3.1 standard.
- In Jitter mode, added three PAM4 Output Jitter measurements for the IEEE 802.3bs standard: **J4u**, **Jrms**, and **EOJ**.
- Added SIRC capability on N1092 M-Series modules for long patterns (e.g. PRBS-31).
- For Eye Mode's FlexEye Streaming application, added the ability to use SIRC (System Impulse Response Correction) on N1092 M-series modules on a per channel basis. SIRC is enabled within the FlexEye Streaming Setup dialog box.
- Improved throughput for Rapid Eye.
- Added the ability to save Eye mode's database as a CSV text file. Previously, the data could only be exported as a .cgsx file with the waveform data in binary.
- Added the ability to save waveform data as VSA recording files in Oscilloscope and Eye modes when pattern lock is turned on. The VSA file (.csv or .txt) can be imported into Keysight's 89600 VSA and WLA software. The 89600 is a set of tools for signal demodulation and vector signal analysis.
- In Jitter mode, the currently displayed jitter data (graphs and scalar information) can now be placed directly into jitter data memory. It is no longer required to save the currently displayed jitter data into a file before it can be imported into the Jitter Data Memory.



- For saving screen images, waveforms, eye database, and jitter database files, changed the **File > Save** menu and dialog box. Previously the file name extension determined the file type. Now, you separately specify the file format and name. Under remote control, the `:DISK` subsystem is still used to save waveform and database files.
- The `:DISK` subsystem commands that load saved files into memory have been deprecated. New commands have been created within the `:WMEemory`, `:EMEMory`, and `:JDMemory` subsystems to load saved files into waveform memory, eye database memory, and jitter database memory.
- When making oscilloscope mode or TDR/TDT mode delta-time measurements, the maximum *stop* edge has been increased from edge 100 to edge 200.

## New Instrument Messages

Added the following new instrument messages. Instrument messages are displayed at the bottom of the display and are returned by the `:SYSTem:ERRor:NEXT?` command.

- 147. The trigger divide ratio was adjusted to ...
- 148. The symbol rate *file* must be divisible by the trigger frequency *count*
- 149. The trigger frequency must be greater than...
- 350. Repository Error
- 351. Repository operation timed out
- 352. Repository operation canceled by user
- 353. Connected to repository: *<URI>*
- 355. *<number>* measurement(s) published to repository
- 357. There are no valid active measurement results to publish
- 358. There are no new measurement results since last publish
- 359. Please specify a valid repository server URI
- 361. There are no cached credentials available for server: *<URL >*
- 362. Cannot publish without a connection to a repository

## Defects Fixed

- Fixed Autoscale errors that prevented signal type detection during pattern autoscale and, when the previous signal type was PAM4, proper detection of a clock.
- Fixed a problem that prevented the proper scaling and offset applied to optical signals during an autoscale.
- Resolved an issue where clock recovery would not relock on startup. Now, on power up, FlexDCA attempts to lock a CDR module if that module is the trigger source.
- Fixed an issue when using TDR de-embedding with an 54754A module that caused improper fixture characterized with AFR.
- Fixed an error that caused special characters within Documentation Wizard waveform files to be incorrect.

## CALibrate Subsystem

- `:CALibrate:FRAME:TIMEbase:STARt` (*new, reserved for future use*)

## CRECovery Subsystem

- :CRECovery:ELEVel (*new*)

## DISK Subsystem

The `:DISK:node:RECa11` commands that are used to load waveform data files into FlexDCA's waveform, color-grade/gray-scale, and jitter database have been deprecated and replaced by `:FILE:LOAD` commands in the individual memory subsystems. the associated `:DISK:node:RECa11:DESTination` child commands are no longer needed because the `:FILE:LOAD` commands specify the memory number to import the file's data into. New commands have also been added to the individual memory subsystems that specify the name of the file to import. So, the `:DISK` subsystem is used to save waveforms to files and the `:WMEemory`, `:EMEMory`, and `:JDMemory` subsystems are used to import a file's data back into FlexDCA.

- :DISK:DWIZard:OJITter:SDATa (*new*)
- :DISK:SIMage:FNAME:AUPDate (*new*)
- :DISK:SIMage:FTYPE (*new*)
- :DISK:WAVEform:SAVE:VSA:DTYPE (*new*)
- :DISK:WAVEform:SAVE:VSA:QSOURce (*new*)
- :DISK:EYE:FNAME:AUPDate (*new*)
- :DISK:EYE:FNAME:USTandard (*new*)
- :DISK:EYE:SAVE:FTYPE (*new*)
- :DISK:EYE:RECall (*deprecated*)
- :DISK:EYE:RECall:DESTination (*deprecated*)
- :DISK:JDATabase:FNAME:AUPDate (*new*)
- :DISK:JDATabase:FNAME:USTandard (*new*)
- :DISK:JDATabase:RECall (*deprecated*)
- :DISK:JDATabase:RECall:DESTination (*deprecated*)
- :DISK:JSANalysis:FNAME:AUPDate (*new*)
- :DISK:JSANalysis:FNAME:USTandard (*new*)
- :DISK:SIMage:FNAME:USTandard (*new*)
- :DISK:WAVEform:FNAME:AUPDate (*new*)
- :DISK:WAVEform:FNAME:USTandard (*new*)
- :DISK:WAVEform:LINTerpolate (*new*)
- :DISK:WAVEform:LSDigits (*new*)
- :DISK:WAVEform:LSDigits:NUMber (*new*)
- :DISK:WAVEform:SAVE:FTYPE (*new*)
- :DISK:WAVEform:SAVE:VSA:DTYPE (*new*)
- :DISK:WAVEform:SAVE:VSA:QSOURce (*new*)
- :DISK:WAVEform:FFORmat (*deprecated*)
- :DISK:WAVEform:SAVE:FLAYout (*deprecated*)
- :DISK:WAVEform:RECall (*deprecated*)
- :DISK:WAVEform:RECall:DESTination (*deprecated*)

## DISPlay Subsystem

- :DISPlay:JITTer:OJITter:ECATegory (*new*)

## EMEMory Subsystem

- :EMEMory:DStatus? (*new*)
- :EMEMory:DStatus:REASon? (*new*)
- :EMEMory:FILE:LOAD (*new*)
- :EMEMory:FILE:NAME (*new*)
- :EMEMory:UNAMe:UFName (*new*)

## FEYE Subsystem

- :FEYE:CHANnel:SIRC

## JDMemory Subsystem

- :JDMemory:CLEar (*new*)
- :JDMemory:DStatus? (*new*)
- :JDMemory:DStatus:REASon? (*new*)
- :JDMemory:FILE:LOAD (*new*)
- :JDMemory:FILE:NAME (*new*)
- :JDMemory:LOAD (*new*)
- :JDMemory:LOAD:SOURce (*new*)

## JSAMemory Subsystem

- :JSAMemory:CLEar (*new*)
- :JSAMemory:DStatus? (*new*)
- :JSAMemory:DStatus:REASon? (*new*)
- :JSAMemory:FILE:LOAD (*new*)
- :JSAMemory:FILE:NAME (*new*)
- :JSAMemory:LOAD (*new*)
- :JSAMemory:LOAD:SOURce (*new*)

## LTESt Subsystem

- :LTESt:ACQuire:SIMAge:FNAME:AUPDate (*new*)
- :LTESt:ACQuire:SIMAge:FNAME:UStandard (*new*)
- :LTESt:ACQuire:SIMAge:FTYPE (*new*)

- :LTEST:LLINE:SIMage:FNAME:AUPDate (*new*)
- :LTEST:LLINE:SIMage:FNAME:UStandard (*new*)
- :LTEST:LLINE:SIMage:FTYPE (*new*)
- :LTEST:MEASure:SIMage:FNAME:AUPDate (*new*)
- :LTEST:MEASure:SIMage:FNAME:UStandard (*new*)
- :LTEST:MEASure:SIMage:FTYPE (*new*)
- :LTEST:MTEST:SIMage:FNAME:AUPDate (*new*)
- :LTEST:MTEST:SIMage:FNAME:UStandard (*new*)
- :LTEST:MTEST:SIMage:FTYPE (*new*)

## MEASure Subsystem

- :MEASure:EYE:NMARgin (*new*)
- :MEASure:EYE:NMARgin:LOCation? (*new*)
- :MEASure:EYE:NMARgin:SOURce (*new*)
- :MEASure:EYE:NMARgin:STATus? (*new*)
- :MEASure:EYE:NMARgin:STATus:REASon? (*new*)
- :MEASure:EYE:PNMargin (*new*)
- :MEASure:EYE:PNMargin:EYE (*new*)
- :MEASure:EYE:PNMargin:LOCation? (*new*)
- :MEASure:EYE:PNMargin:SIDe (*new*)
- :MEASure:EYE:PNMargin:SOURce (*new*)
- :MEASure:EYE:PNMargin:STATus? (*new*)
- :MEASure:EYE:PNMargin:STATus:REASon? (*new*)
- :MEASure:EYE:PSER (*new*)
- :MEASure:EYE:PSER:EYE (*new*)
- :MEASure:EYE:PSER:LOCation? (*new*)
- :MEASure:EYE:PSER:SIDe (*new*)
- :MEASure:EYE:PSER:SOURce (*new*)
- :MEASure:EYE:PSER:STATus? (*new*)
- :MEASure:EYE:PSER:STATus:REASon? (*new*)
- :MEASure:EYE:PTDeq (*new*)
- :MEASure:EYE:PTDeq:EYE (*new*)
- :MEASure:EYE:PTDeq:LOCation? (*new*)
- :MEASure:EYE:PTDeq:SIDe (*new*)
- :MEASure:EYE:PTDeq:SOURce (*new*)
- :MEASure:EYE:PTDeq:STATus? (*new*)
- :MEASure:EYE:PTDeq:STATus:REASon? (*new*)
- :MEASure:JITTer:OJITter:EOJ (*new*)
- :MEASure:JITTer:OJITter:EOJ:DISPlay (*new*)
- :MEASure:JITTer:OJITter:EOJ:ECATegory (*new*)
- :MEASure:JITTer:OJITter:EOJ:LOCation? (*new*)
- :MEASure:JITTer:OJITter:EOJ:SOURce (*new*)

- :MEASure:JITTer:OJITter:EOJ:STATus? (*new*)
- :MEASure:JITTer:OJITter:EOJ:STATus:REASon? (*new*)
- :MEASure:JITTer:OJITter:HISTogram? (*new*)
- :MEASure:JITTer:OJITter:HISTogram:SAMPles? (*new*)
- :MEASure:JITTer:OJITter:HISTogram:XINCrement? (*new*)
- :MEASure:JITTer:OJITter:HISTogram:XORigin? (*new*)
- :MEASure:JITTer:OJITter:J4U (*new*)
- :MEASure:JITTer:OJITter:J4U:DISPlay (*new*)
- :MEASure:JITTer:OJITter:J4U:ECATegory (*new*)
- :MEASure:JITTer:OJITter:J4U:LOCation? (*new*)
- :MEASure:JITTer:OJITter:J4U:SOURce (*new*)
- :MEASure:JITTer:OJITter:J4U:STATus? (*new*)
- :MEASure:JITTer:OJITter:J4U:STATus:DETAils? (*new*)
- :MEASure:JITTer:OJITter:J4U:STATus:REASon? (*new*)
- :MEASure:JITTer:OJITter:JRMS:DISPlay (*new*)
- :MEASure:JITTer:OJITter:JRMS:ECATegory (*new*)
- :MEASure:JITTer:OJITter:JRMS (*new*)
- :MEASure:JITTer:OJITter:JRMS:LOCation? (*new*)
- :MEASure:JITTer:OJITter:JRMS:SOURce (*new*)
- :MEASure:JITTer:OJITter:JRMS:STATus? (*new*)
- :MEASure:JITTer:OJITter:JRMS:STATus:REASon? (*new*)
- :MEASure:JITTer:OJITter:STATe (*new*)
- :MEASure:JITTer:PAM:EYE:LIST:REMOve (*new*)
- :MEASure:JITTer:PAM:OJITter:LIST:SElect (*new*)
- :MEASure:JITTer:PAM:LEVel:LIST:REMOve (*new*)

## REPository Subsystem (*new*)

- :REPository:CANCel (*new*)
- :REPository:CONNect (*new*)
- :REPository:CONNect:STATe? (*new*)
- :REPository:DISConnect (*new*)
- :REPository:DSET (*new*)
- :REPository:DUT:MODEl (*new*)
- :REPository:DUT:SERial (*new*)
- :REPository:MEASure:AMPLitude:SElection (*new*)
- :REPository:MEASure:AMPLitude:SElection:ALL (*new*)
- :REPository:MEASure:AMPLitude:SElection:CLEar (*new*)
- :REPository:MEASure:CRECoverY:SElection (*new*)
- :REPository:MEASure:CRECoverY:SElection:ALL (*new*)
- :REPository:MEASure:CRECoverY:SElection:CLEar (*new*)
- :REPository:MEASure:EYE:SElection (*new*)
- :REPository:MEASure:EYE:SElection:ALL (*new*)

- :REPository:MEASure:EYE:SELECTION:CLEar (*new*)
- :REPository:MEASure:HISTogram:SELECTION (*new*)
- :REPository:MEASure:HISTogram:SELECTION:ALL (*new*)
- :REPository:MEASure:HISTogram:SELECTION:CLEar (*new*)
- :REPository:MEASure:JITTer:SELECTION (*new*)
- :REPository:MEASure:JITTer:SELECTION:ALL (*new*)
- :REPository:MEASure:JITTer:SELECTION:CLEar (*new*)
- :REPository:MEASure:MTESt:SELECTION (*new*)
- :REPository:MEASure:MTESt:SELECTION:ALL (*new*)
- :REPository:MEASure:MTESt:SELECTION:CLEar (*new*)
- :REPository:MEASure:OSCilloscope:SELECTION (*new*)
- :REPository:MEASure:OSCilloscope:SELECTION:ALL (*new*)
- :REPository:MEASure:OSCilloscope:SELECTION:CLEar (*new*)
- :REPository:MEASure:PAM:EYE:SELECTION (*new*)
- :REPository:MEASure:PAM:EYE:SELECTION:ALL (*new*)
- :REPository:MEASure:PAM:EYE:SELECTION:CLEar (*new*)
- :REPository:MEASure:PAM:OJITter:SELECTION (*new*)
- :REPository:MEASure:PAM:OJITter:SELECTION:ALL (*new*)
- :REPository:MEASure:PAM:OJITter:SELECTION:CLEar (*new*)
- :REPository:MEASure:PAM:LEVel:SELECTION (*new*)
- :REPository:MEASure:PAM:LEVel:SELECTION:ALL (*new*)
- :REPository:MEASure:PAM:LEVel:SELECTION:CLEar (*new*)
- :REPository:MEASure:PMODE (*new*)
- :REPository:MEASure:PUBLish:LLIMit (*new*)
- :REPository:MEASure:PUBLish:NAME (*new*)
- :REPository:MEASure:PUBLish:SOURce:LOCation (*new*)
- :REPository:MEASure:PUBLish:SOURce:TYPE (*new*)
- :REPository:MEASure:PUBLish:STAtE (*new*)
- :REPository:MEASure:PUBLish:ULIMit (*new*)
- :REPository:MEASure:SELECTION:ALL (*new*)
- :REPository:MEASure:SELECTION:CLEar (*new*)
- :REPository:MEASure:TDR:SELECTION (*new*)
- :REPository:MEASure:TDR:SELECTION:ALL (*new*)
- :REPository:MEASure:TDR:SELECTION:CLEar (*new*)
- :REPository:PUBLish (*new*)
- :REPository:SERVer:NAME (*new*)
- :REPository:SERVer:VERSion? (*new*)
- :REPository:USER (*new*)

## SPRocess Subsystem

- :SPRocess:TEQualizer:TAPS:IOPTimize (*new*)
- :SPRocess:TEQualizer:TAPS:SEED (*new*)

- :SPRocess:TEQualizer:TAPS:SEED:COpy (*new*)
- :SPRocess:TEQualizer:TAPS:SEED:ENABle (*new*)

## STATus Subsystem

- :STATus:REPository:EVENT? (*new*)
- :STATus:REPository:ENABle (*new*)

## SYSTEM Subsystem

- :SYSTem:MPButton:SIMage:FTYPE (*new*)

## TDR Subsystem

- :TDR:SPMemory:DStatus? (*new*)
- :TDR:SPMemory:DStatus:REASon? (*new*)
- :TDR:SPMemory:FILE:LOAD (*new*)
- :TDR:SPMemory:FILE:NAME (*new*)
- :TDR:SPMemory:LOAD
- :TDR:SPMemory:LOAD:SOURce (*new*)
- :TDR:SPMemory:SOURce (*deprecated*)

## TRIGger Subsystem

- :TRIGger:MRATE? (*new*)

## WMEMory Subsystem

- :WMEMory:DStatus? (*new*)
- :WMEMory:DStatus:REASon? (*new*)
- :WMEMory:FILE:LOAD (*new*)
- :WMEMory:FILE:NAME (*new*)
- :WMEMory:UNAME:UFName (*new*)

## FlexDCA Revision A.05.63

### Defects Fixed

- Fixed a typographical error in the reference bandwidth for 53.125 GbD. The bandwidth was listed as 38.4 GHz instead of 38.7 GHz.
- Fixed an erroneous status message on TDECQ.
- Improved the performance of Autoscale in FlexEye.

- Fixed a synchronization error in the remote commands for saving screen captures.
- Fixed a synchronization error in the remote commands for changing the results panel's tab size.
- Improved Jitter Mode behavior with signal processing operators that caused display clipping.
- Added the CPRI 48x rate (24.33024 GBd) and fixed the CPRI 20x rate (10.1376 GBd)



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## Revision A.05.63, September 2017

### Defects Fixed

- Fixed a typographical error in the reference bandwidth for 53.125 GBd. The bandwidth was listed as 38.4 GHz instead of 38.7 GHz.
- Fixed an erroneous status message on TDECQ.
- Improved the performance of Autoscale in FlexEye.
- Fixed a synchronization error in the remote commands for saving screen captures.
- Fixed a synchronization error in the remote commands for changing the results panel's tab size.
- Improved Jitter Mode behavior with signal processing operators that caused display clipping.
- Added the CPRI 48x rate (24.33024 GBd) and fixed the CPRI 20x rate (10.1376 GBd)

# 26

## Revision A.05.62, June 2017

- N1046A 75, 85, and >100 GHz electrical module. One, two, or four channel remote heads.
- N1092X extension to SIRC to include enhanced BW for 53 Gbd TDECQ reference receiver.
- Made the following changes to the user-defined measurements and user-defined operators:
  - The input variable *BitRate* that is passed to the script has been deprecated. Instead, the new *SymbolRate* input variable is passed. Python and compiled MATLAB scripts will remain backwards compatible so you do not need to update your existing scripts.
  - For user measurements, the *BER* and *bits* measurement units are no longer supported. The new *baud* (Bd) measurement unit is used instead.
- In response to the change in the *IEEE 802.3bs Draft* specification:
  - Added the following two new factory Presets for the TDECQ reference equalizer. The *IEEE 802.3bs Draft 2.2* preset specifies two taps per UI. The *IEEE 802.3bs Draft 3.2* preset specifies one tap per UI.
    - IEEE 802.3bs Draft 2.2 (factory)
    - IEEE 802.3bs Draft 3.2 (factory)
  - For TDECQ measurements, the oscilloscope's reference bandwidth has been decreased from (0.75)(symbol rate) to approximately (0.5)(symbol rate).
  - Reference filter selections in the drop-down lists for optical channels now include additional information for both hardware filters and SIRC rates. In addition to the baud rate, the filter name now includes the 3 dB frequency. Previously, only the baud rate was displayed. This change allows for additional selections within the same data rate. For example, the following three SIRC filters may now be available at 26.5625 GBd:
    - 26.5625 GBd NRZ
    - 26.5625 GBd TDEC
    - 26.5625 GBd TDECQ

### Defects Fixed

- Fixed a defect that could prevent querying the statistics (Min, Max, Mean) of the TDECQ measurements via SCPI.
- Fixed a defect that resulted in the message “*The data analysis engine has recovered from an unexpected software problem*” when optimizing the taps of the TDECQ equalizer.
- Fixed an issue that caused Autoscale to detect the incorrect data rate in some cases when using Free Run with Precision Timebase.

- Fixed a condition where repeatedly locking an N1076A to a stressed signal using SCPI commands resulted in a SCPI timeout that occurred for all SCPI commands.
- Fixed an issue where an N1076A's front-panel *Locked* indicator light remained on even when the N1076A was not locked.
- Fixed an error that prevented simultaneous data acquisition from multiple acquisitions systems such as an N1076A with JSA and an N109X-series sampling oscilloscope.

# 27

## Revision A.05.61, March 2017

### New Features

- For RIN measurements in Jitter mode, you can now select results based on FlexDCA's standard algorithm or the IEEE algorithm. The result of the IEEE based measurement is approximately 6 dB greater than FlexDCA's standard measurement.

### Defects Fixed

- In remote mode, the clock recovery **Attempting Lock** dialog box is no longer displayed.

### MEASure Subsystem

- :AMPLitude:DEFine:RINoise:DEFinition (*new*)

# 28

## Revision A.05.60, January 2017

### New Features

- Jitter Mode now supports measurements on PAM4 signals.
- With the advent of PAM4 support, some terms shown in the GUI, measurements, and remote programming commands have been renamed to support these usage changes. Click [here](#) for information on UIs versus symbols. The following list includes some of the changes:
  - bits to unit interval (UI)
  - bits/second (b/s) to Baud (Bd)
  - data rate to symbol rate
  - bit rate to symbol rate
  - samples/bit to samples/UI
  - BER (Bit Error Rate) to SER (Symbol Error Rate)
  - Jitter mode's DDJ Vs Bit graph has been renamed DDJ Vs Symbol.
  - Jitter mode's ISI Vs Bit graph has been renamed ISI Vs Symbol.
  - Jitter mode's BER Jitter Bathtub graph has been renamed SER Jitter Bathtub.
  - Jitter mode's BER Amplitude Bathtub graph has been renamed SER Amplitude Bathtub.
  - Changed the `:DISPlay:JITTer:GRAPh:TYPE` command's arguments that are used to display two of the DDJ Vs Symbol and ISI Vs Symbol graphs.
- Enhanced selections in the PAM-N Analysis Setup dialog box.
- Added new Thresholds tab to the Jitter Mode Measurement Setup dialog box.
- In Eye/Mask Mode, added the new PAM4 Outer Extinction Ratio measurement.
- In Eye/Mask Mode, added the new PAM4 Outer OMA measurement.
- In Eye/Mask Mode, added the new PAM4 TDECQ measurement.
- Added new signal processing TDECQ Equalizer Operator.
- To the following signal processing operators, added the ability to preserve input waveform noise on the output waveform:
  - Bessel operator
  - Butterworth operator
  - Continuous Time Linear Equalizer (CTLE) operator

- Linear Feedforward Equalizer operator
- Gaussian operator
- Sin(x)/x operator
- TDECQ Equalizer operator
  
- In Jitter Mode, when the source is a PAM4 waveform, the **Jitter** and **Amplitude** NRZ results tables are replaced by the PAM4 **Eye** and **Level** results tables.
- This help system (*FlexDCA.chm*) can now be viewed on mobile devices *depending* on the operating system and installed CHM reader application. This help has been tested on an iPhone 5 and iPad mini with the **CHM+ Reader** application installed from the Apple's App store. The use of a stylus is recommended.

## Defects Fixed

- Corrected an error in the following 100G-SR4 Ethernet eye mask: 25.78125 - 100GBASE-SR4\_Rx\_SEC\_Optical.mskx. The error was in the definition of Standard Mask Violations for Region 1.

## ACQUIRE Subsystem

- :ACQUIRE:RSPec (*modified*)
- :ACQUIRE:SPUI (*new*)
- :ACQUIRE:SPUI:MODE (*new*)
- :ACQUIRE:SPBit (*deprecated*)
- :ACQUIRE:SPBit:MODE (*deprecated*)

## CRECOVERY Subsystem

- :CRECOVERY:ADRatio? (*new*)

## DISK Subsystem

- :DISK:DWIZard:JPEYe:SDATa (*new*)
- :DISK:DWIZard:JPLevel:SDATa (*new*)

## DISPLAY Subsystem

- :DISPLAY:AMPLitude:LEVel (*modified*)
- :DISPLAY:JITTer:ASpectrum:EDGE (*new*)
- :DISPLAY:JITTer:EYE (*new*)
- :DISPLAY:JITTer:GRAPh:TYPE (*modified*)
- :DISPLAY:JITTer:SGRaph:RANGe (*new*)
- :DISPLAY:JITTer:SGRaph:STARt (*new*)
- :DISPLAY:JITTer:DDJVsbIt:NBITs (*deprecated*)
- :DISPLAY:JITTer:DDJVsbIt:STARt (*deprecated*)

## MEASure Subsystem

Substantial changes have been made to the MEASure subsystem's AMPLitude-series commands, which initiate Jitter Mode's interference/noise measurements. For example, one new NRZ/PAM4 compatible command replaces and deprecates two current NRZ compatible commands. The new command applies to both NRZ and PAM4 signals and comes with a new :LEVe1 child command that selects the desired level to measure. In addition, BER commands have been replaced by SER commands. For Jitter Mode's measurements that are based on an eye, a new :EYE child command has been added to select the desired eye to measure on PAM4 signals.

The following table compares three deprecated with their new replacement commands.

Although the deprecated commands continue to be available, it is strongly recommended that you use the new commands.

Table 1. Examples of Old and New Commands

New Commands	Old Deprecated Commands
:MEASure:AMPLitude:HSYMBOL	:MEASure:AMPLitude:HONe :MEASure:AMPLitude:HZERo
:MEASure:AMPLitude:SERFloor	:MEASure:AMPLitude:BERFloor
:MEASure:AMPLitude:SERLimit	:MEASure:AMPLitude:BERLimit

- Bit Number of Highest Level (at Specified Level)
  - :MEASure:AMPLitude:HSYMBOL (*new*)
  - :MEASure:AMPLitude:HSYMBOL:LEVel (*new*)
  - :MEASure:AMPLitude:HSYMBOL:LOCation? (*new*)
  - :MEASure:AMPLitude:HSYMBOL:SOURce (*new*)
  - :MEASure:AMPLitude:HSYMBOL:STATus? (*new*)
  - :MEASure:AMPLitude:HSYMBOL:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:HONe (*deprecated*)
  - :MEASure:AMPLitude:HONe:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:HONe:SOURce (*deprecated*)
  - :MEASure:AMPLitude:HONe:STATus? (*deprecated*)
  - :MEASure:AMPLitude:HONe:STATus:REASon? (*deprecated*)
  - :MEASure:AMPLitude:HZERo (*deprecated*)
  - :MEASure:AMPLitude:HZERo:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:HZERo:SOURce (*deprecated*)
  - :MEASure:AMPLitude:HZERo:STATus? (*deprecated*)
  - :MEASure:AMPLitude:HZERo:STATus:REASon? (*deprecated*)
- Bit Number of Lowest Level (at Specified Level)
  - :MEASure:AMPLitude:LSYMBOL (*new*)
  - :MEASure:AMPLitude:LSYMBOL:LEVel (*new*)
  - :MEASure:AMPLitude:LSYMBOL:LOCation? (*new*)

- :MEASure:AMPLitude:LSYMBOL:SOURce (*new*)
- :MEASure:AMPLitude:LSYMBOL:STATus? (*new*)
- :MEASure:AMPLitude:LSYMBOL:STATus:REASon? (*new*)
- :MEASure:AMPLitude:LZERo (*deprecated*)
- :MEASure:AMPLitude:LZERo:LOCation? (*deprecated*)
- :MEASure:AMPLitude:LZERo:SOURce (*deprecated*)
- :MEASure:AMPLitude:LZERo:STATus? (*deprecated*)
- :MEASure:AMPLitude:LZERo:STATus:REASon? (*deprecated*)
- :MEASure:AMPLitude:LONe (*deprecated*)
- :MEASure:AMPLitude:LONe:LOCation? (*deprecated*)
- :MEASure:AMPLitude:LONe:SOURce (*deprecated*)
- :MEASure:AMPLitude:LONe:STATus? (*deprecated*)
- :MEASure:AMPLitude:LONe:STATus:REASon? (*deprecated*)
- Deterministic Interference
  - :MEASure:AMPLitude:DI (*new*)
  - :MEASure:AMPLitude:DI:LEVel (*new*)
  - :MEASure:AMPLitude:DI:LOCation? (*new*)
  - :MEASure:AMPLitude:DI:SOURce (*new*)
  - :MEASure:AMPLitude:DI:STATus? (*new*)
  - :MEASure:AMPLitude:DI:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:DIONes (*deprecated*)
  - :MEASure:AMPLitude:DIONes:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:DIONes:SOURce (*deprecated*)
  - :MEASure:AMPLitude:DIONes:STATus? (*deprecated*)
  - :MEASure:AMPLitude:DIONes:STATus:REASon? (*deprecated*)
  - :MEASure:AMPLitude:DIZeros (*deprecated*)
  - :MEASure:AMPLitude:DIZeros:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:DIZeros:SOURce (*deprecated*)
  - :MEASure:AMPLitude:DIZeros:STATus? (*deprecated*)
  - :MEASure:AMPLitude:DIZeros:STATus:REASon? (*deprecated*)
- Eye Height
  - :MEASure:AMPLitude:EHEight (*new*)
  - :MEASure:AMPLitude:EHEight:EYE (*new*)
  - :MEASure:AMPLitude:EHEight:LOCation? (*new*)
  - :MEASure:AMPLitude:EHEight:SOURce (*new*)
  - :MEASure:AMPLitude:EHEight:STATus? (*new*)
  - :MEASure:AMPLitude:EHEight:STATus:REASon? (*new*)
- Eye Opening
  - :MEASure:AMPLitude:EOPening:EYE (*new*)
- Inter-Symbol Interference



- :MEASure:AMPLitude:ISI (*new*)
  - :MEASure:AMPLitude:ISI:LEVel (*new*)
  - :MEASure:AMPLitude:ISI:LOCation? (*new*)
  - :MEASure:AMPLitude:ISI:SOURce (*new*)
  - :MEASure:AMPLitude:ISI:STATus? (*new*)
  - :MEASure:AMPLitude:ISI:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:ISIOnes (*deprecated*)
  - :MEASure:AMPLitude:ISIOnes:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:ISIOnes:SOURce (*deprecated*)
  - :MEASure:AMPLitude:ISIOnes:STATus? (*deprecated*)
  - :MEASure:AMPLitude:ISIOnes:STATus:REASon? (*deprecated*)
  - :MEASure:AMPLitude:ISIZeros (*deprecated*)
  - :MEASure:AMPLitude:ISIZeros:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:ISIZeros:SOURce (*deprecated*)
  - :MEASure:AMPLitude:ISIZeros:STATus? (*deprecated*)
  - :MEASure:AMPLitude:ISIZeros:STATus:REASon? (*deprecated*)
- Inter-Symbol Interference Versus Symbol
    - :MEASure:AMPLitude:ISISymbol? (*new*)
    - :MEASure:AMPLitude:ISISymbol:HIGHest? (*new*)
    - :MEASure:AMPLitude:ISISymbol:LOWest? (*new*)
    - :MEASure:AMPLitude:ISISymbol:SYMBols? (*new*)
    - :MEASure:AMPLitude:ISIVsbit? (*deprecated*)
    - :MEASure:AMPLitude:ISIVsbit:BITS (*deprecated*)
    - :MEASure:AMPLitude:ISIVsbit:HIGHest (*deprecated*)
    - :MEASure:AMPLitude:ISIVsbit:LOWest (*deprecated*)
- Periodic Interference / BIR (rms) (Bounded Uncorrelated Interference)
    - :MEASure:AMPLitude:PIR (*new*)
    - :MEASure:AMPLitude:PIR:LEVel (*new*)
    - :MEASure:AMPLitude:PIR:LOCation? (*new*)
    - :MEASure:AMPLitude:PIR:SOURce (*new*)
    - :MEASure:AMPLitude:PIR:STATus? (*new*)
    - :MEASure:AMPLitude:PIR:STATus:REASon? (*new*)
    - :MEASure:AMPLitude:PIROnes (*deprecated*)
    - :MEASure:AMPLitude:PIROnes:LOCation? (*deprecated*)
    - :MEASure:AMPLitude:PIROnes:SOURce (*deprecated*)
    - :MEASure:AMPLitude:PIROnes:STATus? (*deprecated*)
    - :MEASure:AMPLitude:PIROnes:STATus:REASon? (*deprecated*)
    - :MEASure:AMPLitude:PIRZeros (*deprecated*)
    - :MEASure:AMPLitude:PIRZeros:LOCation? (*deprecated*)
    - :MEASure:AMPLitude:PIRZeros:SOURce (*deprecated*)
    - :MEASure:AMPLitude:PIRZeros:STATus? (*deprecated*)

- :MEASure:AMPLitude:PIRZeros:STATus:REASon? (*deprecated*)
- :MEASure:AMPLitude:BIROnes (*deprecated*)
- :MEASure:AMPLitude:BIROnes:LOCation? (*deprecated*)
- :MEASure:AMPLitude:BIROnes:SOURce (*deprecated*)
- :MEASure:AMPLitude:BIROnes:STATus? (*deprecated*)
- :MEASure:AMPLitude:BIROnes:STATus:REASon? (*deprecated*)
- :MEASure:AMPLitude:BIrZeros (*deprecated*)
- :MEASure:AMPLitude:BIrZeros:LOCation? (*deprecated*)
- :MEASure:AMPLitude:BIrZeros:SOURce (*deprecated*)
- :MEASure:AMPLitude:BIrZeros:STATus? (*deprecated*)
- :MEASure:AMPLitude:BIrZeros:STATus:REASon? (*deprecated*)
- Periodic Interference (dual-dirac) or BUI (Bounded Uncorrelated Interference)
  - :MEASure:AMPLitude:PI (*new*)
  - :MEASure:AMPLitude:PI:LEVel (*new*)
  - :MEASure:AMPLitude:PI:LOCation? (*new*)
  - :MEASure:AMPLitude:PI:SOURce (*new*)
  - :MEASure:AMPLitude:PI:STATus? (*new*)
  - :MEASure:AMPLitude:PI:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:PIONes (*deprecated*)
  - :MEASure:AMPLitude:PIONes:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:PIONes:SOURce (*deprecated*)
  - :MEASure:AMPLitude:PIONes:STATus? (*deprecated*)
  - :MEASure:AMPLitude:PIONes:STATus:REASon? (*deprecated*)
  - :MEASure:AMPLitude:PIZeros (*deprecated*)
  - :MEASure:AMPLitude:PIZeros:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:PIZeros:SOURce (*deprecated*)
  - :MEASure:AMPLitude:PIZeros:STATus? (*deprecated*)
  - :MEASure:AMPLitude:PIZeros:STATus:REASon? (*deprecated*)
  - :MEASure:AMPLitude:BUIONes (*deprecated*)
  - :MEASure:AMPLitude:BUIONes:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:BUIONes:SOURce (*deprecated*)
  - :MEASure:AMPLitude:BUIONes:STATus? (*deprecated*)
  - :MEASure:AMPLitude:BUIONes:STATus:REASon? (*deprecated*)
  - :MEASure:AMPLitude:BUIZeros (*deprecated*)
  - :MEASure:AMPLitude:BUIZeros:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:BUIZeros:SOURce (*deprecated*)
  - :MEASure:AMPLitude:BUIZeros:STATus? (*deprecated*)
  - :MEASure:AMPLitude:BUIZeros:STATus:REASon? (*deprecated*)
- Q Measurement
  - :MEASure:AMPLitude:Q:EYE (*new*)
- Random Noise

- :MEASure:AMPLitude:RN (*new*)
- :MEASure:AMPLitude:RN:LEVel (*new*)
- :MEASure:AMPLitude:RN:LOCation? (*new*)
- :MEASure:AMPLitude:RN:SOURce (*new*)
- :MEASure:AMPLitude:RN:STATus? (*new*)
- :MEASure:AMPLitude:RN:STATus:REASon? (*new*)
- :MEASure:AMPLitude:RNONes (*deprecated*)
- :MEASure:AMPLitude:RNONes:LOCation? (*deprecated*)
- :MEASure:AMPLitude:RNONes:SOURce (*deprecated*)
- :MEASure:AMPLitude:RNONes:STATus? (*deprecated*)
- :MEASure:AMPLitude:RNONes:STATus:REASon? (*deprecated*)
- :MEASure:AMPLitude:RNZeros (*deprecated*)
- :MEASure:AMPLitude:RNZeros:LOCation? (*deprecated*)
- :MEASure:AMPLitude:RNZeros:SOURce (*deprecated*)
- :MEASure:AMPLitude:RNZeros:STATus? (*deprecated*)
- :MEASure:AMPLitude:RNZeros:STATus:REASon? (*deprecated*)
- SER (Symbol Error Rate) Floor
  - :MEASure:AMPLitude:SERFloor (*new*)
  - :MEASure:AMPLitude:SERFloor:EYE (*new*)
  - :MEASure:AMPLitude:SERFloor:LOCation? (*new*)
  - :MEASure:AMPLitude:SERFloor:SOURce (*new*)
  - :MEASure:AMPLitude:SERFloor:STATus? (*new*)
  - :MEASure:AMPLitude:SERFloor:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:BERFloor (*deprecated*)
  - :MEASure:AMPLitude:BERFloor:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:BERFloor:SOURce (*deprecated*)
  - :MEASure:AMPLitude:BERFloor:STATus? (*deprecated*)
  - :MEASure:AMPLitude:BERFloor:STATus:REASon? (*deprecated*)
- SER (Symbol Error Rate) Limit
  - :MEASure:AMPLitude:SERLimit (*new*)
  - :MEASure:AMPLitude:SERLimit:EYE (*new*)
  - :MEASure:AMPLitude:SERLimit:LOCation? (*new*)
  - :MEASure:AMPLitude:SERLimit:SOURce (*new*)
  - :MEASure:AMPLitude:SERLimit:STATus? (*new*)
  - :MEASure:AMPLitude:SERLimit:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:BERLimit (*deprecated*)
  - :MEASure:AMPLitude:BERLimit:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:BERLimit:SOURce (*deprecated*)
  - :MEASure:AMPLitude:BERLimit:STATus? (*deprecated*)
  - :MEASure:AMPLitude:BERLimit:STATus:REASon? (*deprecated*)
- Symbol Level

- :MEASure:AMPLitude:LEVel (*new*)
- :MEASure:AMPLitude:LEVel:LEVel (*new*)
- :MEASure:AMPLitude:LEVel:LOCation? (*new*)
- :MEASure:AMPLitude:LEVel:SOURce (*new*)
- :MEASure:AMPLitude:LEVel:STATus? (*new*)
- :MEASure:AMPLitude:LEVel:STATus:REASon? (*new*)
- :MEASure:AMPLitude:OLEVel (*deprecated*)
- :MEASure:AMPLitude:OLEVel:LOCation? (*deprecated*)
- :MEASure:AMPLitude:OLEVel:SOURce (*deprecated*)
- :MEASure:AMPLitude:OLEVel:STATus? (*deprecated*)
- :MEASure:AMPLitude:OLEVel:STATus:REASon? (*deprecated*)
- :MEASure:AMPLitude:ZLEVel (*deprecated*)
- :MEASure:AMPLitude:ZLEVel:LOCation? (*deprecated*)
- :MEASure:AMPLitude:ZLEVel:SOURce (*deprecated*)
- :MEASure:AMPLitude:ZLEVel:STATus? (*deprecated*)
- :MEASure:AMPLitude:ZLEVel:STATus:REASon? (*deprecated*)
- Total Interference
  - :MEASure:AMPLitude:TI (*new*)
  - :MEASure:AMPLitude:TI:LEVel (*new*)
  - :MEASure:AMPLitude:TI:LOCation? (*new*)
  - :MEASure:AMPLitude:TI:SOURce (*new*)
  - :MEASure:AMPLitude:TI:STATus? (*new*)
  - :MEASure:AMPLitude:TI:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:TIONes (*deprecated*)
  - :MEASure:AMPLitude:TIONes:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:TIONes:SOURce (*deprecated*)
  - :MEASure:AMPLitude:TIONes:STATus? (*deprecated*)
  - :MEASure:AMPLitude:TIONes:STATus:REASon? (*deprecated*)
  - :MEASure:AMPLitude:TIZeros (*deprecated*)
  - :MEASure:AMPLitude:TIZeros:LOCation? (*deprecated*)
  - :MEASure:AMPLitude:TIZeros:SOURce (*deprecated*)
  - :MEASure:AMPLitude:TIZeros:STATus? (*deprecated*)
  - :MEASure:AMPLitude:TIZeros:STATus:REASon? (*deprecated*)
- Uncorrelated Noise
  - :MEASure:AMPLitude:UN (*new*)
  - :MEASure:AMPLitude:UN:LEVel (*new*)
  - :MEASure:AMPLitude:UN:LOCation? (*new*)
  - :MEASure:AMPLitude:UN:SOURce (*new*)
  - :MEASure:AMPLitude:UN:STATus? (*new*)
  - :MEASure:AMPLitude:UN:STATus:REASon? (*new*)
  - :MEASure:AMPLitude:UNONes (*deprecated*)

- :MEASure:AMPLitude:UNONes:LOCation? (*deprecated*)
- :MEASure:AMPLitude:UNONes:SOURce (*deprecated*)
- :MEASure:AMPLitude:UNONes:STATus? (*deprecated*)
- :MEASure:AMPLitude:UNONes:STATus:REASon? (*deprecated*)
- :MEASure:AMPLitude:UNZeros (*deprecated*)
- :MEASure:AMPLitude:UNZeros:LOCation? (*deprecated*)
- :MEASure:AMPLitude:UNZeros:SOURce (*deprecated*)
- :MEASure:AMPLitude:UNZeros:STATus? (*deprecated*)
- :MEASure:AMPLitude:UNZeros:STATus:REASon? (*deprecated*)
- Outer Extinction Ratio
  - :MEASure:EYE:OER (*new*)
  - :MEASure:EYE:OER:LOCation? (*new*)
  - :MEASure:EYE:OER:SOURce (*new*)
  - :MEASure:EYE:OER:STATus? (*new*)
  - :MEASure:EYE:OER:STATus:REASon? (*new*)
  - :MEASure:EYE:OER:UNITs (*new*)
- Outer OMA measurement
  - :MEASure:EYE:OOMA (*new*)
  - :MEASure:EYE:OOMA:LOCation? (*new*)
  - :MEASure:EYE:OOMA:SOURce (*new*)
  - :MEASure:EYE:OOMA:STATus? (*new*)
  - :MEASure:EYE:OOMA:STATus:REASon? (*new*)
- Transmitter and Dispersion Eye Closure for PAM4 (TDECQ)
  - :MEASure:EYE:TDEQ (*new*)
  - :MEASure:EYE:TDEQ:LOCation? (*new*)
  - :MEASure:EYE:TDEQ:OMA:METHod (*new*)
  - :MEASure:EYE:TDEQ:OMA:VALue (*new*)
  - :MEASure:EYE:TDEQ:SOURce (*new*)
  - :MEASure:EYE:TDEQ:STATus? (*new*)
  - :MEASure:EYE:TDEQ:STATus:REASon? (*new*)
  - :MEASure:TDEQ:HWIDth (*new*)
  - :MEASure:TDEQ:PRESetS (*new*)
  - :MEASure:TDEQ:PRESetS:SELECTIONs (*new*)
  - :MEASure:TDEQ:TSER (*new*)
- Duty Cycle Distortion (DCD)
  - :MEASure:JITTer:DCD:EYE (*new*)
- Data-Dependent Jitter (DDJ)
  - :MEASure:JITTer:DDJ:EYE (*new*)
- Data-Dependent Jitter Versus Symbol

- :MEASure:JITTer:DDJSymbol? (*new*)
- :MEASure:JITTer:DDJSymbol:EARLiest? (*new*)
- :MEASure:JITTer:DDJSymbol:LATest? (*new*)
- :MEASure:JITTer:DDJSymbol:SYMBOLs? (*new*)
- :MEASure:JITTer:DDJVsbIt? (*deprecated*)
- :MEASure:JITTer:DDJVsbIt:BITS? (*deprecated*)
- :MEASure:JITTer:DDJVsbIt:EARLiest? (*deprecated*)
- :MEASure:JITTer:DDJVsbIt:LATest? (*deprecated*)
- Data Dependent Pulse Width Shrinkage (DDPWS)
  - :MEASure:JITTer:DDPWS:EYE (*new*)
- Deterministic Jitter (DJ)
  - :MEASure:JITTer:DJ:EYE (*new*)
- Eye Skew
  - :MEASure:JITTer:ESKew (*new*)
  - :MEASure:JITTer:ESKew:EYE (*new*)
  - :MEASure:JITTer:ESKew:LOCation? (*new*)
  - :MEASure:JITTer:ESKew:SOURce (*new*)
  - :MEASure:JITTer:ESKew:STATus? (*new*)
  - :MEASure:JITTer:ESKew:STATus:REASon? (*new*)
- Eye Width
  - :MEASure:JITTer:EWIDth (*new*)
  - :MEASure:JITTer:EWIDth:EYE (*new*)
  - :MEASure:JITTer:EWIDth:LOCation? (*new*)
  - :MEASure:JITTer:EWIDth:SOURce (*new*)
  - :MEASure:JITTer:EWIDth:STATus? (*new*)
  - :MEASure:JITTer:EWIDth:STATus:REASon? (*new*)
- F/2 jitter
  - :MEASure:JITTer:FOVer:EYE (*new*)
- Inter-Symbol Interference (ISI)
  - :MEASure:JITTer:ISI:EYE (*new*)
- J1, J2, J3, J4, J5, J6, J7, J8, or J9
  - :MEASure:JITTer:JN:EYE (*new*)
- Jitter Sampling Level
  - :MEASure:JITTer:LEVel:EYE (*new*)
- Select a Measurement Listing in Eye and Level Results Tables
  - :MEASure:JITTer:PAM:EYE:LIST:SElect (*new*)
  - :MEASure:JITTer:PAM:LEVel:LIST:SElect (*new*)

- Periodic Jitter (PJ)
  - :MEASure:JITTer:PJ:EYE (*new*)
- Periodic Jitter (PJ) RMS
  - :MEASure:JITTer:PJRM:s:EYE (*new*)
- Random Jitter
  - :MEASure:JITTer:RJ:EYE (*new*)
- Total Jitter
  - :MEASure:JITTer:TJ:EYE (*new*)
- Uncorrelated Jitter (UJ)
  - :MEASure:JITTer:UJ:EYE (*new*)
- Return ordered list of edge symbol numbers
  - :MEASure:JITTer:ESYMBOLs? (*new*)
  - :MEASure:JITTer:EBITs? (*deprecated A.05.60*)
- Measurement Definitions
  - :MEASure:AMPLitude:DEFine:LOCation:PERCent:LEVel (*new*)
  - :MEASure:AMPLitude:DEFine:LOCation:TYPE (*new*)
  - :MEASure:AMPLitude:DEFine:RNCValue:LEVel (*new*)
  - :MEASure:AMPLitude:DEFine:RNCValue:ONE (*deprecated*)
  - :MEASure:AMPLitude:DEFine:RNCValue:ZERO (*deprecated*)
  - :MEASure:AMPLitude:DEFine:RNSValue:LEVel (*new*)
  - :MEASure:AMPLitude:DEFine:RNSValue:ONE (*deprecated*)
  - :MEASure:AMPLitude:DEFine:RNSValue:ZERO (*deprecated*)
  - :MEASure:JITTer:DEFine:EOPening (*new*)
  - :MEASure:JITTer:DEFine:EOPening:PROBability (*new*)
  - :MEASure:JITTer:DEFine:LEVel:CUSTom (*deprecated*)
  - :MEASure:JITTer:DEFine:LEVel:CUSTom:EYE (*new*)
  - :MEASure:JITTer:DEFine:LEVel:PERCent (*deprecated*)
  - :MEASure:JITTer:DEFine:LEVel:PERCent:EYE (*new*)
  - :MEASure:JITTer:DEFine:LEVel:TYPE (*modified*)
  - :MEASure:JITTer:DEFine:LWIDth (*new*)
  - :MEASure:JITTer:DEFine:LWIDth:PERCent (*new*)
  - :MEASure:JITTer:DEFine:THReshold:ECDefinition (*new*)
  - :MEASure:JITTer:DEFine:THReshold:ESTiming (*new*)
  - :MEASure:JITTer:DEFine:THReshold:PRESets (*new*)
  - :MEASure:JITTer:DEFine:THReshold:PRESets:SELECTIONs? (*new*)
  - :MEASure:JITTer:DEFine:THReshold:PROBability (*new*)
- Eye Contours and Advanced Eye Analysis Configuration

- :MEASure:PAM:OSCilloscope:LRMS:GALL (*new*)
- :MEASure:PAM:OSCilloscope:LRMS:LEVel (*new*)

## SLOT Subsystem

- :SLOT:TRIGger:SRATe (*new*)
- :SLOT:TRIGger:SRATe:AUTodetect (*new*)
- :SLOT:TRIGger:BRATe (*deprecated*)
- :SLOT:TRIGger:BRATe:AUTodetect (*deprecated*)

## SOURce Subsystem

- :SOURce:SRATe (*new*)
- :SOURce:DRATe (*deprecated*)

## SPRocess Subsystem

- Align Math Operator
  - :SPRocess:ALIGn:TIME:AUTO (*modified*)
  - :SPRocess:ALIGn:TIME:RECalculate (*modified*)
- Bessel Filter Math Operator
  - :SPRocess:BESSel:PNOise (*new*)
  - :SPRocess:BESSel:PNOise:BANDwidth (*new*)
  - :SPRocess:BESSel:PNOise:BANDwidth:AUTO (*new*)
- Butterworth Filter Math Operator
  - :SPRocess:BUTTerworth:PNOise (*new*)
  - :SPRocess:BUTTerworth:PNOise:BANDwidth (*new*)
  - :SPRocess:BUTTerworth:PNOise:BANDwidth:AUTO (*new*)
- Continuous Time Linear Equalizer (CTLE) Math Operator
  - :SPRocess:CTLequalizer:PNOise (*new*)
  - :SPRocess:CTLequalizer:PNOise:BANDwidth (*new*)
  - :SPRocess:CTLequalizer:PNOise:BANDwidth:AUTO (*new*)
- Decision Feedback Equalizer Math Operator
  - :SPRocess:DFEQualizer:TAPS (*modified*)
  - :SPRocess:DFEQualizer:TAPS:AUTO (*modified*)
  - :SPRocess:DFEQualizer:TAPS:COUNT (*modified*)
  - :SPRocess:DFEQualizer:TAPS:LLIMit (*modified*)
  - :SPRocess:DFEQualizer:TAPS:RECalculate (*modified*)
  - :SPRocess:DFEQualizer:TAPS:ULIMit (*modified*)
- Linear Equalizer Math Operator



- :SPRocess:FFEQualizer:NPRecursors (*modified*)
- :SPRocess:FFEQualizer:PNOise (*new*)
- :SPRocess:FFEQualizer:PNOise:BANDwidth (*new*)
- :SPRocess:FFEQualizer:PNOise:BANDwidth:AUTO (*new*)
- :SPRocess:FFEQualizer:TAPS (*modified*)
- :SPRocess:FFEQualizer:TAPS:AUTO (*modified*)
- :SPRocess:FFEQualizer:TAPS:COUNT (*modified*)
- :SPRocess:FFEQualizer:TAPS:NORMALize (*modified*)
- :SPRocess:FFEQualizer:TAPS:RECalculate (*modified*)
- :SPRocess:FFEQualizer:TSPacing (*modified*)
- :SPRocess:FFEQualizer:TSPacing:TPUI (*new*)
- :SPRocess:FFEQualizer:TSPacing:TPBit (*deprecated*)
- Gaussian Filter Math Operator
  - :SPRocess:GAUSSian:PNOise (*new*)
  - :SPRocess:GAUSSian:PNOise:BANDwidth (*new*)
  - :SPRocess:GAUSSian:PNOise:BANDwidth:AUTO (*new*)
- Sin(x)/x Math Operator
  - :SPRocess:SINC:BANDwidth (*new*)
  - :SPRocess:SINC:PNOise (*new*)
  - :SPRocess:SINC:PNOise:BANDwidth (*new*)
  - :SPRocess:SINC:PNOise:BANDwidth:AUTO (*new*)
- TDECQ (Transmitter and Dispersion Eye Closure Quaternary) Equalizer Math Operator
  - :SPRocess:TEQualizer:DCGain? (*new*)
  - :SPRocess:TEQualizer:NPRecursors (*new*)
  - :SPRocess:TEQualizer:PNOise (*new*)
  - :SPRocess:TEQualizer:PNOise:BANDwidth (*new*)
  - :SPRocess:TEQualizer:PNOise:BANDwidth:AUTO (*new*)
  - :SPRocess:TEQualizer:PRESets (*new*)
  - :SPRocess:TEQualizer:PRESets:SElections (*new*)
  - :SPRocess:TEQualizer:TAPS (*new*)
  - :SPRocess:TEQualizer:TAPS:AUTO (*new*)
  - :SPRocess:TEQualizer:TAPS:COUNT (*new*)
  - :SPRocess:TEQualizer:TAPS:NORMALize (*new*)
  - :SPRocess:TEQualizer:TAPS:RECalculate (*new*)
  - :SPRocess:TEQualizer:TSPacing:TPUI (*new*)

## SYSTEM Subsystem

- :SYSTEM:SIGNal:TYPE? (*new*)

## TIMebase Subsystem

- :TIMebase:SRATe (*new*)
- :TIMebase:UIPosition (*new*)
- :TIMebase:UIRange (*new*)
- :TIMebase:UNITs (*modified*)
- :TIMebase:BPOStion (*deprecated*)
- :TIMebase:BRANge (*deprecated*)
- :TIMebase:BRATe (*deprecated*)

## TRIGger Subsystem

- :TRIGger:SRATe (*new*)
- :TRIGger:SRATe:AUTodetect (*new*)
- :TRIGger:BRATe (*deprecated*)
- :TRIGger:BRATe:AUTodetect (*deprecated*)

## WAVEform Subsystem

- :WAVEform:PATTern:NSYMBOLs? (*new*)
- :WAVEform:PATTern:PPUI? (*new*)
- :WAVEform:PATTern:SRATe? (*new*)
- :WAVEform:PATTern:BITS? (*deprecated*)
- :WAVEform:PATTern:PPBit? (*deprecated*)
- :WAVEform:PATTern:BRATe? (*deprecated*)

## WMEMory Subsystem

- :WMEMory:SRATe (*new*)
- :WMEMory:BRATe (*deprecated*)

# 29

## Revision A.05.51, October 2016

### New Features

- Revised specifications for N1092A/B/C/D/E and N1094A/B DCA-M multiple-channel sampling oscilloscopes.

### Defects Fixed

- Fixed a problem that could occur when attempting to autoscale a signal with free run trigger.
- Fixed a problem with the 86115D-004.
- Fixed a problem where the Uncertainty for the Mask Test Auto-margin Hit Ratio was reporting an artificially low number after a large amount of data was acquired.
- Fixed a problem where differential signals with a large common mode offset would be incorrectly auto scaled.
- Fixed a problem on calibrated TDR traces when measuring the end of a long device where not enough data was being acquired to properly correct the response.

# 30

## Revision A.05.50, September 2016

### New Features

- Support for new N1092C and N1092E DCA-M multiple-channel optical/electrical sampling oscilloscopes.
- Support for new N1094A/B DCA-M multiple-channel electrical sampling oscilloscopes.
- Support for new N1076A electrical clock recovery extended module.
- Support for new N1077A optical/electrical clock recovery extended module.
- Ability to configure a 3<sup>rd</sup> pole for the CTLE math function.
- New Eye mode OMA at Crossing measurement for optical NRZ signals.
- New Eye mode VECP measurement for optical NRZ signals.
- Changed existing TDEC eye measurement to calculate OMA using the new Eye-mode OMA at Crossing measurement.

### Defects Fixed

- Fixed a defect that prevents jitter mode measurements on PRBS-15 patterns when running FlexDCA in compatibility mode or when connected remotely to an 86100C instrument.
- Fixed a defect that caused incorrect measurements across TDR modules when TDR calibration was active.
- Fixed a defect that would occasionally prevent TDR De-Embedding on multiple ports of a single DUT.
- Fixed a hang that would occur if a screen capture was initiated from SCPI while, in the GUI, the user was dragging the FlexDCA application across the screen.
- Fixed a defect in Jitter Mode's Eye Opening measurement.

### MEASure Subsystem

- :MEASure:EYE:OMAXp (*new*)
- :MEASure:EYE:OMAXp:LOCation? (*new*)
- :MEASure:EYE:OMAXp:SOURce (*new*)
- :MEASure:EYE:OMAXp:STATus? (*new*)
- :MEASure:EYE:OMAXp:STATus:REASon? (*new*)
- :MEASure:EYE:TDEC:OMA:METHod (*modified*)

- :MEASure:EYE:VECP (*new*)
- :MEASure:EYE:VECP:LOCation? (*new*)
- :MEASure:EYE:VECP:OMA:METhod (*new*)
- :MEASure:EYE:VECP:OMA:VALue (*new*)
- :MEASure:EYE:VECP:SOURce (*new*)
- :MEASure:EYE:VECP:STATus? (*new*)
- :MEASure:EYE:VECP:STATus:REASon? (*new*)

## SPRocess Subsystem

- :SPRocess:CTLequalizer:PCOunt (*new*)
- :SPRocess:CTLequalizer:POLe3 (*modified*)
- :SPRocess:CTLequalizer:ZERo2 (*modified*)

# 31

## Revision A.05.41, June 2016

### New Features

- For optical channel reference filters, added the ability to specify the filter using the filter *3 dB bandwidth (Hz)* in addition to the existing capability of specifying them by data rate (b/s).
- When an Extinction Ratio Correction Factor (ERCF) is applied, added the ability to turn on or off the display of the ERCF value in the measurement results panel.
- Added the ability to remotely break a Flex-on-Flex connection *from* the 86100D.
- Added a response to the `:SYSTEM:HAL?` programming query that indicates that FlexDCA is running as an independent FlexEye *session* instance in Eye/Mask mode's FlexEye Independent Eye Acquisition.
- Updated the Python example programs to use the new *keyflex* module. This module makes your programs easier to create and provides many functions that you can leverage.

### Defects Fixed

- Fixed a defect that could cause a SCPI timeout error when using the N4877A Clock/Data Recovery and Demultiplexer.

### APPLication Subsystem

- `:APPLication:CNAME?` (*new*)
- `:APPLication:CState?` (*new*)
- `:APPLication:RDISconnect` (*new*)

### CHANnel Subsystem

- `:CHANnel:BANDwidth:FREQuency` (preferred over `:CHANnel:BANDwidth` because selection is made explicitly instead of implicitly)
- `:CHANnel:FSElect:BANDwidth` (*new*) (preferred over `:CHANnel:FSElect` because selection is made explicitly instead of implicitly)
- `:CHANnel:FSElect:BANDwidth:MAXimum` (*new*)

- :CHANnel:FSElect:BANDwidth:MINimum (*new*)
- :CHANnel:FSElect:BANDwidth:VSET (*new*)
- :CHANnel:FSElect:RATE (preferred over :CHANnel:FSElect because selection is made explicitly instead of implicitly)
- :CHANnel:WAVelength:VALue (preferred over :CHANnel:WAVelength because selection is made explicitly instead of implicitly)

## MEASure Subsystem

- :MEASure:ERATio:DCFactor (*new*)

## SYSTem Subsystem

- :SYSTem:HAL? (*revised*)

# 32

## Revision A.05.40, May 2016

### New Features

- Support for new N1092A/B/D DCA-M multiple-channel optical sampling oscilloscope extended module.
- New FlexEye Independent Eye Acquisition and Analysis.
- In TDR/TDT mode, added N1930B PLTS Automatic Fixture Removal (AFR). Automatic Fixture Removal requires FlexDCA option N1010A-AFR.
- When defining an external transducer, you can now indicate signal inversion (negative gain).
- Added new 100G SR4 stressed receiver mask (25.78125 - 100GBASE-SR4\_Rx\_SEC\_Optical.mskx) as an available mask in Eye/Mask mode.
- Added the ability to copy signal processing operators within the signal processing construction area. By holding the control key while dragging, you can duplicate an operator including its configuration.
- Expanded offering of Python example programs.

### CHANnel Subsystem

- :CHANnel:TRANsducer:INVert (*new*)

### DISK Subsystem

- :DISPlay:DWIZard:T:OHMS:SDATa (*new*)
- :DISPlay:DWIZard:T:PERCent:SDATa (*new*)
- :DISPlay:DWIZard:T:VOLTs:SDATa (*new*)
- :DISPlay:DWIZard:TOHMs:SDATa (*deprecated*)
- :DISPlay:DWIZard:TPERcent:SDATa (*deprecated*)
- :DISPlay:DWIZard:TVOLts:SDATa (*deprecated*)

### DISPlay Subsystem

- :DISPlay:TSMODE (*new*)



## FEYE Subsystem (*new*)

- :FEYE:CHANnel:ENABled (*new*)
- :FEYE:CHANnel:SID (*new*)
- :FEYE:DIFF:ENABled (*new*)
- :FEYE:DIFF:SID (*new*)
- :FEYE:SAMPles (*new*)
- :FEYE:STATe (*new*)
- :FEYE:VIEW (*new*)

## SLOT Subsystem

- TRIGger:BRATe (*new*)
- TRIGger:BRATe:AUTodetect (*new*)
- TRIGger:DCCRatIo
- TRIGger:DCCRatIo:AUTodetect (*new*)
- TRIGger:PLENgtH (*new*)
- TRIGger:PLENgtH:AUTodetect (*new*)
- TRIGger:TRACKing (*new*)

# 33

## Revision A.05.31, March 2016

### General Comments

- Improved the ability of the 86108A and 86108B to lock clock recovery to PAM4 signals.

### Defects Fixed

- Fixed a defect that could cause the eye diagram to be mis-aligned in Jitter Mode when SIRC or other signal processing was in use.
- Fixed a defect in differential de-embedding when a block was defined as "Dual 2-port" and the second port pair was a combination of sub-circuits.

# 34

## Revision A.05.30, January 2016

### New Features

- Single-ended and differential de-embedding of TDR/TDT responses
- N1010A FlexDCA on a PC can now connect directly to the FlexDCA application running on the 86100D. This is known as running Flex-on-Flex. As a result, N1010A FlexDCA supports TDR/TDT mode and all mini one-slot modules such as the N1055A TDR/TDT. The firmware version of N1010A FlexDCA and the 86100D's FlexDCA should be the same version ( $\geq$  A.05.30).
- Draw eye contours on eye diagrams with Eye/Mask mode's Advanced Eye or PAM4.
- New limit-line tools for creating and editing limit-lines in TDR/TDT and oscilloscope mode. The editor allows you to create and edit limit lines using a graphical user interface rather than directly modifying ASCII limit-line definition files in a text editor.
- Added DI, RN, and TI Advanced Eye measurements for NRZ signals. If the PAM4 license is also installed these measurements can also be made on PAM4 signals.
- For DJ, Jn, RJ, and TJ Advanced Eye measurements added the ability to select an individual eye within an eye diagram on which to perform the measurement. These measurements work with NRZ signals and PAM4 signals (if the PAM4 license is also installed).
- Simplified selection of TDR/TDT mode's measurement setup. The two setup tools, **TDR DUT Based Setup** and **TDR Basic Control** are still available, however the **TDR DUT Based Setup** has been emphasized while the **TDR Basic Control** setup can now only be accessed from the menu (click **Setup** > **TDR Basic Control**). The **TDR DUT Based Setup** is the recommended methods to use.
- Display of in-phase and quadrature input waveforms on the setup dialog boxes for precision timebase references such as the 86100D-PTB, 86108B-PTD, and 86107A. To remotely query the waveform data, use the `:waveform:SOURce` command.
- Documented support for new N1055A TDR/TDT module option FS1 (fast sample rate). Option FS1 is automatically included on new N1055A modules.
- Documented N1090A electrical input connector (N1090A Option EEC).
- Added to this help nine example programs for controlling FlexDCA. These are Python examples provided for both Python 3.4 and 2.7.

## CHANnel Subsystem

- :CHANnel:BANDwidth:FREQuency (*added command form*)
- :CHANnel:BANDwidth:FREQuency:MAXimum (*new*)
- :CHANnel:BANDwidth:FREQuency:MINimum (*new*)
- :CHANnel:BANDwidth:FREQuency:VSET? (*new*)
- :CHANnel:FSElect:RATE (*added command form*)
- :CHANnel:FSElect:RATE:MAXimum (*new*)
- :CHANnel:FSElect:RATE:MINimum (*new*)
- :CHANnel:FSElect:RATE:VSET? (*new*)
- :CHANnel:WAVelength:VALue (*added command form*)
- :CHANnel:WAVelength:VALue:VSET? (*new*)

## DISK Subsystem

- :DISK:DWIZard:ECResults:SDATa (*new*)
- :DISK:FILE:ASCIi:READ? (*new*)
- :DISK:FILE:EXISts? (*new*)
- :DISK:FILE:READ? (*new*)
- :DISK:FILE:SIZE? (*new*)
- :DISK:FILE:WRITe? (*new*)
- :DISK:FILE:BFILe (*deprecated*)
- :DISK:FILE:TFILE (*deprecated*)

## DISPlay Subsystem

- :DISPlay:WINDow:ECLegend (*new*)
- :DISPlay:WINDow:TIME:LEGend:ECEXpand (*new*)

## ECONtour Subsystem (*new*)

- :ECONtour:BERates (*new*)
- :ECONtour:DISPlay (*new*)
- :ECONtour:PSPec (*new*)
- :ECONtour:RJSTabilize (*new*)
- :ECONtour:RJSValue:EYE (*new*)
- :ECONtour:RNSTabilize (*new*)
- :ECONtour:RNSValue:LEVel (*new*)
- :ECONtour:SOURce (*new*)

## LLINe Subsystem

- :LLINe:SFIle (*new*)
- :LLINe:SFName (*new*)

## MEASure Subsystem (Acquisition)

- :MEASure:ACQuire:ECOunt? (*new*)

## MEASure Subsystem (Advanced Eye)

- :MEASure:EYE:DI (*new*)
- :MEASure:EYE:DI:LEVel (*new*)
- :MEASure:EYE:DI:LOCation (*new*)
- :MEASure:EYE:DI:RNStabilize (*new*)
- :MEASure:EYE:DI:RNSValue:LEVel (*new*)
- :MEASure:EYE:DI:SOURce (*new*)
- :MEASure:EYE:DI:STATus (*new*)
- :MEASure:EYE:DI:STATus:REASon (*new*)
- :MEASure:EYE:DJ:EYE (*new*)
- :MEASure:EYE:DJ:RJSValue:EYE (*new*)
- :MEASure:EYE:DJ:RJSValue (*deprecated*)
- :MEASure:EYE:JN:EYE (*new*)
- :MEASure:EYE:JN:RJSValue:EYE (*new*)
- :MEASure:EYE:JN:RJSValue (*deprecated*)
- :MEASure:EYE:RJ:EYE (*new*)
- :MEASure:EYE:RJ:RJSValue:EYE (*new*)
- :MEASure:EYE:RJ:RJSValue (*deprecated*)
- :MEASure:EYE:RN (*new*)
- :MEASure:EYE:RN:LEVel (*new*)
- :MEASure:EYE:RN:LOCation (*new*)
- :MEASure:EYE:RN:RNStabilize (*new*)
- :MEASure:EYE:RN:RNSValue:LEVel (*new*)
- :MEASure:EYE:RN:SOURce (*new*)
- :MEASure:EYE:RN:STATus (*new*)
- :MEASure:EYE:RN:STATus:REASon (*new*)
- :MEASure:EYE:TI (*new*)
- :MEASure:EYE:TI:LEVel (*new*)
- :MEASure:EYE:TI:LOCation (*new*)
- :MEASure:EYE:TI:RNStabilize (*new*)
- :MEASure:EYE:TI:RNSValue:LEVel (*new*)
- :MEASure:EYE:TI:SOURce (*new*)

- :MEASure:EYE:TI:STATus (*new*)
- :MEASure:EYE:TI:STATus:REASon (*new*)
- :MEASure:EYE:TI:TIBer (*new*)
- :MEASure:EYE:TJ:EYE (*new*)
- :MEASure:EYE:TJ:RJSValue:EYE (*new*)
- :MEASure:EYE:TJ:RJSValue (*deprecated*)

## MEASure Subsystem (PAM 4)

- :MEASure:EYE:PAM:EHeight:DEFine:EOPening:RJSTabilize (*new*)
- :MEASure:EYE:PAM:EHeight:DEFine:EOPening:RJSValue:EYE (*new*)
- :MEASure:EYE:PAM:EHeight:DEFine:EOPening:RNSTabilize (*new*)
- :MEASure:EYE:PAM:EHeight:DEFine:EOPening:RNSValue:LEVel (*new*)
- :MEASure:EYE:PAM:EWIDth:DEFine:EOPening:RJSTabilize (*new*)
- :MEASure:EYE:PAM:EWIDth:DEFine:EOPening:RJSValue:EYE (*new*)
- :MEASure:EYE:PAM:EWIDth:DEFine:EOPening:RNSTabilize (*new*)
- :MEASure:EYE:PAM:EWIDth:DEFine:EOPening:RNSValue:LEVel (*new*)

## MEASure Subsystem (Limit Tests)

- :MEASure:LTEST:ACQUIRE:COUNT? (*new*)

## PTIMEbase Subsystem

- :PTIMEbase:VPTBsignals (*new*)

## RDCA Subsystem

- :RDCA:CONNEct:MODE (*new*)
- :RDCA:CONNEct:TSETtings (*new*)
- :RDCA:DISConnect:TSETtings (*new*)

## SLOT Subsystem

- :TRIGger:BRATe
- :TRIGger:BRATe:AUTodetect (*new*)
- :TRIGger:DCDRatio (*new*)
- :TRIGger:DCDRatio:AUTodetect (*new*)
- :TRIGger:PLENght (*new*)
- :TRIGger:PLENght:AUTodetect (*new*)
- :TRIGger:TRACking (*new*)

## SYSTEM Subsystem

- :SYSTEM:ERROR:COUNT? (*new*)
- :SYSTEM:UTCNow? (*new*)

## TDR Subsystem

- :TDR:DEEMbed:DUT:Enable (*new*)
- :TDR:DEEMbed:DUT:PORT:DPORT (*new*)
- :TDR:DEEMbed:DUT:PORT:FIXTure (*new*)
- :TDR:DEEMbed:DUT:PORT:TPORT (*new*)
- :TDR:DEEMbed:FCOMponent:CLEar (*new*)
- :TDR:DEEMbed:FCOMponent:LOAD (*new*)
- :TDR:DEEMbed:FCOMponent:LOAD:FNAME (*new*)
- :TDR:DEEMbed:FCOMponent:NOPorts? (*new*)
- :TDR:DEEMbed:FCOMponent:POrDer (*new*)
- :TDR:DEEMbed:FCOMponent:STATus? (*new*)
- :TDR:DEEMbed:FCOMponent:STATus:REASon? (*new*)

## TIMebase Subsystem

- :TIMebase:PTIMebase:VPTBsignals (*new*)

# 35

## Revision A.05.01, October 2015

### General Comments

- Added 100G-CLR4 FEC mask
- Added TWDP and VECpq demo MATLAB user measurement scripts.
- For the N1090A DCA-M Single Optical Channel Sampling Oscilloscope, replaced the Clock Input Bandwidth specification with Clock Input Frequency. The N1090A can now be used with divided triggers down to 100 MHz, provided that the data rate exceeds 455 MHz. Added the Minimum Slew Rate specification.
- Improved measurement throughput for the N1055A module when FlexDCA is in TDR/TDT mode.
- Improved the accuracy and precision of fixture deskew.
- Added support for 32-bit versions of Windows 7 and 8. Windows XP is *not* supported.
- Renamed the File menu command “S-Parameter Memories...” to “S-Parameter Viewer / Memories..”

### Defects Fixed

- Fixed a defect that could cause autoscale to fail when using free-run PTB.
- Fixed a defect that could cause poor horizontal autoscale results when using a differential signal with the constituent channels not displayed.
- Fixed a defect where limit-line violation pixels were not being drawn correctly when the source signal was changed.
- Fixed defect where horizontal signal panning (via touch screen/mouse) did not work on waveform memories whose horizontal tracking was turned off.
- Fixed defect where BER Bathtub and JSA Spectrum graph did not have visible X and Y axis labels with the default black background.
- Fixed a problem preventing an 86107A PTB module from being used in an 86100D with the internal PTB option.
- Fixed defect that prevented help from being displayed when the help button was pressed on the module setup dialog for a USB module such as the N1090A.



# 36

## Revision A.05.00, July 2015

### General Comments

- FlexDCA A.05.00 cannot be installed on 86100D mainframes running Windows XP. A mainframe upgrade to windows 7 is available.
- When installing FlexDCA on a PC, only 64 bit versions of Windows are supported.
- The VXI-11 server for controlling FlexDCA via SCPI remote commands cannot be enabled on Windows 8.1. SCPI connections via GPIB, Telnet, sockets, and HiSLIP do work with Windows 8.1.
- The skew range for the N1045A modules has been increased. To make use of this additional range, perform a skew calibration, which is available from the Skew tab in the Calibrations dialog box.

### Defects Fixed

- Fixed a defect in the signal type detection autoscale algorithm when using PTB and a Free Run trigger.

### New Features

- Support for new N1090A DCA-M Optical Sampling Oscilloscope extended module.
- Ability to perform user optical calibrations on an N1090A extended module within FlexDCA.
- User-defined measurements that are based on Python, MATLAB, and Compiled MATLAB in Oscilloscope, Eye/Mask, and TDR/TDT modes. Requires the N1010A-201 Advanced Waveform Analysis license and the installation of Python or MATLAB.
- User-defined signal processing functions that are based on Python, MATLAB, and Compiled MATLAB. Requires the N1010A-201 Advanced Waveform Analysis license and the installation of Python or MATLAB.
- TDEC measurement in Eye/Mask mode (activated with N1010A-500 Productivity Package License).
- S-parameter memory for saving and viewing multiple S-parameter waveforms.
- Added programming Quick Start Guide with Python examples.
- Switch between black or white backgrounds on all windows that display signals.
- Hide or display the measurement annotations on waveforms.
- Define :CALibrate:DARK:CHANnel:DISCard (*new*)
- :CALibrate:OPTical:CONVersion? (*new*)

- :CALibrate:OPTical:USER:CHANnel:OPower (*new*)
- :CALibrate:OPTical:USER:CHANnel:START (*new*)
- :CALibrate:OPTical:USER:CHANnel:WAVelength (*new*)

## DISK Subsystem Commandss

- :DISK:SIMage:IMETadata (*new*)
- :DISK:SPARameter:EADifferenti (*new*)
- :DISK:SPARameter:LFName (*new*)
- :DISK:SPARameter:RECall (*new*)
- :DISK:SPARameter:RECall:DESTination (*new*)

## :DISPlay Subsystem Command

- :DISPlay:GRATicule:CURSor (*new*)
- :DISPlay:MULTitouch:STATe (*new*)
- :DISPlay:SWINdows:INVert:STATe (*new*)

## :EMODules Subsystem Commands

- :EMODules:DCAM:DEVIce? (*new*)
- :EMODules:SLOT:CMETHod? (*new*)

## LTEST Subsystem

- :LTEST:ACQuire:SIMage:IMETadata (*new*)
- :LTEST:LLINe:SIMage:IMETadata (*new*)
- :LTEST:MEASure:SIMage:IMETadata (*new*)
- :LTEST:MTESt:SIMage:IMETadata (*new*)

## :MEASure Subsystem Commands

- :MEASure:ANNotations:STATe (*new*)
- :MEASure:EYE:TDEC (*new*)
- :MEASure:EYE:TDEC:LOCation? (*new*)
- :MEASure:EYE:TDEC:OMA:METHod (*new*)
- :MEASure:EYE:TDEC:OMA:VALue (*new*)
- :MEASure:EYE:TDEC:SOURce (*new*)
- :MEASure:EYE:TDEC:STATus? (*new*)
- :MEASure:EYE:TDEC:STATus:REASon? (*new*)
- :MEASure:EYE:USER (*new*)
- :MEASure:EYE:USER:ABBReviation? (*new*)
- :MEASure:EYE:USER:CFILe (*new*)

- :MEASure:EYE:USER:CFILe:CLEar (*new*)
- :MEASure:EYE:USER:CFILe:RELoad (*new*)
- :MEASure:EYE:USER:CFLoaded? (*new*)
- :MEASure:EYE:USER:COMMents? (*new*)
- :MEASure:EYE:USER:LOCation? (*new*)
- :MEASure:EYE:USER:LSTatus? (*new*)
- :MEASure:EYE:USER:LSTatus:REASon? (*new*)
- :MEASure:EYE:USER:NAME? (*new*)
- :MEASure:EYE:USER:SOURce (*new*)
- :MEASure:EYE:USER:STATus? (*new*)
- :MEASure:EYE:USER:STATus:REASon? (*new*)
- :MEASure:OSCilloscope:USER (*new*)
- :MEASure:OSCilloscope:USER:ABBReviation? (*new*)
- :MEASure:OSCilloscope:USER:CFILe (*new*)
- :MEASure:OSCilloscope:USER:CFILe:CLEar (*new*)
- :MEASure:OSCilloscope:USER:CFILe:RELoad (*new*)
- :MEASure:OSCilloscope:USER:CFLoaded? (*new*)
- :MEASure:OSCilloscope:USER:COMMents? (*new*)
- :MEASure:OSCilloscope:USER:LOCation? (*new*)
- :MEASure:OSCilloscope:USER:LSTatus? (*new*)
- :MEASure:OSCilloscope:USER:LSTatus:REASon? (*new*)
- :MEASure:OSCilloscope:USER:NAME? (*new*)
- :MEASure:OSCilloscope:USER:REGion (*new*)
- :MEASure:OSCilloscope:USER:SOURce (*new*)
- :MEASure:OSCilloscope:USER:STATus? (*new*)
- :MEASure:OSCilloscope:USER:STATus:REASon? (*new*)
- :MEASure:TDEC:HWIDth (*new*)
- :MEASure:TDEC:MNFactor (*new*)
- :MEASure:TDEC:MPNFactor (*new*)
- :MEASure:TDEC:PRESets (*new*)
- :MEASure:TDEC:PRESets:SELections (*new*)
- :MEASure:TDEC:TBER (*new*)
- :MEASure:TDR:USER (*new*)
- :MEASure:TDR:USER:ABBReviation? (*new*)
- :MEASure:TDR:USER:CFILe (*new*)
- :MEASure:TDR:USER:CFILe:CLEar (*new*)
- :MEASure:TDR:USER:CFILe:RELoad (*new*)
- :MEASure:TDR:USER:CFLoaded? (*new*)
- :MEASure:TDR:USER:COMMents? (*new*)
- :MEASure:TDR:USER:LOCation? (*new*)
- :MEASure:TDR:USER:LSTatus? (*new*)
- :MEASure:TDR:USER:LSTatus:REASon? (*new*)
- :MEASure:TDR:USER:NAME? (*new*)

- :MEASure:TDR:USER:REGion (*new*)
- :MEASure:TDR:USER:SOURce (*new*)
- :MEASure:TDR:USER:STATus? (*new*)
- :MEASure:TDR:USER:STATus:REASon? (*new*)

## :SLOT Subsystem Commands (*new*)

- :SLOT:TRIGger:MODe (*new*)
- :SLOT:TRIGger:MRATe? (*new*)
- :SLOT:TRIGger:SOURce (*new*)

## :SPRocess Subsystem Commands

- :SPRocess:BUSer:ABBReviation (*new*)
- :SPRocess:BUSer:CFILE (*new*)
- :SPRocess:BUSer:CFILE:RELoad (*new*)
- :SPRocess:BUSer:CFLoaded (*new*)
- :SPRocess:BUSer:COMMeNts (*new*)
- :SPRocess:BUSer:CONTRol:DOUBle (*new*)
- :SPRocess:BUSer:CONTRol:ENUM (*new*)
- :SPRocess:BUSer:CONTRol:FILE (*new*)
- :SPRocess:BUSer:CONTRol:INTeger (*new*)
- :SPRocess:BUSer:CONTRol:STRing (*new*)
- :SPRocess:BUSer:LSTATUS (*new*)
- :SPRocess:BUSer:LSTATUS:REASon (*new*)
- :SPRocess:BUSer:NAME (*new*)
- :SPRocess:USER:ABBReviation (*new*)
- :SPRocess:USER:CFILE (*new*)
- :SPRocess:USER:CFILE:RELoad (*new*)
- :SPRocess:USER:CFLoaded (*new*)
- :SPRocess:USER:COMMeNts (*new*)
- :SPRocess:USER:CONTRol:DOUBle (*new*)
- :SPRocess:USER:CONTRol:ENUM (*new*)
- :SPRocess:USER:CONTRol:FILE (*new*)
- :SPRocess:USER:CONTRol:INTeger (*new*)
- :SPRocess:USER:CONTRol:STRing (*new*)
- :SPRocess:USER:LSTATUS (*new*)
- :SPRocess:USER:LSTATUS:REASon (*new*)
- :SPRocess:USER:NAME (*new*)

## :SYSTEM Subsystem

- :SYSTEM:MPButton:SIMage:IMETadata (*new*)

## :TDR Subsystem Commands

- :TDR:SPMemory:CLEar (*new*)
- :TDR:SPMemory:DTYPE (*new*)
- :TDR:SPMemory:ENABle (*new*)
- :TDR:SPMemory:LOAD (*new*)
- :TDR:SPMemory:SOURce (*new*)

# 37

## Revision A.04.54 October 2015

### New Features

- This is the last FlexDCA revision that supports Windows XP.
- The skew range for N1045A modules has been increased. To make use of this additional range, perform a skew calibration, which is available from the Skew tab in the Calibrations dialog box.
- Improved measurement throughput for the N1055A module when FlexDCA is in TDR/TDT mode.

### Defects Fixed

- Fixed a defect in the signal type detection autoscale algorithm when using PTB and a Free Run trigger.

# 38

## Revision A.04.53 June 2015

### New Features

- Added a new PAM measurement in Eye/Mask Mode: PAM Levels Peak-to-Peak.
- Added Infiniband EDR and FDR masks.
- Added 100 GE-SR4 mask.
- Feedthrough compensation in TDR mode can now be turned off. Feedthrough compensation improves the flatness of the step response, but acquisition is slower.
- Improved reliability of RN/PI measurements in Jitter Mode. The measurement now always searches for locations in the pattern that are minimally impacted by jitter.
- Improved acquisition throughput when making TDR measurements.

### Defects Fixed

- Fixed an occasional calibration failure in the N1055A TDR Step Calibration.
- Fixed a defect that would cause vertical calibration to fail for some 86117A modules.
- Fixed a defect that would cause Jitter Mode to under report Sub Rate Jitter (SRJ) in certain situations.
- Fixed a defect that would result in errors in the waveform for certain combinations of data rate, pattern length, and bandwidth when SIRC, De-Embedding, or other Signal Processing operations were active.
- Fixed a defect that could cause TDR waveform charts to stop updating.
- Fixed a rounding error in skew calculations for TDR/TDT calibrations.
- Fixed a problem causing reduced responsiveness in Jitter Mode when working with long patterns.

### :ACQUIRE Subsystem

- :ACQUIRE:FEEDTHRU (*new*)

### :MEASURE Subsystem Commands

- :MEASURE:EYE:PAM:PP (*new*)
- :MEASURE:EYE:PAM:PP:LEVEL (*new*)

- :MEASure:EYE:PAM:PP:LOCation? (*new*)
- :MEASure:EYE:PAM:PP:SOURce (*new*)
- :MEASure:EYE:PAM:PP:STATus? (*new*)
- :MEASure:EYE:PAM:PP:STATus:REASon? (*new*)



# 39

## Revision A.04.51, April 2015

### Defects Fixed

- Fixed a defect that could cause user licenses to not be properly detected following a system reboot.

# 40

## Revision A.04.50, February 2015

### General Comments

- The number of colors available for waveforms has been increased from 12 to 16 colors.

### Defects Fixed

- Dark calibration no longer fails if the precision timebase is active.

### New Features

- Pulse Amplitude Modulation (PAM4) measurement capability in both Oscilloscope and Eye/Mask modes. In addition, Jitter analysis can be made on PAM4 measurements in Jitter mode. Requires options 9FP or 9TP, PAM-N Analysis software license.
- Signals can now be automatically or manually selected be one of three signal types: Unspecified, NRZ format, or PAM4 format. The Signal Type setting is located on the various setup dialog boxes. If options 9FP or 9TP PAM-N Analysis software license is installed, also use the PAM-N Analysis Setup dialog box.
- Autoscale now identifies the signal type of each displayed waveform: Unspecified, NRZ format, and PAM4 format. Signal types can also be manually set.
- **Multi-Purpose** button on the 86100D's front-panel can now be assigned one of four actions:
  - Capture a screen image to a file.
  - Load an instrument setup file.
  - Play back a SCPI script.
  - Save a Documentation Wizard file.
- New Documentation Wizard that places user-selectable information into a zip file so that you can archive and transport them. The following list shows some of the items that can be placed in the zip file:
  - Screen capture
  - Instrument setup
  - Waveform data

- Results data shown on measurement panels
- System information
- Presets, which allow you to save your configuration settings. Presets significantly reduce setup time and are available for the following items:
  - 86108A/B Clock Recovery Configuration.
  - 83496A/B Clock Recovery Configuration.
  - Decision Feedback Equalizer (DFE) function configuration.
  - Continuous Time Linear Equalizer (CTLE) function configuration.
  - Linear Feedforward Equalizer function configuration.
- Limit Line Testing in Oscilloscope and TDR Modes.
- New Oscilloscope Mode Phase measurement.
- New Jitter Mode Even-Odd ( $F/2$ ) measurement, which is labeled  $F/2$  ( $p-p$ ) on the Jitter measurement results table. You can also add  $F/2$  even-odd jitter to simulated signals.
- Added new 100G-SR4 Eye Mode mask.

## :CHANnel Subsystem Commands

- :CHANnel:PROBe:ATTenuation? (*new*)
- :CHANnel:SIGNal:TYPE (*new*)
- :CHANnel:SIGNal:TYPE:AUTO (*new*)
- :CHANnel:SIGNal:TYPE:DETECT (*new*)

## :CMODE Subsystem Commands (*new*)

- :CMODE:SIGNal:TYPE (*new*)
- :CMODE:SIGNal:TYPE:AUTO (*new*)
- :CMODE:SIGNal:TYPE:DETECT (*new*)

## :CRECOVERY Subsystem Commands

- :CRECOVERY:PRESets (*new*)
- :CRECOVERY:PRESets:SELECTIONS? (*new*)

## :DIFF Subsystem Commands

- :DIFF:SIGNal:TYPE (*new*)
- :DIFF:SIGNal:TYPE:AUTO (*new*)
- :DIFF:SIGNal:TYPE:DETECT (*new*)

## :DISK Subsystem Commands

- :DISK:DWIZard:AMPLitude:SDATa (*new*)
- :DISK:DWIZard:FNAME (*new*)
- :DISK:DWIZard:GDElay:SDATa (*new*)
- :DISK:DWIZard:HISTograms:SDATa (*new*)
- :DISK:DWIZard:JGRaphs:SDATa (*new*)
- :DISK:DWIZard:JITTer:SDATa (*new*)
- :DISK:DWIZard:JSAResults:SDATa (*new*)
- :DISK:DWIZard:JSASpectrum:SDATa (*new*)
- :DISK:DWIZard:LLTResults:SDATa (*new*)
- :DISK:DWIZard:MAGNitude:SDATa (*new*)
- :DISK:DWIZard:MARKers:SDATa (*new*)
- :DISK:DWIZard:MTESt:SDATa (*new*)
- :DISK:DWIZard:PHASe:SDATa (*new*)
- :DISK:DWIZard:RESults:SDATa (*new*)
- :DISK:DWIZard:SAVE (*new*)
- :DISK:DWIZard:SSCReen (*new*)
- :DISK:DWIZard:SSEtUp (*new*)
- :DISK:DWIZard:SSINfo (*new*)
- :DISK:DWIZard:SSParam (*new*)
- :DISK:DWIZard:TIME:SDATa (*new*)
- :DISK:DWIZard:TOHMs:SDATa (*new*)
- :DISK:DWIZard:TPERcent:SDATa (*new*)
- :DISK:DWIZard:TVOLts:SDATa (*new*)

## :DISPlay Subsystem Command

- :DISPlay:PINTensity (*new*)
- :DISPlay:WINDow:AMPLitude:RVMode (*new*)
- :DISPlay:WINDow:JITTer:RVMode (*new*)
- :DISPlay:WINDow:RESults:RVMode (*new*)

## :EMEMory Subsystem Commands

- :EMEMory:SIGNal:TYPE (*new*)

## :FUNCTion Subsystem Commands

- :FUNCTion:SIGNal:TYPE (*new*)
- :FUNCTion:SIGNal:TYPE:TRACKing (*new*)

## :LLINE Subsystem Commands (*new*)

- :LLINE:DISPlay (*new*)
- :LLINE:HOFFset (*new*)
- :LLINE:LOAD:FNAME (*new*)
- :LLINE:SOURce (*new*)

## :LTEST Subsystem Commands

- :LTEST:LLINE:SIMage:FNAME (*new*)
- :LTEST:LLINE:SIMage:INVert (*new*)
- :LTEST:LLINE:SIMage:MONochrome (*new*)
- :LTEST:LLINE:SIMage:SAVE (*new*)
- :LTEST:LLINE:SIMage:SINclude (*new*)
- :LTEST:LLINE:SIMage:STATe (*new*)
- :LTEST:LLINE:SIMage:WINDow (*new*)
- :LTEST:LLINE:SSUMmary:FNAME (*new*)
- :LTEST:LLINE:SSUMmary:STATe (*new*)
- :LTEST:LLINE:SWAVEform:CHANnel:FNAME (*new*)
- :LTEST:LLINE:SWAVEform:CHANnel:STATe (*new*)
- :LTEST:LLINE:SWAVEform:CHANnel:WMEMory (*new*)
- :LTEST:LLINE:SWAVEform:CMODE:FNAME (*new*)
- :LTEST:LLINE:SWAVEform:CMODE:STATe (*new*)
- :LTEST:LLINE:SWAVEform:CMODE:WMEMory (*new*)
- :LTEST:LLINE:SWAVEform:DIFF:FNAME (*new*)
- :LTEST:LLINE:SWAVEform:DIFF:STATe (*new*)
- :LTEST:LLINE:SWAVEform:DIFF:WMEMory (*new*)
- :LTEST:LLINE:SWAVEform:FUNction:FNAME (*new*)
- :LTEST:LLINE:SWAVEform:FUNction:STATe (*new*)
- :LTEST:LLINE:SWAVEform:FUNction:WMEMory (*new*)
- :LTEST:LLINE:SWAVEform:RESet (*new*)
- :LTEST:LLINE:TEST:MODE (*new*)
- :LTEST:LLINE:TEST:STATe (*new*)

## :MEASure Subsystem Commands

- :MEASure:EYE:PAM:EHeight (*new*)
- :MEASure:EYE:PAM:EHeight:DEFine:EOPening (*new*)
- :MEASure:EYE:PAM:EHeight:DEFine:EOPening:PROBability (*new*)
- :MEASure:EYE:PAM:EHeight:EYE (*new*)
- :MEASure:EYE:PAM:EHeight:LOCation (*new*)
- :MEASure:EYE:PAM:EHeight:SOURce (*new*)

- :MEASure:EYE:PAM:EHeight:STATus? (*new*)
- :MEASure:EYE:PAM:EHeight:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:ELEVel (*new*)
- :MEASure:EYE:PAM:ELEVel:EYE (*new*)
- :MEASure:EYE:PAM:ELEVel:LOCation (*new*)
- :MEASure:EYE:PAM:ELEVel:SOURce (*new*)
- :MEASure:EYE:PAM:ELEVel:STATus? (*new*)
- :MEASure:EYE:PAM:ELEVel:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:ESKew (*new*)
- :MEASure:EYE:PAM:ESKew:EYE (*new*)
- :MEASure:EYE:PAM:ESKew:LOCation (*new*)
- :MEASure:EYE:PAM:ESKew:SOURce (*new*)
- :MEASure:EYE:PAM:ESKew:STATus? (*new*)
- :MEASure:EYE:PAM:ESKew:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:EWidth (*new*)
- :MEASure:EYE:PAM:EWidth:DEFine:EOpening (*new*)
- :MEASure:EYE:PAM:EWidth:DEFine:EOpening:PROBability (*new*)
- :MEASure:EYE:PAM:EWidth:EYE (*new*)
- :MEASure:EYE:PAM:EWidth:LOCation (*new*)
- :MEASure:EYE:PAM:EWidth:SOURce (*new*)
- :MEASure:EYE:PAM:EWidth:STATus? (*new*)
- :MEASure:EYE:PAM:EWidth:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:LEVel (*new*)
- :MEASure:EYE:PAM:LEVel:LEVel (*new*)
- :MEASure:EYE:PAM:LEVel:LOCation (*new*)
- :MEASure:EYE:PAM:LEVel:SOURce (*new*)
- :MEASure:EYE:PAM:LEVel:STATus? (*new*)
- :MEASure:EYE:PAM:LEVel:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:LINearity (*new*)
- :MEASure:EYE:PAM:LINearity:LOCation (*new*)
- :MEASure:EYE:PAM:LINearity:SOURce (*new*)
- :MEASure:EYE:PAM:LINearity:STATus? (*new*)
- :MEASure:EYE:PAM:LINearity:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:RMS (*new*)
- :MEASure:EYE:PAM:RMS:LEVel (*new*)
- :MEASure:EYE:PAM:RMS:LOCation (*new*)
- :MEASure:EYE:PAM:RMS:SOURce (*new*)
- :MEASure:EYE:PAM:RMS:STATus? (*new*)
- :MEASure:EYE:PAM:RMS:STATus:REASon? (*new*)
- :MEASure:EYE:PAM:SKEW (*new*)
- :MEASure:EYE:PAM:SKEW:LEVel (*new*)
- :MEASure:EYE:PAM:SKEW:LOCation (*new*)
- :MEASure:EYE:PAM:SKEW:SOURce (*new*)

- :MEASure:EYE:PAM:SKEW:STATus? (*new*)
- :MEASure:EYE:PAM:SKEW:STATus:REASon? (*new*)
- :MEASure:JITTer:FOVer2 (*new*)
- :MEASure:JITTer:FOVer2:LOCation (*new*)
- :MEASure:JITTer:FOVer2:SOURce (*new*)
- :MEASure:JITTer:FOVer2:STATus? (*new*)
- :MEASure:JITTer:FOVer2:STATus:REASon? (*new*)
- :MEASure:LLINe:FPOints (*new*)
- :MEASure:LLINe:FPOints:STATus? (*new*)
- :MEASure:LLINe:FPOints:STATus:REASon? (*new*)
- :MEASure:LLINe:LINE:FPOints (*new*)
- :MEASure:LLINe:LINE:FPOints:STATus? (*new*)
- :MEASure:LLINe:LINE:FPOints:STATus:REASon? (*new*)
- :MEASure:LLINe:LINE:MARGin (*new*)
- :MEASure:LLINe:LINE:MARGin:STATus? (*new*)
- :MEASure:LLINe:LINE:MARGin:STATus:REASon? (*new*)
- :MEASure:LLINe:LINE:MLOCation (*new*)
- :MEASure:LLINe:LINE:MLOCation:STATus? (*new*)
- :MEASure:LLINe:LINE:MLOCation:STATus:REASon? (*new*)
- :MEASure:LLINe:MARGin (*new*)
- :MEASure:LLINe:MARGin:STATus? (*new*)
- :MEASure:LLINe:MARGin:STATus:REASon? (*new*)
- :MEASure:LLINe:MLOCation (*new*)
- :MEASure:LLINe:MLOCation:STATus? (*new*)
- :MEASure:LLINe:MLOCation:STATus:REASon? (*new*)
- :MEASure:OSCilloscope:PAM:LEVel (*new*)
- :MEASure:OSCilloscope:PAM:LEVel:LEVel (*new*)
- :MEASure:OSCilloscope:PAM:LEVel:LOCation? (*new*)
- :MEASure:OSCilloscope:PAM:LEVel:REGion (*new*)
- :MEASure:OSCilloscope:PAM:LEVel:SOURce (*new*)
- :MEASure:OSCilloscope:PAM:LEVel:STATus? (*new*)
- :MEASure:OSCilloscope:PAM:LEVel:STATus:REASon? (*new*)
- :MEASure:OSCilloscope:PAM:LINearity (*new*)
- :MEASure:OSCilloscope:PAM:LINearity:LOCation? (*new*)
- :MEASure:OSCilloscope:PAM:LINearity:REGion (*new*)
- :MEASure:OSCilloscope:PAM:LINearity:SOURce (*new*)
- :MEASure:OSCilloscope:PAM:LINearity:STATus? (*new*)
- :MEASure:OSCilloscope:PAM:LINearity:STATus:REASon? (*new*)
- :MEASure:OSCilloscope:PAM:RMS (*new*)
- :MEASure:OSCilloscope:PAM:RMS:LEVel (*new*)
- :MEASure:OSCilloscope:PAM:RMS:LOCation? (*new*)
- :MEASure:OSCilloscope:PAM:RMS:REGion (*new*)
- :MEASure:OSCilloscope:PAM:RMS:SOURce (*new*)

- :MEASure:OSCilloscope:PAM:RMS:STATus? (*new*)
- :MEASure:OSCilloscope:PAM:RMS:STATus:REASon? (*new*)
- :MEASure:OSCilloscope:PHASe (*new*)
- :MEASure:OSCilloscope:PHASe:EDIRection (*new*)
- :MEASure:OSCilloscope:PHASe:ENUMber (*new*)
- :MEASure:OSCilloscope:PHASe:ETHReshold (*new*)
- :MEASure:OSCilloscope:PHASe:LOCation (*new*)
- :MEASure:OSCilloscope:PHASe:REGion (*new*)
- :MEASure:OSCilloscope:PHASe:SOURce (*new*)
- :MEASure:OSCilloscope:PHASe:STATus? (*new*)
- :MEASure:OSCilloscope:PHASe:STATus:REASon? (*new*)
- :MEASure:PAM:AMPLitude:UNITs (*new*)
- :MEASure:PAM:EYE:ELMethod (*new*)
- :MEASure:PAM:EYE:ESTiming (*new*)
- :MEASure:PAM:EYE:PPERcent (*new*)
- :MEASure:PAM:EYE:TIME:LTDefinition (*new*)
- :MEASure:PAM:EYE:TIME:UNITs (*new*)
- :MEASure:TDR:ECAPacitance:REFerence:TYPE (*revised*)
- :MEASure:TDR:ECAPacitance:REFerence:VALue (*new*)
- :MEASure:TDR:EINDuctance:REFerence:TYPE (*revised*)
- :MEASure:TDR:EINDuctance:REFerence:VALue (*new*)

## :SPRocess Subsystem Commands

- :SPRocess:CTLequalizer:PRESets (*new*)
- :SPRocess:CTLequalizer:PRESets:SELECTIONs? (*new*)
- :SPRocess:DFEQualizer:PRESets (*new*)
- :SPRocess:DFEQualizer:PRESets:SELECTIONs? (*new*)
- :SPRocess:FFEQualizer:PRESets (*new*)
- :SPRocess:FFEQualizer:PRESets:SELECTIONs? (*new*)

## :SOURce Subsystem Commands

- :SOURce:FOTWo:JITTer (*new*)
- :SOURce:FOTWo:STATe (*new*)
- :SOURce:FORMat (*new*)

## :STATus Subsystem Commands

Addition of new limit-line event register.

- :STATus:LLINE:ENABle (*new*)
- :STATus:LLINE:EVENT? (*new*)



## :SYSTem Subsystem Commands

- :SYSTem:MPButton:DOCWizard:BFName (*new*)
- :SYSTem:MPButton:FUNCTion (*new*)
- :SYSTem:MPButton:QSETup:FNAME (*new*)
- :SYSTem:MPButton:QSPBack:EYE:FNAME (*new*)
- :SYSTem:MPButton:QSPBack:FNAME (*new*)
- :SYSTem:MPButton:QSPBack:JITTer:FNAME (*new*)
- :SYSTem:MPButton:QSPBack:OSCilloscope:FNAME (*new*)
- :SYSTem:MPButton:QSPBack:SSCRipt (*new*)
- :SYSTem:MPButton:QSPBack:TDR:FNAME (*new*)
- :SYSTem:MPButton:SIMage:BFName (*new*)
- :SYSTem:MPButton:SIMage:INVert (*new*)
- :SYSTem:MPButton:SIMage:MONochrome (*new*)
- :SYSTem:MPButton:SIMage:SAVE (*new*)
- :SYSTem:OSYSstem (*new*)
- :SYSTem:PERSonA:MANufacturer (*new*)
- :SYSTem:PERSonA:MANufacturer:DEFault (*new*)
- :SYSTem:PERSonA:MODEL (*new*)
- :SYSTem:PERSonA:MODEL:DEFault (*new*)
- :SYSTem:STAutodetect (*new*)

## :WMEMory Subsystem Commands

- :WMEMory:SIGNal:TYPE (*new*)

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Revision A.04.20, October 2014

## General Comments

- For TDR/TDT mode's **Time-Ohms**, **Time-Volts**, and **Time-%** T-parameter graphs, added the ability to  
GRAPH:T:OHMS:X:DCONstant (*new*)
- GRAPH:T:OHMS:X:POSition (*new*)
- GRAPH:T:OHMS:X:SCALe (*new*)
- GRAPH:T:OHMS:X:UNITs (*new*)
- GRAPH:T:OHMS:X:VFACtor (*new*)
- GRAPH:T:PERCent:X:DCONstant (*new*)
- GRAPH:T:PERCent:X:POSition (*new*)
- GRAPH:T:PERCent:X:SCALe (*new*)
- GRAPH:T:PERCent:X:UNITs (*new*)
- GRAPH:T:PERCent:X:VFACtor (*new*)
- GRAPH:T:VOLTs:X:DCONstant (*new*)
- GRAPH:T:VOLTs:X:POSition (*new*)
- GRAPH:T:VOLTs:X:SCALe (*new*)
- GRAPH:T:VOLTs:X:UNITs (*new*)
- GRAPH:T:VOLTs:X:VFACtor (*new*)

## :MEASure Subsystem Commands

- :MEASure:RESults? (*new*)

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## Revision A.04.00, August 2014

### General Comments

**NOTE**

FlexDCA is compatible with Windows XP and Windows 7 but is *not* compatible with Windows 8.

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### New Features

- TDR/TDT Mode.
- Support for new N1055A 35/50 GHz TDR/TDT Remote Head module.
- For TDR Mode's S-parameter waveforms, a tracking-marker pair reports the Y values on magnitude, phase, and group delay waveforms for a single common X position. Set one X position value and get three Y values. The **Mag-nitude** and **Δ Mag** values are reported in the Marker results table.

### New Remote Command Subsystems

- :CMODE
- :TDR
- :TRACe

### :CALibrate Subsystem Commands

- CALibrate:SLOT:STEP (*new*)
- CALibrate:SLOT:STEP:STATus? (*new*)
- CALibrate:SLOT:STEP:STATus:DEtails (*new*)
- CALibrate:SLOT:STEP:STATus:DTEmpErature (*new*)
- CALibrate:SLOT:STEP:STATus:TIME (*new*)

### :CHANnel Subsystem Commands

- :CHANnel:YUNits (*command form added*)

## :CMODE Subsystem Commands (*new*)

- :CMODE:COLor (*new*)
- :CMODE:CWINdow (*new*)
- :CMODE:DISPlay (*new*)
- :CMODE:STATus? (*new*)
- :CMODE:UNDEFined:BASE (*new*)
- :CMODE:UNDEFined:DISTal (*new*)
- :CMODE:UNDEFined:MESial (*new*)
- :CMODE:UNDEFined:PROXimal (*new*)
- :CMODE:UNDEFined:TOP (*new*)
- :CMODE:UNAMe (*new*)
- :CMODE:YBOTtom (*new*)
- :CMODE:YOFFset (*new*)
- :CMODE:YSCale (*new*)
- :CMODE:YTOP (*new*)
- :CMODE:YUNits (*new*)

## :DIFF Subsystem Commands

- :DIFF:YUNits (*command form added*)

## :DISK Subsystem Commands

- :DISK:SPARameter:DSDiff (*new*)
- :DISK:SPARameter:DSLoutput (*new*)
- :DISK:SPARameter:DSReciprocal (*new*)
- :DISK:SPARameter:DUT (*new*)
- :DISK:SPARameter:FNAME (*new*)
- :DISK:SPARameter:FWBehavior (*new*)
- :DISK:SPARameter:PSET (*new*)
- :DISK:SPARameter:SAVE (*new*)

## :DISPlay Subsystem Command

- :DISPlay:WINDow:T:OHMS:DMODE (*new*)
- :DISPlay:WINDow:T:OHMS:LEGend:EXPand (*new*)
- :DISPlay:WINDow:T:OHMS:ZSIGnal (*new*)
- :DISPlay:WINDow:T:PERCent:DMODE (*new*)
- :DISPlay:WINDow:T:PERCent:LEGend:EXPand (*new*)
- :DISPlay:WINDow:T:PERCent:ZSIGnal (*new*)

- :DISPlay:WINDow:T:VOLTs:DMODE (new)
- :DISPlay:WINDow:T:VOLTs:LEGend:EXPand (new)
- :DISPlay:WINDow:T:VOLTs:ZSIGnal (new)

## :FUNction Subsystem Commands

- :FUNction:FOPerator INTegrate (depreciated argument)
- :FUNction:FOPerator SUMMation (new argument)

## :GRAPh Subsystem Commands (new)

- :GRAPh:T:OHMS:AUToscale (new)
- :GRAPh:T:OHMS:Y:AUToscale (new)
- :GRAPh:T:OHMS:Y:OFFSet (new)
- :GRAPh:T:OHMS:Y:SCALE (new)
- :GRAPh:T:PERCent:AUToscale (new)
- :GRAPh:T:PERCent:Y:AUToscale (new)
- :GRAPh:T:PERCent:Y:OFFSet (new)
- :GRAPh:T:PERCent:Y:SCALE (new)
- :GRAPh:T:VOLTs:AUToscale (new)
- :GRAPh:T:VOLTs:Y:AUToscale (new)
- :GRAPh:T:VOLTs:Y:OFFSet (new)
- :GRAPh:T:VOLTs:Y:SCALE (new)

## :JSAMemory Subsystem Commands

- :JSAMemory:JSANalysis:SPECTrum:ASCIi:YDATA? (new)
- :JSAMemory:JSANalysis:SPECTrum:DOUBle:YDATA? (new)
- :JSAMemory:JSANalysis:SPECTrum:FLOat:YDATA? (new)
- :JSAMemory:JSANalysis:SPECTrum:PEAKs? (new)
- :JSAMemory:JSANalysis:SPECTrum:PEAKs:ALL? (new)
- :JSAMemory:JSANalysis:SPECTrum:POINts? (new)
- :JSAMemory:JSANalysis:SPECTrum:XINCrement? (new)
- :JSAMemory:JSANalysis:SPECTrum:XORigin? (new)

## :LTEST Subsystem Commands

- :LTEST:ACQuire:SWAVEform:CMODE:FNAME (new)
- :LTEST:ACQuire:SWAVEform:CMODE:STATE (new)
- :LTEST:ACQuire:SWAVEform:CMODE:WMEMory (new)
- :LTEST:MEASure:SWAVEform:CMODE:FNAME (new)
- :LTEST:MEASure:SWAVEform:CMODE:STATE (new)
- :LTEST:MEASure:SWAVEform:CMODE:WMEMory (new)

- :LTESSt:MTESSt:SWAVeform:CMODE:FNAME (*new*)
- :LTESSt:MTESSt:SWAVeform:CMODE:STATe (*new*)
- :LTESSt:MTESSt:SWAVeform:CMODE:WMEMory (*new*)

## :MARKer Subsystem Commands

- :MARKer:X:SOURce:DUT (*new*)
- :MARKer:X:SOURce:SPARameter (*new*)
- :MARKer:X:SOURce:TYPE (*new*)
- :MARKer:Y:SOURce:DUT (*new*)
- :MARKer:Y:SOURce:SPARameter (*new*)
- :MARKer:Y:SOURce:TYPE (*new*)

## :MEASure Subsystem Commands

- :MEASure:JSAMemory:DJ? (*new*)
- :MEASure:JSAMemory:DJ:STATus? (*new*)
- :MEASure:JSAMemory:DJ:STATus:REASon? (*new*)
- :MEASure:JSAMemory:RJ? (*new*)
- :MEASure:JSAMemory:RJ:STATus? (*new*)
- :MEASure:JSAMemory:RJ:STATus:REASon? (*new*)
- :MEASure:JSAMemory:TJ? (*new*)
- :MEASure:JSAMemory:TJ:STATus? (*new*)
- :MEASure:JSAMemory:TJ:STATus:REASon? (*new*)
- :MEASure:LTESSt:MLIMit:FAILures? (*new*)
- :MEASure:LTESSt:MLIMit:WAVEforms? (*new*)
- :MEASure:TDR:DELtatime (*new*)
- :MEASure:TDR:DELtatime:EDIRection (*new*)
- :MEASure:TDR:DELtatime:ENUMber (*new*)
- :MEASure:TDR:DELtatime:ETHReshold (*new*)
- :MEASure:TDR:DELtatime:LOCation? (*new*)
- :MEASure:TDR:DELtatime:REGion (*new*)
- :MEASure:TDR:DELtatime:SOURce (*new*)
- :MEASure:TDR:DELtatime:STATus? (*new*)
- :MEASure:TDR:DELtatime:STATus:REASon? (*new*)
- :MEASure:TDR:ECAPacitance (*new*)
- :MEASure:TDR:ECAPacitance:LOCation? (*new*)
- :MEASure:TDR:ECAPacitance:REFerence:TYPE (*new*)
- :MEASure:TDR:ECAPacitance:REGion (*new*)
- :MEASure:TDR:ECAPacitance:SOURce (*new*)
- :MEASure:TDR:ECAPacitance:STATus? (*new*)
- :MEASure:TDR:ECAPacitance:STATus:REASon? (*new*)
- :MEASure:TDR:EINDuctance (*new*)

- :MEASure:TDR:EINDuctance:LOCation? (*new*)
- :MEASure:TDR:EINDuctance:REFerence:TYPE (*new*)
- :MEASure:TDR:EINDuctance:REGion (*new*)
- :MEASure:TDR:EINDuctance:SOURce (*new*)
- :MEASure:TDR:EINDuctance:STATus? (*new*)
- :MEASure:TDR:EINDuctance:STATus:REASon? (*new*)
- :MEASure:TDR:FALLtime (*new*)
- :MEASure:TDR:FALLtime:LOCation? (*new*)
- :MEASure:TDR:FALLtime:REGion (*new*)
- :MEASure:TDR:FALLtime:SOURce (*new*)
- :MEASure:TDR:FALLtime:STATus? (*new*)
- :MEASure:TDR:FALLtime:STATus:REASon? (*new*)
- :MEASure:TDR:LIST:CLEar (*new*)
- :MEASure:TDR:LIST:REMOve (*new*)
- :MEASure:TDR:LIST:SELEct (*new*)
- :MEASure:TDR:RISetime (*new*)
- :MEASure:TDR:RISetime:LOCation? (*new*)
- :MEASure:TDR:RISetime:REGion (*new*)
- :MEASure:TDR:RISetime:SOURce (*new*)
- :MEASure:TDR:RISetime:STATus? (*new*)
- :MEASure:TDR:RISetime:STATus:REASon? (*new*)
- :MEASure:TDR:TEDGe (*new*)
- :MEASure:TDR:TEDGe:DIRection (*new*)
- :MEASure:TDR:TEDGe:LOCation? (*new*)
- :MEASure:TDR:TEDGe:NUMBer (*new*)
- :MEASure:TDR:TEDGe:REGion (*new*)
- :MEASure:TDR:TEDGe:SOURce (*new*)
- :MEASure:TDR:TEDGe:STATus? (*new*)
- :MEASure:TDR:TEDGe:STATus:REASon? (*new*)
- :MEASure:TDR:TEDGe:THReshold (*new*)
- :MEASure:TDR:TMAXimum (*new*)
- :MEASure:TDR:TMAXimum:LOCation? (*new*)
- :MEASure:TDR:TMAXimum:REGion (*new*)
- :MEASure:TDR:TMAXimum:SOURce (*new*)
- :MEASure:TDR:TMAXimum:STATus? (*new*)
- :MEASure:TDR:TMAXimum:STATus:REASon? (*new*)
- :MEASure:TDR:TMINimum (*new*)
- :MEASure:TDR:TMINimum:LOCation? (*new*)
- :MEASure:TDR:TMINimum:REGion (*new*)
- :MEASure:TDR:TMINimum:SOURce (*new*)
- :MEASure:TDR:TMINimum:STATus? (*new*)
- :MEASure:TDR:TMINimum:STATus:REASon? (*new*)
- :MEASure:TDR:TVOLt (*new*)

- :MEASure:TDR:TVOLt:EDIRectioN (*new*)
- :MEASure:TDR:TVOLt:ENUMber (*new*)
- :MEASure:TDR:TVOLt:LOCation? (*new*)
- :MEASure:TDR:TVOLt:REGion (*new*)
- :MEASure:TDR:TVOLt:SOURce (*new*)
- :MEASure:TDR:TVOLt:STATus? (*new*)
- :MEASure:TDR:TVOLt:STATus:REASon? (*new*)
- :MEASure:TDR:TVOLt:YVALue (*new*)
- :MEASure:TDR:VAVerage (*new*)
- :MEASure:TDR:VAVerage:AREa (*new*)
- :MEASure:TDR:VAVerage:LOCation? (*new*)
- :MEASure:TDR:VAVerage:REGion (*new*)
- :MEASure:TDR:VAVerage:SOURce (*new*)
- :MEASure:TDR:VAVerage:STATus? (*new*)
- :MEASure:TDR:VAVerage:STATus:REASon? (*new*)
- :MEASure:TDR:VMAXimum (*new*)
- :MEASure:TDR:VMAXimum:LOCation? (*new*)
- :MEASure:TDR:VMAXimum:REGion (*new*)
- :MEASure:TDR:VMAXimum:SOURce (*new*)
- :MEASure:TDR:VMAXimum:STATus? (*new*)
- :MEASure:TDR:VMAXimum:STATus:REASon? (*new*)
- :MEASure:TDR:VMINimum (*new*)
- :MEASure:TDR:VMINimum:LOCation? (*new*)
- :MEASure:TDR:VMINimum:REGion (*new*)
- :MEASure:TDR:VMINimum:SOURce (*new*)
- :MEASure:TDR:VMINimum:STATus? (*new*)
- :MEASure:TDR:VMINimum:STATus:REASon? (*new*)
- :MEASure:TDR:VTIME (*new*)
- :MEASure:TDR:VTIME:LOCation? (*new*)
- :MEASure:TDR:VTIME:REGion (*new*)
- :MEASure:TDR:VTIME:SOURce (*new*)
- :MEASure:TDR:VTIME:STATus? (*new*)
- :MEASure:TDR:VTIME:STATus:REASon? (*new*)
- :MEASure:TDR:VTIME:TIME (*new*)

## :SYSTem Subsystem Commands

- :SYSTem:BORDER (*new*)

## :TDR Subsystem Commands

- :TDR:ADAPters:CANCEL (*new*)
- :TDR:ADAPters:CONNector (*new*)



- :TDR:ADAPters:CONTInue (*new*)
- :TDR:ADAPters:DELay (*new*)
- :TDR:ADAPters:DSPEc (*new*)
- :TDR:ADAPters:NAME (*new*)
- :TDR:ADAPters:OVERwrite (*new*)
- :TDR:ADAPters:SCHannel (*new*)
- :TDR:ADAPters:SDONE? (*new*)
- :TDR:ADAPters:STARt (*new*)
- :TDR:AMODE (*new*)
- :TDR:ASNaming (*new*)
- :TDR:CALibration:ATIMEbase (*new*)
- :TDR:CALibration:AVERages (*new*)
- :TDR:CALibration:CANCel (*new*)
- :TDR:CALibration:CONTInue (*new*)
- :TDR:CALibration:DRMCal (*new*)
- :TDR:CALibration:DUT:CDATa? (*new*)
- :TDR:CALibration:DUT:CDATa:REASon? (*new*)
- :TDR:CALibration:DUT:LOAD (*new*)
- :TDR:CALibration:DUT:LOAD:FNAME (*new*)
- :TDR:CALibration:DUT:CDRSet (*new*)
- :TDR:CALibration:DUT:CLEar (*new*)
- :TDR:CALibration:DUT:CONFig? (*new*)
- :TDR:CALibration:DUT:CONFig:REASon? (*new*)
- :TDR:CALibration:DUT:CRSet (*new*)
- :TDR:CALibration:DUT:DRSet (*new*)
- :TDR:CALibration:DUT:ECAL:ADAPters:A (*new*)
- :TDR:CALibration:DUT:ECAL:ADAPters:B (*new*)
- :TDR:CALibration:DUT:ECAL:CHAR (*new*)
- :TDR:CALibration:DUT:ECAL:MODule (*new*)
- :TDR:CALibration:DUT:ECAL:STATus? (*new*)
- :TDR:CALibration:DUT:ECAL:STATus:REASon? (*new*)
- :TDR:CALibration:DUT:ENABLE (*new*)
- :TDR:CALibration:DUT:FDRSet (*new*)
- :TDR:CALibration:DUT:METHod (*new*)
- :TDR:CALibration:DUT:NOCSSteps (*new*)
- :TDR:CALibration:DUT:RDUT (*new*)
- :TDR:CALibration:DUT:SENDEd:PORT:CKIT (*new*)
- :TDR:CALibration:DUT:SENDEd:PORT:CONNector (*new*)
- :TDR:CALibration:DUT:SKAPorts (*new*)
- :TDR:CALibration:DUT:STARt (*new*)
- :TDR:CALibration:SDONE (*new*)
- :TDR:CALibration:STEP? (*new*)
- :TDR:CALibration:STEP:COUNt? (*new*)

- :TDR:CALibration:STEP:SElect (*new*)
- :TDR:CALibration:UCURrent (*new*)
- :TDR:CHANnel:DUT (*new*)
- :TDR:CHANnel:PORT (*new*)
- :TDR:DESKew:CANCel (*new*)
- :TDR:DESKew:CONTinue (*new*)
- :TDR:DESKew:DUT (*new*)
- :TDR:DESKew:FNAME (*new*)
- :TDR:DESKew:SAVE (*new*)
- :TDR:DESKew:SCHannel (*new*)
- :TDR:DESKew:SDONe? (*new*)
- :TDR:DESKew:START (*new*)
- :TDR:DUT:ACMatch (*new*)
- :TDR:DUT:ACONnect (*new*)
- :TDR:DUT:ADPNaming (*new*)
- :TDR:DUT:DIFFerential:NPORt:UNAME (*new*)
- :TDR:DUT:DIFFerential:PPORt:UNAME (*new*)
- :TDR:DUT:DIFFerential:SIGNal:UNAME (*new*)
- :TDR:DUT:DTYPe (*new*)
- :TDR:DUT:ENABle (*new*)
- :TDR:DUT:RISetime (*new*)
- :TDR:DUT:SENDEd:PORT:UNAME (*new*)
- :TDR:DUT:STATus? (*new*)
- :TDR:DUT:STATus:REASon? (*new*)
- :TDR:EXPerience (*new*)
- :TDR:FINCrement (*new*)
- :TDR:STATus? (*new*)
- :TDR:STATus:REASon? (*new*)
- :TDR:STIMulus:CHANnel:AMPLitude (*new*)
- :TDR:STIMulus:CHANnel:METHod (*new*)
- :TDR:STIMulus:CHANnel:POLarity (*new*)
- :TDR:STIMulus:CHANnel:SKEW (*new*)
- :TDR:STIMulus:CHANnel:STATus? (*new*)
- :TDR:STIMulus:CHANnel:STEP (*new*)
- :TDR:STIMulus:CHANnel:TYPe (*new*)
- :TDR:STIMulus:SLOT:RATE (*new*)
- :TDR:STIMulus:SLOT:RATE:AUTomatic (*new*)

## :TRACe Subsystem Commands

- :TRACe:COLor (*new*)
- :TRACe:CWINdow (*new*)
- :TRACe:DISPlay (*new*)

- :TRACe:DUT (*new*)
- :TRACe:OPERator (*new*)
- :TRACe:PARAmeter (*new*)
- :TRACe:STATus? (*new*)
- :TRACe:UDEFinEd:BASe (*new*)
- :TRACe:UDEFinEd:DIStAl (*new*)
- :TRACe:UDEFinEd:MEsIal (*new*)
- :TRACe:UDEFinEd:PROXimal (*new*)
- :TRACe:UDEFinEd:TOP (*new*)
- :TRACe:UNAMe (*new*)
- :TRACe:XLEft? (*new*)
- :TRACe:XPOSition? (*new*)
- :TRACe:XREFerence? (*new*)
- :TRACe:XRIGht? (*new*)
- :TRACe:XSCale? (*new*)
- :TRACe:XUNits? (*new*)
- :TRACe:YBOTtom? (*new*)
- :TRACe:YOFFset? (*new*)
- :TRACe:YSCale? (*new*)
- :TRACe:YTOP? (*new*)
- :TRACe:YUNits? (*new*)

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## Revision A.03.00, May 2014

### New Features

- Microsoft Windows Embedded Standard 7 (WES7 64 bit) is now installed on the 86100D. Windows 7 allows FlexDCA to acquire up to 256 mega-samples for a single pattern-locked waveform in Oscilloscope mode. For example, 4095 samples/bit over an entire PRBS16-1 pattern can be captured.
- Support for new 86100D-PTB option, an internal precision timebase.
- Perform measurement limit tests (including mask limit tests for specific regions of a mask).
- Increased the number of markers. The number of Tracking Markers have been increased from two to four. The number of Manual Line Markers have been increased from four to eight.
- Change waveform labels to a more meaningful custom user name.

### General Comments

- The acquisition buttons located on the menu bar and shown in the following picture are now always displayed. Previously, these buttons could be hidden using the **Show Run/Stop Controls in Title Bar** checkbox in the **Display Setup** dialog box. This checkbox has been removed.

**NOTE**

FlexDCA is compatible with Windows XP and Windows 7 but is *not* compatible with Windows 8.

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### New Command Subsystems

- :GRAPh

### :CALibrate Subsystem Commands

- CALibrate:FRAME:PTIMEbase:START (*new*)
- CALibrate:FRAME:PTIMEbase:STATus (*new*)
- CALibrate:FRAME:PTIMEbase:STATus:DEtails (*new*)
- CALibrate:FRAME:PTIMEbase:STATus:DTEMPerature (*new*)
- CALibrate:FRAME:PTIMEbase:STATus:TIME (*new*)

- CALibrate:FRAMe:TIMebase:STATus (*new*)
- CALibrate:FRAMe:TIMebase:STATus:DETAils (*new*)
- CALibrate:FRAMe:TIMebase:STATus:DTEMPerature (*new*)
- CALibrate:FRAMe:TIMebase:STATus:TIME (*new*)
- CALibrate:TIMebase:SLOT:STARt (*new*)
- CALibrate:TIMebase:SLOT:STATus (*new*)
- CALibrate:TIMebase:SLOT:STATus:DETAils (*new*)
- CALibrate:TIMebase:SLOT:STATus:DTEMPerature (*new*)
- CALibrate:TIMebase:SLOT:STATus:TIME (*new*)
- :CALibrate:FRAMe:STATus? (*deprecated*)
- :CALibrate:FRAMe:STATus:DETAils? (*deprecated*)
- :CALibrate:FRAMe:STATus:DTEMPerature? (*deprecated*)
- :CALibrate:FRAMe:STATus:TIME? (*deprecated*)

## :CHANnel Subsystem Commands

- :CHANnel:CWINdow (*new*)
- :CHANnel:UNAMe (*new*)

## :DIFF Subsystem Commands

- :DIFF:CWINdow (*new*)
- :DIFF:UNAMe (*new*)

## :DISK Subsystem Command

- :DISK:SIMAge:GONLy (*deprecated*)
- :DISK:SIMAge:WINDow (*new*)

## :DISPlay Subsystem Command

- :DISPlay:GRATicule:MCONtrols (*removed*)
- :DISPlay:LOCation:LSECondary:AWINDow (*new*)
- :DISPlay:LOCation:PRIMary:AWINDow (*new*)
- :DISPlay:LOCation:RSECondary:AWINDow (*new*)
- :DISPlay:MARKer:DELTas (*new*)
- :DISPlay:TBControls (*removed*)
- :DISPlay:TMASk (*new*)
- :DISPlay:WINDow:FDLegend (*new*)
- :DISPlay:WINDow:GDELaY:DMODE (*new*)
- :DISPlay:WINDow:GDELaY:LEGend:EXPand (*new*)
- :DISPlay:WINDow:GDELaY:ZSIGnal (*new*)
- :DISPlay:WINDow:MAGNitude:DMODE (*new*)

- :DISPlay:WINDow:MAGNitude:LEGend:EXPand (*new*)
- :DISPlay:WINDow:MAGNitude:ZSIGnal (*new*)
- :DISPlay:WINDow:PHASe:DMODE (*new*)
- :DISPlay:WINDow:PHASe:LEGend:EXPand (*new*)
- :DISPlay:WINDow:PHASe:ZSIGnal (*new*)
- :DISPlay:WINDow:TDLegend (*new*)
- :DISPlay:WINDow:TIME:DMODE (*new*)
- :DISPlay:WINDow:TIME:LEGend:EXPand (*new*)
- :DISPlay:WINDow:TIME:ZSIGnal (*new*)

## :EMEMory Subsystem Command

- :EMEMory:CWINDow (*new*)
- :EMEMory:UNAME (*new*)

## :FUNction Subsystem Command

- :FUNction:CWINDow (*new*)
- :FUNction:UNAME (*new*)

## :GRAPh Subsystem Commands (*new*)

This new subsystem controls waveform scaling and position in the new Group Delay, Magnitude, and Phase content windows.

- :GRAPh:GDELay:AUToscale (*new*)
- :GRAPh:GDELay:X:AUToscale (*new*)
- :GRAPh:GDELay:X:CENTER (*new*)
- :GRAPh:GDELay:X:SPAN (*new*)
- :GRAPh:GDELay:X:START (*new*)
- :GRAPh:GDELay:X:STOP (*new*)
- :GRAPh:GDELay:Y:AUToscale (*new*)
- :GRAPh:GDELay:Y:OFFSet (*new*)
- :GRAPh:GDELay:Y:SCALE (*new*)
- :GRAPh:MAGNitude:AUToscale (*new*)
- :GRAPh:MAGNitude:X:AUToscale (*new*)
- :GRAPh:MAGNitude:X:CENTER (*new*)
- :GRAPh:MAGNitude:X:SPAN (*new*)
- :GRAPh:MAGNitude:X:START (*new*)
- :GRAPh:MAGNitude:X:STOP (*new*)
- :GRAPh:MAGNitude:Y:AUToscale (*new*)
- :GRAPh:MAGNitude:Y:OFFSet (*new*)
- :GRAPh:MAGNitude:Y:SCALE (*new*)

- :GRAPh:PHASe:AUToscale (*new*)
- :GRAPh:PHASe:X:AUToscale (*new*)
- :GRAPh:PHASe:X:CENTer (*new*)
- :GRAPh:PHASe:X:SPAN (*new*)
- :GRAPh:PHASe:X:STARt (*new*)
- :GRAPh:PHASe:X:STOP (*new*)
- :GRAPh:PHASe:Y:AUToscale (*new*)
- :GRAPh:PHASe:Y:OFFSet (*new*)
- :GRAPh:PHASe:Y:SCALE (*new*)

## :JDMemory Subsystem Command

- :JDMemory:CWINdow (*new*)

## :LTEST Subsystem Commands

- :LTEST:ACQuire:SIMage:WINDow (*new*)
- :LTEST:MEASure:MLIMit:FAILures (*new*)
- :LTEST:MEASure:MLIMit:FREGion (*new*)
- :LTEST:MEASure:MLIMit:LLIMit (*new*)
- :LTEST:MEASure:MLIMit:SOURce:LOCation (*new*)
- :LTEST:MEASure:MLIMit:SOURce:TYPE (*new*)
- :LTEST:MEASure:MLIMit:STATe (*new*)
- :LTEST:MEASure:MLIMit:ULIMit (*new*)
- :LTEST:MEASure:MLIMit:UPACtion (*new*)
- :LTEST:MEASure:SIMage:WINDow (*new*)
- :LTEST:MTESt:MRESult:FAILures (*new*)
- :LTEST:MTESt:MRESult:STATe (*new*)
- :LTEST:MTESt:SIMage:WINDow (*new*)
- :LTEST:ACQuire:SIMage:GONLy (*deprecated*)
- :LTEST:MEASure:AMPLitude:LOCation:FAILures (*removed*)
- :LTEST:MEASure:AMPLitude:LOCation:FREGion (*removed*)
- :LTEST:MEASure:AMPLitude:LOCation:LLIMit (*removed*)
- :LTEST:MEASure:AMPLitude:LOCation:STATe (*removed*)
- :LTEST:MEASure:AMPLitude:LOCation:ULIMit (*removed*)
- :LTEST:MEASure:AMPLitude:LOCation:UPACtion (*removed*)
- :LTEST:MEASure:CRECovery:LOCation:FAILures (*removed*)
- :LTEST:MEASure:CRECovery:LOCation:FREGion (*removed*)
- :LTEST:MEASure:CRECovery:LOCation:LLIMit (*removed*)
- :LTEST:MEASure:CRECovery:LOCation:STATe (*removed*)
- :LTEST:MEASure:CRECovery:LOCation:ULIMit (*removed*)
- :LTEST:MEASure:CRECovery:LOCation:UPACtion (*removed*)
- :LTEST:MEASure:EYE:LOCation:FAILures (*removed*)

- :LTEST:MEASure:EYE:LOCation:FREGion (*removed*)
- :LTEST:MEASure:EYE:LOCation:LLIMit (*removed*)
- :LTEST:MEASure:EYE:LOCation:STATe (*removed*)
- :LTEST:MEASure:EYE:LOCation:ULIMit (*removed*)
- :LTEST:MEASure:EYE:LOCation:UPACtion (*removed*)
- :LTEST:MEASure:JITTer:LOCation:FAILures (*removed*)
- :LTEST:MEASure:JITTer:LOCation:FREGion (*removed*)
- :LTEST:MEASure:JITTer:LOCation:LLIMit (*removed*)
- :LTEST:MEASure:JITTer:LOCation:STATe (*removed*)
- :LTEST:MEASure:JITTer:LOCation:ULIMit (*removed*)
- :LTEST:MEASure:JITTer:LOCation:UPACtion (*removed*)
- :LTEST:MEASure:MTEST:LOCation:FAILures (*removed*)
- :LTEST:MEASure:MTEST:LOCation:FREGion (*removed*)
- :LTEST:MEASure:MTEST:LOCation:LLIMit (*removed*)
- :LTEST:MEASure:MTEST:LOCation:STATe (*removed*)
- :LTEST:MEASure:MTEST:LOCation:ULIMit (*removed*)
- :LTEST:MEASure:MTEST:LOCation:UPACtion (*removed*)
- :LTEST:MEASure:OSCilloscope:LOCation:FAILures (*removed*)
- :LTEST:MEASure:OSCilloscope:LOCation:FREGion (*removed*)
- :LTEST:MEASure:OSCilloscope:LOCation:LLIMit (*removed*)
- :LTEST:MEASure:OSCilloscope:LOCation:STATe (*removed*)
- :LTEST:MEASure:OSCilloscope:LOCation:ULIMit (*removed*)
- :LTEST:MEASure:OSCilloscope:LOCation:UPACtion (*removed*)
- :LTEST:MEASure:SIMage:GONLy (*deprecated*)
- :LTEST:MTEST:FAILures (*deprecated*)
- :LTEST:MTEST:SIMage:GONLy (*deprecated*)
- :LTEST:MTEST:STATe (*deprecated*)

## :MARKer Subsystem Commands

- :MARKer:REFerence (*new*)

## :MEASure Subsystem Commands

- :MEASure:EYE:COMPLete (*new*)
- :MEASure:MARKer:DX? (*new*)
- :MEASure:MARKer:DX:STATus? (*new*)
- :MEASure:MARKer:DX:STATus:REASon? (*new*)
- :MEASure:MARKer:DY? (*new*)
- :MEASure:MARKer:DY:STATus? (*new*)
- :MEASure:MARKer:DY:STATus:REASon? (*new*)
- :MEASure:MARKer:IDX? (*new*)
- :MEASure:MARKer:IDX:STATus? (*new*)



- :MEASure:MARKer:IDX:STATus:REASon? (*new*)
- :MARKer:IXDelta? (*deprecated*)
- :MARKer:IXDelta:STATus? (*deprecated*)
- :MARKer:IXDelta:STATus:REASon? (*deprecated*)
- :MARKer:XDELta? (*deprecated*)
- :MARKer:XDELta:STATus? (*deprecated*)
- :MARKer:XDELta:STATus:REASon? (*deprecated*)
- :MARKer:YDELta? (*deprecated*)
- :MARKer:YDELta:STATus? (*deprecated*)
- :MARKer:YDELta:STATus:REASon? (*deprecated*)

## :MTESt Subsystem Commands

- :MTESt:ALIGnment:X (*new*)
- :MTESt:ALIGnment:X:METhod (*new*)
- :MTESt:ALIGnment:Y (*new*)
- :MTESt:ALIGnment:Y:METhod (*new*)
- :MTESt:AMETHod (*deprecated*)
- :MTESt:SMODE (*deprecated*)
- :MTESt:YALign (*deprecated*)

## :SPROcess Subsystem Commands

- :SPROcess:FFT:DISPlay (*revised*)
- :SPROcess:FFT:PREFerence (*new*)
- :SPROcess:FFT:PREFerence:TORigin (*new*)

## :TIMebase Subsystem Commands

- :TIMebase:PTIMEbase:RFRequency (*new*)
- :TIMebase:PTIMEbase:RFRequency:AUTO (*new*)
- :TIMebase:PTIMEbase:RMETHod (*new*)
- :TIMebase:PTIMEbase:RTReference (*new*)
- :TIMebase:PTIMEbase:STATe (*new*)

## :TRIGger Subsystem Commands

- :TRIGger:MODE (*new*)
- :TRIGger:BWLimit (*removed*)

## :WAVeform Subsystem Commands

- :WAVeform:EYE:STATus (*new*)
- :WAVeform:EYE:STATus:REASon (*new*)
- :WAVeform:STATus (*new*)
- :WAVeform:STATus:REASon (*new*)
- :WAVeform:XYFormat:POINts:CLIPped (*new*)
- :WAVeform:XYFormat:POINts:CLIPped:HIGH? (*new*)
- :WAVeform:XYFormat:POINts:CLIPped:LOW? (*new*)
- :WAVeform:XYFormat:POINts:HOLes? (*new*)
- :WAVeform:YFOrmat:POINts:CLIPped (*new*)
- :WAVeform:YFormat:POINts:CLIPped:HIGH? (*new*)
- :WAVeform:YFormat:POINts:CLIPped:LOW? (*new*)
- :WAVeform:YFormat:POINts:HOLes? (*new*)
- :WAVeform:YFormat:WORD:ENCoding:CHIGH? (*revised*)

## :WMEMory Subsystem Command

- :WMEMory:CWINdow (*new*)
- :WMEMory:UNAMe (*new*)

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## Revision A.02.51, January 2014

### General Comments

- An improved phase detector gain algorithm was implemented that allows for more accurate JSA measurements.

### New Feature List

- Support for N108xA-Series IEEE 802.3 Ethernet KR/CR Compliance and Debug Application.

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## Revision A.02.50, October 2013

### General Comments

- Edited the 86118A module specification topic for adjusted 86118-H01 specifications and for information added concerning 86118-H02 module's 1 mm input connectors.
- Added specifications for the 86105D-281 module.
- Added specifications for the 86115D-282 module.

#### NOTE

FlexDCA is compatible with Windows XP and Windows 7 but is *not* compatible with Windows 8.

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### New Features

- New Jitter Spectrum Analysis (JSA) memory and ability to save JSA data files (\*.jsax). This allows JSA data to be viewed offline.
- New Jitter mode scalar measurements:
  - Bounded Uncorrelated Jitter (BUJ)
  - Bounded Uncorrelated Interference (BUI)
- Ability to measure TJ (Total Jitter), DJ (Deterministic Jitter), RJ (Random Jitter), J2, J5, and J9 on long patterns such as PRBS31. This is accomplished within FlexDCA with an option 401 license but without the use of the option 401 spreadsheet. A new **Advanced Eye** tab is enabled in Eye/Mask Mode. This feature requires the option 401 Advanced Eye Analysis Software license.

### New Command Subsystem

- :JSAMemory

### New :DISK Subsystem Commands

- :DISK:JSANalysis:FNAME
- :DISK:JSANalysis:RECall

- :DISK:JSANalysis:RECall:DESTination
- :DISK:JSANalysis:SAVE

## New :DISPlay Subsystem Commands

- :DISPlay:JITTer:CCEdge

## New :MEASure Subsystem Commands

- :MEASure:AMPLitude:BIROnes
- :MEASure:AMPLitude:BIROnes:LOCation
- :MEASure:AMPLitude:BIROnes:SOURce
- :MEASure:AMPLitude:BIROnes:STATus
- :MEASure:AMPLitude:BIROnes:STATus:REASon
- :MEASure:AMPLitude:BIrZeros
- :MEASure:AMPLitude:BIrZeros:LOCation
- :MEASure:AMPLitude:BIrZeros:SOURce
- :MEASure:AMPLitude:BIrZeros:STATus
- :MEASure:AMPLitude:BIrZeros:STATus:REASon
- :MEASure:AMPLitude:BUIOnes
- :MEASure:AMPLitude:BUIOnes:LOCation
- :MEASure:AMPLitude:BUIOnes:SOURce
- :MEASure:AMPLitude:BUIOnes:STATus
- :MEASure:AMPLitude:BUIOnes:STATus:REASon
- :MEASure:AMPLitude:BUIZeros
- :MEASure:AMPLitude:BUIZeros:LOCation
- :MEASure:AMPLitude:BUIZeros:SOURce
- :MEASure:AMPLitude:BUIZeros:STATus
- :MEASure:AMPLitude:BUIZeros:STATus:REASon
- :MEASure:AMPLitude:ISIHist:SAMPles?
- :MEASure:AMPLitude:RNPIhist:SAMPles?
- :MEASure:AMPLitude:SMETHod?
- :MEASure:AMPLitude:TIHist:SAMPles?
- :MEASure:EYE:DJ
- :MEASure:EYE:DJ:RJSTabilize
- :MEASure:EYE:DJ:RJSValue
- :MEASure:EYE:JN
- :MEASure:EYE:JN:RJSTabilize
- :MEASure:EYE:JN:RJSValue
- :MEASure:EYE:JN:SJN
- :MEASure:EYE:RJ
- :MEASure:EYE:TJ
- :MEASure:EYE:TJ:RJSTabilize

- :MEASure:EYE:TJ:RJSValue
- :MEASure:EYE:TJ:TJBer
- :MEASure:JITTer:BUJ
- :MEASure:JITTer:BUJ:LOCation
- :MEASure:JITTer:BUJ:SOURce
- :MEASure:JITTer:BUJ:STATus
- :MEASure:JITTer:BUJ:STATus:REASon
- :MEASure:JITTer:BUJRms
- :MEASure:JITTer:BUJRms:LOCation
- :MEASure:JITTer:BUJRms:SOURce
- :MEASure:JITTer:BUJRms:STATus
- :MEASure:JITTer:BUJRms:STATus:REASon
- :MEASure:JITTer:DDJHist:SAMPles?
- :MEASure:JITTer:DEFine:SMETHod
- :MEASure:JITTer:LJMode
- :MEASure:JITTer:RJPJhist:SAMPles?
- :MEASure:JITTer:SMETHod?
- :MEASure:JITTer:TJHist:SAMPles?

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## Revision A.02.02, May 2013

### General Comments

- Improvements added to eye measurement algorithms.
- Support added for N1012A OIF CEI 3.0 Compliance and Debug Application version 2.00.

### New Features

- Skew calibration added for 86118A H01 modules.
- Fixture deskew added for 86118A H01 modules.
- Ability to open legacy Color Grade-Gray Scale memory files (.cgs).

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## Revision A.02.00, January 2013

Differences from revision A.01.80.

### General Comments

- FlexDCA is now the 86100D's default user interface. The 86100D can be placed in one of three configurations: Standard, Hybrid, or Legacy.
- For working offline, the DCA's data simulation state is now integrated with standard live channels. Open FlexDCA normally without using a command-line switch.
- Added two example programs for performing calibrations. Each program illustrates a different method of controlling execution timing.

#### NOTE

FlexDCA is compatible with Windows XP and Windows 7 but is not compatible with Windows 8.

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### New Features

- Ability to use one-slot mini modules.
- Added new N1045A one-slot mini-module with two or four remote electrical heads.
- Extended Module feature to control supported external instruments (via LAN) such as the N4877A clock data recovery and demultiplexer.
- Added automatic fixture deskew.
- Added Skew Calibration to remove difference in electrical length between the remote sampling heads on N1045A and 86118A-H01 modules.
- Added automatic differential deskew to apply Hardware Skew to two differential channels.
- Added probe support and setup to Standard configuration.
- In Standard configuration, the 86100D supports SCPI connectivity via GPIB, VXI--11 LAN, Telnet, Sockets, and HiSlip.
- Ability to adjust the 86100D front-panel calibration output (DC Cal) voltage.
- Added Absolute and Square Root math operators.
- Added Decision Feedback Equalizer and Sin(X)/X signal-processing operators.
- Support for the N1014A SFF-8431 Compliance Application.
- Added Undo, Redo, and History.



- Added new Ethernet Mask: 100G-SR10 10.3125
- Added new OIF-CEI masks and SFF-8431 masks.

## CALibrate Subsystem

- :CALibrate:CHAN:ENABled (*new*)
- :CALibrate:CHAN:STATus (*new*)
- :CALibrate:CHAN:STATus:DEtails (*new*)
- :CALibrate:CHAN:STATus:DTEmperture (*new*)
- :CALibrate:CHAN:STATus:TIME (*new*)
- :CALibrate:OUTPut (*new*)
- :CALibrate:SKEW:SLOT:STARt (*new*)
- :CALibrate:SKEW:SLOT:STATus? (*new*)
- :CALibrate:SKEW:SLOT:STATus:DEtails? (*new*)
- :CALibrate:SKEW:SLOT:STATus:DTEmperture? (*new*)
- :CALibrate:SKEW:SLOT:STATus:TIME? (*new*)

## :CHANnel Subsystem

- :CHANnel:BANDwidth:FREQUency (*new*)
- :CHANnel:FSElect:RATE (*new*)
- :CHANnel:PROBe (*new*)
- :CHANnel:WAVelength:VALue (*new*)

## :CRECovery:TDENsity? (*new*)

- :CRECovery Subsystem
- :CRECovery:CFRequency? (*new*)
- :CRECovery:OUTPut:DMODE (*new*)

## :DISPlay Subsystem

- :DISPlay:JITTer:GRAPh:TYPE (*new*)
- :DISPlay:JITTer:GRAPh? (*deprecated*)
- :DISPlay:MDISplay:DOCK (*new*)

## :EMODules Subsystem (*new*)

The :EMODules extended modules subsystem controls the connection of extended and simulated modules.

- :EMODules:CRECovery:SADDRESS (*new*)
- :EMODules:CRECovery:VADDRESS (*new*)
- :EMODules:REConnect (*new*)

- :EMODules:SIMulator:SRATe (*new*)
- :EMODules:SLOT:ADDRess (*new*)
- :EMODules:SLOT:CONNect (*new*)
- :EMODules:SLOT:DISConnect (*new*)
- :EMODules:SLOT:SELECTION (*new*)
- :EMODules:SLOT:STATe (*new*)

## :PTIMebase Subsystem

- :PTIMebase:RIPRogress (*deprecated*)

## :SIMulator Subsystem (*deprecated*)

This entire subsystem has been deprecated. Use the :SOUR subsystem instead.

## :SOURce Subsystem (*new*)

The new :SOURce subsystem configures the source signal of extended and simulated modules.

- :SOURce:AMPLitude (*new*)
- :SOURce:DIFFerential (*new*)
- :SOURce:DRATe (*new*)
- :SOURce:FILTer:CUToff (*new*)
- :SOURce:FILTer:STATe (*new*)
- :SOURce:FILTer:TYPe (*new*)
- :SOURce:FNAME (*new*)
- :SOURce:FUNCTion (*new*)
- :SOURce:INVert (*new*)
- :SOURce:JITTer:RJ (*new*)
- :SOURce:JITTer:STATe (*new*)
- :SOURce:NOISe:RN (*new*)
- :SOURce:NOISe:STATe (*new*)
- :SOURce:OENable (*new*)
- :SOURce:OFFSet (*new*)
- :SOURce:PATTern (*new*)
- :SOURce:WTYPE (*new*)

## :SPRocess Subsystem

- :SPRocess:DFEQualizer:BANDwidth (*new*)
- :SPRocess:DFEQualizer:BANDwidth:AUTO (*new*)
- :SPRocess:DFEQualizer:CLKDelay (*new*)
- :SPRocess:DFEQualizer:DWAVEform (*new*)

- :SPRocess:DFEQualizer:TAPS (*new*)
- :SPRocess:DFEQualizer:TAPS:AUTO (*new*)
- :SPRocess:DFEQualizer:TAPS:COUNT (*new*)
- :SPRocess:DFEQualizer:TAPS:RECalculate (*new*)
- :SPRocess:DFEQualizer:TARGET:AUTO (*new*)
- :SPRocess:DFEQualizer:TARGET:LOWer (*new*)
- :SPRocess:DFEQualizer:TARGET:UPPer (*new*)

## :SYSTem Programming Commands Subsystem

- :SYSTem:FCONfig (*new*)
- :SYSTem:GTLocal (*new*)
- :SYSTem:LAUNch (*new*)
- :SYSTem:TEMPerature (*new*)
- :SYSTem:UAUToscale (*deprecated*)
- :SYSTem:UDEFault (*deprecated*)

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## Revision A.01.80, June 2012

### General Comments

- FlexDCA requires Agilent IO Libraries 16.2 or later. If you have a prior version installed, it will be upgraded to version 16.2.
- FlexDCA requires the Agilent licensing system 4.3 or later. This includes "Agilent License Manager", "Agilent ACCL Licensing", and "Agilent Host Processor Platform".
- Removed the **Control** menu. The **Auto Scale**, **Run**, **Stop**, **Single**, and **Clear** functions can more easily be accomplished by clicking the buttons that are shown to the right of the menu bar. The **Undo Auto Scale** command has been moved to the top of the **Setup** menu.
- Added information to the help system on using N2800A-series InfiniiMax III probes.

### New Features

- Ability to use 86100D DCA-X applications. Added a new **Apps** menu to the menu bar for launching applications.
- Support for the N1012A OIF CEI 3.0 Compliance Application and N1019A User Defined Application Tool. The new menu also supports user-added shortcuts to files and Windows applications.
- FlexDCA now includes the ability to take into account the effect of external devices such as attenuators or transducers. With this feature, FlexDCA will report waveform and measurement results referenced to the input of the external device instead of the input of the oscilloscope channel. Additionally, if you have configured external attenuator or transducer settings in the 86100C/D firmware, they will be transferred to FlexDCA when using "Transfer Basic" on connection to the DCA.
- Ability to find a bit sequence in a pattern waveform. This feature can be accessed from the menu bar or from the Timebase Setup dialog box.
- New copy-to-clipboard buttons on the shortcut menus for pasting waveform images or measurement data to external applications.
- Ability to select one of four color schemes for displaying color-grade persistence waveforms. This includes a color scheme that matches the classic 86100A/B/C/D firmware
- Ability to select color or monochrome display of gray-scale persistence waveforms.
- The remote SCPI interface is fully supported on 64-bit operating systems.
- The bandwidth of a differential signal can be configured from a single drop-down in the GUI.
- The message area can now be "docked" so that it is permanently visible.

## General Defects Fixed

- Changed the default trigger bandwidth on the 86100D-STR instrument from "Filtered Edge" to "Standard Edge".
- The waveform save feature will only allow you to save waveforms that are currently displayed. Previously, waveforms that had been acquired but not displayed could also be saved, which made it easy to accidentally save the wrong waveform.
- Fixed the remote command `:DISK:SIMage:SIInclude` in eye mode.
- Fixed a defect that caused Precision Timebase Synchronization to take a very long time to complete when a PRBS 23 pattern was in use.

## New and Changed Programming Commands

### Common Commands

- `*IDN?` (*revised*)

### :ACQUIRE Subsystem

- `:ACQUIRE:RELength:AUTO` (*deprecated*)
- `:ACQUIRE:RELength:MODE` (*new*)
- `:ACQUIRE:SPBit:AUTO` (*deprecated*)
- `:ACQUIRE:SPBit:MODE` (*new*)

### :CHANNEL Subsystem

- `:CHANNEL:ATTenuator:DECibels` (*new*)
- `:CHANNEL:ATTenuator:RATio` (*new*)
- `:CHANNEL:ATTenuator:RESet` (*new*)
- `:CHANNEL:ATTenuator:STATe?` (*new*)
- `:CHANNEL:TRANsdncer:GAIN` (*new*)
- `:CHANNEL:TRANsdncer:OFFSet` (*new*)
- `:CHANNEL:TRANsdncer:STATe` (*new*)
- `:CHANNEL:TRANsdncer:UNITs` (*new*)

### :CRECOVERY Subsystem

- `:CRECOVERY:JSANalysis:SPECTrum:PEAKs?` (*new*)

## :DISPlay Subsystem

- :DISPlay:CGSPectrum (*new*)
- :DISPlay:GSSPectrum (*new*)

## :SYSTem Subsystem

- :SYSTem:MODel? (*revised*)

## :TIMebase Subsystem

- :TIMebase:FIND:NEXT (*new*)
- :TIMebase:FIND:SEQuence (*new*)
- :TIMebase:FIND:SIGNal (*new*)

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## Revision A.01.70, April 2012

Differences from revision A.01.61

### New Feature List

- Support for 86108B Precision Waveform Analyzer module.
- Added Measurement Regions in Oscilloscope Mode.
- Improved Signals Palette with three display modes: Full, Compact, and Mini.
- Jitter Spectrum Analysis and Software Clock Recovery Emulation.
- Added new Ethernet Mask: OTU4 G.959.1
- Improvements to precision timebase synchronization.

### :CALibrate Subsystem

- :CALibrate:CRECovey:{SLOT[1:4] | LMODule | RMODule}:START? (*deprecated*)
- :CALibrate:CRECovey:{SLOT[1:4] | LMODule | RMODule}:STATus? (*deprecated*)
- :CALibrate:CRECovey:{SLOT[1:4] | LMODule | RMODule}:STATus:DEtails? (*deprecated*)
- :CALibrate:CRECovey:{SLOT[1:4] | LMODule | RMODule}:STATus:TEMPerature? (*deprecated*)
- :CALibrate:CRECovey:{SLOT[1:4] | LMODule | RMODule}:STATus:TIME? (*deprecated*)
- :CALibrate:DARK:CHAN:STATus:DTEMperature? (*new*)
- :CALibrate:DARK:CHAN:STATus:TEMPerature? (*deprecated*)
- :CALibrate:MODule:{SLOT[1:4] | LMODule | RMODule}:START (*deprecated*)
- :CALibrate:MODule:{SLOT[1:4] | LMODule | RMODule}:STATus? (*deprecated*)
- :CALibrate:MODule:{SLOT[1:4] | LMODule | RMODule}:STATus:DEtails? (*deprecated*)
- :CALibrate:MODule:{SLOT[1:4] | LMODule | RMODule}:STATus:TEMPerature? (*deprecated*)
- :CALibrate:MODule:{SLOT[1:4] | LMODule | RMODule}:STATus:TIME? (*deprecated*)
- :CALibrate:SLOT[1:4]:CRECovey? (*new*)
- :CALibrate:SLOT[1:4]:CRECovey:STATus? (*new*)
- :CALibrate:SLOT[1:4]:CRECovey:STATus:DEtails? (*new*)
- :CALibrate:SLOT[1:4]:CRECovey:STATus:DTEMperature? (*new*)
- :CALibrate:SLOT[1:4]:CRECovey:STATus:TIME? (*new*)

- :CALibrate:SLOT[1:4]:ENABLEd (*new*)
- :CALibrate:SLOT[1:4]:START (*new*)
- :CALibrate:SLOT[1:4]:STATus? (*new*)
- :CALibrate:SLOT[1:4]:STATus:DEtails? (*new*)
- :CALibrate:SLOT[1:4]:STATus:DTEMperature? (*new*)
- :CALibrate:SLOT[1:4]:STATus:TIME? (*new*)
- :CALibrate:SLOT[1:4]:PTIMEbase (*new*)
- :CALibrate:SLOT[1:4]:PTIMEbase:STATus (*new*)
- :CALibrate:SLOT[1:4]:PTIMEbase:STATus:DEtails (*new*)
- :CALibrate:SLOT[1:4]:PTIMEbase:STATus:DTEMperature (*new*)
- :CALibrate:SLOT[1:4]:PTIMEbase:STATus:TIME (*new*)
- :CALibrate:SLOT[1:4]:VERTical (*new*)
- :CALibrate:SLOT[1:4]:VERTical:STATus? (*new*)
- :CALibrate:SLOT[1:4]:VERTical:STATus:DEtails? (*new*)
- :CALibrate:SLOT[1:4]:VERTical:STATus:DTEMperature? (*new*)
- :CALibrate:SLOT[1:4]:VERTical:STATus:TIME? (*new*)
- :CALibrate:VERTical:{SLOT[1:4] | LMODule | RMODule}:START (*deprecated*)
- :CALibrate:VERTical:{SLOT[1:4] | LMODule | RMODule}:STATus? (*deprecated*)
- :CALibrate:VERTical:{SLOT[1:4] | LMODule | RMODule}:STATus:DEtails? (*deprecated*)
- :CALibrate:VERTical:{SLOT[1:4] | LMODule | RMODule}:STATus:TEMPerature? (*deprecated*)
- :CALibrate:VERTical:{SLOT[1:4] | LMODule | RMODule}:STATus:TIME? (*deprecated*)

## :DISPlay Subsystem

- :DISPlay:SPALette:MODE (*new*)
- :DISPlay:SPALette:COMPact (*deprecated*)

## :CRECcovery, :DISPlay, and :MEASure Subsystem Option JSA Commands

- :DISPlay:JSANalysis:SGRaph (*new*)
- :CRECcovery[1:4]:JSANalysis:ACQUIRE (*new*)
- :CRECcovery[1:4]:JSANalysis:FFTMagnitude:ECOunt (*new*)
- :CRECcovery[1:4]:JSANalysis:FFTMagnitudeSMOothing (*new*)
- :CRECcovery[1:4]:JSANalysis:INTEgrate:F (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:FGAIIn (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:FPOLe (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:FZERo (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:JTF:BWIDth (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:JTF:PEAKing (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:MODE (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:OJTF:BWIDth (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:OJTF:DFACTor (*new*)
- :CRECcovery[1:4]:JSANalysis:PLLorder:ORDer (*new*)



- :CRECovey[1:4]:JSANalysis:RJCorrection (*new*)
- :CRECovey[1:4]:JSANalysis:SPECTrum (*new*)
- :MEASure:CRECovey[1:4]:DJ (*new*)
- :MEASure:CRECovey[1:4]:RJ (*new*)
- :MEASure:CRECovey[1:4]:TJ (*new*)

## :MEASure Subsystem Region Commands

- :MEASure:AMPLitude:BERLimit (revised)
- :MEASure:REgions:COUNt (*new*)
- :MEASure:REgions:REGion (*new*)
- :MEASure:REgions:STATe (*new*)

## General Defects Fixed

- For programming commands that have discrete parameters, (for example, :ACQUIRE:SMOothing) the :DEFAULT, :VSET, :NEXT, and :PREV child commands are no longer documented.
- For programming commands that have numerical values, the :DEFAULT, :MINimum, and :MAXimum child commands are no longer documented.
- Added programming topics for :SOURCE, :LOCATION, :STATUS, and :STATUS:REASON child commands to the measurement commands within the :MEASure subsystem.

## Known Issues

- The remote SCPI interface is limited to the HiSLIP, Telnet, and Sockets protocols when running on a 64-bit Windows OS. To make use of this functionality, the program "Agilent.N1000.x86.exe" needs to be launched instead of the default "Agilent.N1000.exe".

# 50

## Revision A.01.61, February 2012

Differences from revision A.01.50.

### General Comments

- Connecting to a remote instrument requires 86100C/D firmware A.10.60 or later.

### New Features

- Added a Continuous Time Linear Equalizer (CTLE) math function. The CTLE requires option 201, Advanced Waveform Analysis.
- Added a Delay math function. The Delay function adds a customizable time delay to the input waveform.
- Added an Align math function. The Align function delays one input waveform to align it with a second input waveform.
- Added support for Option 500, Productivity Package, which includes Rapid Eye. Rapid Eye significantly reduces the time required to acquire eye-diagram samples. If several eye diagrams are displayed, Auto Scale can be configured to apply software skew to align all of the eye diagrams.
- Eye Tuning enables a variable persistence display in Eye/Mask mode. Eye Tuning can be used to tune a device while simultaneously watching changes to the eye diagram and eye diagram measurements.
- Eye mask margins can now be based on a user-specified target Hit Ratio.
- When saving screen captures, added the capability to select one out of many displayed waveforms to include in the saved graphics file.
- Added comprehensive capability (approximately 800 commands) to remotely control FlexDCA via SCPI programming commands.
- Added an Uncorrelated Noise measurement to Jitter Mode.
- Added the ability to align waveforms on the display, similar to the Horizontal Skew capability of the 86100D firmware. This Time Delay setting is available from the Channel Setup dialog box's Advanced tab.
- The RJ/RN compensation feature can now be used with signal processing operators, such as de-embedding.
- Added mask files for OTU2 and OTU2e.

## General Defects Fixed

- Fixed a problem where the continuous loop bandwidth setting for clock data recovery hardware could be set to values less than 15 kHz.
- Fixed an occasional crash when using a precision timebase.
- When Jitter Mode is used to measure a clock, the clock frequency is reported in unit of Hertz instead of bits-per-second.
- Fixed unreliable detection of the precision timebase reference frequency in Pattern Lock.

## Known Issues

- The remote SCPI interface is limited to the HiSLIP, Telnet, and Sockets protocols when running on a 64-bit Windows OS. To make use of this functionality, the program "Agilent.N1000.x86.exe" needs to be launched instead of the default "Agilent.N1000.exe".

# 51

## Revision A.01.60, December 2011

Differences from revision A.01.50.

### General Comments

- Connecting to a remote instrument requires 86100C/D firmware A.10.60 or later.

### New Features

- Added a Continuous Time Linear Equalizer (CTLE) math function. The CTLE requires option 201, Advanced Waveform Analysis.
- Added a Delay math function. The Delay function adds a customizable time delay to the input waveform.
- Added an Align math function. The Align function delays one input waveform to align it with a second input waveform.
- Added support for Option 500, Productivity Package, which includes Rapid Eye. Rapid Eye significantly reduces the time required to acquire eye-diagram samples. If several eye diagrams are displayed, Auto Scale can be configured to apply software skew to align all of the eye diagrams.
- Eye Tuning enables a variable persistence display in Eye/Mask mode. Eye Tuning can be used to tune a device while simultaneously watching changes to the eye diagram and eye diagram measurements.
- Eye mask margins can now be based on a user-specified target Hit Ratio.
- When saving screen captures, added the capability to select one out of many displayed waveforms to include in the saved graphics file.
- Added comprehensive capability (approximately 800 commands) to remotely control FlexDCA via SCPI programming commands.
- Added an Uncorrelated Noise measurement to Jitter Mode.
- Added the ability to align waveforms on the display, similar to the Horizontal Skew capability of the 86100D firmware. This Time Delay setting is available from the Channel Setup dialog box's Advanced tab.
- The RJ/RN compensation feature can now be used with signal processing operators, such as de-embedding.
- Added mask files for OTU2 and OTU2e.

## General Defects Fixed

- Fixed a problem where the continuous loop bandwidth setting for clock data recovery hardware could be set to values less than 15 kHz.
- Fixed an occasional crash when using a precision timebase.
- When Jitter Mode is used to measure a clock, the clock frequency is reported in unit of Hertz instead of bits-per-second.
- Fixed unreliable detection of the precision timebase reference frequency in Pattern Lock.

## Known Issues

- The remote SCPI interface is limited to the HiSLIP, Telnet, and Sockets protocols when running on a 64-bit Windows OS. To make use of this functionality, the program "Agilent.N1000.x86.exe" needs to be launched instead of the default "Agilent.N1000.exe".

# 52

## Revision A.01.50, September 2011

Differences from revision A.01.03.

### New Features

- Ability to apply SIRC (System Impulse Response Capability) correction data for 86105C, 86105D, 86115D, or 86116C optical modules. SIRC data corrects for a module's specific response.
- Perform vertical module calibrations and dark calibrations from within FlexDCA, as well as view the calibration status.
- FlexDCA now has a remote SCPI interface.
- When running on an 86100D mainframe, FlexDCA can be controlled using the HiSLIP, Telnet, or Sockets protocols.
- When running on a 32-bit Windows operating system, FlexDCA can be controlled using HiSLIP, Telnet, VXI-11, Sockets, GPIB, or USB (hardware permitting).
- New tools to explore and learn the SCPI command set:
  - A new SCPI Recorder control that records and displays the equivalent SCPI commands as the user interacts with the graphical user interface.
  - A new Interactive SCPI Command Tree that allows the user to explore the entire SCPI command set and execute individual commands directly from the tree view.
- New optical channel measurements added:
  - Average Power (Oscilloscope mode)
  - Average Power (Eye/Mask mode)
  - Extinction Ratio (Eye/Mask mode)
  - Ability to apply RJ and RN compensation factors to compensate for the measurement system's intrinsic RJ and RN. It is not yet available in conjunction with signal processing operators, such as de-embedding.
- New Amplify and Square math functions.
- Added the following Fibre Channel masks:
  - 4.25 Gb/s Fibre Channel Delta R
  - 4.25 Gb/s Fibre Channel Delta T
  - 4.25 Gb/s Fibre Channel Delta T (Norm

- 8.5 Gb/s Fibre Channel Delta R
- 8.5 Gb/s Fibre Channel Delta T
- 16x Fibre Channel Delta R
- 16x Fibre Channel Delta T
  
- The 83496A/B/C and 86108A clock recovery modules now support an additional front panel clock sub-rate of divide-by-32, as well as new super-rates of x2, x4, and x8.
- Added new standard bit rate 41.25 Gb/s (40Gb Ethernet) selection for pattern lock triggering and clock recovery, external precision timebase frequency, and horizontal (timebase) scale units of bits.
- Added CPRI and OBSAI bit rates to the standard rate selection lists.
- Optimized waveform graticule size to fill its available space. Towards this end, the marker control-panel button has been moved inside the graticule area (upper right-hand corner). The acquisition limit status and smoothing status annotations now reside directly below the top menu area and, as before, are visible when the associated feature is active.
- Sharper mini signal waveforms (displayed in the signals palette and the source select dialog).

## General Defects Fixed

- Differential skew values from the 86118A-H01 are properly transferred from the instrument to FlexDCA.
- Fixed a defect that would cause the waveform jitter to increase when using pattern lock at large horizontal position values.
- Waveforms files can be loaded from Agilent real-time oscilloscopes, if they were saved in verbose text formats (header included).
- The Message Log Viewer dialog is now fixed width, which prevents the width from potentially jumping around as the user scrolled through a list of messages.
- The on-screen keyboard is no longer invoked when the user clicks on a read-only or disabled textbox widget.
- The RN/PI amplitude histogram now displays a legend when simultaneously displaying both the zero-level and one-level data.
- Fixed the 39.8 Gb/s OC-768 mask.

## Known Issues

- The new RJ/RN compensation feature cannot be used with signal processing operators, such as de-embedding
- The remote SCPI interface is limited to the HiSLIP, Telnet, and Sockets protocols when running on a 64-bit Windows OS. To make use of this functionality, the program "Agilent.N1000.x86.exe" needs to be launched instead of the default "Agilent.N1000.exe".

# 53

## Revision A.01.03, April 2011

Differences from revision A.01.02

### General Comments

- FlexDCA now requires Microsoft .NET Framework version 4.0. If it is not already installed, FlexDCA will install the Microsoft .NET Framework 4.0 Client Profile.
- There is now a free version of FlexDCA available. The free version does not require the following items:
  - Agilent Licensing system
  - Agilent IO Libraries
  - MATLAB Compiler Runtime
- The free version does not enable any of the licensed features, such as:
  - Jitter Mode,
  - De-Embedding filters, or
  - connecting to a remote DCA.
- What is enabled in the free version is basic oscilloscope and eye diagram measurements using the built-in waveform simulator or the Agilent SystemVue product.

### New Features

- Data simulation and analysis are now able to take advantage of multi-core CPUs.
- Waveform and eye memories can be cleared.
- Support for the 86115D-004 module's B channels.
- The data simulator now loads pattern waveforms that are stored in the .wfm format as well as the .csv format.
- The data simulation rate can be reduced to avoid 100% CPU usage whenever the data simulator is running. This is available from the Data Simulator Setup dialog.
- Waveform Signal Processing functionality is now available from a new, translucent slide-up panel accessed via the new Math button in the lower right-hand corner of the application.
- Annotations have been added to the upper right-hand corner of the Jitter Measurement Results window to denote large jitter mode (LJM) and jitter measurements on signal processed waveforms (SP).



## General Defects Fixed

- Fixed a bug that allowed multiple conflicting instances of FlexDCA to be launched at the same time.
- Improved the performance of Jitter Mode on long patterns.
- Improved the reliability of autoscale.
- Fixed an alignment issue with certain masks.
- Fixed a defect that prevented pattern waveform saves from remembering the last saved location.
- Fixed a defect that could, under certain conditions, result in an empty measurement toolbar after the application had been manually resized.
- Fixed a defect that could cause the application to crash if a jitter graph in an undocked window was double-clicked.
- Fixed a bug that prevented jitter measurements from being made on a function of a waveform memory (partial results only).
- Added annotation to the RJ and RN measurements when the values are fixed by the user.
- Fixed a limit tests defect in Jitter Mode. Limit tests now report out-of-limit failures.
- Fixed a defect that prevented a remote FlexDCA session from being able to end a different active FlexDCA session that is connected to the same 86100 DCA.



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