



New Functions in Software Version 8

Signal Quality Analyzer
MP1800A Series

Introduction

- This product introduction explains the new functions supported from Version 8 of the MX180000A software for the MP1800A/MT1810A.
- The software and release notes can be downloaded from the Anritsu website at the following URL.
 - <http://www.anritsu.com/en-au/test-measurement/support/downloads?model=MP1800A>

Version Information (1/4)

Version	Item	Contents	Slide
8.04.00	Added PAM4 patterns for use by 32G PPG, and 32G ED	Pattern files have been added for PAM4 signal generation and BER measurement using the MU18302xA 32G PPG and MU18304xB 32G High Sensitivity ED.	23
	Upgraded MP1825B Emphasis	The following functions have been added to the MP1825B Emphasis. <ul style="list-style-type: none"> • Upgraded settings file Save function. Quick Save/Save functions have been added for the settings file Coefficient Preset Table. • Upgraded Adjust function, To optimize the Adjust function at Jitter Addition, Jitter settings can be set ON/OFF automatically. 	24
	Upgraded 32G ED PAM BER Measurement	The following functions have been added to the MU18304xB 32G High Sensitivity ED PAM BER measurements: <ul style="list-style-type: none"> • Added Repeat measurement function to 3Eye Serial mode • Added measurement function with Middle Eye Phase value to 3Eye Serial mode. 	25
	Added PAM4 mode to 32G ED Eye Contour measurement	A PAM4 measurement mode has been added to the MU18304xB 32G High Sensitivity ED Eye Contour measurement. This supports simultaneous PAM4 signal 3Eye (Upper/Middle/Lower) measurements.	26

Version Information (2/4)

Version	Item	Contents	Slide
8.02.03	MP1825B 4TAP Emphasis Added Preset File for PCIe Gen. 3	A presettings file for using PCIe Gen 3 has been added to the Co-efficient settings of the MP1825B.	18
	MU18304xA/B 28G/32G ED Added Mask Evaluation Function	A Mask evaluation function has been added to the Eye Contour settings of the MU183040A/B and MU183041A/B 32G ED.	19
	MU18304xA/B 28G/32G ED Auto-measurement Supports Differential 100Ω Input	The MU18304xA/B 32G ED auto-measurement function now supports Differential 100-Ω input. The upgraded auto-measurements are: <ul style="list-style-type: none"> • Eye Margin • Eye Diagram • Bathtub • Q Analysis • Eye Contour 	20
	MU18304xA/B 28G/32G ED Added PAM4 Signal Total BER Measurement Function Added Manual Threshold and Phase Measurement Functions to PAM BER Measurement	A manual setting function for Threshold and Phase has been added to the MU18304xB 32G High-sensitivity ED PAM BER measurement function. As a result, each Eye BER measurement point can be fine-adjusted.	21
	MP1800A Shared Functions Added Replay Function for Video Explaining ESD/EOS Countermeasures at Software Start	A function has been added for playing the video explaining ESD/EOS countermeasures at software start-up.	22

Version Information (3/4)

Version	Item	Contents	Slide
8.02.01	MP1800A Shared Functions Upgraded customized screen function	Added File Save function and Preset function to customized screen.	10
	MU18302xA 28G/32G PPG Upgraded bit-rate setting function	Added quick setting for bit rates of each standard to MU18302x 32G PPG.	11
	MU18302xA 28G/32G PPG MU18304xB 28G/32G ED Upgraded PAM4 signal patterns	Added pattern files used for PAM4 signal generation/BER measurement: PRBS13Q, PRQS10, SSPR, JP03A, JP03B, Square wave	12
	MU18304xB 28G/32G ED Upgraded PAM4 signal Auto Search function	Added support for Differential signal input to PAM4 signal Auto Search.	13
	MU18304xB 28G/32G ED Upgraded PAM4 signal auto-measurement function	Added PAM4 Auto Search function to auto-measurements with support for PAM4 signals. Eye Contour, Eye Margin, Eye Diagram, Bathtub, Q Analysis	14
	MU18304xA/B 28G/32G ED Add Eye Contour function	Added Eye Contour function for drawing contours for low error rates, such as 1E-12 and 1E-15, at high speed.	15
	MU181500B Jitter Modulation Source Upgraded RJ setting function	Added ability to set RJ modulation p-p/rms conversion coefficient.	16
MP1825B 4TAP Emphasis Added remote command	Added command for switching Clock rate when linked with 32G PPG.	17	

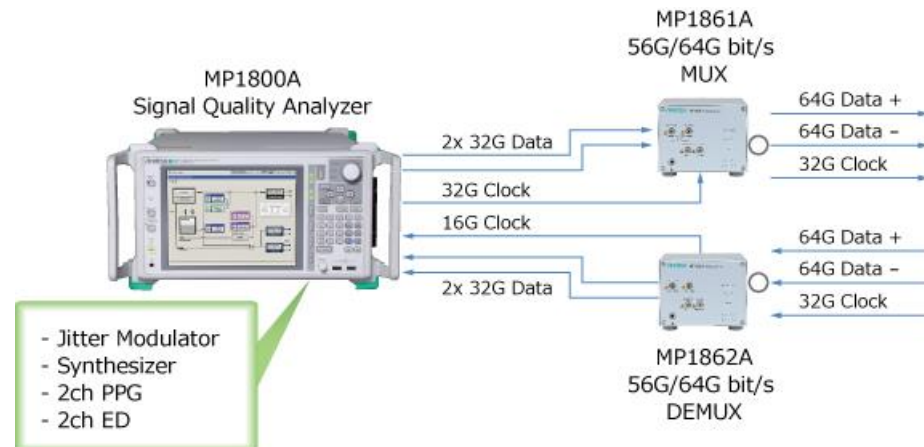
Version Information (4/4)

Version	Item	Contents	Slide
8.00.01	Added support for 64G MUX/DEMUX	Following modules supported: MP1861A 56G/64 Gbit/s MUX MP1862A 56G/64 Gbit/s DEMUX	7
8.00.02	Upgraded MU18302xA 28G/32G PPG Multi-Channel Calibration function	Changed and upgraded some parts of MU18302xA 32G PPG Multi-Channel Calibration functions. When using an external synthesizer, previously a 16.05 GHz clock was required, but now calibration is supported using clocks up to 12.5 GHz.	8
	Upgraded MU181020B 14G PPG Multi-Channel Calibration function	Changed and upgraded some parts of MU181020B 14G PPG Multi-Channel Calibration functions. When both the 14G PPG and MU181000A/B 12.5G synthesizer are installed in the same main frame, calibration can now be executed automatically up to 12.5 Gbit/s.	9

Supported Module Additions

Ver. 8.00.01
Additional Function

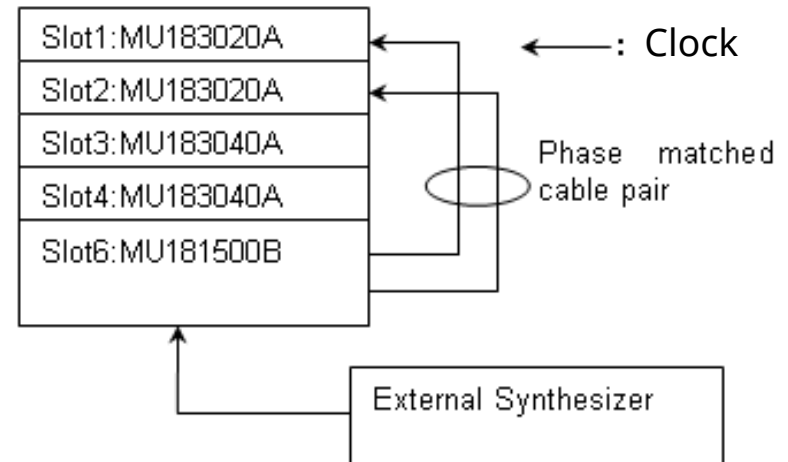
- 64G MUX/DEMUX
 - Support for the following modules has been added:
 - MP1861A 56G/64Gbit/s MUX
 - MP1862A 56G/64Gbit/s DEMUX
 - Combining the 56G/64G bit/s MUX MP1861A with the 32G 2ch PPG generates NRZ Data signals up to 64.2 Gbit/s.
 - Combining the 56G/64G bit/s DEMUX MP1862A with the 32G ED receives signals up to 64.2 Gbit/s for BER measurement.
 - Extending the 32G BERT to 56 Gbit/s or 64 Gbit/s supports an easy transition for R&D from 100GbE to 400 GbE.



MU18302xA 28G/32G PPG

Ver. 8.00.02
Additional Function

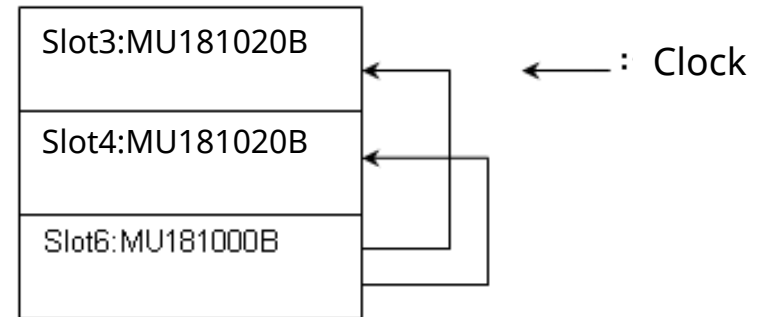
- Upgraded Multi-Channel Calibration Functions
 - Some parts of the MU18302xA 32G PPG Multi-Channel Calibration functions have been changed and upgraded.
 - When using an external synthesizer, previously a 16.05 GHz clock was required, but now calibration is supported using clocks up to 12.5 GHz.



MU181020B 14G PPG

Ver. 8.00.02
Additional Function

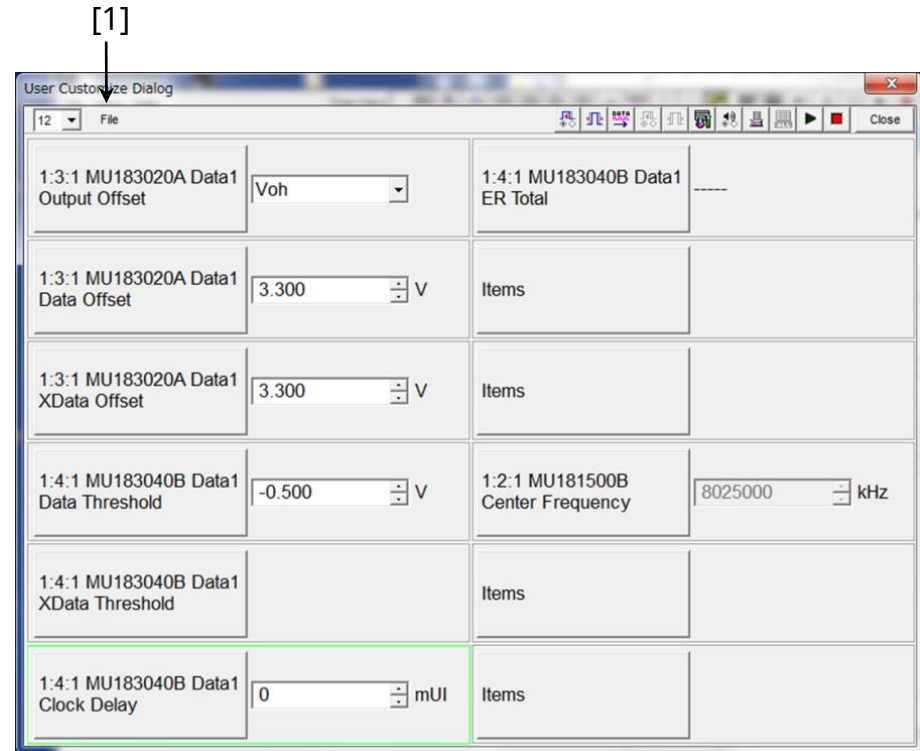
- Upgraded Multi-Channel Calibration Function
 - Some parts of the Calibration functions have been changed and upgraded.
 - When both the 14G PPG and MU181000A/B 12.5G synthesizer are installed in the same main frame, calibration can now be executed automatically up to 12.5 Gbit/s.



MP1800A Shared Functions

Ver. 8.02.01
Additional Function

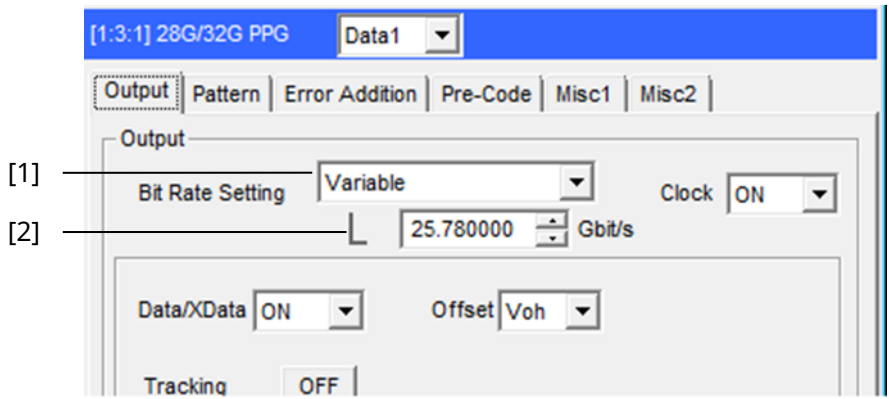
- Upgraded Customized Screen Functions
 - File Save function and Preset function have been added to the customized screen.[1]
 - At User Customize screen, key parameters for multiple modules are displayed on one screen for easy setting.
 - The customized screen setting files is saved with the file extension .UCD for loading.
 - Commonly used functions for 32G systems (MU183020A, MU183040B, MU181500B, and MU181000B) can be loaded as a presettings file (.UCP).



MU18302xA 28G/32G PPG

Ver. 8.02.01
Additional Function

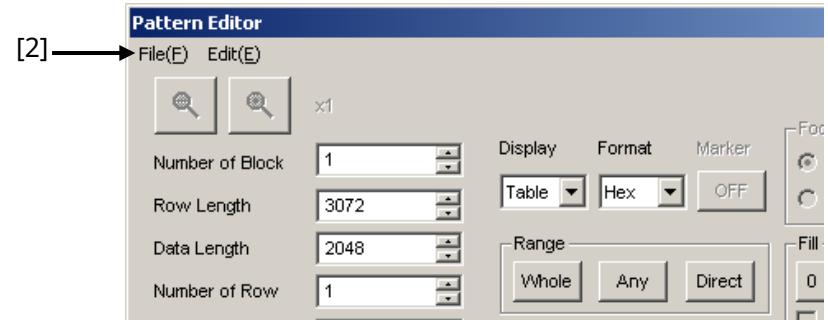
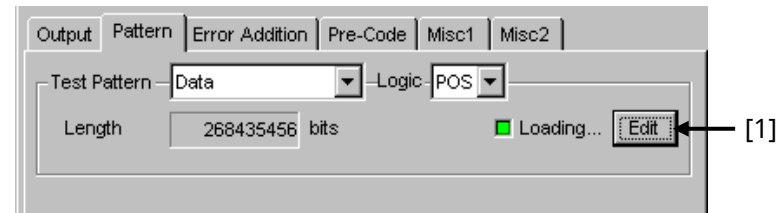
- Upgraded Bit-Rate Settings Function
 - A quick setting function for the bit rates for each standard has been added to the MU18302x 32G PPG.[1] [2]



Preset Standards	Bit rate [Gbit/s]
100G ULH	32.100 000
32G FC	28.050 000
100G OTU4	28.000 000
100GbE(25.78x4)	25.781 250
Infiniband EDR	25.781 250
SAS	24.000 000
PCI Express Gen4	16.000 000
Infiniband FDR	14.062 500
16G FC	14.025 000
10GFC over FEC	11.316 800
10GbE over FEC	11.095 700
OTU2	10.709 225
G975 FEC	10.664 228
10G FC	10.518 750
10GbE	10.312 500
USB3.1	10.000 000
Infiniband QDR	10.000 000
OC-192/STM-64	9.953 280
8G FC	8.500 000
PCI Express Gen3	8.000 000
PCI Express Gen2	5.000 000
USB3.0	5.000 000
PCI Express Gen1	2.500 000

Upgraded PAM4 Signal Patterns

- Pattern files used for PAM4 signal generation/BER measurement have been added.
- Select Edit after setting Test Pattern to Data. [1]
- The following PAM4 Data Patterns can be selected from the Pattern Editor file list.[2]



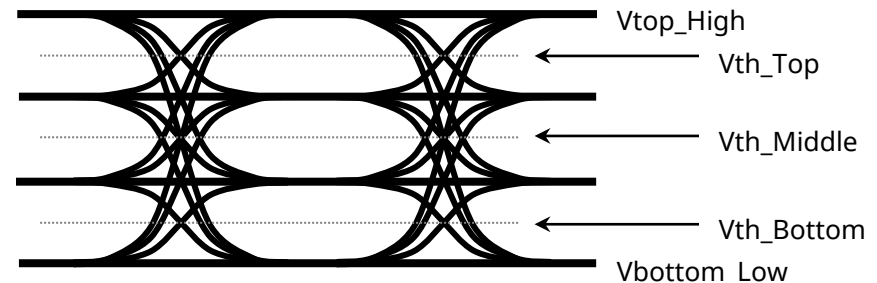
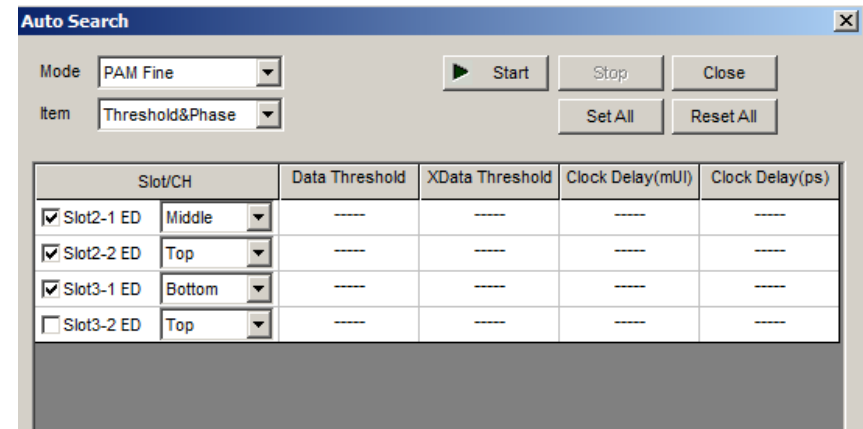
Pattern	PPG1 Pattern file	PPG2 Pattern file	ED Top EYE Pattern	ED Middle EYE Pattern	ED Bottom EYE Pattern
PRBS13Q	PRQS13Q_TX1.txt	PRQS13Q_TX2.txt	PRBS13Q_Upper.txt	PRBS13Q_Middle.txt	PRBS13Q_Lower.txt
GrayPRBS13Q	GrayPRBS13Q_TX1.txt	GrayPRBS13Q_TX2.txt	GrayPRBS13Q_Upper.txt	GrayPRBS13Q_Middle.txt	GrayPRBS13Q_Lower.txt
PRQS10	PRQS10_TX1.txt	PRQS10_TX2.txt	PRQS10_Upper.txt	PRQS10_Middle.txt	PRQS10_Lower.txt
SSPR	SSPR_TX1.txt	SSPR_TX2.txt	SSPR_Upper.txt	SSPR_Middle.txt	SSPR_Lower.txt
JP03A	JP03A.txt	JP03A.txt	JP03A.txt	JP03A.txt	JP03A.txt
JP03B	JP03B.txt	JP03B.txt	JP03B.txt	JP03B.txt	JP03B.txt
Squarewave	Squarewave.txt	Squarewave.txt	Squarewave.txt	Squarewave.txt	Squarewave.txt

Using Combination Mode for PPG_CH1 and PPG_CH2 to generate above PAM4 patterns.
Using Independent Mode for ED to measure above PAM4 patterns.

MU18304xA/B 28G/32G ED

Ver. 8.02.01
Additional Function

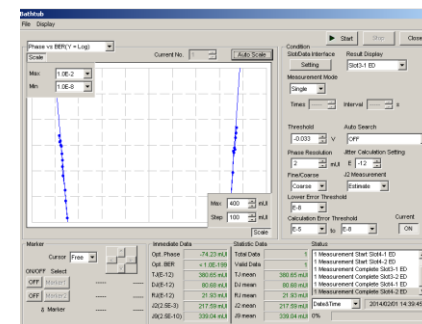
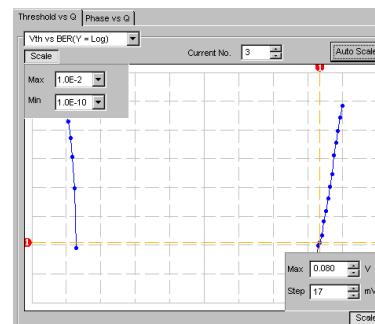
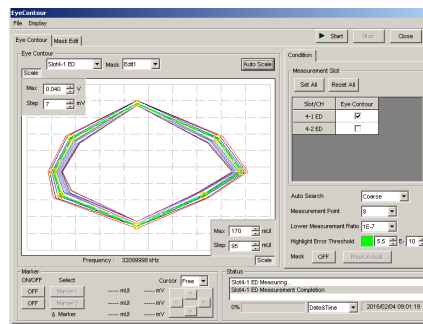
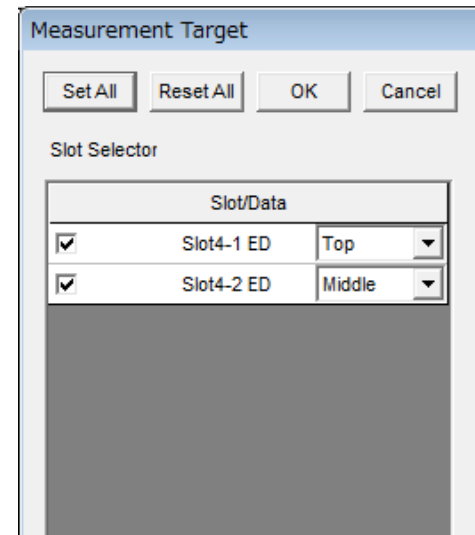
- Upgraded PAM4 Signal Auto Search Function
 - The PAM4 signal Auto Search now supports Differential signal input.
 - The Auto Search function finds the best combination of threshold voltage and phase that matches the input data.
 - PAM Coarse Search
This searches for best threshold point for each level (Top/Middle/Bottom) of the PAM4 waveform. The input waveform High and Low levels are detected to find the optimum values.
 - PAM Fine Search
After executing PAM Coarse, fine adjustment is performed using a software algorithm. Completion of fine adjustment takes longer than PAM Coarse.



MU18304xA/B 28G/32G ED

Ver. 8.02.01
Additional Function

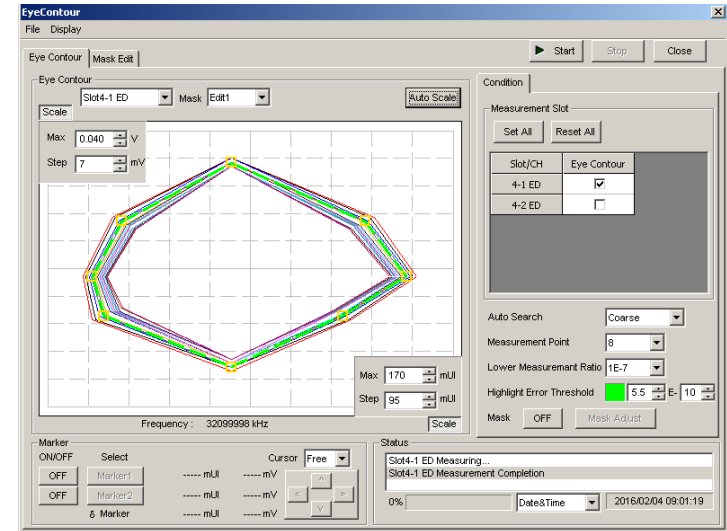
- Upgraded PAM4 Signal Auto-measurement Function
 - The PAM4 Auto Search function has been added to each auto-measurement.
 - Auto-measurement can be specified for any of the PAM4 signal Top, Middle, and Bottom EYES.
 - The supported auto-measurement functions are:
 - Eye Contour
 - Eye Margin
 - Eye Diagram
 - Bathtub
 - Q Analysis



MU18304xA/B 28G/32G ED

Ver. 8.02.01
Additional Function

- Upgraded EYE Contour Function
 - The Eye Contour measurement function draws bit-error rate contours.
 - Contours can be estimated quickly for low error rates, such as 1E-12 and 1E-15, based on Bathtub estimates.
 - Measurement can be specified for any of the Top/Middle/Bottom EYES for either NRZ or PAM4 signals.

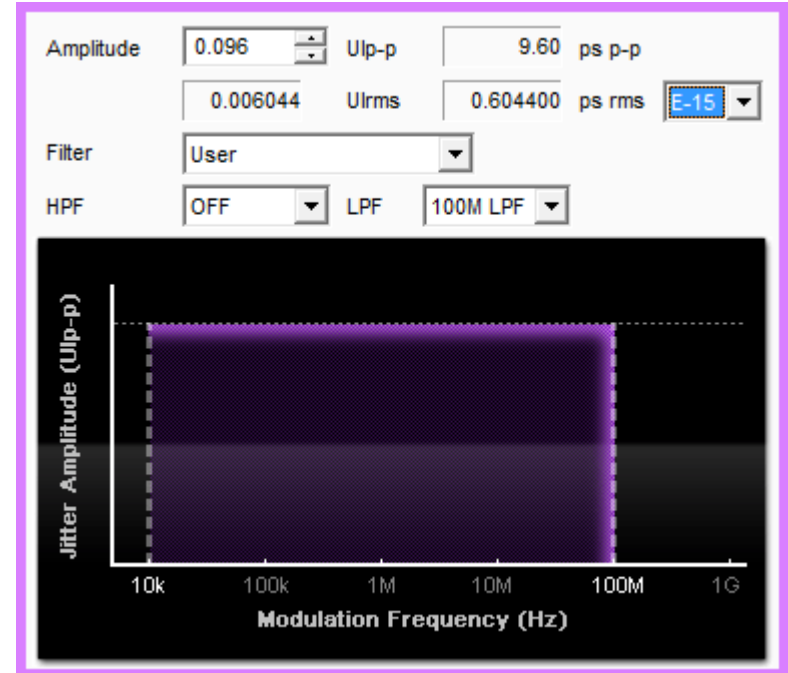


MU181500B Jitter Modulation Source

Ver. 8.02.01
Additional Function

- Upgraded RJ Setting Function
 - The RJ modulation p-p/rms conversion coefficient can be set.
 - The maximum deviation can be set in UIp-p units, and the UIrms, ps p-p, and ps rms conversion values are displayed. The coefficient used for p-p/rms conversion at this time can be set at BER.

BER	Conversion Coefficient (p-p/rms)
1E-10	12.723
1E-11	13.412
1E-12	14.069
1E-13	14.698
1E-14	15.301
1E-15	15.883
1E-16	16.444



MP1825B 4TAP Emphasis

Ver. 8.02.01
Additional Function

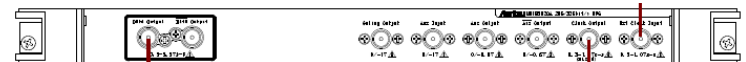
- Added Remote Commands

- A command has been added for switching the Clock rate when linked with the 32G PPG.[1]
- The MP1825B input Clock can be selected from Half Rate Clock and Full Rate Clock.
- For applications, such as Thunderbolt, PCIe, etc., that impress large-amplitude Jitter Modulation, it is necessary to minimize the absolute delay between Data and Clock of the MP1800A to maximize the Jitter Tolerance of the measurement system itself. When connecting the MP1825B 4TAP Emphasis and PPG, use the J1615A Pair Cable to connect PPG Data Out to the MP1825B Data Input, and PPG Clock Out to the MP1825B Clock Input. Use a Full Rate Clock for this connection (ex. 20 GHz Clock Rate for 20 Gbit/s Data Rate).

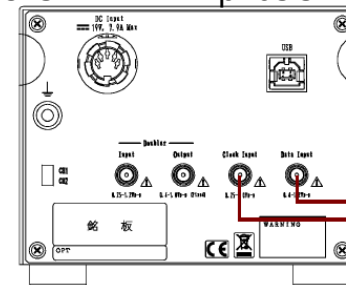


```
:SYSTEM:INPut:CRATe <rate>  
Parameter <rate>=< CHARACTER PROGRAM  
DATA>  
HALFrate Operate at 1/2 clock  
FULLrate Operate at 1/1 clock  
> :SYSTEM:INPut:CRATe HALFrate
```

MU183020A 28G/32G PPG



MP1825B 4TAP Emphasis



J1615A
Pair Cable

MP1825B 4TAP Emphasis

Ver. 8.02.03
Additional Function

- Added Preset File for PCIe Gen. 3
 - A Preset file for PCIe Gen. 3 has been added to the Coefficient (C-1 to C-2) set by Preset.
 - Selecting PCIe 3 sets the standards for PCIe Gen. 3.

The screenshot displays the 'CH2 Interface' settings for '[USB6] 4Tap Emphasis'. The interface includes several control panels:

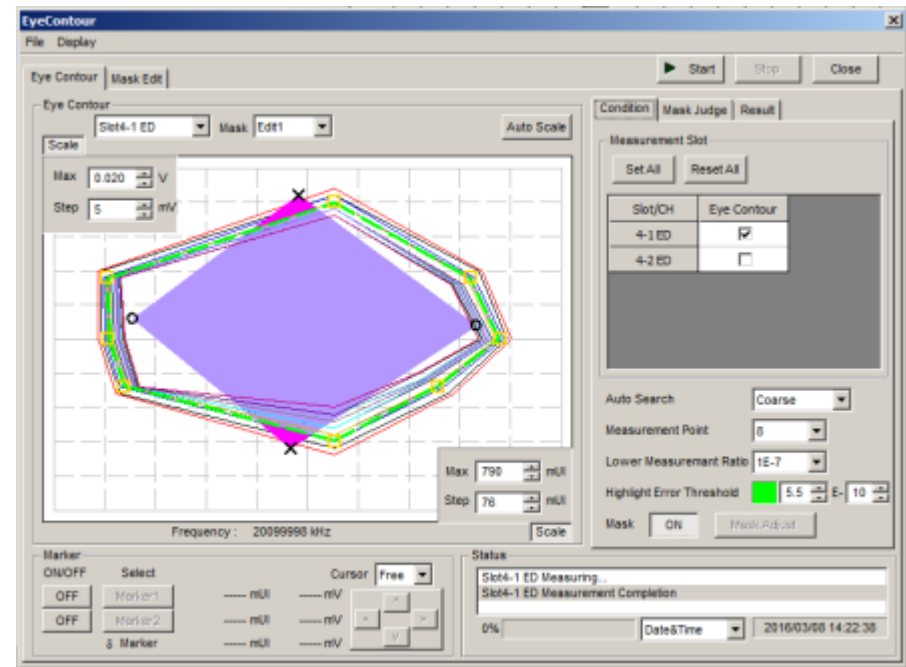
- Emphasis Output:** Set to 'ON' with an 'Adjust' button.
- Bit Rate Monitor:** Set to '20.00000 Gbit/s' with a 'Setting' button.
- Emphasis Function:** Set to 'ON' with 'Default' and 'Calibration' buttons.
- Preset Selection:** A dropdown menu shows 'USER' and 'Preset0', with an 'Edit' button.
- Coefficient step:** A dropdown menu is set to '0.0001'.
- Output Data:** A table showing cursor positions and voltage levels:

Cursor	dB	V p-p	Waveform Image
Post1	-2.49	Va 0.400	
Post2	-3.52	Vb 0.300	
-----		Vc 0.200	
Pre1	3.52	Vd 0.300	
- Eye Amplitude:** Set to '0.500 V p-p'.
- Offset:** Set to '0.033 Vth'.
- Delay:** Set to '30 mUI'.
- Ideal Emphasis Calculate:** Includes a 'DUT S-parameter' dropdown set to 'OPEN', a 'Calculate' button, and a 'Bit Rate Setting' of '10.00000 Gbit/s'.

MU18304xA/B 28G/32G ED

Ver. 8.02.03
Additional Function

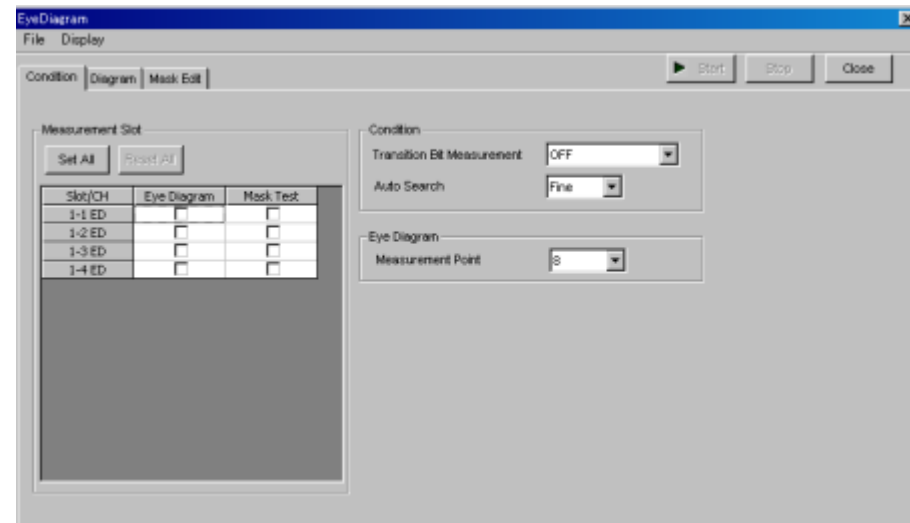
- Added Mask Evaluation Function
 - A Mask evaluation function has been added to Eye Contour measurement.
 - At ON, evaluation is performed about whether or not the Mask area is inside the error rate contour specified at Highlight Error Threshold. The Mask area is colored pink.



MU18304xA/B 28G/32G ED

Ver. 8.02.03
Additional Function

- Auto-measurement Supports Differential 100Ω Input
 - Differential 100Ω input is supported by MU18304xA/B 32G ED Auto-measurement. The following auto-measurements are supported:
 - Eye Margin
 - Eye Diagram
 - Bathtub
 - Q Analysis
 - Eye Contour

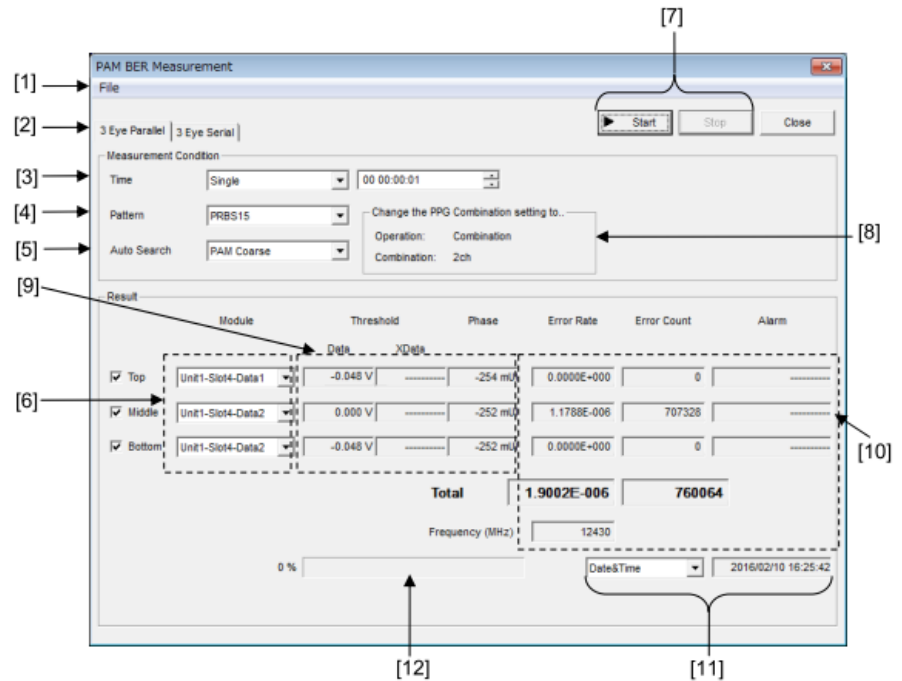


MU18304xA/B 28G/32G ED

Ver. 8.02.03
Additional Function

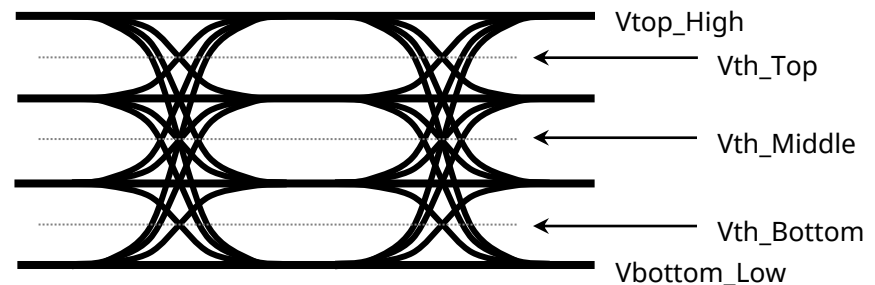
- Added PAM4 Signal Total BER Measurement Function

- The PAM4 3Eye Total BER can be measured at ED 1ch or ED 3ch.
- Using ED 1ch: ED 1ch repeatedly performs Auto Search and BER measurement to calculate the PAM4 Total BER results from the BER results for each of Top/Middle/Bottom.
- Using ED 3ch: ED 3ch performs Auto Search and BER measurement respectively and simultaneously to calculate the PAM4 Total BER result from the Top/Middle/Bottom BER results.



- Added Manual Threshold and Phase Measurement Functions to PAM BER Measurement

- The Threshold and Phase are displayed and set for the BER measurement points for each Top/Middle/Bottom level.



MP1800A Shared Functions

Ver. 8.02.03
Additional Function

- Added Replay Function for Video Explaining ESD/EOS Countermeasures at Software Start

MU18304xA/B 28G/32G ED

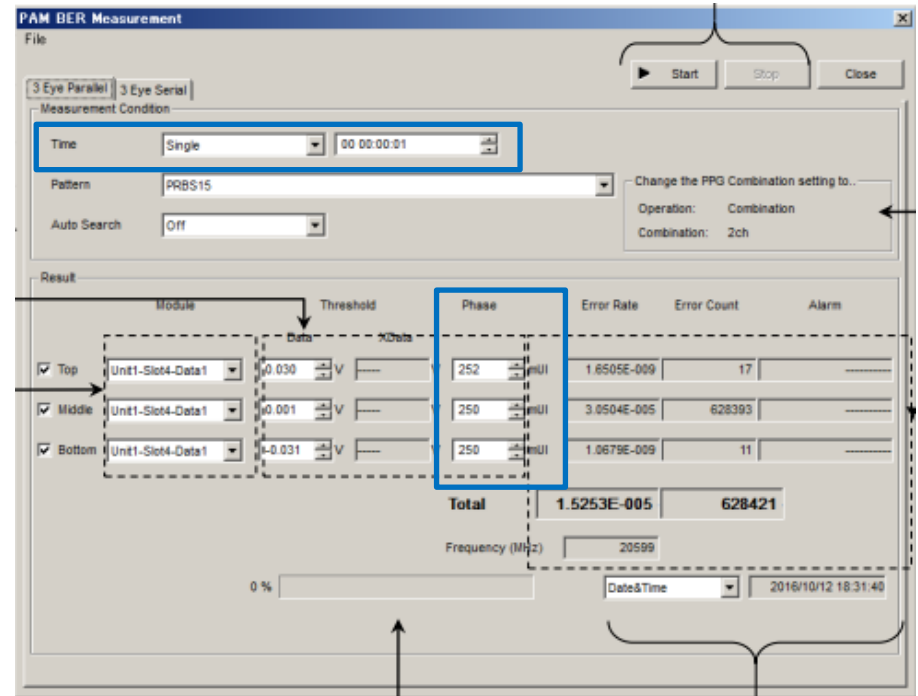
- Pattern files have been added for PAM4 signal generation and BER measurement using the MU18302xA 32G PPG and MU18304xB 32G High Sensitivity ED
 - The added patterns are listed below:
 - Non-linear PAM4 signal generation patterns for use by 32G PPG:
 - PRBS7, PRBS9, PRBS10, PRBS11, PRBS15, PRBS20, PRQS10, SSPR
 - PAM4 and non-linear PAM4 signal generation patterns for use by 32G PPG:
 - QPRBS13-CEI, GrayQPRBS13-CEI, QPRBS13-IEEE100GBASE-KP4_Lane0-3, GrayQPRBS13-IEEE100GBASE-KP4_Lane0-3, GrayPreQPRBS13-IEEE100GBASE-KP4_Lane0-3, Transmitter_Linearity, GrayPRBS7, GrayPRBS9, GrayPRBS10, GrayPRBS11, GrayPRBS15, GrayPRBS20, GrayPRQS10, GraySSPR
 - PAM4 BER Measurement patterns for use by 32G ED:
 - QPRBS13-CEI, GrayQPRBS13-CEI, QPRBS13-IEEE100GBASE-KP4_Lane0-3, GrayQPRBS13-IEEE100GBASE-KP4_Lane0-3, GrayPreQPRBS13-IEEE100GBASE-KP4_Lane0-3, Transmitter_Linearity, GrayPRBS7, GrayPRBS9, GrayPRBS10, GrayPRBS11, GrayPRBS15, GrayPRBS20, GrayPRQS10, GraySSPR

MP1825B 4TAP Emphasis

- The following functions have been added to the MP1825B Emphasis
 - Upgraded settings file Save function. Quick Save/Save functions have been added for the settings file Coefficient Preset Table.
 - Upgraded Adjust function, To optimize the Adjust function at Jitter Addition, Jitter settings can be set ON/OFF automatically.

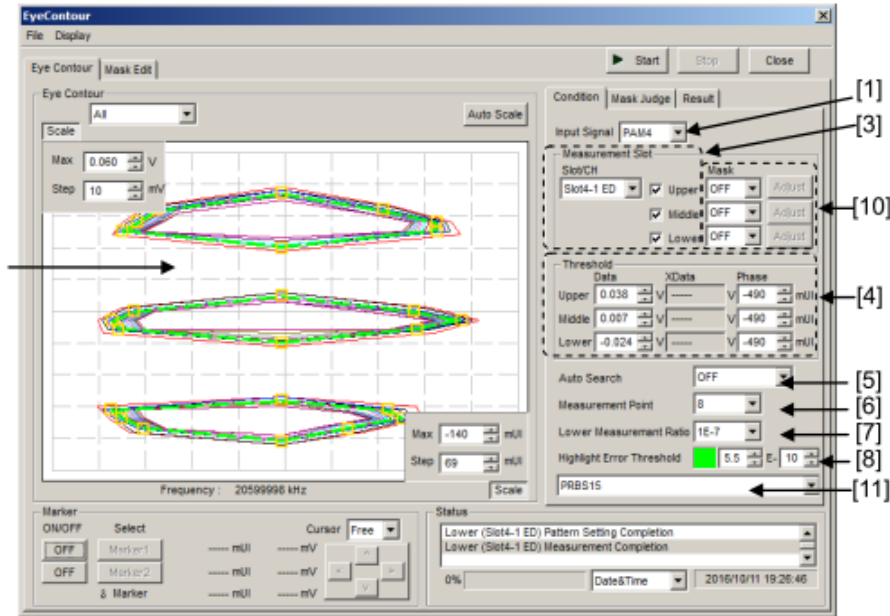
MU18304xA/B 28G/32G ED

- The following functions have been added to the MU18304xB 32G High Sensitivity ED PAM BER measurements
 - Added Repeat measurement function to 3Eye Serial mode
 - Added measurement function with Middle Eye Phase value to 3Eye Serial mode



MU18304xA/B 28G/32G ED

- A PAM4 measurement mode has been added to the MU18304xB 32G High Sensitivity ED Eye Contour measurement.
- This supports simultaneous PAM4 signal 3Eye (Upper/Middle/Lower) measurements.



- [1] Input Signal
- [2] Measurement Slot (When Input Signal is NRZ)
- [3] Measurement Slot (When Input Signal is PAM4)
- [4] Threshold (When Input Signal is PAM4)
- [5] Auto Search
- [6] Measurement Point
- [7] Lower Measurement
- [8] Highlight Error Threshold
- [9] Mask Adjust
- [10] Mask ON/OFF
- [11] Pattern (When Input Signal is PAM4)
- [12] BER contour display area

