

MP1800A Selection Guide

MP1800A / MT1810A / **MP1861A** / **MP1862A**

Signal Quality Analyzer / 4-slot chassis / 56G/64G bit/s MUX / 56G/64G bit/s DEMUX

- **Introduction**

The MP1800A Signal Analyzer offers various modules and options for customizing functions to requirements. Functions are easily extended by adding modules and options to support new future needs. This guide will help you select the best configuration matching your needs by describing the functions, selections, and combinations of modules and options.

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1. Functions and Characteristics of Main Frames, Modules and Options

This chapter describes the functions and characteristics of each main frame, module and option. Refer to the catalog for details of functions and specifications.

Table 1: Functions and Characteristics of Main Frame

MP1800A Signal Quality Analyzer	This main frame with screen supports installation of up to six modules. The MX180000A Signal Quality Analyzer Control Software is preinstalled.
MP1800A-001 GPIB	This GPIB option offers a GPIB port for remote control.
MP1800A-002 LAN	This LAN option offers a LAN port for remote control.
MP1800A-014 2-Slot for PPG and/or ED	This option supports installation of up to two 12.5 Gbit/s PPG/ED modules (MU181020A/40A), 14 Gbit/s PPG/ED modules (MU181020B/40B) or 28G/32 Gbit/s PPG/ED modules (MU183020A/21A/40A/41A). Refer to section 3 for the combination of PPG/ED modules. Although there are no restrictions on the number of other inserted modules, the 25 Gbit/s MUX/DEMUX (MU182020A/21A, MU182040A/41) are not supported.
MP1800A-015 4-Slot for PPG and/or ED	This option supports installation of up to four 12.5 Gbit/s PPG/ED modules (MU181020A/40A), 14 Gbit/s PPG/ED modules (MU181020B/40B) or 28G/32 Gbit/s PPG/ED modules (MU183020A/21A/40A/41A). Refer to section 3 for the combination of PPG/ED modules. There are no restrictions on the number of other inserted modules.
MP1800A-016 6-Slot for PPG and/or ED	This option supports installation of up to six 12.5 Gbit/s PPG/ED modules (MU181020A/40A) or 14 Gbit/s PPG/ED modules (MU181020B/40B). This option also supports up to four 28G/32 Gbit/s PPG/ED modules (MU183020A/21A/40A/41A). Refer to section 3 for the combination of PPG/ED modules. There are no restrictions on the number of other inserted modules.
MP1800A-032 32G PPG/ED Support	This option supports installation of 28G/32 Gbit/s PPG/ED modules. This option must be installed to use the MU183020A/21/40A/41A.
MT1810A 4-Slot Chassis	This main frame with no built-in screen supports installation of up to four modules and is controlled using an external PC in which the MX180000A Signal Quality Analyzer Control Software is installed.
MT1810A-014 2-Slot for PPG and/or ED	This option supports installation of up to two 12.5 Gbit/s PPG/ED modules (MU181020A/40A), 14 Gbit/s PPG/ED modules (MU181020B/40B) or 28G/32 Gbit/s PPG/ED modules (MU183020A/21A/40A/41A). Refer to section 3 for the combination of PPG/ED modules. Although there are no restrictions on the number of other inserted modules, the 25 Gbit/s MUX/DEMUX (MU182020A/21A, MU182040A/41) are not supported.
MT1810A-015 4-Slot for PPG and/or ED	This option supports installation of up to four 12.5 Gbit/s PPG/ED modules (MU181020A/40A), 14 Gbit/s PPG/ED modules (MU181020B/40B) or 28G/32 Gbit/s PPG/ED modules (MU183020A/21A/40A/41A). Refer to section 3 for the combination of PPG/ED modules. Although there are no restrictions on the number of other inserted modules.
MT1810A-032 32G PPG/ED Support	This option supports installation of 28G/32 Gbit/s PPG/ED modules. This option must be installed to use the MU183020A/21/40A/41A.

MP1861A 56G/64G bit/s MUX	<ol style="list-style-type: none"> Combining the MU183020A 28G/32G bit/s PPG and 2ch option supports a MUX configuration for output of NRZ signals up to 64.2 Gbit/s. The MU13020A-031 2ch Data Delay option is required. Combining with the MU183021A 28G/32G bit/s 4ch PPG supports a MUX configuration for output of NRZ signals up to 64.2 Gbit/s. The MU183021A-030 4ch Data Delay option is required.
MP1861A-001 64G bit/s Extension	This option expands the operation frequency to 64.2G. It can be used at bit rates from 8 to 64.2 Gbit/s. If this option is not installed, the bit-rate range is 8 to 56.2 Gbit/s.
MP1861A-011 Variable Data Output (0.5 to 2.5Vp-p)	This option varies the amplitude up to 2.5 Vp-p. Not only can the amplitude be set in the range of 0.5 to 2.5 Vp-p, but the offset and crosspoint can also be varied.
MP1861A-013 Variable Data Output (0.5 to 3.5Vp-p)	This option varies the amplitude up to 3.5 Vp-p. Not only can the amplitude be set in the range of 0.5 to 3.5 Vp-p, but the offset and crosspoint can also be varied.
MP1861A-030 Variable Data Delay	This option varies the data phase. Since the phase of the data can be varied according to the clock, installing this option in several MUXes supports pattern synchronization at each MUX.
MP1862A 56G/64G bit/s DEMUX	<ol style="list-style-type: none"> Combining the MU183040B 28G/32G bit/s ED and 2ch option supports a DEMUX configuration that can receive NRZ signals up to 64.2 Gbit/s. Combining with the MU183041B 28G/32G bit/s 4ch ED supports a DEMUX configuration that can receive NRZ signals up to 64.2 Gbit/s.
MP1862A-001 64G bit/s Extension	This option expands the operation frequency to 64.2G. It can be used at bit rates from 8 to 64.2 Gbit/s. If this option is not installed, the bit-rate range is 8 to 56.2 Gbit/s.

Table 2: Functions and Characteristics of Clock Module

MU181000A 12.5 GHz Synthesizer	This 2-slot wide module supports output clocks of 0.1 to 12.5 GHz. There is one clock output port that can be used as a clock source for the PPG and MUX modules.
MU181000A-001 Jitter Modulation	This option outputs a jittered clock. Inputting the jittered clock to either the PPG or MUX module can be used to output jittered data. The internal sinusoidal jitter source can impress jitter of up to 80 MHz. Moreover, connecting an external regulation source supports impression of various jitter types.
MU181000B 12.5 GHz 4Port Synthesizer	This 2-slot wide module supports output of clocks of 0.1 to 12.5 GHz. There are four output ports that can be used as clock sources for the PPG and MUX modules.
MU181000B-001 Jitter Modulation	This option outputs a jittered clock. Inputting the jittered clock to either the PPG or MUX module can be used to output jittered data. The internal sinusoidal jitter source can impress jitter of up to 80 MHz. Moreover, connecting an external regulation source supports impression of various jitter types.
MU181500B Jitter Modulation Source	This 2-slot wide module adds any jitters such as SJ, RJ, BUJ and SSC to the incoming clock. Two kinds of SJ are available by combination with a jittered synthesizer (MU181000A/B-001)
MU181800A 12.5 GHz Clock Distributor <i>*Manufacturing discontinued</i>	This module divides the 0.1 to 12.5 GHz clock into four branches for distribution of the clock to up to four PPG modules.
MU181800B 14 GHz Clock Distributor	This module divides the 0.1 to 14 GHz clock into five branches for distribution of the clock to up to five PPG modules.
MU181800B-005 14.1 GHz Extension	This module extends the frequency range to support input/output of signals up to 14.1 GHz.

Table 3: 12.5G/14G Functions and Characteristics of PPG Module

MU181020A * 12.5 Gbit/s PPG	This PPG module supports differential interfaces outputting signals up to 12.5 Gbit/s. It can be used to generate various patterns, such as PRBS.
MU181020A-001 9.8 to 12.5 Gbit/s	This operation frequency option can be used in the frequency range of 9.8 to 12.5 Gbit/s. Moreover, because it has a built-in clock source, it eliminates the need for an external clock. Additionally, support for divided-clock operation enables use at operation frequencies of 1/2, 1/4, and 1/8 of 9.8 to 12.5 Gbit/s.
MU181020A-002 0.1 to 12.5 Gbit/s	This operation frequency option can be used in the frequency range of 0.1 to 12.5 Gbit/s. In addition, installing the MU181020A-030 supports pattern synchronization with multiple PPG modules. It requires a clock source (MU181000A or MU181000B).
MU181020A-010 Variable Data Output (0.05 to 0.8 Vp-p)	This variable amplitude option supports amplitudes from 0.05 to 0.8 Vp-p; the offset and cross-point can also be varied. It is the most cost-effective amplitude option.
MU181020A-011 Variable Data Output (0.25 to 2.5 Vp-p)	This variable amplitude option supports amplitudes from 0.25 to 2.5 Vp-p; the offset and cross-point can also be varied. It is an ideal general-purpose amplitude option.
MU181020A-012 High Performance Data Output (0.05 to 2.0 Vp-p)	This variable amplitude option supports amplitudes from 0.05 to 2.0 Vp-p; the offset and cross-point can also be varied. It is ideal for outputting very high-quality waveforms.
MU181020A-013 Variable Data Output (0.5 to 3.5 Vp-p)	This variable amplitude option supports amplitudes from 0.05 to 3.5 Vp-p; the offset and cross-point can also be varied. It is ideal for outputting very high-amplitude waveforms.
MU181020A-021 Differential Clock Output (0.1 to 2.0 Vp-p)	This differential clock option can be changed from a single clock interface to a differential interface; the amplitude and offset can also be varied.
MU181020A-030 Variable Data Delay	This phase shift option can shift the data phase according to the clock, enabling pattern synchronization between each PPG module when multiple PPG modules are installed.

*Manufacturing discontinued

MU181020B 14 Gbit/s PPG	This PPG module supports differential interfaces outputting signals up to 14 Gbit/s. Various patterns such as PRBS can be generated. An external clock source that can output clocks up to 14 GHz is required.
MU181020B-002 0.1 to 14 Gbit/s	This operation frequency option can be used in the frequency range of 0.1 to 14 Gbit/s. In addition, installing the MU181020B-030 supports pattern synchronization with multiple PPG modules.
MU181020B-003 14.05 Gbit/s Extension	This frequency extension option outputs signals up to 14.05 Gbit/s by combination with the 0.1 to 14 Gbit/s option (MU181020B-002). When it is operated at 14 Gbit/s or more, only independent setting is available.
MU181020B-005* 14.1 Gbit/s Extension	This module extends the frequency range to output signals up to 14.1 Gbit/s when used in combination with the 0.1 to 14 Gbit/s option (MU181020B-002).
MU181020B-011 Variable Data Output (0.25 to 2.5 Vp-p)	This variable amplitude option supports amplitudes from 0.25 to 2.5 Vp-p; the offset and cross-point can also be varied. It is an ideal general-purpose amplitude option.
MU181020B-012 High Performance Data Output (0.05 to 2.0 Vp-p)	This variable amplitude option supports amplitudes from 0.05 to 2.0 Vp-p; the offset and cross-point can also be varied. It is ideal for outputting very high-quality waveforms.
MU181020B-013 Variable Data Output (0.5 to 3.5 Vp-p)	This variable amplitude option supports amplitudes from 0.05 to 3.5 Vp-p; the offset and cross-point can also be varied. It is ideal for outputting very high-amplitude waveforms.
MU181020B-021 Differential Clock Output (0.1 to 2.0 Vp-p) *Manufacturing discontinued	This differential clock option can be changed from a single clock interface to a differential interface; the amplitude and offset can also be varied.

MU181020B-030 Variable Data Delay	This phase shift option can shift the data phase according to the clock, enabling pattern synchronization between each PPG module when multiple PPG modules are installed.
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*We recommend the MU181020B-005 14.1 Gbit/s Extension module supporting a wider bit rate instead of the previous MU181020B-003 14.05 Gbit/s Extension.

Table 4: 12.5G/14G Functions and Characteristics of ED Module

MU181040A * 12.5 Gbit/s ED	This ED module supports differential interfaces for analyzing signals up to 12.5 Gbit/s. Its main function is for BER measurement, etc. The analysis functions depend upon the selected options; see Table 9.
MU181040A-001 9.8 to 12.5 Gbit/s	This operation frequency option can be used in the frequency range of 9.8 to 12.5 Gbit/s. The CDR operation eliminates the need for clock input.
MU181040A-002 0.1 to 12.5 Gbit/s	This operation frequency option can be used in the frequency range of 0.1 to 12.5 Gbit/s. Installation of the MU181040A-030 is recommended for adjusting the input clock and input data phase to the optimum values.
MU181040A-020 Clock Recovery	This Clock Recovery option eliminates the need for input of an external clock (from PPG module) because the clock can be regenerated from data. Installation of the MU181040A-030 is mandatory for adjusting the regenerated clock and input data phase to the optimum values.
MU181040A-030 Variable Clock Delay	This phase shift option can shift the phase of the clock according to the data. Installation of the MU181040A-030 is recommended for adjusting the clock and input data phase to the optimum values when the MU181040A-002 is selected.

*Manufacturing discontinued

MU181040B 14 Gbit/s ED	This ED module supports differential interfaces for analyzing signals up to 14 Gbit/s. Its main function is for BER measurement, etc. The analysis functions depend upon the selected options; see Table 9.
MU181040B-002 0.1 to 14 Gbit/s	This operation frequency option can be used in the frequency range of 0.1 to 14 Gbit/s. Installation of the MU181040B-030 is recommended for adjusting the input clock and input data phase to the optimum values.
MU181040B-003 14.05 Gbit/s Extension	This frequency extension option inputs signals up to 14.05 Gbit/s by combination with the 0.1 to 14 Gbit/s option (MU181040B-002). When it is operated at 14 Gbit/s or more, only independent setting is available.
MU181040B-005* 14.1 Gbit/s Extension	This module extends the frequency range to output signals up to 14.1 Gbit/s when used in combination with the 0.1 to 14 Gbit/s option (MU181040B-002).
MU181040B-020 Clock Recovery	This Clock Recovery option eliminates the need for input of an external clock (from PPG module) because the clock can be regenerated from data. Installation of the MU181040B-030 is mandatory for adjusting the regenerated clock and input data phase to the optimum values.
MU181040B-030 Variable Clock Delay	This phase shift option shifts the phase of the clock according to the data. Installation of the MU181040B-030 is recommended for adjusting the clock and input data phase to the optimum values.

*We recommend the MU181040B-005 14.1 Gbit/s Extension module supporting a wider bit rate instead of the previous MU181040B-003 14.05 Gbit/s Extension.

Table 5: Functions and Characteristics of MUX Module

MU182020A * 25 Gbit/s 1ch MUX	This 2:1 single channel output MUX supports differential interfaces. It multiplexes parallel signals from two PPG modules and can output serial signals up to 25 Gbit/s as one channel. By operating with a half-rate clock it can output a half-rate clock from the clock output. A dedicated cable is a standard accessory for connecting PPG modules with MUX modules.
MU182020A-001 28 Gbit/s Extension	This frequency extension option outputs signals up to 28 Gbit/s by combination with the 14 Gbit/s PPG module (MU181020B).
MU182020A-002 Clock Input Band Switch	This input clock switch supports selection of half-rate and full-rate clocks. When full-rate clock is selected, the full-rate clock is output from the clock output.
MU182020A-003 28.1 Gbit/s Extension	This frequency extension option outputs signals up to 28.1 Gbit/s by combination with the 28 Gbit/s extension option (MU182020A-002).
MU182020A-010 Variable Data Output (0.25 to 1.75 Vp-p)	This variable amplitude option supports amplitudes from 0.25 to 1.75 Vp-p; the offset and cross-point can also be varied.
MU182020A-011 Variable Data Output (0.5 to 2.5 Vp-p)	This variable amplitude option supports amplitudes from 0.25 to 2.5 Vp-p; the offset and cross-point can also be varied.
MU182020A-013 Variable Data Output (0.5 to 3.5 Vp-p)	This variable amplitude option supports amplitudes from 0.5 to 3.5 Vp-p; the offset and cross-point can also be varied.
MU182020A-021 Clock Output (0.5 to 2.0 Vp-p)	This variable clock with single interface supports a variable amplitude and offset.
MU182020A-030 25 Gbit/s Variable Data Delay	This phase shift option shifts the phase of the data according to the clock. It can be selected when the 28 Gbit/s extension (MU182020A-001) is not installed.
MU182020A-031 28 Gbit/s Variable Data Delay	This phase shift option shifts the phase of the data according to the clock. It can be selected when the 28 Gbit/s extension (MU182020A-001) is installed.
MU182021A * 25 Gbit/s 2ch MUX	This 2:1, 2-channel output, 2-slot wide MUX supports differential interfaces. It multiplexes parallel signals from four PPG modules and can output serial signals up to 25 Gbit/s as two channels. By operating with a half-rate clock it can output a half-rate clock from the clock output. A dedicated cable is a standard accessory for connecting PPG modules with MUX modules.
MU182021A-001 28 Gbit/s Extension	This frequency extension option outputs signals up to 28 Gbit/s by combination with the 14 Gbit/s PPG module (MU181020B).
MU182021A-002 Clock Input Band Switch	This input clock switch supports selection of half-rate and full-rate input clocks. When full-rate clock is selected, the full-rate clock is output from the clock output.
MU182021A-003 28.1 Gbit/s Extension	This frequency extension option outputs signals up to 28.1 Gbit/s by combination with the 28 Gbit/s extension option (MU182021A-002).
MU182021A-010 Variable Data Output (0.25 to 1.75 Vp-p)	This variable amplitude option supports amplitudes from 0.25 to 1.75 Vp-p; the offset and cross-point can also be varied.
MU182021A-011 Variable Data Output (0.5 to 2.5 Vp-p)	This variable amplitude option supports amplitudes from 0.5 to 2.5 Vp-p; the offset and cross-point can also be varied.
MU182021A-013 Variable Data Output (0.5 to 3.5 Vp-p)	This variable amplitude option supports amplitudes from 0.5 to 3.5 Vp-p; the offset and cross-point can also be varied.
MU182021A-021 Differential Clock Output (0.5 to 2.0 Vp-p)	This differential clock amplitude option can be changed from a single clock interface to differential interface; the amplitude and offset can also be varied.
MU182021A-030 25 Gbit/s Variable Data Delay	This phase shift option shifts the phase of the data according to the clock to output the same pattern-synchronized 2ch MUXed signal. It can be selected when the 28 Gbit/s extension (MU182021A-001) is

	not installed.
MU182021A-031 28 Gbit/s Variable Data Delay	This phase shift option shifts the phase of the data according to the clock to output the same pattern-synchronized 2ch MUXed signal. It can be selected when the 28 Gbit/s extension (MU182021A-001) is installed.
MU182021A-040 Emphasis Control	This emphasis control option uses an external power divider to generate an emphasis signal. The emphasis amplitude rate and width of the emphasized signal can be set on the screen and any waveform distortion and jitter effects caused by reflections, etc., when combined with the power divider can be mitigated by attaching a coaxial attenuator. Refer to Table 11 for the recommended accessories when generating emphasis signals.

*Manufacturing discontinued

Table 6: Functions and Characteristics of DEMUX

MU182040A * 25 Gbit/s 1ch DEMUX	This 1:2, single-channel input DEMUX module supports differential interfaces. A single-channel, serial-signal input up to 25 Gbit/s can be 1:2 divided and output to two ED modules. It supports half-rate operation and input of a half-rate clock from a MUX module or the customer's DUT operating at a half rate. A dedicated cable is a standard accessory for connecting DEMUX modules with ED modules.
MU182040A-001 28 Gbit/s Extension	This frequency extension option inputs signals up to 28 Gbit/s by combination with the 14 Gbit/s ED module (MU181040B).
MU182040A-002 Clock Input Band Switch	This input clock switch supports selection of half-rate and full-rate input clocks.
MU182040A-003 28.1 Gbit/s Extension	This frequency extension option inputs signals up to 28.1 Gbit/s by combination with the 28 Gbit/s extension option (MU182040A-001).
MU182040A-030 25 GHz Variable Clock Delay	This phase shift option shifts the phase of the data according to the clock. It can be selected when the 28 Gbit/s extension (MU182040A-001) is not installed.
MU182040A-031 28 GHz Variable Clock Delay	This phase shift option shifts the phase of the data according to the clock. It can be selected when the 28 Gbit/s extension (MU182040A-001) is installed.
MU182041A * 25 Gbit/s 2ch DEMUX	This 1:2, 2-channel input, 2-slot wide DEMUX module supports differential interfaces. Each signal of a 2-channel, serial-signal input up to 25 Gbit/s can be 1:2 divided and output to four ED modules. It supports half-rate operation and input of a half-rate clock from a MUX module or the customer's DUT operating at half rate. A dedicated cable is a standard accessory for connecting DEMUX modules with ED modules.
MU182041A-001 28 Gbit/s Extension	This frequency extension option inputs signals up to 28 Gbit/s by combination with the 14 Gbit/s ED module (MU181040B).
MU182041A-002 Clock Input Band Switch	This input clock switch supports selection of half-rate and full-rate input clocks.
MU182041A-003 28.1 Gbit/s Extension	This frequency extension option inputs signals up to 28.1 Gbit/s by combination with the 28 Gbit/s extension option (MU182041A-001).
MU182041A-030 25 GHz Variable Clock Delay	This phase shift option shifts the phase of the data according to the clock. It can be selected when the 28 Gbit/s extension (MU182040A-001) is not installed.
MU182041A-031 28 GHz Variable Clock Delay	This phase shift option shifts the phase of the data according to the clock. It can be selected when the 28 Gbit/s extension (MU182041A-001) is installed.

*Manufacturing discontinued

Table 7: Functions and Characteristics of 28G/32G PPG Module

MU183020A 28G/32 Gbit/s PPG	This PPG module supports differential interfaces outputting signals up to 28.1 or 32.1Gbit/s. It can be used to generate various patterns such as PRBS. The number of channels can be selected from 1ch or 2ch according to the option. This module supports half-rate or quarter-rate clock operation for external clock input. Full-rate or half-rate clock can be selected for clock output.
MU183020A-001 32.1 Gbit/s Extension	This option extends the operation bit-rate up to 32.1 Gbit/s. The bit-rate range is 2.4 to 32.1 Gbit/s with this option. Without this option, the bit-rate range is 2.4 to 28.1 Gbit/s.
MU183020A-012 1ch 2 V Data Output	This option supports 1ch differential data output. The variable amplitude range is from 0.5 to 2.0 Vp-p. The offset and cross-point can also be varied.
MU183020A-013 1ch 3.5 V Data Output	This option supports 1ch differential data output. The variable amplitude range is from 0.5 to 3.5 Vp-p. The offset and cross-point can also be varied.
MU183020A-022 2ch 2 V Data Output	This option supports 2ch differential data output. The variable amplitude range is from 0.5 to 2.0 Vp-p. The offset and cross-point can also be varied.

MU183020A-023 2ch 3.5 V Data Output	This option supports 2ch differential data output. The variable amplitude range is from 0.5 to 3.5 Vp-p. The offset and cross-point can also be varied.
MU183020A-030 1ch Data Delay	This option enables phase adjustment of data relative to the clock and enables pattern-synchronized data signals among the other PPGs. This option can be selected when 1ch Data output (MU183020A-012/013) is installed.
MU183020A-031 2ch Data Delay	This option enables phase adjustment of data relative to the clock and enables pattern-synchronized data signals among the other PPGs. This option can be selected when 2ch Data output (MU183020A-022/023) is installed.
MU183021A 28G/32 Gbit/s 4ch PPG	This PPG module supports differential interfaces outputting signals up to 28.1 or 32.1Gbit/s. It can be used to generate various patterns such as PRBS. The number of channels is 4. This module supports half-rate or quarter-rate clock operation for external clock input. Full-rate or half-rate clock can be selected for clock output.
MU183021A-001 32.1 Gbit/s Extension	This option extends the operation bit-rate up to 32.1 Gbit/s. The bit-rate range is 2.4 to 32.1 Gbit/s with this option. Without this option, the bit-rate range is 2.4 to 28.1 Gbit/s.
MU183021A-012 4ch 2 V Data Output	This option supports variable amplitude. The amplitude range is from 0.5 to 2.0 Vp-p. The offset and cross-point can also be varied.
MU183021A-013 4ch 3.5 V Data Output	This option supports 4ch differential data output. The variable amplitude range is from 0.5 to 3.5 Vp-p. The offset and cross-point can also be varied.
MU183021A-030 4ch Data Delay	This option enables phase adjustment of data relative to the clock and enables pattern-synchronized data signals among the other PPGs.

Table 8: Functions and Characteristics of 28G/32G ED Module

MU183040A * 28G/32 Gbit/s ED	This ED module supports differential interfaces for analyzing signals up to 28.1 or 32.1Gbit/s. Its main function is for BER measurement, etc. The number of channels can be selected from 1ch or 2ch according to the option. It supports half-rate operation and input of a half-rate clock from a PPG module or the customer's DUT operating at half rate. The analysis functions depend upon the selected options; see Table 14.
MU183040A-001 32.1 Gbit/s Extension	This option extends the operation bit-rate up to 32.1 Gbit/s. The bit-rate range is 2.4 to 32.1Gbit/s with this option. Without this option, the bit-rate range is 2.4 to 28.1Gbit/s.
MU183040A-010 1ch ED	This option supports 1ch differential data input. A function for phase adjustment between incoming data and clock is included.
MU183040A-020 2ch ED	This option supports 2ch differential data input. A function for phase adjustment between incoming data and clock is included.

*Manufacturing discontinued

MU183040B 28G/32 Gbit/s ED	This ED module supports differential interfaces for analyzing signals up to 28.1 or 32.1 Gbit/s. Its main function is for BER measurement, etc. The number of channels can be selected from 1ch or 2ch according to the option. It supports half-rate operation and input of a half-rate clock from a PPG module or the customer's DUT operating at half rate. The analysis functions depend upon the selected options; see Table 14. The MU183040B offers high-sensitivity compared to the MU183040A. Be careful about the maximum input amplitude. It is 2 Vp-p max. for the A-type, and 1 Vp-p max. for the B-type.
MU183040B-001 32.1 Gbit/s Extension	This option extends the operation bit-rate up to 32.1 Gbit/s. The bit-rate range is 2.4 to 32.1 Gbit/s with this option. Without this option, the bit-rate range is 2.4 to 28.1 Gbit/s.
MU183040B-010 1ch ED	This option supports 1ch differential data input. A function for phase adjustment between incoming data and clock is included.

MU183040B-020 2ch ED	This option supports 2ch differential data input. A function for phase adjustment between incoming data and clock is included.
MU183040B-022 2.4G to 28.1 Gbit/s Clock Recovery	This is the clock recovery option. This option enables recovering clock from incoming data, so input of an external clock (from PPG Module) is not necessary. The clock signal is recovered from the Data signal input to CH-1 and is distributed internally to each channel. This option supports bit rates of 2.4 to 28.1 Gbit/s. The Loop band can be selected from Bit-rate/1667, Bit-rate/2578, and Variable (1 to 17 MHz, 1-MHz steps). This option and the MU183040B-023 cannot be installed simultaneously.
MU183040B-023 25.5G to 32.1 Gbit/s Clock Recovery	This is the clock recovery option. This option enables recovering clock from incoming data, so input of an external clock (from PPG Module) is not necessary. The clock signal is regenerated from the Data signal input to CH-1 and is distributed internally to each channel. This option supports bit rates of 25.5 to 32.1 Gbit/s. The Loop band can be selected from Bit-rate/1667, and Bit-rate/2578. This option and the MU183040B-022 cannot be installed simultaneously. The MU183040B-001 must be installed to select this option.
MU183041A * 28G/32 Gbit/s 4ch ED	This ED module supports differential interfaces for analyzing signals up to 28.1 or 32.1 Gbit/s. Its main function is for BER measurement, etc. The number of channels is 4. It supports half-rate operation and input of a half-rate clock from a PPG module or the customer's DUT operating at half rate. The analysis functions depend upon the selected options; see Table 14.
MU183040A-001 32.1 Gbit/s Extension	This option extends the operation bit-rate up to 32.1 Gbit/s. The bit-rate range is 2.4 to 32.1 Gbit/s with this option. Without this option, the bit-rate range is 2.4 to 28.1Gbit/s.

*Manufacturing discontinued

MU183041B 28G/32 Gbit/s 4ch ED	This ED module supports differential interfaces for analyzing signals up to 28.1 or 32.1 Gbit/s. Its main function is for BER measurement, etc. The number of channels is 4. It supports half-rate operation and input of a half-rate clock from a PPG module or the customer's DUT operating at half rate. The analysis functions depend upon the selected options; see Table 14. The MU183041B offers high-sensitivity compared to the MU183041A. Be careful about the maximum input amplitude. It is 2 Vp-p max. for the A-type, and 1 Vp-p max. for the B-type.
MU183040B-001 32.1 Gbit/s Extension	This option extends the operation bit-rate up to 32.1 Gbit/s. The bit-rate range is 2.4 to 32.1 Gbit/s with this option. Without this option, the bit-rate range is 2.4 to 28.1 Gbit/s.
MU183041B-022 2.4G to 28.1 Gbit/s Clock Recovery	This is the clock recovery option. This option enables recovering clock from incoming data, so input of an external clock (from PPG Module) is not necessary. The clock signal is regenerated from the Data signal input to CH-1 and is distributed internally to each channel. This option supports bit rates of 24 to 28.1 Gbit/s. The Loop band can be selected from Bit-rate/1667, Bit-rate/2578, and Variable (1 to 17 MHz, 1-MHz steps). This option and the MU183041B-023 cannot be installed simultaneously.
MU183041B-023 25.5G to 32.1 Gbit/s Clock Recovery	This is the clock recovery option. This option enables recovering clock from incoming data, so input of an external clock (from PPG Module) is not necessary. The clock signal is regenerated from the Data signal input to CH-1 and is distributed internally to 1ch and 2ch. Moreover, similarly, the clock regenerated from the Data input to 3ch is distributed to 3ch and 4ch. This option supports bit rates of 25.5 to 32.1 Gbit/s. The Loop band can be selected from Bit-rate/1667, and Bit-rate/2578. This option and the MU183041B-022 cannot be installed simultaneously. The MU183041B-001 must be installed to select this option.

Table 9: Functions and Characteristics of Optical Module

MU181600A * Optical Transceiver (XFP)	Optical interfaces can be evaluated by combining this XFP optical module with PPG and ED modules.
MU181601A * Optical Transceiver (SFP)	Optical interfaces can be evaluated by combining this SFP optical module with PPG and ED modules.
MU181620A* Stressed Eye Transmitter	This E/O converter supports operation frequencies from 0.1 to 12.5 Gbit/s. Installing with reference light sources supports IEEE802.3 10G BASEL/R stressed receiver conformance tests. For details of the stressed receiver conformance test configuration, refer to the separate stressed eye catalog.
MU181620A-001* 1310 nm Reference	This reference light source options supports wavelengths of 1310 nm. It can be used as a reference light source with tunable extinction ratio and optical power.
MU181620A-002* 1550 nm Reference	This reference light source options supports wavelengths of 1550 nm. It can be used as a reference light source with tunable extinction ratio and optical power.
MU181620A-003* 1310/1550 nm Reference	This reference light source options supports wavelengths of 1310 and 1550 nm. It can be used as a reference light source with tunable extinction ratio and optical power.
MU181620A-011* 1310 nm Stressed Eye	This option supports stressed receiver conformance tests at 1310 nm. It can be used as a reference light source.
MU181620A-012* 1550 nm Stressed Eye	This option supports stressed receiver conformance tests at 1550 nm. It can be used as a reference light source.
MU181620A-013* 1310/1550 nm Stressed Eye	This option supports stressed receiver conformance tests at both 1310 and 1550 nm. It can be used as a reference light source.
MU181620A-037* FC Connector	FC connector option
MU181620A-040* SC Connector	SC connector option
MU181640A* Optical Receiver	This O/E converter supports operation frequencies of 0.1 to 12.5 Gbit/s. It supports the wavelength band of 750 to 1650 nm for both single-mode and multimode core diameters.
MU181640A-004* Band Width 8.5GHz	This filter option supports DC to 8.5 GHz with a –3 dB bandwidth.
MU181640A-037* FC Connector	FC connector option
MU181640A-040* SC Connector	SC connector option

*Manufacturing discontinued

Table 10: Software Functions and Characteristics

MX180000A Signal Quality Analyzer Control Software	This software controls each type of module installed in the MP1800A/MT1810A. It is preinstalled by default when the MP1800A is shipped. MT1810A customers can also install it in the PC controller.
MX180000A-001* Pre-Code	This is the precode option for 100G DP-QPSK and 40G DQPSK/DPSK/ODB. This option can create the modulation signal for 100GDP-QPSK and 40G DQPSK/DPSK/ODB automatically.
MX180000A-002* De-Code	This is the decode option for 100G DP-QPSK and 40G DQPSK/DPSK/ODB. This option can demodulate the modulation signal for 100GDP-QPSK and 40G DQPSK/DPSK/ODB.
MX180001A SDH/SONET Pattern Editor	This software generates SONET/SDH frame patterns. It supports the ITU-T G.707/Bellcore STM-0 to STM-256c and STS-1 to STS-768c SDH/SONET patterns. Refer to Table 13 for the modules supported by this software.
MX180002A* Stressed Eye Measurement Control Software	This software executes the stressed receive conformance test. It can calibrate the measurement system and perform power penalty tests. For details of the stressed receiver conformance test configurations, referred to the separate stressed eye catalog. Refer to Table 13 for

	the modules supported by this software.
MX180003A GbE/10GbE Pattern Editor	This software generates GbE/10GbE frame patterns. Refer to Table 13 for the modules supported by this software.
MX180004A PON Application Software	This software supports the upstream test for PON optical modules. It performs editing of burst data, and controls the data and auxiliary signal timing to evaluate optical modules for E-PON, G-PON, and 10GE-PON systems. Refer to Table 13 for the modules supported by this software.
MX180005A Jitter Application Software	This software supports the jitter tolerance and jitter sweep tests when used in combination with a jitter modulation option (MU181000A/B-001). Jitter tolerance and jitter sweep are performed in accordance with each application. Refer to Table 13 for the modules supported by this software.
MX181500A Jitter/Noise Tolerance Test Software	This software supports the jitter tolerance and jitter sweep tests up to 64.2 Gbit/s when used in combination with the jitter modulation source (MU181500B). Jitter tolerance and jitter sweep are performed in accordance with each application. Refer to Table 13 for the modules supported by this software. Please use MX181500A Ver. 2.04 or later when MX180000A Ver. 7.09 or later is used. MX181500A does not work when other version was used.

*Manufacturing discontinued

Table 11: List of Supported Functions of Error Detector Options

Function	Model	MU181040A/B		
		Frequency Option	MU181040A/B-002	
		Phase Shift Option	MU181040A/B-030	-
Auto Search	Threshold	Supported	Supported	Not supported
	Phase	Supported	Not supported	Not supported
Auto Adjust	Threshold	Supported	Supported	Supported
	Phase	Supported	Not supported	Not supported
Eye Margin	Threshold	Supported	Supported	Not supported
	Phase	Supported	Not supported	Not supported
Eye Diagram		Supported	Not supported	Not supported
Bathtub		Supported	Not supported	Not supported
Q Measurement		Supported	Not supported	Not supported
ISI Measurement		Supported	Supported	Supported
Capture		Supported	Supported	Supported
Histogram		Supported	Supported	Supported

Table 12: Anritsu-recommended Accessories at Emphasis Signal Generation

Model	Product
41KC-3	Coaxial Attenuator (3 dB)
41KC-6	Coaxial Attenuator (6 dB)
41KC-10	Coaxial Attenuator (10 dB)
41KC-20	Coaxial Attenuator (20 dB)
K240C	Power Divider
K120MM-20CM	DC to 40 GHz, 50 Ω, 20 cm, K (m) to K (m)

Table 13: Modules Supported by Software

	MU181020A/40A 12.5 Gbit/s PPG/ED	MU181020B/40B 14 Gbit/s PPG/ED	MU182020A/40A 25 Gbit/s 1ch MUX/DEMUX MU182021A/41A 25 Gbit/s 2ch MUX/DEMUX	MU183020A/40A/40B 28G/32G PPG/ED MU183021A/41A/41B 28G/32G 4ch PPG/ED MP1861A 56G/64 Gbit/s MUX MP1862A 56G/64 Gbit/s DEMUX
MX180001A SDH/SONET Pattern Editor	Supported	Not supported	Not supported	Not supported
MX180002A* Stressed Eye Measurement Control Software	Supported	Not supported	Not supported	Not supported
MX180003A GbE/10GbE Pattern Editor	Supported	Supported	Not supported	Not supported
MX180004A PON Application Software	Supported	Supported	Not supported	Not supported
MX180005A Jitter Application Software	Supported	Supported	Supported	Not supported
MX181500A Jitter/Noise Tolerance Test Software	Supported	Supported	Supported	Supported

Requires MP1800A-002 LAN option in order to run these software on MP1800A main frame.

*Manufacturing discontinued

Table 14: List of Supported Functions of Error Detector Options

Function	Model	MU183040A/MU183041A/MU183040B/MU183041B
Auto Search	Threshold	Supported
	Phase	Supported
Auto Adjust	Threshold	Supported
	Phase	Supported
Eye Margin	Threshold	Supported
	Phase	Supported
Eye Diagram		Supported
Bathtub		Supported
Q Measurement		Supported
ISI Measurement		Not supported
Capture		Supported (Max. 8 Mbits)
Histogram		Not supported

* MX180000A Software Version 7.09 or later supports.

Table 15: List of Functions Supported by 56G/64 Gbit/s DEMUX

Function	Model	MP1862A
Auto-search	Threshold	Supported
	Phase	Supported
Auto-adjust	Threshold	Not Supported
	Phase	Not Supported
EYE Margin	Threshold	Supported
	Phase	Supported
EYE Diagram		Supported
Bathtub		Supported
Q Measurement		Not Supported
ISI Measurement		Not Supported
Capture		Supported (8 Mbits max.) (Supported by MU183040A/41A/40B/41B)
Histogram		Not Supported

2. Option Combinations

The following tables show the combinations of each main frame and module options. Use the tables to determine the option combinations.

Table 16: MP1800A Signal Quality Analyzer

No.	PPG/ED	Remote Interface	
1	Option-014 2-Slot for PPG and/or ED	-	-
2		Option-001 GPIB	-
3		-	Option-002 LAN
4		Option-001 GPIB	Option-002 LAN
5	Option-015 4-Slot for PPG and/or ED	-	-
6		Option-001 GPIB	-
7		-	Option-002 LAN
8		Option-001 GPIB	Option-002 LAN
9	Option-016 6-Slot for PPG and/or ED	-	-
10		Option-001 GPIB	-
11		-	Option-002 LAN
12		Option-001 GPIB	Option-002 LAN

Table 17: MT1810A 4-Slot Chassis

No.	PPG/ED
1	Option-014 2-Slot for PPG and/or ED
2	Option-015 4-Slot for PPG and/or ED

Table 18: MP1861A 56G/64G bit/s MUX

No.	Frequency	Data amplitude	Variable data phase
1	-	Select any one of the following options: MP1861A-011 Variable Data Output (0.5 to 2.5Vp-p) MP1861A-013 Variable Data Output (0.5 to 3.5Vp-p)	Either use with no option or select the following option: MP1861A-030 Variable Data Delay
2	MP1861A-001 64G bit/s Extension	Select any one of the following options: MP1861A-011 Variable Data Output (0.5 to 2.5Vp-p) MP1861A-013 Variable Data Output (0.5 to 3.5Vp-p)	Either use with no option or select the following option: MP1861A-030 Variable Data Delay

Table 19: MP1862A 56G/64G bit/s DEMUX

No.	Frequency
1	-
2	MP1862A-001 64G bit/s Extension

Table 20: MU181020A 12.5 Gbit/s PPG

No.	Frequency	Data Amplitude	Clock Output	Data Phase Shift	
1	Option-001 9.8 to 12.5 Gbit/s	No option H: 0 V, L: -0.5 V (Fixed)	-	-	
2		Option-010 0.05 to 0.8 Vp-p	Option-011 0.25 to 2.5 Vp-p	Option-021 Differential Clock Output	-
3				-	-
4				Option-021 Differential Clock Output	-
5				-	-
6				Option-021 Differential Clock Output	-
7				-	-
8				Option-021 Differential Clock Output	-
9				-	-
10				Option-021 Differential Clock Output	-
11	Option-002 0.1 to 12.5 Gbit/s			No option H: 0 V, L: -1.0 V (Fixed)	-
12		-	Option-030 Variable Data Delay		
13		Option-021 Differential Clock Output	-		
14		-	Option-030 Variable Data Delay		
15	-	Option-010	-	-	

16		0.05 to 0.8 Vp-p		Option-030 Variable Data Delay
17			Option-021 Differential Clock Output	-
18				Option-030 Variable Data Delay
19				-
20		Option-011 0.25 to 2.5 Vp-p	-	Option-030 Variable Data Delay
21			Option-021 Differential Clock Output	-
22				Option-030 Variable Data Delay
23			-	-
24		Option-012 0.05 to 2.0 Vp-p	-	Option-030 Variable Data Delay
25			Option-021 Differential Clock Output	-
26				Option-030 Variable Data Delay
27			-	-
28		Option-013 0.5 to 3.5 Vp-p	-	Option-030 Variable Data Delay
29			Option-021 Differential Clock Output	-
30				Option-030 Variable Data Delay

*Manufacturing discontinued

Table 21: MU181020B 14 bit/s PPG

No.	Frequency	Data Amplitude	Clock Output	Data Phase Shift
1				-
2		No option H: 0 V, L: -1.0 V (Fixed)	-	Option-030 Variable Data Delay
3			Option-021 Differential Clock Output	-
4				Option-030 Variable Data Delay
5			-	-
6		Option-011 0.25 to 2.5 Vp-p	-	Option-030 Variable Data Delay
7			Option-021 Differential Clock Output	-
8				Option-030 Variable Data Delay
9	Option-002 0.1 to 14 Gbit/s		-	-
10		Option-012 0.05 to 2.0 Vp-p	-	Option-030 Variable Data Delay
11			Option-021 Differential Clock Output	-
12				Option-030 Variable Data Delay
13			-	-
14		Option-013 0.5 to 3.5 Vp-p	-	Option-030 Variable Data Delay
15			Option-021 Differential Clock Output	-
16				Option-030 Variable Data Delay

Add the MU181020B-005 14.1 Gbit/s extension option when extending the operation frequency up to 14.1 Gbit/s.

We recommend the MU181020B-005 14.1 Gbit/s Extension module supporting a wider bit rate instead of the previous MU181020B-003 14.05 Gbit/s Extension.

Table 22: MU181040A 12.5 Gbit/s Error Detector

No.	Frequency	Clock Recovery	Clock Phase Shift
1	Option-001 9.8 to 12.5 Gbit/s	-	-
2			-
3	Option-002 0.1 to 12.5 Gbit/s	-	Option-030 Variable Clock Delay
4		Option-020 Clock Recovery	Option-030 Variable Clock Delay

*Manufacturing discontinued

Table 23: MU181040B 14 Gbit/s Error Detector

No.	Frequency	Clock Recovery	Clock Phase Shift
1			-
2	Option-002 0.1 to 14 Gbit/s	-	Option-030 Variable Clock Delay
3		Option-020 Clock Recovery	Option-030 Variable Clock Delay

Add the MU181040B-005 14.1 Gbit/s extension option when extending the operation frequency up to 14.1 Gbit/s.

We recommend the MU181040B-005 14.1 Gbit/s Extension module supporting a wider bit rate instead of the previous MU181040B-003 14.05 Gbit/s Extension.

*The MU181040B-030 Variable Clock Delay option is required when using the MU181040B-020.

Table 24: MU182020A 25 Gbit/s 1ch MUX

No.	Frequency	Clock Frequency	Data Amplitude	Clock Output	Data Phase Shift
1	-	Select no option or following option. Option-002 Clock Input Band Switch	Select one of following options. Option-010 0.25 to 1.75 Vp-p Option-011 0.5 to 2.5 Vp-p Option-013 0.5 to 3.5 Vp-p	Select no option or following option. Option-021 0.5 to 2.0 Vp-p	Select no option or following option. Option-030 25 Gbit/s Variable Data Delay
2	Option-001	Select no option or	Select one of following	Select no option or	Select no option or following

	28 Gbit/s Extension	following option. Option-002 Clock Input Bandwidth Switch	options. Option-010 0.25 to 1.75 Vp-p Option-011 0.5 to 2.5 Vp-p Option-013 0.5 to 3.5 Vp-p	following option. Option-021 0.5 to 2.0 Vp-p	option. Option-031 28 Gbit/s Variable Data Delay
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Add the MU182020A-003 28.1 Gbit/s extension option when extending the operation frequency up to 28.1 Gbit/s.

*Manufacturing discontinued

Table 25: MU182021A 25 Gbit/s 2ch MUX

No.	Frequency	Clock Frequency	Data Amplitude	Clock Output	Data Phase Shift
1	-	Select no option or following option. Option-002 Clock Input Band Switch	Select one of following options. Option-010 0.25 to 1.75 Vp-p Option-011 0.5 to 2.5 Vp-p Option-013 0.5 to 3.5 Vp-p	Select no option or following option. Option-021 0.5 to 2.0 Vp-p	Select no option or following option. Option-030 25 Gbit/s Variable Data Delay
2	Option-001 28 Gbit/s Extension	Select no option or following option. Option-002 Clock Input Band Switch	Select one of following options. Option-010 0.25 to 1.75 Vp-p Option-011 0.5 to 2.5 Vp-p Option-013 0.5 to 3.5 Vp-p	Select no option or following option. Option-021 0.5 to 2.0 Vp-p	Select no option or following option. Option-031 28 Gbit/s Variable Data Delay

Add the MU182021A-003 28.1 Gbit/s extension option when extending the operation frequency up to 28.1 Gbit/s.

*Manufacturing discontinued

Table 26: MU182040A 25 Gbit/s 1ch DEMUX

No.	Frequency	Clock Frequency	Clock Phase Shift
1	-	Select no option or following option. Option-002 Clock Input Band Switch	Select no option or following option. Option-030 25 GHz Variable Clock Delay
2	Option-001 28 Gbit/s Extension	Select no option or following option. Option-002 Clock Input Band Switch	Select no option or following option. Option-031 28 GHz Variable Clock Delay

Add the MU182040A-003 28.1 Gbit/s extension option when extending the operation frequency up to 28.1 Gbit/s.

*Manufacturing discontinued

Table 27: MU182041A 25 Gbit/s 2ch DEMUX

No.	Frequency	Clock Frequency	Clock Phase Shift
1	-	Select no option or following option. Option-002 Clock Input Band Switch	Select no option or following option. Option-030 25 GHz Variable Clock Delay
2	Option-001 28 Gbit/s Extension	Select no option or following option. Option-002 Clock Input Band Switch	Select no option or following option. Option-031 28 GHz Variable Clock Delay

Add the MU182041A-003 28.1 Gbit/s extension option when extending the operation frequency up to 28.1 Gbit/s.

*Manufacturing discontinued

Table 28: MU183020A 28G/32Gbit/s PPG

No.	Frequency	Data Amplitude and Number of Channels	Data Phase Shift
1	-	Select one of following options. Option-012 0.5 ~ 2.0 Vp-p, 1CH Option-013 0.5 ~ 3.5 Vp-p, 1CH	Select no option or following option. Option-030 1ch Data Delay
		Select one of following options. Option-022 0.5 ~ 2.0 Vp-p, 2CH Option-023 0.5 ~ 3.5 Vp-p, 2CH	Select no option or following option. Option-031 2ch Data Delay
2	Option-001 32 Gbit/s Extension	Select one of following options. Option-012 0.5 ~ 2.0 Vp-p, 1CH Option-013 0.5 ~ 3.5 Vp-p, 1CH	Select no option or following option. Option-030 1ch Data Delay
		Select one of following options. Option-022 0.5 ~ 2.0 Vp-p, 2CH Option-023 0.5 ~ 3.5 Vp-p, 2CH	Select no option or following option. Option-031 2ch Data Delay

Table 29: MU183021A 28G/32Gbit/s 4ch PPG

No.	Frequency	Data Amplitude	Data Phase Shift
1	-	Select one of following options. Option-012 0.5 ~ 2.0 Vp-p Option-013 0.5 ~ 3.5 Vp-p	Select no option or following option. Option-030 4ch Data Delay
2	Option-001 32 Gbit/s Extension	Select one of following options. Option-012 0.5 ~ 2.0 Vp-p Option-013 0.5 ~ 3.5 Vp-p	Select no option or following option. Option-030 4ch Data Delay

Table 30: MU183040A 28G/32Gbit/s ED, MU183040B 28G/32Gbit/s High Sensitivity ED

No.	Frequency	Number of Channels	Clock Recovery	Clock Phase Shift
1	-	Option-010 1ch ED	Select no option or Option-022.	Standard function
		Option-020 2ch ED	Select no option or Option-022.	Standard Function
2	Option-001 32 Gbit/s Extension	Option-010 1ch ED	Select no option or Option-023.	Standard function
		Option-020 2ch ED	Select no option or Option-023	Standard Function

*The Clock Recovery option is the MU183040B dedicated option. It cannot be installed in the MU183040A.

*MU183040A Manufacturing discontinued

Table31: MU183041A 28G/32Gbit/s 4ch ED, MU183041B 28G/32Gbit/s 4ch High Sensitivity ED

No.	Frequency	Clock Recovery	Clock Phase Shift
1	-	Select no option or Option-022.	Standard function
2	Option-001 32 Gbit/s Extension	Select no option or Option-023.	Standard Function

*The Clock Recovery option is the MU183041B dedicated option. It cannot be installed in the MU183041A

*MU183041A Manufacturing discontinued

Table 32: MU181620A Stressed Eye Transmitter*

No.	Wavelength	Connector
1	Option-001 1310 nm Reference*	Option-37 FC Connector
2		Option-40 SC Connector
3	Option-002 1550 nm Reference*	Option-37 FC Connector
4		Option-40 SC Connector
5	Option-003 1310/1550 nm Reference*	Option-37 FC Connector
6		Option-40 SC Connector
7	Option-011 1310 nm Stressed Eye*	Option-37 FC Connector
8		Option-40 SC Connector
9	Option-012 1550 nm Stressed Eye*	Option-37 FC Connector
10		Option-40 SC Connector
11	Option-013 1310/1550 nm Stressed Eye*	Option-37 FC Connector
12		Option-40 SC Connector

*Manufacturing discontinued

Table 33: MU181640A Optical Receiver*

No.	Bandwidth	Connector
1	Option-004 Band Width 8.5 GHz*	Option-37 FC Connector
2		Option-40 SC Connector

*Manufacturing discontinued

3. PPG/ED Module Combinations

3.1 12.5G/14G PPG/ED Module

The following tables show the insertion position and number of 12.5G/14G PPG/ED modules that can be installed in the main frame. Combining several PPG modules supports the channel synchronization function (synchronize and shift pattern generation from each PPG) and combination function (generate set pattern after passage through MUX). In addition, combining several ED modules offers the combination function (analyze patterns before passage through DEMUX). Refer to these tables to determine the number of PPG/ED modules and main-frame option.

Table 34: MP1800A/MT1810A-014

Slot No.		A	B	C	D								
Independent / Ch Sync	Slot1	-	-	-	-								
	Slot2	-	-	-	-								
	Slot3	PPG	-	PPG	PPG								
	Slot4	-	ED	ED	PPG								
	Slot5	-	-	-	-								
	Slot6	-	-	-	-								

Table 35: MP1800A/MT1810A-015

Slot No.		A	B	C	D	E	F	G	H	I	J	K	L
Independent / Ch Sync	Slot1	-	-	-	PPG	PPG	PPG	ED	ED	ED	PPG	PPG	PPG
	Slot2	-	-	-	PPG	PPG	PPG	ED	ED	ED	PPG	PPG	PPG
	Slot3	PPG	-	PPG	-	PPG	PPG	-	ED	ED	-	PPG	ED
	Slot4	-	ED	ED	-	-	PPG	-	-	ED	ED	ED	ED
	Slot5	-	-	-	-	-	-	-	-	-	-	-	-
	Slot6	-	-	-	-	-	-	-	-	-	-	-	-
4ch Combination	Slot1	-	-	-	-	-	-	-	-	-	-	-	-
	Slot2	-	-	-	-	-	-	-	-	-	-	-	-
	Slot3	-	-	-	-	-	4ch PPG	-	-	4ch ED	-	-	-
	Slot4	-	-	-	-	-	-	-	-	-	-	-	-
	Slot5	-	-	-	-	-	-	-	-	-	-	-	-
	Slot6	-	-	-	-	-	-	-	-	-	-	-	-
2ch Combination	Slot1				2ch PPG	2ch PPG	2ch PPG	2ch ED	2ch ED	2ch ED	2ch PPG	2ch PPG	2ch PPG
	Slot2					PPG	2ch PPG		ED	2ch ED	ED	PPG	2ch ED
	Slot3												
	Slot4												
	Slot5												
	Slot6												

Table 36: MP1800A-016

Slot No.		A	B	C	D	E	F	G	H	I	J	K	L
Independent / Ch Sync	Slot1	PPG	-	-	PPG	PPG	PPG	-	-	-	PPG	PPG	PPG
	Slot2	-	-	-	PPG	PPG	PPG	-	-	-	PPG	PPG	PPG
	Slot3	-	-	PPG	-	PPG	PPG	-	-	ED	-	PPG	PPG
	Slot4	-	ED	ED	-	-	PPG	-	ED	ED	-	-	PPG
	Slot5	-	-	-	-	-	-	-	ED	ED	ED	-	-
	Slot6	-	-	-	-	-	-	-	ED	ED	ED	ED	ED
4ch Combination	Slot1	-	-	-	-	-	-	-	-	-	-	-	-
	Slot2	-	-	-	-	-	4ch	-	-	-	-	-	4ch
	Slot3	-	-	-	-	-	PPG	-	-	4ch ED	-	-	PPG
	Slot4	-	-	-	-	-	-	-	-		-	-	-
	Slot5	-	-	-	-	-	-	-	-		-	-	-
	Slot6	-	-	-	-	-	-	-	-		-	-	-
2ch Combination	Slot1				2ch PPG	2ch PPG	2ch PPG				2ch PPG	2ch PPG	2ch PPG
	Slot2					PPG	2ch PPG					PPG	2ch PPG
	Slot3						PPG		ED	2ch ED			2ch PPG
	Slot4								2ch ED	2ch ED	2ch ED		
	Slot5								2ch ED	2ch ED	2ch ED	ED	ED
	Slot6											ED	ED

Slot No.		M	N	O	P	Q							
Independent / Ch Sync	Slot1	PPG	PPG	PPG	PPG	PPG							
	Slot2	PPG	PPG	PPG	PPG	PPG							
	Slot3		PPG	PPG		ED							
	Slot4			PPG	ED	ED							
	Slot5	ED	ED	ED	ED	ED							
	Slot6	ED	ED	ED	ED	ED							
4ch Combination	Slot1												
	Slot2			4ch PPG									
	Slot3												
	Slot4					4ch ED							
	Slot5												
	Slot6												
2ch Combination	Slot1	2ch PPG	PPG	2ch PPG	2ch PPG	2ch PPG							
	Slot2	PPG	PPG	PPG	PPG	PPG							
	Slot3		PPG	2ch PPG	ED	2ch ED							
	Slot4			PPG	ED	ED							
	Slot5	2ch ED	2ch ED	2ch ED	2ch ED	2ch ED							
	Slot6	ED	ED	ED	ED	ED							

- : Slots where PPG and ED cannot be installed
- PPG : Slots where MU181020A/B PPG can be installed
- ED : Slots where MU181040A/B ED can be installed
- Dashed Line : Slots where PPG/ED disabled at Combination

3.2 28G/32G PPG/ED Modules

The following tables show the insertion position and number of 28G/32G PPG/ED modules that can be installed in the main frame.

The 2ch PPG and 4ch PPG modules support the channel synchronization function (synchronize and shift pattern generation from each PPG) and combination function (generate set pattern after passage through MUX). Combining several PPG modules supports the channel synchronization function (synchronize and shift pattern generation from each PPG).

In addition, using 2ch ED or 4ch ED modules offers the combination function (analyze patterns before passage through DEMUX). Refer to these tables to determine the number of PPG/ED modules and main-frame option.

Table 37: MP1800A/MT1810A-014 (for 28G/32G modules)

Slot No.		C	D	E
Independent / Ch Sync 2ch Combination	Slot1	-		
	Slot2	-		
	Slot3	1ch/2ch PPG	4ch PPG	4ch ED
	Slot4	1ch/2ch ED		
	Slot5	-		
	Slot6	-		

Slot No.		D	E
4ch Combination	Slot1		
	Slot2		
	Slot3	4ch PPG	4ch ED
	Slot4		
	Slot5		
	Slot6		

- : Slots where PPG and ED cannot be installed
- 1ch/2ch PPG : Slots where MU183020A 1ch/2ch PPG can be installed
- 1ch/2ch ED : Slots where MU183040A/B 1ch/2ch ED can be installed
- 4ch PPG : Slots where MU183021A 4ch PPG can be installed
- 4ch ED : Slots where MU183041A/B 4ch ED can be installed

Table 38: MP1800A/MT1810A-015, -016 (for 28G/32G modules)

Slot No.		C	E	F	G	H
Independent Ch Sync 2ch Combination	Slot1	-	4ch PPG	4ch PPG	4ch PPG	4ch ED
	Slot2	-				
	Slot3	1ch/2ch PPG	-	4ch PPG	4ch ED	-
	Slot4	1ch/2ch ED	-			-
	Slot5	-	-	-	-	-
	Slot6	-	-	-	-	-

Slot No.		I	J	K	L	M(Opt-15 only)
Independent Ch Sync 2ch Combination	Slot1	4ch ED	4ch PPG	1ch/2ch PPG	1ch/2ch PPG	2ch PPG
	Slot2			-	1ch/2ch PPG	2ch PPG
	Slot3	4ch ED	1ch/2ch ED	4ch ED	1ch/2ch ED	2ch PPG
	Slot4				1ch/2ch ED	2ch PPG
	Slot5	-	-	-	-	
	Slot6	-	-	-	-	

Slot No.		E	F	G	H
4ch Combination	Slot1	4ch PPG	4ch PPG	4ch PPG	4ch ED
	Slot2				
	Slot3	-	4ch PPG	4ch ED	-
	Slot4	-			-
	Slot5	-	-	-	-
	Slot6	-	-	-	-

Slot No.		I	J	K
4ch Combination	Slot1	4ch ED	4ch PPG	1ch/2ch PPG
	Slot2			-
	Slot3	4ch ED	1ch/2ch ED	4ch ED
	Slot4			
	Slot5	-	-	-
	Slot6	-	-	-

Slot No.		M(Opt-15 only)	N
64Gx2ch Combination	Slot1	2ch PPG	2ch PPG
	Slot2	2ch PPG	2ch PPG
	Slot3	2ch PPG	-
	Slot4	2ch PPG	-
	Slot5		-
	Slot6		-

- : Slots where PPG and ED cannot be installed
- 1ch/2ch PPG : Slots where MU183020A 1ch/2ch PPG can be installed
- 1ch/2ch ED : Slots where MU183040A 1ch/2ch ED can be installed
- 4ch PPG : Slots where MU183021A 4ch PPG can be installed
- 4ch ED : Slots where MU183041A 4ch ED can be installed

3.3 Simultaneous Installation of 28G/32G PPG/ED and 12.5G/14G PPG/ED Modules

The following table lists the number of modules and their positions in the main frame slots for each option when the 28G/32G PPG/ED and 12.5G/14G PPG/ED modules are installed simultaneously.

When selecting a 2ch PPG, the channel synchronizing function (synchronizes and varies pattern generation position from PPG) and the combination function (generates set pattern after passage through MUX) can be used. The channel synchronization function can be used by combining several PPG modules.

When selecting a 2ch ED, the combination function (for analyzing pattern before passage through DEMUX) can be used. Refer to the following table to determine the number of PPG/ED modules and main-frame options.

- MX180000A Version 7.04.00 or newer supports simultaneous installation of 28G/32G PPG/ED and 12.5G/14G PPG/ED modules.
- The 32G 4CH PPG and 32G4CH ED cannot be installed at the same time as the 12.5G/14G PPG/ED.
- The 12.5G/14G PPG and 32G PPG CH Sync and Combination, as well as the 12.5G/14G ED and 32G ED Combination functions are not supported.
- The 32G ED error buzzer does not ring at simultaneous installation.
- The modules must be installed into the slot position shown in Table 36 and 37. The MP1800A/MT1810A does not work if the Slot No. or module configuration is different from that shown Table 36 and 37. The MP1800A/MT1810A does not work if any of these modules are not installed.
Ex. If the 32G ED is not installed in configuration “E”, the MP1800A/MT1810A does not work.

Table 39: MP1800A/MT1810A-015 (for 28G/32G and 12.5G/14G modules)

Independent	Slot No	A	B	C	D	E
Independent	Slot 1	PPG	ED	—	—	32G PPG
	Slot 2	PPG	ED	—	—	32G ED
	Slot 3	MUX	DEMUX	32G PPG	PPG	PPG
	Slot 4	32G ED	32G PPG	ED	32G ED	ED
	Slot 5	—	—	—	—	—
	Slot 6	—	—	—	—	—
CH Synchronization Combination	Slot1	CHSync 2ch Combi	2ch Combi	—	—	CHSync 2ch Combi
	Slot 2			—	—	2ch Combi
	Slot 3	—	—	CHSync 2ch Combi	—	—
	Slot 4	2ch Combi	CHSync 2ch Combi	—	2ch Combi	—
	Slot 5	—	—	—	—	—
	Slot 6	—	—	—	—	—

- : Slots where PPG/ED or 32G PPG/ED cannot be installed
Synthesizer Module, Jitter Modulator Module, Clock Distributor Module and Optical Interface Module can be installed.
- PPG : Slots where MU181020A/B 12.5G/14G PPG can be installed
- ED : Slots MU181040A/B 12.5G/14G ED can be installed
- 32G PPG : Slots where MU183020A 32G PPG can be installed
- 32G ED : Slots where MU183040A/B 32G ED can be installed
- MUX : Slot for MU182020A 1ch MUX
- DEMUX : Slot for MU182040A 1ch DEMUX
- CH Sync : Slots where the 2ch-Channel-Synchronization can be used when either two 12.5G/14G PPG boards or 32G PPG are installed.
- 2ch Combi : Slots where the 2ch-Combination can be used when either two 12.5G/14G PPG boards or 32G PPG are installed.

Table40: MP1800A/MT1810A-016 (for 28G/32G and 12.5G/14G modules)

Independent	Slot No	A	B	C	D	E
	Slot 1	PPG	—	—	—	32G PPG
	Slot 2	PPG	—	—	—	32G ED
	Slot 3	MUX	32G PPG	32G PPG	PPG	PPG
	Slot 4	32G ED	DEMUX	ED	32G ED	ED
	Slot 5	—	ED	—	—	—
	Slot 6	—	ED	—	—	—
CH Synchronization Combination	Slot1	CHSync 2ch Combi	—	—	—	CHSync 2ch Combi
	Slot 2	—	—	—	—	2ch Combi
	Slot 3	—	CHSync 2ch Combi	CHSync 2ch Combi	—	—
	Slot 4	2ch Combi	—	—	2ch Combi	—
	Slot 5	—	2ch Combi	—	—	—
	Slot 6	—	—	—	—	—

- : Slots where PPG/ED or 32G PPG/ED cannot be installed
Synthesizer Module, Jitter Modulator Module, Clock Distributor Module and Optical Interface Module can be installed.
- PPG : Slots where MU181020A/B 12.5G/14G PPG can be installed
- ED : Slots MU181040A/B 12.5G/14G ED can be installed
- 32G PPG : Slots where MU183020A 32G PPG can be installed
- 32G ED : Slots where MU183040A/B 32G ED can be installed
- MUX : Slot for MU182020A 1ch MUX
- DEMUX : Slot for MU182040A 1ch DEMUX
- CH Sync : Slots where the 2ch-Channel-Synchronization can be used when either two 12.5G/14G PPG boards or 32G PPG are installed.
- 2ch Combi : Slots where the 2ch-Combination can be used when either two 12.5G/14G PPG boards or 32G PPG are installed.

3.4. Combining MU18302xA and MP1861A, and MU18304xB and MP1862A

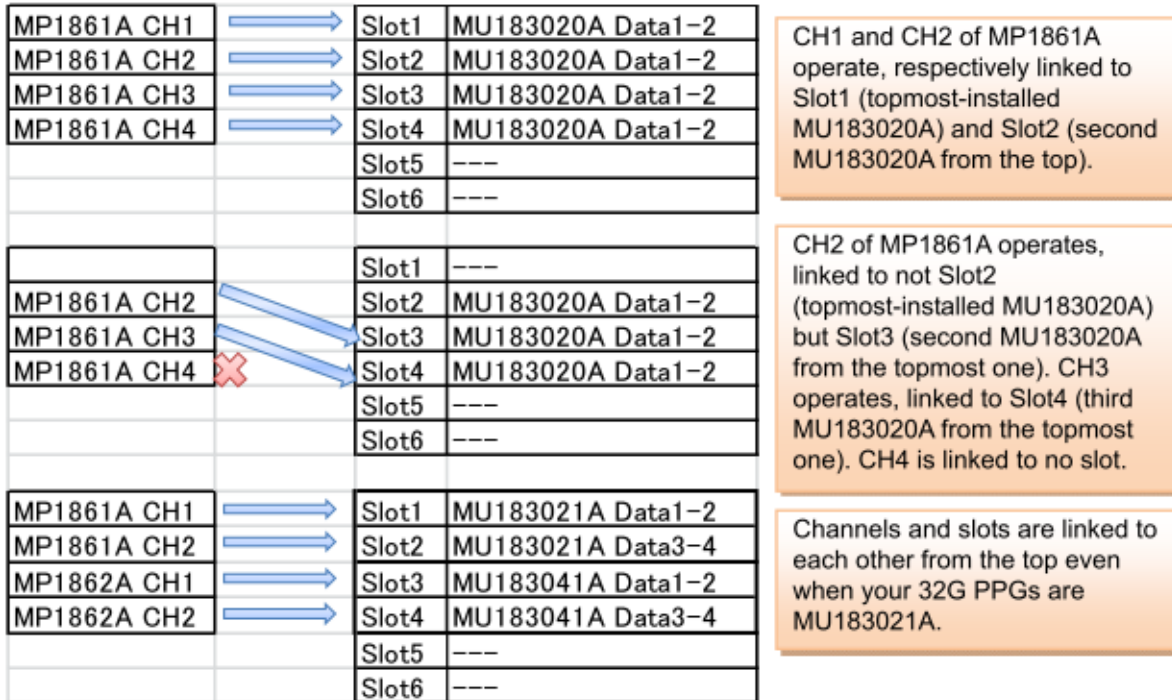
3.4.1 Combination Operation

When MP1861A and MU18302xA are installed in the same mainframe and either 2 Ch Combination or 25G x 2 Ch Combination is selected, operation of MP1861A and MU18302xA can be linked (combined). The following restrictions apply to the options and Combination setting of the MU18302xA module that can operate linked with MP1861A.

- MU183020A with the MU183020A-x22/x23 2ch Option installed
- MU18302xA with the MU18302xA-x30/x31 Delay Option installed
- The Combination setting for MU18302xA is 2ch Combination, 2ch CH Sync or 64Gx2 Combination.

In addition, the following restrictions apply to the slot position of MU18302xA that operates linked with MP1861A.

- MP1861A set to CH1 operates linked with the MU18302xA installed to the slot of the smallest slot number.
- The order of MP1861A's channel numbers always matches the slot numbers to which MU18302xAs are installed.



4. Software Versions Supported by Modules and Options

This table shows the software versions for each module and option. When adding modules and options, upgrade to the relevant software version.

Table 41: Supported Software Versions

Version	Main Frame/Module		Supported Version
	Model	Name	
8.00.00	MP1800A	Signal Quality Analyzer	From Ver. 01.00.00
	MP1800A-001	GPIB	From Ver. 01.00.00
	MP1800A-002	LAN	From Ver. 01.00.00
	MP1800A-014	2-Slot for PPG and/or ED	From Ver. 01.00.00
	MP1800A-015	4-Slot for PPG and/or ED	From Ver. 01.00.00
	MP1800A-016	6-Slot for PPG and/or ED	From Ver. 01.00.00
	MP1800A-032	32G PPG/ED Support	From Ver. 07.00.00
	MT1810A	4-Slot Chassis	From Ver. 01.00.00
	MT1810A-014	2-Slot for PPG and/or ED	From Ver. 01.00.00
	MT1810A-015	4-Slot for PPG and/or ED	From Ver. 01.00.00
	MT1810A-032	32G PPG/ED Support	From Ver. 07.00.00
	MP1861A	56G/64G bit/s MUX	from Ver. 08.00.00
	MP1861A-001	64G bit/s Extension	from Ver. 08.00.00
	MP1861A-011	Variable Data Output (0.5 to 2.5Vp-p)	from Ver. 08.00.00
	MP1861A-013	Variable Data Output (0.5 to 3.5Vp-p)	from Ver. 08.00.00
	MP1861A-030	Variable Data Delay	from Ver. 08.00.00
	MP1862A	56G/64G bit/s DEMUX	from Ver. 08.00.00
	MP1862A-001	64G bit/s Extension	from Ver. 08.00.00
	MU181000A	12.5 GHz Synthesizer	From Ver. 01.00.00
	MU181000A-001	Jitter Modulation	From Ver. 03.00.00
	MU181000B	12.5 GHz 4Port Synthesizer	From Ver. 03.00.00
	MU181000B-001	Jitter Modulation	From Ver. 03.00.00
	MU181500B	Jitter Modulation Source	From Ver. 06.00.00
	MU181800A*	12.5 GHz Clock Distributor	From Ver. 01.00.00
	MU181800B	14 GHz Clock Distributor	From Ver. 05.00.03
	MU181800B-005	14.1 GHz Extension	From Ver. 05.00.03
	MU181020A*	12.5 Gbit/s PPG	From Ver. 01.00.00
	MU181020A-001	9.8 to 12.5 Gbit/s	From Ver. 01.00.00
	MU181020A-002	0.1 to 12.5 Gbit/s	From Ver. 01.00.00
	MU181020A-010	Variable Data Output (0.05 to 0.8 Vp-p)	From Ver. 01.00.00
	MU181020A-011	Variable Data Output (0.25 to 2.5 Vp-p)	From Ver. 01.00.00
	MU181020A-012	High Performance Data Output (0.05 to 2.0 Vp-p)	From Ver. 01.00.00
	MU181020A-013	Variable Data Output (0.5 to 3.5 Vp-p)	From Ver. 04.01.00
	MU181020A-021	Differential Clock Output (0.1 to 2.0 Vp-p)	From Ver. 01.00.00
	MU181020A-030	Variable Data Delay	From Ver. 01.00.00
	MU181020B	14 Gbit/s PPG	From Ver. 05.00.03
	MU181020B-002	0.1 to 14 Gbit/s	From Ver. 05.00.03
	MU181020B-003	14.05 Gbit/s Extension	From Ver. 05.02.08
	MU181020B-011	Variable Data Output (0.25 to 2.5 Vp-p)	From Ver. 05.00.03
	MU181020B-005	14.1 Gbit/s Extension	From Ver. 05.02.08
	MU181020B-012	High Performance Data Output (0.05 to 2.0 Vp-p)	From Ver. 05.00.03
	MU181020B-013	Variable Data Output (0.5 to 3.5 Vp-p)	From Ver. 05.00.03
	MU181020B-021*	Differential Clock Output (0.1 to 2.0 Vp-p)	From Ver. 05.00.03
	MU181020B-030	Variable Data Delay	From Ver. 05.00.03
	MU181040A*	12.5 Gbit/s ED	From Ver. 01.00.00
	MU181040A-001	9.8 to 12.5 Gbit/s	From Ver. 01.00.00
	MU181040A-002	0.1 to 12.5 Gbit/s	From Ver. 01.00.00
	MU181040A-020	Clock Recovery	From Ver. 01.00.00
	MU181040A-030	Variable Clock Delay	From Ver. 01.00.00
	MU181040B	14 Gbit/s ED	From Ver. 05.00.03
MU181040B-002	0.1 to 14 Gbit/s	From Ver. 05.00.03	
MU181040B-003	14.05 Gbit/s Extension	From Ver. 05.02.08	
MU181040B-005	14.1 Gbit/s Extension	From Ver. 05.02.08	
MU181040B-020	Clock Recovery	From Ver. 05.00.03	

Table 41: Supported Software Versions (continued)

Version	Main Frame/Module		Supported Version
	Model	Name	
8.00.00	MU182020A*	25 Gbit/s 1ch MUX	From Ver. 05.00.03
	MU182020A-001	28 Gbit/s Extension	From Ver. 05.00.03
	MU182020A-002	Clock Input Band Switch	From Ver. 05.00.03
	MU182020A-003	28.1 Gbit/s Extension	From Ver. 06.00.00
	MU182020A-010	Variable Data Output (0.25 to 1.75 Vp-p)	From Ver. 05.00.03
	MU182020A-011	Variable Data Output (0.5 to 2.5 Vp-p)	From Ver. 05.00.03
	MU182020A-013	Variable Data Output (0.5 to 3.5 Vp-p)	From Ver. 05.00.03
	MU182020A-021	Variable Clock Output (0.5 to 2.0 Vp-p)	From Ver. 05.00.03
	MU182020A-030	25 Gbit/s Variable Data Delay	From Ver. 05.00.03
	MU182020A-031	28 Gbit/s Variable Data Delay	From Ver. 05.00.03
	MU182021A*	25 Gbit/s 2ch MUX	From Ver. 05.00.03
	MU182021A-001	28 Gbit/s Extension	From Ver. 05.00.03
	MU182021A-002	Clock Input Band Switch	From Ver. 05.00.03
	MU182021A-003	28.1 Gbit/s Extension	From Ver. 06.00.00
	MU182021A-010	Variable Data Output (0.25 to 1.75 Vp-p)	From Ver. 05.00.03
	MU182021A-011	Variable Data Output (0.5 to 2.5 Vp-p)	From Ver. 05.00.03
	MU182021A-013	Variable Data Output (0.5 to 3.5 Vp-p)	From Ver. 05.00.03
	MU182021A-021	Differential Clock Output (0.5 to 2.0 Vp-p)	From Ver. 05.00.03
	MU182021A-030	25 Gbit/s Variable Data Delay	From Ver. 05.00.03
	MU182021A-031	28 Gbit/s Variable Data Delay	From Ver. 05.00.03
	MU182021A-040	Emphasis Control	From Ver. 05.00.03
	MU182040A*	25 Gbit/s 1ch DEMUX	From Ver. 05.00.03
	MU182040A-001	28 Gbit/s Extension	From Ver. 05.00.03
	MU182040A-002	Clock Input Band Switch	From Ver. 05.00.03
	MU182040A-003	28.1 Gbit/s Extension	From Ver. 05.04.00
	MU182040A-030	25 GHz Variable Clock Delay	From Ver. 05.00.03
	MU182040A-031	28 GHz Variable Clock Delay	From Ver. 05.00.03
	MU182041A*	25 Gbit/s 2ch DEMUX	From Ver. 05.00.03
	MU182041A-001	28 Gbit/s Extension	From Ver. 05.00.03
	MU182041A-002	Clock Input Band Switch	From Ver. 05.00.03
	MU182041A-003	28.1 Gbit/s Extension	From Ver. 06.00.00
	MU182041A-030	25 GHz Variable Clock Delay	From Ver. 05.00.03
	MU182041A-031	28 GHz Variable Clock Delay	From Ver. 05.00.03
	MU183020A	28G/32 Gbit/s PPG	From Ver. 07.00.00
	MU183020A-001	32.1 Gbit/s Extension	From Ver. 07.00.00
	MU183020A-012	1ch 2V Data Output	From Ver. 07.00.00
	MU183020A-013	1ch 3.5V Data Output	From Ver. 07.00.00
	MU183020A-022	2ch 2V Data Output	From Ver. 07.00.00
	MU183020A-023	2ch 3.5V Data Output	From Ver. 07.00.00
	MU183020A-030	1ch Data Delay	From Ver. 07.00.00
	MU183020A-031	2ch Data Delay	From Ver. 07.00.00
	MU183021A	28G/32 Gbit/s 4ch PPG	From Ver. 07.00.00
	MU183021A-001	32.1 Gbit/s Extension	From Ver. 07.00.00
	MU183021A-012	4ch 2 V Data Output	From Ver. 07.00.00
	MU183021A-013	4ch 3.5 V Data Output	From Ver. 07.00.00
	MU183021A-030	4ch Data Delay	From Ver. 07.00.00
	MU183040A*	28G/32 Gbit/s ED	From Ver. 07.00.00
	MU183040A-001	32.1 Gbit/s Extension	From Ver. 07.00.00
	MU183040A-010	1ch ED	From Ver. 07.00.00
	MU183040A-020	2ch ED	From Ver. 07.00.00
	MU183041A*	28G/32 Gbit/s 4ch ED	From Ver. 07.00.00
	MU183041A-001	32.1 Gbit/s Extension	From Ver. 07.00.00
	MU183040B	28G/32 Gbit/s High Sensitivity ED	From Ver. 07.06.02
	MU183040B-001	32.1 Gbit/s Bit-Rate Extension	From Ver. 07.06.02
	MU183040B-010	1ch ED	From Ver. 07.06.02
	MU183040B-020	2ch ED	From Ver. 07.06.02
	MU183040B-022	2.4G to 28.1 Gbit/s Clock Recovery	From Ver. 07.08.04
	MU183040B-023	25.5G to 32.1 Gbit/s Clock Recovery	From Ver. 07.08.04
	MU183041B	28G/32 Gbit/s 4ch High Sensitivity ED	From Ver. 07.06.02
	MU183041B-001	32.1 Gbit/s Bit-Rate Extension	From Ver. 07.06.02
MU183041B-022	2.4G to 28.1 Gbit/s Clock Recovery	From Ver. 07.08.04	

	MU183041B-023	25.5G to 32.1 Gbit/s Clock Recovery	From Ver. 07.08.04
	MU181600A*	Optical Transceiver (XFP)	From Ver. 01.00.00
	MU181601A*	Optical Transceiver (SFP)	From Ver. 01.00.00
	MU181620A*	Stressed Eye Transmitter	From Ver. 04.00.00
	MU181620A-001*	1310 nm Reference	From Ver. 04.00.00
	MU181620A-002*	1550 nm Reference	From Ver. 04.00.00
	MU181620A-003*	1310/1550 nm Reference	From Ver. 04.00.00
	MU181620A-011*	1310 nm Stressed Eye	From Ver. 04.00.00
	MU181620A-012*	1550 nm Stressed Eye	From Ver. 04.00.00
	MU181620A-013*	1310/1550 nm Stressed Eye	From Ver. 04.00.00
	MU181620A-037*	FC Connector	From Ver. 04.00.00
	MU181620A-040*	SC Connector	From Ver. 04.00.00
	MU181640A*	Optical Receiver	From Ver. 04.00.00
	MU181620A-004*	Band Width 8.5 GHz	From Ver. 04.00.00
	MU181640A-037*	FC Connector	From Ver. 04.00.00
	MU181640A-040*	SC Connector	From Ver. 04.00.00
	MX180000A	Signal Quality Analyzer Control Software	From Ver. 01.00.00
	MX180000A-001	Pre-Code	From Ver. 05.02.02
	MX180000A-002	De-Code	From Ver. 05.02.02
	MX180001A	SDH/SONET Pattern Editor	From Ver. 03.00.00
	MX180002A*	Stressed Eye Measurement Control Software	From Ver. 04.00.00
	MX180003A	GbE/10 GbE Pattern Editor	From Ver. 03.00.00
	MX180004A	PON Application Software	From Ver. 03.00.00
	MX180005A	Jitter Application Software	From Ver. 03.00.00
	MX181500A	Jitter/Noise Tolerance Test Software	From Ver. 06.00.00 MX181500A Ver.2.04 or later must be used for MX180000A Ver.7.09. MX181500A Ver.2.05 or later must be used for MX180000A Ver.8.00.

*Manufacturing discontinued

5. Restrictions

Main-Frame Restrictions

- The MU182020A/21A and MU182040A/41A are supported by the MP1800A/MT1810A-015, and MP1800A-016 options.
- To support the MU183020A/21A and MU183040A/41A, the MP1800A-x32/MT1810A-x32 must be installed in the MP1800A/MT1810A.

12.5G/14G PPG/ED Restrictions

- When using programmable patterns with a PPG or ED, use the same frequency band as 0.1 to 6 Gbit/s or 6 to 14 Gbit/s bands. Do not mix the 0.1 to 6 Gbit/s and the 6 to 14 Gbit/s bands.
- When using PPGs/EDs in a multi-channel configuration with the CH Synchronization or Combination mode, select the same option configuration for each PPG/ED. If the options for each PPG/ED are different, each PPG/ED will operate independently.
- The MU181020A 12.5 Gbit/s PPG and MU181020B 14 Gbit/s PPG can be used together in the same main frame, but the CH Synchronization and Combination modes are not supported.
- The MU181040A 12.5 Gbit/s ED and MU181040B 14 Gbit/s ED can be used together, but the Combination mode is not supported.
- When using several EDs, the Eye Margin, Eye Diagram, Bathtub, Q, ISI, Capture, and Auto Search measurements can be performed serially for each ED.
- The MU181020B/40B-003 supports only independent setting when operated at 14 Gbit/s or more.

MUX Module Restrictions

- The 28G MUX modules (MU182020A/21A) are tuned at shipment to match the PPG modules (MU181020A/B) installed in the main frame. Consequently, the performance of configurations other than the factory default is not assured. However, this restriction does not apply to the 28G DEMUX modules (MU182040A/41A).
- Recalibration, including the main frame, is required when adding a new MUX module (MU182020A/21A) to a customer's existing configuration. Request factory recalibration by Anritsu.
- The unit must be returned to Anritsu for factory recalibration even when only changing the position of a module when adding a 12.5/14G ED module or a 28G DEMUX module (MU182040A/41A). Refer to Table 31, 32 and 33 for the configuration restrictions.

Jitter Modulation Source Module and Synthesizer Module Restrictions

- The SJ2 jitter generation function can be used when the MU150000B Jitter Modulation Source module is installed in a main frame with Opt-001 installed in the MU181000A/B Synthesizer module. To use SJ2 with the best accuracy, the Synthesizer and Jitter Modulation Source modules are adjusted as a pair at factory shipment. Consequently, this performance is guaranteed only for the shipped configuration.
- Customers requiring addition of a new Jitter Modulation Source module to an already shipped configuration including the Synthesizer module (with Opt-001) must return the Synthesizer module to Anritsu for combined adjustment with the new Jitter Modulation Source. Although the SJ2 function can be used without making this combined adjustment, the SJ2 jitter generation accuracy may not meet the catalog specifications.

28G/32G PPG/ED Restrictions

- The main frame with MP1800A/MT1810A-015/016 supports up to four slots for a total of 8ch. Installation is not possible if even one of the total slot number or the total channel number is exceeded, such as with six 1ch PPG boards. The total number of slots is limited to four when the MP1800A/MT1810A-016 installed.
- The main frame with MP1800A/MT1810A-014 supports up to two slots for a total of 4ch. Installation is not possible if even one of the total slot number or the total channel number is exceeded, such as with four 1ch PPG boards.
- There are restrictions when the 12.5G PPG/ED, 14G PPG/ED and 25G MUX/DEMUX are installed simultaneously. Refer to section 3.3 Simultaneous Installation of 28G/32G PPG/ED and 12.5G/14G PPG/ED Modules.
- The 2ch combination requires the 2ch PPG/ED option or 4ch PPG/ED Module. A pair of 1ch PPG/ED cannot support 2ch combination.
- The 4ch combination requires the 4ch PPG/ED module. A pair of 2ch PPG/ED cannot support 4ch combination.
- Even if the MP1800A/MT1800A-016 is installed, the maximum number of slots is four for the 32G PPG/ED. Hence, the maximum number of channels is 8.

- The following functions are not supported:
 - ISI
 - Block Windows with mixed pattern
 - Logging
 - Histogram
 - Self-test
 - Error Performance
 - Variable mark ratio with PRBS pattern (only 1/2 is supported)
- The Clock Recovery option can be installed in the MU183040B/41B but not in the MU183040A/41A.
- The MU18304xB-022 and MU18304xB-023 cannot be installed simultaneously.
- Installation of the MU18304xB-023 requires the MU18304xB-001.

Software Restrictions

- Refer to “Table 12 for the modules and supported software” and “Table 41: Supported Software Versions”.

Hot Swap on MP1825B, MP1861A, and MP1862A

- The MP1825B, MP1861A, and MP1862A connected to the MP1800A using a USB cable. However, hot swapping is not supported, so take care not to hot swap connected equipment. Read Chapter Connecting Controller in the MP1825B, MP1861A and MP1862A Operation Manual
- The MP1800A has three USB ports but this may be insufficient when using several MP1861A and MP1862A units. In this case, use a commercial USB hub.

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