



MP9677B

E/O, O/E Converter

10 Gbit/s

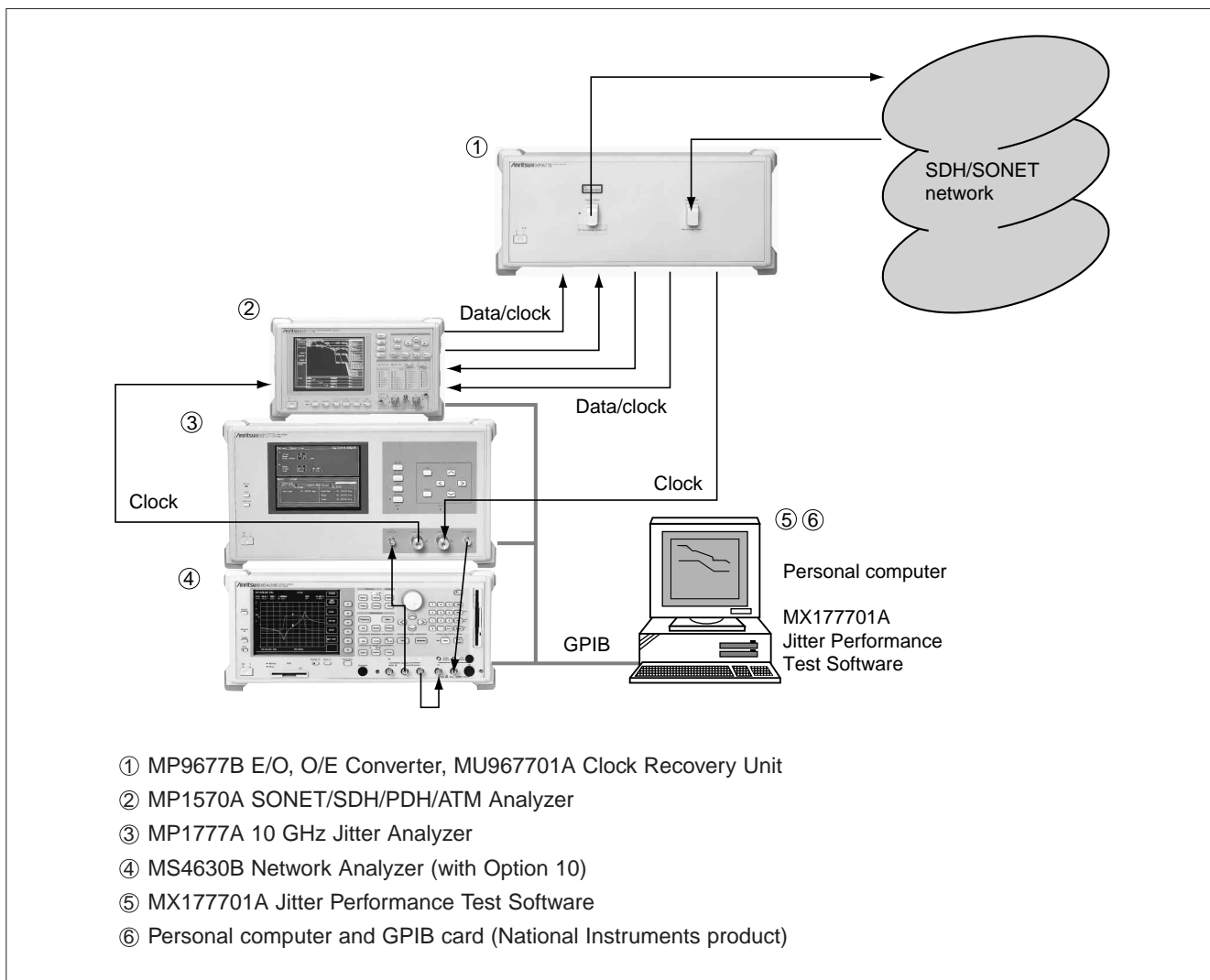


MP9677B is the 10 Gbit/s E/O and O/E converter for STM-64, OC-192 or FEC jitter evaluation and BER measurement. It has a jitter bandwidth of 80 MHz, and can measure jitter tolerance, jitter transfer, and output jitter at 10 Gbit/s optical interface when used with MP1777A. It can be also used with MP1570A.

Example of Measurement Configuration

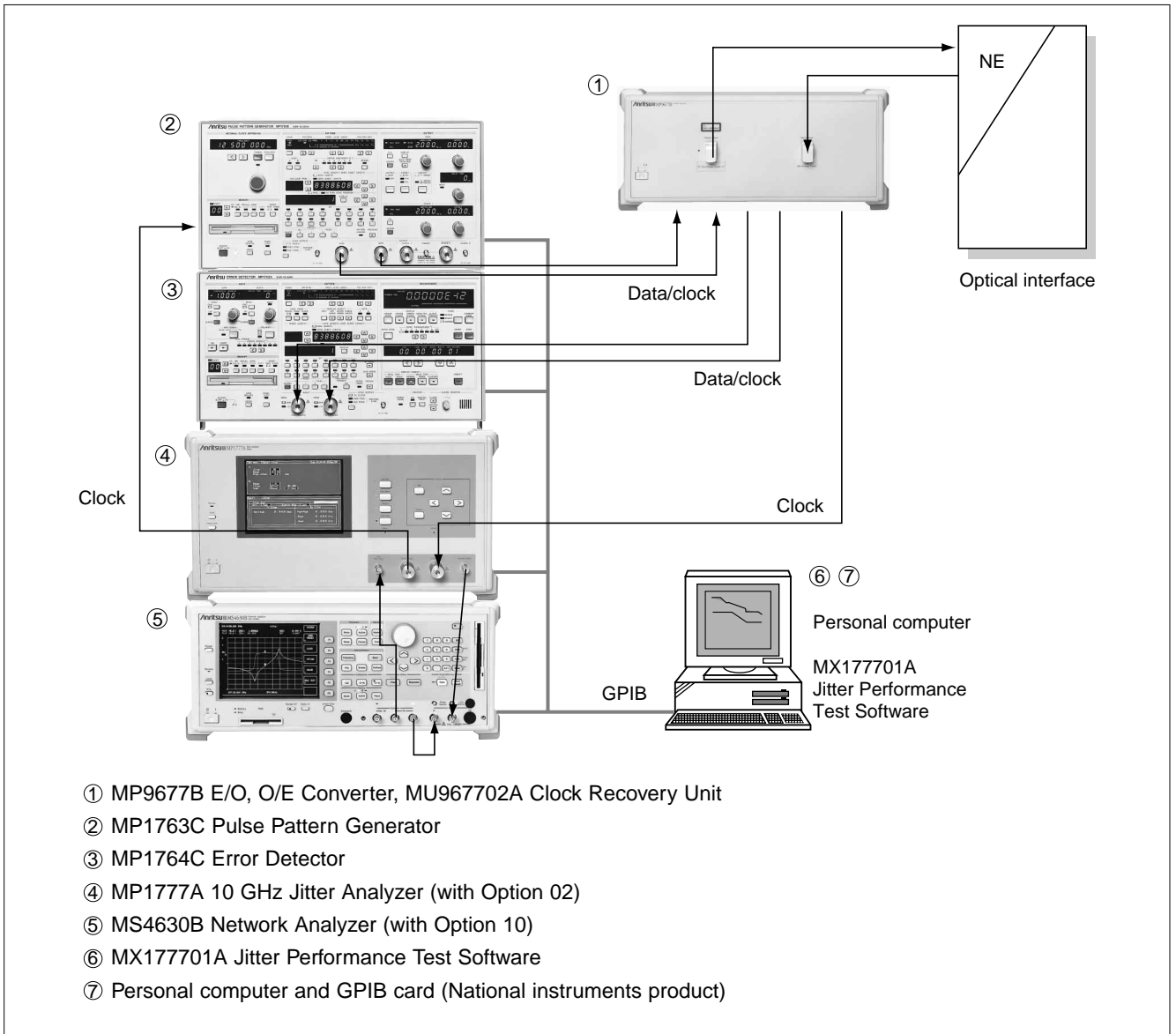
• SDH/SONET network test

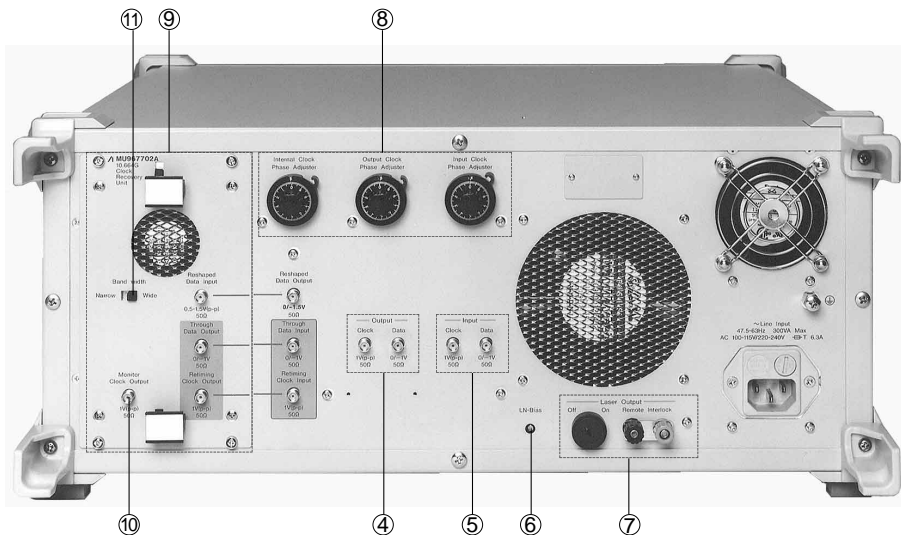
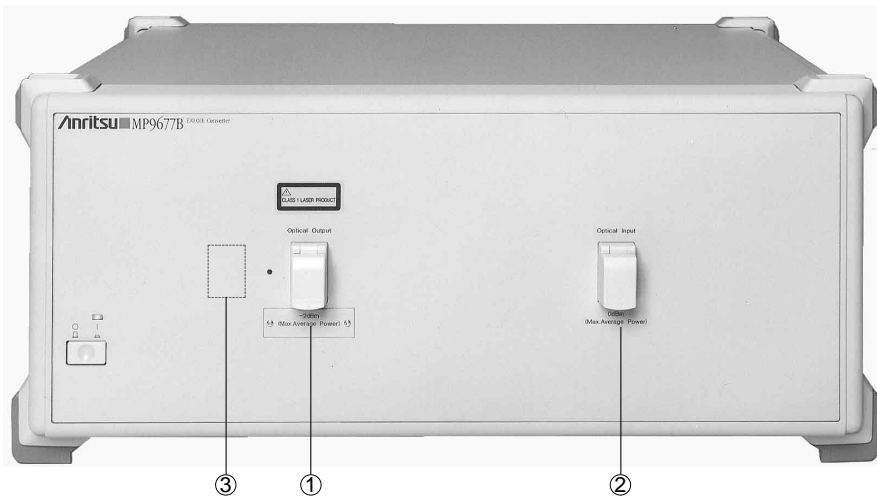
Measurements such as jitter tolerance, jitter transfer, output jitter, and BER at 9.95328 Gbit/s optical interface are available in the configuration shown in the diagram below. These measurements can be performed manually, with no need for a personal computer.



• **FEC test**

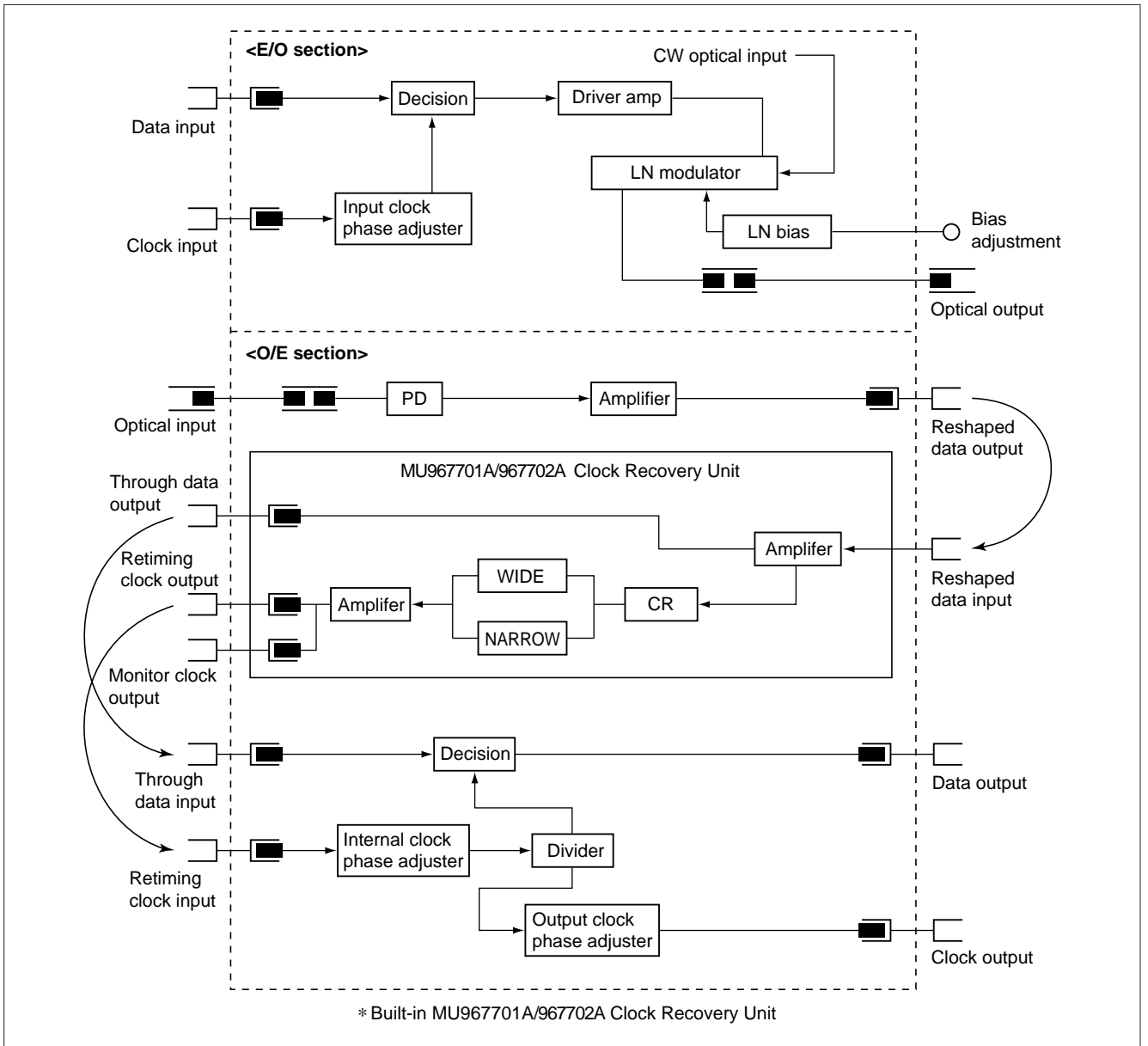
Measurements such as jitter tolerance, jitter transfer, output jitter, and error at 10.66423 Gbit/s optical interface are available in the configuration shown in the diagram below. These measurements can be performed manually, with no need for a personal computer.





- ① **Optical Output:** Optical signal output (FC-PC). Can be changed to ST, SC, or DIN connector
- ② **Optical Input:** Optical signal input (FC-PC). Can be changed to ST, SC, or DIN connector
- ③ **External Optical Input:** External optical input (option 01). Optical connector is added.
- ④ **Data/Clock Output:** Data/Clock output. Connected to the error detection equipment
- ⑤ **Data/Clock Input:** Data/Clock input. Connected to the pattern generator
- ⑥ **LN Bias:** Able to adjust the LN modulator bias
- ⑦ **Optical Output Control:** Optical output control key and remote interlock
- ⑧ **Phase Adjuster:** Phase adjuster between clock/data.
- ⑨ **Clock Recovery Unit:** Replaceable unit to recover the clock
- ⑩ **Monitor Clock Output:** Clock output connector. Connected to MP1777A
- ⑪ **Band Width:** Recovery clock switch to change jitter band width
Wide: At jitter measurement; **Narrow:** At BER measurement

Function block diagram



Specifications

• MP9677B E/O, O/E Converter

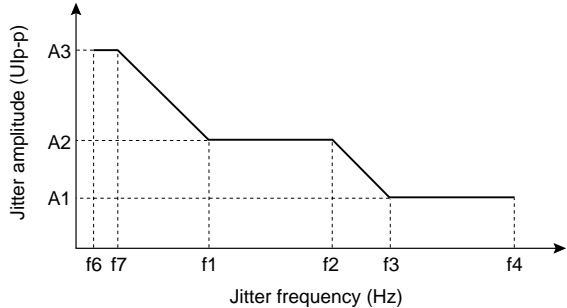
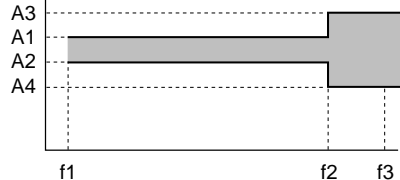
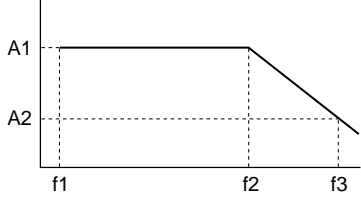
Bit rate	2.4 to 11 Gbit/s (typical)
Optical signal output	Level: $-5 \text{ dBm} \pm 3 \text{ dBm}$ (average power) Output waveform: NRZ Wavelength: $1545 \text{ nm} \pm 20 \text{ nm}$ (any one wavelength within range*1) Wavelength width: $\leq 1 \text{ nm}$ (20 dB down point) Side mode suppression ratio: $\geq 30 \text{ dB}$ Extinction ratio: $\geq 10 \text{ dB}$ Connector: FC-SPC ^{*2} (single mode fiber)
Electrical signal input	Data level: $0 \text{ V} \pm 0.3 \text{ V}(V_H)/-1 \text{ V} \pm 0.3 \text{ V}(V_L)$, 50Ω Output waveform: NRZ Clock level: $1 \text{ V}(p-p) \pm 0.3 \text{ V}$, 50Ω Connector: SMA Phase adjustable range: $\geq 100 \text{ ps}$
Optical signal input	Sensitivity Wide: -11 to -5 dBm , Narrow: -11 to -3 dBm Input waveform: NRZ Wavelength: 1480 to 1580 nm Maximum input level: 0 dBm (average power) Return loss: $\geq 20 \text{ dB}$ Connector: FC-SPC ^{*2} (single mode fiber)
Electrical signal output	Data level: $0 \text{ V} \pm 0.2 \text{ V}(V_H)/-1 \text{ V} \pm 0.2 \text{ V}(V_L)$, 50Ω Output waveform: NRZ Clock level: $1 \text{ V}(p-p) \pm 0.33 \text{ V}$, 50Ω Connector: SMA Phase adjustable range: $\geq 100 \text{ ps}$
External optical input*3 (Option 01)	Maximum input level: $+10 \text{ dBm}$ Wavelength: 1530 to 1570 nm (guaranteed range)
Others	Through data input: $0 \text{ V} \pm 0.3 \text{ V}(V_H)/-1 \text{ V} \pm 0.3 \text{ V}(V_L)$, 50Ω Retiming clock input: $1 \text{ V}(p-p) \pm 0.3 \text{ V}$, 50Ω Internal phase adjustable range: $\geq 100 \text{ ps}$ Reshaped data output: $0 \text{ V} \pm 0.2 \text{ V}(V_H)/-1.5 \text{ V} \pm 0.2 \text{ V}(V_L)$, 50Ω Connector: SMA
Dimensions and mass	$426 \text{ (W)} \times 177 \text{ (H)} \times 450 \text{ (D)} \text{ mm}$, $\leq 20 \text{ kg}$ (including clock recovery unit)
Power	AC 85 to $132 \text{ V}/170$ to 250 V (auto-switching), 47 to 63 Hz , $\leq 300 \text{ VA}$ (including clock recovery unit)
Environmental condition	Operating temperature: $+10^\circ$ to $+40^\circ \text{C}$, Storage temperature: -20° to $+60^\circ \text{C}$, Humidity: 40 to 90%

*1: When ordering, the option specified connector is supplied as standard.

*2: User replaceable

*3: Using this with the application parts' polarization rotating module is recommended.

• **MU967701A/967702A Clock Recovery Unit**

Data input	Reshaped data input Bit rate: 9.95328 Gbit/s \pm 50 ppm (MU967701A), 10.66423 Gbit/s \pm 50 ppm (MU967702A) Level: 0.5 to 1.5 V(p-p), 50 Ω Input waveform: NRZ Connector: SMA																								
Data output	Through data output Bit rate: 9.95328 Gbit/s \pm 50 ppm (MU967701A, depend on input signal), 10.66423 Gbit/s \pm 50 ppm (MU967702A, depend on input signal) Level: 0 V \pm 0.2 V(V _H)/-1 V \pm 0.2 V(V _L), 50 Ω Output waveform: NRZ Connector: SMA																								
Clock output	Retiming clock output, monitor clock output Frequency: 9.95328 GHz \pm 50 ppm (MU967701A, depend on input signal), 10.66423 GHz \pm 50 ppm (MU967702A, depend on input signal) Level: 1 V(p-p) \pm 0.2 V, 50 Ω Connector: SMA																								
Jitter tolerance*1	 <table border="1" data-bbox="443 1093 778 1153"> <tr> <td>A1</td> <td>A2</td> <td>A3</td> </tr> <tr> <td>0.2 UIp-p</td> <td>2 UIp-p</td> <td>2490 UIp-p</td> </tr> </table> <table border="1" data-bbox="443 1164 992 1225"> <tr> <td>f6 (Hz)</td> <td>f7 (Hz)</td> <td>f1 (Hz)</td> <td>f2 (Hz)</td> <td>f3 (Hz)</td> <td>f4 (Hz)</td> </tr> <tr> <td>10</td> <td>12.1</td> <td>20k</td> <td>400k</td> <td>4M</td> <td>80M</td> </tr> </table>	A1	A2	A3	0.2 UIp-p	2 UIp-p	2490 UIp-p	f6 (Hz)	f7 (Hz)	f1 (Hz)	f2 (Hz)	f3 (Hz)	f4 (Hz)	10	12.1	20k	400k	4M	80M						
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10	12.1	20k	400k	4M	80M																				
Jitter transfer characteristics	<p>Wide mode</p>  <table border="1" data-bbox="443 1460 1082 1520"> <tr> <td>A1</td> <td>A2</td> <td>A3</td> <td>A4</td> <td>f1</td> <td>f2</td> <td>f3</td> </tr> <tr> <td>1.5 dB</td> <td>-1.5 dB</td> <td>3.5 dB</td> <td>-3.5 dB</td> <td>100 Hz</td> <td>10 MHz</td> <td>80 MHz</td> </tr> </table> <p>Narrow mode</p>  <table border="1" data-bbox="443 1758 901 1818"> <tr> <td>A1</td> <td>A2</td> <td>f1</td> <td>f2</td> <td>f3</td> </tr> <tr> <td>0.1 dB</td> <td>-19.9 dB</td> <td>100 Hz</td> <td>8 MHz</td> <td>80 MHz</td> </tr> </table>	A1	A2	A3	A4	f1	f2	f3	1.5 dB	-1.5 dB	3.5 dB	-3.5 dB	100 Hz	10 MHz	80 MHz	A1	A2	f1	f2	f3	0.1 dB	-19.9 dB	100 Hz	8 MHz	80 MHz
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0.1 dB	-19.9 dB	100 Hz	8 MHz	80 MHz																					
Environmental condition	Same as MP9677B (main frame)																								

*1 MP9677B: Wide mode, -8 to -6 dBm input level, 10° to 30°C
 MU967701A: SDH internal, VC4-64c-Bulk, PRBS 2²³ -1 used with MP1570A and MU150000A
 MU967702A: PRBS 2²³ -1 used MP1763C/1764C

Ordering Information

Please specify model/order number, name, and quantity when ordering.

Model/Order No.	Name
	Main frame
MP9677B	E/O, O/E converter
MU967701A	Clock Recovery Unit (9.95328 Gbit/s)
MU967702A	Clock Recovery Unit (10.66423 Gbit/s)
	Standard accessories
	AC power cord: 1 pc
F0014	Fuse, 6.3 A: 2 pcs
J0900E	Coaxial cord: 4 pcs
W1765AE	MP9677B operation manual: 1 copy
W1710AE	MU967701A operation manual (supplied to MU967701A): 1 copy
W1761AE	MU967702A operation manual (supplied to MU967702A): 1 copy
B0329C	Front cover: 1 pc
E0008A	Optical output control key: 2 pcs
J0995	U link (for connection with MU967701A or MU967702A): 3 pcs
	Options
MP9677B-01	External optical input function (external light source usable)
MP9677B-10	E/O converter minus option
MP9677B-38	ST connector
MP9677B-39	DIN connector
MP9677B-40	SC connector
MP9677B-43	HMS-10/A connector

Model/Order No.	Name
	Peripheral instruments
MP1777A	10 GHz Jitter Analyzer
MS4630B	Network analyzer (10 Hz to 300 MHz, with Option 10)
MP1763C	Pulse Pattern Generator (12.5 Gbit/s)
MP1764C	Error Detector (12.5 Gbit/s)
MP1570A	SONET/SDH/PDH/ATM Analyzer (with MU150000A)
	Application parts
J0796A	ST connector (user replaceable, with protective cap, 1 set)
J0796B	DIN connector (user replaceable, with protective cap, 1 set)
J0796C	SC connector (user replaceable, with protective cap, 1 set)
J0796D	HMS-10/A connector (user replaceable, with protective cap, 1 set)
J0796E	FC connector (user replaceable, with protective cap, 1 set)
Z0478	Polarization rotating module (for MP9677B-01)
J0747A	Fixed optical attenuator (5 dB)
J0635B	SM optical fiber cord (both-ends FC-SPC connector), 2 m



Specifications are subject to change without notice.

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