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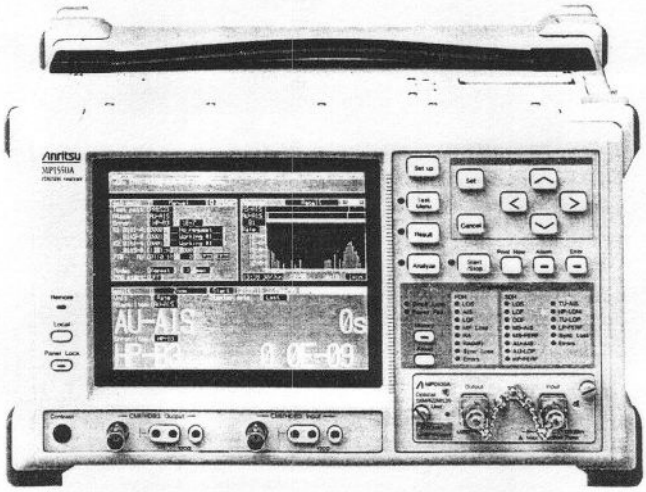
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PDH/SDH ANALYZER
MP1550A/B
PDH: 2/8/34/139 Mb/s, SDH: 156/622 Mb/s



Custom-made product

CE GPIB OPTION

The MP1550A/B is a small PDH/SDH analyzer. Despite its size, it has all the measurement functions necessary for evaluating PDH/SDH systems, like bit errors, alarms, pointers, performance, jitter, and wander. It can be carried easily by hand and is ideal for pre-shipment inspection on production lines, connecting tests at construction sites, acceptance tests, periodic maintenance, and other tasks.

Features
- All PDH/SDH system tests
- Large, easy-to-read color LCD (MP1550A)
- Built-in printer and floppy disk drive (standard)
- In-service and out-of-service measurement
- Simultaneous error and alarm measurements at multi layer
- Trouble-search functions

Specifications
• MP1550A/B PDH/SDH Analyzer

PDH	Bit rate	2.048, 8.448, 34.368, 139.264 Mb/s
	Level/waveform	Conforms to ITU-T G.703 (with 20 dB monitoring points)
	Connector	BNC, 75 Ω unbalanced, 3-pin Siemens 120 Ω balanced 2.048 Mb/s: HDB3 balanced/unbalanced 8.448, 34.368 Mb/s: HDB3 unbalanced 139.264 Mb/s: CMI unbalanced
	Clock	Internal (accuracy: ±7 ppm), external (ECL [AC] 50 Ω), receive
	Auxiliary interface	Clock sync output, frame sync output
	Frame format	Unframed: 2, 8, 34, 139 Mb/s Framed: 2 Mb/s (30, 31 ch with or without CRC4) [G.704], 8 Mb/s [G.742], 34 Mb/s [G.751], 139 Mb/s [G.751], MUX/DEMUX function (option)
	Test pattern	PRBS: $2^{11}-1$, $2^{15}-1$, $2^{20}-1$, $2^{23}-1$ (O.151) Word: 16 bit program, all 0, all 1
	Error addition	Bit all, bit info, code, Ebit, FAS Timing: Single, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6}, 10^{-7}, 10^{-8}, 10^{-9}, all FAS: n in 16 (n: 1 to 4), all
	Alarm addition	LOS, AIS, RA, RA (MF), Timing: all
	Measurement	Mode: Single, repeat, manual In-service Error: Frame, code, CRC-4, Ebit Alarm: Power fail, LOS, AIS, LOF, MF loss, RA, RA (MF) Performance: G.821 (including ANNEX. D), M.2100, G.826 Out-of-service Error: Frame, code, CRC-4, Ebit, bit Alarm: Power fail, LOS, AIS, LOF, MF loss, RA, RA (MF), sync loss Performance: G.821 (including ANNEX. D), M.2100, G.826
	LED	LOS, AIS, LOF, MF loss, RA, RA (MF), sync loss, errors
	Monitor	Frame word (FAS)

Continued on next page

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SDH	Bit rate	155.520, 622.080 Mb/s
	Clock	Internal (accuracy: ±3.5 ppm), lock (2 M), external (ECL [AC] 50 Ω), receive
	Auxiliary interface	Clock sync output, frame sync output, DCC interface (V.11)
	Multiplexing structure	See Fig. 1
	Through	Loop-through with bit-error insertion
	Test pattern	PRBS: $2^{11}-1$, $2^{15}-1$, $2^{20}-1$, $2^{23}-1$ (O.151) Word: 16 bit program, all 0, all 1
	Error addition	Bit all, bit info. B1, B2, B3, BIP-2, MS-FEBE, HP-FEBE, LP-FEBE Timing: Single, 10^{-3}, 10^{-4}, 10^{-5}, 10^{-6}, 10^{-7}, 10^{-8}, 10^{-9}, all
	Alarm addition	LOS, LOF, MS-AIS, MS-FERF, AU-AIS, AU-LOP, HP-FERF, TU-AIS, TU-LOP, HP-LOM, LP-FERF Timing: All
	OH preset data	SOH, VC3/VC4 POH, VC1 POH, K1/K2, pointer, path trace
	Measurement	Mode: Single, repeat, manual In-service Error: B1, B2, B3, BIP-2, MS-FEBE, HP-FEBE, LP-FEBE Alarm: Power fail, LOS, LOF, OOF, MS-AIS, MS-FERF, AU-AIS, AU-LOP, HP-FERF, TU-AIS, HP-LOM, TU-LOP, LP-FERF Performance: G.826 Out-of-service Error: B1, B2, B3, BIP-2, MS-FEBE, HP-FEBE, LP-FEBE, bit Alarm: Power fail, LOS, LOF, OOF, MS-AIS, MS-FERF, AU-AIS, AU-LOP, HP-FERF, TU-AIS, HP-LOM, TU-LOP, LP-FERF, sync loss Performance: G.826
	LED	LOS, LOF, OOF, MS-AIS, MS-FERF, AU-AIS, AU-LOP, HP-FERF, TU-AIS, HP-LOM, LP-FERF, sync loss, errors
	Justification	AU-PTR, TU-PTR, C, C1/C2 Measurement: NDF, +PJC, –PJC, 3 times consecutively
	Monitor	SOH, VC3/VC4 POH, VC1 POH, K1/K2, pointer, path trace
	Pointer sequence	Single of opposite polarity, double of opposite polarity, regular with double, regular with missing (G.783)
PDH, SDH	Trouble search	Search the all channels errors/alarms automatically, and results are displayed every channel
	Delay measurement	0 to 10.00 s
	Graphics	Error/alarm, Bar resolution: 1, 15, 60 min
	Printer	Internal (built-in)/external
	Internal memory	10 setup memories: 15 graphic memories
	Others	FDD (standard), RS-232C (Option 03), GPIB (Option 04), buzzer, real time clock
	General	Dimensions: 320 (W) x 177 (H) x 215 (D) mm Mass: approx. 8.5 kg (without options) Power supply: 85 to 132 Vac or 170 to 250 Vac, 47.5 to 63 Hz, ≤300 VA Temperature: 0° to 50° (operating, except FDD operating), –20° to 60°C (storage) EMC*1: EN55011 (1991, Group 1, Class A), EN50082-1 (1992) Safety: EN61010-1: 1993 (Installation Category II, Pollution Degree II)

*1: Electromagnetic compatibility

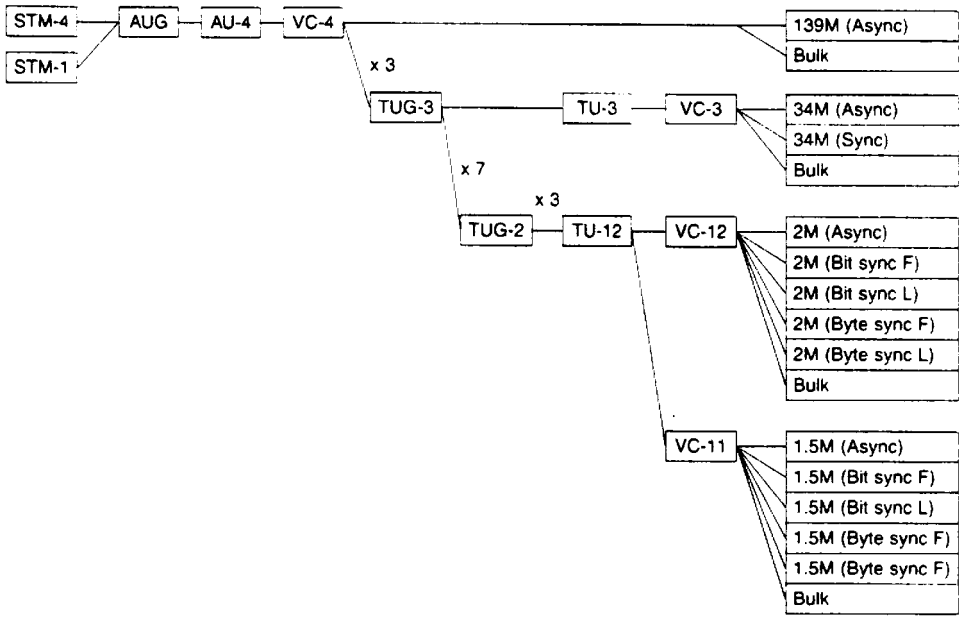
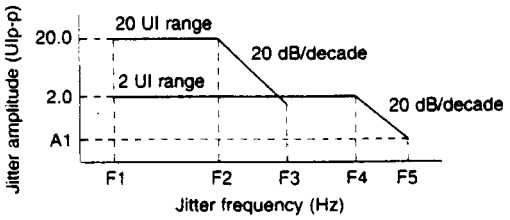


Fig. 1 Multiplexing structure

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• Jitter (Tx)/frequency offset (Option 06)

Bit rate	2.048, 8.448, 34.368, 139.264, 155.520, 622.080 Mb/s
Jitter generation	Conforms to ITU-T O.171 Frequency: 2 Hz to 6 MHz Amplitude: 0 to 20.00 UIp-p Resolution: 0.001 UIp-p (2 UI range), 0.01 UIp-p (20 UI range)



Bit rate (Mb/s)	A1 (UIp-p)	F1 (Hz)	F2*1(kHz)	F3*1(kHz)	F4*1(kHz)	F5*1(MHz)
2.048	0.5	2	1	20	27.5	0.11
8.448	0.5	2	2	20	105	0.42
34.368	0.5	2	5	100	250	1
139.264	0.5	2	5	100	1000	4
155.520	0.5	2	6.5	500	150	1.5
622.080	0.5	2	25	500	600	6

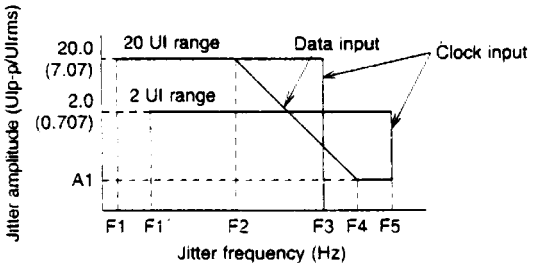
Accuracy: ±5% ±0.05 UIp-p at 1kHz (2 UI range), ±5% ±0.3 UIp-p at 1 kHz (20 UI range)
Frequency response error referring to error at 1 kHz:
±5% (2 to 20 Hz), ±2% (20 Hz to 300 kHz), ±3% (300 kHz to 1 MHz), ±5% (1 to 3 MHz), ±10% (3 to 6 MHz)

Auxiliary interface	Ext modulation/10M input, jitter reference clock output (ECL [AC] 50 Ω)
Jitter tolerance	Conforms to ITU-T G.823, G.825, G.958 Display: Numerical or graphical
Frequency offset	Range: ±999 ppm (1 ppm steps), Accuracy: ±1 ppm

*1: Typical value (typical values are given for reference only to assist in the use of this instrument, and are not guaranteed specifications.)

• Jitter (Rx) (Option 07)

Bit rate	2.048, 8.448, 34.368, 139.264, 155.520, 622.080 Mb/s
Jitter measurement	Conforms to ITU-T O.171 Frequency: 2 Hz to 5 MHz Amplitude: 0 to 20.00 UIp-p, 0 to 7.07 UIrms Resolution: 0.001 UIp-p/0.001 UIrms (2 UI range), 0.01 UIp-p/0.01 UIrms (20 UI range)



Bit rate (Mb/s)	A1 (UIp-p)	F1 (Hz)	F1' (Hz)	F2*1(kHz)	F3*1(kHz)	F4*1(MHz)	F5*1(MHz)
2.048	0.5	2	20	0.45	–	25	0.1
8.448	0.5	2	20	0.2	–	100	0.4
34.368	0.5	2	20	0.5	–	500	0.8
139.264	0.5	2	20	0.25	–	1000	3.5
155.520	0.5	2	20	0.7	500	500	1.3
622.080	0.5	2	20	20	500	2000	5

[UIp-p]
Accuracy: ±5% ±0.01 UIp-p ±X UIp-p at 1 kHz (2 UI range), ±5% ±0.1 UIp-p ±X UIp-p at 1 kHz (20 UI range)
X: 0.025 UIp-p/2 and 8 Mb/s, 0.055 UIp-p/34 Mb/s, 0.085 UIp-p/139 and 156 Mb/sE, 0.13 UIp-p/156 and 622 Mb/sO (+10° to +40°C), 0.25 UIp-p/156 MHz clock, 0.04 UIp-p/622 MHz clock (2 UI range); 0.12 UIp-p/2, 8 and 34 Mb/s, 0.2 UIp-p/139 and 156 Mb/sE, 0.2 UIp-p/156 and 622 Mb/sO (+10° to + 40°C), 0.1 UIp-p/156 and 622 MHz clock (20 UI range)
Additional 0.01 UIp-p/dB at 156 Mb/sO with input levels <–25 dBm
Additional 0.01 UIp-p/dB at 622 Mb/sO with input levels <–20 dBm
[UIrms]
Accuracy: ±5% ±0.002 UIrms ±Y UIrms at 1 kHz (2 UI range), ±5% ±0.02 UIrms ±Y UIrms at 1 kHz (20 UI range)
Y: 0.004 UIrms/2 and 8 Mb/s, 0.015 UIrms/34 Mb/s, 0.02 UIrms/139 and 156 Mb/sE, 0.03 UIrms/156 and 622 Mb/sO (+10° to +40°C), 0.015 UIrms/156 MHz clock, 0.025 UIrms/622 MHz clock (2 UI range); 0.02 UIrms/2, 8 and 34 Mb/s, 0.04 UIrms/139 and 156 Mb/sE, 0.06 UIrms/156 and 622 Mb/sO (+10° to + 40°C), 0.03 UIrms/156 MHz clock, 0.05 UIrms/622 MHz clock (20 UI range)
Additional 0.002 UIrms/dB at 156 Mb/sO with input levels <–25 dBm
Additional 0.002 UIrms/dB at 622 Mb/sO with input levels <–20 dBm
Frequency response error referring to error at 1 kHz:
±5% (2 to 20 Hz), ±2% (20 Hz to 300 kHz), ±3% (300 kHz to 1 MHz), ±5% (1 to 3 MHz), 10% (3 to 5 MHz)

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Jitter measurement	Filters Bit rate (Mb/s) / HP1 (Hz) / HP2 (kHz) / HP2' (kHz) / HP (kHz) / LP (MHz) 2.048 / 20 / 18 / 0.7 / 12 / 0.1 8.448 / 20 / 3 / 80 / 12 / 0.4 34.368 / 100 / 10 / – / 12 / 0.8 139.264 / 200 / 10 / – / 12 / 3.5 155.520 / 500 / 65 / – / 12 / 1.3 622.080 / 1000 / 250 / – / 12 / 5
Auxiliary interface	Jitter demodulation output, jitter reference clock input (ECL [AC] 50 Ω)
Hit measurement	Display: Hit count, hit second, %hit-free second
Jitter transfer	Conforms to ITU-T G.823, G.825 Display: Numerical or graphical

*1: Typical value (typical values are given for reference only to assist in the use of this instrument, and are not guaranteed specifications.)

• Jitter (Rx)/2M Wander (Option 08)

Wander measurement	2.048 Mb/s Reference input: Clock or HDB3 (unbalanced) Measurement range: p-p: 0.0 to 2E8 ns, +p/–p: 0.0 to 1E8 ns, TIE: 0.0 to ±1E8 ns
Jitter (Rx)	Same as Option 07

• Built-in CMI (156M) (Option 10)

The specifications are the same as the MP0105A CMI Unit.

• MP0104A Optical 156M (1.31) Unit

Transmit	155.520 Mb/s (NRZ) Wavelength: 1310 nm Power: –15 to –8 dBm IEC825-1: CLASS 1 LASER PRODUCT Connector: FC-PC (SM-F)
Receive	155.520 Mb/s (NRZ) Sensitivity: –34 to –8 dBm (with test pattern: PRBS 2^{23}–1 at BER of 10^{-10}) Connector: FC-PC (GI-F)

• MP0109A Optical 156M/622M (1.31) Unit

Transmit	155.520, 622.080 Mb/s (NRZ) Wavelength: 1310 nm Power: –15 to –8 dBm IEC825-1: CLASS 1 LASER PRODUCT, 21 CFR 1040.10: CLASS 1 LASER PRODUCT Connector: FC-PC (SM-F)
Receive	155.520, 622.080 Mb/s (NRZ) Sensitivity 156M: –33 to –8 dBm (with test pattern: PRBS 2^{23}–1 at BER of 10^{-10}, +10° to +40°C) 622M: –28 to –8 dBm (with test pattern: PRBS 2^{23}–1 at BER of 10^{-10}, +10° to +40°C) Connector: FC-PC (SM-F)

• MP0105A CMI Unit

Transmit	155.520 Mb/s Level: 1±0.1 V Connector: BNC, 75 Ω
Receive	155.520 Mb/s Level: 1±0.1 V (with 0 to 12 dB automatic $\sqrt{f}$ equalization and 20 dB additional gain) Connector: BNC, 75 Ω

• MP0110A Optical 156M/622M (1.55) Unit

Transmit	155.520, 622.080 Mb/s (NRZ) Wavelength: 1550 nm Power: –5 to –1 dBm IEC825-1: CLASS 1 LASER PRODUCT, 21 CFR 1040.10: CLASS 1 LASER PRODUCT Connector: FC-PC (SM-F)
Receive	155.520, 622.080 Mb/s (NRZ) Sensitivity 156M: –33 to –8 dBm (with test pattern: PRBS 2^{23}–1 at BER of 10^{-10}, +10° to +40°C) 622M: –28 to –8 dBm (with test pattern: PRBS 2^{23}–1 at BER of 10^{-10}, +10° to +40°C) Connector: FC-PC (SM-F)

• MP0108A NRZ Unit

Transmit	155.520, 622.080 Mb/s Level: ECL Connector Clock: SMA (50 Ω), Data: SMA (50 Ω)
Receive	155.520, 622.080 Mb/s Level: ECL (–2 V) Connector: SMA (Clock, 50 Ω), SMA (Data, 50 Ω)

Ordering information

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

Model/Order No.	Name	
	Main Frame	
MP1550A	PDH/SDH Analyzer (color display)	
MP1550B	PDH/SDH Analyzer (monochrome display)	
	Standard accessories	
J0670A	AC power cord (for 200 Vac mains):	1 pc
J0017	AC power cord, 2.5 m (for 100 Vac mains)	1 pc
Z0169	Thermal paper for printer (5 rolls/pack):	1 pack
F0012	Fuse, 3.15A (for 200 Vac mains):	2 pcs
F0014	Fuse, 6.3A (for 100 Vac mains):	2 pcs
B0329G	Protective cover:	1 pc
W0933AE	MP1550A/B operation manual:	1 copy
W0934AE	MP1550A/B remote control operation manual:	1 copy
W1000AE	MP1550A/B option 06/07/08 operation manual:	1 copy
	Units	
MP0104A	Optical 156M (1.31) Unit (cannot be done jitter measurement with this unit even when Option 07 or 08 is installed)	
MP0105A	CMI Unit	
MP0108A	NRZ Unit	
MP0109A	Optical 156M/622M (1.31) Unit	
MP0110A	Optical 156M/622M (1.55) Unit	
	Options	
Option 01	MUX/DEMUX (add PDH MUX/DEMUX functions)	
Option 03	RS-232C	
Option 04	GPIB	
Option 06	Jitter (Tx)/frequency offset	
Option 07	Jitter (Rx, Option 07 cannot be upgraded to Option 08)	
Option 08	Jitter (Rx)/2M wander	
Option 10	Built-in CMI (156M)	
MP0109A/0110A-38	ST connector (replaceable)	
MP0109A/0110A-39	DIN connector (replaceable)	
MP0109A/0110A-40	SC connector (replaceable)	
MP0109A/0110A-43	HMS-10/A connector (replaceable)	
	Application equipment	
MP1656A	Portable STM-16 Analyzer	
	Optional accessories	
MZ8012A	Connector Cleaning Set (for MP0109A/0110A)	
J0162A	Balanced cord, M-3192•–•M-3192, 1 m	
J0162B	Balanced cord, M-3192•–•M-3192, 2 m	
J0775D	Coaxial cord, BNC-P620•3C-2WS•BNC-P620, 2 m (75 Ω)	
J0776D	Coaxial cord, BNC-P-3W•3D-2W•BNC-P-3W, 2 m (50 Ω)	
J0635B	Optical fiber cord, 2 m (for SM, both ends with FC-SPC connector)	
J0322B	Coaxial cord, 11SMA•SUCOFLEX104•11SMA, 1 m	
J0008	GPIB cable, 2 m	
B0368A	Shoulder bag	
B0369A	Carrying case	
B0370A	Soft case	
W0933BE	MP1550A/B service manual	
J0056B	Optical fiber cord, 2 m (for SM, both ends with FC connector)	

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