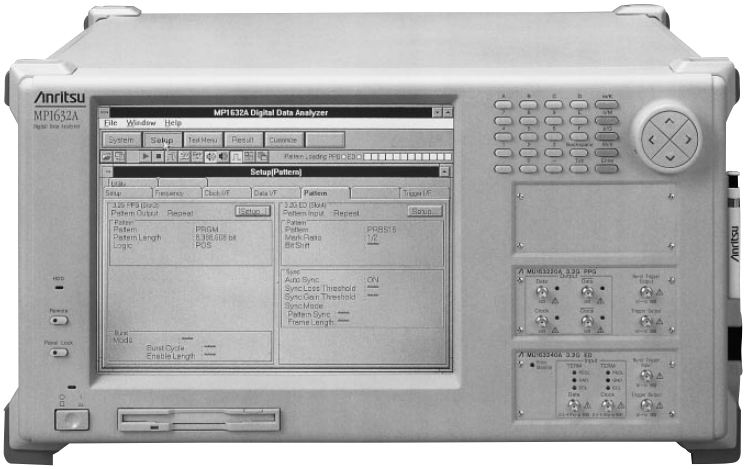
DIGITAL DATA ANALYZER
MP1632A
50 MHz to 3.2 GHz

NEW



CE GPIB OPTION

Core networks and computer networks are becoming increasingly rapid as the volume of data transmitted in this multimedia data is growing. In addition to the STM-16/OC-48 (2.488 Gbit/s), Fibre channel, Giga-bit Ethernet, etc. are being commercialized. Compact and low-cost BERTSs (Bit Error Rate Test Sets) are required for production inspections of all kinds of transfer devices, optical modules, and logic devices.

The MP1632A realizes a compact and low-cost solution that incorporates existing measuring equipment (MP1652A Pulse Pattern Generator and MP1653A Error Detector) into one cabinet.

Features

- 3.2 Gb/s PPG and ED in one cabinet
- Eye diagram measurement and burst signal measurement supported

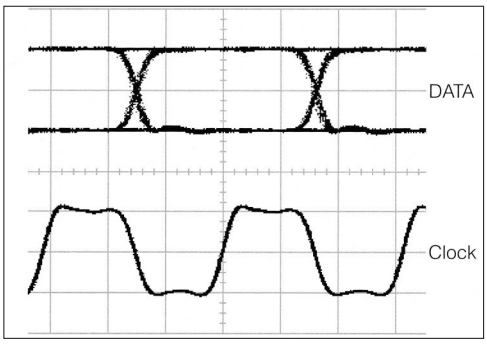
Performance and functions

- **Easy to view, superb operability**

The MP1632A comes with a large, color LCD with touch screen. Moreover, it employs the Microsoft Windows® operating system version 3.1. In addition to the graphic display of measurement results, customized screens enable one-key and one-parameter operation.

- **High-quality pulse pattern generator**

Programmable patterns of 8 Mb max, PRBS patterns [$(2^7 - 1)$ to $(2^{31} - 1)$, variable mark ratio], and zero substitution patterns can be generated. Moreover, variable cross-point of data output waveform is also supported.



H: 100 ps/div, V: 1 V/div
MU163220A output waveform (3.2 GHz)

- **Error detector with many functions**

High input sensitivity (25 mVp-p*) and wide phase margin (250 ps*) performance is provided. Phase margin and threshold margin can be measured using various error rates. Eye diagram display is also supported. Moreover, the autosearch function enables PRBS pattern search in addition to ordinary phase and threshold search.

*Typical values at 3 Gb/s, PRBS $2^{23} - 1$

- **Internal synthesizer with high signal purity (Option)**

Generates highly pure signals with SSB phase noise characteristics of –85 dBc/Hz or less (10 kHz offset).

- **Support of various applications**

Testing of SDH/SONET (STM-0, 1, 4, 16/OC-1, 3, 12, 48) devices and modules, research and development on WDM components, Fibre channels, Giga-bit Ethernet, evaluation of E/O and O/E module, GaAs IC, and high-speed ASIC/FPGAs

Specifications

• MU163220A 3.2G Pulse Pattern Generator

Operating frequency	10 MHz to 3.2 GHz
External clock input	0.5 to 2 Vp-p
Generation pattern	Pseudo random pattern (PRBS) Pattern length: $2^n - 1$ (n: 7, 9, 11, 15, 20, 23, 31) Mark ratio: 1/2, 1/4, 1/8, 0/8, $\overline{1/2}$, 3/4, 7/8, 8/8 AND bit shift upon mark ratio setting: 1, 3 bits Data pattern Data length: 2 to 8,338,608 bits Zero substitution pattern Continuous 0 bit length: 1 to (pattern length – 1) bits Pattern length: 2^n (n: 7, 9, 11, 15) Error insertion Error ratio: 10^{-n} (n: 3, 4, 5, 6, 7, 8, 9), single error External error input: Provided
Data output	Number of outputs: 2 (DATA/$\overline{\text{DATA}}$, independent) Amplitude: 0.5 to 2 Vp-p (10 mV steps) Offset voltage V_{OH}: –2 to +2 V (5 mV steps) Display: V_{OH}, V_{TH}, and V_{OL} selectable Rise/fall time: ≤80 ps (10% to 90% of amplitude) Pattern jitter: ≤30 psp-p Waveform distortion: 10% or 0.1 V of amplitude, whichever is greater Load impedance: 50 Ω (with back termination) Connector: SMA DATA/$\overline{\text{DATA}}$ tracking: $\overline{\text{DATA}}$ amplitude and offset voltage can be set to same value as DATA. Crosspoint adjustment function: Provided
Clock output	Number of output: 2 (CLOCK/$\overline{\text{CLOCK}}$, independent) Amplitude: 0.5 to 2 Vp-p (10 mV steps) Offset voltage V_{OH} : –2 to +2 V (5 mV steps) Display: V_{OH}, V_{TH}, and V_{OL} selectable Rise/fall time: ≤80 ps (10% to 90% of amplitude) Load impedance: 50 Ω (with back termination) Connector: SMA Clock delay: –1 to +1 ns (2 ps steps)
External burst trigger input	Input level: 0/–1 V, connector: SMA
Internal burst signal	Burst cycle: 2 µs to 50 ms (1 µs steps); Enable length: 1 µs to 49.999 ms (1 µs steps)
Burst trigger output	Output level: 0/–1 V, connector: SMA
Sync signal output	Number of outputs: 1 (1/8 clock, variable pattern synchronization output selectable) Output level: 0/–1 V Connector: SMA
Operating temperature	+5 to +45˚C
Power	≤200 VA
Dimensions and mass	232 (W) x 49 (H) x 449 (D) mm, ≤4.5 kg

• MU163240A 3.2G Error Detector

Operating frequency	10 MHz to 3.2 GHz
Data input	Input waveform: NRZ Input voltage: 0.5 to 4 Vp-p Variable threshold voltage: –4 to +4 V (1 mV steps) Termination: Connected to GND, –2 V or +3 V via 50 Ω Connector: SMA
Clock input	Input waveform: Square wave (<0.5 GHz), square wave or sine wave (≥0.5 GHz), duty: 50% Input amplitude: 0.5 to 4 Vp-p Variable input delay: –1 to +1 ns (2 ps steps) Polarity inversion: POS/NEG inversion selectable Termination: Connected to GND, –2 V or +3 V via 50 Ω Connector: SMA
Auto search function	Phase, threshold, PRBS pattern
Receive pattern	Pseudo random pattern (PRBS) Pattern length: $2^n - 1$ (n: 7, 9, 11, 15, 20, 23, 31) Marker ratio: 1/2, 1/4, 1/8, 0/8, $\overline{1/2}$, 3/4, 7/8, 8/8 AND bit shift upon marker ratio setting: 1, 3 bits Data pattern Data length: 2 to 8,338,608 bits Zero substitution pattern Continuous 0 bit length: 1 to (pattern length – 1) bits Pattern length: 2^n (n: 7, 9, 11, 15)
Sync mode	Normal, frame
Sync threshold	AUTO or 10^{-n} (n: 2, 3, 4, 5, 6, 7, 8)
Error detection mode	Omission, insertion, total

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Measurement items	Error rate: 0.0000 x 10^{-16} to 1.0000 x 10^{-0} Number of errors: 0 to 9.9999 x 10^{16} Error interval (async): 0 to 9999999 (Interval: 100 ms, 1 s) Error free interval (EFI): 0.0000 to 100.0000% Clock frequency: 0.01 to 3.2 GHz (resolution: 1 Hz, accuracy: 10 ppm ±1 kHz)
Eye margin measurement function	Provided
Error performance calculation function	Provided
Measurement channel mask	1 to 8 channels, each channel settable independently
Error output	Number of output: 1 (1/8 bit rate OR error), Output level: 0/–1; Connector: SMA
Sync signal output	Number of outputs: 1 (switchable among 1/8 clock, fixed pattern sync, sync gain output) Output level: 0/–1 V; Connector: SMA
Burst trigger input	Input level: 0/–1 V, connector: SMA
Operating temperature	+5˚ to +45˚C
Power	≤250 VA
Dimensions and mass	232 (W) x 49 (H) x 449 (D) mm, ≤4.5 kg

- **MP1632A (Main frame)**

System environment	OS: Microsoft Windows® operating system Version 3.1 Display: 10.4 inch, color LCD (touch screen), 640 x 480 dots, 256 colors Printer: Parallel port for external printer (D-sub, 25-pins) Keyboard: 101 type (English), PS/2 (mini DIN 6-pin connector) Mouse: Serial, PS/2 (mini DIN, 6-pin connector) FDD: 2 modes (1.44 MB, 740 KB) HDD C drive: ≥474 KB (used for system: measurement data, pattern) D drive: ≥30 MB (not accessible to users, interface: IDE)
Remote control	RS-232C (standard), GPIB (option): IEEE488.2, Ethernet (option): 10 Base-T
EMC	EN55011: 1991, Group 1, Class A EN50082-1: 1992 Harmonic current emissions: EN61000-3-2 (1995)
Safety	EN61010-1: 1993 (Installation Category Ⅱ, Pollution Degree Ⅱ)
Power supply	100 to 120 Vac/200 to 240 Vac, 47.5 to 63 Hz, ≤150 VA
Operating temperature	+5˚ to +45˚C
Dimensions and mass	426 (W) x 221.5 (H) x 451(D) mm, ≤20 kg

- **3.2G Internal Synthesizer (Option 03)**

Frequency range	50 MHz to 3.2 GHz (1 kHz steps)
Frequency accuracy	±2 ppm
SSB phase noise	≤–85 dBc/Hz (10 kHz offset, 1 kHz bandwidth)
Non-harmonic spurious	≤–60 dBc (limited to spurious 10 kHz or more distant from carrier frequency)
Power	≤50 VA
Mass	≤5 kg

Ordering information

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

Model/Order No.	Name	
	Main frame	
MP1632A	Digital Data Analyzer	
	Standard accessories	
J0491	Power cord (shielded):	1 pc
F0071	Fuse, 8 A:	2 pcs
Z0319A	PS/2 mouse:	1 pc
Z0320	Input pen:	1 pc
Z0347	Recovery disk*1:	1 set
Z0393	Application disk*1:	1 set
Z0395	Remote sample disk*1:	1 set
W1360AE	MP1632A operation manual:	1 copy
W1361AE	MP1632A remote control operation manual:	1 copy
	Options	
MP1632A-01	GPIB interface board	
MP1632A-02	Ethernet interface board	
MP1632A-03	3.2G internal synthesizer	
	Peripherals	
Z0321A	Keyboard (PS/2)	
J0008	GPIB cable, 2 m	

Model/Order No.	Name	
MU163220A	3.2G Pulse Pattern Generator	
	Standard accessories	
J0693A	Coaxial cord (HRM202B • 3D2W • HRM202B), 1 m:	1 pc
J0696A	Coaxial cord (AA-165-500), 0.5 m:	2 pcs
W1386AE	MU163220A/163240A operation manual:	1 copy
Z0306A	List strap:	1 pc
MU163240A	3.2G Error Detector	
	Standard accessories	
J0693A	Coaxial cord (HRM202B • 3D2W • HRM202B), 1 m:	1 pc
J0696A	Coaxial cord (AA-165-500), 0.5 m:	2 pcs
W1386AE	MU163220A/163240A operation manual*2:	1 copy

*1: Only for MP1632A customer
*2: Not supplied when 3.2G pulse pattern generator purchased as same time