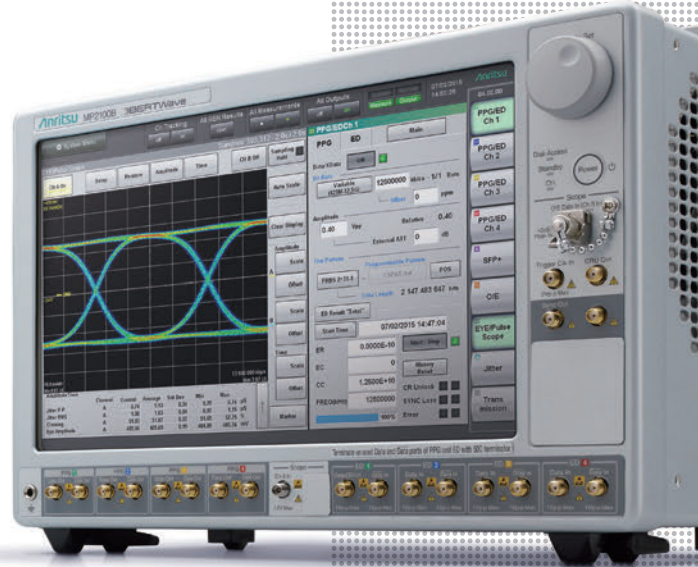


BERTWave™

MP2110A*

MP2100B



**All
In One**

4ch BERT+
Sampling
Oscilloscope

*: For the latest information about the MP2110A, read the MP2110A catalog (MP2110A-E-A-1).

Reduce cost. Increase productivity.

All-in-one BERTWave with Built-In BERT + Sampling Oscilloscope

Multi-Channel Optical Module Evaluation Solution

BERTWave MP2110A / MP2100B

 **BERTWave**

4ch for 100G/200G/400G



For Multi-Channel Optical Module/Device Manufacturing and Development

To cope with exploding data traffic volumes caused by providers offering new unique services, optical modules and devices are transitioning to use of higher bit rates. However, a key issue for data centers is how to hold-down system costs, which requires higher productivity as well as cost reductions at optical module/device manufacturing.

The BERTWave series is designed especially for mass-production of optical modules and features an All-in-one BERT (for bit error rate measurement) plus sampling oscilloscope (for Eye pattern analysis) to help increase optical module production efficiency and cut costs.



4 ch for 100G/200G/400G

MP2110A

All In One

All-in-one max. 4ch 28.2 Gbit/s BERT + max. 4ch optical sampling oscilloscope

Low Cost

Integrated BERT and sampling oscilloscope reduce instrument capital costs

PAM4 Analysis

Easy, fast and high-sensitivity analysis of PAM4 signals including TDECQ with support for clock recovery

250
ksamples/s

Captures 1 million samples in about 5 seconds

-15
dBm
Sensitivity

Measures optical signals attenuated by peripherals such as optical switches

Shorter Measurement Times

High-speed Sampling Oscilloscope (250 ksamples/s)

Multi-channel Measurement (4ch BERT and 4ch Optical Sampling Oscilloscope)

More Accurate Performance

Sampling Oscilloscope

- Bandwidth
 - Optical: 35 GHz (SMF), 25 GHz (MMF)
 - Electrical: 40 GHz
- High Sensitivity: -15 dBm (typ., SMF)
- Low-Jitter: 200 fs rms (typ.)

BERT

- Low-Jitter PPG: 600 fs rms (typ.)
- High-Sensitivity ED: 25 mV (typ.)

Built-in PC for Stable Operation

Efficient Measurement Systems

Easy configuration of flexible measurement system using All-in-one and discrete instruments

Slashes instrument capital costs by up to about 50% depending on selected configuration

Easy measurement system configuration using sample program

All-in-one support (sampling oscilloscope) for both NRZ and PAM4 signals

Supported Applications: Evaluation of physical-layer performance for 25G/50G/100G/200G/400G optical transport modules, optical cables, and associated parts used by data centers, Core/Metro networks, 4G/5G mobile backhaul, and 5G mobile fronthaul

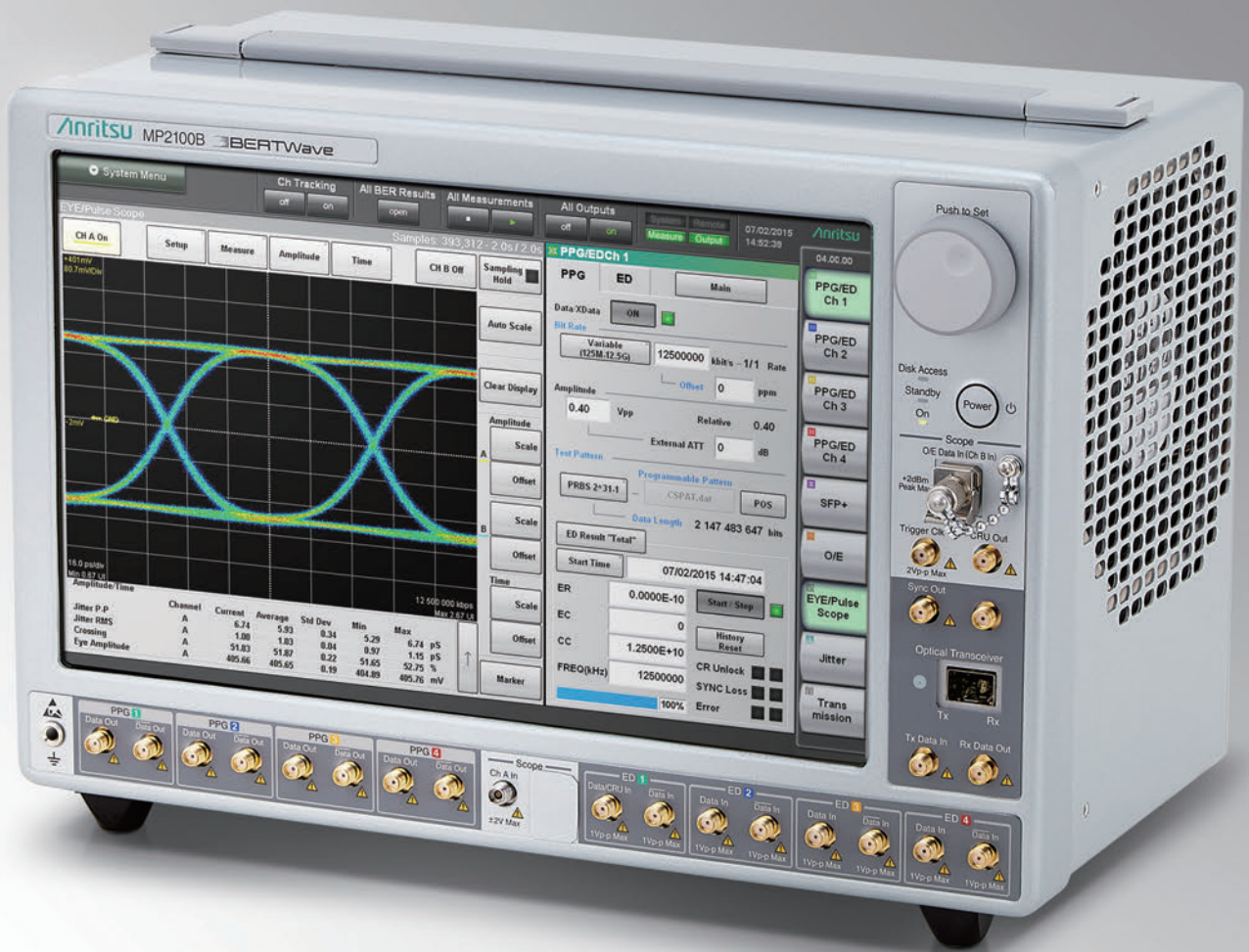
Transmission Paths: Ethernet, eCPRI/RoE, CPRI, SDH/SONET, OTN, InfiniBand, Fibre Channel

Optical Transceiver Modules: SFP28, QSFP28, CFP2/4/8, SFP56, QSFP56, OSFP, QSFP-DD

Cables: Active Optical Cables (AOC), Direct Attach Cables (DAC)

Devices: TOSA, ROSA, High-Speed Optical Engine, PHY, Driver ICs





4ch for 10G/40G

MP2100B

1
ps rms
Jitter

Pulse Pattern Generator (PPG)
Jitter: 1 ps rms

4ch
BERT

Built-in 1ch to 4ch 12.5 Gbit/s BERT

10
mVp-p
Sensitivity

Error Detector (ED)
Sensitivity: 10 mVp-p

Short Measurement Times

Simultaneous 4ch BERT and Eye Pattern Measurements
Simultaneous 4ch BER Measurements
High-Speed Eye Mask Tests
High-Speed BER Tests

Full-Featured Analysis Functions

Wideband Operation Frequency
Electrical and Optical Interfaces
Jitter Analysis
Clock Recovery

Cost-Effective Investment

Flexible Measurement System
Configuration
Multi-channel BERT

Target Applications

Transmission Paths

- InfiniBand, Fibre Channel, Ethernet, CPRI, OBSAI, SDH/SONET
- TOSA/ROSA
- High Speed Optical Engine

BERTWave Series Features

Supports Optical-module and Optical-device Measurements at Bit Rates from 1 Mbit/s to 100 Gbit/s (25 Gbit/s × 4ch)

All-in-one

The All-in-one design incorporates a BERT and sampling oscilloscope in one cabinet, supporting simultaneous BER measurements at the Rx side of optical modules and devices while analyzing the signal Eye pattern at the Tx side to greatly improve measurement efficiency.

Shared GUI and Compatible Remote Commands

With its simplified shared GUI, the BERTWave series supports easy measurement. Additionally, since the remote commands are compatible with all BERTWave series, production-line configuration is easy because one program can be used for lines with different bit rates.

BERTWave MP2110A



Fast, Low-Noise, High-Sensitivity Sampling Oscilloscope

With a sampling speed of 250 ksamples/second, the sampling oscilloscope captures 1 Msamples in about 5 seconds. In addition, the Auto-Mask Margin function cuts the time required for Mask Margin tests. These features support low noise values of 3.4 μW and a Mask Margin sensitivity of −15 dBm (typ., SMF) using a high-sensitivity O/E module.

Moreover, the sampling oscilloscope has a built-in high-accuracy trigger signal of 200 fs rms.

As well as enabling accurate measurement of DUT characteristics, this high-performance hardware also supports a built-in Clock Recovery Unit (CRU) option.

Max. 4ch High-Sensitivity ED and Low-Jitter PPG

With a low data Jitter of 600 fs rms (typ.), the MP2110A PPG supports high-accuracy measurement of optical-module and optical-device characteristics. The 25 mV (typ.) ED enables BER measurement of low-amplitude signals caused by transmission path losses to help improve DUT yields.

Option Configuration

BERT	1ch	2ch	4ch
Sampling Oscilloscope	Electrical 2ch		
	Electrical 1ch	Optical 1ch	
	Optical 1ch		
	Optical 2ch		
	Optical 4ch		

BERTWave MP2100B



High-Speed Eye Pattern Analysis

With a sampling speed of 150 ksamples/s, 1 million samples can be captured in about 8 seconds. The automatic Mask Margin measurement function built-in as standard reduces Mask Margin measurement test times.

Clock Recovery Option

A clock recovery option for the sampling oscilloscope can be installed in the MP2100B to support operation ranges of 8.5 GHz to 12.5 GHz and 0.1 GHz to 2.7 GHz covering bit rates for existing standards used by transmission equipment. This clock recovery option is used to evaluate the characteristics of optical equipment for long-distance transmissions and transmission equipment with no clock output.

Wideband Operating Frequency

Since the MP2100B PPG and ED support all bit rates from 125 Mbit/s to 12.5 Gbit/s, one MP2100B set can be used for various applications, such as STM-1 10GFC, etc.

Option Configuration

BERT	1ch	2ch	4ch
Sampling Oscilloscope	Electrical 2ch		
	Electrical 1ch	Optical 1ch	

For details please refer to the separate catalog.

BERTWave Series Related Products

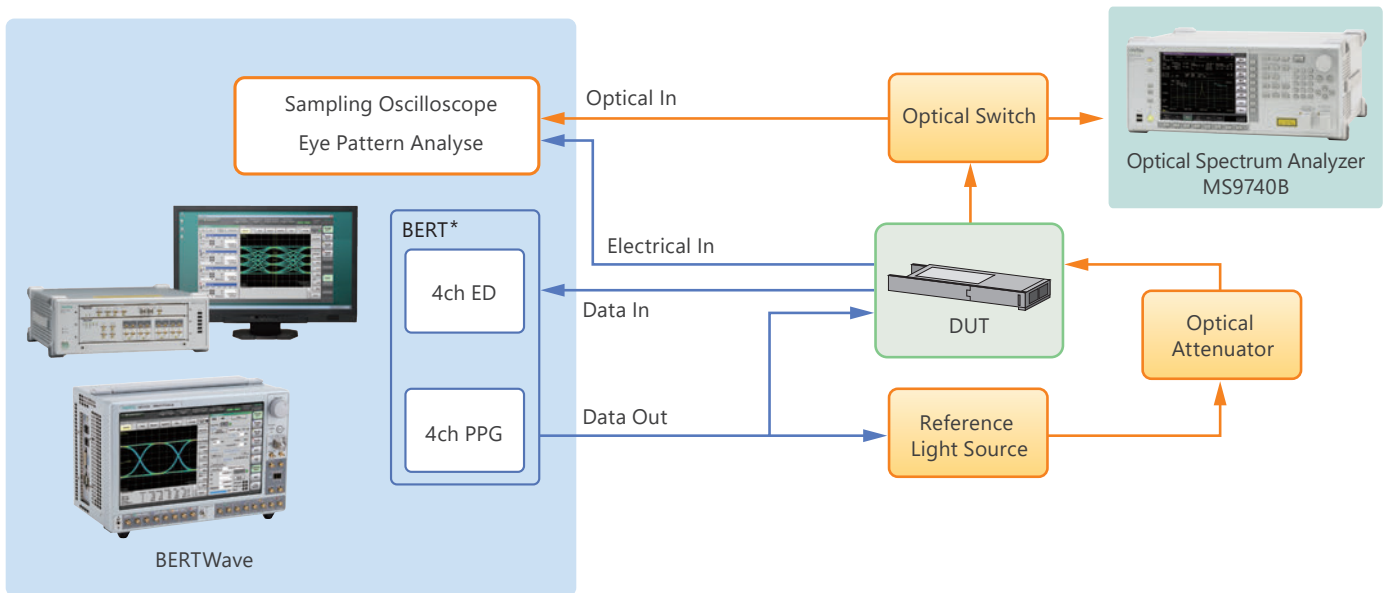
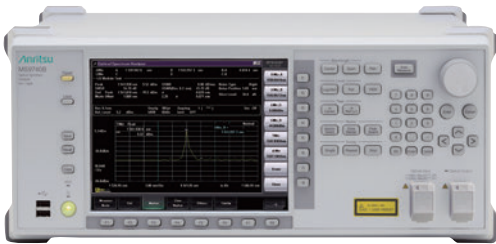
Optical Spectrum Analyzer MS9740B

600 nm to 1750 nm

Faster measurement speed shortens measurement time and improves production efficiency

- Faster measurement speed of <0.2 s/5 nm reduces total analysis time for active optical devices
- Built-in applications for evaluating active optical devices
- Built-in Fast mode cuts measurement time by 50% for better production efficiency to predecessor MS9740A using 200 Hz or 1 kHz bandwidth
- Excellent cost performance
- >58 dB dynamic range (0.4 nm from peak wavelength)
- 30 pm minimum resolution
- Low power consumption (75 VA), light weight (15 kg max.)

The MS9740B reduces production costs by shortening active optical device evaluation times and supporting efficient analysis applications.



Application Examples: Optical Module Evaluation

*: Use MP1900A/MP1800A PPG/ED, etc., at PAM4 signal evaluation.

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