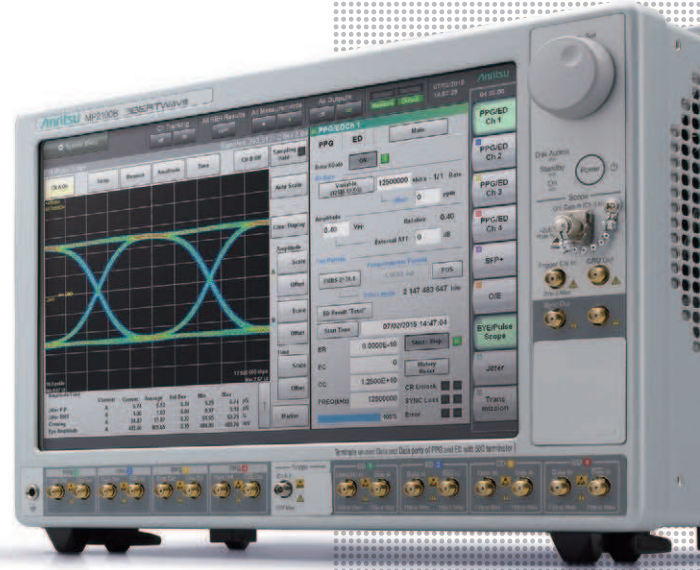


**Anritsu** envision : ensure

# BERTWave™

MP2110A

MP2100B



# All In One

# 4ch

BERT+  
Sampling  
Oscilloscope

[www.valuetronics.com](http://www.valuetronics.com)



# Reduce cost. Increase productivity.

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

Multi-Channel Optical Module Evaluation Solution

BERTWave MP2110A / MP2100B



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**

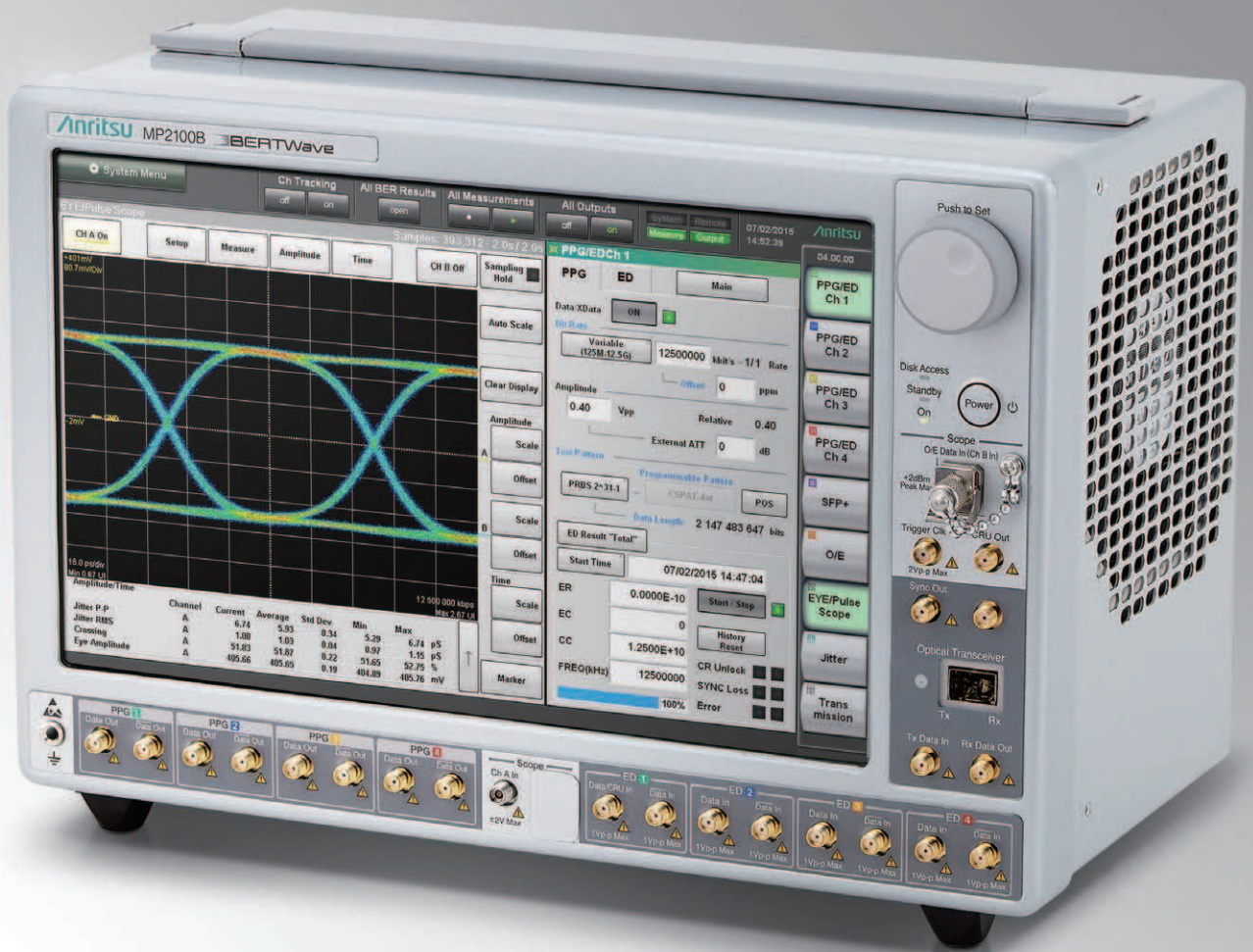
Transmission Paths: Ethernet, eCPRI/RoE, CPRI, SDH/SONET, OTN, InfiniBand, Fibre Channel

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)

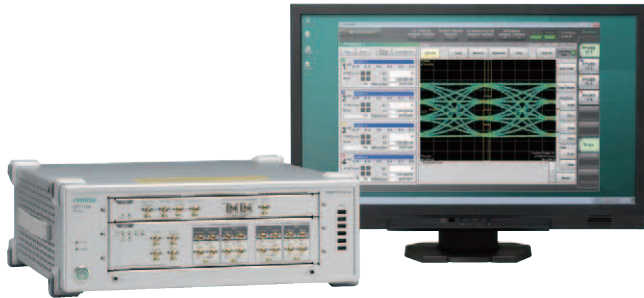
### All-in-one

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.

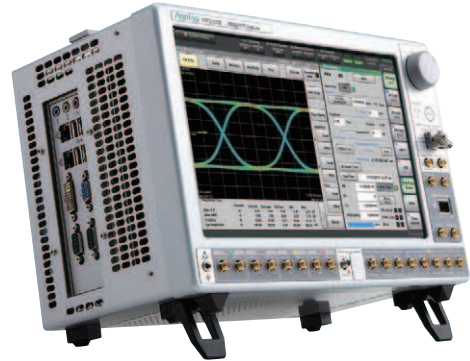
#### Max. 4ch High-Sensitivity ED and Low-Jitter PPG

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

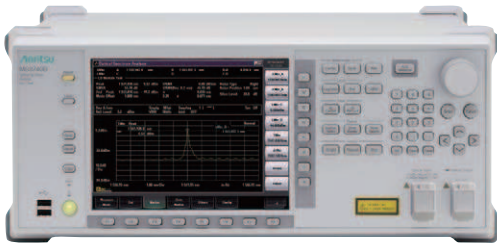
### Optical Spectrum Analyzer MS9740B

600 nm to 1750 nm

#### Faster measurement speed shortens measurement time and improves production efficiency

- Faster measurement speed of <math><0.2 \text{ s}/5 \text{ nm}</math> 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.



### Optical Attenuator G035xF/S

This bench-top optical attenuator has an optical attenuation of 60 dB. Support for remote control over GPIB makes it easy to configure a remote measurement setup in combination with the the BERTWave series.

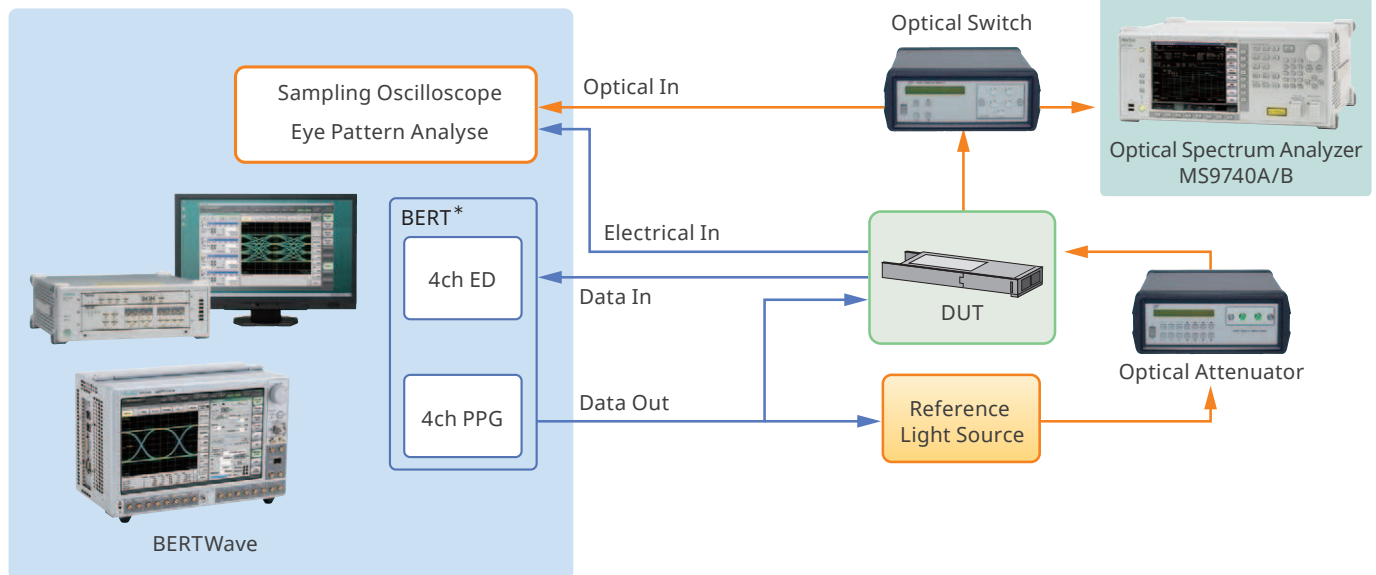
Choose the model with the correct fiber connectors for the application.



### Optical Switch G034xF/S

This bench-top optical switch supports 1x4, 2x4, and 1x16 switching. Support for remote control over GPIB makes it easy to configure a remote measurement setup in combination with the the BERTWave series.

Choose the model with the correct fiber connectors for the application.



Application Examples: Optical Module Evaluation

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

• **United States**

**Anritsu Americas Sales Company**

450 Century Parkway, Suite 190, Allen,  
TX 75013, U.S.A.  
Phone: +1-800-Anritsu (1-800-267-4878)

• **Canada**

**Anritsu Electronics Ltd.**

700 Silver Seven Road, Suite 120, Kanata,  
Ontario K2V 1C3, Canada  
Phone: +1-613-591-2003  
Fax: +1-613-591-1006

• **Brazil**

**Anritsu Eletronica Ltda.**

Praça Amadeu Amaral, 27 - 1 Andar  
01327-010 - Bela Vista - Sao Paulo - SP  
Brazil  
Phone: +55-11-3283-2511  
Fax: +55-11-3288-6940

• **Mexico**

**Anritsu Company, S.A. de C.V.**

Bldv Miguel de Cervantes Saavedra #169 Piso 1, Col. Granada  
Mexico, Ciudad de Mexico, 11520, MEXICO  
Phone: +52-55-4169-7104

• **United Kingdom**

**Anritsu EMEA Ltd.**

200 Capability Green, Luton, Bedfordshire, LU1 3LU, U.K.  
Phone: +44-1582-433200  
Fax: +44-1582-731303

• **France**

**Anritsu S.A.**

12 avenue du Québec, Bâtiment Iris 1-Silic 612,  
91140 VILLEBON SUR YVETTE, France  
Phone: +33-1-60-92-15-50  
Fax: +33-1-64-46-10-65

• **Germany**

**Anritsu GmbH**

Nemetschek Haus, Konrad-Zuse-Platz 1  
81829 München, Germany  
Phone: +49-89-442308-0  
Fax: +49-89-442308-55

• **Italy**

**Anritsu S.r.l.**

Via Elio Vittorini 129, 00144 Roma, Italy  
Phone: +39-6-509-9711  
Fax: +39-6-502-2425

• **Sweden**

**Anritsu AB**

Isafjordsgatan 32C, 164 40 KISTA, Sweden  
Phone: +46-8-534-707-00

• **Finland**

**Anritsu AB**

Teknobulevardi 3-5, FI-01530 VANTAA, Finland  
Phone: +358-20-741-8100  
Fax: +358-20-741-8111

• **Denmark**

**Anritsu A/S**

Torveporten 2, 2500 Valby, Denmark  
Phone: +45-7211-2200  
Fax: +45-7211-2210

• **Russia**

**Anritsu EMEA Ltd.**

**Representation Office in Russia**

Tverskaya str. 16/2, bld. 1, 7th floor.  
Moscow, 125009, Russia  
Phone: +7-495-363-1694  
Fax: +7-495-935-8962

• **Spain**

**Anritsu EMEA Ltd.**

**Representation Office in Spain**

Edificio Cuzco IV, Po. de la Castellana, 141, Pta. 5  
28046, Madrid, Spain  
Phone: +34-915-726-761  
Fax: +34-915-726-621

• **United Arab Emirates**

**Anritsu EMEA Ltd.**

**Dubai Liaison Office**

902, Aurora Tower,  
P O Box: 500311 - Dubai Internet City  
Dubai, United Arab Emirates  
Phone: +971-4-3758479  
Fax: +971-4-4249036

• **India**

**Anritsu India Private Limited**

6th Floor, Indigube ETA, No.38/4, Adjacent to EMC2,  
Doddanekundi, Outer Ring Road, Bengaluru - 560048, India  
Phone: +91-80-6728-1300  
Fax: +91-80-6728-1301

• **Singapore**

**Anritsu Pte. Ltd.**

11 Chang Charn Road, #04-01, Shriro House  
Singapore 159640  
Phone: +65-6282-2400  
Fax: +65-6282-2533

• **P.R. China (Shanghai)**

**Anritsu (China) Co., Ltd.**

Room 2701-2705, Tower A,  
New Caohejing International Business Center  
No. 391 Gui Ping Road Shanghai, 200233, P.R. China  
Phone: +86-21-6237-0898  
Fax: +86-21-6237-0899

• **P.R. China (Hong Kong)**

**Anritsu Company Ltd.**

Unit 1006-7, 10/F., Greenfield Tower, Concordia Plaza,  
No. 1 Science Museum Road, Tsim Sha Tsui East,  
Kowloon, Hong Kong, P.R. China  
Phone: +852-2301-4980  
Fax: +852-2301-3545

• **Japan**

**Anritsu Corporation**

8-5, Tamura-cho, Atsugi-shi, Kanagawa, 243-0016 Japan  
Phone: +81-46-296-6509  
Fax: +81-46-225-8352

• **Korea**

**Anritsu Corporation, Ltd.**

5FL, 235 Pangyoyeok-ro, Bundang-gu, Seongnam-si,  
Gyeonggi-do, 13494 Korea  
Phone: +82-31-696-7750  
Fax: +82-31-696-7751

• **Australia**

**Anritsu Pty. Ltd.**

Unit 20, 21-35 Ricketts Road,  
Mount Waverley, Victoria 3149, Australia  
Phone: +61-3-9558-8177  
Fax: +61-3-9558-8255

• **Taiwan**

**Anritsu Company Inc.**

7F, No. 316, Sec. 1, NeiHu Rd., Taipei 114, Taiwan  
Phone: +886-2-8751-1816  
Fax: +886-2-8751-1817