

# PORTABLE BERT

## AP9945



The AP9945 PORTABLE BERT is a compact and lightweight 10 Gbit/s portable Bit Error Rate Tester (BERT).

The combination of high quality features such as an internal Signal Generator (SG) option, Clock Data Recovery (CDR) and several variable signal output functions along with its smaller size, make this BERT useful in both a lab and field environment.

### Features

- Compact & lightweight
- Multi-bit rate: 9.95 Gbit/s to 11.3 Gbit/s
- 1/N pattern generation  
1/N pattern (N=2,4 and 8) generation of PPG internal clock rate  
Test example: 5 Gbit/s, 2.5 Gbit/s and 1.25 Gbit/s
- Variable signal output functions  
Amplitude: 0.5 Vpp to 2.0 Vpp  
Offset: -2.0V to +3.0V  
Cross-Point: 30% to 70%
- Built-in CDR

**ANDO Electric Co., Ltd.**

**Specifications**

Pulse Pattern Generator			
<b>PPG Interfaces</b>			
DATA OUT	Bit rate	9.95 Gbit/s to 11.3 Gbit/s	
	Output level	0.50 Vpp to 2.0 Vpp (10 mV step)	
	Offset	-2 V to +3 V (10 mV step)	
	Cross-Point	30% to 70 % (1 % step)	
	Tr/Tf (20-80%)	25 ps or less	
	Data format	NRZ	
	Termination	50 Ω (AC/ GND)	
	Output control	ON/OFF function	
	Number of ports	2 (Invert, non-invert)	
	Connector	3.5 mm-Female	
CLOCK OUT	Modes	Internal, External sync, External Clock in	
	Internal clock	9.95328 GHz (Standard) Option 1: 1 alternative clock, specify 10.3125 GHz, 10.664 GHz or 10.709 GHz (Factory option) Option 2: 2 clocks, specify 2 clocks from 9.95328 GHz, 10.3125 GHz, 10.664 GHz and 10.709 GHz (Factory option) Option 3: Built-in Signal Generator (9.95 GHz to 11.3 GHz / 1 kHz step) (Factory option)	
		Output level	0.6Vpp or more
		Offset	-2 V to +3 V (10 mV step)
	Duty	50 % ± 10 %	
	Termination	50 Ω (AC/ GND)	
	Control	ON/OFF function	
	Number of ports	2 (Invert, non-invert)	
	Connector	SMA-Female	
	<b>Clock &amp; Common Interfaces</b>		
REF CLOCK IN	Input waveform	Square Clock (Duty 50%)	
	Frequency	1/16 or 1/64 clock of bit rate	
	Input level	0.4 Vpp to 1.0 Vpp	
	Coupling	50 Ω (AC coupling)	
	Connector	SMA-Female	
EXT CLOCK IN	Input waveform	Duty 50%	
	Frequency	1/1 clock of bit rate	
	Input level	0.4 Vpp to 1.0 Vpp	
	Coupling	50 Ω (AC coupling)	
	Connector	SMA-Female	
TRIGGER OUT	Modes	Clock trigger: 1/16 or 1/64 of clock output frequency Pattern trigger: PRBS, Program, Zero Substitute and 1/N bit rate	
	Output level	0.6 Vpp or more	
	Termination	50 Ω (GND)	
	Connector	SMA-Female	
<b>PPG Data</b>			
Output Pattern	PRBS	2 <sup>n</sup> -1 (n : 7, 15, 23, 31)	
	Zero Substitute Logic	Modes	OFF , All One, All Zero ,TOGGLE (All One, All Zero by turns)
		Interval	32 byte to 512 byte (16 byte step)
		Length	1 byte to 128 byte (1 byte step) (1/4 or less of interval)
	Program	2 / 4 / 8 / 16 / 32 / 64 / 128 byte	
1/N bit rate	1/2 , 1/4 and 1/8 bit rate of PPG clock (9.95 Gbit/s to 11.1 Gbit/s)		
Error Addition	Single	1 bit when user specifies	
	Rate	10 <sup>-n</sup> (n= 3 to 12)	

**Specifications (cont'd)**

Error Detector			
ED Interface			
DATA IN (CDR)	Clock signal	Recovered from data signal	
	Bit rate	9.95 Gbit/s to 11.3 Gbit/s	
	Input level	Minimum: TBD, Maximum: 0.7 Vpp	
	Threshold level adjustment	± 0.35 V (1 mV step)	
	Coupling	50 Ω (AC coupling)	
	Synchronization range	± 100 ppm of PPG clock	
DATA IN	Connector	3.5 mm-Female	
	Clock signal	Operated by CLOCK IN signal	
	Bit rate	9.95 Gbit/s to 10.71 Gbit/s	
	Input level	Minimum:TBD, Maximum: 0.6 Vpp	
	Threshold level adjustment	± 0.35 V (1 mV step)	
	Coupling	50 Ω (AC coupling)	
CLOCK IN	Connector	3.5 mm-Female	
	Input level	Minimum (TBD), Maximum: 0.6 Vpp	
	Coupling	50 Ω (AC coupling)	
TRIGGER OUT	Connector	SMA-Female	
	Mode	Clock trigger: 1/16 or 1/64 of bit rate Pattern trigger: PRBS, Program, Zero Substitute	
	Output level	0.6 Vpp or more	
	Termination	50 Ω (GND)	
ED Data			
Pattern	PRBS	2 <sup>n</sup> -1 (n = 7, 15, 23, 31)	
	Mode	OFF, All One, All Zero, TOGGLE (All One, All Zero by turns)	
	Zero Substitute	Interval	32 byte to 512 byte (16 byte step)
	Logic	Length	1 byte to 128 byte (1 byte step) ( 1/4 or less of interval)
	Program		2 / 4 / 8 / 16 / 32 / 64 / 128 byte
Measurement Function on PC software	Mode	Manual, Single	
	Period	1 to 99 sec./ min./ hour	
	Result	Current, Timed / Bit Error, Error rate, Sync. loss	
	Error Log	Available	

## Specifications (cont'd)

General Specifications		
Controller Interface		USB, (Ethernet : Under development)
Environmental conditions	Operating temperature	+5 to +40 °C
	Humidity	20 to 80 %RH
Power requirement		AC100 V to 120V, AC200 V to 240 V, 50 Hz/60 Hz, 100VA
Dimensions and mass		Approx. 213(W) x 88(H) x 429(D) mm Approx. 4.5 kg or less
Accessories		Instruction Manual (1), Application software (1), USB cable (1), Power cable (1), Terminator (6)



Note: Application software to control the AP9945 is included.  
 PC is not included.

AP9946 E/O O/E CONVERTER is also available for optical testing.



*Specifications are subject to change without notice.*

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