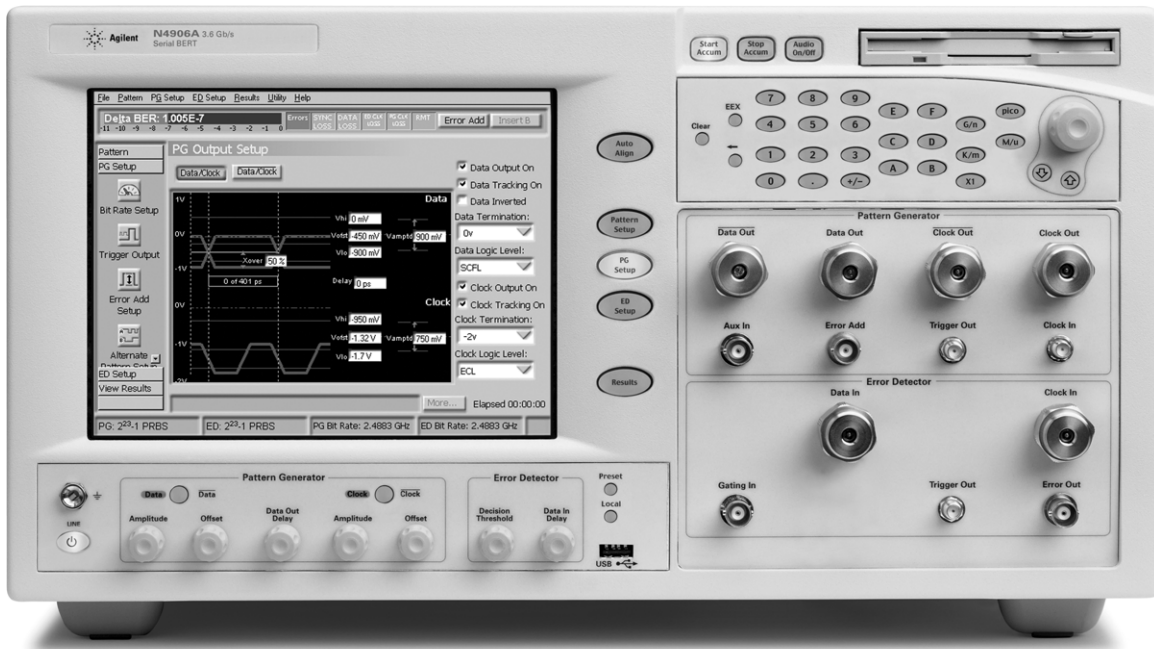


Agilent N4906A Serial BERT 3.6 Gb/s Bit Error Ratio Tester

Technical Specifications



General features

Internal hard disk

For local storage of user patterns and data

Removable storage

MS-DOS[®] compatible 3.5" Superdrive (accepts 1.4 Mbyte HD disks & 120 Mbyte SuperDisks[™])

Data entry

Touch-sensitive display, numeric keypad with up/down arrows, analogue feel position controls, or provided USB keyboard and mouse if desired.

Display

Internal 8" (diagonal) backlit LCD touch-screen

Interfaces

GPIO (IEEE 488), LAN ("10 Base T" Ethernet) for printing and file transfer, Parallel/Centronics printer port, external VGA output.

On-line help

Context-sensitive On-Line help is included. Operation, programming and quick-start guides are also included and supplied on MS-Windows[®] compatible CD-ROM.

Accessories supplied

USB compatible keyboard; mouse; stylus; Quick Start Manual on paper; Quick Start Card.

MS-Windows[®] compatible CD-ROM containing "PDF" files of Operating, Quick-Start, and Programming guides.

Power Cord; 6x APC-3.5 connector savers (female to female); 6x 50 Ω APC-3.5 (male) terminations, 3x 1 metre SMA (male to male) cables.



Agilent Technologies

Pattern Generator

Pattern generator parameters

Operating frequency

Operating frequency

50 MHz to 3.6 GHz with external clock (optional)

50 MHz to 3.0 GHz with internal clock source

Internal clock source

Frequency range

50 MHz to 3.0 GHz

Frequency accuracy

±20 ppm

Test patterns

2^N-1 PRBS

2³¹-1, 2²³-1, 2¹⁵-1, 2¹⁰-1, 2⁷-1

2^N PRBS

2²³, 2¹⁵, 2¹⁰, 2⁷

Variable mark density

1/8, 1/4, 1/2, 3/4, 7/8

User defined patterns

Variable length patterns from 1 to 8 Mbits

Alternating patterns

Change between two equal length user patterns, each up to 4 Mbits long. Changeover is synchronous with the end of a pattern, under the control of the front panel or the Auxiliary Input.

Error add

Single, continuously variable between 1x10⁻² and 1x10⁻⁹, and user specified bursts of errors.

Pattern editor

Fully flexible pattern editor included with “cut”, “copy” and “paste” functions.

Pattern Generator Input/Output Specifications

Data and Data outputs

Data and $\overline{\text{Data}}$ outputs are independently settable

Format: NRZ

Polarity: Normal or Inverted

Amplitude: 0.5 to 2 V in 10 mV steps

Offset: See figure below. 10 mV resolution.

Data outputs on/off: 'Off' goes to high impedance state

Supported terminations:

0 V (LVTTTL, SCFL, etc.), -2 V (ECL), +1.3 V (3.3 V PECL), AC-coupled

Jitter (pk-pk): < 20 ps, < 12 ps typical (w/internal source)

Transition time (10-90%): < 42 ps, < 30 ps typical (25C)

Variable crossover: Supported

Clock/data delay range: 0-1 bit period or 10 ns, whichever is less. 1 ps resolution.

Interface: DC-coupled
50 Ω reverse terminated,
APC-3.5 connector

Clock and Clock outputs

Clock and $\overline{\text{Clock}}$ outputs are independently settable

Amplitude: 0.5 to 2 V in 10 mV steps

Offset: See figure below.

10 mV resolution.

Clock outputs on/off: 'Off' goes to high impedance state

Supported terminations:

0 V (LVTTTL, SCFL, etc.), -2 V (ECL), +1.3 V (3.3 V PECL), AC-coupled

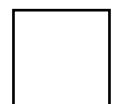
Transition time (10-90%): < 42 ps, < 35 ps typical (25C, 3 GHz)

Interface: DC-coupled 50 Ω reverse terminated, APC-3.5 connector

Intrinsic Clock to data delay is constant at all frequencies.

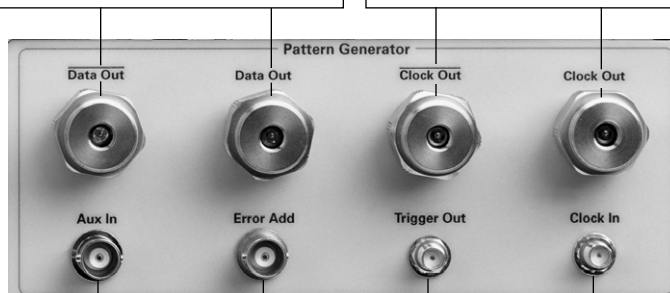
Data/Data/Clock/Clock Amplitudes and Offsets

0.5 min
to
2 V max



Termination:

	-2 V	0 V	+1.3 V
Maximum High Level:	0 V	2.5 V	2.5 V
Minimum Low Level:	-3 V	-3 V	-3 V



Auxiliary input

This has two functions.

1. Blanks the data outputs to allow the user to create bursts of data
2. If in Alternating Pattern mode, used to change between 'A' and 'B' patterns

Minimum pulse width: 128 clock periods

Interface: TTL compatible, 50 Ω BNC female connector

Clock input

Allows connection of an external clock source in order to extend the operating range of the instrument. Recommended clock sources are the Agilent E4422B and the 83752A.

Frequency range: 50 MHz to 3.6 GHz

Amplitude range: +3 dBm to -3 dBm

Interface: SMA female 50 Ω , DC coupled to 0 V

Error add input

This allows injection of single errors by an external pulse generator into the transmitted test pattern synchronous with the rising edge of the pulse

Minimum pulse width: 128 clock periods

Interface: TTL compatible, 50 Ω BNC female connector

Trigger output

Provides a pulse to trigger a communication analyzer etc. It has two modes:

1. Divided Clock mode: pulses at 1/8th of the clock rate.
2. Pattern mode: pulse at a settable bit position within the pattern.

Min.pulse width: (Pattern mode) 64 bits

Output levels: High -0.3 V, Low -0.8 V

Interface: 50 Ω SMA female

Error Detector

Error detector parameters

Operating frequency

50 MHz to 3.6 GHz.

Test patterns

As specified for Pattern Generator

Auto-align

Includes synchronizing, data polarity, clock/data align, clock invert, 0/1 threshold center.

Data in delay

Manual Data In Delay/Auto Clock-Data Align

Threshold setting

Manual set, Average DC level set, Auto 0/1 center

Synchronization

Manual, Automatic, Burst, Capture. Sync threshold adjustable from 10^{-1} to 10^{-9} .

Results

Accumulated measurements may be run once, repetitively or manual start/stop.

Delta (instantaneous) BER always available.

Accumulation

Time

Accumulate for periods from 1 second to 100 days

Errors

Until at least 10/100/1000 errors

Bits

$10E^7$ to $10E^{15}$ bits

Results are logged periodically to the hard disk for later export (in 'CSV' format) and analysis in a PC spreadsheet program.

Result displays

Results are displayed under the following headings.

Delta BER results

Delta Error Ratio, Delta Error Count, Graph of BER vs Time

Accumulated results

Bit Count, Error Ratio, Error Count, Errored One Count, Errored Zero Count, Error Free Seconds, Errored Seconds, Elapsed Accumulation Time, Sync Loss Seconds, Power Loss Seconds, Graph vs Time

Burst mode results

Burst Duty Cycle, Burst Sync Ratio, Total Burst Count, BAD Burst Count

Eye results

Eye Width, Eye Height, Eye Voltage Center value, Eye Time Center value, Delta Error Ratio at Eye Center on completion of Autoalign

Audible error indicator

Selectable to indicate Isolated Errors, Delta Error Ratio, Errors above user-defined threshold. On/Off Volume Control. Audible pitch changes, with higher pitch corresponding to higher BER.

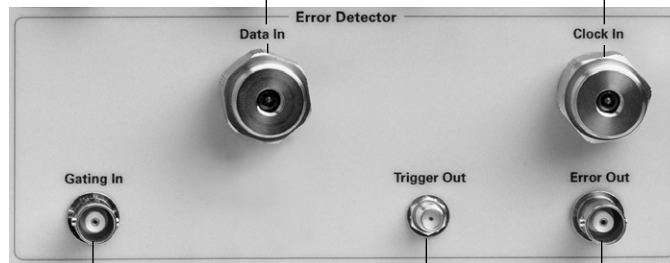
Error Detector Input/Output Specifications

Data input

Polarity: Normal or Inverted
Input amplitude: 0.1 to 2 V (typical)
Threshold range: +3 to -3 V
Threshold resolution: 0.5 mV
Terminations: Via 50 Ω to -2 V, 0 V, +1.3 V
Data input delay range: 0-1 bit period, or 10 ns whichever is less. 1 ps resolution
Interface: DC-coupled 50 Ω , APC-3.5 female connector

Clock input

Clock Input functions—switchable termination voltages, input frequency measurement, clock invert.
Bit rate: 50 MHz to 3.6 GHz
Data sampling clock edge: Selectable Rising or Falling
Input amplitude: 0.2 to 2 V (typical)
Terminations: Via 50 Ω to -2 V, 0 V, +1.3 V
Interface: DC-coupled 50 Ω , APC-3.5 female



Gating input

This is used to inhibit error counting
Minimum pulse width: 128 clock periods
Interface: TTL compatible, BNC female connector

Error output

Provides a pulse if one or more errors have been detected within the preceding 128 bit block.
Pulse width: 64 bits
Output levels: High +2.4 V, Low +0.4 V
Interface: DC-coupled, reverse terminated BNC female connector

Trigger output

Provides a pulse to trigger a communication analyzer etc. It has two modes:
1. Divided Clock mode: pulses at 1/8th of the clock rate.
2. Pattern mode: pulse at a fixed bit position within the pattern.
Pulse width (Pattern mode): 64 bits
Output levels: High -0.3V, Low -0.8 V
Interface: 50 Ω SMA female

External parameters

Environmental

Warm-up time

30 minutes

Operating temperature range to specification

10 to 45 °C

Humidity

15 to 95% at 45 °C non-condensing

Electrical

Supply voltage parameters

90 V–250 V AC, 50–60 Hz

Power consumption

< 300 W

EMC

EU EMC Directive (CE-Marked)

Support

Warranty

1 year

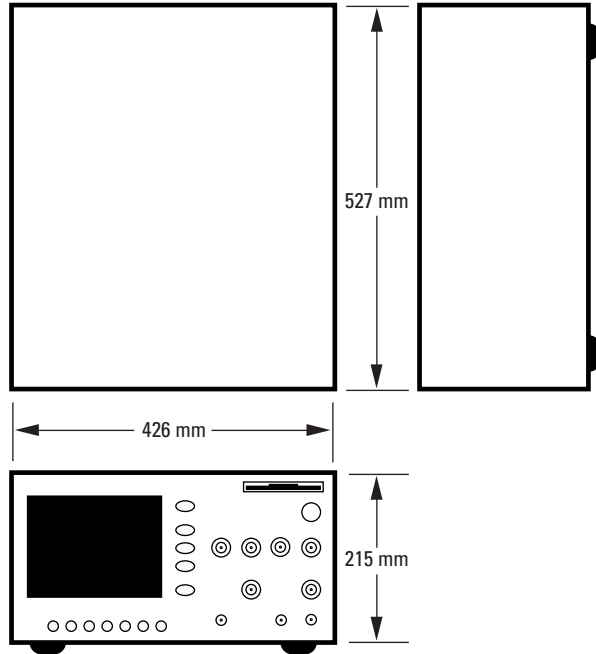
Calibration

2 year cycle, return to Agilent Technologies

Physical

Dimensions

426 W x 215 H x 527 D mm approx (16.8" W x 8.5" H x 20.7" D approx)



Weight

23 kg (50 lbs)

Ordering Information

- N4906A Serial BERT** Serial BERT 3 Gb/s (for 3.0 Gbit/s BER measurement and analysis with internal clock source, 3.6 Gbit/s with external clock source)
- Clock Source** Add E4422B 4.0 GHz external synthesized signal source
- Option N4906A-0B1** Hard copy programming manuals
- Option N4906A-AX4** Mounting kit for 19" rack, without handles
- Option N4906A-AXE** Mounting kit for 19" rack, including front handles

Recommended product accessories

Torque wrench:

- 8710-1765** For APC 3.5 connectors

Cable:

- 8120-4948** 1m SMA cable

Blocking capacitor:

- 11742A** 45 MHz to 26.5 GHz, APC-3.5 mm

Bias network:

- 11612A** 45 MHz to 26.5 GHz, APC-3.5 mm

Attenuators:

- Option 8493C-003** 3 dB APC 3.5 pad
- Option 8493C-006** 6 dB APC 3.5 pad
- Option 8493C-010** 10 dB APC 3.5 pad
- Option 8493C-020** 20 dB APC 3.5 pad

Transition time convertors:

Used to slow the output waveform rise/fall times if desired. SMA male to SMA female connectors.

- 15435A** 150 ps output transition time
- 15432B** 250 ps output transition time
- 15433B** 500 ps output transition time
- 15434B** 1000 ps output transition time
- 15438A** 2000 ps output transition time

SuperDisk is a trademark of Imation Corp.

MS-DOS and MS-Windows are U.S. registered trademarks of Microsoft Corporation.

Agilent Technologies' **Test and Measurement Support, Services, and Assistance**

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise

Our Promise means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

Your Advantage means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional engineering services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

By internet, phone, or fax, get assistance with all your test & measurement needs.

Online assistance:
www.agilent.com/find/n4900_series



Agilent Email Updates

www.agilent.com/find/emailupdates
Get the latest information on the products and applications you select.

Phone or Fax

United States:

(tel) 1 800 452 4844

Canada:

(tel) 1 877 894 4414

(fax) (905) 282 6495

China:

(tel) 800-810-0189

(fax) 1-0800-650-0121

Europe:

(tel) (31 20) 547 2323

(fax) (31 20) 547 2390

Japan:

(tel) (81) 426 56 7832

(fax) (81) 426 56 7840

Korea:

(tel) (82-2) 2004-5004

(fax)(82-2) 2004-5115

Latin America:

(tel) (305) 269 7500

(fax) (305) 269 7599

Taiwan:

(tel) 080-004-7866

(fax) (886-2) 2545-6723

Other Asia Pacific Countries:

(tel) (65) 375-8100

(fax) (65) 836-0252

Email: tm_asia@agilent.com

Product specifications and descriptions in this document subject to change without notice.

© 2000, 2001, 2002, 2003 Agilent Technologies, Inc.

Printed in USA May 28, 2003

5988-9276EN



Agilent Technologies