

Keysight Technologies

N4975A PRBS Generator 56 Gb/s

Data Sheet



Features

- Self-contained PRBS generator
- Built-in, quarter-rate clock source (14.0 GHz) for 56 Gb/s operation
- 1010, 1100, and PRBS-15 patterns
- 500-1000 mV differential, adjustable output
- Quarter rate (Clk/4) clock input
- Quarter and half rate clock outputs
- Pattern trigger output

Description

The Keysight Technologies, Inc. N4975A PRBS generator 56 Gb/s is a self-contained pattern generator capable of operating at either 56 Gb/s data rate using the internal oscillator or operating over a wider data rate range of 39.8 to 56 Gb/s when used with an external quarter-rate clock source. This is made possible through comprehensive integration of the key building blocks into monolithic integrated circuits founded on SiGe technology. The performance generated from the N4975A PRBS generator 56 Gb/s is world class with the typical data signal having 500 fs rms jitter, 500 mV of output swing and 9 ps rise time.

Application

The N4975A PRBS generator 56 Gb/s, in conjunction with a high speed digital communications analyzer can be used to make eye and jitter measurements of 56 Gb/s components such as modulator drivers, optical modulators, MUX, and DEMUX components. The superior rise time, fall time, and excellent jitter of the N4975A PRBS generator 56 Gb/s make it desirable for production component test where the source performance needs to be as good as possible to meet production specification margins. The low price of the N4975A PRBS generator 56 Gb/s make it desirable for manufacturing environments which are cost sensitive.



Figure 1. Front of N4975A PRBS generator 56 Gb/s.



Figure 2. Back of N4975A PRBS generator 56 Gb/s.

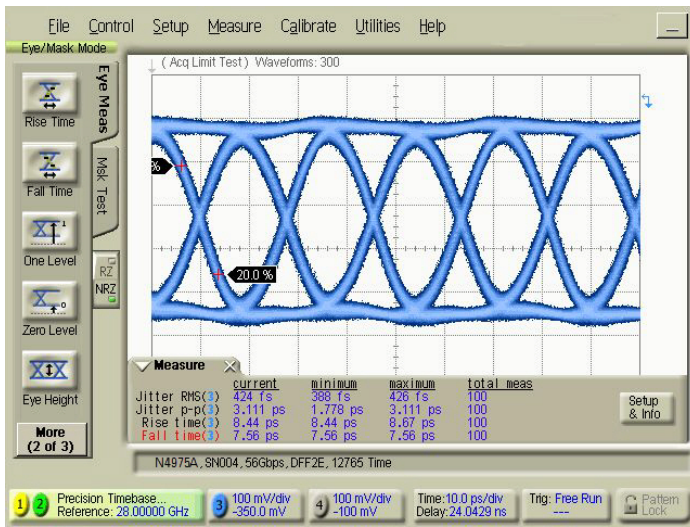


Figure 3. 56 Gb/s typical eye diagram time parameters.

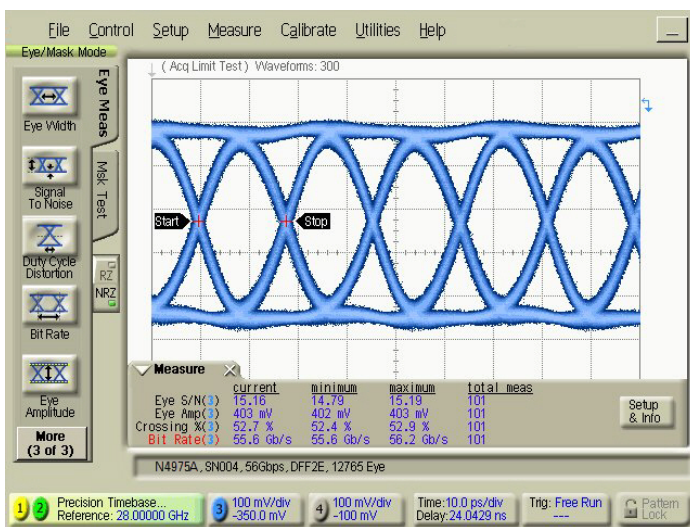


Figure 4. 56 Gb/s typical eye diagram amplitude parameters.

N4975A PRBS generator specifications

| Data output | |
|---|---|
| Data rate | 39.8 to 56 Gb/s ¹ |
| Patterns | PRBS 215-1 : 1 + X14 + X15 Divided Clock 1010, and 1100 |
| Output amplitude (single-ended) | 500 mV p-p typical (at maximum setting on amplitude adjust control) |
| Output amplitude adjustment range | 0 to -6 dB typical |
| Output level | high: 0 V nominal low: -500 mV nominal |
| Jitter | 500 fs rms typical |
| Rise/fall time (20% to 80%) | 9 ps typical |
| External interface | Differential. DC coupled, 50 Ω nominal, 1.85 mm female connectors Note: outputs are CML and must be externally DC terminated with 50 Ω to GND. |
| Clock/4 input | |
| External quarter-rate clock input range | 9.95 to 14 GHz |
| External half-rate clock input power required | +4 to +15 dBm (1 to 3.5 V p-p) |
| External interface (Clk/4 In) | Single-ended. AC coupled, 50 Ω nominal, SMA female connector |
| Internal clock/4 | |
| Internal quarter-rate clock frequency | 14.0 GHz internal oscillator (for 56 Gb/s data rate) |
| Frequency accuracy | < ±20 ppm typical |
| Output power | +7.5 dBm typical (1.5 V p-p) |
| External interface (Clk/4 Out) | Single-ended. AC coupled, 50 Ω nominal, SMA female connector |
| (Buffered) clock/4 output | |
| Frequency range | 9.95 to 14 GHz |
| Output power | +2 dBm typical (800 mV p-p) |
| External interface (Clk/4 Buf) | Single-ended. AC coupled, 50 Ω nominal, SMA female connector |
| Clock/2 Output | |
| Frequency range | 19.9 to 28 GHz |
| Output power | 0 dBm typical (630 mV p-p) |
| External interface (Clk/2 Buf) | Single-ended. AC coupled, 50 Ω nominal, 2.92 mm female connector |
| Pattern trigger output ² | |
| Frequency | $(\text{Bit_rate}) / (128 * (2^{15} - 1))$ e.g. at 56 Gb/s frequency = 13.35 kHz |
| Output amplitude | 600 mV p-p nominal |
| External interface | Single-ended. DC coupled, SMA female connector |

¹ With an external clock. Internal clock (14 GHz) provides fixed 56 Gb/s data rate operation.

² Available only with PRBS-15 pattern. Pattern trigger is a square wave output.

General specifications

| General and mechanical parameters | |
|-----------------------------------|---|
| Operating temperature | +10 to +40 °C |
| Storage temperature | -40 to +70 °C |
| Power requirements | 25 W External AC Adaptor (included) · 100 to 240 V AC, 50 to 60 Hz |
| Physical dimensions (W x H x D) | 178 mm (7 in) x 63.5 mm (2.5 in) x 229 mm (9 in) |

Regulatory standards

EMC

Complies with European EMC Directive 2004/108/EC

- IEC/EN 61326-1
- CISPR Pub 11 Group 1, class A
- AS/NZS CISPR 11
- ICES/NMB-001

This ISM device complies with Canadian ICES-001.

Cet appareil ISM est conforme a la norme NMB-001 du Canada.

Ordering information

N4975A PRBS generator 56 Gb/s

Warranty and calibration service

For warranty and calibration service information, contact your local authorized Keysight distributor or Keysight sales department.

myKeysight

myKeysight

www.keysight.com/find/mykeysight

A personalized view into the information most relevant to you.



Three-Year Warranty

www.keysight.com/find/ThreeYearWarranty

Keysight's commitment to superior product quality and lower total cost of ownership. The only test and measurement company with three-year warranty standard on all instruments, worldwide.

www.keysight.com/go/quality

Keysight Technologies, Inc.

DEKRA Certified ISO 9001:2008

Quality Management System



Keysight Channel Partners

www.keysight.com/find/channelpartners

Get the best of both worlds: Keysight's measurement expertise and product breadth, combined with channel partner convenience.

www.keysight.com/find/N4975A

For more information on Keysight Technologies' products, applications or services, please contact your local Keysight office. The complete list is available at: www.keysight.com/find/contactus

Americas

| | |
|---------------|------------------|
| Canada | (877) 894 4414 |
| Brazil | 55 11 3351 7010 |
| Mexico | 001 800 254 2440 |
| United States | (800) 829 4444 |

Asia Pacific

| | |
|--------------------|----------------|
| Australia | 1 800 629 485 |
| China | 800 810 0189 |
| Hong Kong | 800 938 693 |
| India | 1 800 112 929 |
| Japan | 0120 (421) 345 |
| Korea | 080 769 0800 |
| Malaysia | 1 800 888 848 |
| Singapore | 1 800 375 8100 |
| Taiwan | 0800 047 866 |
| Other AP Countries | (65) 6375 8100 |

Europe & Middle East

| | |
|----------------|---------------|
| Austria | 0800 001122 |
| Belgium | 0800 58580 |
| Finland | 0800 523252 |
| France | 0805 980333 |
| Germany | 0800 6270999 |
| Ireland | 1800 832700 |
| Israel | 1 809 343051 |
| Italy | 800 599100 |
| Luxembourg | +32 800 58580 |
| Netherlands | 0800 0233200 |
| Russia | 8800 5009286 |
| Spain | 0800 000154 |
| Sweden | 0200 882255 |
| Switzerland | 0800 805353 |
| | Opt. 1 (DE) |
| | Opt. 2 (FR) |
| | Opt. 3 (IT) |
| United Kingdom | 0800 0260637 |

For other unlisted countries:
www.keysight.com/find/contactus
 (BP-07-10-14)