



**Agilent Technologies**

## **Errata Notice**

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## 12.5 Gb/s Programmable Pattern Generator

Cost Effective Solution for Receiver Characterization



### Product Highlights

- 24Mb pattern memory supports virtually any pattern
- Integrated two tap de-emphasis
- Fully programmable data and clock output parameters
- Transparent jitter pass-through
- Output calibrated near the point of use, not the front panel
- Single port remote control of all parameters through USB or GPIB
- GUI interface for multiple instrument control: Centellax Signal Integrity Studio (SIS) application or LabVIEW® driver and GUI

### An affordable generator for characterization needs beyond PRBS patterns

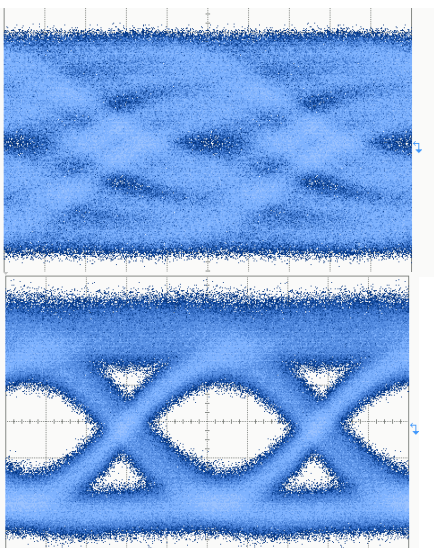
The PPG12500 is a single channel generator capable of producing any serial data pattern up to 24Mbits in length. An internal non-volatile pattern library comes preloaded with PRBS along with several common telecom and PC data bus test patterns. It can also store multiple user generated patterns. Output parameters of the data and clock outputs can be independently programmed, Presets for common logic families simplify user set up. All outputs can supply differential or single ended signals.

## Typical Applications

- Transmitter emulation for general receiver characterization
- Verification of tolerance to over and under applied pre-emphasis
- Protocol simulation during development of systems employing closed loop equalization optimization such as 10 Gb/s Base-KR
- Packet generation for initiating receiver loopback, internal BER counting, or other test modes

## Pass-through jitter

Any calibrated jitter stress appearing on the clock input passes through to the data and clock outputs. Low intrinsic jitter contribution from the PPG12500 itself makes it ideal for receiver characterization using calibrated stress. The combination with the SCS16000J results in a stressed programmable pattern generator priced less than half of competing serial BERT generator only versions.



## Integrated De-emphasis

The PPG12500 includes integrated two tap de-emphasis signal conditioning. Commonly used in higher data rate systems to open eyes by counteracting high frequency loss in the channel, applying de-emphasis to the test signal is required for receiver testing. Other vendors' generators require additional dedicated external signal processors. The internal de-emphasis conditioning in the PPG12500 eliminates the expense of additional signal processors, as well as the associated signal degradation resulting from the extra cables used to connect them.

## Eliminate Downtime

User replaceable connector savers on the Data and Clock outputs eliminate down time. Should the output connectors be damaged through improper cable installation, simply replace the connector saver yourself without the need to send the instrument in for service.

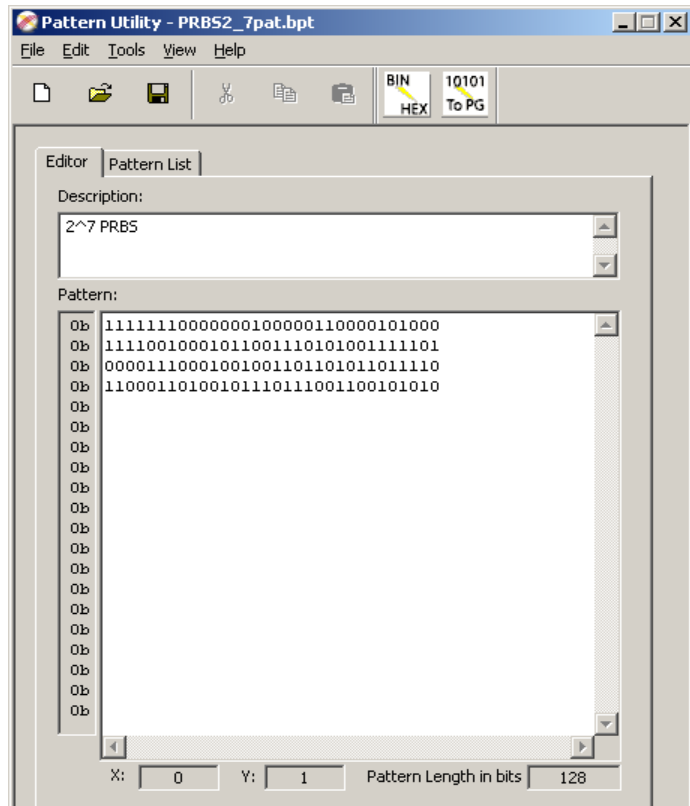


## Output calibration near the DUT

Most competitive pattern generators calibrate the output parameters at the output connector. As even the highest quality low loss cables create some frequency dependant loss, the user will generally need to adjust amplitude to de-embed cable loss effects in the system. The PPG12500 output parameters and waveshape are factory calibrated at the end of precision cables provided with the instrument, generally eliminating the need for de-embedding calibration.

## Pattern Editor

Pattern editor software included with the instrument provides a convenient tool for generation of user patterns in a PC running Microsoft Windows®. Familiar cut, copy and paste functions simplify the creation of repetitive portions of patterns. Data may be entered in hexadecimal or binary format. Integrated syntax checking screens for invalid characters before downloading patterns via USB interface into the PPG12500 library. The pattern editor software also allows for management of the user patterns in the PPG12500.



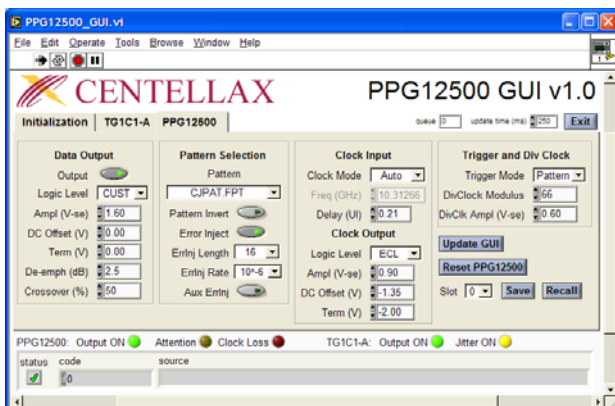
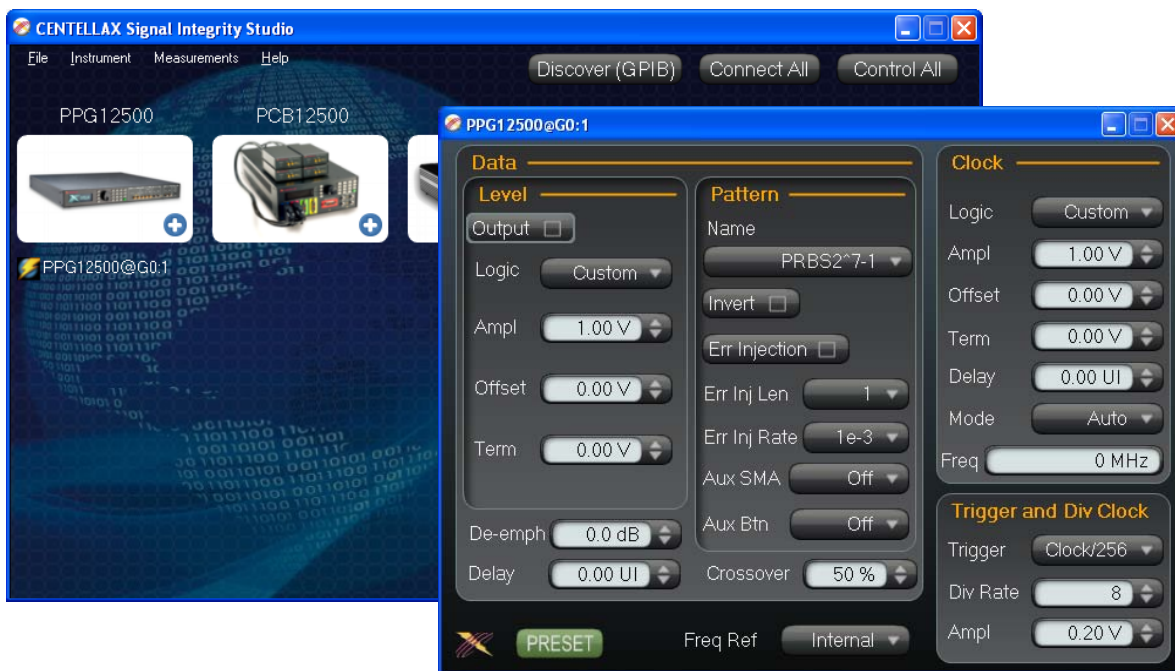
# PPG12500 Datasheet

## Centralized control

Controlling multiple pattern generators or signal sources for characterizing multi-lane devices or cross talk is cumbersome and confusing. In addition to the need to address multiple instruments, the command syntax or user interface usually differs. The Centellax Signal Integrity Studio (SIS) application provides customers the ability to control multiple Centellax instruments through a Windows-based Graphical User Interface (GUI).

Set up is easy using the Signal Integrity Studio application. For repetitive testing, setups can be stored and recalled at a later time.

The results view shows composite BER along with the performance of the individual lanes. Bar graphs give a quick indication of any lane specific problems without the need to look at the individual BER numbers.



Also available, LabVIEW® open source code drivers and stand alone GUI for the PPG12500. All of the operating parameters of the PPG12500 are displayed in a single window, allowing the user to instantly see the state of the entire system.

# PPG12500 Datasheet

## Specifications

### Clock Input

|                       |               |
|-----------------------|---------------|
| Input Clock Frequency | 1 – 13 GHz    |
| Input Clock Amplitude | 200mV – 2 Vpp |

### Differential Data Outputs

|                             |   |
|-----------------------------|---|
| Signal Configuration        | Differential. Will operate in single ended mode   |
| Data Line Coding            | Non-Return to Zero (NRZ)  |
| Output Amplitude            | 200mV – 1.6Vpp, single ended  |
| Output Offset Range         | -2.0V – +2.0V   |
| Termination Voltage Range   | -2.0V – +2.0V   |
| Cross-over Adjustment Range | 25 – 75%  |
| Rise & Fall Time            | ≤30ps, 25ps typical   |
| Additive Jitter             | ≤20ps pp, 10ps pp typical   |
| Data Delay Range            | ±10UI   |
| De-Emphasis                 | 0 – 20dB in 0.1dB steps   |
| Error Injection             | Single or continuous at rates of $10^{-9}$ – $10^{-3}$ ,<br>Burst length of 1, 2, 4, 8, 16, 32, 54, 128   |
| Data Patterns               | 2n-1 PRBS, where n=7,9,10,11,15,23,29,31<br>2n PRBS, where n=7,10,11,13,15,23<br>with mark/space density of 1/8, 1/4, 1/2, 3/4, 7/8<br>Selection of other common patterns e.g. CJPAT, CRPAT, K28-X, etc |
| Data Connectors             | 2.92mm, male  |

### Differential Clock Outputs

|                           |   |
|---------------------------|---|
| Signal Configuration      | Differential. Will operate in single ended mode |
| Output Amplitude          | 200mV – 1.8Vpp, single ended                    |
| Output Offset Range       | -2.0V – +2.0V                                   |
| Termination Voltage Range | -2.0V – +2.0V                                   |
| Rise & Fall Time          | ≤40ps   |
| Additive Jitter           | ≤3ps rms, 1.5ps rms typical                     |
| Clock Connectors          | 2.92mm, male                                    |

# PPG12500 Datasheet

## Specifications

### Differential Divided Clock Outputs

|                            |   |
|----------------------------|---|
| Signal Configuration       | Differential. Will operate in single ended mode |
| Clock Output Divider Ratio | 8 – 511 in steps of 1                           |
| Output Amplitude           | 200mV – 600mV V <sub>pp</sub> , single ended    |
| Rise & Fall Time           | 50ps typical                                    |
| Divided Clock Connectors   | SMA female                                      |

### Trigger Output

|                   |   |
|-------------------|---|
| Output type       | Clock ÷256 or Pattern Synchronized      |
| Output Amplitude  | 400mV pp, centered around +900mV offset |
| Trigger Connector | SMA female                              |

### System

|                          |                            |
|--------------------------|----------------------------|
| Remote Control Interface | USB2.0 and IEEE-488 (GPIB) |
| Power Requirements       |                            |
| Voltage                  | 100 – 240VAC, autoranging  |
| Frequency                | 50 – 60Hz                  |
| Power Consumption        | 170W maximum               |

## Physical and Environmental

|  |   |
|--|---|
| Temperature, Operating                         | +10° to +40° C                                    |
| Temperature, Non-Operating                     | - 40° to +70° C                                   |
| Dimensions ( <i>Height, Width, and Depth</i> ) | 53mm (2.1 in) x 425mm (16.7 in) x 425mm (16.7 in) |
| Mass   | 3.2kg (7.0 lbs)                                   |

## Compliance

|        |  |
|--------|--|
| EMC    | Complies with:<br>European EMC Directive 2004/108/EC, IEC/EN 61326<br>CISPR 11 Group 1 Class A<br>AS/NZS CISPR 11<br>ICES/NMB-001  |
| Safety | Complies with:<br>European Low Voltage Directive 2006/95/EC, IEC/EN 61010-1<br>CSA C22.2 No. 61010-1<br>UL 61010-1<br>This product is designed to be used in an indoor environment to Pollution Degree 2 (IEC 61010) and Enclosure Protection level IP20 (IEC 60529) |

# PPG12500 Datasheet

## Ordering Information

| <u>Product Code</u> | <u>Description</u>                       |
|---------------------|--|
| PPPG12500           | 12.5 Gb/s Programmable Pattern Generator |
| SCS16000 Series     | 16 GHz Clock Synthesizer                 |

## Product Options

|         |                      |
|---------|----------------------|
| -OPT101 | European Power Cord  |
| -OPT102 | UK Power Cord        |
| -OPT103 | US/Canada Power Cord |
| -OPT109 | China Power Cord     |

## Warranty and Calibration Service

|         |  |
|---------|--|
| -OPT300 | 1 Year Warranty Extended to 3 Years      |
| -OPT301 | 1 Year Warranty Extended to 5 Years      |
| -OPT320 | Centellax Calibration – Per Incident     |
| -OPT321 | Annual Centellax Calibration for 3 Years |
| -OPT322 | Annual Centellax Calibration for 5 Years |

## More Information

For additional information, to schedule a product demonstration, or to request a quote, contact your local authorized Centellax Distributor or:

### Centellax Sales Department

**Tel: 1-866-522-6888**

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