

Pattern Generator BPG 60G



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Key Features

- Wide-band Pattern Generator with Complementary Outputs for Binary NRZ Pulses at Data Rates from 2 to 60 GBit/s
- Two additional Complementary Output Channels for Signals at Data Rates up to 30 GBit/s
- 128 MBit Memory for User Programmable Patterns
- Variable Pattern Length
- Latest Technology Using SiGe, InP, GaAs Integrated Circuits
- Compact Desktop Design with Low Power Consumption and Low Fan Noise
- Optionally available:
 - Extended Pattern Memory of 256 MBit or 512 MBit
 - Other Customizer Specific Features on Demand

Brief Description

The pattern generator BPG 60G is a universal test instrument for ultra-fast communication systems and electronic components in the picosecond range. User programmable patterns and pseudo random binary sequences at data rates between 2 and 60 GHz can be generated. An external clock signal is needed to provide the time base for operation.

The complementary data outputs provide non-return-to-zero signals. The following patterns are selectable: Pseudo Random Binary Sequences of $2^7 - 1$, $2^{15} - 1$, $2^{23} - 1$ and $2^{31} - 1$ bit length, two short user patterns with a length of 16 and 256 bit and a user pattern of 134,217,728 bit length. Larger pattern memory of 256 MBit or 512 Mbit is optionally available.

All user patterns are freely programmable, either via the instruments front panel controls (short user patterns) or via USB interface. Each bit can be set to a positive pulse or to zero and the length of the long user pattern is configurable from 768 bit up to 134,217,728 bit.

The programmed bit sequence is repeated periodically. Additionally the pattern memory can be split in 2 or 4 parts to toggle synchronously between different waveforms.

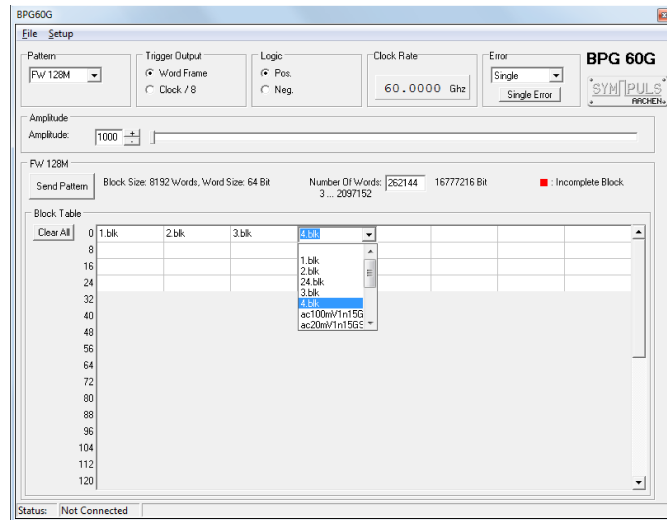
The 60 GBit/s data signal is generated by multiplexing two data channels with maximal data rates of 30 GBit/s each. These data channels are also accessible at the front panel.

The amplitude of the output signal is independently adjustable for all channels between -0.4 V and -0.6 V.

Several clock and trigger signals are available: Complementary clock signals, a divided clock signal (Clock/16) and a word frame trigger signal.

Single errors and programmable error sequences can be added to the data outputs over the error input.

The instrument can be operated locally via the front panel controls or remotely controlled via USB-interface. An easy-to-use graphical user interface is included in the supplied software and allows simple operation by mouse-clicking. Additionally self-programmed software may be used to control the instrument.



Graphical User Interface of the Operating Software

Graphical User Interface

All instrument settings and patterns are programmed via an easy-to-use graphical user interface on your PC.

The block editor allows to programm the long user patterns by mouse-clicking. The long user patterns can also be generated using customer-specific software and then loaded into the pattern memory from a binary data file.

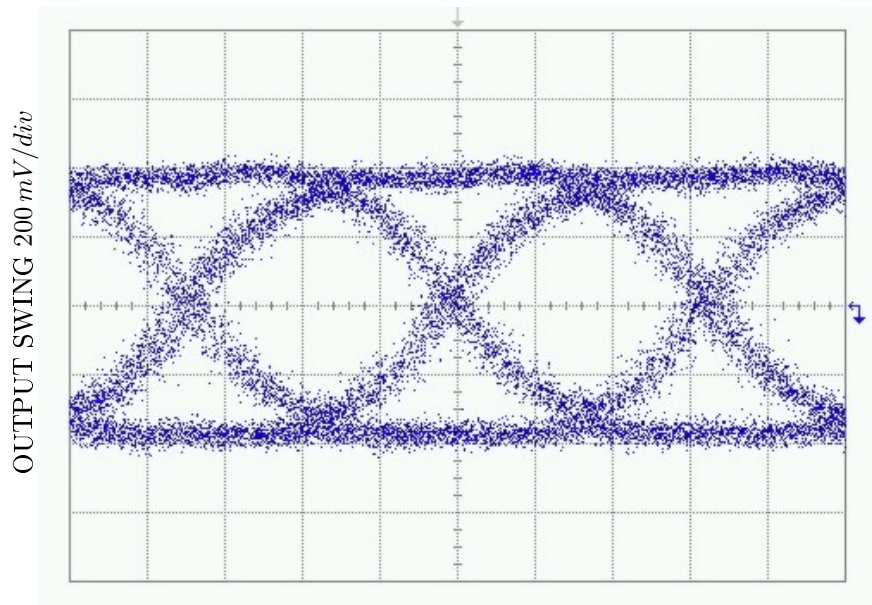


Block Editor for Programming the Long User Patterns

Output Signals

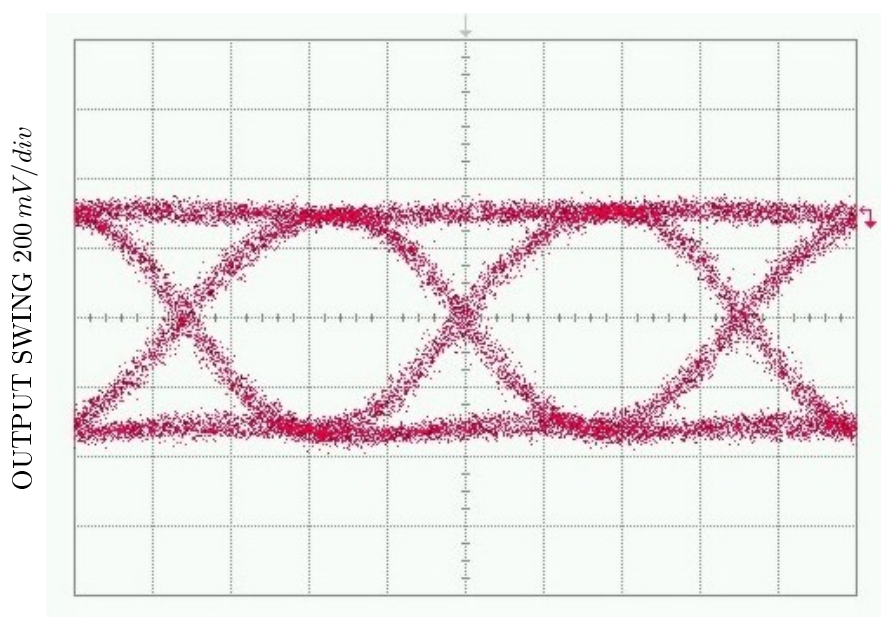
All oscillograms taken using Agilent 86100B sampling oscilloscope with sampling module 86118A (70 GHz cut-off frequency).

Eye Diagram at 60 GBit/s



TIME 5 ps/div

Eye Diagram of 30 GBit/s Output at 28 GBit/s



TIME 10 ps/div

Technical Specifications

BPG 60G	
Bit Rate	2 Gbit/s ... 60 Gbit/s, full-range tuneable
Clock Input	1 GHz ... 30 GHz (Externer Clock = Bit Rate/2), $U_i = 0.5 \dots 1 V_{pp}$ (-3 ... +3 dBm), $R_i = 50 \Omega$, 50 Ω SMA, $ r < 0,2$ 6 digit frequency display
Patterns	<ol style="list-style-type: none"> 1. PRBS: $2^{31} - 1$, $2^{23} - 1$, $2^{15} - 1$, $2^7 - 1$ 2. User Programmable Patterns of 16 and 256 Bit Length, Manually Programmable via Front Panel 3. User Patterns of Length $256 * m$ Bit ($m = 3, 4, \dots, 2^{19}$) (=max. 134,217,728 Bit), Programmable via USB-Port 4. User Patterns Consisting of Two Parts, Each of Length $256 * m$ Bit ($m = 3, 4, \dots, 2^{18}$), Programmable and Synchronously Selectable via USB-Port (Two Patterns Mode) 5. User Patterns Consisting of Four Parts, Each of Length $256 * m$ Bit ($m = 3, 4, \dots, 2^{17}$), Programmable and Synchronously Selectable via USB-Port (Four Patterns Mode) <p>Long User Patterns only Programmable via USB Interface. The polarity of the output signals is reversible.</p>
Data Outputs	<p>Data: 2 ... 60 GBit/s NRZ and /NRZ, 50 Ω, 2.4 mm connector</p> <p>Amplitude $0 V/U_{peak}$ into 50 Ω, $-0.8 V \leq U_{peak} \leq -0.4 V$, ($\pm 0.1 V$) Rise / Fall time < 10 ps (10/90%) Jitter (pp) < 7 ps</p> <p>Data A: 1 ... 30 GBit/s NRZ and /NRZ, 50 Ω 2.92 mm connector (K-type)</p> <p>Data B: 1 ... 30 GBit/s NRZ and /NRZ, 50 Ω 2.92 mm connector (K-type)</p> <p>Amplitude $0 V/U_{peak}$ into 50 Ω, $-0.6 V \leq U_{peak} \leq -0.4 V$, ($\pm 0.1 V$) Rise / Fall time < 20 ps (10/90%) Jitter (pp) < 7 ps</p>

BPG 60G	
Clock Outputs	(Bit Rate)/2 and /(Bit Rate)/2, 0.5 V ± 0.1 V, DC-free, 50 Ω 2.92 mm connector (K-type) Clock Pulse Edge in Center of Data Signal Eye ±10 ps
Trigger Output	1. (Bit Rate)/32 2. Word Frame Trigger CML: 0 V/-0.4 V into 50 Ω SMA
Error Addition	Programmable: 10 ⁻⁴ , 10 ⁻⁴ , ..., 10 ⁻¹⁰ Single Errors via Push Button or TTL Signal, max. 100 KHz, SMA
Interface	High Speed USB Max. Data Transmission Rate 2 MByte/s
Software	Graphical User Interface for Operation and Pattern Programming
Dimensions	19" Desktop W x H x D = 462 x 140 x 480 mm
Weight	approx. 8 kg
Power Supply	110 V-120 V/60 Hz/75 VA or 220 V-240 V/50 Hz/75 VA
Optionally Available	
Option 1	Extended Pattern Memory of 256 MBit
Option 2	Extended Pattern Memory of 512 MBit
Option 3	Data A and Data B outputs with fast output driver (Rise / Fall time < 10 ps)

Ordering Information

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Included in delivery:

- BPG 60G
- User Manual
- CD-ROM with Device Driver and Operating Software

**The instrument is produced by SYMPULS in Germany.
We offer a reliable service and 24 month warranty.**