Multichannel Pattern Generator BPG 4x12G

(Illustration similiar)

Wide-band Test Generator for Multiplexer Circuits up to 48 Gbps

Four-Channel Bit Pattern Generator with Differential Outputs and Maximum Data Rates of 12 Gbps per Channel

4*32 Mbit Memory for User Programmable Patterns

Variable Pattern Length

Operation via USB Interface

Optional:

- **Integrated Synthesized Clock Generator**
- **Extended Output Amplitude and Offset of the Output Channels**
- **Extended Pattern Memory of 4*256 Mbit**
- **Other Customizer Specific Features on Demand**

Brief Description

The multichannel bit pattern generator BPG 4x12G is a wideband tuneable test generator with four independent output channels for the development of fast multiplexer circuits.

User programmable patterns and pseudo random binary sequences at data rates between 5 Mbps and 12 Gbps can be generated. An external clock signal is needed to provide the time base for operation. All four output channels have complementary outputs and provide non-return-to-zero signals. The output signals are clocked by D-Flip-Flops to achieve best signal symmetry and low jitter. In PRBS Mode there is a phase lag of one quarter of the length of the pseudo random binary sequence between the output channels A, B, C and D to fulfill CCITT recommendations after 4 to 1 multiplexing.

The following patterns are selectable: Four Peudo Random Binary Sequences of $2^7 - 1$, $2^{15} - 1$, $2^{23} - 1$ und $2^{31} - 1$ bit length and structure according to CCITT standards and for each channel a short user pattern with a length of 64 bits and a long user pattern with a programmable length betweeb 64 bits and 32 Mbits.

All user patterns are freely programmable via the instrument's 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 64 bit up to 33 554 432 bit. The programmed bit sequence is then generated periodically. Additionally the pattern memory can be split in 2 or 4 parts to toggle synchronously between different waveforms.

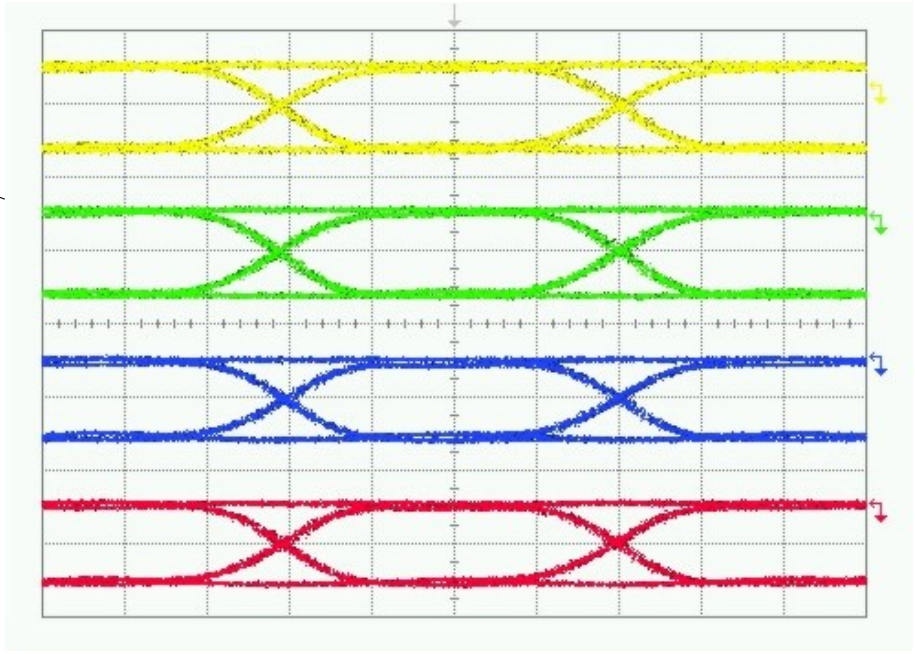
Several clock and trigger signals are available: Complementary clock signals, a divided clock signal (Clock/8) and a word frame trigger signal.

The instrument is remotely controlled via its USB-interface. An easy-to-use graphical user interface is included in the supplied software and allows simple operation by mouse-clicking.

Additionally the pattern generator can be remotely controlled via SCPI commands, a standardized instruction set for controlling and programming measurement instruments. The SCPI commands are transfered to the instrument in ASCII text format and may be generated using any programming language and development environment.

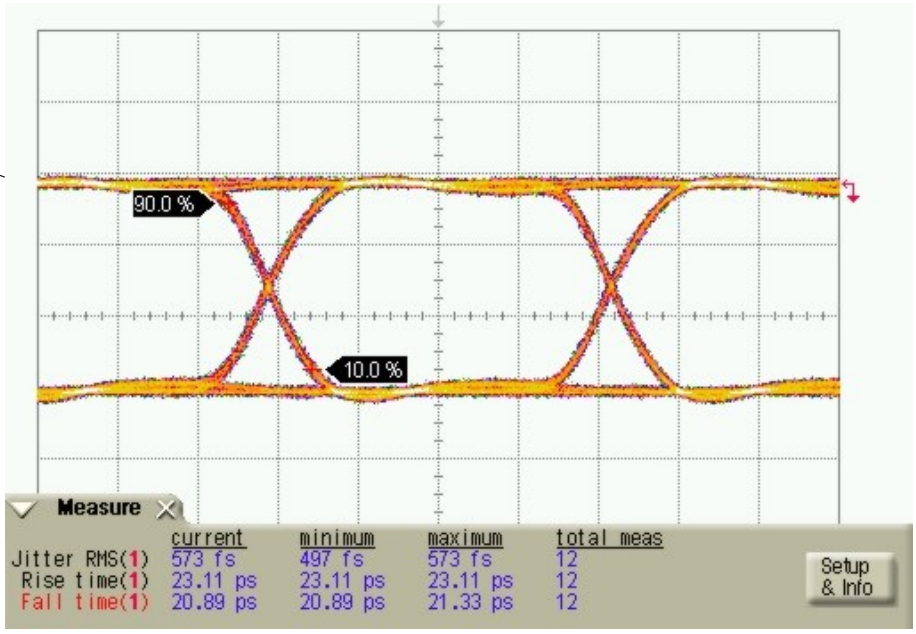
Output Signals

Eye Diagram of the Four Output Signals at 12 Gbps:



TIME 20 ps/div

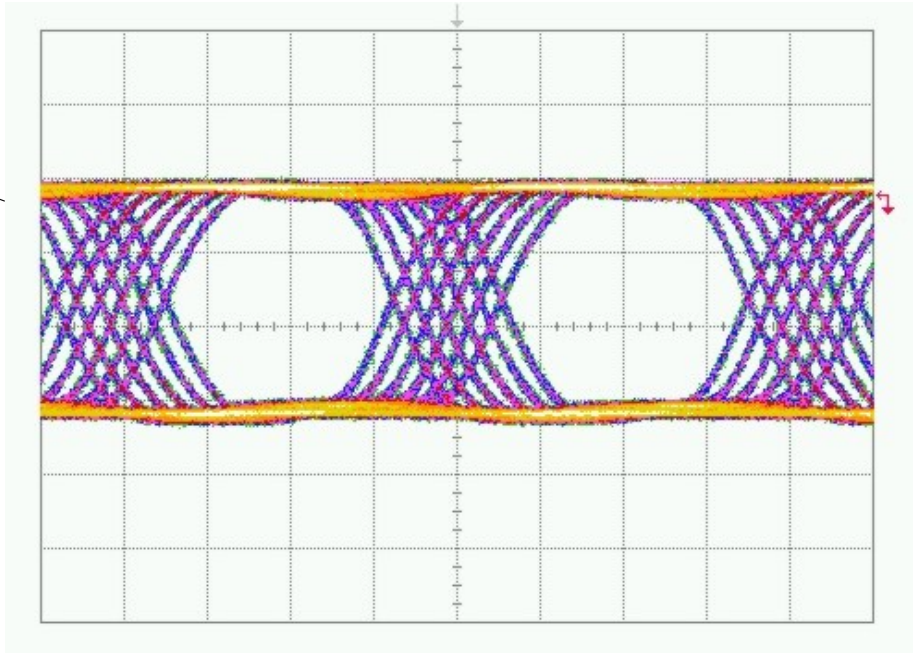
Jitter and Rise-/Fall-Times of the Output Signal at 12 Gbps:



TIME 20 ps/div

Eye Diagram of Output Signal with Option 2:

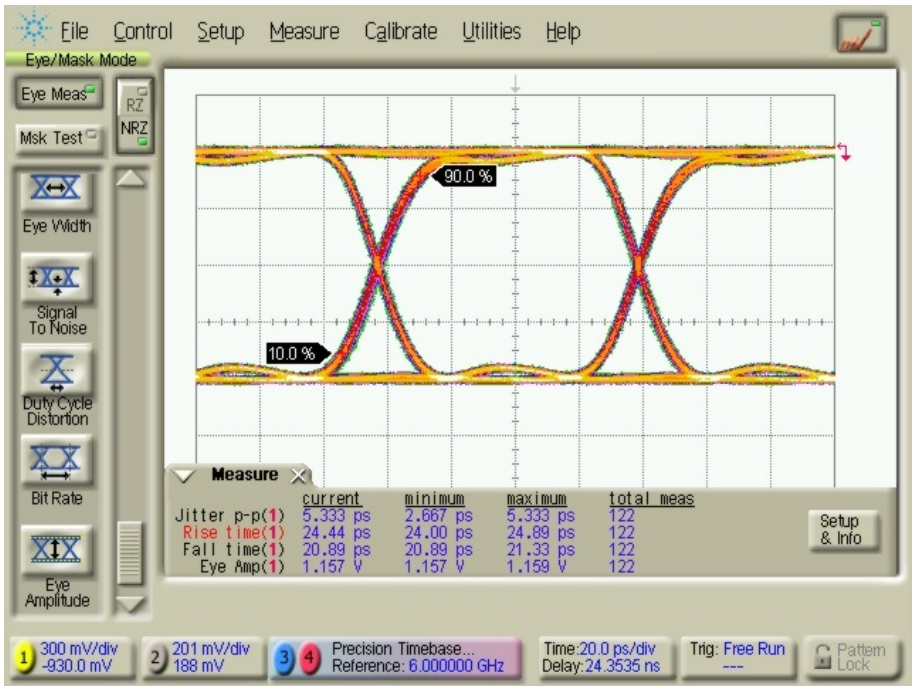
The output signal is delayed in steps of 5 ps.



TIME 20 *ps/div*

Eye Diagram of Two Complementary Output Signals with Option 3:

The amplitude of the output signals is set to 1.2 V_{pp}.



Technical Data

BPG 4x12G	
Bit Rate	5 Mbps ... 12 Gbps, full-range tuneable
Clock Input	5 MHz ... 12 GHz $U_i = 0,5 \ldots 1\,V_{pp}$, $R_i = 50\,\Omega$, $\lvert r \rvert < 0,2$, 50 Ω SMA 6-Digit Frequency Display
Pulse Patterns	1. PRBS $2^{31} - 1$, PRBS $2^{23} - 1$, PRBS $2^{15} - 1$, PRBS $2^7 - 1$ For Each Channel A, B, C and D: 2. User Pattern 16 Bit, Programmable via USB-Port 3. User Pattern 32*m Bit ($m = 3, 4 \ldots, 2^{20}$), (= max. 33 554 432 Bit), Programmable via USB-Port 4. User Pattern Consisting of Two Parts, Each of Length $128 * m$ Bit ($m = 3, 4, \ldots, 2^{19}$), Programmable and Synchronously Selectable via USB-Port (Two Waveform Mode) 5. User Pattern Consisting of Four Parts, Each of Length $128 * m$ Bit ($m = 3, 4, \ldots, 2^{18}$), Programmable and Synchronously Selectable via USB-Port (Four Waveform Mode)
Data Outputs	A: NRZ and /NRZ, 50 Ω SMA, B: NRZ and /NRZ, 50 Ω SMA, C: NRZ and /NRZ, 50 Ω SMA, D: NRZ and /NRZ, 50 Ω SMA, Independently Adjustable Amplitude $0.35\,V \ldots 0.55\,V$ into 50 Ω Rise-/ Fall-Time < 25 ps (10/90%) Jitter (rms) < 1 ps Polarity Reversible
Clock Outputs	Clock and /Clock, $0.5\,V_{pp} \pm 0.1\,V$, AC-Coupled, 50 Ω SMA Data to Clock Skew $\pm 10\,ps$
Trigger Outputs	1. Clock/8 2. Word Frame Trigger, Repetition Rate=$\frac{\text{Input Frequency}}{\text{Pattern Length}}$ CML: 0 V/-0.4 V into 50 Ω SMA

BPG 4x12G	
Interface	High Speed USB Max. Data Transmission Rate 8 MByte/s
Dimensions	19" Desktop W x H x D = approx. 462 x 135 x 435 mm
Weight	approx. 8 kg
Power Supply	110 V-120 V/60 Hz/150 VA or 220 V-240 V/50 Hz/150 VA

Optionally Available	
Option 1	Internal Synthesizer, Frequency Range 125 MHz to 12 GHz, Resolution 10 Hz, Internal or External Clock Selectable, 10 MHz Reference Input and Output
Option 2	Independent Time Delay of $\pm 30\,ps$ for each Channel, Resolution 0.1 ps
Option 3	Integrated Output Amplifier with Extended Amplitude Amplitude: $0.5 \ldots 1.2\,V_{pp}$, Jitter(rms) $<$ 1.5 ps, Rise-/Fall-Time $<$ 30 ps (10/90%)
Option 4	Extended Pattern Memory of 4*64 MBit
Option 5	Extended Pattern Memory of 4*256 MBit
Option 6	Extended Pattern Memory of 4*512 MBit
Option 7	Additional pattern synchronous trigger output with selectable divider n, Repetition rate$=\frac{\text{Input Frequency}}{\text{Pattern Length}*n}$

Ordering Information

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Included in delivery:

- BPG 4x12G
- 115/230 V Mains, User Manual, USB Cable Set
- CD-ROM with Device Drivers and Operating Software

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