

SHF Communication Technologies AG

Data Sheet

SHF BPG 4×11

Bit Pattern

Generator

Data Sheet Version 1.24

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1 Introduction

The SHF BPG 4×11 pattern generator is a versatile test instrument for PCM- and SDH-systems as well as for components used within high speed communication systems. It produces four quarter shifted PRBS signals at a bit rate of 0.5 to 11GBit/s with an output level of $\geq 1 V_{amp}$.

In conjunction with a multiplexer such as the SHF 4005 A 4:1 MUX, a true PRBS pattern with a bit rate of ≥ 44 GBit/s can be produced. This is ideal for testing the new generation of communication systems, and can be combined with the error analyzer SHF EA 44 to form a complete bit error rate test system (BERT). To aid the generation of true PRBS signals, the shift of each channel can be adjusted.

All functions are microprocessor controlled, and are accessed via a keypad on the front panel. For remote operation, a GPIB interface is provided.

2 Summary of Features

CCITT conforming PRBS patterns 2^7-1 , $2^{15}-1$, $2^{23}-1$, $2^{31}-1$

Four 64 bit programmable patterns in four different registers

Three different error injection modes (front panel, external trigger input and GPIB control)

Pattern inversion by push button

Four quarter PRBS shifted complementary data outputs @11GBit/s

Low rise time and overshoot of output signals

External master clock input at same frequency as bitrate

Low noise, low jitter advanced circuit for bit synchronized trigger output

External GPIB control

Ruggedized 2.9 mm male output connectors for data and two clock outputs

Burst-mode gating capability

Options

Option 02: adjustable Data and $\overline{\text{Data}}$ output amplitude plus DC shift

Higher output levels available on request

3 Specifications

Bit rate	$\leq 0.5 \text{ GBit/s} \dots \geq 11 \text{ GBit/s}$
External Master Clock input ¹	$\leq 0.5 \text{ GHz} \dots \geq 11 \text{ GHz}$, $S_{11} < -10 \text{ dB}$, $0.6 \dots 1 \text{ V}_{pp}$
Gating Input: AC coupled TTL compatible ²	$R_{in} = 1 \text{ k}\Omega \text{ to GND}$
Error Trigger: AC coupled TTL compatible ²	$R_{in} = 1 \text{ k}\Omega \text{ to GND}$
Electrical data outputs at 11 GBit/s, AC coupled: ¹	$\geq 1 \text{ V}_{amp}$
Four 1/4 PRBS shifted data outputs	
Adjustable output amplitude	$0.25 \dots 1 \text{ V}$
DC offset @ 50 Ω load	$0 \dots \pm 1 \text{ V}$
Rise/fall time (20% to 30%)	$\leq 30 \text{ ps}$
Bitsync/Word frame, DC coupled	$0 \dots -0.8 \text{ V}_{pp} \pm 0.2 \text{ V}$
Clock output, AC coupled	$0.8 \text{ V}_{pp} \pm 0.2 \text{ V}$
Power supply	90 V...135 V 180 V...270 V 47...63 Hz
Power consumption	220 W
Weight	27 kg
Operating temperature	+ 15° to 35° C
Size (W × H × D)	450 × 270 × 506 mm

¹ ruggedized 2.9mm precision male connector

² female SMA connector

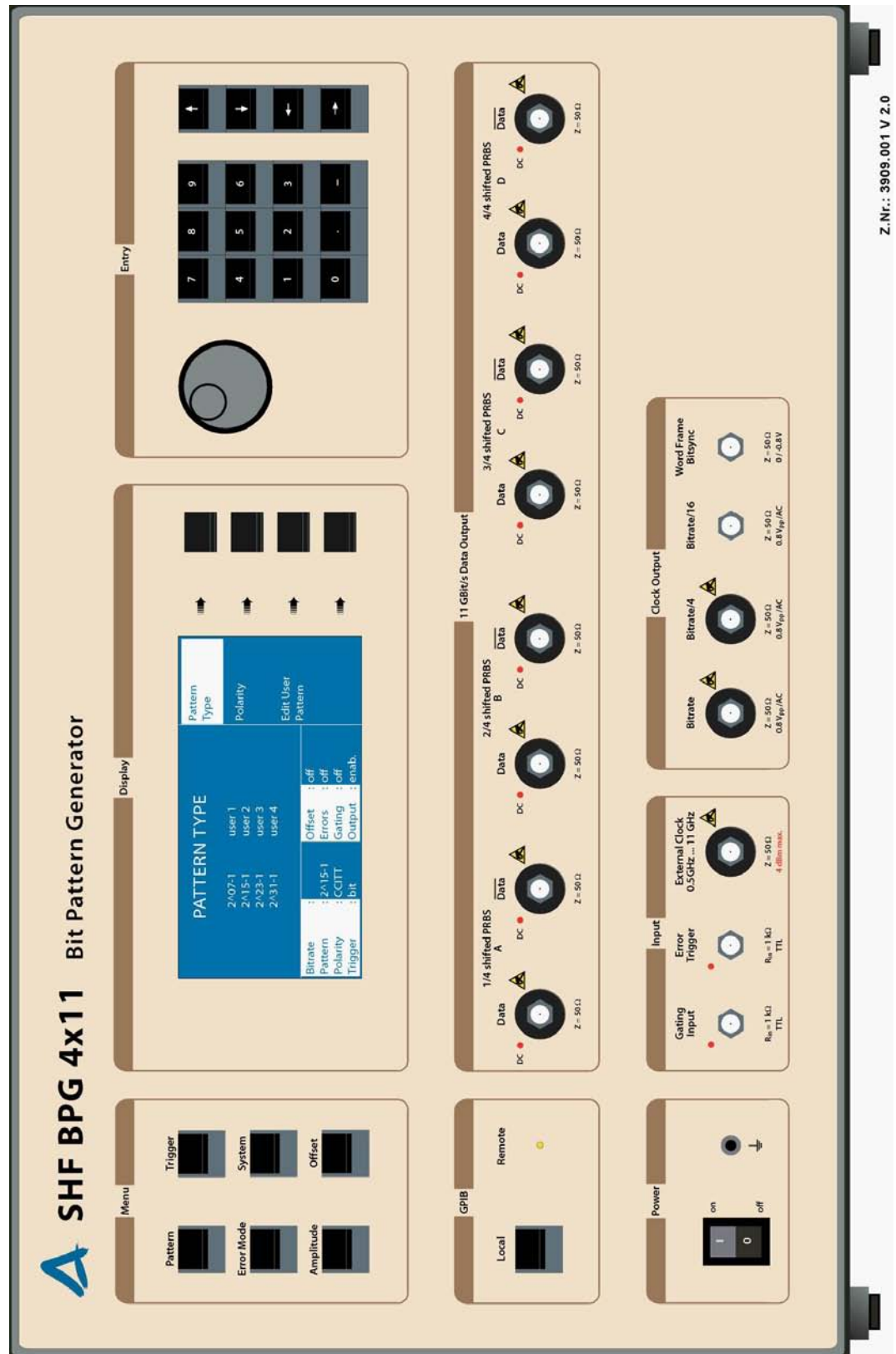
All results measured at the end of a 0.5m cable (4 pieces supplied with instrument)

Standard accessories:

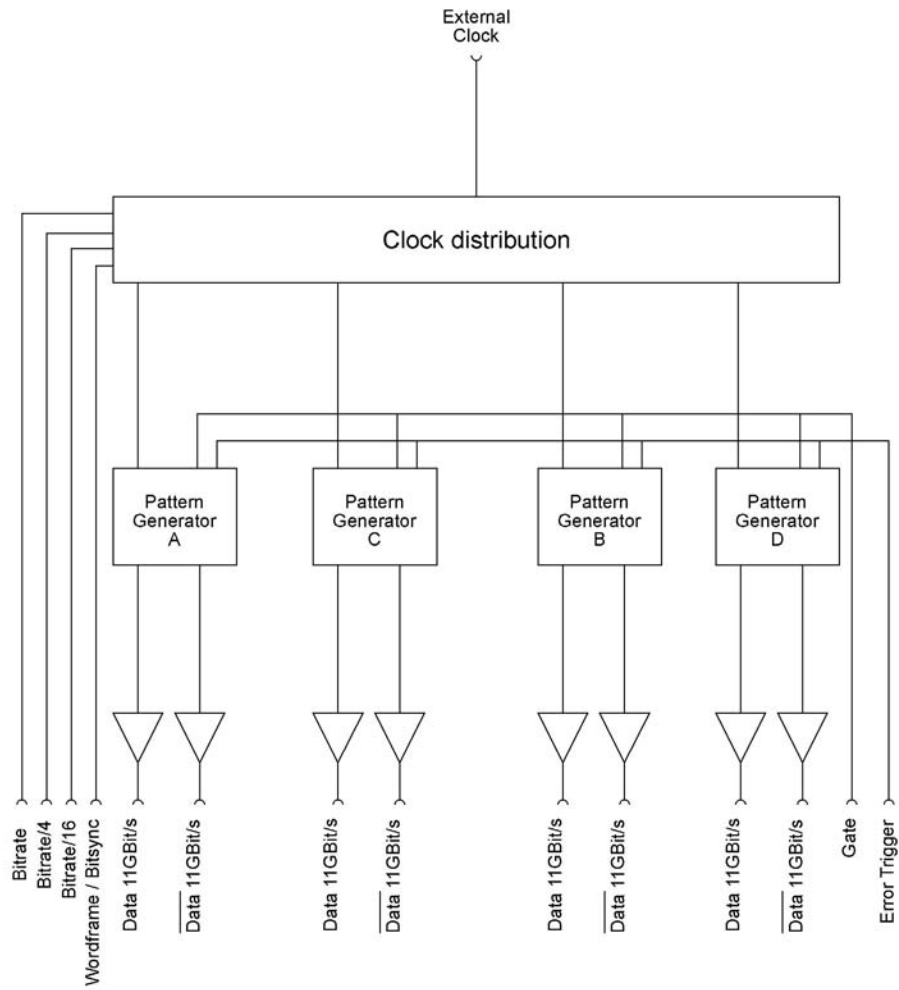
4 × 50 Ω loads

4 × precision cable assemblies

4 Front Panel



5 Block Diagram

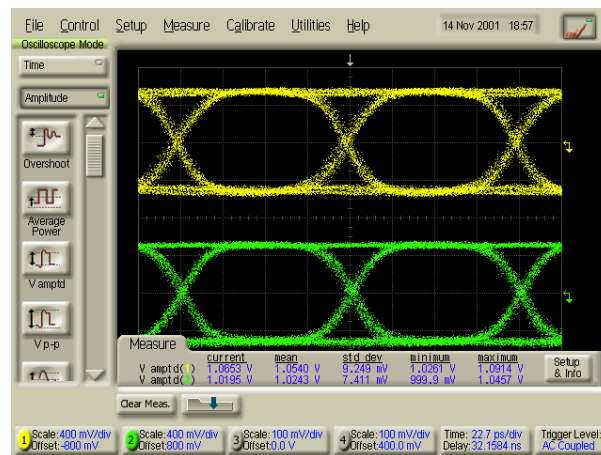


6 Performance: Test and Measured Results

The following tests were performed using an 11 GHz clock generator. The eye diagrams were measured using a Agilent 86100 A digitizing oscilloscope (including enhanced trigger option) and a 50 GHz plug-in Agilent 83484 A sampling head.

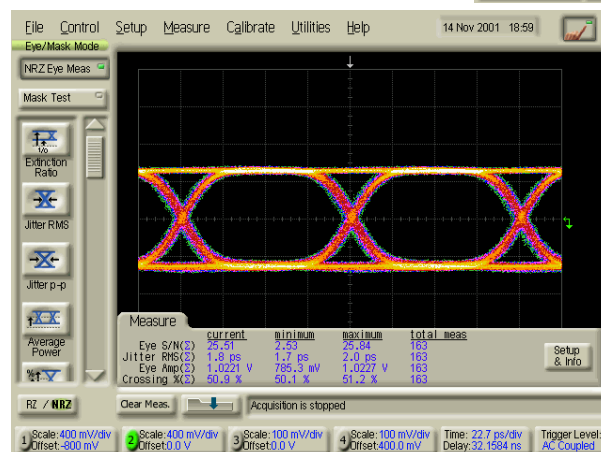
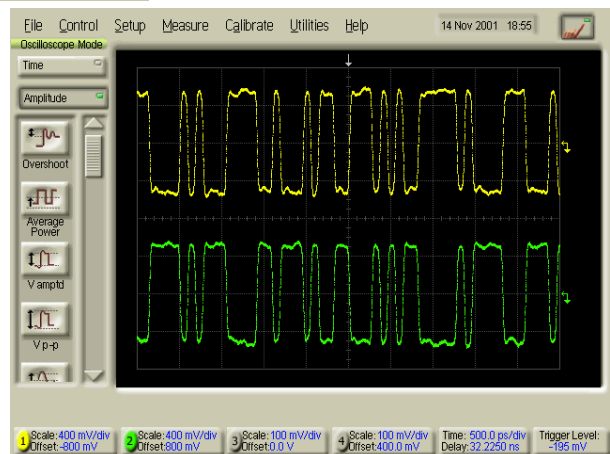
All results measured at the end of a 0.5m cable (4 pieces supplied with instrument)

Measurements @ 11 GBit/s



Data and $\overline{\text{Data}}$ output: eye diagram

Data and $\overline{\text{Data}}$ output: pulse train



Eye diagram: Q-factor and jitter measurements