

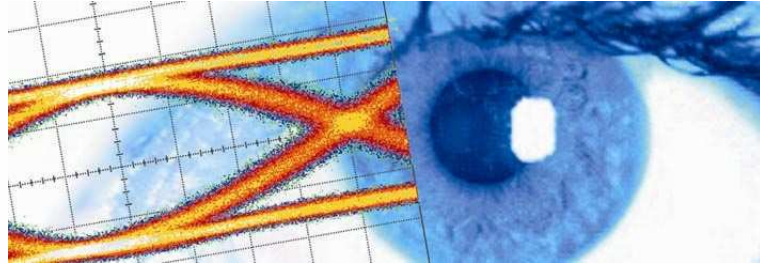


SHF Communication Technologies AG

Wilhelm-von-Siemens-Str. 23D • 12277 Berlin • Germany

Phone ++49 30 / 772 05 10 • Fax ++49 30 / 753 10 78

E-Mail: sales@shf.de • Web: <http://www.shf.de>



Datasheet

SHF 1120C

40 - 43 Gbps Clock Recovery Module





Description

The SHF 11120C Clock Recovery is designed to extract and synchronize the clock from a serial data stream. The module operates at bit rates from 39.8 to 43.1 Gbps.

It uses two separate VCOs which allow operation in two bands. The lower band spans the range between 39.8 and 41.6 Gbps and the higher band spans the range between 41.6 and 43.1 Gbps.

Due to the circuit concept a reference clock with a frequency of bit rate divided by either 64, 32 or 16 must be applied to the unit. For better convenience reference oscillators for three standard bit rates (39.813 Gbps, 42.656 Gbps and 43.018 Gbps) are built-in.

The SHF 11120C can be operated locally by the front panel or remote via Ethernet-connection from a PC running the SHF BERT Control Center control software (BCC). Its programming features allow automated measurements using test programs like Agilent VEE or National Instruments LabView.

The module is a compact solution which offers superb performance while including easy to use features.

Features

- Operating bit rate range from 39.8 to 43.1 Gbps (this includes OC-768 with and without FEC)
- Clock output frequency at half and quarter of the nominal input data bit rate
- Excellent input sensitivity of 50 mV
- Local or remote operation via Ethernet-connection to a PC (SHF BERT Control Center)

Options

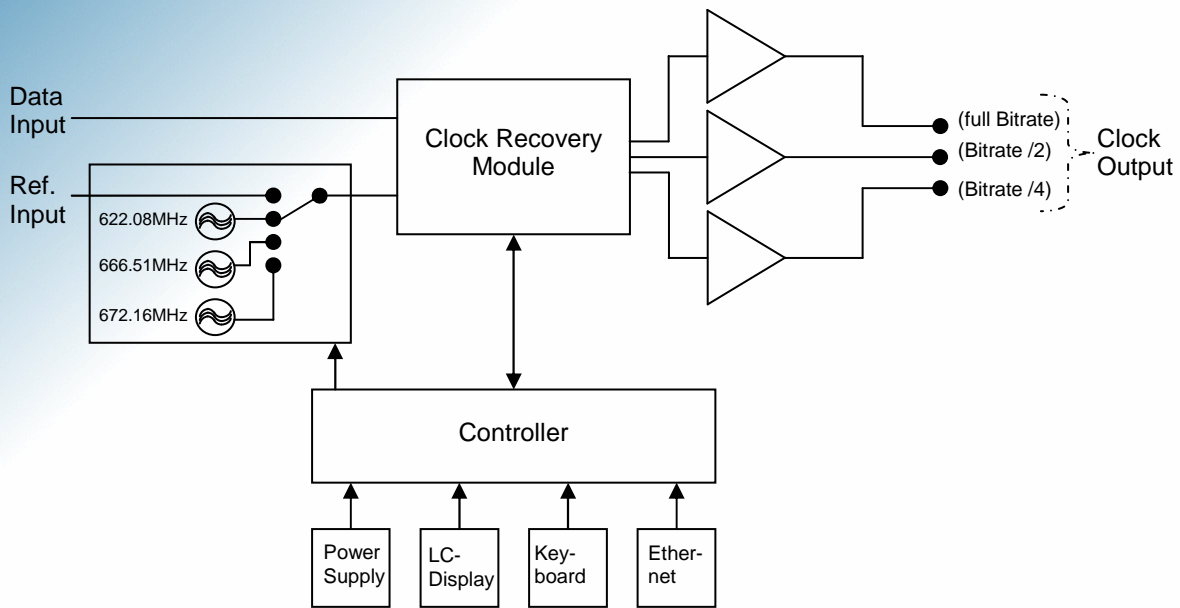
- Option C40: Full clock output

Applications

- R&D for optical communication systems at bit rates from 40 to 43 Gbps
- Characterization of high speed optical components
- Bit error rate testing
- Optical component and fiber loop testing
- Optical transmitter testing



Block Diagram



Specifications – SHF 11120C

| Parameter | Unit | Min. | Typ. | Max. | Comment |
|---------------------------------|------------------|-------|---------|-------|---------------|
| Data Input | | | | | |
| Operating bit rate | Gbps | | | | |
| VCO1 | | 39.8 | | 41.6 | |
| VCO2 | | 41.6 | | 43.1 | |
| Locking Range ¹ | MHz | | ± 4 | | |
| Input Voltage | mV _{pp} | 50 | | 800 | |
| Connector | Ω | | 50 | | V-female |
| Return loss | dB | | 8 | | |
| Reference Clock Input | | | | | |
| Input Frequency | GHz | | | | |
| (Bit Rate / 64 mode) | | 0.622 | | 0.674 | |
| (Bit Rate / 32 mode) | | 1.244 | | 1.348 | |
| (Bit Rate / 16 mode) | | 2.488 | | 2.696 | |
| Input Voltage | mV _{pp} | 400 | | 800 | |
| Connector | Ω | | 50 | | SMA-female |
| Internal Reference Clock | | | | | |
| Clock 1 | MHz | | 622.080 | | 39.81312 Gbps |
| Clock 2 | MHz | | 666.514 | | 42.65692 Gbps |
| Clock 3 | MHz | | 672.163 | | 43.01841 Gbps |

¹ PRBS 2³¹-1, Input Amplitude 100mV

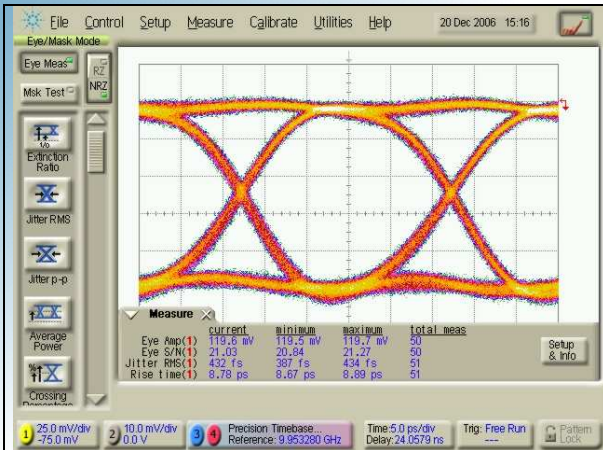


| Clock /4 Output (quarter bit rate) | | | | | |
|----------------------------------------------------|------------------|------|----------|--------|-------------------------------------------------------------------------|
| Output Frequency | GHz | 9.95 | | 10.775 | |
| Output Voltage | mV _{pp} | 400 | | 800 | |
| Connector | Ω | | 50 | | SMA-female |
| RMS-Jitter | fs | | 550 | 700 | on scope display, measured with Agilent 86100A with precision time base |
| Half Clock Output (half bit rate) | | | | | |
| Output Frequency | GHz | 19.9 | | 21.55 | |
| Output Voltage | mV _{pp} | 500 | | 1000 | |
| Connector | Ω | | 50 | | K-female |
| RMS-Jitter | fs | | 450 | 600 | on scope display, measured with Agilent 86100A with precision time base |
| Full Clock Output (optional, full bit rate) | | | | | |
| Output Frequency | GHz | 39.8 | | 43.1 | |
| Output Voltage | mV _{pp} | 500 | | 1000 | |
| Connector | Ω | | 50 | | V-female |
| RMS-Jitter | fs | | 450 | 600 | on scope display, measured with Agilent 86100A with precision time base |
| General Data | | | | | |
| Power Supply | V | 90 | | 240 | 47... 63Hz |
| Power Consumption | W | | 15 | | |
| Weight | kg | | 3 | | |
| Dimensions (WxHxD) | mm | | | | 235 x 110 x 290 |
| Operating temperature | °C | 10 | | 35 | |
| Storage temperature | °C | -20 | | 70 | |
| Network Connection | Mbps | | 10 / 100 | | Ethernet, RJ-45 connector |

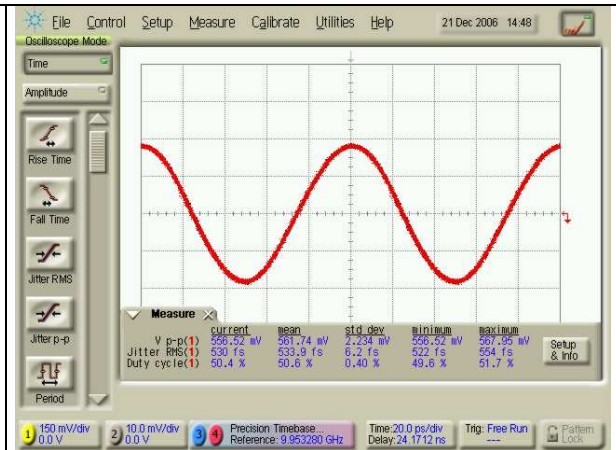


Test Results

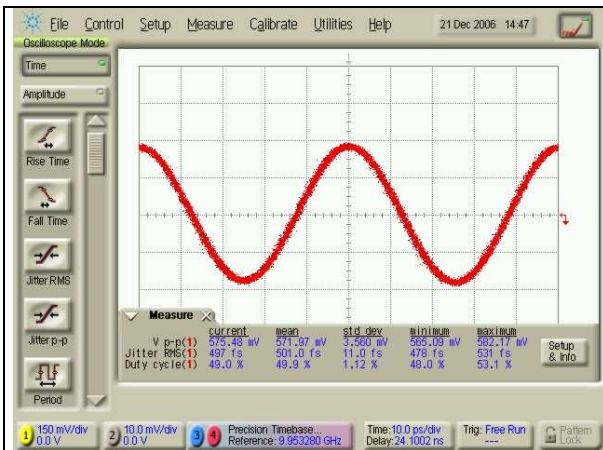
Test Results @39.813 Gbps with Internal Reference 1 (622.08 MHz)



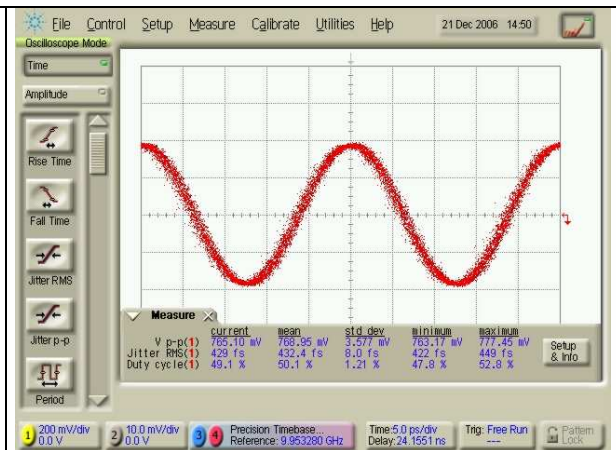
Data In @ 39.813 Gbps



Clk/4 Out @ 39.813 Gbps



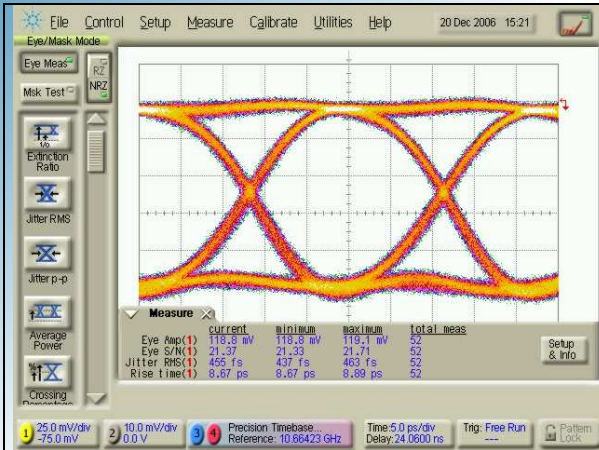
Clk/2 Out @ 39.813 Gbps



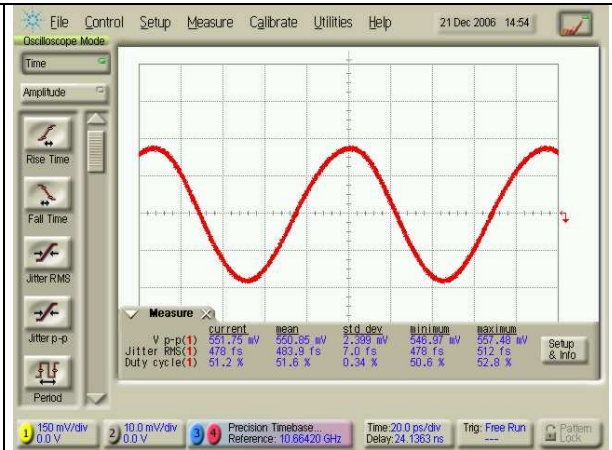
Clk Out @ 39.813 Gbps



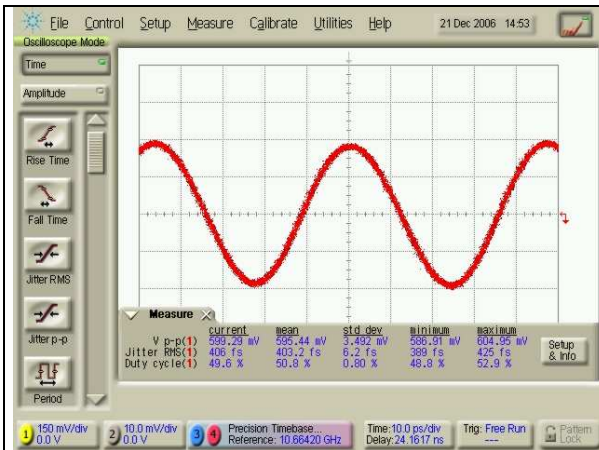
Test Results @ 42.656 Gbps with Internal Reference 2 (655.514 MHz)



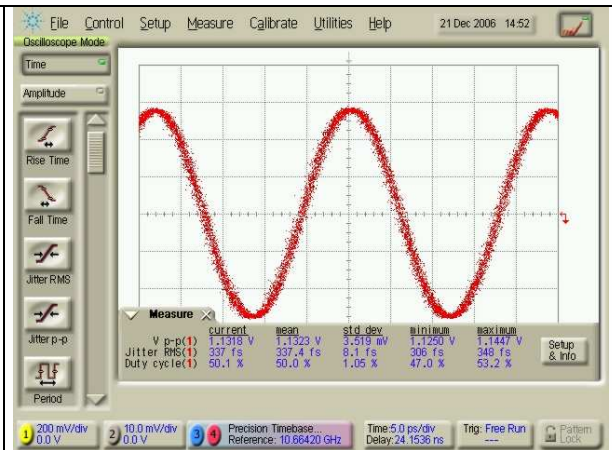
Data In @ 42.656 Gbps



Clk/4 Out @ 42.656 Gbps



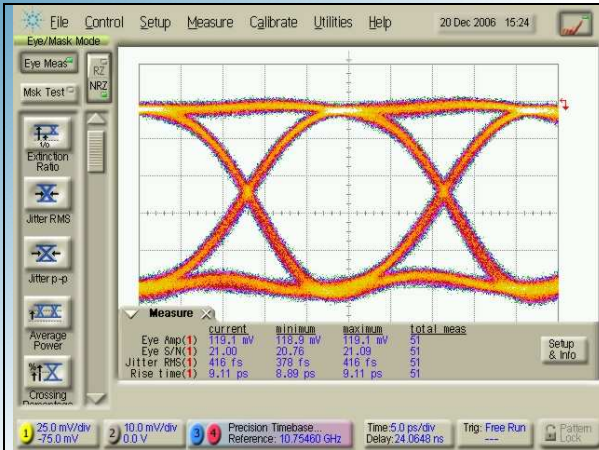
Clk/2 Out @ 42.656 Gbps



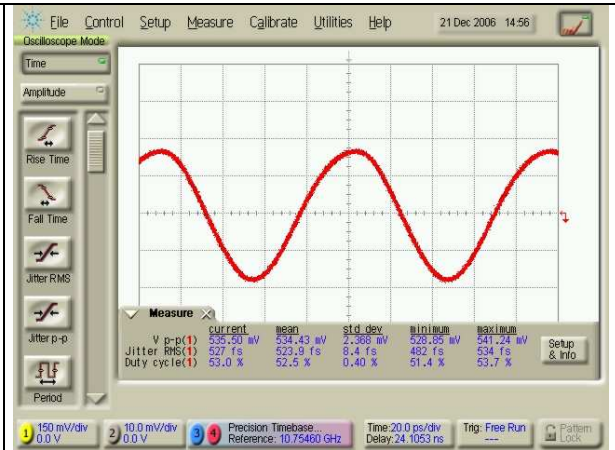
Clk Out @ 42.656 Gbps



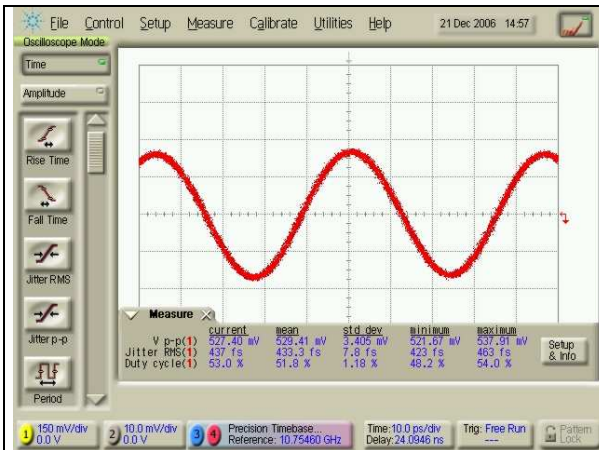
Test Results @ 43.018 Gbps with Internal Reference 1 (672.163 MHz)



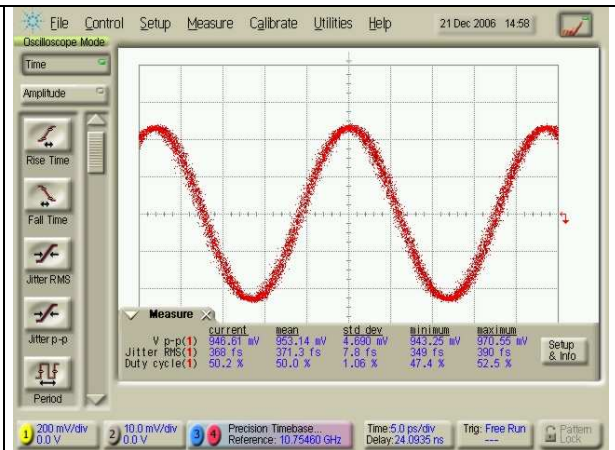
Data In @ 43.018 Gbps



Clk/4 Out @ 43.018 Gbps



Clk/2 Out @ 43.018 Gbps



Clk Out @ 43.018 Gbps