

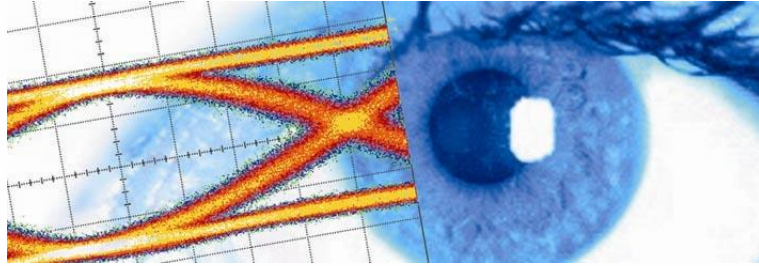


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Datasheet

SHF C681 B

Analog FIR Filter





Description

The SHF C681 B is a tunable analog 6-tap finite impulse response (FIR) filter. The differential input signal is amplified and filtered by a 6-stage FIR filter structure with fixed tap delays of ~ 7.5 ps. The frequency response can be arbitrarily modified by adjusting the filter coefficients i.e. the gain of the tap amplifiers in the GUI.

Equalizing operation has been verified for heavily degraded signals up to 60 GBaud PAM4 and 60 Gbps NRZ (please be referred to the signals below).

All RF in- and output ports are AC-coupled and internally terminated with 50 Ohm to GND. Unused in- or output ports should be terminated with 50 Ohm.

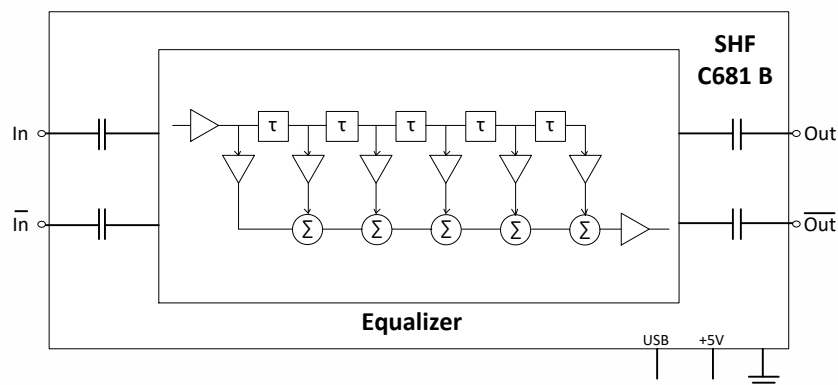
Features

- Differential data input and output
- Complementary DSP software ("SHF FIR") to calculate the optimum settings from s2p files
- Compact module to be placed wherever adaptive equalization is required e.g. close to the DUT

Applications

- Quality Improvement of a degraded signal e.g. for BER measurements
- Equalization of transmission channels
- Signal predistortion to simulate various transmission channels
- 100GbE, 200GbE, 400GbE and 1TbE system evaluation & development
- Telecom transmission
- Broadband test and measurement equipment
- Feed forward equalization (FFE)

Block Diagram



Accessories

- +5V power supply desktop adapter
- Functional earth cable
- Mini-USB cable



Absolute Maximum Ratings

Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Input Parameters						
Data Input Voltage	mV	$V_{data\ in}$			900	Peak-to-Peak
External DC Voltage on Data Input Ports	V	V_{DCin}	-6		+6	AC coupled input
External DC Voltage on RF Output Ports	V	V_{DCout}	-6		+6	AC coupled output
DC Supply Voltage	V	V_{cc}	0		+6	

Specifications

Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Input Parameters						
Maximum Analog Bandwidth	GHz	f_{-3dB}	55 ¹			
Data Input Voltage	mV	$V_{data\ in}$		200	800	Eye Amplitude; Single-ended
1 dB Compression	mV	V_{1dB}		200 100		Eye Amplitude; Single ended drive; Differential drive
Output Parameters						
Output Amplitude	mV	V_{out}			300	Eye Amplitude; Single-ended; Depending on tap settings
Power Requirements						
Supply Voltage	V	V_{cc}	+5		+5.5	2.5 x 0.7 mm DC Power Jack
Supply Current	mA	I_{ee}			250	
Power Dissipation	W	P_d	1.25		1.38	@ $V_{CC} = +5V$
Mechanical Characteristics						
Connectors	Ω			50		1.85 mm (V) female
Dimensions	mm					see page 7
Weight	g			90		
Conditions						
Operating Temperature	°C	$T_{ambient}$	15		35	

¹ Analog Bandwidth depends on the set filter characteristic (flat_maxBW)

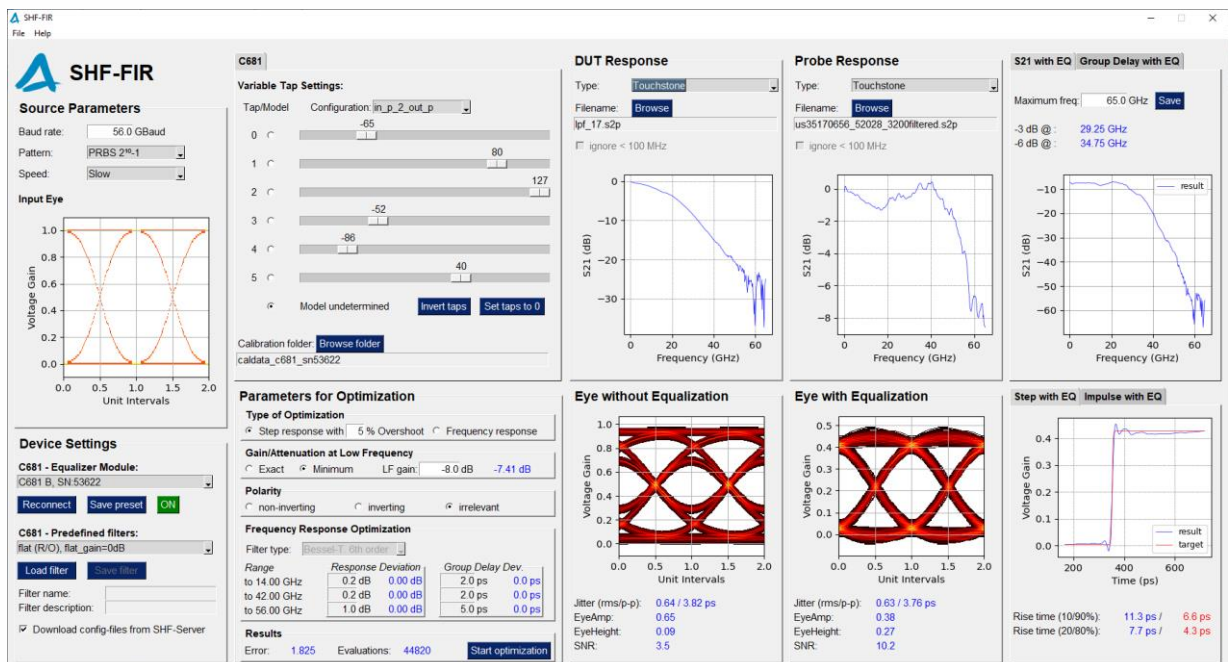


Remote Interface & Software

The Filter is controlled by the easy to use software package SHF Control Center (SCC).



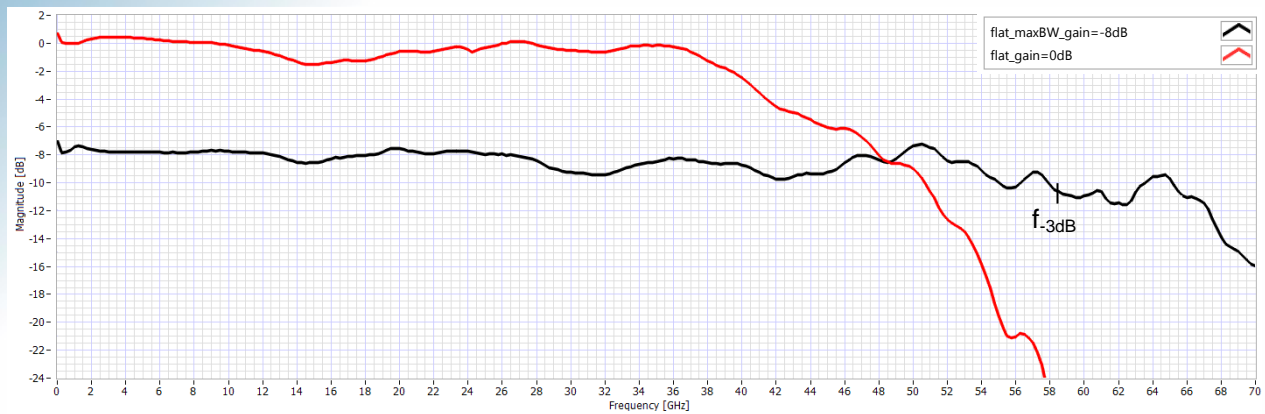
The Filter settings can be derived and optimized by a dedicated DSP program package “SHF FIR”.



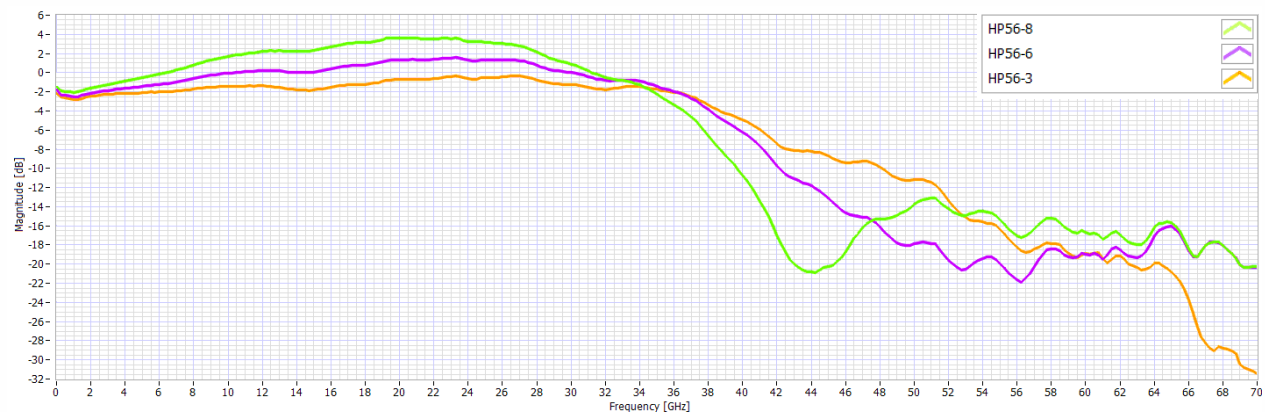


Typical FIR Filter Presets

Flat frequency responses for maximum bandwidth and maximum gain.



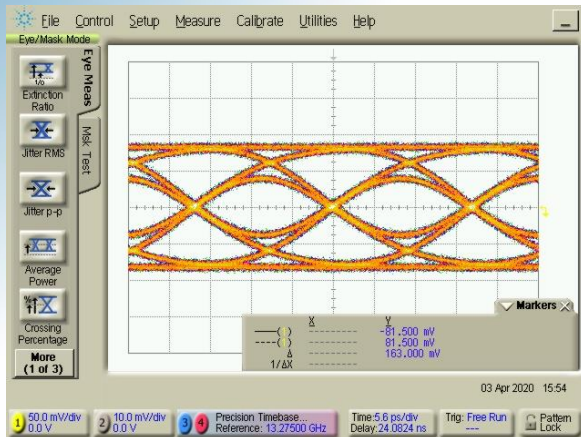
Frequency responses for a 3, 6 and 8 dB slope @ $f_{\text{Nyquist}} = 28 \text{ GHz}$.



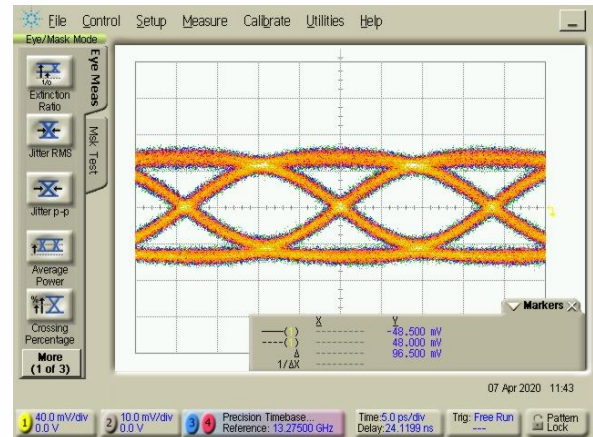


Typical Applications

Compensation of a low pass filtered signal at 53.1 GBit/s



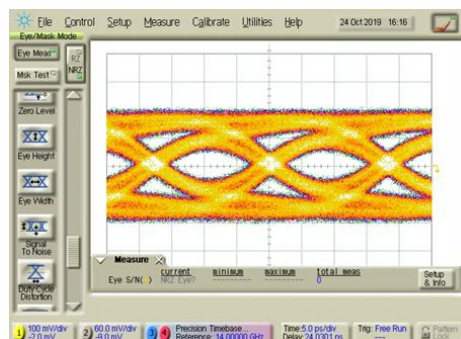
Signal before equalization



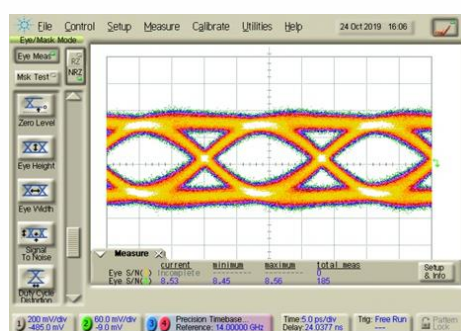
Signal with equalization

Compensation of a 2.8 m TCF280 cable at 56 GBaud

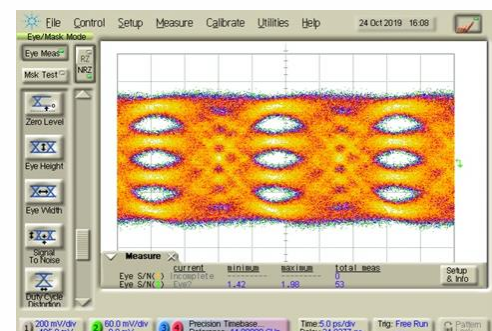
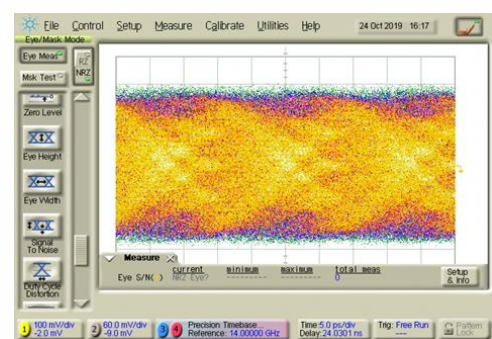
Signals before equalization



Signal with equalization (optimized)



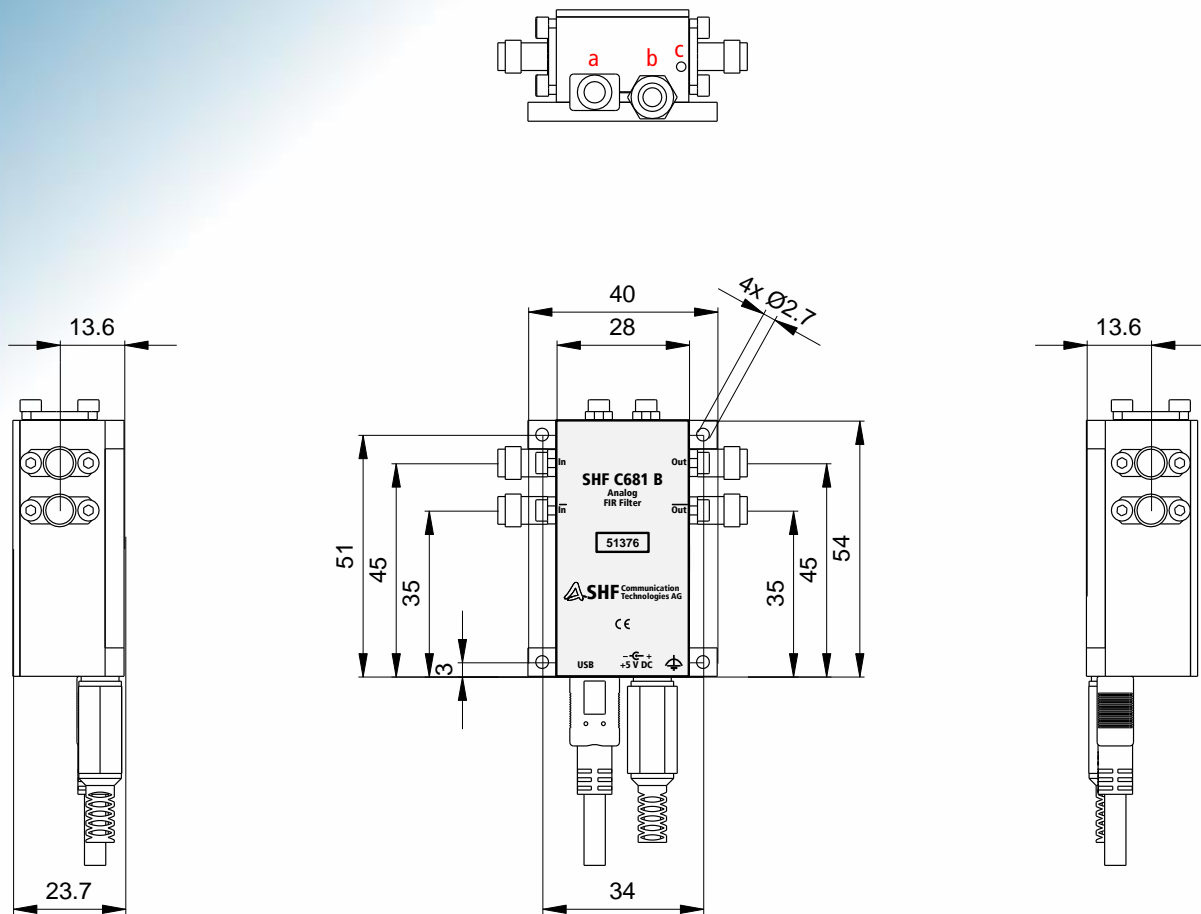
NRZ



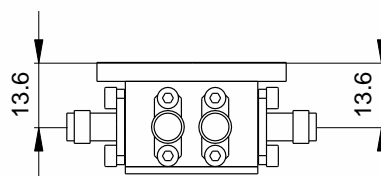
PAM4



Outline Drawing – Module



Port	Connector
In	1.85mm (V) female
In	1.85mm (V) female
Out	1.85mm (V) female
Out	1.85mm (V) female



All dimensions are in mm

Port	Connector
a	Mini-USB
b	Power
c	Functional earth (FE)