

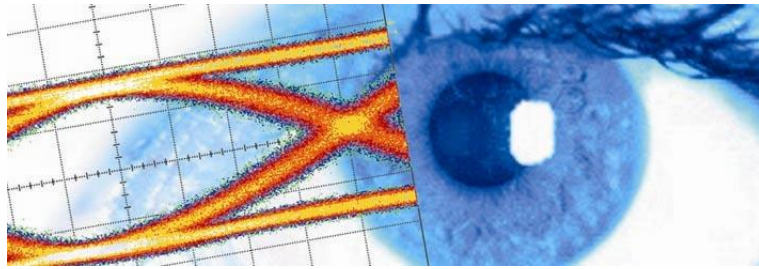


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Datasheet

SHF 11221 A

120 Gbps 1:2 Demultiplexer



SHF reserves the right to change specifications and design without notice - SHF 11221 A – V 002 – March 01, 2022 Page 1/8



Description

The SHF 11221 A is a 1:2 demultiplexer operating at bit rates up to 120 Gbps for use in broadband test setups and telecom transmission systems. The module essentially is a high sensitivity 1:2 demultiplexer extended by an automated delay line for computer-controlled sampling time adjustments.

The threshold and time delay position can be controlled to explore the error characteristics of the input NRZ signal. At each position, the demultiplexer outputs two half speed NRZ signals to be further processed by an error analyzer.

For BER measurements, the module is optimized to operate with the SHF 11104 A Error analyzer.

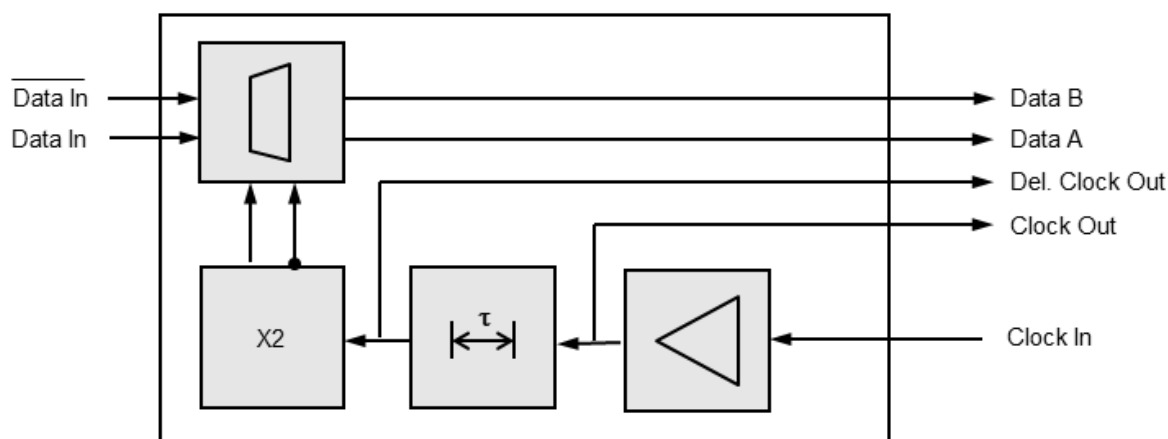
Features

- Broadband operation up to 120 Gbps
- Differential data input
- Quarter-clock system
- Data Input Sensitivity <110 mV (single ended)
- Single ended data outputs
- Time delay and threshold adjustment via software
- Graphical eye scan for signal visualization

Applications

- 100, 200, 400 Gbps and 1 Tbps system evaluation & development
- Broadband test and measurement equipment

Block Diagram





Ease of Use

Housed in a small benchtop case, this remote head can be easily embedded in the customer's test environment close to the DUT.



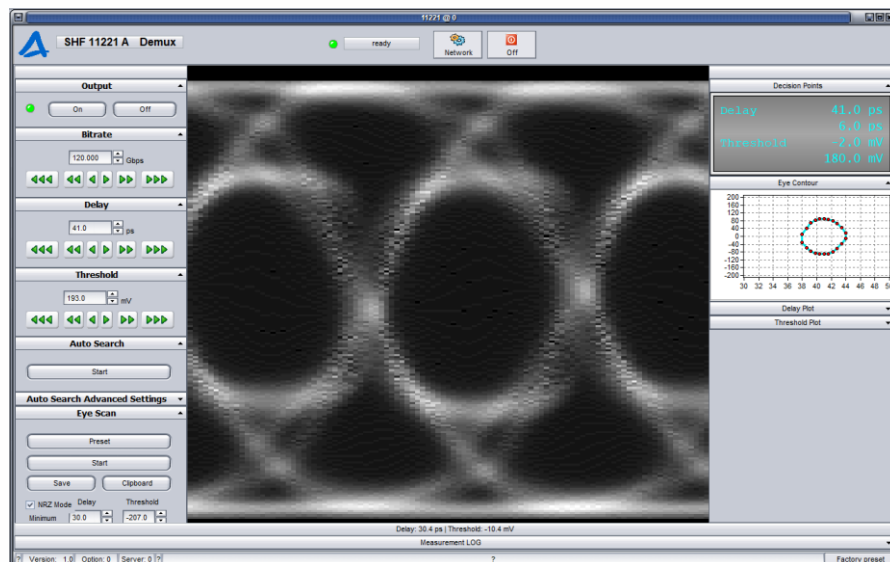
SHF 11221 A

The SHF 11221 A requires a clock signal at quarter the input bit rate as master clock.

The operation can be controlled by the Demultiplexer GUI in the SHF BERT Control Center (BCC) or via simple text commands for integration in other software environments.

In the Demultiplexer GUI, the built-in eye scan function has the capability to map out an eye pattern of the input NRZ signal, as well as to execute a fast "Auto-search" to determine the threshold and delay of the input.

For BER measurements, a dual channel SHF 11104 A error analyzer is required. The measurement software has been tailored to integrate the over-all operation with the SHF 11104 A, and combine the BER data taken from the two demultiplexed channels.



BCC SHF 11221 A Demultiplexer GUI, showing the eye scan of an 120 Gbps NRZ signal



Absolute Maximum Ratings

Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Input Parameters						
Data Input Voltage	mV	$V_{data\ in}$			900	Peak-to-Peak
Clock Input Voltage	mV	$V_{clk\ in}$			900	Peak-to-Peak
External DC Voltage on RF Clock Input Port	V	V_{DCin}	-3		+3	AC coupled input
External DC Voltage on RF Data Input Ports	V	V_{DCin}	-3		+3	AC coupled input
External DC Voltage on RF Output Ports	V	V_{DCout}	-3		+3	AC coupled input
DC Supply Voltage	V	V_{cc}			13	



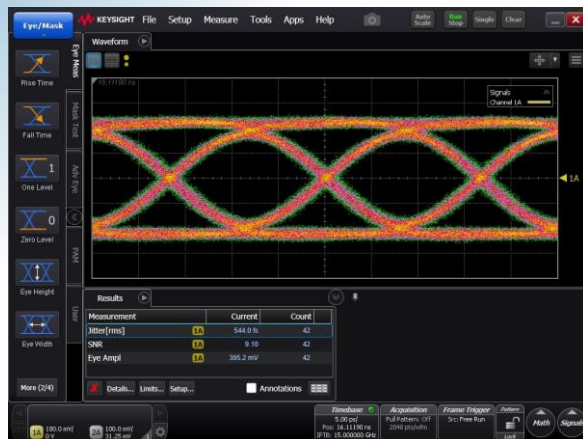
Specifications

Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Input Parameters						
Minimum Input Data Rate	GBaud	$R_{in,min}$			60	
Maximum Input Data Rate	GBaud	$R_{in,max}$	120			
Minimum Clock Input Frequency	GHz	$F_{in,min}$			15	quarter of the input bit rate
Maximum Clock Input Frequency	GHz	$F_{in,max}$	30			quarter of the input bit rate
Clock Input Voltage	mV _{pp}	$V_{clk\ in}$	300		800	Peak-to-Peak; 500 mV recommended
Data Input Voltage	mV	$V_{data\ in}$		400	800	Eye Amplitude; Single-ended
Data Input Sensitivity	mV	60 80 110				≤ 80 Gbps > 80 ... ≤ 100 Gbps > 100 Gbps Eye height, Single-ended; On scope display; See page 7
Delay / Clock Phase Adjustment	ps		0		60	Adjustable in 0.1 ps steps
Output Parameters						
Data Output Voltage	mV	V_{Out}	350	400		Eye Amplitude; Single-ended
Clock Output Voltage	mV _{pp}	V_{Clkout}	450	600		Peak-to-Peak
Del. Clock Output Voltage	mV _{pp}	V_{Clkout}	450	600		Peak-to-Peak
Connectors						1.85 mm (V) male
General						
Supply Voltage	V	V_c	+11.5	+12	+12.5	2.1 mm DC Power Jack; +12V switching power supply is included
Supply Current	mA	I_c		1670		
Power Consumption	W	P_d		20		@ $V_c = +12\ V$
Height	mm	H		58.9		
Width	mm	W		221.4		
Depth	mm	D		177		
Weight	kg	m		1.75 2		without power supply with power supply
Operating Temperature	°C	T	10		35	Ambient temperature

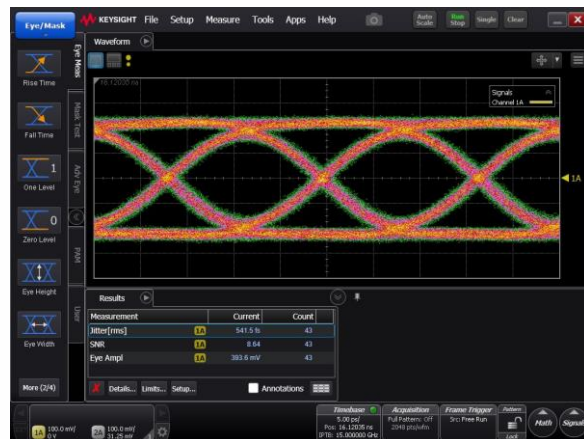


Typical Output Eye Diagrams

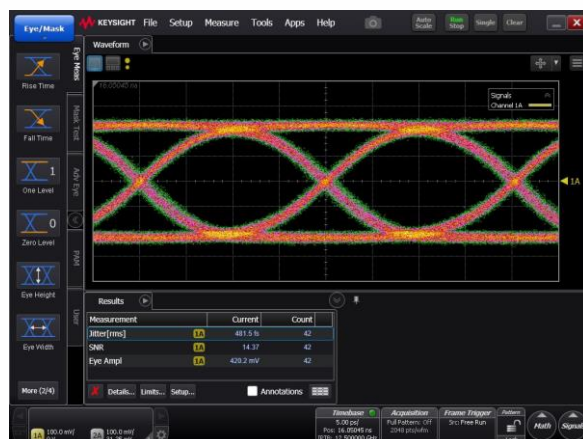
The measurements below had been performed using a SHF 603 B MUX (PRBS $2^{31}-1$) and a Keysight DCA-X N1000 A with Precision Timebase and 70 GHz Sampling Head (80N01). The outputs of the demultiplexer module had been connected by 10 dB attenuators to the DSA input.



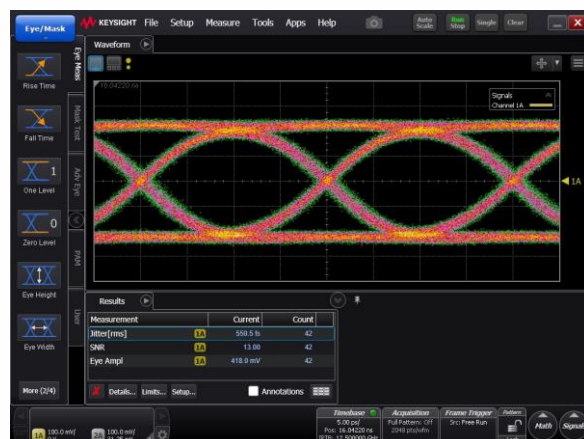
Out A @ 60 Gbps Output Bitrate



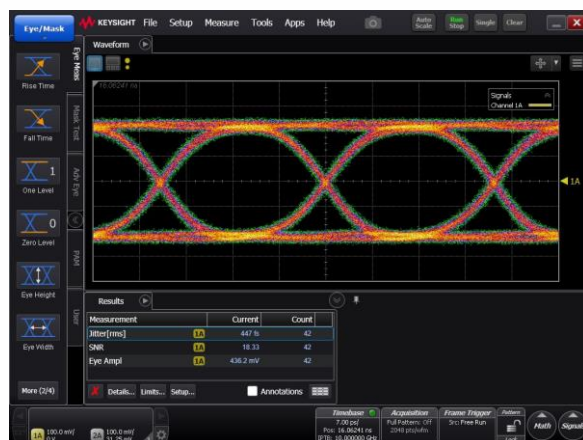
Out B @ 60 Gbps Output Bitrate



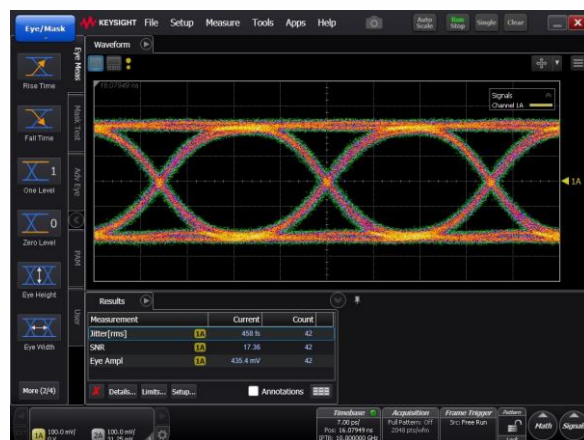
Out A @ 50 Gbps Output Bitrate



Out B @ 50 Gbps Output Bitrate



Out A @ 40 Gbps Output Bitrate

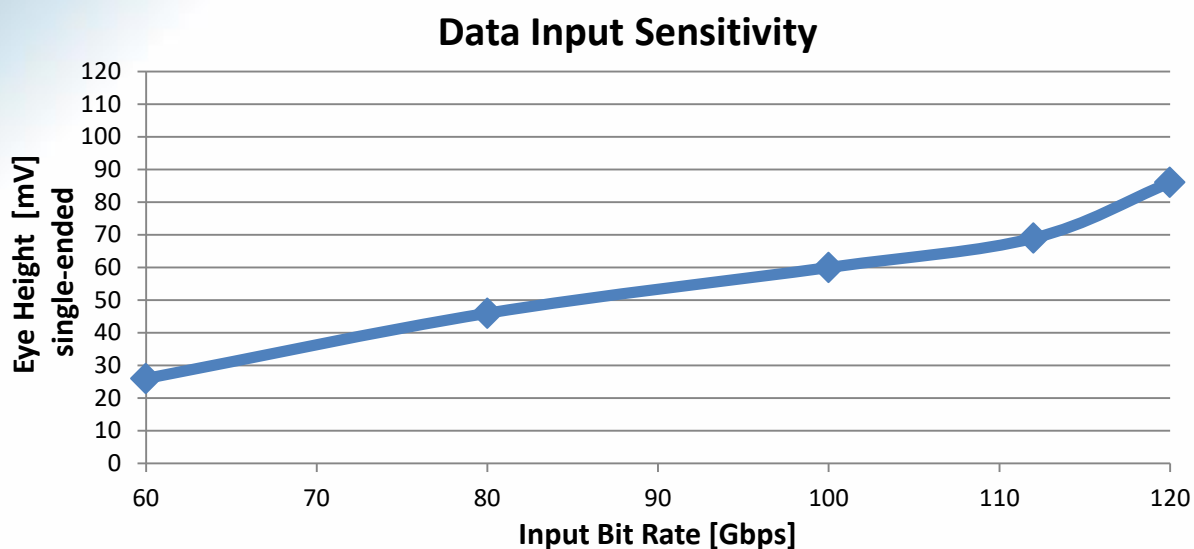


Out B @ 40 Gbps Output Bitrate



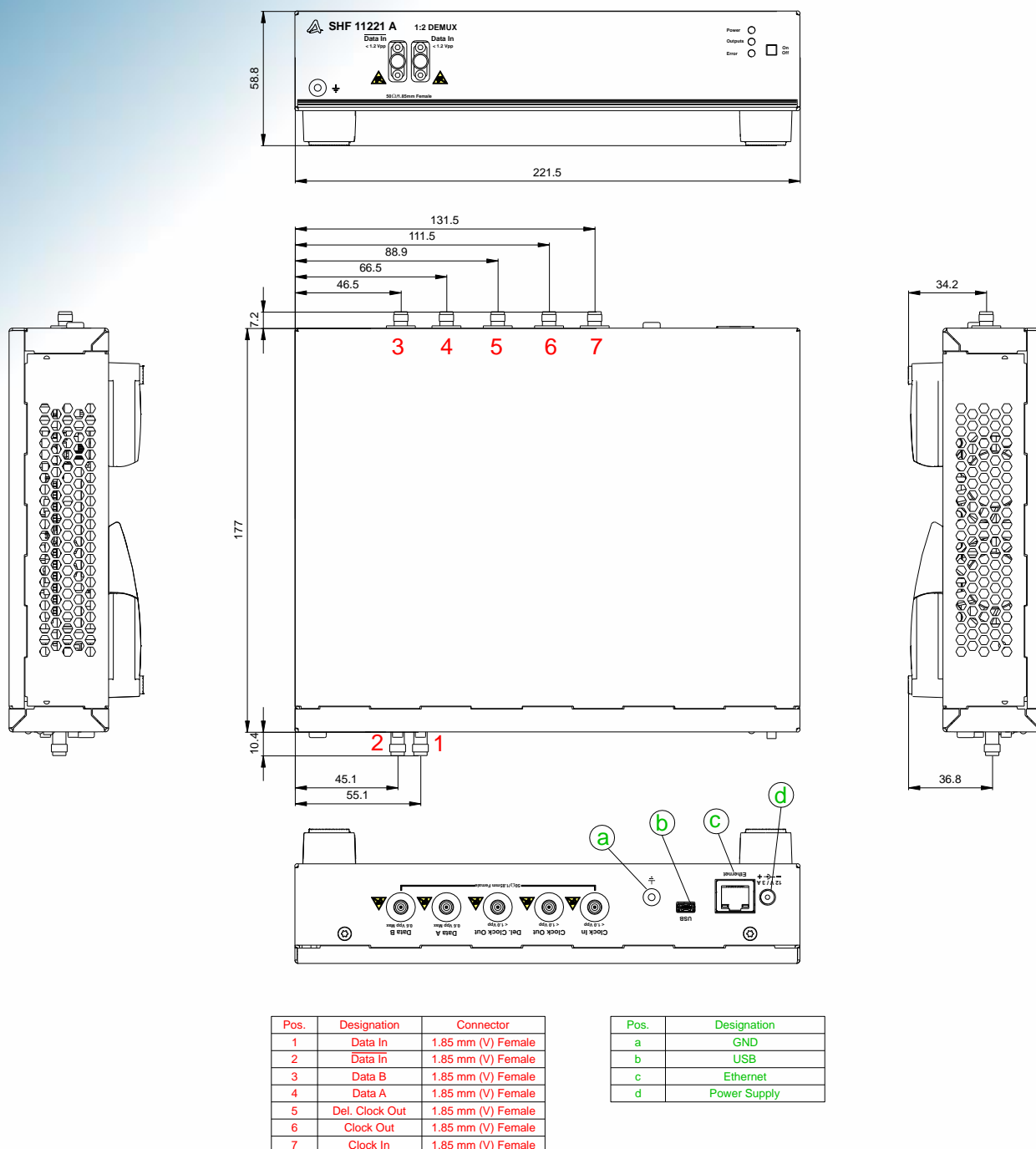
Typical Performance

The measurements shown below had been performed using a SHF C603 B MUX (PRBS $2^{31}-1$), a SHF 11104 A Error Analyzer, a Keysight DCA-X N1000 A with Precision Timebase and 70 GHz Sampling Head (80N01) to determine the eye height of the input signal. For the sensitivity measurement the input signal had been reduced until a BER limit of $<10^{-9}$ was achieved.





Outline Drawing – SHF 11221 A



All dimensions in mm