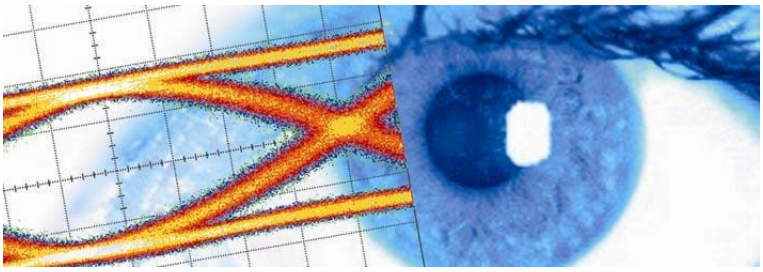
SHF Communication Technologies AG

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

Phone +49 30 772051-0 • Fax +49 30 7531078

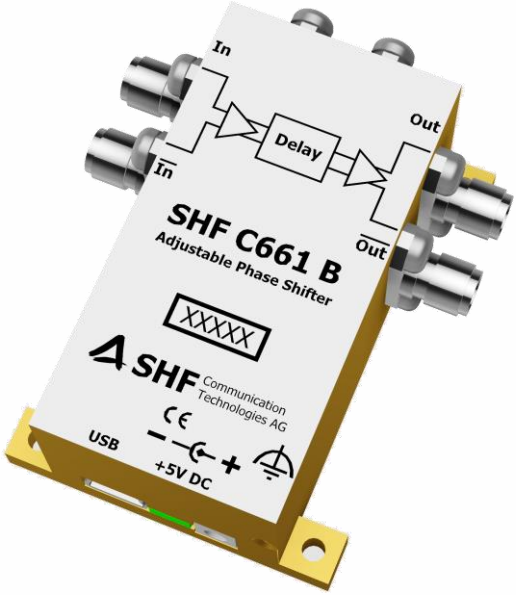
E-Mail: sales@shf-communication.com • Web: www.shf-communication.com



Datasheet

SHF C661 B

Adjustable Phase Shifter



Description

The SHF C661 B is a broadband digitally controlled phase shifter.

The phase shifter features a maximum delay of 70 ps with a 100 fs resolution. This phase-controlled output signal is provided at a differential output.

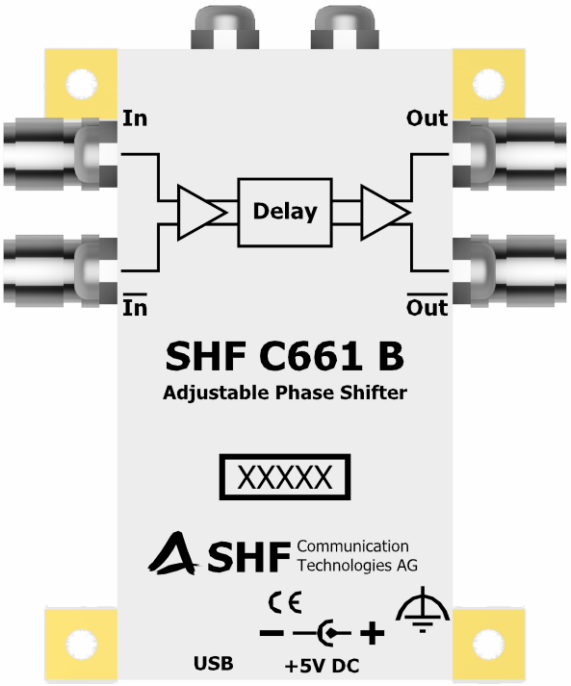
Features

- Broadband 70 ps delay line with a 100 fs step size operating from 2 GHz up to 35 GHz
- Controlled by intuitive graphical user interface SHF Control Center (SCC) or BERT Control Center (BCC) via USB
- Differential or single-ended operation
- Design features limiting amplifiers

Applications

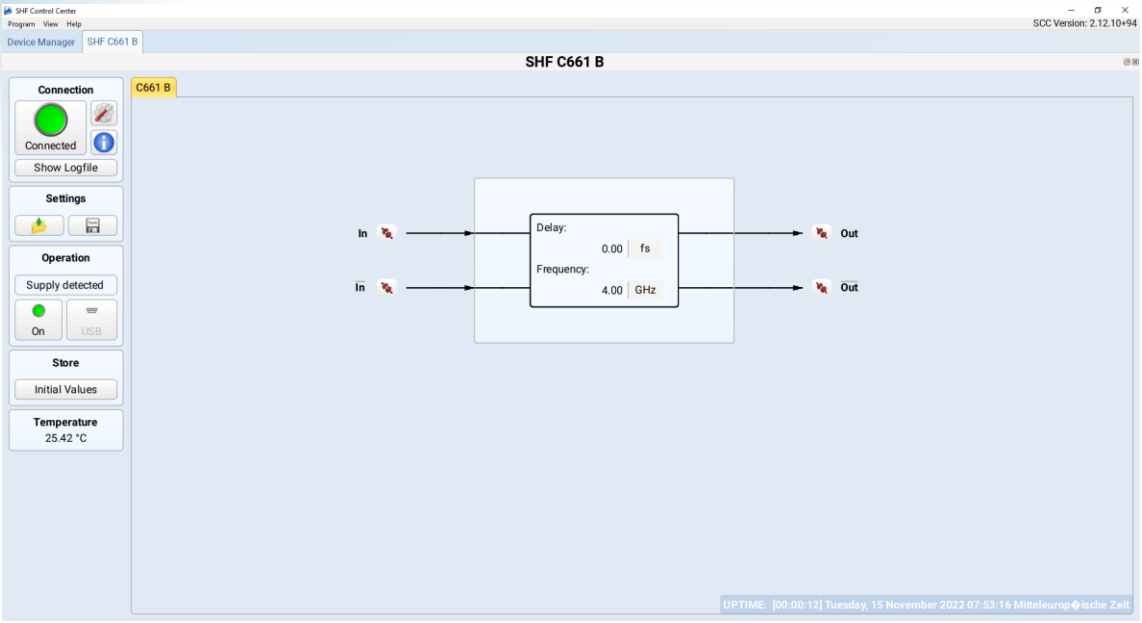
- Computer controlled phase adjustments of clock signals up to 35 GHz
- Phase margin tests
- Clock signal distribution in high-speed telecom setups
- Precise delay control for automated measurements

Block Diagram



Remote Interface & Software

The Adjustable Phase Shifter is controlled by the easy to use software package SHF Control Center (SCC). The adjustable Phase (“Delay”) and the used Frequency (“Frequency”) are to be set and are displayed in the graphical user interface (GUI).



SHF Control Center (SCC)

Accessories

- +5 V Power Supply Desktop Adapter
- Functional Earth Cable
- Mini-USB cable

Absolute Maximum Ratings

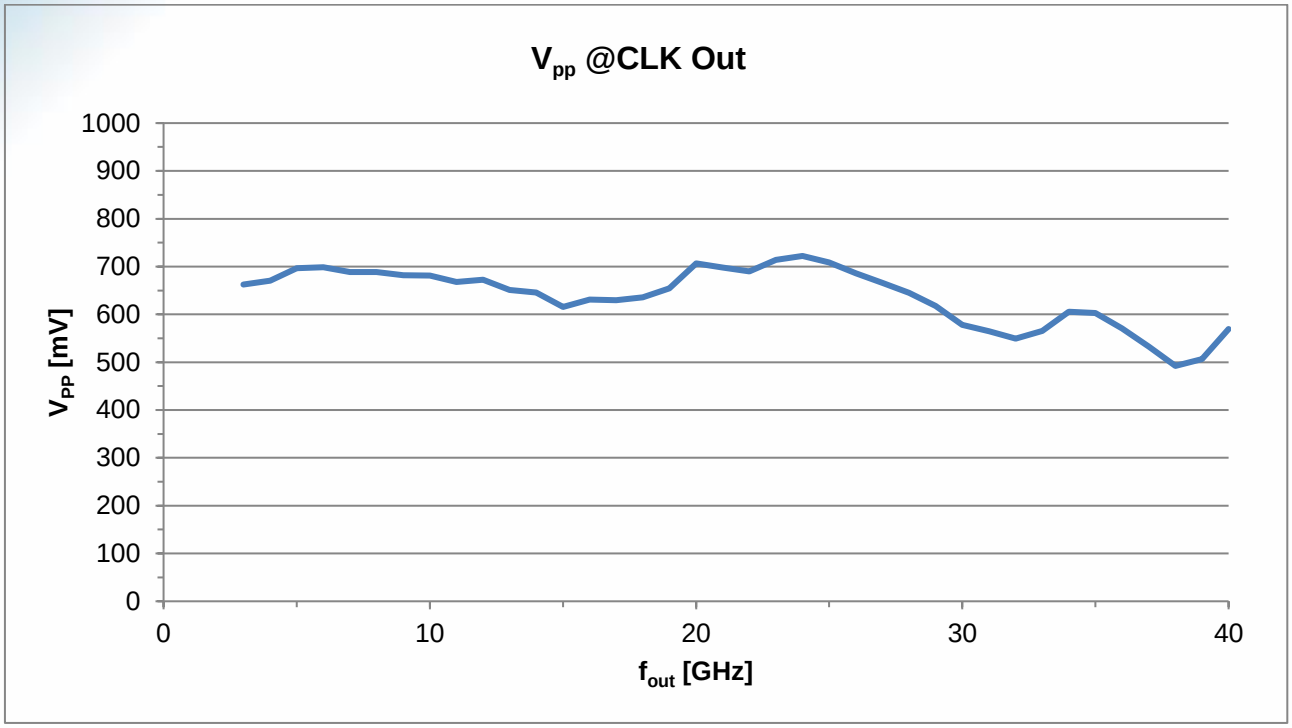
Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Input Parameters						
Input Amplitude	mV	$V_{Clk\ in}$			950	Peak-to-Peak
External DC Voltage on RF Input Port	V	$V_{DC\ in}$	-6		+6	AC coupled port
External DC Voltage on RF Output Ports	V	$V_{DC\ out}$	-6		+6	AC coupled ports
DC Supply Voltage	V	V_{cc}	0		+6	

Specifications – SHF C661 B

Parameter	Unit	Symbol	Min.	Typ.	Max.	Comment
Delay						
Adjustable Delay	ps		0		70	
Step Size	fs			100		
Absolut deviation	ps				1	Room Temperature
Input Frequency						
CLK In	GHz	f_{in}	2		35	
Input Amplitude						
Input Amplitude	mV_{pp}	V_{in}	200	600	900	AC coupled Single ended
Output Frequency						
CLK Out	GHz	f_{out}	2		35	f_{in}
Output Amplitude						
CLK Out	mV_{pp}	V_{out}	450		850	AC coupled Single ended
Power Requirement						
Supply Voltage	V	V_{cc}	+4.8	+5	+5.2	
Supply Current	A	Icc		1		Without heat sink
Power Dissipation	W	P_d		5		@ V_{CC} = +5 V
Mechanical Characteristics						
Clock In	Ω			50		2.92 mm (K) female
CLK Out	Ω			50		2.92 mm (K) female
Dimensions	mm					See Outline Drawing pages 9/10
Weight	g			90 417		Without heat sink With heat sink
Conditions						
Operating Temperature	°C	$T_{ambient}$	15		35	

Typical Output Amplitudes

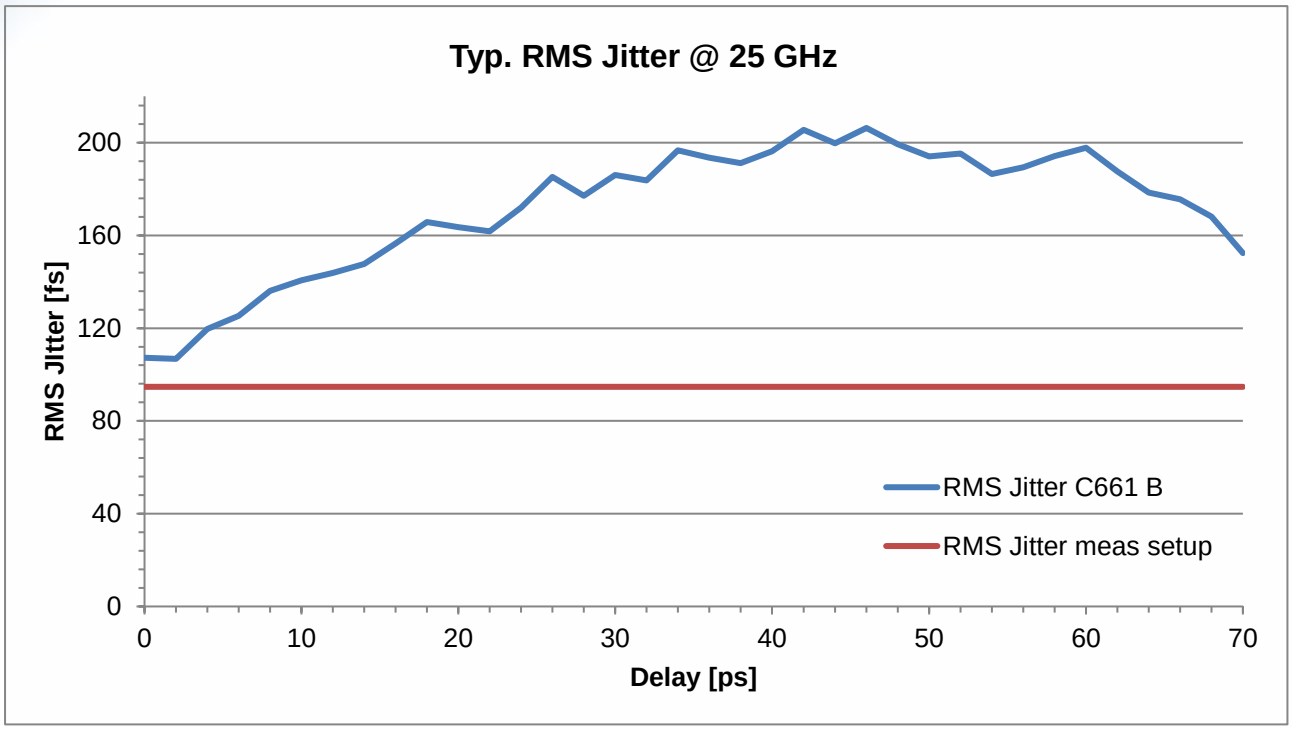
The measurements below have been performed using an Anritsu® signal generator (MG3697C) and an Agilent Digital Communication Analyzer (86100A) with a 70 GHz Sampling Module (86118A) and a Time Base (86107A). The output of the module is connected directly to the DCA input with a 10 dB attenuator. The input power of the clock signal is 0 dBm (630 mV_{pp}). The module is driven single ended at “In” and the amplitude is measured single-ended at “Out”. The unused ports “In_b” and “Out_b” are terminated with 50 Ohm.



® Tectronix is a registered trademark of Tectronix Inc.,

Typical RMS Jitter

The measurements below have been performed using an Anritsu® signal generator (MG3697C) and an Tectronix® Digital Communication Analyzer (DSA8300) with a 70 GHz Sampling Module (80E11) and a Time Base (82A04B-60G). The output of the module is connected directly to the DCA input with a 10 dB attenuator. The input power of the clock signal is 0 dBm (630 mV_{pp}). The module is driven single ended at "In" and the amplitude is measured single-ended at "Out". The unused ports "In_b" and "Out_b" are terminated with 50 Ohm. Since the measured RMS jitter depends heavily on the input jitter and the used measurement setup, the following graph is an assistance, which magnitude of jitter can be expected at different delay configurations.



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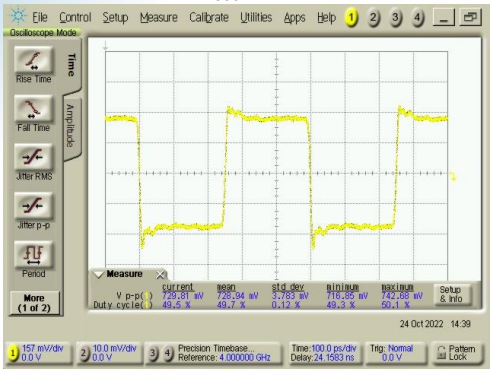
Typical Output Waveforms

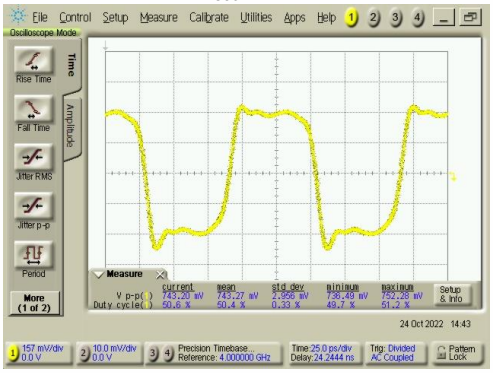
The measurements below are performed using an Anritsu® signal generator (MG3697C) and an Agilent® Digital Communication Analyzer (86100A) with a 70 GHz Sampling Module (86118A) and a Time Base (86107A). The output of the module is connected directly to the DCA input. The input power of the clock signal is 0 dBm (630 mV_{pp}). The module is driven single ended at “In” and the amplitude was measured single-ended at “Out”. The unused ports “In_b” and “Out_b” are terminated with 50 Ohm.

$f_{out} = f_{in}$



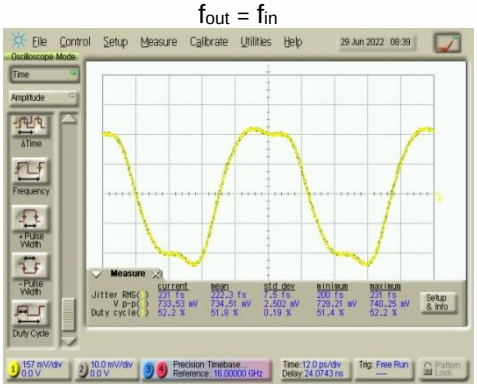
2 GHz output signal

$f_{out} = f_{in}$



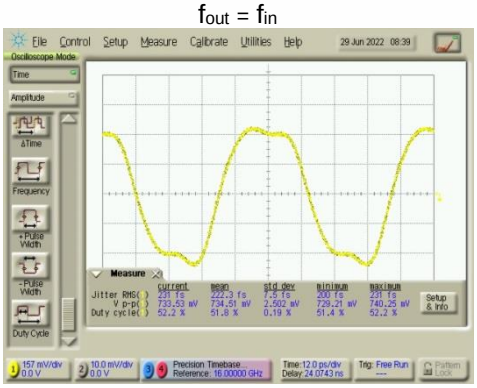
8 GHz output signal

$f_{out} = f_{in}$



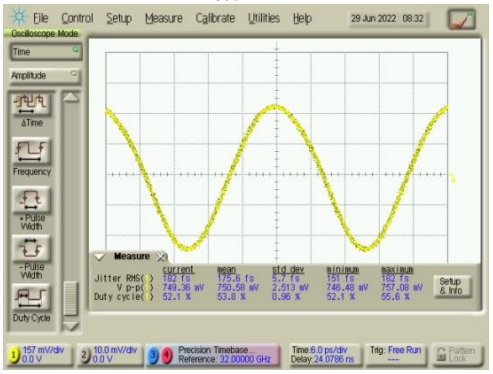
16 GHz output signal

$f_{out} = f_{in}$



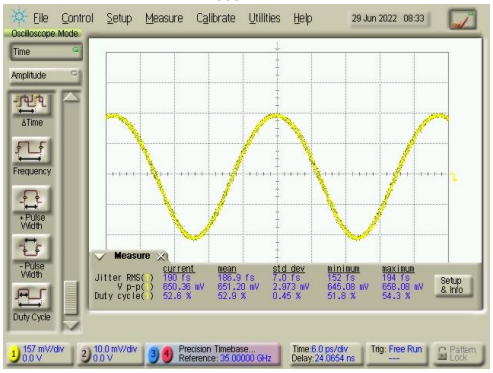
24 GHz output signal

$f_{out} = f_{in}$



32 GHz output signal

$f_{out} = f_{in}$



35 GHz output signal

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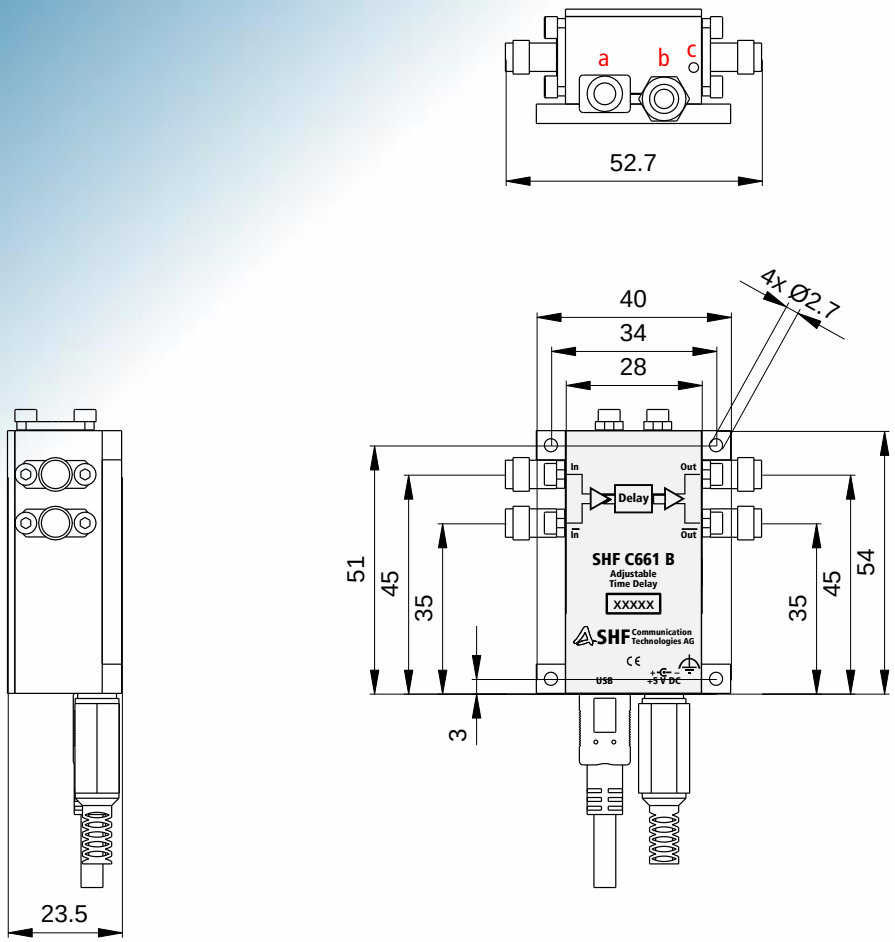
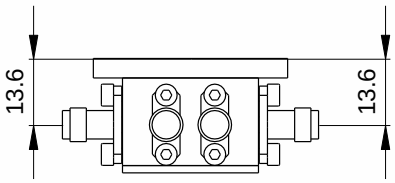
Mechanical Drawing



Port	Connector
In	2.82mm (K) female
$\overline{\text{In}}$	2.82mm (K) female
Out	2.82mm (K) female
$\overline{\text{Out}}$	2.82mm (K) female

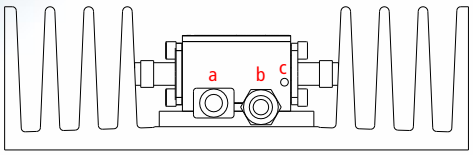


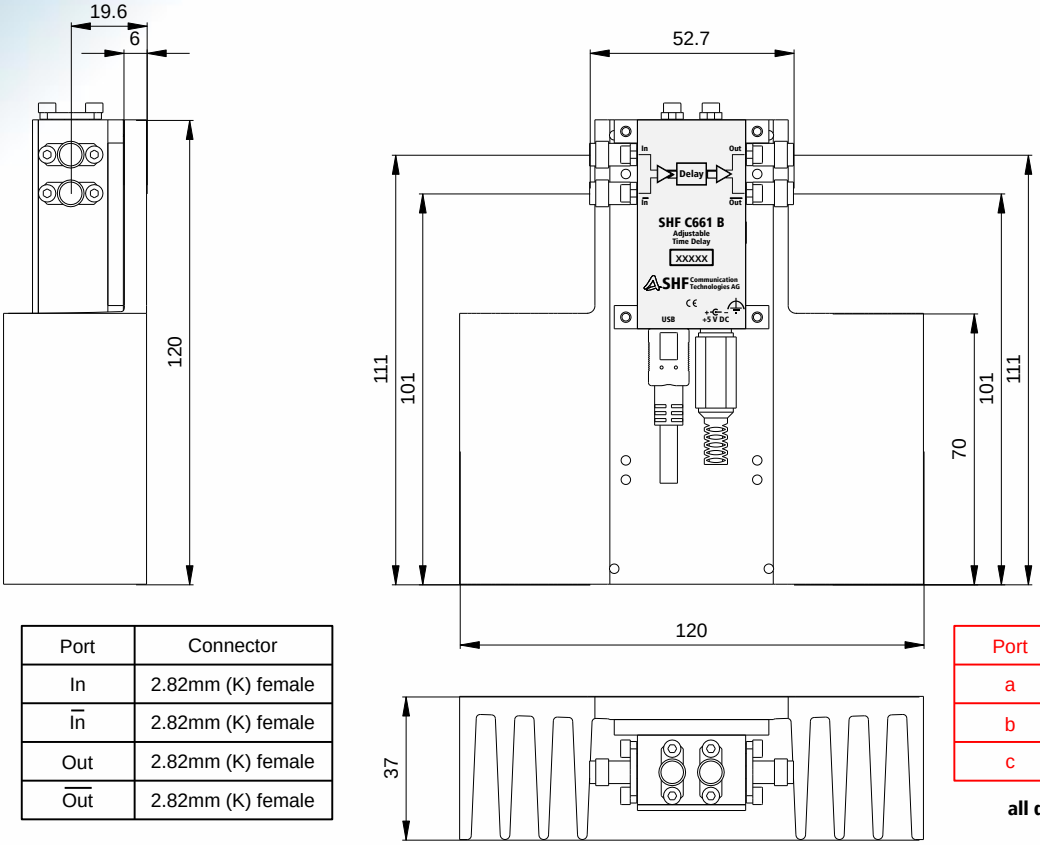
all dimensions imm

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

SHF Communication Technologies AG
the bandwidth company

Mechanical Drawing with Heat Sink





Port	Connector
In	2.82mm (K) female
$\overline{\text{In}}$	2.82mm (K) female
Out	2.82mm (K) female
$\overline{\text{Out}}$	2.82mm (K) female

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

all dimensions imm