

Data Sheet

SHF 78125 A



64 GHz Synthesized Clock Generator

Description

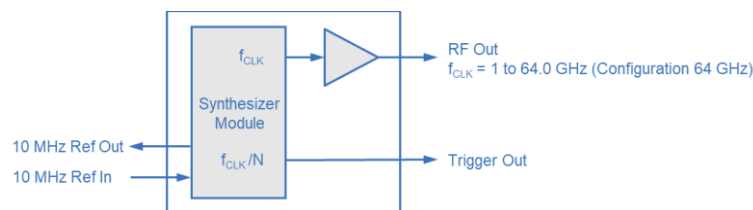
The SHF 78125 A is a compact synthesized continuous wave (CW) signal generator featuring a wide-frequency range (tunable continuously without any gap), adjustable output power, low jitter, low harmonic and low non-harmonic signal components.

In 'configuration 64' it features a frequency range from 1 to 64 GHz with a 1 kHz resolution and an output power range from -10 to +8 dBm. The output power can be adjusted in 0.1 dB steps.

An additional trigger output provides a trigger signal whose frequency can be 1/n of the output frequency (with n= 2, 4, 8, 16, 32 or 64).

Among a wide range of applications, the SHF 78125 A is perfectly suited as a clock source for our BERT and AWG Systems. To derive further clock signals at various frequencies fitting clock distributions and clock doublers are available.

Block Diagram



Features

- Clock frequency ranges from $f_{CLK} = 1$ to 64.0 GHz with 1 kHz resolution
- Output power adjustable from -10 to +8 dBm with 0.1 dB resolution depending on selected configuration and option.
- 10 MHz reference input and output for phase locking to other instruments
- Controlled by intuitive graphical user interface [SHF Control Center \(SCC\)](#)
- Remote programming interface (Ethernet) for automated measurements

Configurations

The SHF 78125 A can be equipped with the following configuration:

64: Output frequency range from 1 to 64.0 GHz

Options

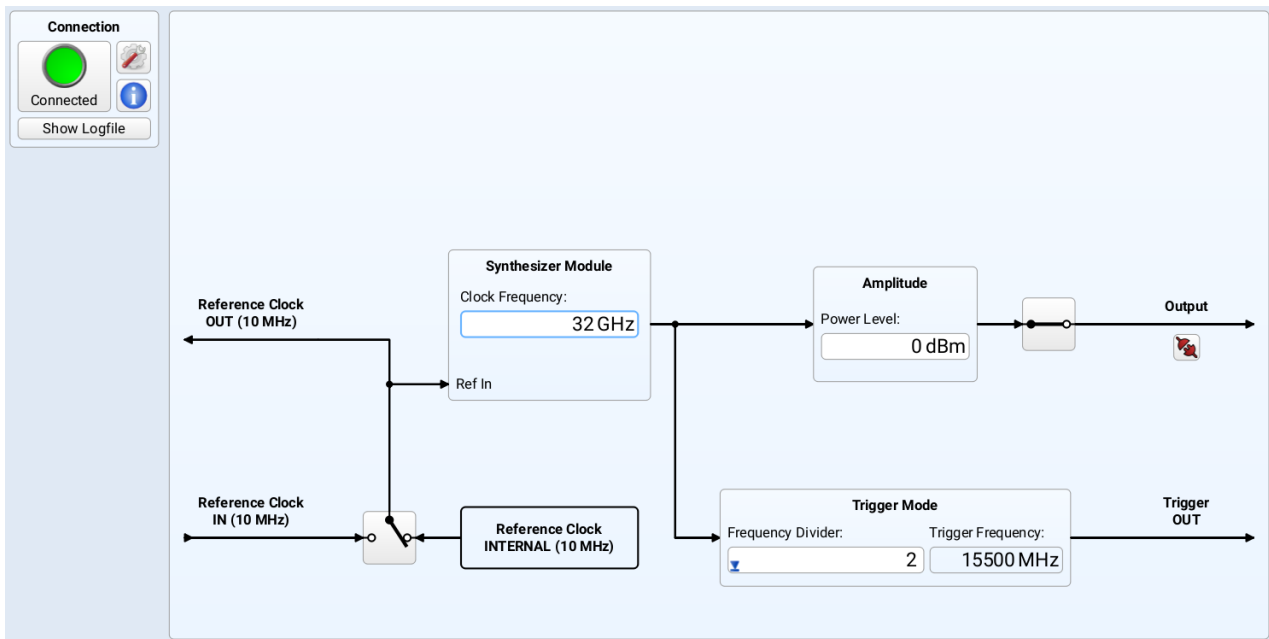
ULPN: The Ultra-Low Phase Noise option improves the phase noise.



Operation of the Synthesized Signal Generator

The SHF 78125 A is controlled over a standard Ethernet connection by an external computer (not part of the delivery). Every system comes along with the intuitive, easy to use SHF Control Center software (SCC). It provides the interface for changing the device parameters, see screenshot below.

Additionally, the instrument may be programmed remotely over the Ethernet connection for automated tests and measurements. Please refer to the SHF BERT Programming Manual.



SHF Control Center GUI



Specifications

Clock Output (RF Out) Configuration 64 GHz ¹

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Operating Frequency	GHz	f_{CLK}	1		64	
Frequency Resolution	kHz		1			
Frequency Accuracy	ppb		-1000		+1000	with internal reference
Frequency Stability	ppb		-50		+50	Ambient temperature 21°C
Frequency Stability (with option ULPN)	Ppb		Tbd		Tbd	Ambient temperature 21°C
Frequency Stability Aging	ppb		-50		+50	per year
Minimum Output Power	dBm	$P_{out,min}$			-10	
Maximum Output Power	dBm	$P_{out,max}$	8 6			$f_{CLK} \leq 60$ GHz $f_{CLK} > 60$ GHz
Output Power Resolution	dB		0.1			
Output Power Accuracy	dB		-1		1	Ambient temperature 21°C
Harmonics	dBc				-20	
Sub-Harmonics	dBc				-50 -40 -30	$f_{CLK} \leq 32.8$ GHz $32.8 < f_{CLK} \leq 60$ GHz $f_{CLK} > 60$ GHz
Phase Noise	dBc/Hz			-100 -105 -110 -120		$f_{CLK} = 10$ GHz 1 kHz offset 10 kHz offset 100 kHz offset 1 MHz offset
Phase Noise (with option ULPN)						
Output Impedance	Ω			50		
Connector						1.85 mm (V) female

¹ The specifications in this datasheet are only valid if the internal reference is activated. If the external reference setting is activated the signal at Ref In is fed through to Ref Out. In this case the parameters frequency accuracy, frequency stability and amplitude depend on the Ref In signal.



Trigger Output

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Frequency	GHz		0.015625		32	f_{CLK} / n n = 2, 4, 8, 16, 32 and 64
Output Amplitude	mVpp		400		800	
Output Impedance	Ω			50		
Connector						2.92 mm (K) female

Ref In

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Reference Frequency	MHz	f_{ref}		10		
Amplitude	Vpp		0.2		2	
Input Impedance	Ω			50		
Connector						SMA female

Ref Out (using internal reference setting) ²

Parameter	Unit	Symbol	Min	Typ	Max	Comment
Reference Frequency	MHz			10		
Amplitude	Vpp				0.8	
Output Impedance	Ω			50		
Frequency Accuracy	ppb		-1000		+1000	
Frequency Stability	ppb		-50		+50	Ambient temperature 21°C
Frequency Stability (with option ULPN)	Ppb		Tbd		Tbd	Ambient temperature 21°C
Frequency Stability Aging	ppb		-50		+50	per year
Connector						SMA female

² The specifications in this datasheet are only valid if the internal reference is activated. If the external reference setting is activated the signal at Ref In is fed through to Ref Out. In this case the parameters frequency accuracy, frequency stability and amplitude depend on the Ref In signal.



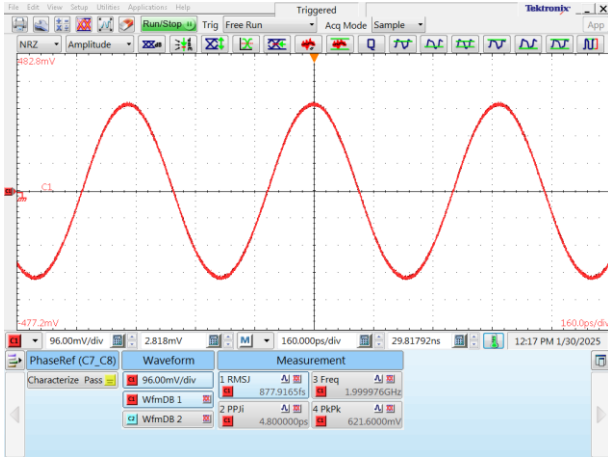
General

Parameter	Unit	Symbol	Min	Typ	Max	Conditions
Supply Voltage	V		+22	+24	+26	4 pin DIN Power Jack
Supply Current	mA			1.3		Configuration 64 G
Power Consumption	W				33	Configuration 64 G +24 V switching power supply is included
Weight	kg			4.2		without power supply Configuration 64
Operating Temperature	°C		10		35	Ambient temperature

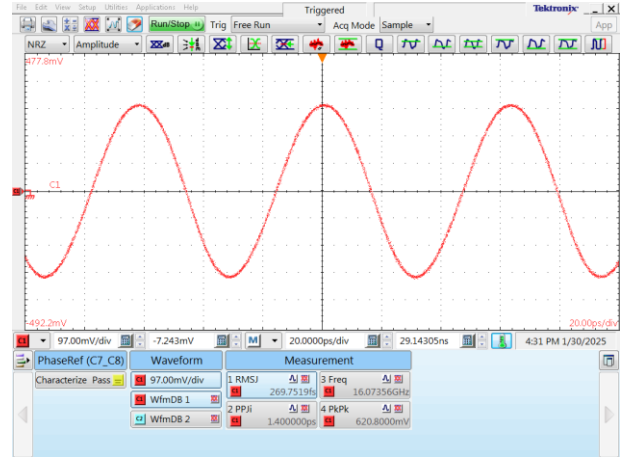


Typical Output Waveforms

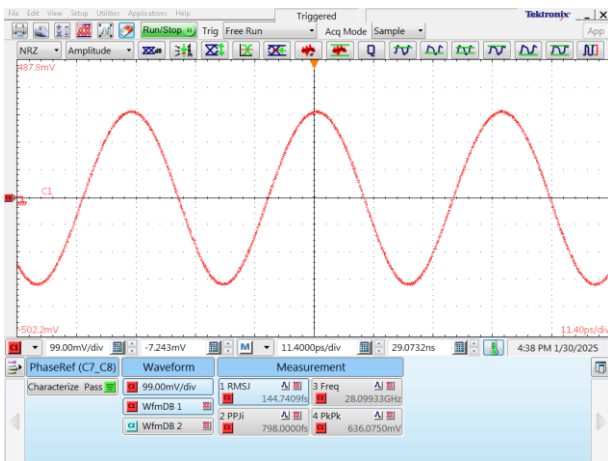
Configuration 64



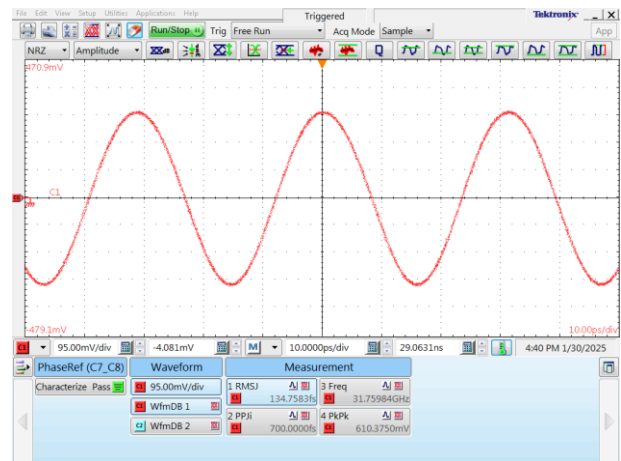
2 GHz clock output at 0 dBm



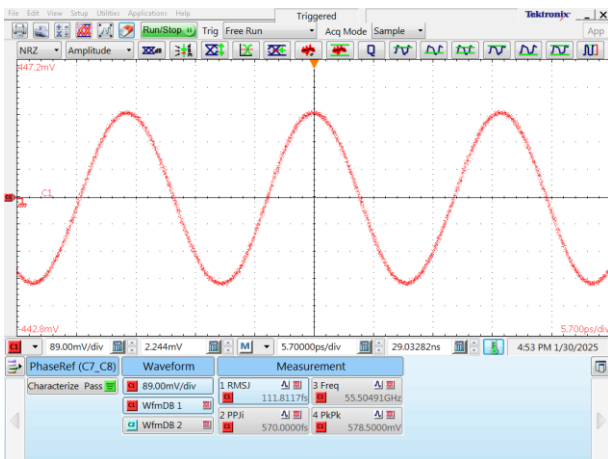
16 GHz clock output at 0 dBm



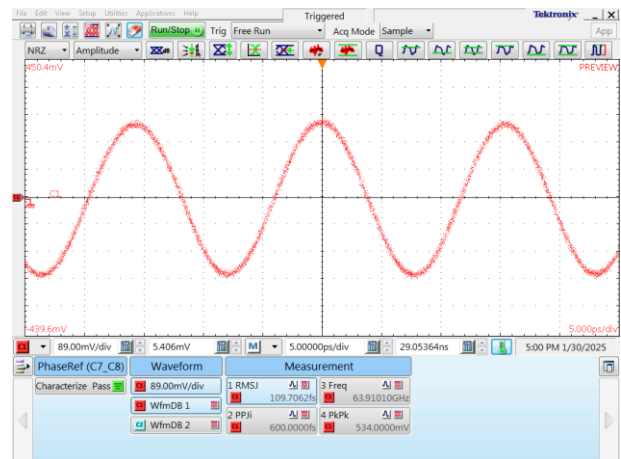
28 GHz clock output at 0 dBm



32 GHz clock output at 0 dBm



56 GHz clock output at 0 dBm

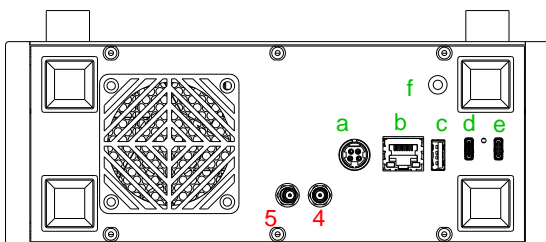
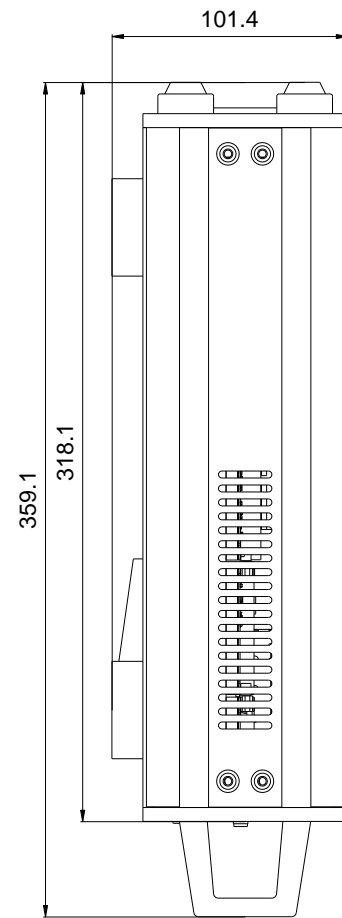
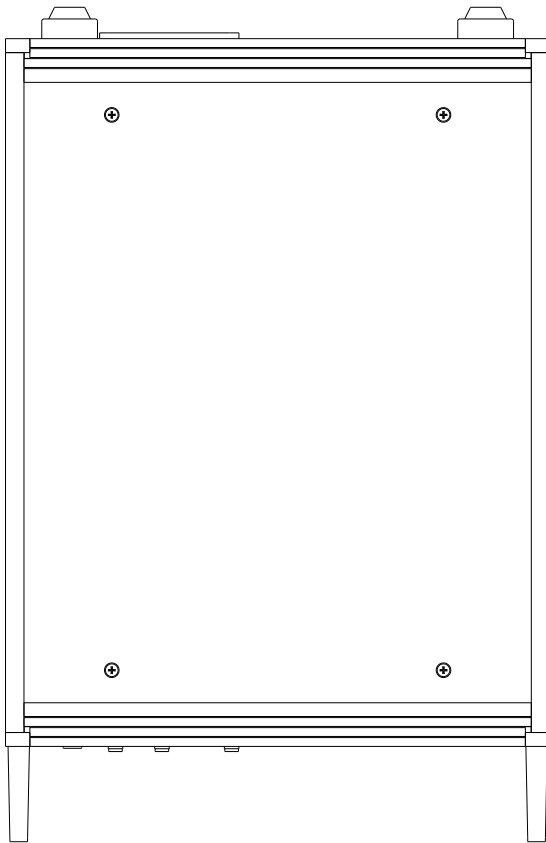
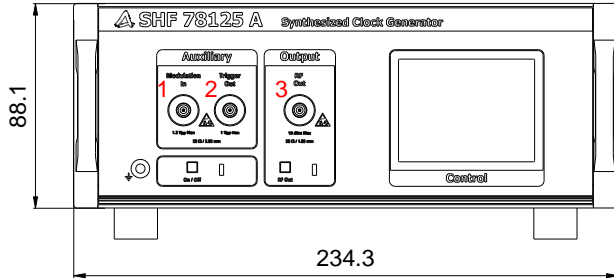


64 GHz clock output at 0 dBm



Mechanical Drawings

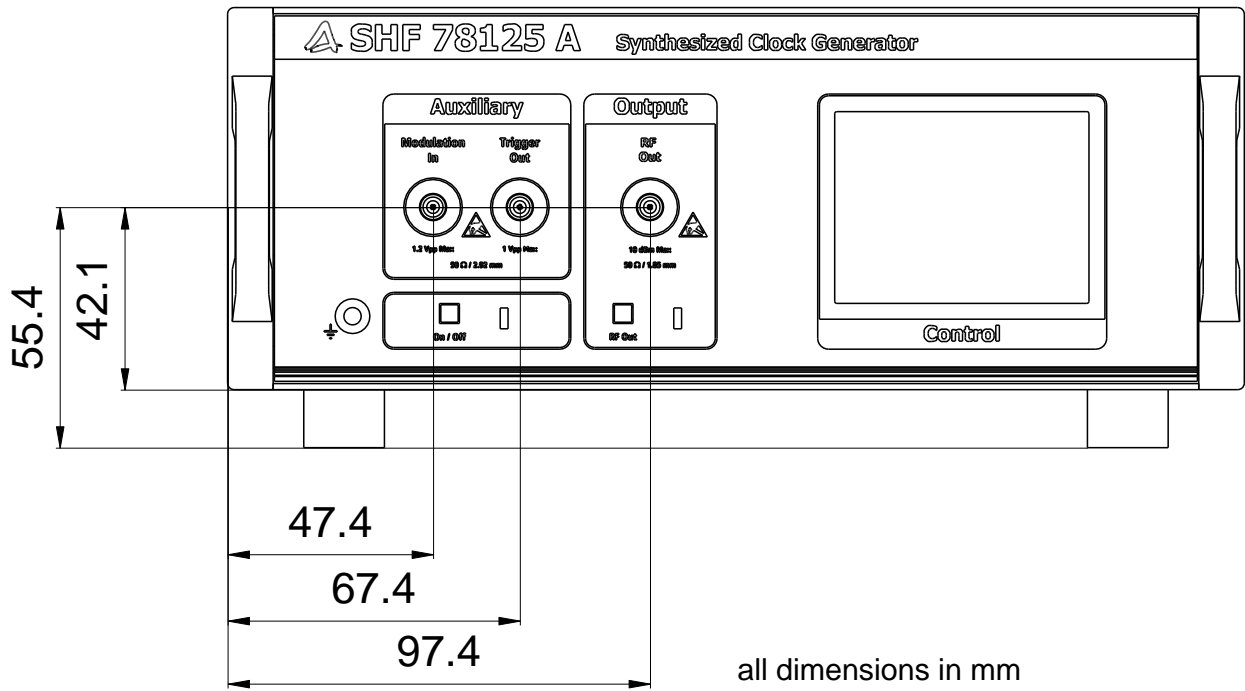
Configuration 64



Pos.	Designation
a	Power Supply
b	Ethernet
c	USB Host
d	USB OTG
e	Service
f	GND

Pos.	Designation	Connector
1	Modulation In (Opt.)	2.92 mm (K) Female
2	Trigger Out	2.92 mm (K) Female
3	RF Out	1.85 mm (V) Female
4	Reference In	SMA Female
5	Reference Out	SMA Female

all dimensions in mm





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