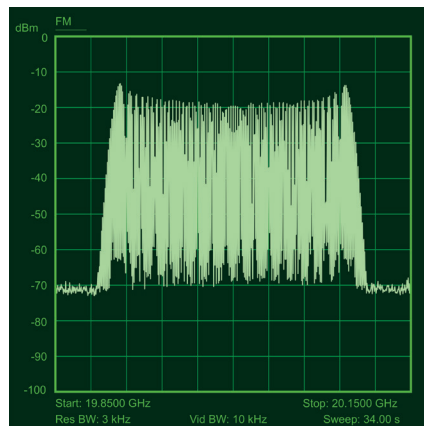# QuickSyn Frequency Synthesizers

The QuickSyn Advantage

Our popular line of QuickSyn frequency synthesizers delivers instrument-grade performance up to 82 GHz, increased functionality, and efficient power consumption at a reduced size and low cost, which is a huge advantage for system engineers and instrument designers facing extreme constraints as well as for engineers and technicians who instantly deploy their QuickSyn synthesizers for use in lab environments.

At the heart of QuickSyn synthesizers is a patented, revolutionary phase-refining technology that provides a unique combination of fast-switching speed and low phase-noise characteristics. This advantage is why QuickSyn synthesizers are designed into SIGINT systems, communication T&M instruments, signal-simulation systems, antenna-qualification systems, etc.

Engineers and designers can choose from three different series of QuickSyn synthesizers: the FSW series (full-featured version), the FSL series ("lite" version), and the FSL mmW series (millimeter-wave extended version).

Shown here is a representative FM deviation (wideband FM) at 20 GHz using the QuickSyn model FSW-0020.
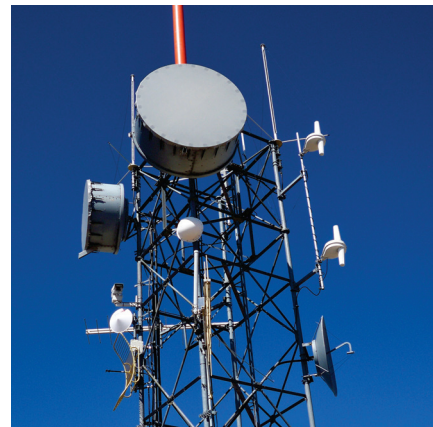
QuickSyn frequency synthesizers are a popular choice for communications testing systems.

FSW Series

This series consists of the full-featured QuickSyn synthesizers models FSW-0010 and FSW-0020, which cover frequency ranges of 0.5 to 10 GHz and 0.5 to 20 GHz respectively. The 10 GHz unit is available with the option to extend down to 0.1 GHz, and the 20 GHz unit can extend down to 0.2 GHz by option. Other optional features include pulse modulation, amplitude modulation, frequency and phase modulation, power control, and fast switching. All QuickSyn synthesizers come with USB and SPI interface control for use in the lab or in your next instrument design.

FSW-0010 and FSW-0020 Specifications

Description	Specification	
Frequency	**FSW-0010**	**FSW-0020**
Range[1]	0.5 GHz to 10 GHz	0.5 GHz to 20 GHz
Resolution	0.001 Hz	
Stability	Same as reference	
Switching Time (full-band step to ±50 kHz of final frequency)	1 ms standard in all modes 100 µs with option 3 in triggered list mode 200 µs with option 3 for individual SPI commands	
List Mode	32,000 points, separate control of frequency, power, RF output mute, and pulse modulation	

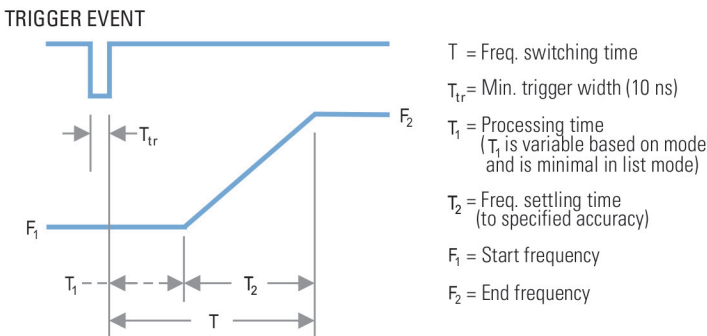[1]Frequency extension available with option 1 (FSW-0010 to 0.1 GHz / FSW-0020 to 0.2 GHz)

TRIGGER EVENT

T = Freq. switching time

T_{tr} = Min. trigger width (10 ns)

T_1 = Processing time (T_1 is variable based on mode and is minimal in list mode)

T_2 = Freq. settling time (to specified accuracy)

F_1 = Start frequency

F_2 = End frequency

FIGURE 1: Frequency Switching Speed

Description	Specification	
Output Power	**FSW-0010**	**FSW-0020**
Power	+15 dBm	+13 dBm
Power Accuracy	±2.0 dB typ.	
Power Control Range with Option 2[1]	-25 dBm to +15 dBm Power Resolution 0.01 dB nom.	-10 dBm to +13 dBm Power Resolution 0.1 dB nom.
Power Mute	-65 dBm max.	
Output Return Loss	-10 dB nom.	

[1]Power accuracy may change at lower power levels.

Description	Specification									
Spectral Purity[1]	**FSW-0010**					**FSW-0020**				
Harmonics	-45 dBc typ.					-35 dBc typ.				
Non-harmonic Spurious	-75 dBc typ. -65 dBc max.					-70 dBc typ. -60 dBc max.				
Phase Noise[1]										
dBc/Hz	0.5 GHz (typ.)	0.5 GHz (max.)	1 GHz (typ.)	1 GHz (max.)	5 GHz (typ.)	5 GHz (max.)	10 GHz (typ.)	10 GHz (max.)	20 GHz (typ.)	20 GHz (max.)
100 Hz	-109	-103	-103	-97	-89	-83	-83	-77	-77	-71
1 kHz	-132	-128	-132	-126	-118	-112	-112	-106	-106	-100
10 kHz	-144	-139	-138	-133	-128	-123	-122	-117	-116	-111
100 kHz	-144	-139	-138	-133	-128	-123	-122	-117	-116	-111
1 MHz	-146	-141	-140	-135	-132	-127	-126	-121	-120	-115
Floor	-151	-147	-150	-147	-150	-147	-150	-147	-150	-147

[1]Measured at maximum specified power.
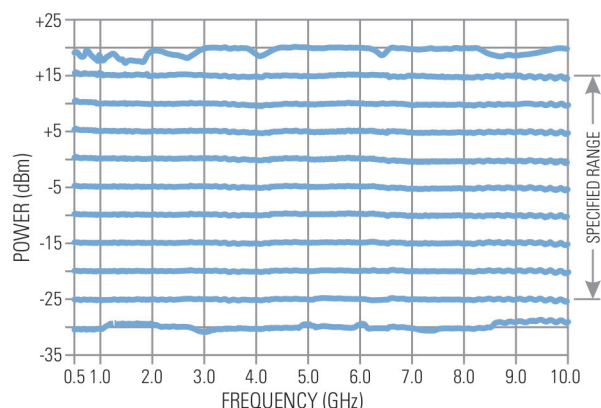
FIGURE 2: FSW-0010 Output Power
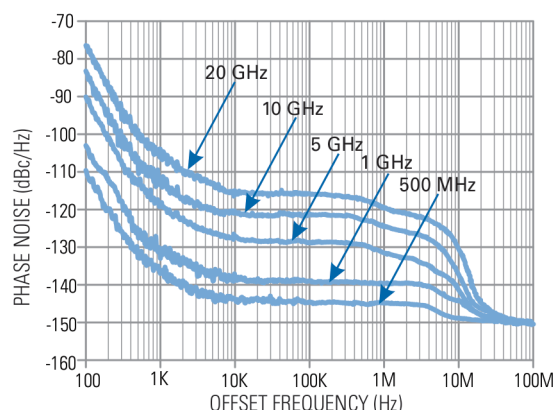
FIGURE 3: Phase Noise

Description	Specification	
Pulse Modulation[1]	**FSW-0010**	**FSW-0020**
On-Off Ratio	80 dB min.	
Repetition Frequency Range	DC to 10 MHz	
Minimum Pulse Width	50 ns nom.	
Width Compression	< 15 ns nom.	
Delay Time	< 35 ns nom.	
Rise-Fall Time (10 to 90%)	10 ns max.	
Pulse Overshoot	10% max.	
Input Level (CMOS)	+5 V (RF on), 0 V (RF off)	
Absolute Maximum Input Level	+6 V	
Input Impedance	100 kΩ (pulled up to +5 V)	
Amplitude Modulation (AM)[2]	**FSW-0010**	**FSW-0020**
Rate Range	DC to 100 kHz	
Modulation Depth[3]	40 dB min.	20 dB min.
Sensitivity[4]	user defined	
Absolute Maximum Input Level	±2 V (4 V p-p)	
Input Impedance	50 Ω nom.	
Frequency Modulation (FM)[2]	**FSW-0010**	**FSW-0020**
NB 1 Mode Rate Range	100 Hz to 10 kHz	
NB 2 Mode Rate Range	10 kHz to 100 kHz	
WB Mode Rate Range	50 kHz to 1 MHz	
Phase Mode Rate Range	DC to 100 kHz	
Sensitivity[4]	user defined	
Deviation[5]	see note 5	
Absolute Maximum Input Level	±2 V (4 V p-p)	
Input Impedance	50 Ω nom.	

[1]Measured at maximum specified power.
[2]Available with option 2 only. Power accuracy may change at low power levels.
[3]Measured with power set at mid range. AM is clipped when available power (min. or max) is reached.
[4]AM and FM sensitivity is dependent on synthesizer output frequency and is controllable by software.
[5]The amplitude of the FM input signal must be adjusted to obtain the desired deviation according to the output frequency range.

Description	Specification	
Internal Reference	**FSW-0010**	**FSW-0020**
Output Frequency	10 MHz nom.	
Output Power	+5 ±2 dBm	
Reference Mute	-60 dBm max.	
Output Impedance	50 Ω nom.	
Frequency Temperature Stability	±0.2 ppm (over 0° C to 50° C)	
Aging (after 30 days of operation)	±1.25 ppm for 10 years	
Locking Range	±2.0 ppm	
External Reference	**FSW-0010**	**FSW-0020**
Input Frequency[1]	10 MHz	
Input Power	+5 dBm ±5 dBm	
Absolute Maximum Input Level	+15 dBm	
Input Impedance	50 Ω nom.	

[1]External reference frequency input to be within ±2 ppm max.

Description	Specification	
Electrical	**FSW-0010**	**FSW-0020**
Supply Voltage	+12 V to +12.6 V DC	
Absolute Maximum Supply Voltage	+15 V DC	
Power Consumption (at warm up[1])	24 W max.	
Power Consumption (operating)	18 W nom.	20 W nom.

[1]Warm-up time = 15 minutes

Description	Specification	
Temperature[1]	**FSW-0010**	**FSW-0020**
Operating	0° C to +55° C	
Storage	-40° C to +70° C	

[1]Adequate heat sinking must be provided in order to prevent permanent damage.

Description	Specification	
Physical	**FSW-0010**	**FSW-0020**
Size (W x L x H)	5 in. x 7 in. x 1 in.	
Weight	2.5 lb. (1.13 kg)	

Description	Specification	
Connectors	**FSW-0010**	**FSW-0020**
RF OUT	SMA-F	
PULSE	SMA-F	
REF OUT	SMA-F	
REF IN	SMA-F	
AM	MCX-F	
FM	MCX-F	
SPI[1]	20 pin, 0.1 in. spaced double-row header	
USB	Mini-B receptacle (USB 2.0)	

[1]National Instruments recommends Hirose manufactured socket DF1B-20DS-2.5RC and contacts DF1B-2022SC.

Description		Specification

SPI Interface Programming[1]

Signal	Pin	Description
SPI_CLK	11	SPI clock. Supplied by the controlling computer (not the synthesizer). The controlling computer is the SPI master; the synthesizer is the SPI slave.
SPI_SS	13	SPI Slave Select. This signal is an active low input to the synthesizer. It frames command communications. For each command, SPI_SS goes low before the first bit is sent and goes high after the last bit is sent.
SPI_MISO	7	Master In/Slave Out. Status and other returned information from the synthesizer to the controlling computer.
SPI_MOSI	9	Master Out/Slave In. Command data from the controlling computer to the synthesizer.
TRIGGER	17	Rising edge active input. When enabled, the trigger signal of +3.3 V can initiate freq. change or step through lists or sweeps.
LOCK	15	Output indicates the synthesizer is locked on its current setting (+3.3 V locked, 0 V unlocked).
REF_LOCK	16	Output indicates the synthesizer has detected an external reference signal and locked on that signal (+3.3 V locked, 0 V unlocked).
RESET	18	Internally pulled up to +3.3 V with 100 kΩ resistor. Active "low" signal, which has a minimum width of 1 ms, will reset the synthesizer to a default state.
PWER_+12V	3,4	External +12V DC supply.
GND	8,10,19,20	Ground.
N/C	1,2,5,6,12,14	Do not use. Reserved for factory use.

[1] A QuickSyn communications specification is available on the ni-microwavecomponents.com website.

Mechanical Dimensions

Unless otherwise specified, dimensions are in inches ±0.01.
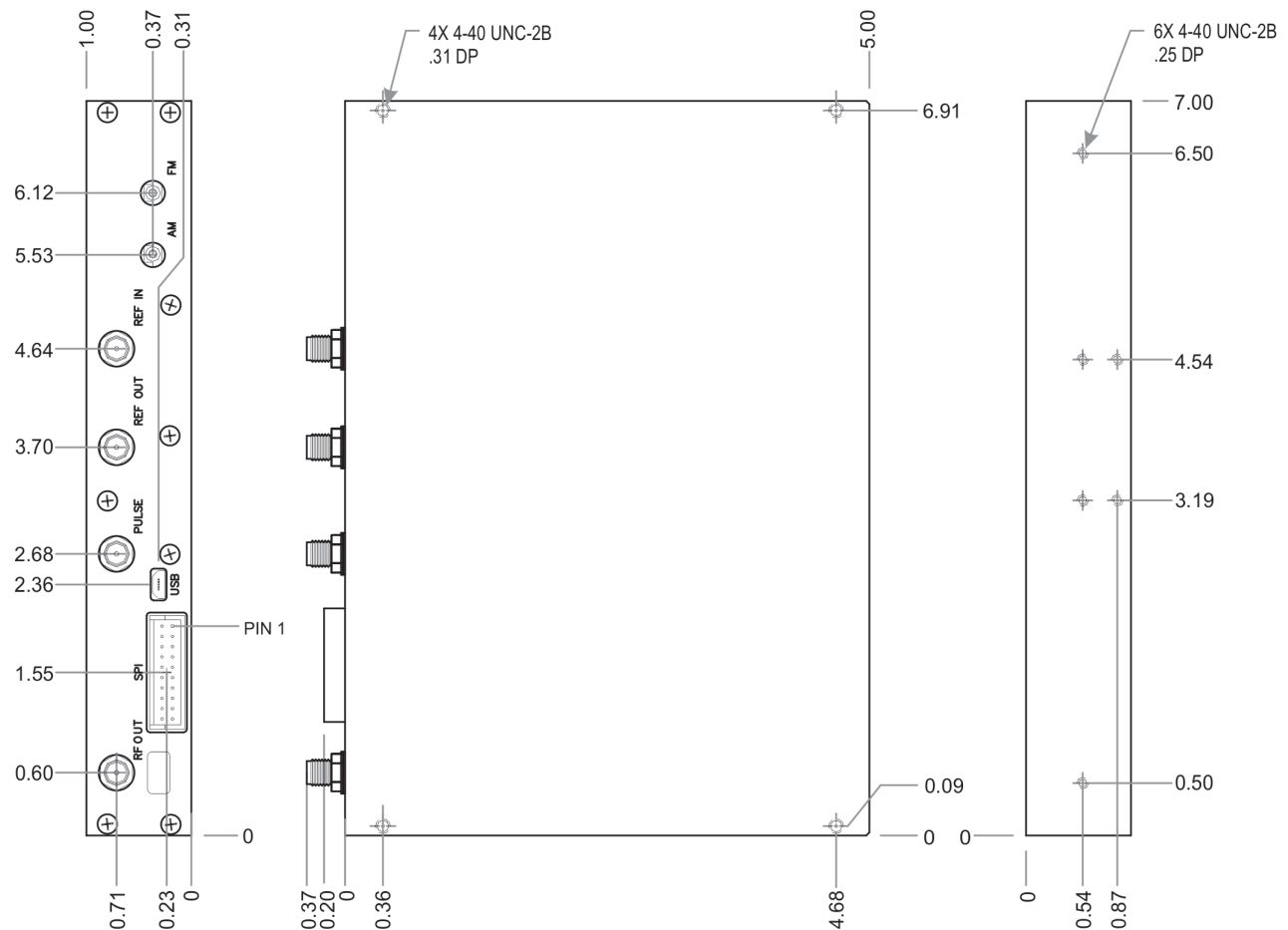
Description	Specification
SPI Timing	
Description	**Specification**
$T_{SC} > 25$ ns	Slave select low before first CLK
$T_{CS} > 25$ ns	CLK low before slave select high
$T_{SU} > 15$ ns	Data stable before rising edge of CLK
$T_{CH} > 25$ ns	Minimum CLK high time
T_{CL} 25 ns	Minimum CLK low time
$T_{CLK} \leq 12$ MHz	Maximum CLK frequency
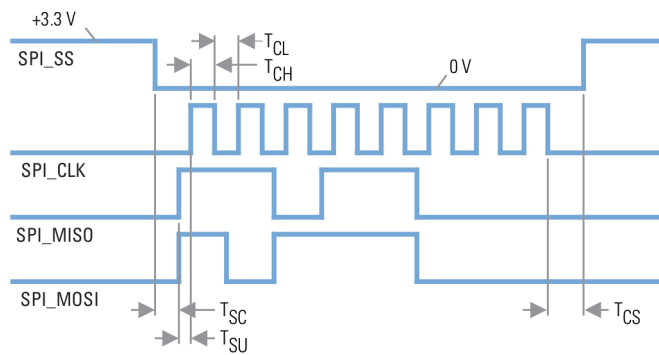
FIGURE 4: SPI Timing

Description	Specification	
Ordering Information	**FSW-0010**	**FSW-0020**
Models	FSW-0010	FSW-0020
Option 1[1]	Option 1 frequency extension to 0.1 GHz	Option 1 frequency extension to 0.2 GHz
Option 2	Option 2 power control, -25 dBm to + 15 dBm	Option 2 power control, -10 dBm to +13 dBm
Option 3	Option 3 fast switching (any frequency to any frequency) 100 µs max. (to ±50 kHz in external triggered list mode) 200 µs max. (to ±50 kHz regular SPI control)	
Option 4	USB interface	
Option 5	Pulse modulation	
Option 6[2]	Amplitude modulation	
Option 7	Frequency and phase modulation	
Option 8	Two-year warranty extension (three years total)	
Accessory 1	Cable, BNC-M to MCX-M	
Accessory 2	Cable, USB	
Accessory 3	Cable, DC bias	
Accessory 4	Test report	
Accessory 5[3]	Kit, SPI mating connector with contacts	
Accessory 6	Kit,Quickstart (includes Quickstart guide, AM-FM cable, USB cable, DC bias cable, accessory 5, and power supply)	
Accessory 7	Kit, RS232 cable	
Accessory 8	Kit, Ethernet adapter	
Accessory 9	Kit, GPIB adapter	
Accessory 10	Kit, heatsink	
Accessory 11	Certificate of calibration	

[1]Output power between 0.1 and 0.5 GHz is limited at +10 dBm. Harmonics may increase below 0.5 GHz.

[2]Available with option 2 only. Power accuracy may change at low power levels.

[3]National Instruments recommends Hirose manufactured socket DF1B-20DS-2.5RC and contacts DF1B-2022SC.

FSL Series

This series offers the streamlined version of the full-featured synthesizer and is less than half the size too! Instrument designers restricted by space, power-consumption constraints, and the need for low phase noise will appreciate the QuickSyn Lite synthesizer as the single solution to a multitude of design challenges. The 10 GHz version (Model FSL-0010) has a frequency coverage of 0.65 to 10 GHz, and Model FSL-0020 covers the 0.65 to 20 GHz frequency range.

FSL-0010 and FSL-0020 Specifications

Description	Specification	
Frequency	**FSL-0010**	**FSL-0020**
Range[1]	0.65 GHz to 10 GHz	0.65 GHz to 20 GHz
Resolution	0.001 Hz	
Stability	Same as reference	
Accuracy	Same as reference	
Switching Time[2]	1 ms mode (Model FSL-E020, no export-control version) 100 µs in triggered list mode 200 µs for individual SPI commands	
List Mode	32,000 points	

[1]Tested to 10.4 GHz and to 20.8 GHz FSL-0010 and FSL-0020 respectively.
[2]Full band setup to ±5 ppm of final frequency.

Description	Specification	
Output Power	**FSL-0010**	**FSL-0020**
Power	+15 dBm min.	+10 dBm min.
RF Output On-Off Ratio	60 dB min.	
Output Return Loss	-10 dB nom.	

Description	Specification	
Internal Reference	**FSL-0010**	**FSL-0020**
Output Frequency	10 MHz nom.	
Output Power	+5 ±2 dBm	
Reference Mute	-60 dBm max.	
Output Impedance	50 Ω nom.	
Frequency Temperature Stability	±1 ppm	
Aging[1]	±1 ppm / year	
Locking Range	±5 ppm	
External Reference	**FSL-0010**	**FSL-0020**
Input Frequency	10 MHz	
Input Power	+5 dBm ±10 dBm	
Absolute Maximum Input Level	+15 dBm	
Input Impedance	50 Ω nom.	

[1]A self-calibration feature can be launched through USB command for in-field units.

Description	Specification								
Spectral Purity	**FSL-0010**					**FSL-0020**			
Harmonics[1]	-12 dBc typ.								
Non-harmonic Spurious	-60 dBc max.								
Phase Noise									
dBc/Hz	0.65 GHz (typ.)	0.65 GHz (max.)	1 GHz (typ.)	1 GHz (max.)	5 GHz (typ.)	5 GHz (max.)	10 GHz (typ.)	10 GHz (max.)	20 GHz (typ.)	20 GHz (max.)
100 Hz	-83	-77	-80	-74	-66	-60	-60	-54	-54	-48
1 kHz	-126	-120	-124	-118	-110	-104	-104	-98	-98	-92
10 kHz	-138	-132	-136	-130	-123	-117	-117	-111	-111	-105
100 kHz	-138	-132	-136	-130	-123	-117	-117	-111	-111	-105
1 MHz	-138	-132	-136	-130	-123	-117	-117	-111	-111	-105
Floor	-155	-149	-153	-147	-150	-144	-147	-141	-141	-135

[1]Measured between 2 GHz and 10 GHz.
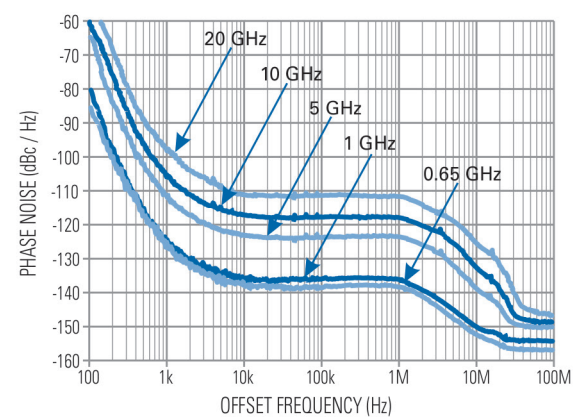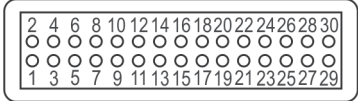
FIGURE 5: Phase Noise

Description	Specification	
Electrical	**FSL-0010**	**FSL-0020**
Supply Voltage	+ 12 V DC ±5%	
Absolute Maximum Supply Voltage	+15 V DC	
Power Consumption (operating)	12.6 W nom.	12.6 W nom.

Description	Specification	
Temperature[1]	**FSL-0010**	**FSL-0020**
Operating	0° C to +55° C	
Storage	-40° C to +70° C	

[1]Adequate heat sinking must be provided in order to prevent permanent damage.

Description	Specification	
Physical	**FSL-0010**	**FSL-0020**
Size (W x L x H)	4 in. x 4 in. x 0.8 in.	
Weight	0.8 lb. (0.36 kg)	

Description	Specification	
Connectors	**FSL-0010**	**FSL-0020**
RF OUT	SMA-F	
REF OUT	SMA-F	
REF IN	SMA-F	
SPI[1]	30 pin, 0.05 in. spaced double-row header	
	2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 1 3 5 7 9 11 13 15 17 19 21 23 25 27 29	
USB	Mini-AB receptacle (USB 2.0)	

[1]National Instruments recommends Samtec mating socket assembly SFSD-15-28-H-06.00-SL.

Description		Specification
SPI Interface Programming[1]		
Signal	**Pin**	**Description**
SPI_CLK	20	SPI clock. Supplied by the controlling computer (not the synthesizer). The controlling computer is the SPI master; the synthesizer is the SPI slave.
SPI_SS	18	SPI Slave Select. This signal is an active low input to the synthesizer. It frames command communications. For each command, SPI_SS goes low before the first bit is sent and goes high after the last bit is sent.
SPI_MISO	24	Master In/Slave Out. Status and other returned information from the synthesizer to the controlling computer.
SPI_MOSI	22	Master Out/Slave In. Command data from the controlling computer to the synthesizer.
TRIGGER	14	Rising edge active input. When enabled, the trigger signal of +3.3 V can initiate freq. change or step through lists or sweeps.
LOCK	16	Output indicates the synthesizer is locked on its current setting (+3.3 V locked, 0 V unlocked).
REF_LOCK	13	Output indicates the synthesizer has detected an external reference signal and locked on that signal (+3.3 V locked, 0 V unlocked).
RESET	1	Internally pulled up to +3.3 V with 100 kΩ resistor. Active "low" signal, which has a minimum width of 1 ms, will reset the synthesizer to a default state.
PWER_+12V	26,28,30	External +12V DC supply.
GND	2,15,25,27,29	Ground.
N/C	3,4,5,6,7,8,9,10 11,12,17,19,21,23	Do not use. Reserved for factory use.

[1]A QuickSyn communications specification is available on the ni-microwavecomponents.com website.

FSL Series

Mechanical Dimensions
Unless otherwise specified, dimensions are in inches ±0.01.

2X 0.38

10X 4-40 UNC-2B
X 0.25 DEEP

2X 3.91

4.00

2.63

1.38

2X 0.09

2X 0.38

RF OUT
POWER / SPI
USB
REF OUT
REF IN

0.415
3.53
2.49
1.76
1.19
0.53

3X 0.54
0.38

3X 0.38
2X 0.75
2X 3.25
4.00

0.38
0.80

1.38
2.63

Description	Specification		
Ordering Information			
Models	FSL-0010	FSL-0020	FSL-E020[1]
Option 8	Two-year warranty extension (three years total)		
Accessory 4	Test report		
Accessory 6	Kit,Quickstart (includes Quickstart guide, USB cable, DC bias cable, and power supply)		
Accessory 10	Kit, heatsink		
Accessory 11	Certificate of calibration		

[1]FSL-E020 is a no export-control version of FSL-0020 and has a frequency switching speed of 1 ms.

FSL mmW Series

This series offers models FSL-2740, FSL-5067, and FSL-7682, which extend QuickSyn Lite synthesizers into the millimeter-wave range. The three available models correspond to popular millimeter wave bands—27 GHz to 40 GHz, 50 GHz to 67 GHz, and 76 GHz to 82 GHz. The QuickSyn Lite mmW synthesizer modules are a cost-effective solution for applications requiring a stable and clean CW millimeter wave source.
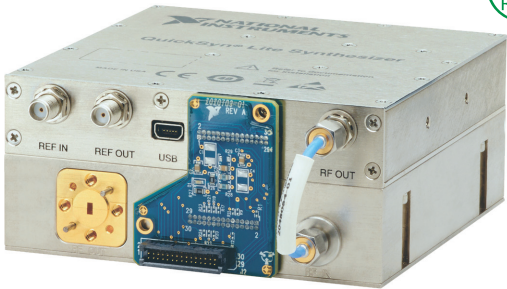
FSL-2740, FSL-5067, FSL-7682 Specifications

Description	Specification		
Frequency	**FSL-2740**	**FSL-5067**	**FSL-7682**
Range	27 GHz to 40 GHz	50 GHz to 67 GHz	76 GHz to 82 GHz
Resolution	1 Hz		
Switching Time	1 ms 100 µs with Option 3		
List Mode	32,000 points		

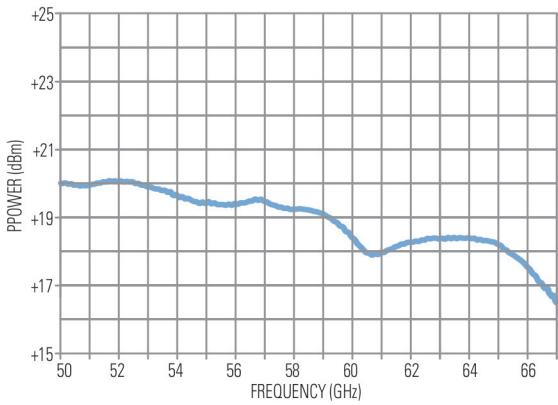| Description	Specification		
Output Power	**FSL-2740**	**FSL-5067**	**FSL-7682**
Power	+17 dBm min., +18 dBm typ., +24 dBm max.	+15 dBm min., +17 dBm typ., +22 dBm max.	+10 dBm min., +11 dBm typ., +14 dBm max.
Output Return Loss	10 dB nom.		
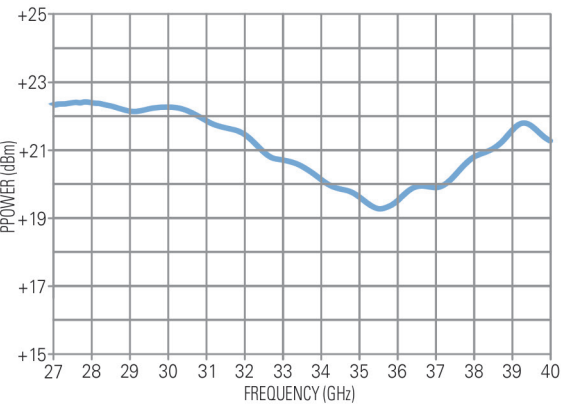
FIGURE 6: FSL-2740 Typical Power Output
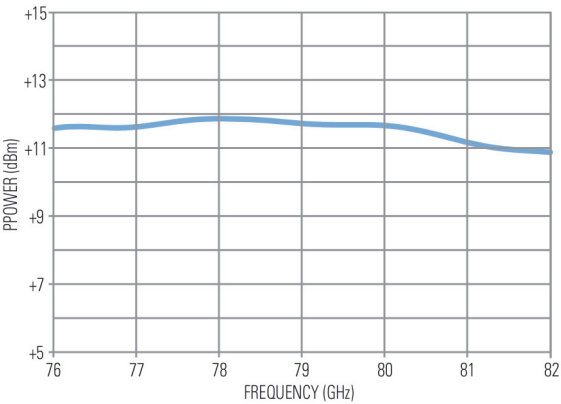
FIGURE 7: FSL-5067 Typical Power Output

FIGURE 8: FSL-7682 Typical Power Output

Description	Specification		
Internal Reference	**FSL-2740**	**FSL-5067**	**FSL-7682**
Frequency Output	10 MHz typ.		
Power Output	+3 dBm min., +5 dBm typ., +7 dBm max.		
Mute	-60 dBm max.		
Frequency Temperature Stability	±1 ppm		
Aging[1]	±1 ppm / year		
Locking Range	±5 ppm		
Output Impedance	50 Ω nom.		
External Reference	**FSL-2740**	**FSL-5067**	**FSL-7682**
Frequency Input	10 MHz typ.		
Power Input	+10 dBm min., +5 dBm typ., +10 dBm max.		
Input level (absolute max.)	+15 dBm max.		

[1]A self-calibration feature can be launched through USB command for in-field units.

Description	Specification		
Spectral Purity	**FSL-2740**	**FSL-5067**	**FSL-7682**
Harmonics	-20 dBc typ., -15 dBc max.	-30 dBc typ., -25 dBc max.	-30 dBc typ.
Out-of-Band Sub-Harmonics (F/2 & 3F/2)	-40 dBc typ., -15 dBc max.	-60 dBc typ., -50 dBc max.	-60 dBc typ.
In-Band Sub-Harmonics (3F/4 & 5F/4	-40 dBc typ., -35 dBc max.	-60 dBc typ., -50 dBc max.	-60 dBC typ., -50 dBc max.
Spurious	-60 dBc typ., -55 dBc max.	-60 dBC typ., -50 dBc max.	-60 dBC typ., -50 dBc max.
Phase Noise	**FSL-2740**	**FSL-5067**	**FSL-7682**
dBc/Hz	40 GHz (typ.) (max.)	67 GHz (typ.) (max.)	82 GHz (typ.) (max.)
100 Hz	-55 -61	-59 -53	-57 -51
1 kHz	-90 -84	-89 -83	-87 -81
10 kHz	-100 -94	-100 -94	-99 -92
100 kHz	-103 -97	-101 -95	-101 -93
1 MHz	-105 -99	-103 -97	-100 -95
10 MHz	-116 -110	-117 -111	-115 -109
Floor	-145 -145	-141 -135	-141 -135
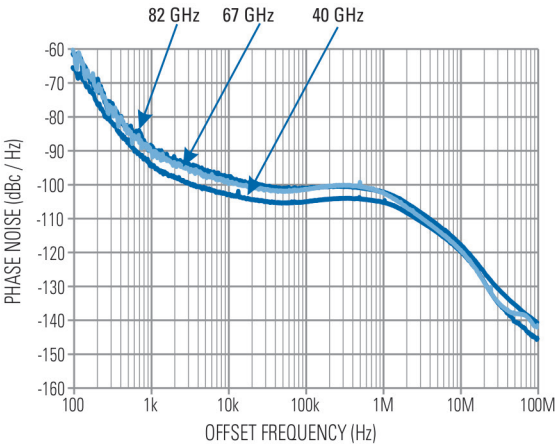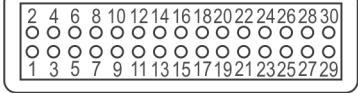
FIGURE 9: Phase Noise

Description	Specification		
Electrical	**FSL-2740**	**FSL-5067**	**FSL-7682**
Supply Voltage	+11.4 V min., +12 V typ., +12.6 V max.		
Absolute Maximum Supply Voltage	+15 max.		
Supply Current	1350 mA typ., 1500 mA max.	1350 mA typ., 1500 mA max.	1450 mA typ., 1600 mA max.

Description	Specification		
Temperature[1]	**FSL-2740**	**FSL-5067**	**FSL-7682**
Operating	0° C to +40° C		
Storage	-40° C to +70° C		

[1]Adequate heat sinking must be provided in order to prevent permanent damage.

Description	Specification		
Physical	**FSL-2740**	**FSL-5067**	**FSL-7682**
Size (W x L x H)	4 in. x 4 in. x 1.8 in.		
Weight	1.6 lb. (0.73 kg)		

Description	Specification		
Connectors	**FSL-2740**	**FSL-5067**	**FSL-7682**
RF OUT	K Type	V Type	WR12
REF IN	SMA-F		
REF OUT	SMA-F		
SPI[1]	30 pin, 0.05 in. spaced double-row header		
USB	Mini-AB receptacle (USB 2.0)		

[1]National Instruments recommends Hirose manufactured socket SFSD-15-28-H-06.00-SL

Description	Specification
SPI Interface Programming[1]	

Signal	Pin	Description
SPI_CLK	20	SPI clock. Supplied by the controlling computer (not the synthesizer). The controlling computer is the SPI master; the synthesizer is the SPI slave.
SPI_SS	18	SPI Slave Select. This signal is an active low input to the synthesizer. It frames command communications. For each command, SPI_SS goes low before the first bit is sent and goes high after the last bit is sent.
SPI_MISO	24	Master In/Slave Out. Status and other returned information from the synthesizer to the controlling computer.
SPI_MOSI	22	Master Out/Slave In. Command data from the controlling computer to the synthesizer.
TRIGGER	14	Rising edge active input. When enabled, the trigger signal of +3.3 V can initiate freq. change or step through lists or sweeps.
LOCK	16	Output indicates the synthesizer is locked on its current setting (+3.3 V locked, 0 V unlocked).
REF_LOCK	13	Output indicates the synthesizer has detected an external reference signal and locked on that signal (+3.3 V locked, 0 V unlocked).
RESET	1	Internally pulled up to +3.3 V with 100 kΩ resistor. Active "low" signal, which has a minimum width of 1 ms, will reset the synthesizer to a default state.
PWER_+12V	26,28,30	External +12V DC supply.
GND	2,15,25,27,29	Ground.
N/C	3,4,5,6,7,8,9,10 11,12,17,19,21,23	Do not use. Reserved for factory use.

[1]A QuickSyn communications specification is available on the ni-microwavecomponents.com website.

Mechanical Dimensions

Unless otherwise specified, dimensions are in inches ±0.010.

WR12 VIEW
(FSL-7682)

Description	Specification		
Ordering Information			
Models	FSL-2740	FSL-5067	FSL-7682
Option 3	Fast Switching		
Option 8	Two-year warranty extension (three years total)		
Accessory 4	Test report		
Accessory 6	Kit,Quickstart (includes Quickstart guide, USB cable, DC bias cable, and power supply)		
Accessory 10	Kit, heatsink		
Accessory 11	Certificate of calibration		

Soft Front Panel

You can control QuickSyn product functionality through the soft front panel, which is a graphical user interface available from the ni-microwavecomponents.com website. The soft front panel consists of three separate sections—the main-control panel, the sweep-mode panel, and the list-mode panel. From these panels, numerous sophisticated functions (e.g., precise frequency and power control, RF output and reference mute, blanking, independent frequency and power sweeps, list mode, modulation, and more) can be utilized, depending on which QuickSyn model you are using.
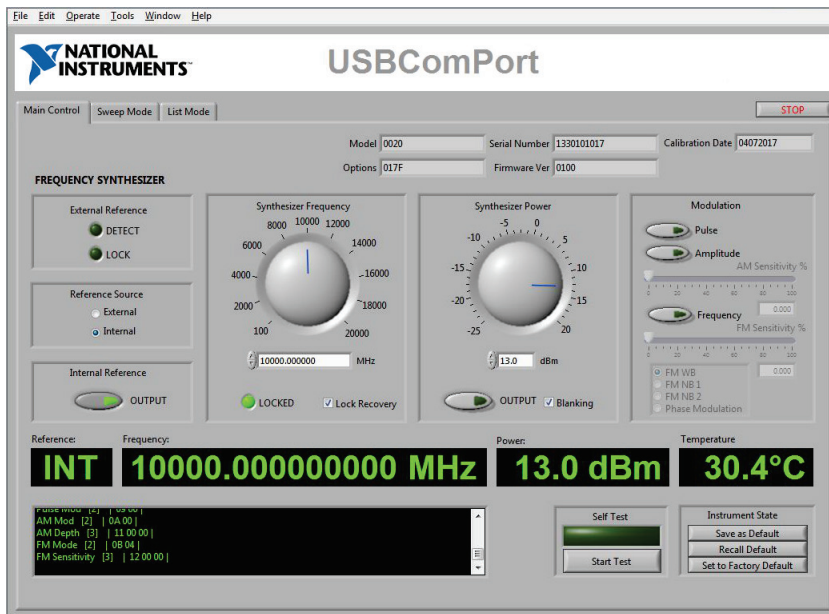
The soft front panel for the QuickSyn FSW Series frequency synthesizers is shown here. Reference, frequency, power, and modulation controls are presented on the main-control panel along with corresponding indicators and internal temperature.
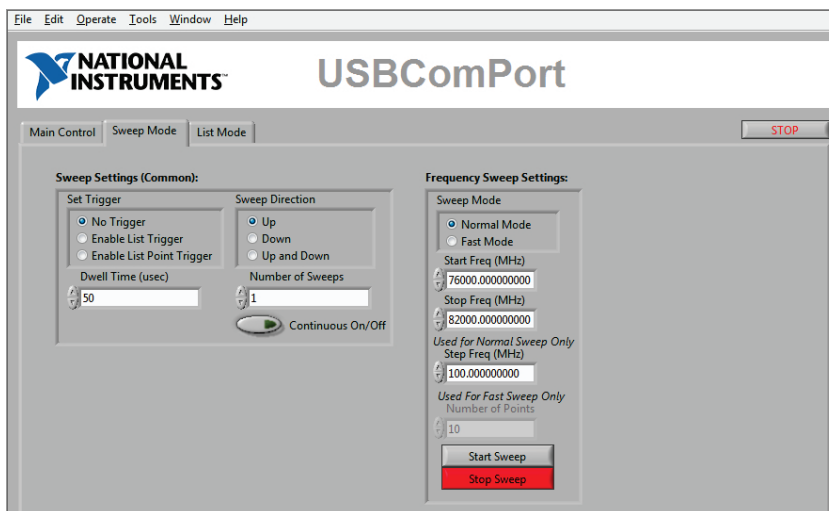
Sweep mode for the FSL Series is accessible through the sweep-mode panel shown here. You can set triggering, sweep direction, frequency range, and step size.

Application Examples

Two-tone tests are a standard benchmarking linearity of many RF products. Our FSL Series synthesizers allow for low-cost testing of third-order intercept points of amplifiers and mixers. Additionally, the low spurious performance of QuickSyn products makes them ideal for measuring conversion loss and conducting MxN spurious tests. In these applications, measurement speed is enhanced by our synthesizer's excellent frequency switching speed, sweep, list, and list trigger modes. Each list mode is capable of 32,000 step points.

Two-Tone Third-Order Intercept Test Setup
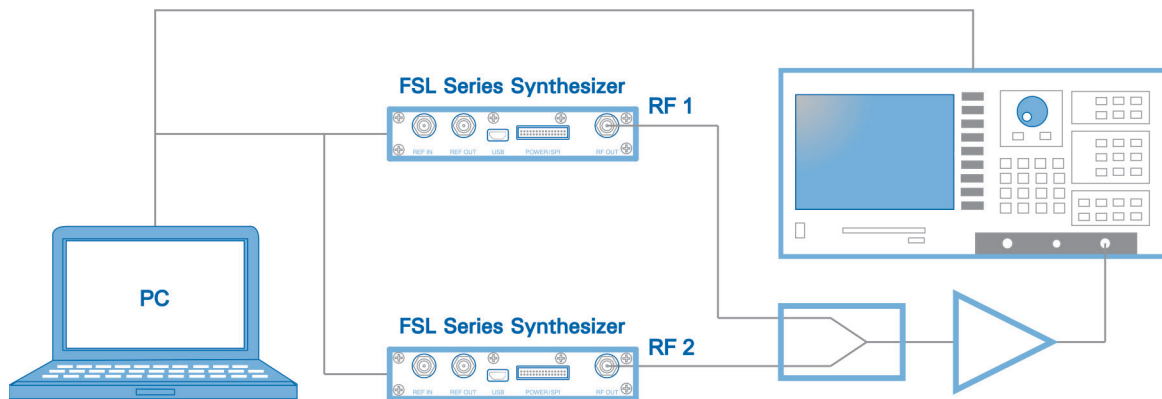
Mixer Conversion Loss Isolation and MxN Spurious Test Setup
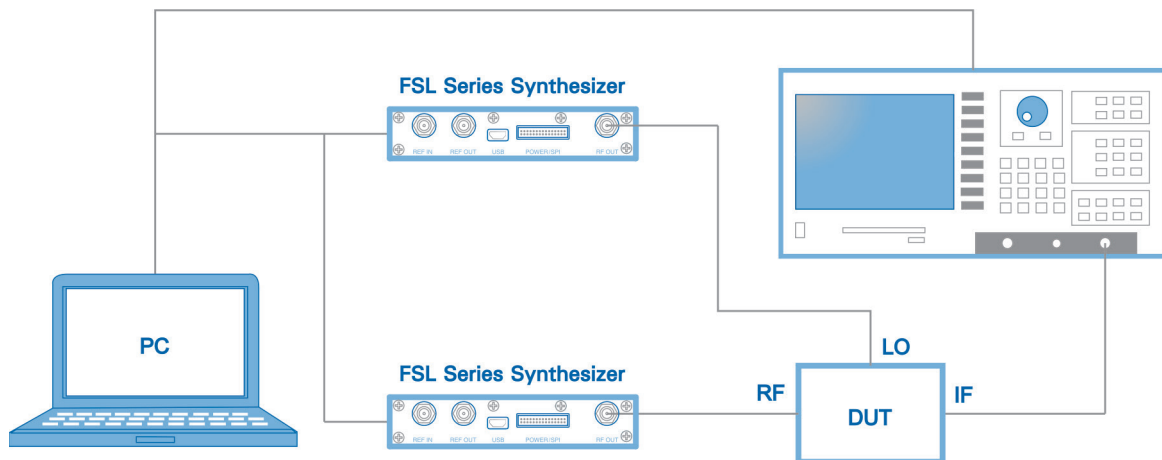
With extended frequency coverage into millimeter wave, our FSLmmW Series synthesizers are ideal for many crucial tasks in the emerging 5G and automotive-radar markets and other applications that require compact size, low cost, fast testing, and instrument-grade phase-noise performance. Error vector magnitude (EVM) measurements are especially sensitive to phase-noise performance. The application here shows the QuickSyn FSLmmW series synthesizers used as low phase noise LOs that enable high-quality EVM measurements. The QuickSyn synthesizers can be used as direct input stimulus as well as to test the analog response of the DUT. The ability to seamlessly program numerous list and sweep points also aids in simplifying test systems.

Low Cost 5G EVM Test

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