

RFPD-RO-0126-8

Dual-Channel Quad-Output Synthesizer

Product Brief

Summary

The RFPD-RO-0126-8 incorporates two independent signal sources that can generate 0.8 to 12.8 GHz on four output ports. The signal sources can be phased-synchronized with each other as well as with those on other RFPD-RO-0126-8 modules.

The high density and compact form factor are ideal for applications requiring multiple, phase-synchronous, signal sources such as in MIMO arrays and coherent communication systems in research and development.



RFPD-RO-0126-8 Dual Channel Signal Source

Description

The module can be operated as a stand-alone signal source when configured to use its internal frequency reference. In multi-unit configurations, devices can accept an external 10 or 100 MHz frequency reference. Two internal reference sources help to minimize integer boundary spurs (IBS) when operating in fractional mode.

The synthesizers can be configured independently of each other, providing the user with full control of the frequency plan.

The RFPD-RO-0126-8 comes with a 12-volt supply to power the unit. Built-in fan and temperature monitoring ensure

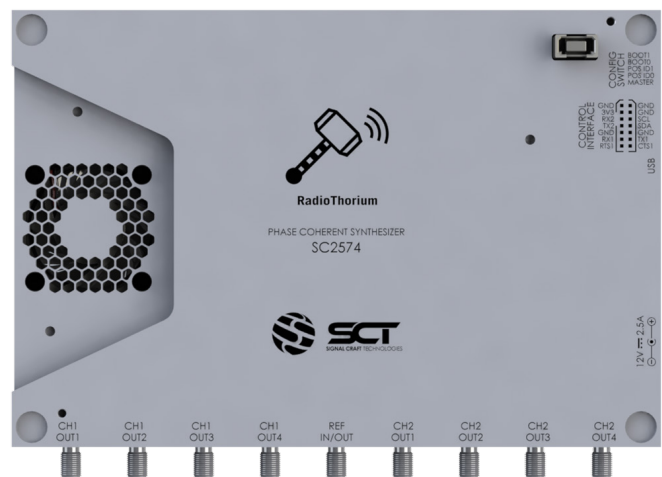
proper heat management.

The module can be controlled through USB, UART, or SPI interfaces. A console session over the USB UART is most convenient for benchtop use, but applications incorporating embedded controllers will likely leverage the UART or SPI interfaces on the external Control Ports.

Two API protocols are provided, an ASCII-based protocol using SCPI commands as defined in IEEE 488.2 and a binary protocol optimized for speed and timing in embedded control applications. Both protocols are fully described in the API Specification.

Units are mechanically compatible with the Thorium converter modules which include the SC2426, a 26 GHz Frequency Converter, and the SC2444, a 44 GHz Converter. Connectivity between the modules occurs over the Expansion Port. This allows API commands sent on the primary unit to be directed to the downstream modules, eliminating the need for multiple controllers, and simplifying timing and synchronization between units.

A single RFPD-RO-0126-8 Synthesizer module can provide 8 Local Oscillator outputs.

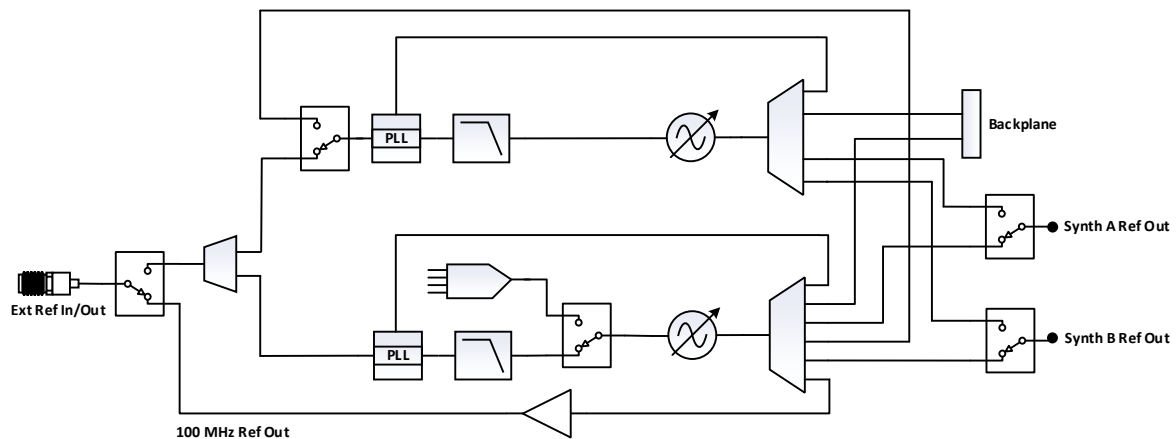


RFPD-RO-0126-8 Top View

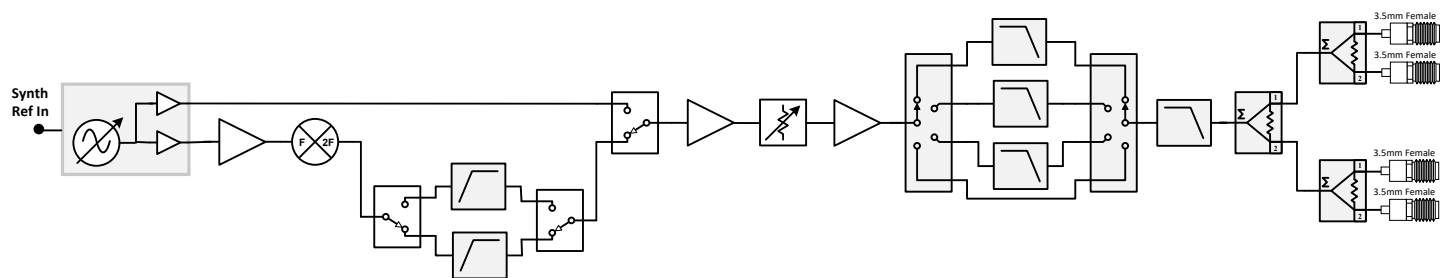
Common Applications

- Large scale MIMO systems
- Coherent communications and defense applications
- Software Defined Radio
- Advanced Wireless Communications Research

Block Diagram

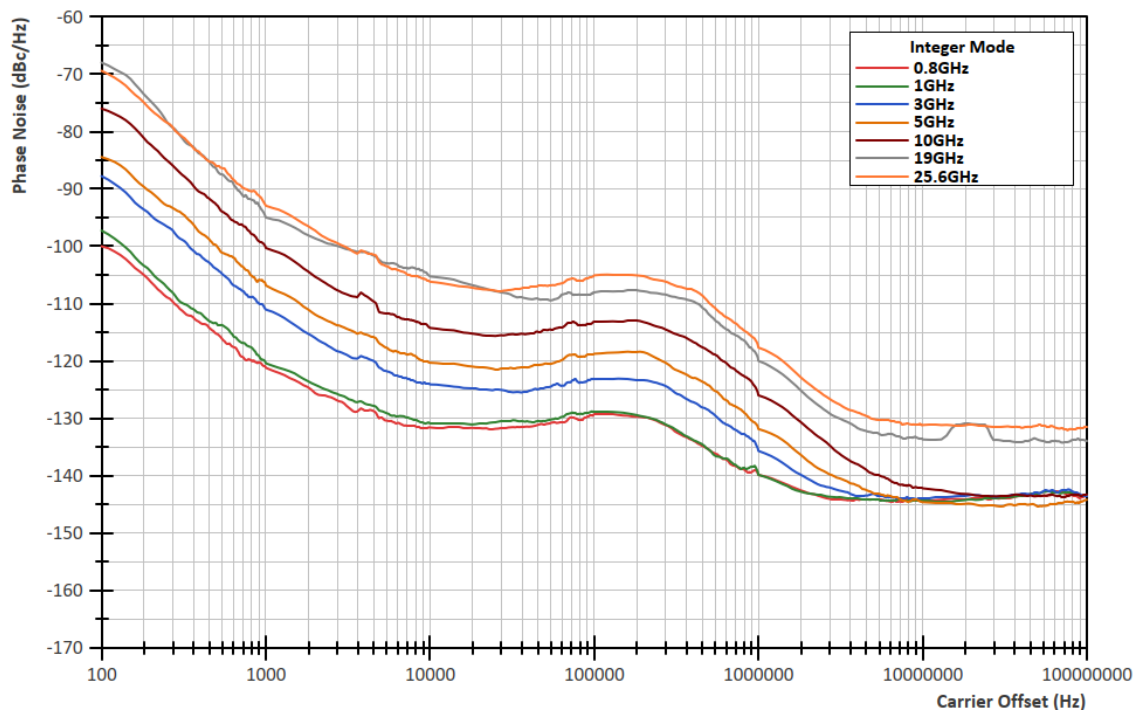


Reference Generation/Recovery Circuit



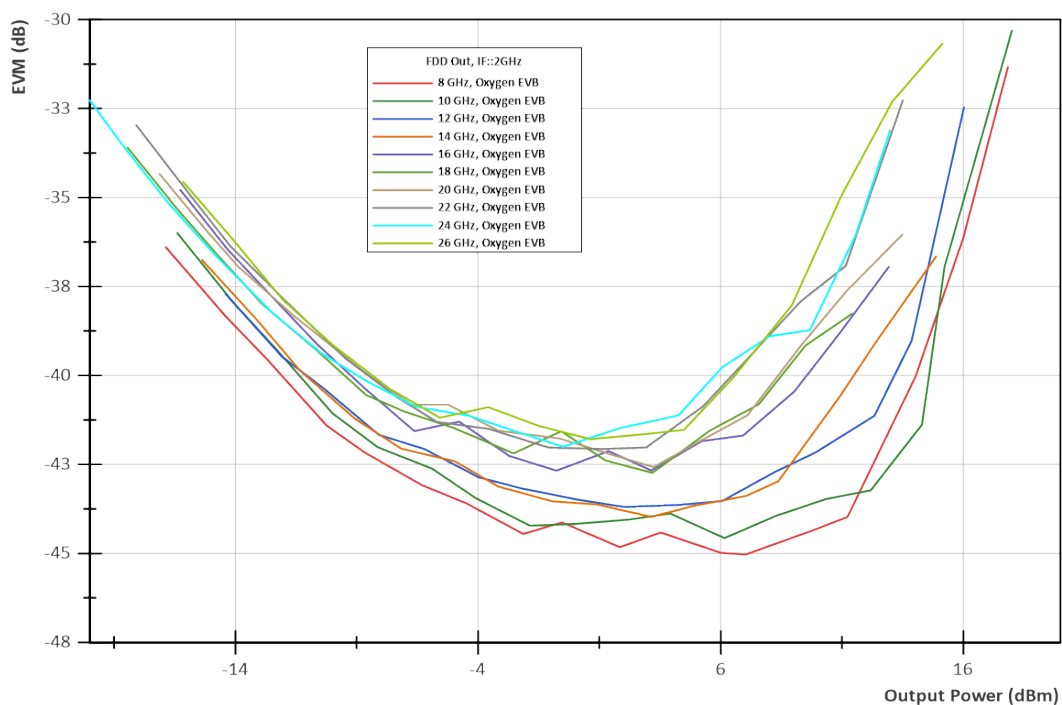
Main Synthesizer (1 of 2)

Typical Performance



Conditions: Internal Reference, 200MHz Comparison Frequency, Integer Mode)

Typical Phase Noise



Conditions: Test Signal NR_FR1_UL_FDD_SISO_BW-100MHz_CC-1_SCS-60kHz_Mod-256QAM-OFDM

Example EVM Performance when Combined with SC2426 Frequency Converter

Typical Performance - Summary

General

- Dual Independent Synthesizers
- Can be Internally and Externally Phase Synchronized to Each Other
- Each synthesizer feeds a 4-way splitter
- Output Frequency
 - » Range: 0.8 to 25.6 GHz
 - » Resolution: 0.1 Hz
- Output Power
 - » Minimum: 5 dBm
 - » Flatness: tbd
 - » Control Range: 60 dB
 - » Resolution: 0.5 dB
- Settling Time
 - » Frequency Switching: 2 mS
 - » On/Off Switching (10/90%): tbd
- Stability (Internal Reference):
 - » Absolute: tbd ppm
 - » Time: tbd ppm / year
 - » Temperature: tbd ppm (0 to +55C)
- External Reference Input:
 - » Selectable 10 or 100 MHz
 - » 0.5 to 2.5 Vpp
 - » 50% Duty Cycle
 - » Min Slew Rate 1000V/uS
- Reference Output:
 - » 100 MHz
 - » 20 Vpp
 - » 50% Duty Cycle
 - » Sinusoidal
- Spurious Output:
 - » Harmonics: -30 dBc
 - » Non-harmonic:
 - -75 dBc typical
 - -55 dBc at Integer Boundary
- Phase Noise
 - » See plots of typical performance under various configurations

Synchronization

- Relative Phase Accuracy
 - » LO to LO: +/- 0.5 degree
 - » Path to Path: TBD degree
- Absolute Amplitude Accuracy
 - » Path to Path: TBD dB
 - » LO to LO: TBD dB

Interfaces

- LO Outputs (4 Outputs per Channel)
 - » 3.5 MM
- Reference Ports (Input and Output)
 - » SMA
- Primary Control Interface (UART)
 - » USB-C
- Auxiliary Control Interface (SPI, I2C)
 - » Thorium Compatible
- Config Port
 - » 2-Bit Device Addressing
 - » Boot Modes
- Expansion Port
 - » Thorium Compatible
- No Front End Interface
- Power Supply
 - » 12 Vdc
- Trigger (on/off)

Environmental

- Operating
 - » Temperature: 0 to 55 C
 - » Humidity: 10 to 90% (non-condensing)
- Storage
 - » Temperature: -40 to 70 C
 - » Humidity: 10 to 90% (non-condensing)
- Mechanical Dimensions
 - » 193 mm (l) x 130 mm (w) x 24.1 mm (h)
- Weight
 - » 1000 g