

Synchronous Dual-Channel Synthesizer

SC2574 | Phase Coherent Synthesizer

Product Brief

Summary

The SC2574 features two independent signal sources, each capable of generating frequencies from 0.8 to 25.6 GHz across four output ports. These signal sources can be phase-synchronized with each other and with those on additional SC2574 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.



SC2574 – Phase Coherent Synthesizer

Description

The SC2574 can be operated as a stand-alone signal source. The synthesizers can be configured independently of each other, providing the user with full control of the frequency plan.

The module incorporates a low phase noise reference source. Alternatively, the device can be configured to accept an external 10 or 100 MHz frequency reference.

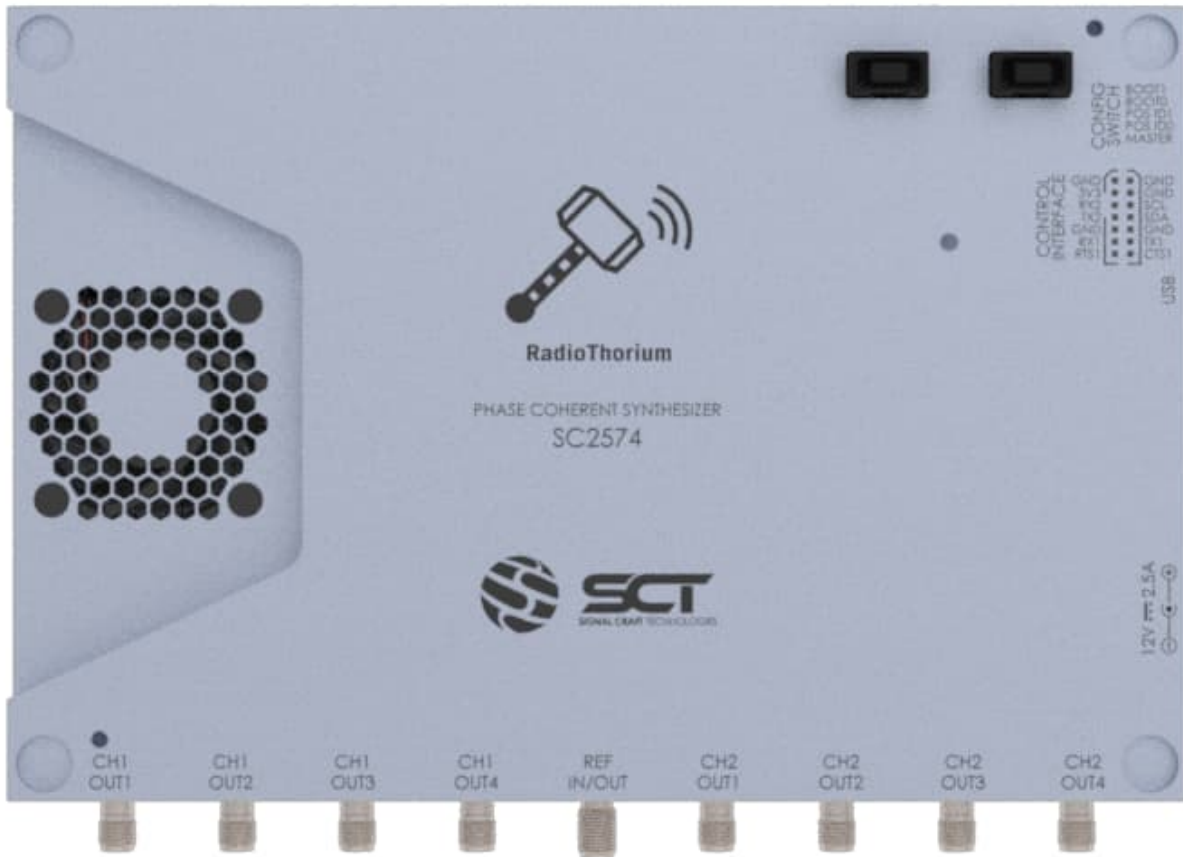
Units are mechanically compatible with SCT's family of converter modules which include the SC2426, a 26 GHz Frequency Converter, and the SC2444, a 44 GHz Converter. Connectivity between the modules occurs over the Expansion Port. This allows API commands sent on the primary unit to be directed to the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

The SC2574 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.

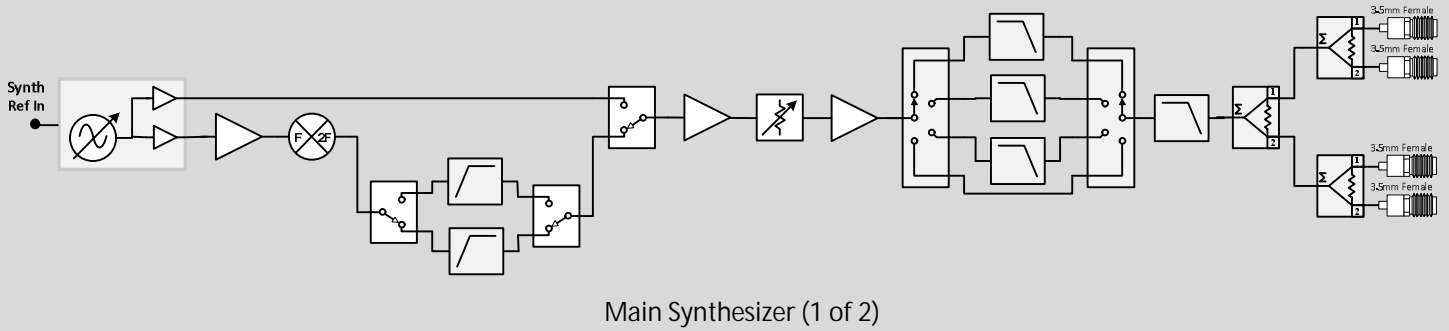
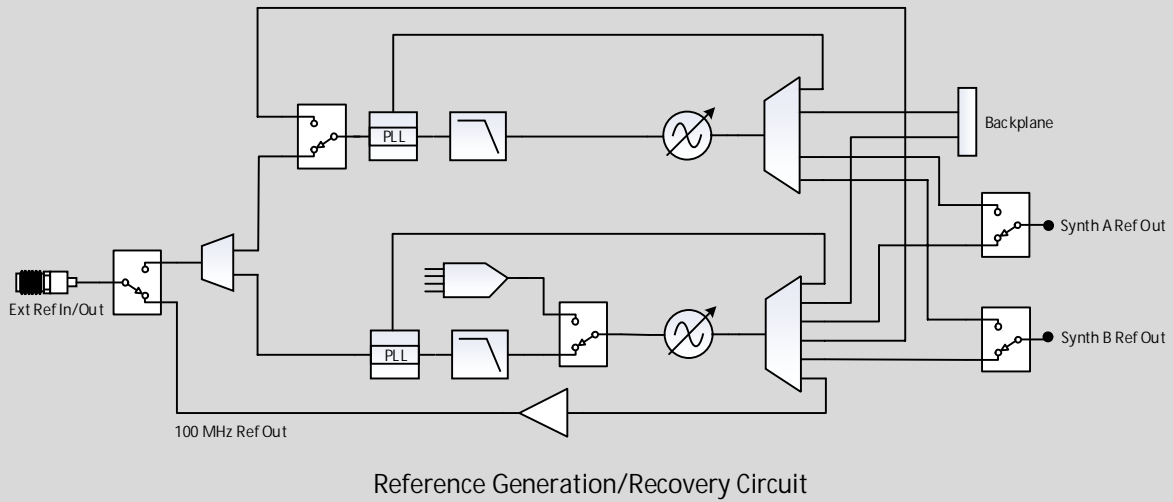


SC2574 Top View

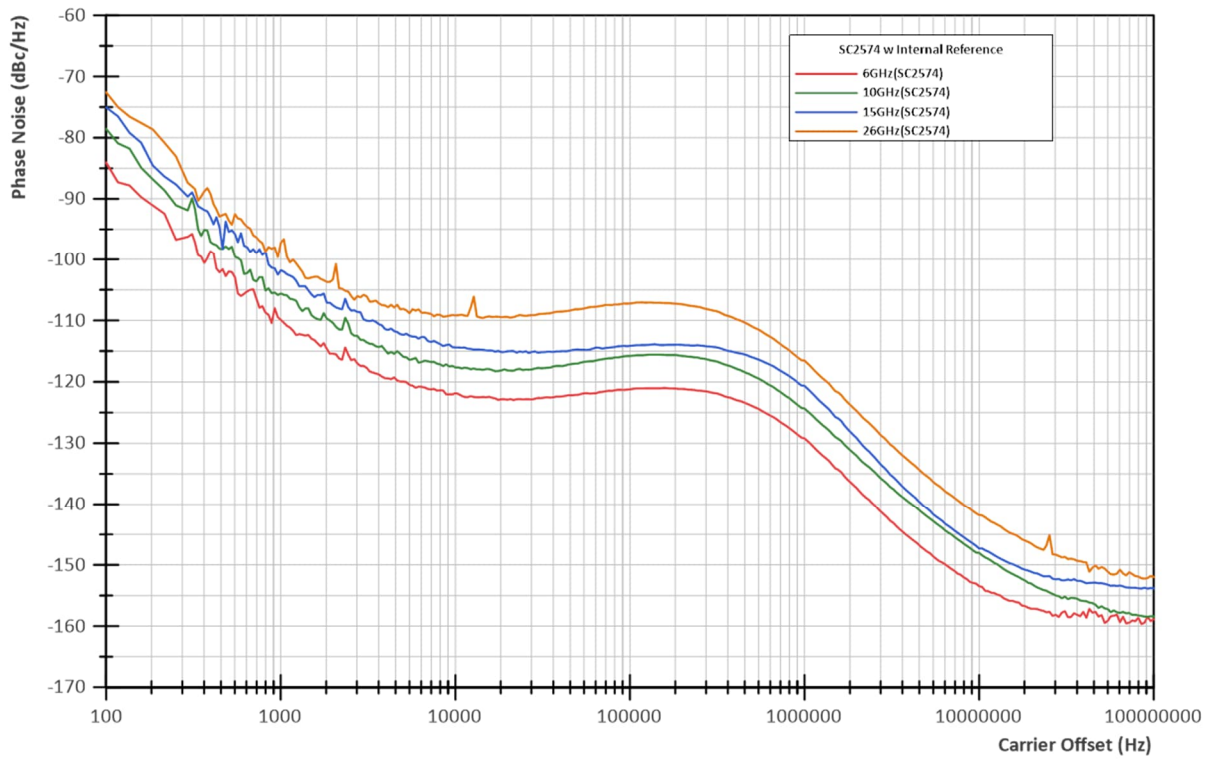
Common Applications

- Large scale MIMO systems
- Coherent communications and defense applications
- Software Defined Radio
- Advanced wireless communications research

Block Diagram

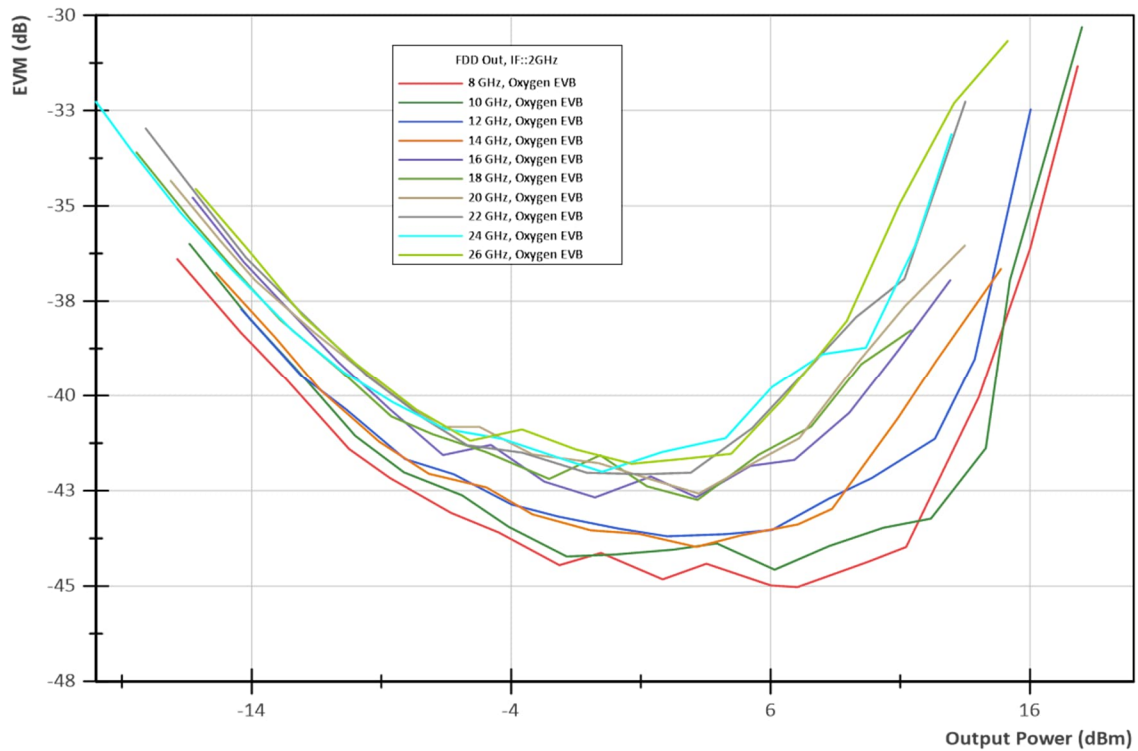


Typical Performance



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

Figure 1 - Typical Phase Noise



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

Figure 2 - Example EVM Performance when Combined with SC2426 Frequency Converter

Typical Performance - Summary

General

- Dual independent synthesizers
- Internally and externally phase synchronizable
- Quad outputs on each synthesizer
- Output Frequency
 - Range: 0.8 to 25.6 GHz
 - Resolution: 0.1 Hz
- Output Power
 - Minimum: 5 dBm
 - Flatness: +/- 1 dB
 - Control Range: 30 dB
 - Resolution: 0.5 dB
- Switching Time
 - Frequency Change: < 5 mS
 - List Mode: < 100 uS
- Power Ramp
 - On/Off Switching (10/90%): tbd
- Stability (Internal Reference):
 - Total: +/- 10 ppm
- External Reference Input:
 - Selectable 10 or 100 MHz
 - 0.7 to 2.5 Vpp
 - 50% Duty Cycle
 - Min Slew Rate 1000V/uS
- External Reference Output:
 - 100 MHz
 - 1.8 Vpp
 - 50% Duty Cycle
 - Sinusoidal
- Spurious Output:
 - Harmonic: -30 dBc
 - Non-harmonic: -75 dBc
- Phase Noise
 - See plots of typical performance under various configurations.

Synchronization

- Phase Stability*
 - Chan to Chan: < 1 deg pk-pk
 - Path to Path: < 0.2 deg pk-pk
 - Module to Module: TBD
 - Absolute Amplitude Accuracy
 - Path to Path: +/- 1 dB
- *measured at 23C after device warmup

Interfaces

- LO Outputs (4 Outputs per Channel)
 - 3.5 mm
- Reference Port (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
 - Converter family compatible
- Status LED
- Power Supply
 - 12 Vdc

Trigger

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
 - 1100 g



Support

Technical support is available through our website, www.signalcraft.com/support, or by contacting us at support@signalcraft.com.

Warranty

Full one-year parts and labour when used under normal installation and operation conditions. Repair services are available for products no longer covered under warranty.

Ordering Information

Send inquiries to support@signalcraft.com.