

SFC4200A C-Band Synthesized Frequency Down Converter

Converters



Overview

The SFC4200A C-Band Synthesized Frequency Down Converter has been designed to provide performance that meets or exceeds industry standards. The SFC4200A features also provide ease of integration and operation. Designed to handle extreme ratios of adjacent carrier power, the SFC4200A offers the highest standard input P1 dBm in the industry at -19 dBm. With a typical noise figure of 10 dB at 40 dB gain, the SFC4200A can receive signals below -110 dBm with an aggregate input power of -25 dBm. This represents a receive dynamic range in excess of 85 dB. At 40 dB of gain standard, or with the 60 dB gain option, the SFC4200A will easily integrate into any size earth station while eliminating the need for receive line amplifiers, even for installations that employ power splitters on the downlink. Linearity of the converter is equally impressive. The SFC4200A boasts a two-tone IMD product of 60 dBc for a combined output power of 0 dBm. Output P1 dBm of the converter is +20 dBm. In most installations this allows IF power splitters to be used without the need for IF distribution amplifiers.

Features

- Low-Cost and High Performance in a 1.75" High Chassis
- Built-in 1:N Series Switching Option
- High Receive Intercept/Dynamic Range
- Low Phase Noise
- 125 kHz Frequency Resolution (optional 1 KHz)
- RS-232/-422/-485 Operator Serial Interface
- Plug-and-Play Compatibility With Radyne Low-Cost 1:1 and 1:N Switches
- Available in Extended Frequency Bands

Monitor and Control

All of the configuration, monitor and control functions are available at the front panel. Operating parameters such as frequency, channel, gain, gain offset and switch settings (backup only) can be readily set and changed at the front panel. Additionally, all functions can be accessed with a terminal or personal computer via a serial link (RS-232, RS-485, or Ethernet) for complete remote monitor and control (M&C) capabilities. Extensive fault monitoring with masking capability, along with time and date stamped event storage are available.

Protection Switch Versatility

Redundancy for the SFC converter products can be supported by an external rack mounted RCU101 (1:1) or RCU108 (1:N) system. These redundant systems are designed to ensure continuous operation thus allowing a unit to be replaced without disruption of the signal transmission. The RCU101 or the RCU108 can be easily configured by connecting the cables and starting the plug and play process.

Identical firmware enables any converter to be plugged into the backup slot and assume the role of protection switch controller. It is the backup converter that learns and stores the frequency, gain and channel settings of the primary converters. The backup converter can be operated automatically, in which case an automatic backup of a failed on-line converter occurs after a user pre-programmed delay. The backup may also be operated manually, allowing the operator to manually switch-in the backup unit. In the event the stored setting of the primary converter is changed, the backup converter will notify the user.

Switching configuration settings, such as priority, fault delay, force and learn controls, backup testing, and compensation, are available on the front panel and all serial interfaces. Status information on all primes, such as summary fault, learn and backup status tests, configuration change, relay status, and converter type, is also available. All circuits are protected upon installation of the switch and upon completion of the learning process. This eliminates the need for complicated software configurations that might otherwise leave a circuit vulnerable. Likewise, replacing a failed converter is as simple as plugging in a replacement.

Specifications

Input Characteristics

Frequency	3.625 - 4.20 GHz Standard 3.40 - 4.20 GHz Extended (Optional)
Impedance	50 Ohms
Return Loss	≥ 20 dB
P1 dBm Input	-19 dBm
Input Dynamic Range	-25 dBm Aggregate Signal; Power to -110 dBm Carrier Level
Connector	N, Type-F

Output Characteristics

Frequency	70 MHz ± 20 MHz Standard 140 MHz ± 40 MHz Optional
Impedance	75 Ohms
Return Loss	≥ 23 dB
P1 dBm Output	+20 dBm
Connector	BNC, F

Transfer Characteristics

Type	Double Conversion, No Spectral Inversion
Gain	40 dB Maximum @ 0 dB Total Attenuation (60 dB Optional)
Gain Control	40 dB in 0.1 dB Increments (0 dB to +40 dB Conversion Gain)
Gain Ripple	± 0.25 dB/36 MHz, ± 0.5 dB/76 MHz
Gain Slope	± 0.05 dB/MHz
Gain Stability	± 0.25 dB/24 Hours, ± 1.0 dB; 0 to 50°C
Noise Figure	11 dB Maximum @ 0 dB Attenuation
Spurious	-80 dBm Local Oscillator Related Spurious (In-band) at Minimum Attenuation -65 dBc Signal Related Spurious (In-band) at Minimum Attenuation
Third Order Intercept	+30 dBm -60 dBc IMD Two Tones With 0 dBm Total Output Power
AM/PM Conversion	0.1°/dB
Image Rejection	> 80 dB

Frequency Synthesizer Characteristics

Resolution	125 kHz Step Size (optional 1 KHz)
Stability	± 5 x 10 ⁻⁹ Over Temperature (0 to 50°C) +1 x 10 ⁻⁹ /24 Hours
Accuracy	± 5.0 x 10 ⁻⁹ After 20 Minutes

Single Side Band Phase Noise

Offset	C-Band Standard
10 Hz	-50 dBc/Hz
100 Hz	-70 dBc/Hz
1 kHz	-80 dBc/Hz
10 kHz	-88 dBc/Hz
100 kHz	-95 dBc/Hz
1 MHz	-110 dBc/Hz
Ext. Reference	10 MHz, 0 dBm, 50 Ohms (5 MHz Optional)

Group Delay

Linear	0.025 nsec./MHz
Parabolic	0.005 nsec./MHz ²
Ripple	1 nsec. p-p for ± 18 MHz

Operator Interface

Front Panel	Keypad Control, LED Indicators, and LCD Indicators
Remote Interfaces	Terminal (RS-232), ASCII and RLLP (RS-232/RS-485) Serial Interface, and SNMP (Ethernet) 10Base-T
Rear Panel Connections	RF Input (SMA 50 Ohms), IF Output (75 Ohm BNC), Operator Serial Port (DB 9-Pin), 10 MHz REF In (BNC), REF Out (BNC), Fault/Test (DB 9-Pin), Switch Interface (DB 15Pin), Equipment RS-485 Interface (DB 9-Pin), IEC/EN60320/C13 Power Entry Module/Switch, #10 Ground Lug, Series Switch Interface (Optional)
Front Panel Test Ports:	RF Monitor -15 dB; IF Monitor -15 dB

Converter Settings

Monitored and/or controlled from the front panel or remotely, using the RS-232/RS-484 or Ethernet remote port:

<ul style="list-style-type: none"> • Frequency • Current Channel • Event Buffer • Power Supply Voltages • Input Attenuation (Up converter Only) • Carrier Control and Status (Up converter Only) • RF Detector, IF Detector, and DAC Attenuation Voltages • Converter and Frequency Type • Terminal Emulation and Baud Rate 	<ul style="list-style-type: none"> • Channel Gain • Gain Offset • Faults Status and Mask • Frequency Reference Status and Offset Control • Remote Protocol, Baud, Line, and Echo Modes • Converter Band and User Minimum/Maximum Frequencies
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Switch Settings:

Monitored and/or controlled from the front panel or remotely, using the RS-232/RS-484 or Ethernet remote port (backup only)

<ul style="list-style-type: none"> • Priority • Fault Delay • Force Backup • Learn Control • Backup Testing • Compensation Control 	<ul style="list-style-type: none"> • All Available Prime Summary Fault • All Available Prime Learn Status • All Available Prime Backup Test Status • All Available Prime Configuration Change Status • All Available Prime Relay Status • All Available Prime Converter Types
LED Indications	Standby, LO Fault, Ext Ref Online, Backup, Sw Fault, Manual (Backup Only), Power, Fault, Event, Remote Sig Fault (Up converter Only)

Physical & Environmental Characteristics

Dimensions (height x width x depth)	1.75 x 19" x 19" (4.44 x 48.26 x 48.26 cm)
Weight	12 lb. (5.44 kg)
Primary Power	100 - 240 VAC, 50 - 60 Hz, 1.0 A
Power Consumption	50 W
Operating Temperature	0 to 50°C
Humidity	To 95% Non-Condensing
Altitude	To 8,000 Feet (2438.4 meters) AMSL
Shock and Vibration	No loss of frame synchronization at the BER Test set due to a standard hammer drop test on any outside surface of converter. Likewise, no loss of frame sync for temp gradient of ± 22°C/Hour
Non-Operating Temperature	-32 to +70°C, 99% Humidity, Non-Condensing



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