SFC1275A Ku-Band Synthesized Frequency Down Converter

Overview

The SFC1275A Ku-Band Synthesized Frequency Down Converter has been designed to provide performance that meets or exceeds industry standards. The SFC1275A features also provide ease of integration and operation. Designed to handle extreme ratios of adjacent carrier power, the SFC1275A offers the highest standard input P1 dBm in the industry at -20 dBm. With a typical noise figure of 10 dB at 40 dB gain, the SFC1275A 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, the SFC1275A 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 SFC1275A boasts a two-tone IMD product of 60 dBc for a combined output power of 0 dBm. Output P1 dBm of the converter is +19 dBm. In most installations, this allows IF power splitters to be used without the need for IF distribution amplifiers.

Features

- High-Performance at a Low-Cost in a 1.75” Chassis
- Built-In 1:N Series Switching Option
- High Receive Intercept/Dynamic Range
- Low Phase Noise
- 125 kHz Frequency Resolution (optional 1 kHz)
- RS-232/485 Operator Serial Interface
- 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.

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Specifications

Published specifications reflect the maximum SFC1275A performance. Each SFC1275A can be configured to customer requirements via hardware / software options applied at the factory or in the field.

Input Characteristics

Frequency	10.95 11.70 GHz (Plan A) 12.25 12.75 GHz (Plan B) 11.70 12.20 GHz (Plan C) 10.95 12.75 GHz (Global)
Impedance	50 Ohms
Return Loss	≥19 dB
P1 dBm Input	20 dBm
Input Dynamic Range	25 dBm Aggregate Signal Power to 110 dBm Carrier Level
Connector	SMA, Type F

Output Characteristics

Frequency:	70 MHz ± 18 MHz Standard 140 MHz ± 36 MHz Optional
Impedance:	75 Ohms
Return Loss:	≥ 23 dB Maximum; 26 dB Typical
P1 dBm Output:	+19 dBm
Connector:	BNC, F

Transfer Characteristics

Type	Double Conversion, No Spectral Inversion
Gain	40 dB Maximum @ 0 dB Total Attenuation
Gain Control	40 dB in 0.1 dB Increments (0 dB to +40 dB Conversion Gain)
Gain Ripple	± 0.5 dB/36 MHz
Gain Slope	± 0.05 dB/MHz
Gain Stability	± 0.25 dB/24 Hours, ± 1.0 dB; 0 to 50°C
Noise Figure	12 dB Max. @ 0 dB Attenuation
Spurious	80 dBm Local Oscillator Related Spurious (In band) at Minimum Attenuation 50 dBc Signal Related Spurious (In band) at Minimum Attenuation
Line Frequency Reference	< 50 dBc @ ± 100 kHz
Third Order Intercept	+30 dBm 60 dBc IMD Two Tones with 0 dBm Total Output Power
AM/PM Conversion	0.15°/dB

Frequency Synthesizer Characteristics

Resolution:	125 kHz Step Size (optional 1KHz)
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	Ku-Band Standard
10 Hz	50 dBc/Hz
100 Hz	60 dBc/Hz
1 kHz	80 dBc/Hz
10 kHz	84 dBc/Hz
100 kHz	94 dBc/Hz
1 MHz	110 dBc/Hz
Ext. Reference	10 MHz, 0 dBm, 50 Ohms (5 MHz Optional)

Group Delay

Linear	0.035 nsec./MHz
Parabolic	0.0075 nsec./MHz^2
Ripple	1.5 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)
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 15 Pin), 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:

- Frequency
- Current Channel
- Event Buffer
- Power Supply Voltages
- Terminal Emulation and Baud
- Converter and Frequency Type
- RF Detector, IF Detector, and DAC Attenuation Voltages
- Input Attenuation (Up Converter Only)
- Carrier Control and Status (Up Converter Only)
- Channel Gain
- Gain Offset
- Faults Status and Mask
- Frequency Reference Status and Offset Control
- Remote Protocol, Baud, Line, Echo and Offset Modes
- Converter Band and User Minimum/Maximum Frequencies

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

- Priority
- Fault Delay
- Force Backup
- Learn Control
- Backup Testing
- Compensation Control
- 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, SwFault, Manual (Backup Only), Power, Fault, Event, Remote

Physical & Environmental Characteristics

Dimensions (height x width x depth)	1.75" x 19" x 19" (4.44 x 48.2 x 48.26 cm)
Weight	12 lb. (5.44 kg)
Primary Power	100 to 240 VAC, 50 to 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 (2.438 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 +65°C, 99% Humidity, Non Condensing