

# SFC1800A

## DBS-Band Synthesized Frequency Upconverter



### HIGHLIGHTS

- ▶ Low-Cost and High Performance in a 1.75" High Chassis
- ▶ Built-In 1:N Series Switching Option
- ▶ +27 dBm Output Intercept Drives 100 Extra Feet of Coaxial Cable
- ▶ 50 dB of Gain Control at 0.2 dB Resolution
- ▶ Versatile Input and Output Attenuators Ease Integration
- ▶ -80 dBc Spurious Suited for Large Earth Stations
- ▶ 125 kHz Frequency Resolution
- ▶ Low Phase Noise
- ▶ Low Group Delay Distortion for High Data Rates and DVB

### OVERVIEW

The Radyne Model SFC1800A DBS-Band Synthesized Frequency Upconverter has been designed to provide performance that meets or exceeds industry standards. The SFC1800A features also provide ease of integration and operation.

The SFC1800A offers the highest standard output power of any rack-mount upconverter available. With an output P1 dB in excess of +10 dBm, the SFC1800A may eliminate the need for line amplifiers in your next installation. Installation of the SFC1800A into any existing earth station is easily accomplished due to the presence of independently adjustable input and output attenuators that provide total gain control of 50 dB. The input attenuator optimizes the existing IF power applied to the converter to a level which guarantees optimal performance over 30 dB of input signal power. Output power is adjustable over 20 dB which further guarantees that spurious performance is maintained independently of upconverter gain.

Linearity of the converter is equally impressive. The SFC1800A boasts a two tone IMD product of -44 dBc with a combined output power of 0 dBm. Phase linearity is maintained through an internal group delay equalizer that limits parabolic plus linear group delay to less than three nanoseconds across the band. Thus, the SFC1800A is ideally suited for multiple carrier or DVB uplinks where linearity and group delay distortion becomes critical.

### 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 a built in Series Switch or 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 Radyne's built in Series Switching can be configured from a 1:1 to 1:8 redundant system without the need for additional hardware or support equipment. In either case, the built in Series Switch, 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.



# SFC1800A DBS-Band Synthesized Frequency Upconverter

## SPECIFICATIONS

### OUTPUT CHARACTERISTICS

|                     |   |
|---------------------|---|
| Frequency:          | 17.30 - 17.80 GHz<br>17.30 - 18.10 GHz<br>17.30 - 18.40 GHz |
| Impedance:          | 50 Ohms   |
| Return Loss:        | ≥16 dB  |
| P1 dBm Output:      | +10 dBm Minimum   |
| L-Band Attenuation: | 0 - 20 dB Continuously; Variable in 0.1 dB Steps            |
| Connector:          | SMA Female  |

### INPUT CHARACTERISTICS

|               |   |
|---------------|---|
| Frequency:    | 70 MHz ±18 MHz Standard<br>140 MHz ±36 MHz Optional                     |
| Impedance:    | 75 Ohms   |
| Return Loss:  | ≥23 dB  |
| P1 dBm Input: | +10 dBm (Input Attenuator @ 30 dB)<br>-15 dBm (Input Attenuator @ 0 dB) |
| Pin Nominal:  | +5 dBm (Input Attenuator @ 30 dB)<br>-25 dBm (Input Attenuator @ 0 dB)  |
| Connector:    | BNC Female  |

### TRANSFER CHARACTERISTICS

|                           |   |
|---------------------------|---|
| Type:                     | Double Conversion, No Spectral Inversion  |
| Gain:                     | 30 dB Maximum @ 0 dB Total Attenuation  |
| Gain Control:             | 50 dB in 0.2 dB Increments<br>(30 dB to -20 dB Conversion Gain)   |
| Gain Ripple:              | ±0.50 dB/36 MHz Typical, ±0.50 dB Maximum   |
| Gain Slope:               | ±0.05 dB/MHz  |
| Gain Stability:           | ±0.25 dB/24 Hours, ± 1.0 dB; 0 to 50°C  |
| Spurious:                 | -80 dBm Local Oscillator Related Spurious<br>(In-Band) at Maximum gain<br>-60 dBc Signal Related Spurious (In-Band) at<br>Minimum Attenuation |
| Third Order<br>Intercept: | +27 dBm -44 dBc IMD Two Tones With +0 dBm<br>Total Output Power   |
| AM/PM<br>Conversion:      | 0.15°/dB @ +5 dBm Output  |
| Group Delay Linear:       | 0.025 nsec./MHz   |
| Parabolic:                | 0.005 nsec./MHz <sup>2</sup>  |
| Ripple:                   | 1 nsec. p-p   |
| Carrier Mute:             | 80 dBm Minimum  |

### FREQUENCY SYNTHESIZER CHARACTERISTICS

|             |  |
|-------------|--|
| Resolution: | 125 kHz Step Size  |
| Accuracy:   | ±5 x 10 <sup>-9</sup>  |
| Stability:  | ±5 x 10 <sup>-9</sup> Over Temperature<br>(0 to 50°C) ± 1 x 10 <sup>-9</sup> /24 Hours |
| Accuracy:   | ±5 x 10 <sup>-9</sup>  |

### SINGLE SIDE BAND PHASE NOISE

| Offset             | DBS-Band Standard                       |
|--------------------|---|
| 10 Hz              | -50 dBc/Hz                              |
| 100 Hz             | -66 dBc/Hz                              |
| 1 KHz              | -76 dBc/Hz                              |
| 10 KHz             | -86 dBc/Hz                              |
| 100 KHz            | -95 dBc/Hz                              |
| 1 MHz              | -110 dBc/Hz                             |
| External Reference | 10 MHz, 0 dBm, 50 Ohms (5 MHz Optional) |

## OPERATOR INTERFACE

Front Panel: Keypad Control, LED Indicators, and LCD Indicators  
Remote Interfaces: Terminal (RS-232), ASCII and RLLP (RS-232/RS-485)  
Serial Interfaces, and SNMP (Ethernet) 10Base-T

Rear Panel  
Connections: RF Output (SMA Female), IF Input (75 Ohm BNC),  
Operator Serial Port (DB-9 Pin), 10 MHz REF In  
(50 Ohm BNC), 10 MHz REF Out (50 Ohm 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 (Option)

Front Panel  
Test Ports: RF Monitor -15 dB (Nominal) SMA Female,  
IF Monitor -15 dB SMA Female

### 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
- Input Attenuation
- Carrier Control and Status
- Converter and Frequency Type
- RF Detector, IF Detector, and DAC Attenuation Voltages
- 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
- Terminal Emulation and Baud Rate

### 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, Sig Fault, Ext Ref Online, Backup,  
SwFault, Manual (Backup Only), Power, Fault, Event,  
Remote

## PHYSICAL CHARACTERISTICS

|                    |  |
|--------------------|--|
| Size:              | 19" x 1.75" x 21" deep (48.26cm x 4.44cm x 53.34cm deep) |
| Weight:            | 12 lb. (5.44 kg)   |
| Primary Power:     | 100 - 240 VAC, 50 - 60 Hz                                |
| Power Consumption: | 50 Watts   |

## ENVIRONMENTAL CHARACTERISTICS

Operating  
Temperature: 0 to 50°C  
Humidity: To 95% non-condensing  
Altitude: To 8,000 Feet (2438.4 meters) AMSL  
Shock & 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 temperature  
gradient of ±22°C/hour

Non-Operating  
Temperature: -32 to +70°C, 99% Humidity, Non-Condensing

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