

DUAL CONVERSION L-BAND SATCOM FREQUENCY CONVERTERS



The GeoSync Microwave Converters are designed to simultaneously provide high performance, high reliability and high value, and are available for operation in the full L-band frequency range.

The low phase noise and excellent dynamic range of these converters enable them to carry almost any type of analog or digital communications signals.

Multiple remote connections and a robust protocol provide strong M&C support.

STANDARD FEATURES

- High harmonics rejection (MIL-STD-188-164 Compliant)
- Phase perturbation: MIL-STD-188-164 Compliant (external reference)
- Amplitude slope adjust
- RS422, RS485 and 10/100Base-T Ethernet
- Serial output for Redundancy Switchover units
- Switchable 50/75 ohm IF impedance
- RF and IF monitor ports
- Automatic switching to external 5/10 MHz reference
- Electronic adjustment of internal reference frequency
- Low intermodulation distortion
- Phase noise IESS-308/309 compliant
- 64 programmable memory locations
- 30 dB level control
- Independent input level control (upconverters only)
- Elapsed time and event log after power turn on
- CE mark

OPTIONS

- 140 MHz IF frequency
- Switchable 70/140 MHz IF frequencies
- Reference clean-up loop and improved frequency stability

UPCONVERTERS

Model Number	RF Frequency (GHz)
UTR-950175	950-1750
UTR-950215	950-2150

DOWNCONVERTERS

Model Number	RF Frequency (GHz)
DTR-950215	950-2150

SPECIFICATIONS (1/3)

	UPCONVERTER	DOWNCONVERTER
Type	Dual conversion	
Frequency Step Size	1 kHz	
Frequency Sense	No inversion	
OUTPUT CHARACTERISTICS		
Frequency	70 ±20 MHz (140 ±40 MHz, Option 1-1)	Refer to model number table
Impedance	50/75 ohm switchable	50 ohms
Return Loss	20 dB minimum	14 dB minimum
Signal Monitor	-20 dBc nominal	
Input Level (Non-damage)	+15 dBm maximum	



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SPECIFICATIONS (2/3)

	UPCONVERTER	DOWNCONVERTER
OUTPUT CHARACTERISTICS		
Frequency	Refer to model number table	70 ±20 MHz (140 ±40 MHz, Option 15-1)
Impedance	50 ohms	50/75 ohm switchable
Return Loss	14 dB minimum	20 dB minimum
Signal Monitor		-20 dBc nominal
Power Output (1 dB Compression)	+15 dBm minimum	+16 dBm minimum
TRANSFER CHARACTERISTICS		
Gain	+31 to +34 dB	+44 to +48 dB
Level Control	30 dB in 0.2 dB steps	
Input Level Control	20 dB in 0.2 dB steps	N/A
Level Stability	±0.25 dB/day 0°C ±0.5 dB typical from 0 to 50°C	
Amplitude Response	0.5 dB peak-to-peak/40 MHz maximum, 70 MHz IF 0.75 dB peak-to-peak/80 MHz maximum, 140 MHz IF (Option 15-1) 2 dB maximum/RF band	
Gain Slope	0.03 dB/MHz typical, 0.05 dB/MHz maximum (10 MHz minimum)	
Slope Adjust	±3 dB typical in 0.2 dB steps	
Noise Figure at Minimum Attenuation	N/A	14 dB maximum
Noise Power Density	-123 dBm/Hz maximum	N/A
Image Rejection	N/A	80 dB minimum
Group Delay (70 ±18 MHz)		
Linear	0.03 ns/MHz maximum	
Parabolic	0.01 ns/MHz² maximum	
Ripple	1 ns peak-to-peak maximum	
Group Delay (140 ±36 MHz)		
Linear	0.025 ns/MHz maximum	
Parabolic	0.0035 ns/MHz² maximum	
Ripple	1 ns peak-to-peak maximum	
Third Order Intermodulation Distortion (Two tones each at 0 dBm output)-	55 dBc minimum (+27.5 dBm IP3)	60 dBc minimum (+30 dBm IP3)
AM/PM Conversion	0.1°/dB maximum to 0 dBm output	
Spurious Outputs (Inband)-		
Signal Related up to 0 dBm output	50 dBc maximum	65 dBc maximum
Signal Independent	-50 dBm maximum	-70 dBm maximum
Harmonic Emission	-60 dBm maximum up to 0 dBm output	N/A
	-65 dBm maximum	-80 dBm maximum
LO Leakage at RF	±2 x 10 ⁻⁸ , 0 to 50°C	
Frequency Stability	5 x 10 ⁻⁹ /day, after 24 hours on time	
Frequency Aging	Less than 1 Hz (external reference)	
Frequency Accuracy	5 or 10 MHz, +4 ±3 dBm	
External Reference	Automatic switch to the internal reference if the external reference level falls below +1 dBm nominal	



DUAL CONVERSION L-BAND SATCOM FREQUENCY CONVERTERS

SPECIFICATIONS (3/3)

	UPCONVERTER	DOWNCONVERTER
Phase Noise (dBc/Hz)-	Offset	Maximum
With Maximum Reference Phase Noise:	10 Hz	-72
10 Hz: -120 dBc/Hz,	100 Hz	-82
100 Hz: -145 dBc/Hz,	1 kHz	-90
1 kHz: -160 dBc/Hz	10 kHz	-95
	100 kHz	-99
	300 kHz	-99
	1 MHz	-115
Upconverter Mute	80 dBm minimum	N/A

REMOTE CONTROLS

Serial Interface	RS485/RS422
Ethernet Interface	10/100 Base-T Ethernet interface providing: • HTTP-based web server • SNMP 1.0 configuration • Alarm reporting via SNMP Trap • Telnet access • Password protection

INDICATORS and ALARMS

Remote Mode	Green LED (front panel)
Alarm	Red LED (front panel)
Summary Alarm	Contact closure/open for DC voltage and local oscillator

OPTIONS

15-1

140 MHz IF frequency

15-2. Reference Clean-up Loop and Improved
Frequency Stability

Reference oscillator acts as an analog phase lock with a 0.1 Hz nominal loop bandwidth. Typical loop suppression of the external reference is as follows:

28 dB at 1 Hz offset, 65 dB at 10 Hz offset and
100 dB at 100 Hz offset

Frequency Stability: $\pm 2 \times 10^{-9}$, 0 to 50°C

Frequency Aging: 1×10^{-9} per day after 24 hours operation
preceded by 10 days operation

Note: Not compliant with MIL-STD-188-164 phase perturbation





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PRIMARY POWER REQUIREMENTS

Voltage	90-250 VAC
Frequency	47-63 Hz
Consumption	40W typical
Fuse	T1.25A

PHYSICAL

Weight	10 pounds (4.5 kg) nominal without rack slides 14 pounds (6.4 kg) nominal with rack slides
Chassis Dimensions	19" x 1.75" panel height x 20" maximum

Connectors

RF	SMA female
IF	BNC female
RF Monitor	SMA female
IF Monitor	BNC female
External Reference	BNC female
Summary Alarm	DE-9P
Remote Interface	DE-9S for RS485, RS422 RJ-45 female for Ethernet
Primary Power	IEC-60320-C13/C14
Redundancy Interface	DE-9P

ENVIRONMENTAL

Operating

Ambient Temperature	0 to 50°C Up to 10,000 feet
Relative Humidity	Up to 95% at 30°C
Altitude	Up to 10,000 feet

Non-operating

Ambient Temperature	-50 to +70°C
Relative Humidity	Up to 95% at 45°C
Altitude	Up to 40,000 feet
Shock and Vibration	Normal handling by commercial carriers



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