



DUAL CONVERSION L-BAND SATCOM FREQUENCY CONVERTERS



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

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.

OPTIONS

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

UPCONVERTERS

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

DOWNCONVERTERS

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

SPECIFICATIONS

	UPCONVERTER	DOWNCONVERTER
Type	Dual conversion	
Frequency Step Size	1 kHz	
Frequency Sense	No inversion	

INPUT CHARACTERISTICS

Frequency	70 ±20 MHz (140±40 MHz, Option 15-1)	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	

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/MHz ² maximum	
Ripple	1 ns peak-to-peak maximum	

TRANSFER CHARACTERISTICS (Continued)-	UPCONVERTER	DOWNCONVERTER
Group Delay (140 ±36 MHz)-		
Linear	0.025 ns/MHz maximum	
Parabolic	0.0035 ns/MHz ² 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
LO Leakage at RF	-65 dBm maximum	-80 dBm maximum
Frequency Stability	±2 x10 ⁻⁸ , 0 to 50°C	
Frequency Aging	5 x10 ⁻⁹ per day, after 24 hours on time	
Frequency Accuracy	Less than 1 Hz (external reference)	
External Reference	5 or 10 MHz, +4 ±3 dBm Automatic switch to the internal reference if the external reference level falls below +1 dBm nominal	
Phase Noise (dBc/Hz)-		
With Maximum Reference	Offset	Maximum
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

INDICATOR 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

PRIMARY POWER REQUIREMENTS

Voltage..... 90-250 VAC

Frequency..... 47-63 Hz

Power 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-320

Redundancy Interface DE-9P

ENVIRONMENTAL

Operating -

Ambient Temperature 0 to +50°C

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 40°C

Altitude Up to 40,000 feet

Shock and Vibration Normal handling by commercial carriers