



## DUAL CONVERSION SYNTHESIZED SATCOM FREQUENCY CONVERTERS



### STANDARD FEATURES

- Amplitude slope adjust
- RS422, RS485 and 10/100 Base-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
- 30 dB level control
- Independent input level control (upconverters only)
- External alarm input
- 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
- Optimized phase noise

The GeoSync Microwave Converters are designed to simultaneously provide high performance, high reliability and high value, and are available for operation in either S-, C-, X-, Ku-or DBS-band

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.

### UPCONVERTERS

Model Number	RF Frequency (GHz)
UTR-200240	2.0-2.4
UTR-572672	5.725-6.725
UTR-670710	6.7-7.1
UTR-790840	7.9-8.4
UTR-127132	12.75-13.25
UTR-127145	12.75-14.50
UTR-137148	13.75-14.80
UTR-173184	17.3-18.4

### DOWNCONVERTERS

Model Number	RF Frequency (GHz)
DTR-200240	2.0-2.4
DTR-340420	3.4-4.2
DTR-450480	4.5-4.8
DTR-725775	7.25-7.75
DTR-800850	8.0-8.5
DTR-107127	10.7-12.75

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 1-1)	Refer to model number table
Impedance	50/75 ohm switchable	50 ohms
Return Loss	20 dB minimum	20 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 1-1)
Impedance	50 ohms	50/75 ohm switchable
Return Loss	20 dB minimum	20 dB minimum
Signal Monitor	-20 dBc nominal	
Power Output (1 dB Compression)- C- and S-band	16 dBm minimum/17 dBm typical	
X-, Ku- and DBS-band	10 dBm minimum/12 dBm typical	16 dBm minimum/17 dBm typical

### TRANSFER CHARACTERISTICS

Gain	31 to 34 dB at 23°C	44 to 48 dB at 23°C
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 maximum at constant temperature ±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 1-1)	
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	11 dB maximum
Noise Power Density	-125 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 <sup>2</sup> maximum	
Ripple	1 ns peak-to-peak maximum	
Group Delay (140 ±36 MHz)-		
Linear	0.025 ns/MHz maximum	
Parabolic	0.0035 ns/MHz <sup>2</sup> maximum	
Ripple	1 ns peak-to-peak maximum	

**TRANSFER CHARACTERISTICS***(Continued)*-

	UPCONVERTER	DOWNCONVERTER
Third Order Intermodulation Distortion (Two tones each at 0 dBm output)-		
C-band and S-band	55 dBc minimum (+27.5 dBm IP3)	60 dBc minimum (+30 dBm IP3)
Ku-band and DBS-band	45 dBc minimum (+22.5 dBm IP3)	60 dBc minimum (+30 dBm IP3)
AM/PM Conversion	0.1°/dB maximum to 0 dBm output	
Spurious Outputs (Inband)-		
Signal Related	65 dBc up to 0 dBm output	
Signal Independent	-75 dBm maximum	
LO Leakage at RF	-75 dBm maximum	-80 dBm maximum
Frequency Stability	$\pm 2 \times 10^{-8}$ , 0 to 50°C	
Frequency Aging	5 x 10 <sup>-9</sup> /day, after 24 hours on time	
Frequency Accuracy	Same as Frequency 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	
Upconverter Mute	80 dB minimum	N/A

**PHASE NOISE**

RF BAND	Frequency Offset maximum/typical (dBc/Hz)						
	10 Hz	100 Hz	1 kHz	10 kHz	100 kHz	300 kHz	1 MHz
S-BAND	-60/-63	-78/-81	-88/-91	-96/-99	-96/-99	-96/-99	-117/-120
C-BAND	-70/-74	-80/-84	-90/-94	-94/-97	-94/-97	-94/-97	-116/-119
X-BAND	-67/-72	-81/-85	-89/-93	-92/-95	-90/-94	-90/-94	-115/-122
Ku-BAND	-65/-70	-72/-82	-87/-90	-90/-92	-90/-92	-90/-93	-115/-122
DBS-BAND	-65/-70	-72/-82	-87/-90	-90/-92	-90/-92	-90/-93	-115/-122
Ka-BAND	-65/-70	-72/-82	-87/-90	-90/-92	-90/-92	-90/-93	-115/-122
Required maximum reference							
10 MHz	-120	-145	-160	-160			

**REMOTE CONTROLS**

Serial Interface	RS485/RS422
Ethernet Interface	10/100Base-T Ethernet interface providing:
	-HTTP-based web server
	-SNMP1.0 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 (CONTINUED)

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- 1-1. 140 MHz IF frequency
  - 1-2. Selectable 70 MHz and 140 MHz IF frequencies.
    - One IF connector provided (BNC female).
    - Selection of IF frequency is available over the remote bus.
  - 1-3 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:  $1 \times 10^{-9}$  per day after 24 hours operation preceded by 10 days of operation
  - 1-4 Optimized Phase Noise - A 6 dB reduction in phase noise below stated values given in the phase noise chart, consult factory for details.
- 1-X99

## PRIMARY POWER REQUIREMENTS

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

## PHYSICAL

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Weight .....	10 pounds (4.5kg) nominal without rack slides
	14 pounds (6.4kg) 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

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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