



MODEL U-9696-3-L

Ku-BAND COMMUNICATION UPCONVERTER

**With Auxiliary L-Band Output
Ideal for ENG/SNG and
Video Broadcasting Applications**

**Dual-Conversion
125 kHz Step Size**



FEATURES

- Local or remote control (RS485)
- Output amplifier for increased dynamic range
- Low intermodulation distortion
- Low phase noise
- 32 programmable frequency and attenuation settings
- Nonvolatile memory
- 30 dB level control
- IF signal monitor output, -20 dBc

OPTIONS

- Higher stability reference
- Remote RS422, RS232, IEEE-488 or contact closure interface
- 140 MHz IF frequency

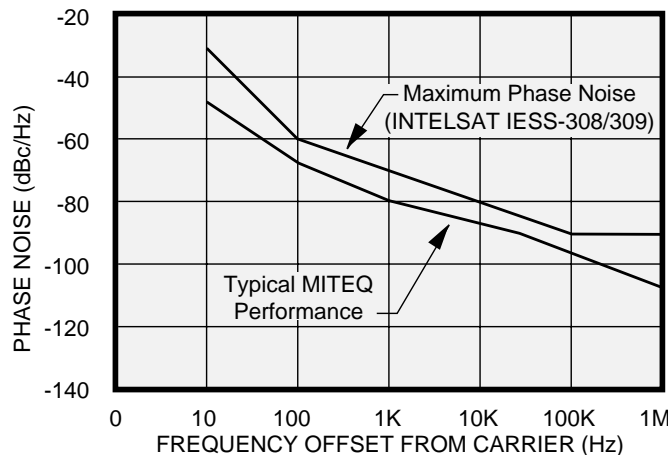
The model U-9696-3-L is a Ku-Band upconverter covering the 13.75–14.5 GHz band that provides an L-band monitor output to a rear panel SMA connector. This enables the operator to monitor the uplink signal using an L-band receiver or spectrum analyzer. The L-band monitor signal occurs at a fixed frequency of 1.22 GHz and a level of -2 dBc, relative to the input, less any input attenuation.

This Ku-band frequency upconverter uses an internal synthesizer to provide frequency tuning. Level control is available via the front panel or the remote control interface.

SPECIFICATIONS

Type	Dual conversion
Tunability	RF local oscillator only
Frequency sense	No inversion
IF characteristics	
Frequency	70 ±20 MHz (140 ±40 MHz optional)
Impedance	75 ohms (50 ohms optional)
Return loss	26 dB minimum
Signal monitor	-20 dBc nominal
RF characteristics	
Frequency	13.75–14.5 GHz
Impedance	50 ohms
Return loss	20 dB minimum
Power output (1 dB compression)	10 dBm minimum
Downconverter LO leakage	-80 dBm maximum at input port
Transfer characteristics	
Gain (minimum attenuation)	26 dB nominal
Monitor output	1.22 GHz (fixed frequency) (1.29 GHz if Option 4 is chosen), -2 dBc for 0 dB input attenuation
Image rejection	80 dB minimum
Level stability	±0.25 dB/day maximum at constant temperature
Noise figure	20 dB typical, 25 dB maximum
Amplitude response	±0.25 dB/±20 MHz, ±0.20 dB/±18 MHz
Group delay (±18 MHz)	0.03 ns/MHz maximum linear, 0.01 ns/MHz ² maximum parabolic, 1 ns peak-to-peak maximum ripple
Intermodulation distortion (third order)	At -10 dBm output, 60 dBc minimum
AM/PM conversion	0.1°/dB maximum to 5 dBm output
Gain slope	0.02 dB/MHz maximum
Spurious outputs	
Signal related	60 dBc minimum
Signal independent	-75 dBm maximum
Gain adjustment	30 dB, local and remote control
Gain adjustment step size	0.2 dB
Frequency stability	±2 × 10 ⁻⁸ , 0 to 50°C (higher stability options available), ±5 × 10 ⁻⁹ /day typical (fixed temperature after 24 hour on time)
Upconverter mute	60 dB

TYPICAL PHASE NOISE CHARACTERISTICS (1.0 Hz BANDWIDTH)



OPTIONS

- 4. A.** 140 MHz IF frequency.
Bandwidth: 80 MHz minimum
Flatness: 0.75 dB/76 MHz
Group delay (± 36 MHz)
 Linear: 0.025 ns/MHz
 Parabolic: 0.0035 ns/MHz²
 Ripple: 1 ns peak-to-peak
IF return loss (140 \pm 40 MHz): 20 dB minimum
Gain slope: 0.04 dB/MHz maximum (10 MHz minimum)
- 10.** Higher frequency stability reference.
A. $\pm 1 \times 10^{-8}$, 0 to 50°C,
 5 $\times 10^{-9}$ /day typical (fixed temperature after 24 hour on time).
B. $\pm 5 \times 10^{-9}$, 0 to 50°C,
 1 $\times 10^{-9}$ /day typical (fixed temperature after 24 hour on time).
C. $\pm 2 \times 10^{-9}$, 0 to 50°C,
 1 $\times 10^{-9}$ /day typical (fixed temperature after 24 hour on time).
- 15.** 50 ohm IF impedance.
- 17.** Remote control.
A. RS422.
B. RS485 (supplied as standard).
C. RS232.
D. Contact closure selection of up to sixteen preprogrammed frequencies.
F. IEEE-488.
G. BCD contact closure.
- 23. D.** Automatic reference switchover.
An internal 5 MHz reference and rear panel connector for external reference input (+4 \pm 3 dBm) is provided. The converter oscillators will lock to the external reference. If external reference is not present, the converter oscillators will automatically lock to the internal reference. External reference input connector is BNC female.
- F.** Automatic reference configuration, reference output.
An internal 5 MHz reference is provided. Rear panel connectors are provided for 5 MHz reference output and external reference input (+4 dBm \pm 3 dBm). The converter will lock to the external reference when the external reference is present. If the external reference is not present, the converter oscillators will automatically lock to the internal reference.

Notes: Missing option numbers are not applicable for this product.

For literature describing local control (front panel) and remote control (bus protocols), refer to MITEQ's Technical Note 25T009.

Ku-BAND COMMUNICATION UPCONVERTER

PRIMARY POWER REQUIREMENTS

Voltage	100, 120, 220, 230/240 VAC +10%, -13% (rear panel selectable), 250 VAC maximum
Frequency	47–63 Hz
Power consumption.....	120 W typical

SUMMARY ALARM

Contact closure/open for DC voltage alarm
Contact closure/open for DC voltage and/or LO alarm

PHYSICAL

Weight	20 pounds nominal
Overall dimensions.....	19" x 1.75" panel x 22" maximum (chassis depth 20")
Rear panel connectors	
RF	SMA female
IF	BNC female
IF signal monitor.....	BNC female
Remote interface.....	DEM-9S for RS485 and RS422, DB-25P for RS232, DB-25S for contact closure, and BCD contact closure, IEEE-488 receptacle for GPIB
Summary alarm.....	DE-9P
Redundancy alarm	DE-9P
LO frequency/power monitor.....	SMA female
L-band monitor output.....	SMA female

ENVIRONMENTAL

Operating	
Ambient temperature.....	0 to 50°C
Relative humidity	Up to 95% at 30°C
Atmospheric pressure	Up to 10,000 feet
Nonoperating	
Ambient temperature.....	-50 to +70°C
Relative humidity	Up to 95% at 40°C
Atmospheric pressure	Up to 40,000 feet
Shock and vibration.....	Normal handling by commercial carriers



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