



MODEL U-9956-6-1K-L

# 9900 SERIES Ku-BAND COMMUNICATION UPCONVERTER

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



## FEATURES

- L-band monitor output
- Supports expandable NSU 1:N Switchover series (D-323)
- Amplitude slope adjust
- Two monitor and control ports-
  1. Standard RS485/RS422 remote interface which can be substituted with Ethernet (Option 17H) or RS232 (Option 17C)
  2. RS485/RS422 auxiliary control interface which can be configured to control an external HPA or as an alternate remote interface (useful with Option 17C or 17H )
- RF, IF and LO monitor ports
- Automatic switching to external 5/10 MHz reference and electronic adjust of internal reference frequency
- Low intermodulation distortion
- Better than IESS-308/309 compliant phase noise
- 64 programmable memory locations
- 30 dB level control
- External alarm input via contact closure
- Date and time stamped event log
- CE Mark

## Dual Conversion 1 kHz Step Size

The Model U-9956-6-1K-L is a Ku-band upconverter covering 13.75–14.8 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 is 1.15 GHz (1.22 GHz for Option 4) at a level of -2 dBc relative to the input, less any input attenuation.

A strong feature set of monitor and control functions supports powerful local and remote control. Among the features are control of frequency, attenuation and 64 memory locations for each converter where various setups can be stored and recalled.

A continuously updated log of time-stamped records of activity is also provided.

## OPTIONS

- Higher stability reference
- Remote RS232 or 10/100 Base-T Ethernet
- 140 MHz IF frequency
- 50 ohm IF impedance

# SPECIFICATIONS

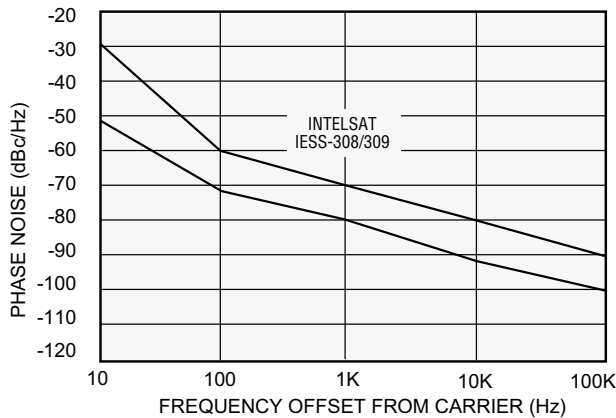
## PHYSICAL

- Weight..... 12 pounds nominal
- Chassis dimensions..... 19" x 1.75" panel height x 20" maximum
- Connectors
  - RF ..... SMA female
  - RF monitor ..... SMA female
  - IF ..... BNC female
  - IF monitor..... BNC female
  - LO monitors ..... SMA female
  - L-band monitor output..... SMA female
  - Alarm..... DE-9P
  - External reference..... BNC female
  - Remote interface..... DE-9S for RS485, RS422 and RS232, RJ-45 female for Ethernet
  - Primary power input..... IEC-320
  - Control interface..... DE-9S

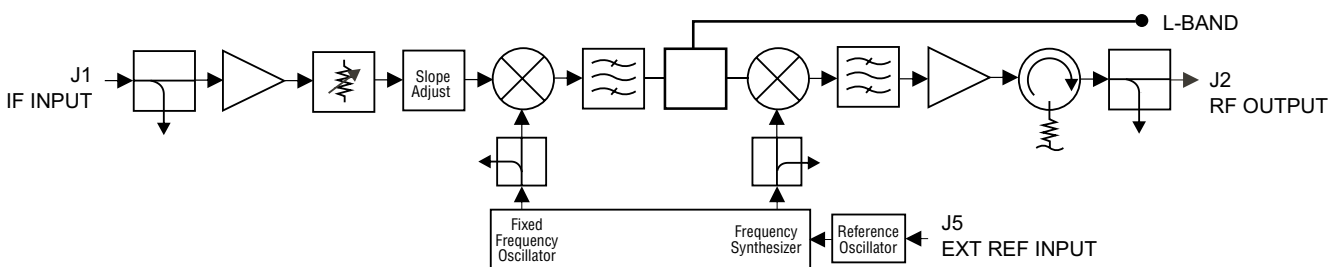
## ENVIRONMENTAL

- 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

**MAXIMUM PHASE NOISE CHARACTERISTICS  
(1.0 Hz BANDWIDTH)**



# REPRESENTATIVE BLOCK DIAGRAM



## SPECIFICATIONS

Type	Dual conversion
Frequency step size	1 kHz
Frequency sense	No inversion
Input characteristics	
Frequency	70 ±20 MHz (140 ±40 MHz Option 4)
Impedance	75 ohms (50 ohms Option 15)
Return loss	26 dB minimum
Signal monitor	-20 dBc nominal
Input level (non-damage)	+15 dBm maximum
Output characteristics	
Frequency	13.75–14.8 GHz
Impedance	50 ohms
Return loss	21 dB nominal
Signal monitor	-20 dBc nominal
Power output (P1dB)	+10 dBm minimum/12 dBm typical
Transfer characteristics	
Gain	31–34 dB at 23°C
L-band monitor output	-2 dBc nominal relative to the input signal at 0 dB attenuation at 1.15 GHz (1.22 GHz for Option 4)
Noise figure at min. atten.	14 dB maximum
Noise power density	-125 dBm/Hz maximum
Image rejection	N/A
Level stability	±0.25 dB/day maximum at constant temperature ±0.5 dB typical from 0 to 50°C
Amplitude response	±0.3 dB maximum
Slope adjust	±1 dB typical in 0.2 dB steps
Group delay (70 ±18 MHz)	
Linear	0.03 ns/MHz maximum (15 to 50°C)
Parabolic	0.01 ns/MHz <sup>2</sup> maximum (15 to 50°C)
Ripple	1 ns peak-to-peak maximum
Group delay (140 ±36 MHz)	
Linear	0.025 ns/MHz maximum (15 to 50°C)
Parabolic	0.0035 ns/MHz <sup>2</sup> maximum (15 to 50°C)
Ripple	1 ns peak-to-peak maximum
Intermodulation distortion (third order) at 0 dBm output	45 dBc minimum (+22.5 dBm IP3 pt.)
AM/PM conversion	0.1°/dB maximum to 0 dBm output
Gain slope	0.03 dB/MHz typical, 0.05 dB/MHz maximum (10 MHz minimum)
Frequency Accuracy	±22 Hz, maximum using external reference
Spurious outputs	
Signal related	65 dBc up to 0 dBm output
Signal independent	-80 dBm maximum
LO leakage at RF	-75 dBm maximum
Gain adjustment	30 dB in 0.2 dB steps
Frequency stability	±2 x 10 <sup>-8</sup> , 0 to 50°C (higher stability options available) ±5 x 10 <sup>-9</sup> /day typical (fixed temperature after 24 hour on time)
Option10B	±5 x 10 <sup>-9</sup> , 0 to 50°C, 1 x 10 <sup>-9</sup> /day typical (fixed temperature after 24 hour on time)
Option10C	±2 x 10 <sup>-9</sup> , 0 to 50°C, 1 x 10 <sup>-9</sup> /day typical (fixed temperature after 24 hour on time)
Upconverter mute	80 dB minimum
External reference	5 or 10 MHz, +4 ±3 dBm Unit will automatically switch to internal reference if external reference level falls below +1 dBm nominal
Phase noise	See graph
Primary power	90–250 VAC
Fuse	T1.25A

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## OPTIONS

- 4. 140 MHz IF frequency.
- 10. Higher frequency stability reference.
  - B.  $\pm 5 \times 10^{-9}$ , 0 to 50°C,  
1 x 10<sup>-9</sup>/day typical (fixed temperature after 24 hour on time).
  - C.  $\pm 2 \times 10^{-9}$ , 0 to 50°C,  
1 x 10<sup>-9</sup>/day typical (fixed temperature after 24 hour on time).
- 15. 50 ohm IF impedance.
- 17. Remote control.
  - C. RS232 remote interface.
  - H. 10/100Base-T Ethernet interface providing:
    - HTTP-based web server
    - SNMP 1.0 configuration
    - Alarm reporting via SNMP Trap
    - Telnet access
    - Password protection

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

## 9900 SERIES CONVERTER REAR PANEL



NSU Switch module location

