

Multiband 9800 Series Frequency Converters



Multi band

The MITEQ frequency converters are designed for advanced satellite communication systems and are available for a wide variety of frequency plans. Phase noise, amplitude flatness and spurious outputs have been optimized to provide the user with a transparent frequency conversion for all video and data applications.

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.

RF Frequency (GHz)	Model Number
Dual-Band Upconverters	
5.725 - 6.725 13.75 - 14.8	U-98-37991BHV-1K
Dual-Band Downconverters	
3.4 - 4.2 10.7 - 12.75	D-98-37991BHV-1K
Tri-Band Upconverters	
5.725 - 6.725 7.9 - 8.4 13.75 - 14.8	U-98-37991AHV-1K
Tri-Band Downconverters	
3.4 - 4.2 7.25 - 7.75 10.7 - 12.75	D-98-37991AHV-1K
Quad-Band Downconverters	
0.95 - 1.75 3.4 - 4.2 7.25 - 7.75 10.7 - 12.75	D-98-37991DHV-1K
2.2 - 2.3 3.4 - 4.2 7.25 - 7.75 10.7 - 12.75	D-98-37991D2HV-1K

Features

- Supports expandable NSU 1:N switchover series (D-323)
- Amplitude slope adjust
- Three monitor and control ports:
 1. RS485/RS422 remote interface (J6A) changes to RS232 with Option 17C
 2. RS485/RS422 control interface (J7) is provided for use with NSU redundancy system (D-323) or as an alternative interface
 3. 10/100Base-T Ethernet interface (J6B)
- RF, IF and LO monitor ports
- Automatic switching to external 5/10 MHz reference and electronic frequency adjust of internal reference frequency
- Low intermodulation distortion
- Better than IESS-308/309 phase noise
- 64 programmable memory locations
- 30 dB level control
- External alarm input via contact closure
- Time and date stamped event log
- CE Mark

Options

- Higher stability reference
- Remote RS232
- 140 MHz IF frequency
- Higher gain (downconverter)
- Selectable 70/140 MHz IF frequency
- 50 ohms IF impedance
- Selectable 50/75 ohms IF impedance
- Multiple IF outputs (downconverter)
- Group delay equalization
- 45 dB level control
- Type "N" RF connector

Specifications	Upconverter	Downconverter
Type	Triple conversion	
Frequency step size	1 kHz	
Frequency sense	No inversion	
Input characteristics		
Frequency	70 ±20 MHz (140 ±40 MHz Option 4)	Refer to model number table
Impedance	75 ohms (50 ohms Option 15)	50 ohms
Return loss	26 dB minimum, 20 dB minimum (140 ±40 MHz)	17 dB minimum
Signal monitor	-20 dBc nominal	N/A
LO leakage	-75 dBm maximum	-80 dBm maximum
Input level (non-damage)	+20 dBm maximum	
Output characteristics		
Frequency	Refer to model number table	70 ±20 MHz (140 ±40 MHz Option 4)
Impedance	50 ohms	75 ohms (50 ohms Option 15)
Return loss	17 dB minimum	26 dB minimum (70 ±20 MHz) 20 dB minimum (140 ±40 MHz)
Signal monitor	N/A	-20 dBc nominal
Power output (P1dB)	+10 dBm minimum	+20 dBm minimum
Transfer characteristics		
Gain	+30–35 dB at 23°C	43-50 dB at 23°C 55-61 dB at 23°C (Option 16C)
Noise figure at min. atten.	N/A	15 dB maximum
Image rejection	80 dB minimum	
Level stability	±0.25 dB/day maximum at constant temperature ±0.5 dB typical from 0 to 50°C	
Amplitude response		
70 ±20 MHz	±0.25/±20 MHz; ±0.2/±18 MHz	
140 ±40 MHz	0.75 dB/ ±36 MHz	
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	
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	
Intermodulation distortion (third order)	Two signals each at 0 dBm output, 40 dBc minimum (+20 dBm IP3 pt.)	Two signals each at 0 dBm output, 60 dBc minimum (+30 dBm IP3 pt.)
AM/PM conversion	0.1°/dB maximum to 0 dBm output	
Gain slope		
70 ±20 MHz	0.03 dB/MHz maximum (10 MHz maximum)	
140 ±40 MHz	0.05 dB/MHz maximum (10 MHz maximum)	
Spurious outputs		
Signal related	60 dBc up to 0 dBm output	
Signal independent	-70 dBm maximum	-75 dBm maximum -65 dBm maximum (Option 16C)
Gain adjustment	30 dB in 0.2 dB steps, +65 dBm maximum (Option 16C)	
Upconverter mute	60 dB minimum	N/A
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 table	
Slope adjust	±3 dB typical in 0.2 dB steps	
Noise power density	-125 dBm/Hz maximum	N/A
Remote interface	RS485/RS422: 2 ports user selectable each port (1 port with Option 17C) Ethernet interface: HTTP based web server, SNMP 1.0 configuration, Alarm reporting via SNMP trap, Telnet access, Password protection	

Note: All specifications guaranteed at maximum gain unless otherwise noted.

Phase Noise Specifications

Model	10	100	1K	10K	100K	300K	1M	Offset (Hz)
All Systems	-45	-67	-87	-94	-99	-99	-117	Maximum Phase Noise (dBc/Hz)

Maximum External Reference to achieve above phase noise

All Systems	-120	-150	-160	-160	-160	-160	-160
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Options

- 1.** 45 dB level control.
- 4.** 140 MHz IF frequency.
- 5.** Group delay equalization.
1 ns p-p maximum/70 ±18 MHz IF output.
2 ns p-p maximum/140 ±36 MHz IF output.
- 10.** Higher frequency stability reference.
 - B.** ±5 x 10⁻⁹, 0 to 50°C,
1 x 10⁻⁹/day typical (fixed temperature after 24 hour on time).
 - C.** ±2 x 10⁻⁹, 0 to 50°C,
1 x 10⁻⁹/day typical (fixed temperature after 24 hour on time).
- 14.** Front panel selectable 50/75 ohms IF impedance.
- 15.** 50 ohm IF impedance.
- 16C.** Higher gain (downconverters): 55-61 dB gain.
- 17.** Remote control.
 - C.** RS232 remote interface.
- 18.** Multiple IF output module (downconverter only; not compatible with NSUN, or Option 14)
 - 4.** Four IF outputs.
 - 8.** Eight IF outputs.
Output 1 dB compression point: +10 dBm
Intermodulation distortion at 0 dBm output: 40 dBc minimum (+20 dBm IP3)
- NRF.** Type N female RF connector (Note: Monitor remains SMA female).
- 20.** Selectable 70 MHz and 140 MHz IF frequencies.
One IF connector provided at rear panel (BNC female). Selection of IF frequency is available from the front panel and over the remote bus.

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 Technical Note 25T063.

Protocols are backwards compatible with Technical Notes 25T010 and 25T009.

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General Specifications

Primary Power Requirements

Voltage	90–250 VAC
Frequency	47–63 Hz
Consumption	60 W typical

Physical

Weight	18 pounds (6.9 kg) nominal
Chassis dimensions	19" x 1.75" panel height x 20" maximum
Connectors	
RF	SMA female (N female, Option NRF)
RF monitor	SMA female
IF	BNC female
IF monitor	BNC female
LO monitors	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

Typical Rear Panel View



← RSM Switch Module Location
(see D-323 for more information)



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