# 9700 SERIES FREQUENCY CONVERTERS

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.

## FEATURES

- **RS485/RS422 remote control**
- **RF and IF signal monitor ports**
- **Automatic 5/10 MHz internal/external reference selection**
- **Low intermodulation distortion**
- **IESS-308/309 compliant phase noise**
- **64 programmable memory locations**
- **30 dB level control**
- **External alarm input via contact closure**
- **CE Mark**

## OPTIONS

- **Higher stability reference**
- **Remote RS232, IEEE-488 or 10/100Base-T Ethernet**
- **140 MHz IF frequency**
- **Higher gain (downconverter)**
- **50 ohm IF impedance**

# SPECIFICATIONS

| | UPCONVERTER | DOWNCONVERTER |
|---|---|---|
| Type | Dual conversion | |
| Frequency step size | See model number table | |
| 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<br>70 ±20 MHz | 26 dB minimum | 20 dB minimum |
| 140 ±40 MHz | 20 dB minimum | |
| Signal monitor | -20 dBc nominal | |
| LO leakage | N/A | -80 dBm maximum |
| Input level (nondamage) | +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<br>70 ±20 MHz | 20 dB minimum | 26 dB minimum |
| 140 ±40 MHz | 20 dB minimum | |
| Signal monitor | -20 dBc nominal | |
| Power output | +10 dBm minimum at 1 dB compression point | |
| Transfer characteristics | | |
| Gain | +30 dB minimum | +45 dB minimum<br>+55 dB minimum (Option 16C) |
| Noise figure | 20 dB typical, 25 dB maximum | 12 dB maximum |
| Image rejection | 80 dB minimum | |
| Level stability | ±0.25 dB/day maximum at constant temperature | |
| Amplitude response<br>70 ±20 MHz | ±0.25 dB/±20 MHz, ±0.20 dB/±18 MHz | |
| 140 ±40 MHz | 0.75 dB/76 MHz | |
| Group delay (70 ±18 MHz)<br>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)<br>Linear | 0.025 ns/MHz maximum | |
| Parabolic | 0.0035 ns/MHz$^2$ maximum | |
| Ripple | 1 ns peak-to-peak maximum | |
| Intermodulation distortion (third order) | With two -10 dBm output signals, 60 dBc minimum | |
| AM/PM conversion | 0.1°/dB maximum to 0 dBm output | |
| Gain slope<br>70 ±20 MHz | 0.03 dB/MHz maximum (10 MHz minimum) | |
| 140 ±40 MHz | 0.05 dB/MHz maximum (10 MHz minimum) | |
| Spurious outputs | | |
| Signal related | 60 dBc up to 0 dBm output | |
| Signal independent | -70 dBm maximum | -75 dBm maximum<br>-65 dBm maximum (Option 16C) |
| Gain adjustment | 30 dB in 0.2 dB steps | |
| Frequency stability | ±2 x $10^{-8}$, 0 to 50°C (higher stability options available)<br>±5 x $10^{-9}$/day typical (fixed temperature after 24 hour on time) | |
| Option10B | ±5 x $10^{-9}$, 0 to 50°C, 1 x $10^{-9}$/day typical (fixed temperature after 24 hour on time) | |
| Option10C | ±2 x $10^{-9}$, 0 to 50°C, 1 x $10^{-9}$/day typical (fixed temperature after 24 hour on time) | |
| Upconverter mute | 60 dB minimum | N/A |
| External reference | 5 or 10 MHz, +4 ±3 dBm<br>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 | |

# SPECIFICATIONS

## UPCONVERTERS

| RF Frequency (GHz) | 1 kHz Step Size Model Number | 125 kHz Step Size Model Number |
|---|---|---|
| 0.95 – 1.75 | U-9788-1-1K | U-9788-1 |
| 5.725 – 6.725 | U-9793-6-1K | U-9793-6 |
| 6.7 – 7.1 | U-9793-2-1K | U-9793-2 |
| 7.9 – 8.4 | U-9794-1K | U-9794 |
| 12.75 – 13.25 | U-9795-2-1K | U-9795-2 |
| 12.75 – 14.5 | U-9796-7-1K | U-9796-7 |
| 13.75 – 14.8 | U-9796-6-1K | U-9796-6 |
| 17.3 – 18.4 | U-9797-2-1K | U-9797-2 |

## DOWNCONVERTERS

| RF Frequency (GHz) | 1 kHz Step Size Model Number | 125 kHz Step Size Model Number |
|---|---|---|
| 0.95 – 1.75 | D-9740-3-1K | D-9740-3 |
| 3.4 – 4.2 | D-9741-1-1K | D-9741-1 |
| 4.5 – 4.8 | D-9742-2-1K | D-9742-2 |
| 7.25 – 7.75 | D-9745-1K | D-9745 |
| 10.7 – 12.75 | D-9748-6-1K | D-9748-6 |

### PHYSICAL

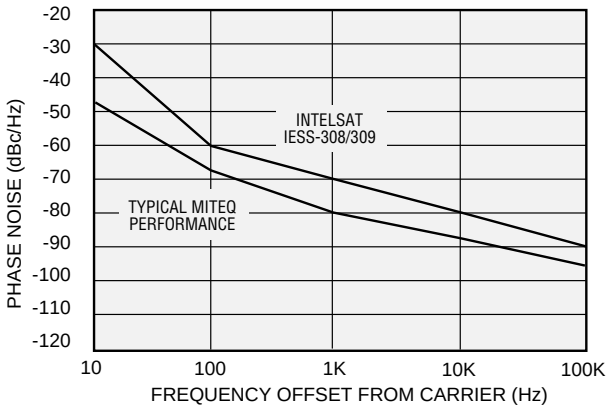
Weight ..... 18 pounds nominal
Chassis dimensions ..... 19" x 1.75" panel height x 20" maximum
Connectors
- RF ..... SMA female
- RF monitor ..... SMA female
- IF ..... BNC female
- IF monitor ..... BNC female
- LO monitors ..... SMA female
- Alarm ..... DE-9P
- External reference ..... BNC female
- Remote interface ..... DE-9S for RS485, RS422 and RS232, IEEE-488 receptacle for GPIB, RJ-45 female for Ethernet
- Primary power input ..... IEC-320

### 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 PHASE NOISE CHARACTERISTICS (1.0 Hz BANDWIDTH)



# 9700 SERIES FREQUENCY CONVERTERS

## OPTIONS

**4.** 140 MHz IF frequency.

**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).

**15.** 50 ohm IF impedance.

**16.** Higher gain option (downconverters).
- **C.** 55 dB nominal RF/IF gain.

**17.** Remote control.
- **C.** RS232 remote interface.
- **F.** IEEE-488 remote interface.
- **H.** 10/100Base-T Ethernet interface providing:
  - Web-browser-based configuration
  - SNMP 1.0 configuration
  - Alarm reporting via SNMP Trap
  - Telnet access
  - Password protection

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

## 9700 SERIES CONVERTER REAR PANEL



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