narda MITEQ

For Satellite Communications

1/3 Rack-Mounted Block Converters

Unit shown with Option 17

Unit shown without Option 17

Input Frequency (GHz)	Output Frequency (GHz)	LO Frequency (GHz)	Model Number
Block Upconverters			
0.95 – 1.525	5.85 – 6.425	7.375	UPB1-6.1TR-INV
0.95 – 1.75	5.85 – 6.65	4.9	UPB1-6.25TR
0.95 – 1.35	6.7 – 7.1	5.75	UPB1-6.9TR
0.95 – 1.45	7.9 – 8.4	6.95	UPB1-8.15TR
0.95 – 1.45	12.75 – 13.25	11.8	UPB1-13TR
0.95 – 1.7	13.75 – 14.5	12.8	UPB1-14.125TR
0.95 – 1.45	14 – 14.5	13.05	UPB1-14.25TR
0.95 – 2.05	17.3 – 18.4	16.35	UPB1-17.85TR*
0.95 – 1.25	18.1 – 18.4	17.15	UPB1-18.25TR
Ka-Band			
0.95 – 1.2	28.35 – 28.6	27.4	UPB1-28.475TR
0.95 – 1.45	29 – 29.5	28.05	UPB1-29.25TR
0.95 – 1.2	29.25 – 29.5	28.3	UPB1-29.375TR
0.95 – 1.7	29.25 – 30	28.3	UPB1-29.625TR
0.95 – 1.95	30 – 31	29.05	UPB1-30.5TR*
1 – 2	30 – 31	29	UPB1-30.5-1TR*

*1 GHz IF Bandwidth.

Block Downconverters			
3.4 – 4.2	0.95 – 1.75	5.15	DNB1-3.8TR-INV
3.4 – 4.2	0.95 – 1.75	8.55/11	DNB1-3.8TR
3.7 – 4.2	0.95 – 1.45	8.55/11.3	DNB1-3.95TR
7.25 – 7.75	0.95 – 1.45	6.3	DNB1-7.5TR
10.7 – 11.7	0.95 – 1.95	9.75	DNB1-11.2TR*
10.95 – 11.7	0.95 – 1.7	10	DNB1-11.35TR
11.2 – 12	0.95 – 1.75	10.25	DNB1-11.6TR
11.45 – 12.25	0.95 – 1.75	10.5	DNB1-11.85TR
11.7 – 12.5	0.95 – 1.75	10.75	DNB1-12.1TR
11.7 – 12.75	0.95 – 2	10.75	DNB1-12.225TR*
12.2 – 12.75	0.95 – 1.5	11.25	DNB1-12.475TR
12.25 – 12.75	0.95 – 1.45	11.3	DNB1-12.5TR
Ka-Band			
18.3 – 18.8	0.95 – 1.45	17.35	DNB1-18.55TR
19.7 – 20.2	0.95 – 1.45	18.75	DNB1-19.95TR
20.2 – 21.2	0.95 – 1.95	19.25	DNB1-20.7TR*
20.2 – 21.2	1 – 2	19.2	DNB1-20.7-1TR*
28.3 – 28.8	0.95 – 1.45	27.35	DNB1-28.55TR
29.25 – 29.5	0.95 – 1.2	28.3	DNB1-29.375TR
29.25 – 30	0.95 – 1.7	28.3	DNB1-29.625TR

*1 GHz IF Bandwidth.

This equipment is designed for applications where frequency translation is needed between L-band and the transponder frequency.

Features

- **Automatic 5/10 MHz internal/external reference selection with a 0.1 Hz nominal bandwidth clean-up loop**
- **Gain control**
- **RF and L-band signal monitor ports (RF monitor not available with Ka-band units)**
- **Low phase noise**
- **Low intermodulation distortion**
- **High frequency stability**
- **Summary alarm**
- **Mute function on alarm or external mute input command**
- **LO frequency and power monitor**
- **CE Mark**

Options

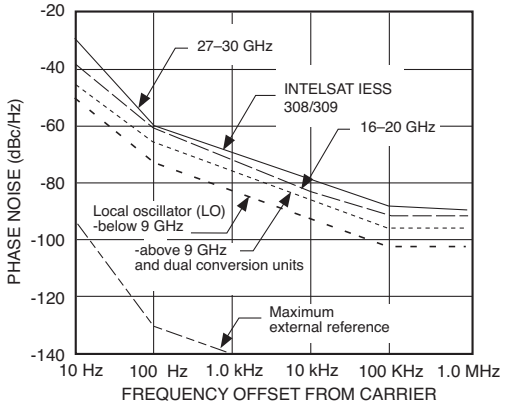
- **High performance package**
- **Higher frequency stability**
- **RS422/RS485 and 10/100Base-T Ethernet**
- **LO level monitor**
- **Lower gain**
- **Amplitude slope Control**

U.S. Patent #7,510,090

Specifications	Upconverter	Downconverter
Input characteristics		
Return loss	18 dB minimum	20 dB minimum
LO leakage	N/A	-80 dBm maximum
Signal monitor	-20 dBc nominal	
Output characteristics		
Return loss (50 ohms)	20 dB minimum, 18 dB for units above 22 GHz	18 dB minimum
Signal monitor	-20 dBc nominal	
Power output (P1 dB)	+13 dBm minimum	+18 dBm minimum
Transfer characteristics		
Gain	30 dB, ±3 dB at 23°C	35 dB, ±3 dB at 23°C
Gain control	30 dB continuous adjust, rear panel control (0.2 dB steps with Option 17)	
Gain stability	±0.25 dB/day maximum at constant temperature	
Amplitude response	±0.25 dB/40 MHz maximum, ±1 dB maximum over RF frequency band	
Image rejection	60 dB minimum	
Noise figure at min. atten.	15 dB maximum (20 dB for units above 22 GHz, 1 GHz IF bandwidth units)	
Intermodulation distortion (third order)	With two inband signals at 0 dBm output, third order intermodulation products are less than 60 dBc minimum (downconverters) and 50 dBc minimum (upconverters, and all Ka-band units).	
Spurious outputs (inband)	65 dBc minimum up to 0 dBm output (including 2x1 spurious on 1 GHz IF bandwidth units)	
Signal related	at maximum gain	
Signal independent	-75 dBm maximum	
Phase noise	See graph	
Frequency stability	±5 x 10^{-8}, 0 to 50°C (higher stability options available), ±5 x 10^{-9}/day typical (fixed temperature after 24 hour on time)	
Automatic reference configuration	External 5 or 10 MHz at +4 ±3 dBm. If external reference is below +1 dBm nominal, the converter will automatically lock to the internal reference. 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 (No reference suppression with Option 10F)	
Mute	60 dB minimum on summary alarm or mute command. Mute status and control illuminated keys and LCD display with Option 17.	
Indicator and Alarms		
LO out-of-lock	Red LED (front panel)	
Internal reference	Amber LED (front panel)	
Power ON indicator	Green LED (front panel)	
Summary alarm	Contact closure status for DC voltage and local oscillator	

Phase Noise Specifications

Phase Noise Charactеristics



Options

1. High performance package.

Power output (1 dB compression)..... +20 dBm minimum (+15 dBm minimum, Ka-band upconverters)
Gain slope..... 0.03 dB/MHz maximum
Gain stability ..... ±0.25 dB/day maximum at constant temperature,
1.0 dB peak-to-peak maximum/0 to 50°C
Group delay ..... 1 ns peak-to-peak maximum
Spurious outputs (inband)
Signal related ..... 65 dBc minimum at 0 dBm output
Signal independent..... -80 dBm maximum
Image rejection ..... 80 dB minimum
Intermodulation distortion (third order)..... With two inband signals at 0 dBm output, third order intermodulation products are less than 60 dBc minimum and 50 dBc minimum (Ka-band upconverters).
High performance phase noise (dBc/Hz)(maximum)

	OFFSET (Hz)					
LO Frequency	**10**	**100**	**1K**	**10K**	**100K/300K**	**1M**
Up to 6.7 GHz.....	-54	-78	-108	-116	-119	-136
6.7 GHz to < 8 GHz.....	-53	-76	-107	-114	-117	-134
8 GHz to < 12 GHz.....	-48	-73	-103	-112	-115	-132
12 GHz to < 13.4 GHz.....	-48	-72	-102	-110	-113	-130
13.4 GHz to < 16 GHz.....	-47	-70	-100	-108	-111	-128
16 GHz to < 24 GHz.....	-42	-67	-98	-106	-109	-126
24 GHz to < 29.05 GHz.....	-41	-64	-94	-102	-107	-124

Noise spectral density ..... -90 dBm/4 kHz maximum (upconverters below 18 GHz),
-85 dBm/4 kHz maximum (downconverters and upconverters above 18 GHz)
AM/PM conversion (at 0 dBm output)..... 0.1°/dB maximum
Upconverter mute..... 80 dB minimum on summary alarm, external mute input control or remote command.

2. Lower gain..... 20 ±3 dB at 23°C,
18 dB noise figure, 22 dB for 1 GHz IF bandwidth units,
signal related spurious -65 dBc at -5 dBm output.

8. LO level alarm.
Summary alarm is generated for loss of power in any of the required local oscillators.

10. Higher frequency stability reference.

B. ±1 x 10^{-8}, 0 to 50°C,
1 x 10^{-9}/day typical (fixed temperature after 24 hour on time).

C. ±5 x 10^{-9}, 0 to 50°C,
1 x 10^{-9}/day typical (fixed temperature after 24 hour on time).

F. Higher frequency stability reference with direct phase lock to external reference input. No phase noise suppression on external reference input.
±5 x 10^{-9}, 0 to 50°C,
1 x 10^{-9}/day typical (fixed temperature after 24 hour on time).

Note: Converter may require 7-10 days to reach stability after long storage periods.

17. Remote control ..... 10/100Base-T Ethernet interface providing:
HTTP-based web server; SNMP 1.0 configuration; Alarm reporting via SNMP Trap Telnet access; Password protection and selectable S485/422; Gain control is 30 dB in 0.2 dB steps; Alarm, reference and mute status on front panel

***21.** Amplitude slope control.....Front panel and remote control of amplitude slope.
Control range; 0 to 1 dB minimum 500 MHz IF BW; 0 to 1.5 dB minimum 800 MHz IF BW; 0 to 2 dB minimum 1000 MHz IF BW; 0 to 3 dB minimum 1500 MHz IF BW;
Control step size: 0.2 dB

***21-1.** Amplitude slope control .....Front panel and remote control of amplitude slope.
Control range; 0 to 2 dB minimum 500 MHz IF BW; 0 to 3 dB minimum 800 MHz IF BW; 0 to 4 dB minimum 1000 MHz IF BW; 0 to 6 dB minimum 1500 MHz IF BW;
Control step size: 0.2 dB

Notes: Amplitude response specifications are measure with linear components of slope equalization removed. Units are calibrated outside minimum range, however, minimum slope range provided as listed above. For Options 21-1 and 21-2, Amplitude slope may be flat for 0 dB slope value.
*Available with Options 17 only.

Note: For literature describing local control (front panel) and remote control (bus control), refer to MITEQ's Technical Note 25T066.
Missing option numbers are not applicable for this product.

General Specifications

Primary Power Requirements

Voltage.....100-240 VAC (-10%, +6%)
Frequency.....47-63 Hz
Consumption.....12 W typical

Physical

Weight.....4.5 pounds (2.04 kg) nominal
Dimensions.....5.70" [144.8mm] x 1.48" [37.6mm] x 18" [457.2mm] (excluding connectors)
Rear panel connectors
- RF band.....SMA female compatible
- L-band.....SMA female
- RF band monitor.....SMA female (not available with Ka-band units)
- L-band monitor.....SMA female
- External reference input.....SMA female
- Status interface.....DE-9S
- Redundancy interface.....DE-9P
- Remote interface (Option 17).....RJ-45 female for Ethernet, RS422/485 available on status connector
- Primary power input.....IEC-320

Front panel connectors
- LO monitor.....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 45°C
- Atmospheric pressure.....Up to 40,000 feet
- Shock and vibration.....Normal handling by commercial carriers

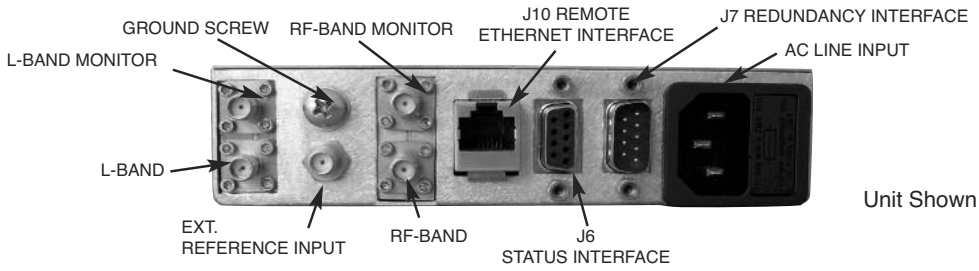
Accessories

1/3 Rack mount frame
- Model number.....OL-TR3-20
- Weight.....1.5 lbs. [0.68 kg] nominal
- Dimensions.....19" [482.6mm] x 1.75" [44.5mm] x 20" [508.0mm]

Single unit frame (includes rack slides)
- Model number.....OL-TR1-20
- Weight.....2 lbs. [0.9 kg] nominal
- Dimensions.....19" [482.6mm] x 1.75" [44.5mm] x 18" [457.2mm]

Dual unit frame (includes rack slides)
- Model number.....OL-TR2-20
- Weight.....3 lbs. [1.35 kg] nominal
- Dimensions.....19" [482.6mm] x 1.75" [44.5mm] x 18" [457.2mm]

Typical Rear Panel View



Unit Shown with Option 17

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