

## BLOCK CONVERTER



### FEATURES

- Cover multiple ITU Ku-Band regions and other combinations
- Automatic 5/10 MHz internal/external reference selection with a 0.1 Hz nominal bandwidth clean-up loop
- RS-485/RS-422 and 10/100 Base-T Ethernet remote control
- Gain control
- RF- and L-Band signal monitor ports
- 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 certification

### OPTIONS

- High-performance package
- Higher frequency stability
- LO level monitor
- Lower gain
- Amplitude slope control

This equipment is designed for applications where multiple frequency band coverage is required (i.e. Ku-Band: 1, 2, 3 or 4 and other combinations). The up and downconverters cover from L-Band to the transponder bands in a single one-third rack unit.

# MULTIBAND 1/3 RACK-MOUNTED

## BLOCK DOWNCONVERTER

RF INPUT FREQUENCY (GHz)	RF OUTPUT FREQUENCY (GHz)	LO FREQUENCY (GHz)	MODEL NUMBER
10.7 to 11.7	0.95 to 1.95	9.75	DNB2-11.725TR
11.7 to 12.75	0.95 to 2	10.75	
10.95 to 11.7	0.95 to 1.7	10.0	DNB2-11.85TR
12.2 to 12.75	0.95 to 1.45	11.25	
12.75 to 13.75	0.95 to 1.95	11.8	DNB2-13.625TR
13.75 to 14.8	0.95 to 2	12.8	
10.7 to 11.45	0.95 to 1.7	9.75	DNB3-11.725TR
11.45 to 12.2	0.95 to 1.7	10.5	
12.2 to 12.75	0.95 to 1.5	10.25	
10.95 to 11.7	0.95 to 1.7	10	DNB3-11.8TR
11.7 to 12.2	0.95 to 1.45	10.75	
12.2 to 12.75	0.95 to 1.5	11.25	

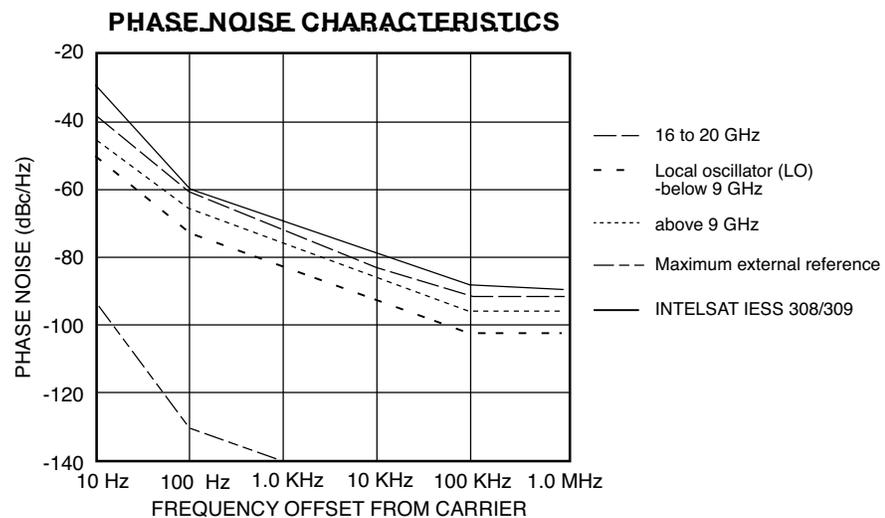
Note: See datasheet D-321 for single band models.

## BLOCK UPCONVERTER

RF INPUT FREQUENCY (GHz)	RF OUTPUT FREQUENCY (GHz)	LO FREQUENCY (GHz)	MODEL NUMBER
0.95 to 1.75	5.85 to 6.65	4.9	UPB2-6/8TR
0.95 to 1.45	7.9 to 8.4	6.95	
0.95 to 1.45	12.75 to 13.25	11.8	UPB2-13.625TR
0.95 to 1.7	13.75 to 14.5	12.8	
0.95 to 1.7	13.75 to 14.5	12.8	UPB2-14/18TR
0.95 to 2.05	17.3 to 18.4	16.35	
0.95 to 1.95	10.7 to 11.7	9.75	UPB2-11.725TR
0.95 to 2.0	11.7 to 12.75	10.75	
0.95 to 1.7	10.95 to 11.7	10.0	UPB3-11.825TR
0.95 to 1.7	11.45 to 12.2	10.5	
0.95 to 1.7	12.0 to 12.7	11.0	

Note: See datasheet D-321 for single-band models.

## PHASE NOISE SPECIFICATIONS



SPECIFICATIONS	BLOCK DOWNCONVERTER
Input characteristics	
Return loss (50 ohms)	18 dB minimum
LO leakage	-80 dB maximum
Signal monitor	-20 dBc nominal
Output characteristics	
Return loss	18 dB minimum
Signal monitor	-20 dBc nominal
Power output (1 dB compression)	+13 dBm minimum (upconverters), +18 dBm minimum (downconverters)
Transfer characteristics	
Gain	33 dB $\pm$ 3 dB at 23 °C (upconverters), 35 dB $\pm$ 3 dB at 23 °C (downconverters)
Gain control	30 dB in 0.2 dB steps
Gain stability	$\pm$ 0.25 dB/day maximum at constant temperature
Amplitude response	$\pm$ 0.25 dB/40 MHz maximum, $\pm$ 1 dB maximum over RF frequency band
Image rejection	60 dB minimum
Noise figure (at minimum attenuation)	15 dB maximum
Intermodulation distortion (third-order)	With two inband signals at 0 dBm output, third-order intermodulation products are less than 50 dBc minimum (upconverters), 60 dBc minimum (downconverters)
Spurious outputs (inband)	
Signal-related (non-harmonic)	65 dBc minimum up to 0 dBm output
Output harmonic (downconverters only)	60 dBc up to -10 dBm output
Signal-independent	-75 dBm maximum
Phase noise	See graph on page two
Frequency stability	$\pm$ 5 x 10 <sup>-8</sup> , 0 °C to 50 °C (higher stability options available), 5 x 10 <sup>-9</sup> /day typical (fixed temperature after 24 hours on time)
Automatic reference configuration	External 5 MHz or 10 MHz at +4 $\pm$ 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
RF mute	60 dB minimum on summary alarm or mute command
Remote interface	10/100 Base-T Ethernet interface providing web-browser based configuration, SNMP 1.0 configuration, alarm reporting via SNMP trap, telnet access, password protection and selectable RS-485/RS-422. Refer to Narda-MITEQ Technical Note 25T066 for details.
Alarms	
Summary alarm	Contact closure status for DC voltage and local oscillator

Note: All specifications at minimum attenuation unless otherwise noted.

# MULTIBAND 1/3 RACK-MOUNTED

## OPTIONS

Missing option numbers are not applicable for this product.

1. High-performance package
  - Power output (1 dB compression) .....+20 dBm minimum
  - Gain slope.....0.03 dB/MHz maximum/any 10 MHz
  - Gain stability.....±0.25 dB/day maximum at constant temperature,  
±1.0 dB peak-to-peak maximum/0 °C to 50 °C
  - Group delay .....1 ns peak-to-peak maximum each band
  - Spurious outputs (inband)
    - Signal-related.....65 dBc minimum up to 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
  - High-performance phase noise (dBc/Hz) (maximum)

LO Frequency	OFFSET (Hz)					
	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

- Noise spectral density.....-88 dBm/4 kHz maximum (upconverters)
  - AM/PM conversion (at 0 dBm output).....0.1 °/dB maximum
  - RF mute .....80 dB minimum on summary alarm, external mute  
input command or remote control
2. Lower gain .....20 ±3 dB at 23 °C, 18 dB noise figure, 20 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.
    - C. ±5 x 10<sup>-9</sup>, 0 to 50°C, 1 x 10<sup>-9</sup>/day typical (fixed temperature after 72 hours 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<sup>-9</sup>, 0 °C to 50 °C, 1 x 10<sup>-9</sup>/day typical (fixed temperature after 72 hours on time).
    - G. Self-calibrating tracking reference with controlled slew rate. Internal reference tracks external reference and uses external reference to correct for aging of the internal reference. The internal reference changes frequency at a maximum rate of 0.06 ppm/second. When external reference is lost, the reference frequency is held at the previous value. Frequency stability on internal reference: ±5 x 10<sup>-8</sup>, 0°C to 50°C, 1 x 10<sup>-9</sup>/day typical (fixed temperature after 72 hours on time).  
5 x 10<sup>-8</sup>/year typical
    - H. Self-calibrating tracking reference with controlled slew rate. Internal reference tracks external reference and uses external reference to correct for aging of the internal reference. The internal reference changes frequency at a maximum rate of 0.06 ppm/second. When external reference is lost, the reference frequency is held at the previous value. Frequency stability on internal reference: ±2 x 10<sup>-9</sup>, 0°C to 50°C, 1 x 10<sup>-9</sup>/day typical (fixed temperature after 72 hours on time).  
5 x 10<sup>-8</sup>/year typical

## OPTIONS (CONTINUED)

Missing option numbers are not applicable for this product.

- \*21-1. Amplitude slope control ..... Front panel and remote control of amplitude slope.  
 Control range: 0 dB to 1 dB minimum 500 MHz IF BW,  
 0 dB to 1.5 dB minimum 800 MHz IF BW, 0 dB to 2 dB  
 minimum 1000 MHz IF BW, 0 dB to 3 dB minimum  
 1500 MHz IF BW. Control step size: 0.2 dB
- \*21-2. Amplitude slope control ..... Front panel and remote control of amplitude slope.  
 Control range: 0 dB to 2 dB minimum 500 MHz IF BW,  
 0 dB to 3 dB minimum 800 MHz IF BW, 0 dB to 4 dB  
 minimum 1000 MHz IF BW, 0 dB to 6 dB minimum  
 1500 MHz IF BW. Control step size: 0.2 dB

Notes: Amplitude response specifications are measured 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.

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

For literature describing local control (front panel) and remote control (bus control), refer to Narda-MITEQ Technical Note 25T066.

## GENERAL SPECIFICATIONS

### PRIMARY POWER REQUIREMENTS

- Voltage..... 100 VAC to 240 VAC (-10%, +6%)  
 Frequency ..... 47 Hz to 63 Hz  
 Consumption..... 12 W typical, 20 W maximum

### PHYSICAL

- Weight..... 4.5 lb. [2.04 kg] nominal  
 Dimensions ..... 5.70" [144.8 mm] x 1.48" [37.6 mm] x 20" [508.0 mm] (excluding connectors)  
 Rear-panel connectors  
 RF-Band..... SMA female  
 RF-Band monitor ..... SMA female  
 L-Band ..... SMA female  
 L-Band monitor ..... SMA female  
 External reference input..... SMA female  
 Status interface ..... DE-9S  
 Redundancy interface ..... DE-9P  
 Remote interface ..... RJ-45 female for Ethernet, RS-422/RS-485 available on status connector  
 Primary power input..... IEC-320

### Front panel connectors

- LO monitor..... SMA female

### ENVIRONMENTAL

#### Operating

- Temperature ..... 0 °C to 50 °C  
 Atmospheric pressure..... Up to 10,000 feet

#### Nonoperating

- Temperature ..... -50 °C to +70 °C  
 Atmospheric pressure..... Up to 40,000 feet  
 Shock and vibration ..... Normal handling by commercial carriers

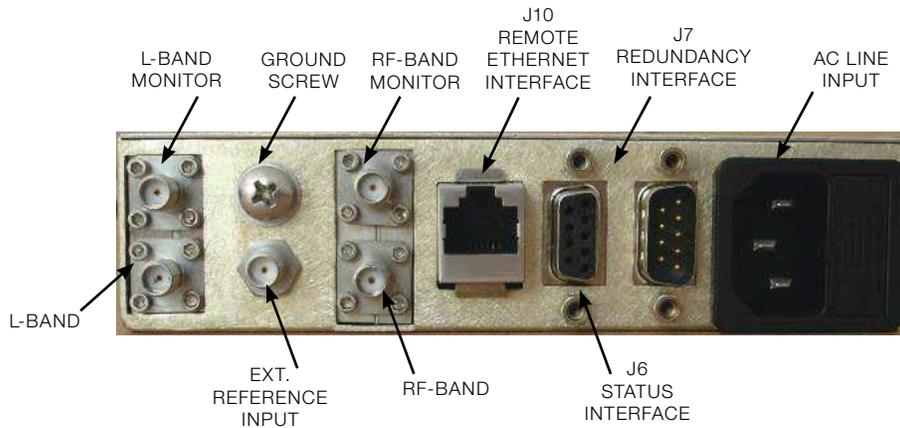
### ACCESSORIES

#### Rack-mount frame

- Model number..... OL-TR3-20  
 Weight ..... 1.5 lb. [0.68 kg] nominal  
 Dimensions ..... 19" [482.6 mm] x 1.75" [44.5 mm] x 20" [508.0 mm]

# MULTIBAND 1/3 RACK-MOUNTED

## TYPICAL REAR-PANEL VIEW



The material presented in this datasheet was current at the time of publication. Narda-MITEQ's continuing product improvement program makes it necessary to reserve the right to change our mechanical and electrical specifications without notice. If either of these parameters is critical, please contact the factory to verify that the information is current.

This material consists of Narda-MITEQ general capabilities information and does not contain controlled technical data as defined within the International Traffic in Arms (ITAR) Part 120.10 or Export Administration Regulations (EAR) Part 734.7-11.  
D-351F/03.16.17

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