

MULTIPLE WIDEBAND Ku AND Ka UPCONVERTERS



FEATURES

- Small weather resistant enclosure
- Automatic 5/10 MHz internal/external reference selection
- 10/100 Base-T Ethernet and RS-485/RS-422 remote control
- Superior phase noise below IESS-308/309 and MIL-STD-188-164B specification
- 30 dB gain control
- 32 memory locations
- High-frequency stability
- Summary alarm
- AC power supply with power factor correction
- CE mark

OPTIONS

- Custom frequency ranges
- Higher frequency stability
- Lower phase noise with high performance package Option 1
- Fiber-optic L-Band interface

This Narda-MITEQ series of outdoor, antenna-mount block downconverters is designed to cover simultaneously multiple wide bandwidth satellite transponders by accepting either two or three independent IF inputs which are up converted into one wideband RF output.

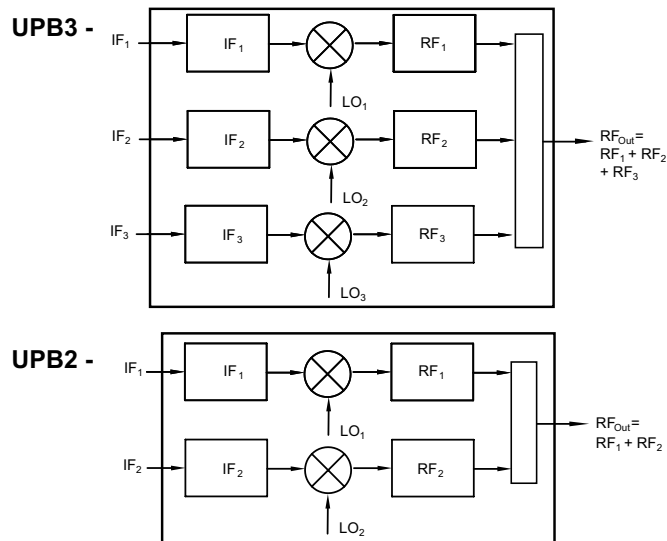
A strong set of monitor and control functions support powerful remote control. A contact closure summary alarm is provided for fault monitoring. A continuously updated log of time-stamped records of activity is also provided.

FREQUENCY CONVERTER

MULTI-INPUT SIMULTANEOUS UPCONVERTERS

| RF FREQUENCY (GHz) | IF FREQUENCY (GHz) | LO FREQUENCY (GHz) | MODEL NUMBER |
|-----------------------------------|---------------------------------|--------------------------|------------------|
| 12.75 to 13.25 (RF ₁) | 0.95 to 1.45 (IF ₁) | 11.8 (LO ₁) | UPB2-W-13.625 |
| 13.75 to 14.5 (RF ₂) | 0.95 to 1.7 (IF ₂) | 12.8 (LO ₂) | |
| 29.5 to 30.0 (RF ₁) | 1.50 to 2.0 (IF ₁) | 28.0 (LO ₁) | UPB2-W-30.25 |
| 30.0 to 31.0 (RF ₂) | 1.00 to 2.0 (IF ₂) | 29.0 (LO ₂) | |
| 27.5 to 28.7 (RF ₁) | 0.95 to 2.15 (IF ₁) | 26.55 (LO ₁) | UPB3-W-29.75-1.2 |
| 28.65 to 29.85 (RF ₂) | 0.95 to 2.15 (IF ₂) | 27.7 (LO ₂) | |
| 29.8 to 31.0 (RF ₃) | 0.95 to 2.15 (IF ₃) | 28.85 (LO ₃) | |
| 27.0 to 28.0 (RF ₁) | 0.95 to 1.95 (IF ₁) | 26.05 (LO ₁) | UPB3-W-28.5-1 |
| 28.0 to 29.0 (RF ₂) | 0.95 to 1.95 (IF ₂) | 27.05 (LO ₂) | |
| 29.0 to 30.0 (RF ₃) | 0.95 to 1.95 (IF ₃) | 28.05 (LO ₃) | |
| 28.0 to 28.8 (RF ₁) | 0.95 to 1.75 (IF ₁) | 27.05 (LO ₁) | UPB3-W-29 |
| 28.7 to 29.5 (RF ₂) | 0.95 to 1.75 (IF ₂) | 27.75 (LO ₂) | |
| 29.4 to 30.0 (RF ₃) | 0.95 to 1.75 (IF ₃) | 28.45 (LO ₃) | |

BLOCK DIAGRAMS

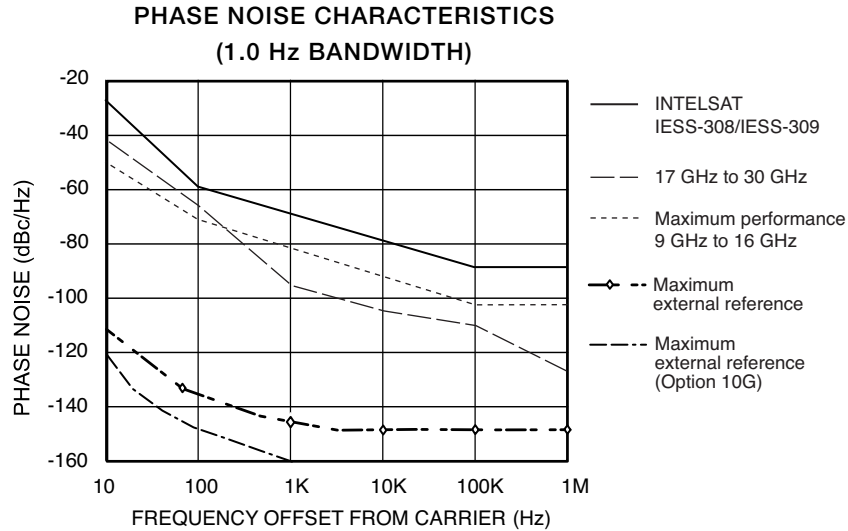


| SPECIFICATIONS | UPCONVERTER |
|--|--|
| Input characteristics | |
| Return loss (50 ohms) | 18 dB minimum |
| Signal monitor | -20 dBc nominal (available as Option 6A) |
| Output characteristics | |
| Return loss | 18 dB minimum |
| Power output (P1dB) | 15 dBm minimum |
| Signal monitor | -20 dBc nominal |
| Transfer characteristics | |
| Gain | 27 dB, ± 3 dB at 23°C |
| Gain adjustment | 30 dB in 0.2 dB steps independent for each input |
| Gain stability | ± 0.25 dB/day maximum at constant temperature, ± 2 dB -40°C to +50°C |
| Amplitude response | ± 0.5 dB/40 MHz maximum, ± 1 dB/1 GHz, ± 2 dB over each output band above 1 GHz BW |
| Image rejection | 80 dB minimum |
| Noise figure at minimum attenuation | 15 dB maximum each band independently (only 1 band on), 18 dB maximum with all bands on |
| Group delay | 1 ns peak-to-peak maximum per band |
| Intermodulation distortion (third-order) | With two inband signals at 0 dBm output, third-order intermodulation products are less than 50 dBc minimum at minimum attenuation |
| Spurious outputs | |
| Signal-related (in-band) | 65 dBc minimum up to 0 dBm output |
| Signal-independent | -70 dBm maximum including LO leakage |
| Phase noise | See graph on next page |
| Frequency stability | $\pm 5 \times 10^{-8}$, -40°C to +60°C (higher stability options available), 5×10^{-9} /day typical (fixed temperature after 24 hours on time) |
| Automatic reference configuration | External 5 MHz or 10 MHz, +4 ± 3 dBm. If external reference is below +1 dBm nominal, the converter will lock to the internal reference. |
| 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 Multi-Channel Technical Note for details. |
| Indicator and Alarms | |
| LO out-of-lock | Red LED (front panel), Amber LED (for logged alarms), Summary alarm indicates: LO out-of-lock or DC voltage alarm |
| Power ON indicator | Green LED (front panel) |
| Summary alarm | Contact closure status for DC voltage and local oscillator, external mute input |

Note: All specifications at maximum gain unless otherwise noted.

FREQUENCY CONVERTER

PHASE NOISE SPECIFICATIONS



OPTIONS

Missing option numbers are not applicable for this product.

1. High-performance package

Gain slope..... 0.03 dB/MHz maximum
 Gain stability..... ± 0.25 dB/day maximum at constant temperature,
 ± 1 dB peak-to-peak maximum/ -40°C to $+60^{\circ}\text{C}$

Spurious outputs (in-band)

Signal-related..... 65 dBm minimum up to 0 dBm output
 Signal-independent -75 dBm maximum
 Noise spectral density..... -90 dBm/4 kHz maximum
 AM/PM conversion (at 0 dBm output)..... $0.1^{\circ}/\text{dB}$ maximum
 High performance phase noise (dBc/Hz) (maximum)

| MODEL | OFFSET (Hz) | | | | | |
|---------|-------------|-----|------|------|------|------|
| | 10 | 100 | 1K | 10K | 100K | 1M |
| Ku-Band | -48 | -73 | -103 | -112 | -115 | -132 |
| Ka-Band | -42 | -67 | -97 | -106 | -109 | -126 |

6A. L-Band IF monitor 20 dBc nominal from IF signal, SMA female with termination

10. Higher frequency stability reference.

D. $\pm 5 \times 10^{-9}$, -40°C to $+60^{\circ}\text{C}$,
 $2 \times 10^{-10}/\text{day}$ typical (fixed temperature after 24 hours on time).

G. Higher frequency stability reference with an analog phase lock with 0.2 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 and 100 dB at 100 Hz with the following frequency stability:
 $\pm 5 \times 10^{-9}$, -40°C to $+60^{\circ}\text{C}$,
 $1 \times 10^{-9}/\text{day}$ typical (fixed temperature after 24 hours on time).

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

OPTIONS (CONTINUED)

Missing option numbers are not applicable for this product.

25. Front panel RF connector option

- 1. WR-42 grooved flange, 2 psi 10 cm³/min leakage rate
- 2. WR-34 grooved flange, 2 psi 10 cm³/min leakage rate
- 3. 2.92 mm female per standard outline
- 4. 3.5 mm female per standard outline
- 5. WR-28 grooved flange, 2 psi 10 cm³/min leakage rate

28B. L-Band fiber-optic interface (bandwidth 0.95 GHz to 2.15 GHz)

Upconverter fiber-optic input receiver interface is:

Fiber: 9/125 (single-mode fiber), Wavelength: 1540 nm to 1560 nm, Optical power in fiber: 4 mW typical

Connector: FC/APC

GENERAL SPECIFICATIONS

PRIMARY POWER REQUIREMENTS

Voltage.....100 VAC to 240 VAC (-10%, +6%)

Frequency47 Hz to 63 Hz

Consumption.....50 W typical below 15 GHz, 60 W typical above 15 GHz

PHYSICAL

Weight.....28 lb. [12.72 kg] nominal, 30 lb. [3.64 kg] maximum

Front panel connectors

RF-Band

Below 22 GHz.....SMA female-compatible

Above 22 GHz.....2.92 mm female

L-BandN female

RF-Band monitor.....SMA female-compatible (available as option below 22 GHz)

L-Band monitorSMA female with termination (available as Option 6A)

External reference input.....SMA female with termination

Status/Control interface*.....MS3116F14-18P for summary alarm, RS-422/RS-485 and redundancy

Remote interface*.....RJ-45 female for Ethernet, RS-422/RS-485 available on status connector

Primary power input.....FCI clipper series CL1M1102*

Rear panel connectors (above 22 GHz)

RF-Band.....WR-28 standard

RF-Band monitor.....SMA female-compatible (available as option)

* Unit supplied with mating connector.

ENVIRONMENTAL

Operating

Ambient temperature.....-40°C to +50°C

Atmospheric pressureUp to 10,000 feet

Nonoperating

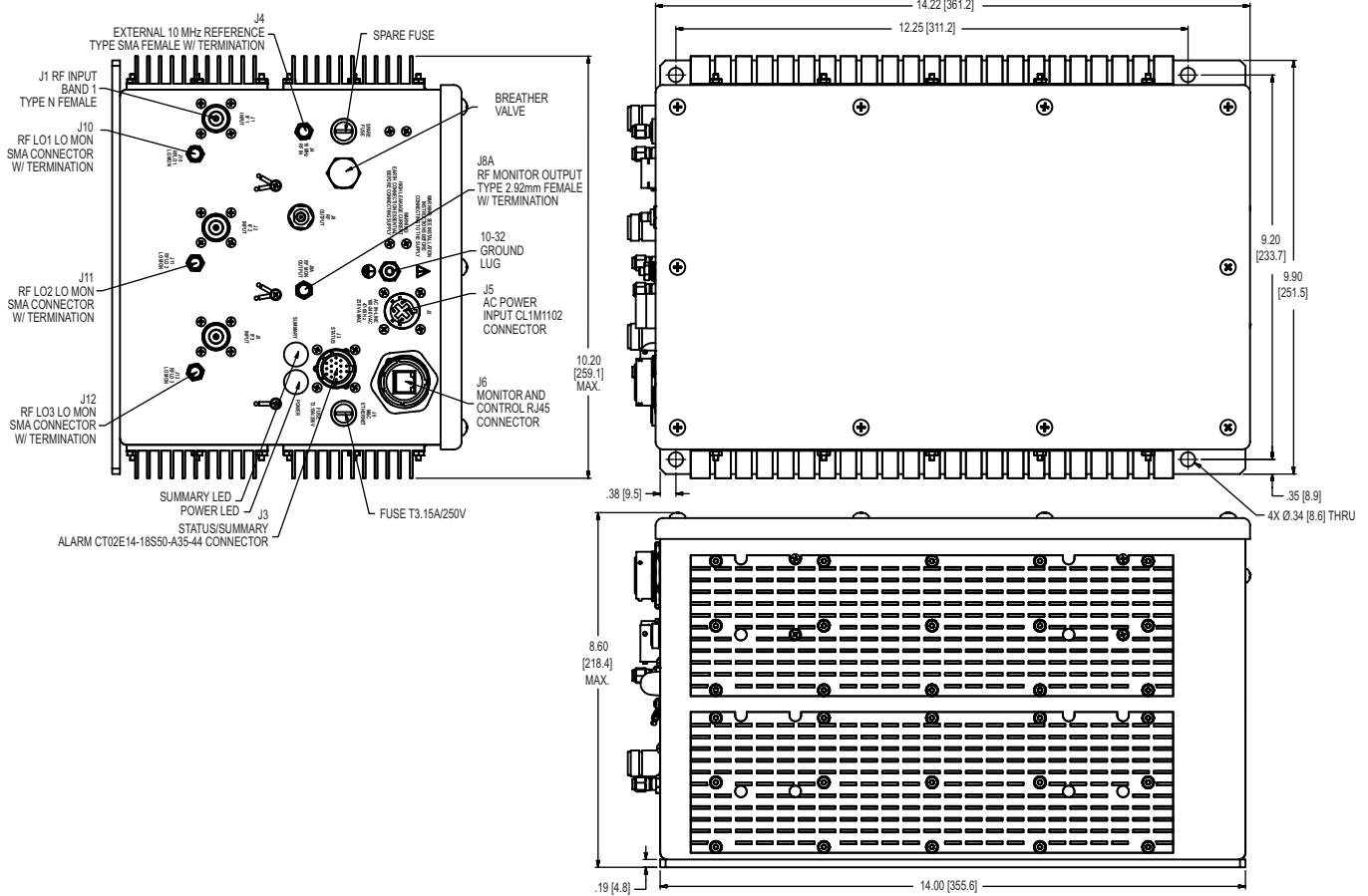
Ambient temperature.....-50°C to +70°C

Atmospheric pressureUp to 40,000 feet

Shock and vibrationNormal handling by commercial carriers

FREQUENCY CONVERTER

OUTLINE DRAWING



Note: Dimensions shown are in inches and those shown in brackets [] are in millimeters.

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