This L3 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.

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
MULTI-INPUT SIMULTANEOUS UPConvertERS

<table>
<thead>
<tr>
<th>RF FREQUENCY (GHz)</th>
<th>IF FREQUENCY (GHz)</th>
<th>LO FREQUENCY (GHz)</th>
<th>MODEL NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.75 to 13.25 (RF₁)</td>
<td>0.95 to 1.45 (IF₁)</td>
<td>11.8 (LO₁)</td>
<td>UPB2-W-13.625</td>
</tr>
<tr>
<td>13.75 to 14.5 (RF₂)</td>
<td>0.95 to 1.7 (IF₂)</td>
<td>12.8 (LO₂)</td>
<td>UPB2-W-30.25</td>
</tr>
<tr>
<td>29.5 to 30.0 (RF₃)</td>
<td>1.50 to 2.0 (IF₃)</td>
<td>28.0 (LO₃)</td>
<td>UPB3-W-29.75-1.2</td>
</tr>
<tr>
<td>30.0 to 31.0 (RF₄)</td>
<td>1.00 to 2.0 (IF₄)</td>
<td>29.0 (LO₄)</td>
<td></td>
</tr>
<tr>
<td>27.5 to 28.7 (RF₅)</td>
<td>0.95 to 2.15 (IF₅)</td>
<td>26.55 (LO₅)</td>
<td></td>
</tr>
<tr>
<td>28.65 to 29.85 (RF₆)</td>
<td>0.95 to 2.15 (IF₆)</td>
<td>27.7 (LO₆)</td>
<td></td>
</tr>
<tr>
<td>29.8 to 31.0 (RF₇)</td>
<td>0.95 to 2.15 (IF₇)</td>
<td>28.85 (LO₇)</td>
<td></td>
</tr>
<tr>
<td>27.0 to 28.0 (RF₈)</td>
<td>0.95 to 1.95 (IF₈)</td>
<td>26.05 (LO₈)</td>
<td>UPB3-W-28.5-1</td>
</tr>
<tr>
<td>28.0 to 29.0 (RF₉)</td>
<td>0.95 to 1.95 (IF₉)</td>
<td>27.05 (LO₉)</td>
<td></td>
</tr>
<tr>
<td>29.0 to 30.0 (RF₁₀)</td>
<td>0.95 to 1.95 (IF₁₀)</td>
<td>28.05 (LO₁₀)</td>
<td></td>
</tr>
<tr>
<td>28.0 to 28.8 (RF₁₁)</td>
<td>0.95 to 1.75 (IF₁₁)</td>
<td>27.05 (LO₁₁)</td>
<td>UPB3-W-29</td>
</tr>
<tr>
<td>28.7 to 29.5 (RF₁₂)</td>
<td>0.95 to 1.75 (IF₁₂)</td>
<td>27.75 (LO₁₂)</td>
<td></td>
</tr>
<tr>
<td>29.4 to 30.0 (RF₁₃)</td>
<td>0.95 to 1.75 (IF₁₃)</td>
<td>28.45 (LO₁₃)</td>
<td></td>
</tr>
</tbody>
</table>

BLOCK DIAGRAMS

**UPB3**

- IF₁₁ × RF₁₁ → LO₁₁
- IF₁₂ × RF₁₂ → LO₁₂
- IF₁₃ × RF₁₃ → LO₁₃
- RFᵢₒᵤₐₛ = RF₁ + RF₂ + RF₃

**UPB2**

- IF₁₁ × RF₁₁ → LO₁₁
- IF₁₂ × RF₁₂ → LO₁₂
- IF₁₃ × RF₁₃ → LO₁₃
- RFᵢₒᵤₐₛ = RF₁ + RF₂
### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Input characteristics</th>
<th>UPCONVERTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return loss (50 ohms)</td>
<td>18 dB minimum</td>
</tr>
<tr>
<td>Signal monitor</td>
<td>-20 dBc nominal (available as Option 6A)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Output characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Return loss</td>
<td>18 dB minimum</td>
</tr>
<tr>
<td>Power output (P1dB)</td>
<td>15 dBm minimum</td>
</tr>
<tr>
<td>Signal monitor</td>
<td>-20 dBc nominal</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transfer characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Gain</td>
<td>27 dB, ±3 dB at 23 °C</td>
</tr>
<tr>
<td>Gain adjustment</td>
<td>30 dB in 0.2 dB steps independent for each input</td>
</tr>
<tr>
<td>Gain stability</td>
<td>±0.25 dB/day maximum at constant temperature, ±2 dB -40 °C to +50 °C</td>
</tr>
<tr>
<td>Amplitude response</td>
<td>±0.5 dB/40 MHz maximum, ±1 dB/1 GHz, ±2 dB over each output band above 1 GHz BW</td>
</tr>
<tr>
<td>Image rejection</td>
<td>80 dB minimum</td>
</tr>
<tr>
<td>Noise figure at minimum attenuation</td>
<td>15 dB maximum each band independently (only 1 band on), 18 dB maximum with all bands on</td>
</tr>
<tr>
<td>Group delay</td>
<td>1 ns peak-to-peak maximum per band</td>
</tr>
<tr>
<td>Intermodulation distortion (third-order)</td>
<td>With two inband signals at 0 dBm output, third-order intermodulation products are less than 50 dBc minimum at minimum attenuation</td>
</tr>
<tr>
<td>Spurious outputs</td>
<td></td>
</tr>
<tr>
<td>Signal-related (in-band)</td>
<td>65 dBc minimum up to 0 dBm output</td>
</tr>
<tr>
<td>Signal-independent</td>
<td>-70 dBm maximum including LO leakage</td>
</tr>
<tr>
<td>Phase noise</td>
<td>See graph on next page</td>
</tr>
<tr>
<td>Frequency stability</td>
<td>±5 x 10⁻⁸, -40 °C to +60 °C (higher stability options available), 5 x 10⁻⁹/day typical (fixed temperature after 24 hours on time)</td>
</tr>
<tr>
<td>Automatic reference configuration</td>
<td>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.</td>
</tr>
<tr>
<td>Remote interface</td>
<td>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 L3 Narda-MITEQ Multi-Channel Technical Note for details.</td>
</tr>
<tr>
<td>Indicator and Alarms</td>
<td></td>
</tr>
<tr>
<td>LO out-of-lock</td>
<td>Red LED (front panel), Amber LED (for logged alarms), Summary alarm indicates: LO out-of-lock or DC voltage alarm</td>
</tr>
<tr>
<td>Power ON indicator</td>
<td>Green LED (front panel)</td>
</tr>
<tr>
<td>Summary alarm</td>
<td>Contact closure status for DC voltage and local oscillator, external mute input</td>
</tr>
</tbody>
</table>

Note: All specifications at maximum gain unless otherwise noted.
PHASE NOISE SPECIFICATIONS

PHASE NOISE CHARACTERISTICS
(1.0 Hz BANDWIDTH)

OFFSET (Hz)

MODEL | 10 | 100 | 1K | 10K | 100K | 1M
--- | --- | --- | --- | --- | --- | ---
Ku-Band | -48 | -73 | -103 | -112 | -115 | -132

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 °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 °/dB maximum
   - High performance phase noise (dBc/Hz) (maximum)

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

   - D. ±5 x 10⁻⁹, -40 °C to +60 °C,
     2 x 10⁻¹⁰/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:
     ±5 x 10⁻⁹, -40 °C to +60 °C,
     1 x 10⁻⁹/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%)
Frequency ............................................... 47 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-Band ................................................. N female
  - RF-Band monitor .................................. SMA female-compatible (available as option below 22 GHz)
  - L-Band monitor  ................................... SMA 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 pressure ........................... Up to 10,000 feet
Nonoperating
  - Ambient temperature ........................... -50 °C to +70 °C
  - Atmospheric pressure ........................... Up to 40,000 feet
  - Shock and vibration ............................ Normal handling by commercial carriers
Note: Dimensions shown are in inches and those shown in brackets [ ] are in millimeters.

The material presented in this datasheet was current at the time of publication. L3 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 L3 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-393D/10.05.17