

Multiple Output Outdoor Wideband Ku and Ka Downconverters



RF Frequency (GHz)	IF Frequency (GHz)	LO Frequency (GHz)	Model Number
Multi-Output Simultaneous Downconverters			
10.7–11.45 (RF ₁)	0.95–1.7 (IF ₁)	9.75 (LO ₁)	DNB3-W-11.725
11.45–12.2 (RF ₂)	0.95–1.7 (IF ₂)	10.5 (LO ₂)	
12.2–12.75 (RF ₃)	0.95–1.5 (IF ₃)	11.25 (LO ₃)	
10.95–11.7 (RF ₁)	0.95–1.7 (IF ₁)	10.0 (LO ₁)	DNB3-W-11.8
11.7–12.2 (RF ₂)	0.95–1.45 (IF ₂)	10.75 (LO ₂)	
12.2–12.75 (RF ₃)	0.95–1.5 (IF ₃)	11.25 (LO ₃)	
10.7–11.75 (RF ₁)	0.95–2.0 (IF ₁)	9.75 (LO ₁)	DNB2-W-11.725
11.7–12.75 (RF ₂)	0.95–2.0 (IF ₂)	10.75 (LO ₂)	
17.7–18.7 (RF ₁)	0.95–1.95 (IF ₁)	16.75 (LO ₁)	DNB3-W-18.75-1
18.3–19.3 (RF ₂)	0.95–1.95 (IF ₂)	17.35 (LO ₂)	
19.2–20.2 (RF ₃)	0.95–1.95 (IF ₃)	18.25 (LO ₃)	
18.3–18.8 (RF ₁)	0.95–1.45 (IF ₁)	17.35 (LO ₁)	DNB3-W-19.75
19.7–20.2 (RF ₂)	0.95–1.45 (IF ₂)	18.75 (LO ₂)	
20.2–21.2 (RF ₃)	0.95–1.95 (IF ₃)	19.25 (LO ₃)	
19.7–20.2 (RF ₁)	1.5–2.0 (IF ₁)	18.2 (LO ₁)	DNB2-W-20.45
20.2–21.2 (RF ₂)	1.0–2.0 (IF ₂)	19.2 (LO ₂)	
17.0–18.8 (RF ₁)	0.80–2.60 (IF ₁)	16.2 (LO ₁)	DNB3-W-19.5-1.8
18.6–20.4 (RF ₂)	0.80–2.60 (IF ₂)	17.8 (LO ₂)	
20.2–22.0 (RF ₃)	0.80–2.60 (IF ₃)	19.6 (LO ₃)	
27.5–28.5 (RF ₁)	0.95–1.95 (IF ₁)	26.55 (LO ₁)	DNB3-W-28.75-1
28.3–29.3 (RF ₂)	0.95–1.95 (IF ₂)	27.35 (LO ₂)	
29.0–30.0 (RF ₃)	0.95–1.95 (IF ₃)	28.05 (LO ₃)	
27.0–28.5 (RF ₁)	0.95–2.45 (IF ₁)	26.05 (LO ₁)	DNB3-W-29.5-1.5
28.3–29.8 (RF ₂)	0.95–2.45 (IF ₂)	27.35 (LO ₂)	
29.5–31.0 (RF ₃)	0.95–2.45 (IF ₃)	28.55 (LO ₃)	

This series of outdoor, antenna mount block downconverters are designed to cover simultaneously multiple wide bandwidth satellite transponders providing two or three independent IF outputs.

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.

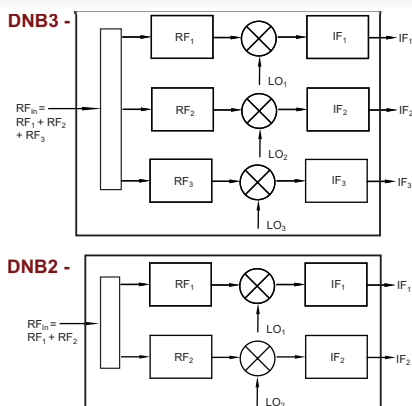
Features

- Small weather resistant enclosure
- Automatic 5/10 MHz internal/external reference selection
- 10/100Base-T Ethernet and RS485/RS422 remote control
- Superior phase noise below IESS308/309 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
- RoHS-5 compliant

Options

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

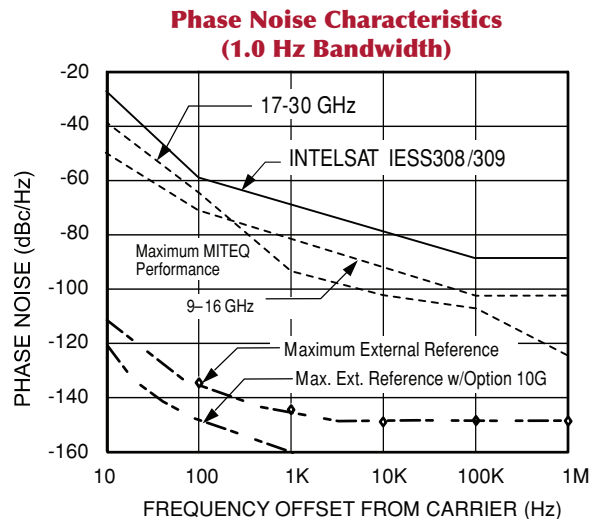
Block Diagrams



Specifications	Downconverter
Input characteristics	
Return loss (50 ohms)	18 dB minimum
LO leakage	-80 dB maximum
Signal monitor	-20 dBc nominal, optional above 15 GHz
Output characteristics	
Return loss	18 dB minimum
Power output (P1dB)	18 dBm minimum
Transfer characteristics	
Gain	30 dB, ± 3 dB at 23°C
Gain adjustment	30 dB in 0.2 dB steps independent for each output
Gain stability	± 0.25 dB/day maximum at constant temperature, ± 2 dB -40 to +50°C and over a 1 GHz BW
Amplitude response	± 0.5 dB/40 MHz maximum, ± 1 dB/1 GHz, ± 2 dB over each output band above 1 GHz
Image rejection	80 dB minimum
Noise figure at min. atten.	15 dB maximum
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 60 dBc minimum at minimum attenuation
Spurious outputs	
Signal related (in band)	65 dBc minimum up to 0 dBm output
Signal independent	-75 dBm maximum
Phase noise	See graph
Frequency stability	$\pm 5 \times 10^{-8}$, -40 to +60°C (higher stability options available), 5×10^{-9} /day typical (fixed temperature after 24 hour on time)
Automatic reference configuration	External 5 or 10 MHz, +4 ± 3 dBm. If external reference is below +1 dBm nominal, the converter will lock to the internal reference.
Remote interface	10/100Base-T Ethernet interface providing Web-browser based configuration, SNMP 1.0 configuration, alarm reporting via SNMP trap, telnet access, password protection and selectable RS485/RS422. Refer to MITEQ's 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 or LNA current on block downconverters
Power ON indicator	Green LED (front panel)
Summary alarm	Contact closure status for DC voltage and local oscillator, external mute input (Programmable LNA current alarm for downconverters +12 VDC up to 500 mA maximum)

Note: All specifications at maximum gain unless otherwise noted.

Phase Noise Specifications



Options

- 1.** High performance package.
 - Power output (1 dB compression) 20 dBm minimum
 - Gain slope 0.03 dB/MHz maximum
 - Gain stability ± 0.25 dB/day maximum at constant temperature,
 ± 1 dB peak-to-peak maximum/-40 to +60°C
 - Spurious outputs (inband)
 - Signal related 65 dBm minimum up to 0 dBm output
 - Signal independent -80 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):

Models	OFFSET (Hz)					
	10	100	1K	10K	100K	1M
Ku-Band	- 48	-73	-103	-112	-115	-132
K-Band	- 42	-67	-97	- 106	- 109	-126
Ka-Band	- 41	- 64	-94	- 102	- 107	-124

- 6A.** L-Band IF monitor 20 dBc nominal from IF signal
- 6B.** RF monitor above 15 GHz 20 dBc nominal from RF signal. SMA female below 15 GHz and 2.9 mm female with termination located after LNA with Option 14.
- 10.** Higher frequency stability reference.
 - D.** $\pm 5 \times 10^{-9}$, -40 to +60°C,
 2×10^{-10} /day typical (fixed temperature after 24 hour 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 to +60°C,
 1×10^{-9} /day typical (fixed temperature after 24 hour on time).

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

- 14.** Low noise option. Gain: 60 ± 2 dB @ 25°C

Frequency (GHz)	Available Noise Temperature		Interface Input (rear panel)
	At +25°C (Maximum)		
10.70 - 12.75	80		WR-75 Flat Flange
17.0 - 22.0	150		WR-42 Grooved Flange

- 27.** Rear panel connector option. (Above 15 GHz)
 - 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
- 28A.** L-band fiber optic interface (bandwidth 0.95-2.15 GHz). Downconverter FO output transmitter interface is; Fiber: 9/125 (single mode fiber), Wavelength: 1540–1560 nm, Optical power in fiber: 4 mW typical, Connector: FC/APC
- 28C.** L-band fiber optic interface (bandwidth 0.8-2.6 GHz). Downconverter FO output transmitter interface is; Fiber: 9/125 (single mode fiber), Wavelength: 1540–1560 nm, Optical power in fiber: 4 mW typical, Connector: FC/APC

General Specifications

Primary Power Requirements

Voltage 100–240 VAC, -10%, +6%
 Frequency 47–63 Hz
 Consumption 50 W typical below 15 GHz, 60 W typical above 15 GHz

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General Specifications (Cont.)

Physical

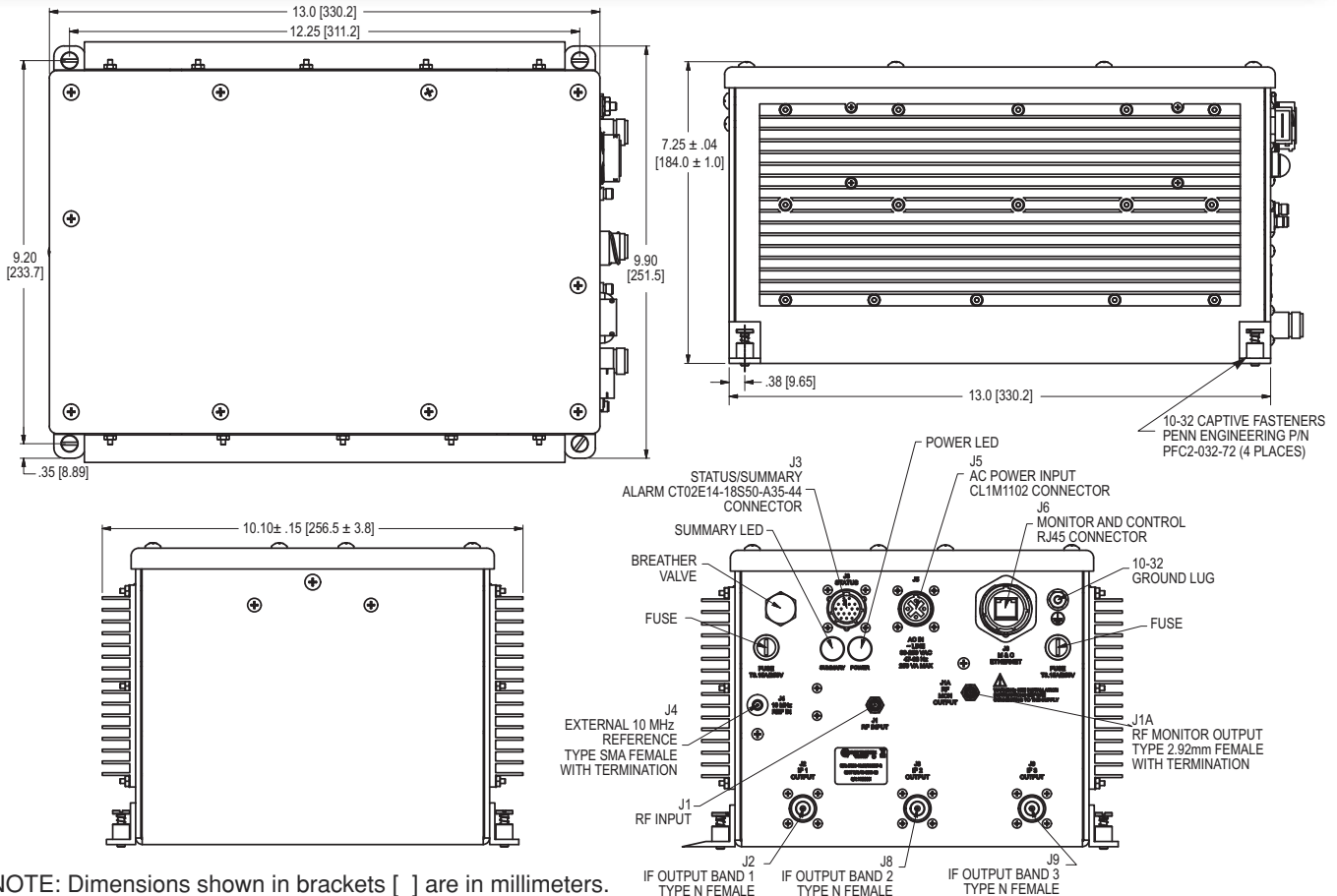
Weight	17 pounds [7.71kg] nominal, 20 pounds [9.07kg] maximum
Front Panel connectors	
RF Band**	
Below 17 GHz	SMA female
Below 17-22 GHz	3.5 mm female
Above 26.5 GHz	2.9 mm female
L-Band	N female
RF band monitor	SMA female compatible (available as option for Ka-band)
External reference input	SMA female with termination
Status/control interface*	MS3116F14-18P for summary alarm, RS422/485, redundancy and LNA power
Remote interface*	RJ-45 female for Ethernet, RS422/485 available on status connector
Primary power input	FCl clipper series CL1M1102*

Notes: * Unit supplied with mating connector.
 ** Option 14 RF input on rear.
 Option 27 RF input available rear panel.

Environmental

Operating	
Ambient temperature	-40 to +50°C
Atmospheric pressure	Up to 10,000 feet
Nonoperating	
Ambient temperature	-50 to +70°C
Atmospheric pressure	Up to 40,000 feet
Shock and vibration	Normal handling by commercial carriers

Outline Drawing



NOTE: Dimensions shown in brackets [] are in millimeters.



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