

High Performance Rack-Mounted Block Converters



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

Input Frequency (GHz)	Output Frequency (GHz)	LO Frequency (GHz)	Model Number
Block Upconverters			
0.95 - 1.525	5.85 - 6.425	7.375	UPB-1B-6.1-IN*
0.95 - 1.75	5.85 - 6.65	4.9	UPB-1B-6.25
0.95 - 1.35	6.7 - 7.1	5.75	UPB-1B-6.9
0.95 - 1.45	7.9 - 8.4	6.95	UPB-1B-8.15
0.95 - 1.45	12.75 - 13.25	11.8	UPB-1B-13
0.95 - 1.7	13.75 - 14.5	12.8	UPB-1B-14.125
0.95 - 1.45	14 - 14.5	13.05	UPB-1B-14.25
0.95 - 1.75	17.3 - 18.1	16.35	UPB-1B-17.7
0.95 - 2.05	17.3 - 18.4	16.35	UPB-1B-17.85
0.95 - 1.25	18.1 - 18.4	17.15	UPB-1B-18.25
Ka-Band			
0.95 - 1.2	28.35 - 28.6	27.4	UPB-1B-28.475
0.95 - 1.45	29 - 29.5	28.05	UPB-1B-29.25
0.95 - 1.2	29.25 - 29.5	28.3	UPB-1B-29.375
0.95 - 1.7	29.25 - 30	28.3	UPB-1B-29.625
0.95 - 1.95	30 - 31	29.05	UPB-1B-30.5
1 - 2	30 - 31	29	UPB-1B-30.5-1
Block Downconverters			
3.4 - 4.2	0.95 - 1.75	5.15	DNB-1B-3.8-IN*
3.4 - 4.2	0.95 - 1.75	8.55/11	DNB-1B-3.8
3.7 - 4.2	0.95 - 1.45	8.55/11.3	DNB-1B-3.95
7.25 - 7.75	0.95 - 1.45	6.3	DNB-1B-7.5
10.7 - 11.7	0.95 - 1.95	9.75	DNB-1B-11.2
10.95 - 11.7	0.95 - 1.7	10	DNB-1B-11.325
11.2 - 12	0.95 - 1.75	10.25	DNB-1B-11.6
11.45 - 12.25	0.95 - 1.75	10.5	DNB-1B-11.85
11.7 - 12.5	0.95 - 1.75	10.75	DNB-1B-12.1
11.7 - 12.75	0.95 - 2	10.75	DNB-1B-12.225
12.2 - 12.75	0.95 - 1.5	11.25	DNB-1B-12.475
Ka-Band			
18.3 - 18.8	0.95 - 1.45	17.35	DNB-1B-18.55
19.7 - 20.2	0.95 - 1.45	18.75	DNB-1B-19.95
20.2 - 21.2	0.95 - 1.95	19.25	DNB-1B-20.7
20.2 - 21.2	1 - 2	19.2	DNB-1B-20.7-1
28.3 - 28.8	0.95 - 1.45	27.35	DNB-1B-28.55
29.25 - 29.5	0.95 - 1.2	28.3	DNB-1B-29.375
29.25 - 30	0.95 - 1.7	28.3	DNB-1B-29.625

* Model includes frequency inversion.

Features

- Supports expandable NSU 1:N switchable series (D-323)
- Three monitor and control ports:
 1. RS485/RS422 remote interface (J6A) changes to RS232 with Option 17C
 2. RS485/RS422 control interface (J7) is provided for use with NSU redundancy system (D-323) or as an alternate remote interface
 3. 10/100Base-T Ethernet interface (J6B)
- Automatic 5/10 MHz and internal/external reference selection
- RF, IF and LO signal monitor ports
- 30 dB gain control
- Low phase noise
- Low intermodulation distortion
- 64 memory locations
- High frequency stability
- Summary alarm
- Mute function on alarm or external mute input control
- Date and time-stamped event log
- AC power supply with power factor correction
- CE Mark

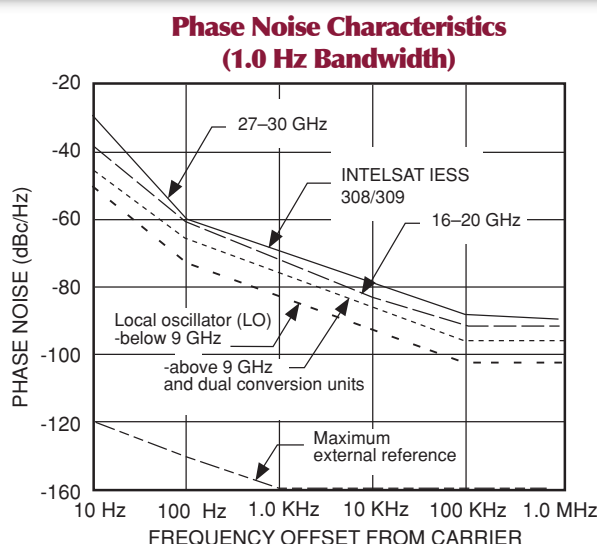
Options

- Higher frequency stability
- RS232
- Lower phase noise
- LO level alarm
- Amplitude slope control

Specifications	Upconverter	Downconverter
Input characteristics		
Return loss (50 ohms)	18 dB minimum	20 dB minimum, 18 dB above 22 GHz
LO leakage	N/A	-80 dBm maximum
Signal monitor	-20 dBc nominal	
Output characteristics		
Return loss	20 dB minimum, 18 dB above 22 GHz	18 dB minimum
Power output (P1dB)	+20 dBm minimum, +15 dBm above 22 GHz	+20 dBm minimum
Signal monitor	-20 dBc nominal	
Transfer characteristics		
Gain at min. atten.	33 dB, ± 3 dB at 23°C	38 dB, ± 3 dB at 23°C
Gain slope	0.03 dB/MHz any 10 MHz	
Gain control	30 dB in 0.2 dB steps	
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	80 dB minimum	
Noise figure at min. atten.	15 dB maximum	
Intermodulation distortion (third order)	With two inband signals at 0 dBm output, third order intermodulation products are less than 60 dBc minimum (50 dBc above 22 GHz)	With two inband signals at 0 dBm output, third order intermodulation products are less than 60 dBc minimum
Group delay	1 ns peak-to-peak maximum	
Spurious outputs (inband)		
Signal related	65 dBc minimum at 0 dBm output (including 2 x 1 spurs on 1 GHz IF BW units)	
Signal independent	-75 dBm maximum	
Harmonics	N/A	55 dBc up to 0 dBm output
Phase noise	See graph	
Noise spectral density	-87 dBm/4 kHz maximum	-82 dBm/4 kHz maximum
AM/PM conversion (at 0 dBm output)	0.1°/dB maximum	0.05°/dB maximum
Frequency stability	$\pm 2 \times 10^{-8}$, 0 to 50°C (higher stability options available), $\pm 5 \times 10^{-9}$ /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.	
Upconverter mute	80 dB minimum on summary alarm, external mute input control or remote command	
Remote interface	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 RS485/RS422	

Note: All specifications guaranteed at maximum gain unless otherwise noted.

Phase Noise Specifications



Options

1. High performance phase noise (dBc/Hz) (maximum/typical).

LO Frequency	Offset [Hz]					
	10	100	1K	10K	100K/300K	1M
Up to 6.7 GHz	54/56	78/82	108/114	116/121	119/127	136/145
6.7 ≤ LO ≤ 8 GHz	53/55	77/80	107/112	114/119	117/125	134/143
8 ≤ LO ≤ 12 GHz	48/50	73/77	103/110	112/117	115/123	132/141
12 ≤ LO ≤ 13.4 GHz	48/50	72/76	102/108	110/115	113/121	130/139
13.4 ≤ LO ≤ 16 GHz	47/49	70/74	100/106	108/113	111/119	128/137
16 ≤ LO ≤ 24 GHz	42/44	67/71	97/104	106/111	109/117	126/135
24 ≤ LO ≤ 29.05 GHz	41/43	64/68	94/100	102/107	107/116	124/133

8. LO level detect.

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

10. Higher frequency stability reference.

B. $\pm 5 \times 10^{-9}$, 0 to 50°C, 1×10^{-9} /day typical (fixed temperature after 24 hour on time).

C. $\pm 2 \times 10^{-9}$, 0 to 50°C, 1×10^{-9} /day typical (fixed temperature after 24 hour on time).

E. $\pm 5 \times 10^{-9}$, 0 to 50°C, 1×10^{-9} /day typical (fixed temperature after 24 hour on time). See Note 1 below.

F. $\pm 2 \times 10^{-9}$, 0 to 50°C, 1×10^{-9} /day typical (fixed temperature after 24 hour on time). See Note 1 below.

NOTE 1: Analog reference Phase Lock: External 5 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.

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: $\pm 5 \times 10^{-8}$, 0 to 50°C, 1×10^{-9} /day typical (fixed temperature after 72 hour on time). 5×10^{-8} /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: $\pm 2 \times 10^{-9}$, 0 to 50°C, 1×10^{-9} /day typical (fixed temperature after 72 hour on time). 5×10^{-8} /year typical

17. Remote control.

C. RS232

For literature describing local control (front panel) and remote control (bus protocols), refer to MITEQ's Technical Note 25T055.

High Performance Rack-Mounted Block Converters

Options

- 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 controlFront 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.

Notes: Missing option numbers are not applicable for this product.

General Specifications

Primary Power Requirements

Voltage	100-240 VAC (-10%, +6%)
Frequency	47-63 Hz
Power consumption.....	30 W typical
Power factor	0.85 minimum, 0.95 typical

Physical

Weight	15 pounds (6.08 kg) nominal
Overall dimensions.....	19" [482.6mm] x 1.75" [44.45mm] x 20" [508mm] (excluding connectors)

Connectors

RF	SMA female
L-band	N female
RF monitor.....	SMA female
L-band monitor	SMA female
External reference input	BNC female
Summary alarm	DE-9P
Test points	SMA female for LO frequency
Remote interface	DEM-9S for RS485, RS422 and RS232, RJ-45 female for Ethernet
Primary power input	IEC-320

Environmental

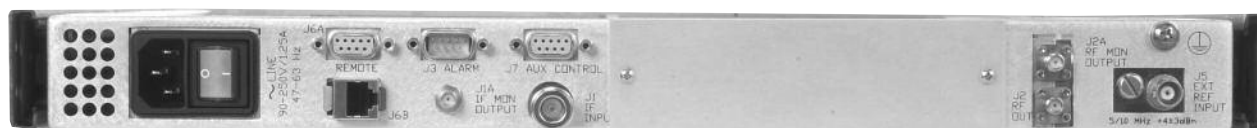
Operating

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 40°C
Atmospheric pressure	Up to 40,000 feet
Shock and vibration	Normal handling by commercial carriers

Typical Rear Panel View



RSM Switch Module Location
(see D-323 for more information)



100 Davids Drive, Hauppauge, NY 11788
TEL.: +1-631-436-7400 • FAX: +1-631-436-7430
www.miteq.com