

Ka-BAND RACK MOUNTED BLOCK CONVERTERS WITH HIGH PERFORMANCE OPTIONS



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

STANDARD FEATURES

- Amplitude slope adjust
- RS422, RS485 and 10/100 Base-T Ethernet
- Serial output for Redundancy Switchover units
- RF and L-band monitor ports
- Automatic 5/10 MHz internal/external reference selection
- Electronic adjust of internal reference frequency
- Low phase noise
- Low intermodulation distortion
- 45 dB of independent RF and L-band level control
- Mute function on alarm or external mute input command
- Elapsed time and event log after power turn on
- CE Mark

BLOCK UPCONVERTERS

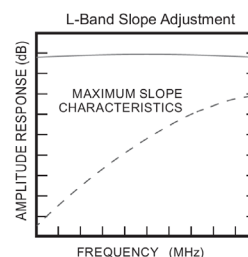
Output (GHz)	Input (GHz)	LO (GHz)	Model Number
27.5-28.5	0.95-1.95	26.55	UBR-1.45-28
28.75-29.75	0.95-1.95	27.8	UBR-1.45-29.25
29-30	0.95-1.95	28.05	UBR-1.45-29.5
29.75-30.75	0.95-1.95	28.8	UBR-1.45-30.25
30-31	0.95-1.95	29.05	UBR-1.45-30.5
30-31	1-2	29	UBR-1.5-30.5

REVERSE BAND BLOCK UPCONVERTERS

Output (GHz)	Input (GHz)	LO (GHz)	Model Number
19.2-19.7	0.95-1.45	18.25	UBR-1.2-19.45
20.2-21.2	0.95-1.95	19.25	UBR-1.45-20.7

OPTIONS

- High performance package
 - Lower gain
 - Reference clean-up loop and improved stability
 - Lower phase noise
- (included in high performance package)



BLOCK DOWNCONVERTERS

Input (GHz)	Output (GHz)	LO (GHz)	Model Number
17.7-18.7	0.95-1.95	16.75	DBR-18.2-1.45
18.3-19.3	0.95-1.95	17.35	DBR-18.8-1.45
19-20	0.95-1.95	18.05	DBR-19.5-1.45
19.7-20.2	0.95-1.45	18.75	DBR-19.95-1.2
20.2-21.2	0.95-1.95	19.25	DBR-20.7-1.45
20.2-21.2	1-2	19.2	DBR-20.7-1.5

REVERSE BAND BLOCK DOWNCONVERTERS

Input (GHz)	Output (GHz)	LO (GHz)	Model Number
30-31	0.95-1.95	29.05	DBR-30.5-1.45
30-31	1-2	29	DBR-30.5-1.5



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SPECIFICATIONS

INPUT CHARACTERISTICS

Return Loss (50 Ohms)	18 dB minimum	18 dB minimum
Signal Monitor	-20 dBc nominal	
LO Leakage	N/A	-80 dB maximum
Input Level (Non-damage)	+10 dBm	

OUTPUT CHARACTERISTICS

Return Loss (50 ohms)	18 dB minimum	18 dB minimum
Signal Monitor	-20 dBc nominal	
Power Output (1 dB Compression)	+13 dBm minimum	+18 dBm minimum

TRANSFER CHARACTERISTICS

Gain	33 dB, ± 3 dB at center frequency	36 dB, ± 3 dB at center frequency
L-band Level Control	30 dB in 0.2 dB steps	
RF-band Level Control	15 dB in 0.2 dB steps	
Level Stability	± 0.25 dB over any 20°C, 31.5 dB over -40° to 60°C	
Amplitude Response	± 0.25 dB/40 MHz maximum, ± 1 dB maximum over RF frequency band	
Slope Adjust	0 to 6 dB minimum	
Noise Figure at Minimum Attenuation	15 dB maximum	15 dB maximum at maximum gain
	18 dB maximum >1 GHz IF bandwidth	
Image Rejection	70 dB minimum	
Third Order Intermodulation Distortion	50 dBc minimum	60 dBc minimum
With two inband signals each at	(+25 dBm IP3)	(+30 dBm IP3)
0 dBm, measured at the output		
Spurious Outputs (Inband)		
Signal Related	65 dBc minimum	
Signal Independent	-75 dBm maximum	
Signal Harmonic Related	65 dBc minimum (including	55 dBc minimum
up to -10 dBm output	2 x 1 spurious on IF bandwidths >1 GHz	(Including 2nd harmonic)

Maximum Phase Noise (dBc/Hz) –
With Maximum Reference Phase Noise:

10 Hz: -120 dBc/Hz
100 Hz: -145 dBc/Hz
1 kHz: -160 dBc/Hz

LO Frequency	Offset (Hz)					
	10	100	1K	10K	100K	1M
16 to 20 GHz	-55	-75	-85	-85	-97	-120
Up to 30 GHz	-55	-75	-80	-85	-95	-118

Frequency Stability	$\pm 2 \times 10^{-8}$, 0° to 50° (reference 25°C)
Frequency Aging	5×10^{-9} /Day after 24 hours 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.
Converter Mute	60 dB minimum on summary alarm or mute command.



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REMOTE CONTROLS

Serial Interface	RS485/RS422
Ethernet Interface	10/100 Base-T Ethernet - HTTP-based web server - SNMP1.0 - Alarm reporting via SNMP - Telnet Access - Password protection

INDICATOR and ALARMS

Status Indicator	Red LED: Alarm, Yellow LED: External Reference
Power ON Indicator	Green LED
Summary Alarm	Contact closure/open for DC voltage and local oscillator

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

OPTIONS (1/2)

-1. High Performance Package -

Power Output (1 dB Compression)	+15 dBm minimum
Gain Slope	0.03 dB/MHz maximum
Level Stability	±0.25 dB/day maximum at constant temperature, ±1.0 dB maximum/-40 to 60°C
Group Delay	1 ns peak-to-peak maximum
Spurious Outputs (Inband)	
Signal Related	65 dBc minimum at 0 dBm output
Signal Independent	-80 dBm maximum
Local Oscillator Leakage	-65 dBm maximum (upconverters only)
Image Rejection	80 dB minimum
Intermodulation Distortion (Third Order)	With two inband signals at 0 dBm output each, third order intermodulation products are less than 60 dBc minimum.

High Performance Phase Noise (dBc/Hz)

LO Frequency	Offset (Hz)					
	10	100	1K	10K	100K	1M
< 20 GHz	-47	-70	-98	-103	-106	-127
< 30 GHz	-40	-65	-90	-100	-102	-124

AM/PM Conversion (at 0 dBm Output)	0.1°/dB maximum
Upconverter Mute	80 dB minimum on summary alarm, external mute input control or remote command
-2. Lower Gain	20 ±3 dB at 23°C, 18 dB noise figure (20 dB noise figure for upconverters with 1 GHz bandwidth) (2 x 1 signal related, 65 dBc at -10 dBm output)



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OPTIONS (2/2)

-3. Lower Gain

10 $\pm$ 3 dB at 23°C, 20 dB noise figure
(22 dB noise figure for upconverters with 1 GHz bandwidth)
(2 x 1 signal related, 65 dBc at -10 dBm output)

-4. Reference Clean-up Loop and Improved Frequency Stability

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

Internal oscillator phase noise :

10 Hz at -130 dBc/Hz; 100 Hz at -155 dBc/Hz and 1 KHz at -165 dBc/Hz

Frequency Stability: $\pm 2 \times 10^{-9}$, 0 to 50°C

Frequency Aging: 1×10^{-9} per day after 24 hours operation preceded by 10 days operation.

-5. Waveguide connector

WR-28 O-Ring located on rear panel. Upconverters only.

PRIMARY POWER REQUIREMENTS

Voltage
Frequency
Power Consumption
Fuses

90-250 VAC
47-63 Hz
40W typical
T1.25A

PHYSICAL

Weight

9 pounds (4.08 kg) nominal without rack slides
13 pounds (5.9 kg) nominal with rack slides
19" x 1.75" panel height x 20" maximum

Chassis Dimensions

Connectors

RF
L-band
RF Monitor
L-band Monitor
External Reference
Summary Alarm
Remote Interface

2.92 mm female
SMA female
SMA female compatible
SMA female
BNC female
DE-9S
DE-9S for RS485, RS422
RJ-45 female for Ethernet
IEC-320
DE-9P

Primary Power
Redundancy Interface





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ENVIRONMENTAL

Operating

Ambient Temperature

0 to 50°C

Relative Humidity

Up to 95% at 30°C

Altitude

Up to 10,000 feet

Non-operating

Ambient Temperature

-50 to +70°C

Relative Humidity

Up to 95% at 45°C

Altitude

Up to 40,000 feet

Shock and Vibration

Normal handling by commercial carriers



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