



WIDE RF BAND MULTIPLE IF RACK MOUNTED BLOCK CONVERTERS WITH HIGH PERFORMANCE OPTIONS



This series of Rack Mount Block converters provides one RF composite band covering 2 satellite transponder frequencies and has 2 separate & independent L-band IF connections.

Ka-band, Ku-band and C-band models are available covering the entire SatCom bands. A companion series of Outdoor Converters is also available, as are reverse band models.

A strong set of monitor and control functions provides powerful remote control capability via either RS422/485 or 10/100BaseT Ethernet. A contact closure summary alarm is provided for fault monitoring.

The standard phase noise is superior to IESS-308/309 and options are available for lower phase noise surpassing the phase noise requirements of MIL-STD-188-164B.

STANDARD FEATURES

- Single wideband RF output with 2 independent IF ports
- 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
- Better than IESS-308/309 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

OPTIONS

- High performance package
- Lower gain
- Reference clean-up loop and improved stability
- Lower phase noise

BLOCK UPCONVERTERS

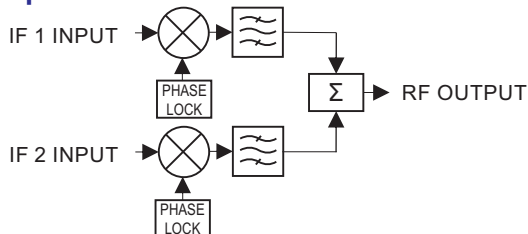
Output (GHz)	Input (GHz)	LO (GHz)	Model Number
12.75-13.25	0.95-1.45	11.8	UBR2B-13.625
13.75-14.5	0.95-1.7	12.8	
12.75-13.75	0.95-1.95	11.8	UBR2B-13.6
13.75-14.5	0.95-1.7	12.8	
28.0-29.0	0.95-1.95	27.05	UBR2B-29
29.0-30.0	0.95-1.95	28.05	

BLOCK DOWNCONVERTERS

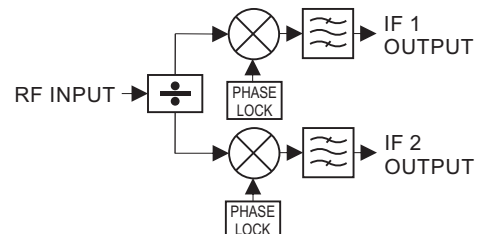
Input (GHz)	Output (GHz)	LO (GHz)	Model Number
10.7-11.6	0.95-1.85	9.75	DBR2-11.6
11.6-12.5	0.95-1.85	10.65	
10.7-11.7	0.95-1.95	9.75	DBR2-11.725
11.7-12.75	0.95-2	10.75	

BLOCK DIAGRAM

Dual IF Upconverters -



Dual IF Downconverters -



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

OUTPUT CHARACTERISTICS -

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

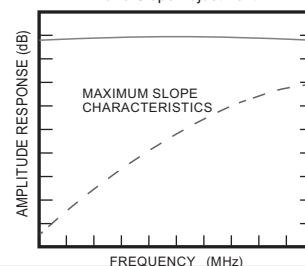
TRANSFER CHARACTERISTICS -

Gain	30 dB, ± 3 dB at center frequency		33 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, ± 1.5 dB over -40° to 60°C						
Amplitude Response	± 0.25 dB/40 MHz maximum, ± 1 dB maximum over RF frequencyband						
Slope Adjust	0 to 6 dB minimum						
Noise Figure at Minimum Attenuation Single band	15 dB maximum at maximum gain, 18 dB max ≥ 1 GHz IF bandwidth		15 dB maximum at maximum gain,				
Image Rejection	70 dB minimum						
Third Order Intermodulation Distortion With two inband signals each at 0 dBm, measured at the output	50 dBc minimum (+25 dBm IP3)		60 dBc minimum (+30 dBm IP3)				
Spurious Outputs (Inband) –							
Signal Related up to 0 dBm output	65 dBc minimum						
Signal Independent	-75 dBm maximum						
Signal Harmonic Related up to -10 dBm output	55 dBc minimum (including 2nd harmonic)						
Maximum Phase Noise (dBc/Hz) –	Offset (Hz)						
With Maximum Reference Phase	LO Frequency	10	100	1K	10K	100K	1M
10 Hz: -120 dBc/Hz	6.7 to 12 GHz	-65	-73	-85	-95	-104	-119
100 Hz: -145 dBc/Hz	16 to 20 GHz	-60	-70	-85	-85	-92	-112
1 KHz: -160 dBc/Hz	Up to 30 GHz	-47	-65	-78	-85	-87	-110
Frequency Stability	$\pm 2 \times 10^{-8}$, 0° to +50°C (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.						

REMOTE CONTROLS

Serial Interface	RS485/RS422
Ethernet Interface	10/100Base-T Ethernet <ul style="list-style-type: none"> • HTTP-based web server • Telnet access • Password protection

L-Band Slope Adjustment



INDICATORS and ALARMS

Remote Mode	Green LED (front panel)
Alarm	Red LED (front panel)
Summary Alarm	Contact closure/open for DC voltage and local oscillator

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

OPTIONS

41-1. High Performance Package -

Power Output (1 dB Compression)	+20 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
Spurious Outputs (Inband)	
Signal Related	-65 dBc minimum at 0 dBm output
Signal Independent	-80 dBm maximum
Local Oscillator Leakage.....	-70 dBm maximum (upconverters only)
Image Rejection	80 dB minimum
Group delay.....	1 ns maximum peak to peak/RF band segment

High Performance Phase Noise (dBc/Hz, maximum)

LO Frequency	Offset(Hz)					
	10	100	1K	10K	100K	1M
≤ 12 GHz	-60	-78	-105	-112	-117	-136
≤ 20 GHz	-42	-67	-98	-106	-109	-126
≤ 30 GHz	-41	-64	-94	-102	-107	-124

Mute	80 dB minimum on summary alarm or mute command
Intermodulation Distortion (Third Order)	With two inband signals at 0 dBm output, third order intermodulation products are less than 60 dBc minimum.
AM/PM Conversion (at 0 dBm Output).....	0.1°/dB maximum

41-1A High Performance Phase Noise only. Standard IF/RF performance.

Note: Consult factory for lower phase noise options.

41-2. 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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41-3. Lower Gain.....	10 ±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)
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41-4. 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 Frequency Stability: ±2 x 10 ⁻⁹ , 0 to 50°C Frequency Aging: 1 x 10 ⁻⁹ per day after 24 hours operation preceded by 10 days operation
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PRIMARY POWER REQUIREMENTS

Voltage.....	90-250 VAC
Frequency.....	47-63 Hz
Consumption.....	40W typical
Fuse.....	T1.25A

PHYSICAL

Weight.....	9 pounds (4.08 kg) nominal without rack slides
	13 pounds (5.9 kg) nominal with rack slides
Chassis Dimensions.....	19" x 1.75" panel height x 20" maximum
Connectors-	
RF	SMA female
L-band	SMA female
RF Monitor	SMA female
L-band Monitor	SMA female
External Reference	BNC female
Summary Alarm.....	DE-9S
Remote Interface	DE-9S for RS485, RS422
	RJ-45 female for Ethernet
Primary Power	IEC-320
Redundancy Interface	DE-9P

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