



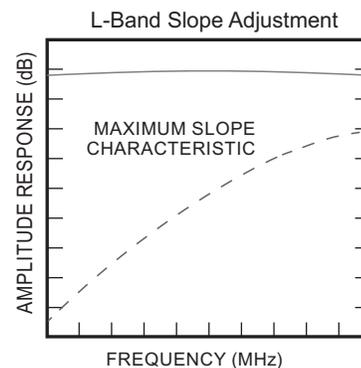
This equipment is designed for applications where frequency translation is needed between L-band and the transponder frequencies.

## STANDARD FEATURES

- Amplitude slope adjust
- RS422, RS485 and 10/100Base-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

## OPTIONS

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



## BLOCK UPCONVERTERS

Input (GHz)	Output (GHz)	LO (GHz)	Model Number
0.95 – 1.525	5.85 – 6.425	7.375	UBR-6.1-INV
0.95 – 1.75	5.85 – 6.65	4.9	UBR-6.25
0.95 – 1.825	5.85 – 6.725	4.9	UBR-6.28
0.95 – 1.35	6.7 – 7.1	5.75	UBR-6.9
0.95 – 1.45	7.9 – 8.4	6.95	UBR-8.15
0.95 – 2.05	11.7 – 12.75	10.75	UBR-12.25
0.95 – 1.45	12.75 – 13.25	11.8	UBR-13
0.95 – 1.7	13.75 – 14.5	12.8	UBR-14.125
0.95 – 1.45	14 – 14.5	13.05	UBR-14.25
0.95 – 1.75	17.3 – 18.1	16.35	UBR-17.7
0.95 – 2.05	17.3 – 18.4	16.35	UBR-17.85
0.95 – 1.25	18.1 – 18.4	17.15	UBR-18.25

**NOTE:** The DBE-7.5 Block Downconverter incorporates an inter-stage filter to attenuate the transmit frequency. Published performance will be maintained with the presence of a 7.9 GHz signal at a level of -5 dBm.

## BLOCK DOWNCONVERTERS

Input (GHz)	Output (GHz)	LO (GHz)	Model Number
3.4 – 4.2	0.95 – 1.75	5.15	DBR-3.8-INV
3.4 – 4.2	0.95 – 1.75	9/6.55	DBR-3.8
3.7 – 4.2	0.95 – 1.45	9/6.25	DBR-3.95
4.2 – 4.8	1.15 – 1.75	9/5.7	DBR-4.5
4.5 – 4.8	0.95 – 1.7	3.55	DBR-4.65
7.25 – 7.75	0.95 – 1.45	6.3	DBR-7.5 <sup>*(Note1)</sup>
10.7 – 11.7	0.95 – 1.95	9.75	DBR-11.2
10.95 – 11.7	0.95 – 1.7	10	DBR-11.35
11.2 – 12	0.95 – 1.75	10.25	DBR-11.6
11.4 – 12.2	0.95 – 1.75	10.45	DBR-11.8
11.45 – 12.25	0.95 – 1.75	10.5	DBR-11.85
11.7 – 12.5	0.95 – 1.75	10.75	DBR-12.1
11.7 – 12.75	0.95 – 2	10.75	DBR-12.225
12.2 – 12.75	0.95 – 1.5	11.25	DBR-12.475
12.2 – 13.25	0.95 – 2	11.25	DBR-12.725
12.75 – 13.75	0.95 – 1.95	11.8	DBR-13

## SPECIFICATIONS

INPUT CHARACTERISTICS-	UPCONVERTER	DOWNCONVERTER
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	30 dB, $\pm 3$ dB at center frequency	35 dB, $\pm 3$ dB at center frequency
RF-band Level Control	15 dB in 0.2 dB steps	
L-band Level Control	30 dB in 0.2 dB steps	
Level Stability	$\pm 0.25$ dB maximum constant temperature	
Amplitude Response	$\pm 0.25$ dB/40 MHz maximum, $\pm 1$ dB maximum over RF frequencyband	
Slope Adjust	0 to 6 dB	
Noise Figure at Minimum Attenuation	15 dB maximum 18 dB maximum $\geq 1$ 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 0 dBm output	65 dBc minimum (including 2 x 1 spurious on IF bandwidths $\geq 1$ GHz)	60 dBc minimum (Including 2nd harmonic)
Maximum Phase Noise (dBc/Hz) –	LO Frequency	Offset (Hz)
With Maximum Reference Phase Noise:		10    100    1K    10K    100K    1M
10 Hz: -120 dBc/Hz	$\leq 6.7$ GHz	-52    -80    -90    -100    -110    -125
100 Hz: -145 dBc/Hz	< 12 GHz	-46    -73    -84    -94    -104    -119
1 kHz: -160 dBc/Hz	< 17.15 GHz (dual conv)	-45    -68    -80    -90    -100    -115
Frequency Stability	$\pm 2 \times 10^{-8}$ , 0° to 50°C	
Frequency Aging	$5 \times 10^{-9}$ /Day after 24 hours on time	
Automatic Reference Configuration	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.	

## REMOTE CONTROLS

Serial Interface	RS485/RS422
Ethernet Interface	10/100Base-T Ethernet
	<ul style="list-style-type: none"> <li>• HTTP-based web</li> <li>• SNMP 1.0</li> <li>• Alarm reporting via SNMP</li> <li>• Telnet access</li> <li>• Password protection</li> </ul>

## 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

### 2-1. 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/0 to 50°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, third order intermodulation products are less than 60 dBc minimum.
High Performance Phase Noise (dBc/Hz) (Maximum) -	

LO Frequency	Offset (Hz)					
	10	100	1K	10K	100K	1M
≤ 6.7 GHz	-54	-78	-108	-116	-119	-136
≤ 12 GHz	-48	-73	-103	-112	-115	-132
≤ 17.15 GHz	-47	-70	-100	-108	-111	-128

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

### 2-1A. High Dynamic Range -

Power output (1 dB compression).....	20 dBm minimum
Group delay.....	1ns peak-to-peak maximum

2-2. 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)

2-3. 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)

2-4. 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:  $\pm 2 \times 10^{-9}$ , 0 to 50°C  
Frequency Aging:  $1 \times 10^{-9}$  per day after 24 hours operation preceded by 10 days operation

2-5. RF Output Detector (upconverters only) Composite output RF detector, -5 dBm to rated P1dB in 0.5 dB steps, ±1 dB typical accuracy. High and low alarm window values in 0.5 dB increments. Local and remote measured status and control in 1 second intervals.

## PRIMARY POWER REQUIREMENTS

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

## PHYSICAL

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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-9P
Remote Interface .....	DE-9S for RS485, RS422
	RJ-45 female for Ethernet
Primary Power .....	IEC-320
Redundancy Interface .....	DE-9P

## ENVIRONMENTAL

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### 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