



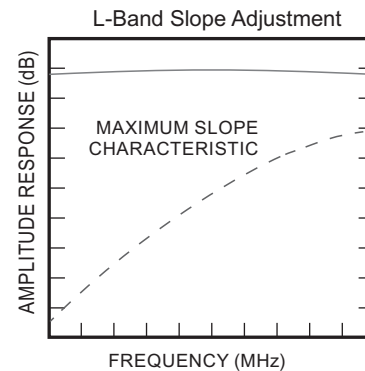
This equipment is designed for applications where frequency translation is needed between L-band and the transponder frequencies.

## 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
- 64 programmable memory locations
- 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                    |
| 4.5 – 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                  |

## 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<br>18 dB maximum $\geq 1$ GHz IF bandwidth  | 15 dB maximum at maximum gain              |
| Image Rejection  | 70 dB minimum   |  |
| Third Order Intermodulation Distortion<br>With two inband signals each at<br>0 dBm, measured at the output | 50 dBc minimum<br>(+25 dBm IP3)   | 60 dBc minimum<br>(+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<br>to 0 dBm output  | 65 dBc minimum (including 2 x 1<br>spurious on IF bandwidths $\geq 1$ GHz)  | 60 dBc minimum<br>(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,<br>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 |