# L-BAND to L-BAND FREQUENCY CONVERTER RACK MOUNTED FOR SATELLITE COMMUNICATION


This L-band to L-band Frequency Converter is designed for applications where frequency translation is needed with a minimum of amplitude, group delay and spurious distortion. A dual conversion solution provides a flexible high performance solution.

## STANDARD FEATURES

- Dual conversion for low spurious.
- Factory set frequency translation
- RS422, RS485 and 10/100BaseT Ethernet
- Low phase noise, better than IESS-308/309
- Low intermodulation distortion
- Summary Alarm

## OPTIONS

- Reference clean-up loop and improved stability
- Higher dynamic range
- Lower gain

## MODEL NUMBER TABLE

| Input Frequency | Output Frequency | Model Number |
|---|---|---|
| 900 – 1700 MHz | 950 – 1750 MHz | TLR-1300/1350-800 |

## SPECIFICATIONS

### INPUT CHARACTERISTICS

| | |
|---|---|
| Frequency | See model number table |
| Impedance | 50 ohms |
| Return loss | 20 dB minimum |
| Input Signal monitor | -20 dBc nominal |
| Input level (non-damage) | +10 dBm maximum |
| LO Leakage | -80 dBm maximum |

### OUTPUT CHARACTERISTICS

| | |
|---|---|
| Frequency | See model number table |
| Impedance | 50 ohms |
| Return loss | 20 dB minimum |
| Output Signal monitor | -20 dBc nominal |
| Power output (P1dB) | +15 dBm typical at minimum attenuation,<br>+10 dBm, up to 20 dB attenuation. |

### TRANSFER CHARACTERISTICS

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Gain | 35 dB minimum, 41 dB maximum | | | | | | | |
| Noise figure | 15 dB maximum | | | | | | | |
| Level Control | 30 dB in 0.2 dB steps | | | | | | | |
| Image rejection | 80 dB | | | | | | | |
| Level stability | ±0.25 dB/day at constant temperature | | | | | | | |
| Amplitude response | ±0.25 dB/40 MHz, ±0.5 dB/72 MHz, ±2 dB over 800 MHz | | | | | | | |
| Group delay | 1 ns peak to peak maximum | | | | | | | |
| Intermodulation distortion (third order) | With two 0 dBm output signals, 40 dBc minimum up to 20 dB attenuation | | | | | | | |
| AM/PM conversion | 0.1°/dB maximum up to 0 dBm output | | | | | | | |
| Spurious outputs- | | | | | | | | |
| Signal related | -50 dBc in-band minimum | | | | | | | |
| Signal indepedent | -50 dBm in-band maximum | | | | | | | |
| Frequency stability | $\pm 2 \times 10^{-8}$, 0 to 50°C | | | | | | | |
| Frequency aging | $5 \times 10^{-9}$ 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. | | | | | | | |
| Phase noise Offset (Hz) | 10 | 100 | 1K | 10K | 100K | 300K | 1M | 10M |
| dBc/Hz | -50 | -70 | -83 | -93 | -93 | -93 | -112 | -135 |

## OPTIONS

| | |
|---|---|
| 72-1A. High Dynamic Range - | |
| Power Output (1 dB compression). . . . . | 20 dBm minimum |
| Group Delay. . . . . | 1 ns peak-to-peak maximum |
| 72-2. Lower Gain . . . . . | 20 ±3 dB at 23°C, 18 dB noise figure<br>(20 dB noise figure for converters with 1 GHz bandwidth)<br>(2x1 signal related, 65 dBc at -10 dBm output) |
| 72-3. Lower Gain . . . . . | 10 ±3 dB at 23°C, 20 dB noise figure<br>(22 dB noise figure for converters with 1 GHz bandwidth)<br>(2x1 signal related, 65 dBc at -10 dBm output) |
| 72-4. Reference Clean-up Loop and Improved Frequency Stability . . . . . | Reference oscillator acts as an analog phase lock with a 0.1 Hz nominal loop bandwidth.<br>Typical loop suppression of the external reference is as follows: 28 dB at 1 Hz offset, 65 dB at 10 Hz, and 100 dB at 100 Hz offset<br>Frequency Stability: ±2 x $10^{-9}$, 0 to 50°C<br>Frequency Aging: 1 x $10^{-9}$ per day after 24 hours operation preceded by 10 days operation. |
| 72-4A. Reference Clean-up Loop and Improved Frequency Stability . . . . . | Reference oscillator acts as an analog phase lock with a 40 Hz nominal loop bandwidth.<br>Typical loop suppression of the external reference is as follows: 100 dB at 100 Hz offset<br>Frequency Stability: ±2 x $10^{-9}$, 0 to 50°C<br>Frequency Aging: 1 x $10^{-9}$ per day after 24 hours operation preceded by 10 days operation |

## PRIMARY POWER REQUIREMENTS

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

## PHYSICAL

Weight ..... 10 pounds (4.5 kg) nominal with rack slides,
14 pounds (6.4 kg) nominal without rack slides
Chassis Dimensions ..... 19” x 1.75” panel height x 20” maximum
Connectors -
RF ..... SMA female
External Reference .....BNC female
Summary Alarm .....DE-9P
Remote Interface .....DE-9S for RS422, RS485
RJ-45 female for Ethernet
Primary Power .....IEC-320

## 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

GeoSync Microwave, Inc. • 320 Oser Avenue • Hauppauge, NY 11788
Phone: 631 760-5567 • Fax: 631 780-0214 www.geosyncmicrowave.com