



These Multi-band Test Translators are designed for applications where frequency translation is needed with a minimum of amplitude and group delay distortion. Models are available in multiple band combinations including C, X, Ku and Ka band. The Ka-band translation includes suppression of the 2nd harmonic of the local oscillator.

STANDARD FEATURES

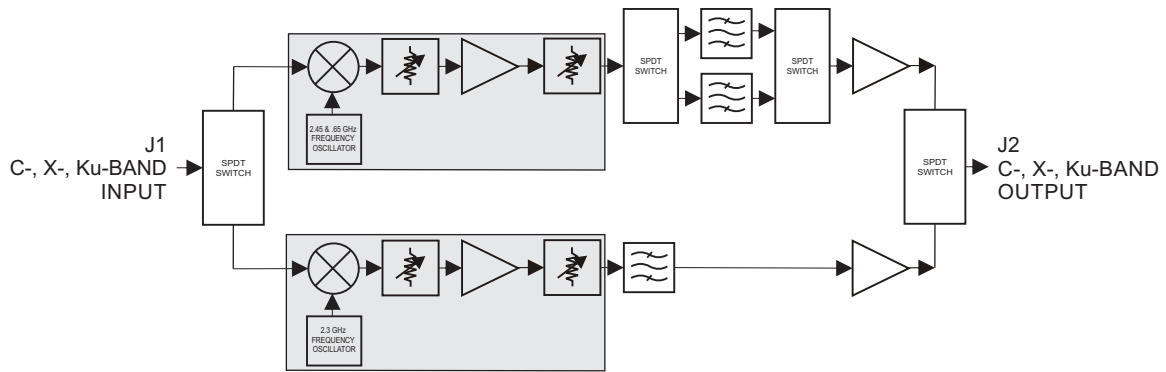
- RS422, RS485 and 10/100 Base-T Ethernet
- Phase noise IESS-308/309
- Low intermodulation distortion
- Low phase noise
- 50 dB level control
- Summary alarm
- CE mark

OPTIONS

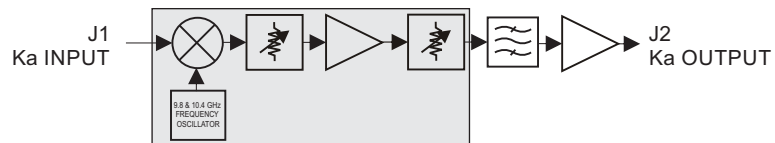
- Reference clean-up loop and improved frequency stability

RF TRANSMIT-BAND TO RF RECEIVE-BAND

BAND	RF INPUT (GHz)	LO Frequency	RF Output (GHz)	Model Number
1a 1b	27.5-31 28.6-30	9.8 10.4	17.7-21.2 18.2-19.6	TRR-2B-1
1a 1b	27.5-30 28.6-30	9.8 10.4	17.7-20.2 18.2-19.6	TRR-2B-2
1 2 3	5.85-6.65 7.9-8.4 13.75-14.5	2.45 0.65 2.3	3.4-4.2 7.25-7.75 11.45-12.2	TRR-3B-1
1 2 3a 3b 3c 3d	5.85-6.65 7.9-8.4 13.75-14.5 13.75-14.5 13.75-14.5 13.75-14.5	2.45 0.65 3.05 2.55 2.3 1.75	3.4-4.2 7.25-7.75 10.7-11.45 11.2-11.95 11.45-12.2 12.0-12.75	TRR-3B-2
1 2 3 4a 4b	5.85-6.65 7.9-8.4 13.75-14.5 27.5-31 28.6-30	2.45 0.65 2.3 9.8 10.4	3.4-4.2 7.25-7.75 11.45-12.2 17.7-21.2 18.2-19.6	TRR-4B-1



Typical C, X and Ku-band Chain



Typical Ka-band Chain

SPECIFICATIONS

INPUT CHARACTERISTICS

	RF TRANSMIT-BAND TO RF RECEIVE BAND
Frequency	Refer to model number table
Impedance	50 ohms
Return Loss	18 dB minimum
Input Level (Non-damage)	+10 dBm maximum

OUTPUT CHARACTERISTICS

Frequency	Refer to model number table
Impedance	50 ohms
Return Loss	18 dB minimum

TRANSFER CHARACTERISTICS

Level Control	50 dB/0.2 dB step					
Amplitude Response	± 0.5 dB/40 MHz, ± 2 dB/output frequency band					
Noise Figure at Minimum Attenuation	30 dB maximum					
Frequency Stability	$\pm 2 \times 10^{-8}$, 0 to 50°C					
Frequency Aging	5×10^{-9} /day after 24 hours on time					
Conversion Loss at Min Attenuation	0 dB nominal					
Conversion Loss Stability	± 0.25 dB/day at 23°C					
Intermodulation	-50 dBc minimum at -5 dBm input					
Signal related inband spurious	-25 dBc typical					
LO related spurious & harmonics	-30 dBm typical					
Non signal or LO related spurious	-60 dBc minimum					
Phase Noise (dBc/Hz) –	LO Frequency	Offset (Hz)				
Typical Phase Noise		100	1K	10K	100K	1M
	≤ 4.0 GHz	-75	-85	-87	-100	-127
	> 4.0 GHz	-70	-77	-87	-87	-117
	≥ 9.8 GHz	-64	-75	-85	-95	-100
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.					
Input/Output Isolation	60 dB minimum					
Translator Mute	60 dB minimum					

INDICATOR and ALARMS

LO Out-of-lock	Red LED (front panel)
Internal Reference	Yellow LED (front panel)
Power ON Indicator	Green LED (front panel)
Summary Alarm	Contact closure status for DC voltage and local oscillator

REMOTE CONTROLS

Serial Interface	RS485/RS422
Ethernet Interface	10/100Base-T Ethernet interface providing:
	• HTTP-based web server
	• Telnet access
	• Password protection

OPTIONS

40-1. 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 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
 without rack slides,
 14 pounds (6.4 kg) nominal
 with rack slides

Chassis Dimensions 19" x 1.75" panel height
 x 20" maximum

Connectors -

RFSMA female below 21.2 GHz
 2.92 mm f above 21.2 GHz

External ReferenceBNC female

Summary AlarmDE-9P

Remote InterfaceDE-9S for RS422, RS485
 RJ-45 female for Ethernet

Primary PowerIEC-320

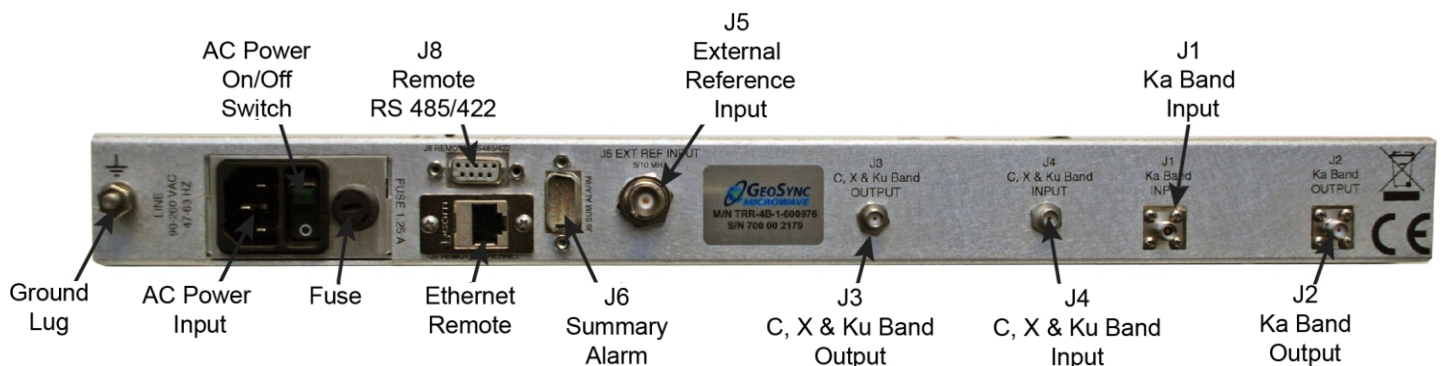
ENVIRONMENTAL

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



Typical rear panel view, TRR-4B-1