

Dual Channel, Shared Oscillator Downconverter for Monopulse Tracking Receivers

Satellite up- and downconverters are designed to meet the requirements of modern satellite transmission, like TV uplink and high speed data networks. Analogue transmission formats are supported as well as digital transmission formats. For many years these devices have been used worldwide in fixed satellite earth stations as well as in satellite news gathering (SNG) vehicles and Fly-Aways and other mobile or portable applications.

Operating and control

Converters can be operated via the push buttons on the front panel using self-explanatory display menus or via remote control (RS232, RS422/485, TCP/IP over Ethernet).

Detailed monitoring of the system status and a summary alarm output (dual change over switch contacts) are provided. For the remote control either ASCII string based commands as well as addressable, packet based commands are provided.

Housing options

Converters normally are delivered without fans and can be operated in environments where a minimum 1 RU space for natural ventilation is available above each unit. This eliminates the fan as a potential point of failure. For rack installations without any space in between the units a fan within the converter unit is recommended, which forces airflow from the right side to left side of the units.



Key features

- Shared oscillator to guarantee excellent phase tracking in between channels
- 70 MHz or 140 MHz IF bands available
- Low power consumption
- Extreme low phase noise (< -60 dBc/Hz @ 10 Hz)
- Long- term stability 10^{-7} / year
- Output power +10 dBm (1dB compression point)
- Automatic reference recognition (5 and 10 MHz)
- 0°C to 50°C
- Remote control through RS232, RS422/485 (2-wire or 4-wire) interfaces, TCP/IP over Ethernet
- Packet command syntax supports RS485 bus systems and allows addressed operation.
- IF test outputs on the front panel
- Summary alarm output (dual change over switch contacts)
- Internal Fan
- CE compliant

Dual Channel, Shared Oscillator Downconverter for Monopulse Tracking Receivers (cont.)

Specifications			
Downconverter Type	SCD-SST	SCD-KuKuT	
RF-Input Frequency	S-Band 2.2...2.3 GHz	Ku-Band 10.70...12.75 GHz	Other frequency bands on request
Intermediate Frequency	2450 MHz for 70 MHz IF Output 2440 MHz for 140 MHz IF Output	2150 MHz for 70 MHz IF Output 2140 MHz for 140 MHz IF Output	
Phase Noise			
10Hz	- 60	-50	
100 Hz	- 80	-70	
1 kHz	- 90	-80	
10 kHz	- 98	-90	
100 kHz	- 103 ¹	- 95 ¹	
1 MHz	- 112 ¹	- 105 ¹	
max. values in dBc/ Hz ¹) 0°C to 50°C, outside this temperature range degraded by max 5 dB.			
Test Output (Fixed Oscillator)	2520 MHz (70 MHz IF) 2580 MHz (140 MHz IF) -6 ± 3 dBm, Connector SMA female	2220 MHz (70 MHz IF) 2280 MHz (140 MHz IF) -6 ± 3 dBm, Connector SMA female	
Test Output (Microwave Oscillator)	4.65...4.75 GHz (70 MHz IF) 4.64...4.74 GHz (140 MHz IF) -7 ± 3 dBm SMA female	12.85...14.90 GHz (70 MHz IF) 12.84...14.89 GHz (140 MHz IF) -7 ± 3 dBm SMA female	
Conversion Scheme	Dual down-conversion, no frequency inversion Two channels with shared oscillators: Same conversion frequency for both channels Gain setting individual for each channel		
Phase Tracking between channels	<10 deg rms after 1 hour warmup, environmental temperature constant within 5 °C, constant gain setting, constant frequency setting, signal frequency constant within 10 kHz. Initial phase difference to be compensated externally.		
Frequency Resolution	10 Hz		
RF-Input Characteristics	Impedance: Return Loss: Max. input level: LO Leakage: RF-Connector:	50 Ω >20 dB < approx. -25 dBm (operational) < approx. +10 dBm (damage level) -80 dBm max. SMA female	
IF-Output Characteristics	Frequency: Impedance: Return Loss: 1 dB Compression Point: Output Muting: IF-Signal Monitor: IF-Connectors:	70 ± 20 MHz or 140 ± 40 MHz 50 or 75 Ω 26 dB min >10 dBm, 13 dBm typical >60 dB (by command or sense input or by alarm condition) -20 dB of IF-output on front panel BNC female	
Transfer Characteristics	Max. Conversion Gain: Attenuation Range: Gain Accuracy: Level Stability: Amplitude Response: Image Rejection: Noise Figure:	45 dB 0...30 dB, Step 0.1 dB (Conversion Gain 45...15 dB) ± 2 dB ± 0.25 dB/day (constant temperature) ± 0.25 dB / ±20 MHz, ±0.2 dB / ± 18 MHz >80 dB <12 dB, 10 dB typical	

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Specifications (cont.)

Downconverter Type	SCD-SST	SCD-KuKuT	
Group Delay (± 18 MHz)	Linear: Parabolic: Ripple:	0.03 ns / MHz max. 0.01 ns / MHz ² max. 1 ns peak to peak max.	
Group Delay (± 36 MHz)	Linear: Parabolic: Ripple:	0.015 ns / MHz max. 0.005 ns / MHz ² max. 2 ns peak to peak max.	
Intermodulation (3rd Order)	-60 dBc max (Δf_{in} : 5 MHz, P_{in} : 2 x -40 dBm, P_{out} : 2 x -10 dBm)		
AM / PM conversion	0.1° / dB (P_{out} = 0 dBm)		
Spurious Outputs	Signal related: Signal independent:	< - 60 dBc (Δf < 1 MHz), < -70 dBc Δf ³¹ MHz) < - 76 dBm (< - 80 dBm typical)	
Frequency Stability	$\pm 1 \times 10^{-7}$, 0°C to 50°C $\pm 2 \times 10^{-8}$, 0°C to 50°C (after 30 min warm up) $\pm 2 \times 10^{-9}$ per day (fixed temperature after 24 h warm up)		
Reference Input	Frequency: Level: Modes: Connector:	10 MHz or 5 MHz -3...10 dBm internal, external, auto (senses reference input) BNC female	
Reference Output	Frequency: Level: Connector:	10 MHz 0 \pm 3 dBm BNC female	
Monitoring and Control Interface	TCP/IP over Ethernet (10 or 100 Mbit/s, auto sensing) RS232 or RS422/RS485 (Connectors DSUB09 female) (configurable by software)		
Alarm Interface	Two potential free contacts (DPDT, Connector DSUB09 female)		
MTBF	50000 hours (typical)		
Internal Fan	Yes		
Temperature Range	0°C to 50°C operating - 30°C to 80°C storage		
Relative Humidity	< 95 % non condensing		
< 95 % non condensing	LCD-Display 2 x 40 characters, 4 cursor keys, 2 function keys Option: VFD-Display 2 x 40 characters, 4 cursor keys, 2 function keys		
Power Supply	85...264 V AC, 40...70 Hz		
Power Consumption:	Max: 37 VA / 24 W Typ: 33 VA / 21 W		
Mains Fuse	2 x 3.15 A time-lag fuse		
Dimension and Weights	483 x 44 x 500 mm ³ , 1 RU (19") approx 9 kg		