Compact Satellite Up- and Downconverter

Indoor

Single / Dual Channel
L-Band

WORK Microwave's integrated, compact frequency converter is a new cost-effective option for satellite operators, integrators, and teleports made possible by the latest advancements in RF chipsets.

Enhancements

Compact Design: Designed specifically for operators using classic IF frequency bands, the compact version enables operators to support multiple simultaneous channels in one unit, saving significant rack space and costs.

Input and Output Adjustable Attenuator: With two software adjustable attenuators the operator can now optimize the system performance regarding noise figure and intermodulation.

RF-RMS Detector: Through a new RMS Detector the user can perform a real time monitoring of RF-power, giving the opportunity to initialize a switch over to spare units in case of RF power loss or simply to monitor the system.

Scalability

Together with WORK Microwave's new compact N:1 Redundancy Switch (RSCC-N) very compact and flexibly redundancy solutions up to 8:1 can be designed, giving the user the possibility to start with a small group of converters and expand it later to 8 operational units and one spare unit.

Operating and control – easy integration into your system

The converters can be operated via the push buttons on the front panel using intuitive display menus or via remote control (RS232, RS422/485 and 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.

Remote monitoring and control through SNMP and a Web browser interface is also available.

Key features

- 70 MHz or 140 MHz IF bands available
- Optional switchable IF 70 MHz and 140 MHz (IF 70/140)
- Variable attenuator on input and output
- Digital gain compensation
- RF RMS detector (UPC)
- Very low phase noise (< -67 dBc/Hz @ 10 Hz)
- Long-term stability 10^{-7} / year
- Automatic reference recognition (5 and 10 MHz)
- Adjustable gain equalizer
- Remote control through RS232, RS422/485 (2-wire or 4-wire) interfaces. Packet command syntax supports RS485 bus systems and allows addressed operation.
- Remote control through Ethernet supporting a TCP/IP command interface, a Web browser interface and SNMP (MIBs are provided).
- Test output on the front panel: RF-Test at upconverter, IF-Test at downconverter.
- AC power switch on the front panel
- Summary alarm output (dual change over switch contacts)
- Transmit mute input
- Optional internal Fan (Option: FAN)
- CE compliant
- **3 years warranty**

Compact Satellite Up- and Downconverter
L-Band

Upconverter Type:		VSCU-L
RF-Output Frequency:		L-Band 0.95 … 2.15 GHz
Intermediate Frequency:		5170 MHz for 70 MHz IF Input 5100 MHz for 140 MHz IF Input
Phase Noise:	10 Hz	-67 / -64
	100 Hz	-80 / -77
	1 kHz	-90 / -87
	10 kHz	-95 / -92
	100 kHz	-100 /-97
	1 MHz	-125 / -122
		typ. / max. values in dBc/Hz
Fixed Oscillator with Test Output:		5240 MHz (70 MHz IF) 5240 MHz (140 MHz IF) -6 ±3 dBm SMA female
Microwave Oscillator with Test Output		6.12 … 7.32 GHz (70 MHz IF) 6.05 … 7.25 GHz (140 MHz IF) -7 ±3 dBm SMA female

Downconverter Type:		VSCD-L
RF-Input Frequency:		L-Band 0.95 … 2.15 GHz
Intermediate Frequency:		5170 MHz for 70 MHz IF Output 5100 MHz for 140 MHz IF Output
Phase Noise:	10 Hz	-67 / -64
	100 Hz	-80 / -77
	1 kHz	-90 / -87
	10 kHz	-95 / -92
	100 kHz	-100 /-97
	1 MHz	-125 / -122
		typ. / max. values in dBc/Hz
Fixed Oscillator with Test Output:		5240 MHz (70 MHz IF) 5240 MHz (140 MHz IF) -6 ±3 dBm, Connector SMA female
Microwave Oscillator with Test Output		6.12 … 7.32 GHz (70 MHz IF) 6.05 … 7.25 GHz (140 MHz IF) -7 ±3 dBm SMA female

Common Parameters		
Conversion Scheme:	Dual conversion, no frequency inversion	
Frequency Resolution:	100 Hz	
IF Characteristics:	Frequency:	70 ±20 MHz or 140 ±40 MHz (optional: both → [IF-Band] = 70/140)
	Impedance:	50 or 75 Ω
	Return loss:	> 20 dB
	IF-Connectors:	BNC female
RF Characteristics:	Impedance:	50 Ω
	Return loss:	> 15 dB
	1 dB compression point:	> 10 dBm
	Output muting:	> 60 dB (by command or sense input or by alarm condition)
	RF-signal monitor:	-20 dB of RF-output (approx.)
	RF-connectors:	SMA female (standard)
Transfer Characteristics:	Max. conversion gain:	40 dB ±1.0 dB for upconverter 45 dB ±1.0 dB for downconverter
	Attenuation range IF:	0 … 30 dB, Step 0.1 dB
	Attenuation range RF:	0 … 20 dB, Step 0.1 dB
	Level stability:	± 0.25 dB/day at constant temperature ± 0.5 dB max., ±0.2 dB typ. over temperature range
	Gain flatness:	± 0.25 dB over ±20 MHz (IF 70 MHz), ±0.40 dB over ±40 MHz (IF 140 MHz)
	Image rejection:	> 80 dB
	Noise figure:	< 12 dB[1)]
Equalizer (Gain Slope):	Max. ±0.0625 dB / MHz (IF 70 MHz), adjustable Max. ±0.05 dB / MHz (IF 140 MHz), adjustable	
Group Delay (±18 MHz):	Linear:	0.03 ns / MHz max.
	Parabolic:	0.01 ns / MHz² max.
	Ripple:	1 ns peak to peak max.
Group Delay (±36 MHz):	Linear:	0.015 ns / MHz max.
	Parabolic:	0.005 ns / MHz² max.
	Ripple:	2 ns peak to peak max.
Intermodulation (3rd Order):	OIP3:	>20 dBm[1)]
AM / PM conversion:	0.1° / dB[1)]	
Spurious Outputs:	Signal related:	< -60 dBc[1) 2)]
	Output harmonics (DNC only):	< -40 dBc[1) 2)]
	Signal independent:	< -70 dBm
Frequency Stability:	±1 x 10^{-7}, -30 °C … 60 °C ±1 x 10^{-8}, -30 °C … 60 °C (after 30 min warm up) ±1 x 10^{-9} per day (fixed temperature after 24 h warm up)	
Reference Input:	Frequency:	5 or 10 MHz sine wave
	Level:	5 dBm ±5 dB
	Modes:	auto/extern/intern
	Connector:	BNC female
Reference Output:	Frequency:	10 MHz
	Level:	0 dBm ±3 dB
	Connector:	BNC female

Specifications continued next page

Monitoring and Control Interface:	Protocol: Connection:	SNMP UDP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
	Protocol: Connection:	HTTP (web browser interface) TCP/IP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
	Protocol: Connection:	Multipoint RS232 or RS422/RS485 (configurable), connector DSUB09 female or TCP/IP over Ethernet (10 or 100 Mbps, auto sensing), connector RJ-45
Alarm Interface: **Mute Input:**	Alarm: Two potential free contacts (DPDT) Mute Input: TTL logic input with internal pull up Connector DSUB09 female	
Temperature Range:	Standard performance: 0 °C … 50 °C operating, -30 °C … 80 °C storage	
Relative Humidity:	< 95 % non condensing	
User Interface: (Indoor only)	LCD-Display 2 x 40 characters, 4 cursor keys, 4 function keys VFD-Display 2 x 40 characters, 4 cursor keys, 4 function keys (with option VFD)	
Mains Power Input:	100 … 240 V AC nominal, 90 … 264 V AC max., 50 … 60 Hz	
Mains Power Consumption:	Max.: 40 VA / 25 W (single converters)	
Mains Power Input Connector:	Indoor: IEC C14	
Mains Fuse:	2 x 2.0 A, time-lag fuse	
Dimension and Weight:	Indoor: 483 x 44 x 505 mm³ (WxHxD), 1 RU (19") approx. 8.4 kg	

[1] at max. conversion gain

[2] Pout = 0 dBm

All specifications are preliminary and subject to change

Open questions, demo units

For detailed order options or if you need more information about WORK Microwave's new compact IF/L-Band frequency converters, please contact us via e-mail: sales@work-microwave.com or call us. We are glad to assist you.