

MBT-5000 L-Band Up/Down Converter System

Converters



Introduction

The MBT-5000 Up/Down Converter System provides frequency conversion between L-Band IF and C-/X-/Ku/Ka-Band RF frequencies. Featuring a drop down front panel providing access to two “hot swappable” frequency conversion modules, this unit offers either a mix of conversion functionality or 1:1 redundant system operation.

Designed for rack mounting, the MBT-5000's 1RU 19-inch chassis front panel contains all operator controls, indicators and displays for local and remote with RF, IF, power, and communications interfaces on the rear. When configured with the redundancy option, the main chassis contains two diode “OR-ed” internal power supplies for increased reliability along with the necessary IF/RF switches.

Key Features

- Meets or exceeds IESS-308/309
- Facilitates 188-164A system compliance
- Low phase noise
- Powerful M&C support
- Ethernet/Telnet/SNMP
- EIA-232/485
- Flexible configuration
- RF Band switching in minimal time without requiring tools
- Available 1:1 redundancy in a 1RU chassis

Applications

The flexibility of the MBT-5000 makes it ideally suited for:

- Earth stations where L-Band IF products are being integrated into a 70/140 MHz IF infrastructure
- Reconfigurable Multi-Band requirements that are typically found in transportable / flyaway type installations

Block Up Converter

The field interchangeable block up converter module translates an L-Band input frequency block up to the band specific RF output frequency block (C, X, Ku, or Ka-Band).

Available bands include:

Up converter Frequency Bands

	RF Output	IF Input	LO
C band	5850 – 6425 MHz	950 – 1525 MHz	4900 MHz
C band	5850 – 6425 MHz	950 – 1525 MHz	7375 MHz
C band	5850 – 6650 MHz	950 – 1750 MHz	4900 MHz
C band	5850 – 6725 MHz	950 – 1825 MHz	4900 MHz
X band	7900 – 8400 MHz	1000 – 1500 MHz	6900 MHz
Ku band	13.75 – 14.50 GHz	950 – 1700 MHz	12.80 GHz
Ku band	14.00 – 14.50 GHz	950 – 1450 MHz	13.05 GHz
Ka Band	30.00 – 31.00 GHz	1000 – 2000 MHz	29.00 GHz

Block Down Converter

The field interchangeable block down converter module translates a band specific input frequency block (C, X, Ku, or Ka) from the LNA down to the corresponding L-Band frequency block.

Available bands include:

Down Converter Frequency Bands

	RF Input	IF Output	LO
C band (inverted)	3400 – 4200 MHz	950 – 1750 MHz	5150 MHz
X	7250 – 7750 MHz	1000 – 1500 MHz	6250 MHz
Ku, Switched LO, Standard	10.95 – 11.70 GHz	950 – 1700 MHz	10.00 GHz
	11.70 – 12.20 GHz	950 – 1450 MHz	10.75 GHz
Ku, Switched LO, Option 1	12.25 – 12.75 GHz	950 – 1450 MHz	11.30 GHz
	10.95 – 11.70 GHz	950 – 1700 MHz	10.00 GHz
Ku, switched LO, Option 2	11.70 – 12.75 GHz	950 – 2000 MHz	10.75 GHz
	10.70 – 11.70 GHz	950 – 1950 MHz	9.75 GHz
Ka	11.70 – 12.75 GHz	950 – 2000 MHz	10.75 GHz
	20.20 – 21.20 GHz	950 – 1950 MHz	19.25 GHz
Optional	20.20 – 21.20 GHz	1000 – 2000 MHz	19.20 GHz



Specifications

Block Up Converter IDU

Input/Output Impedance	50 Ω
Input Return Loss	15 dB minimum
Output Return Loss	18 dB minimum
Input Connector	N, Female (SMA for Redundancy option)
Output Connector	N, Female (SMA for Redundancy option and Ka)
Gain	30 dB nominal (35 dB for Ka) at minimum attenuation
Gain Full Band (Constant Temp.)	+/- 1.0 dB
Gain (0° to 50°C)	+/- 1.0 dB
Gain Per 40 MHz Slope	+/- 0.25 dB .03 dB/MHz Max.
Mute	-60 dBc
User Attenuation Range	0 to 20 dB (0 to 30 opt) in 0.25 dB steps
Output Power, P1dB	+15 dBm minimum
Noise Figure	15 dB at minimum attenuation
Intermodulation Distortion	-50 dBc at 0 dBm Total Output -30 dBc at 3 dB OPBO Total Output
Lo Leakage	-60 dBm
60 Hz & Harmonics	<-36 dBc (typically <-50 dBc)
Phase Non-Linearity	
per 20 MHz BW	8 degrees p-p
per 36 MHz BW	12 degrees p-p
Spurious (In-band) Carrier Related	-60 dBc
Non-Carrier Related	-60 dBm
Phase Noise	Exceeds MIL-STD-188-164A
100 Hz	-68 dBc/Hz
1 kHz	-78 dBc/Hz
10 kHz	-88 dBc/Hz
100 kHz	-98 dBc/Hz
1 MHz	

Monitor & Control

Serial M&C Interface	TIA/EIA-232, TIA/EIA-485, 4-wire 9-pin D, Female
Alarm	Form C 9-pin D, Female
Redundant Switch Connections	SMA Female
Remote Interface	Ethernet, RJ-45

Reference

External Input	5 or 10 MHz 0 \pm 5 dBm BNC Female
Optional output	10 MHz Rear Panel BNC Female
Stability over Time	$\pm 1 \times 10^{-9}$ /Day
Stability over Temp	$\pm 1 \times 10^{-8}$ /0° to 50°C

Block Down Converter IDU

Input/Output Impedance	50 Ω
Input Return Loss	18 dB minimum
Output Return Loss	15 dB minimum
Input Connector	N, Female (SMA for Redundancy option and Ka)
Output Connector	N, Female (SMA for Redundancy option)
Gain	35 dB nominal at minimum attenuation +/- 1.0 dB
Gain Full Band (Constant Temp.)	+/- 1.0 dB
Gain (0° to 50°C)	+/- 0.25 dB
Gain Per 40 MHz Slope	.03 dB/MHz Max.
Mute	-60 dBc
User Attenuation Range	0 to 20 dB, in 0.25 dB steps (0 to 30, opt)
Output Power, P1dB	+ 15 dBm minimum
Noise Figure	15 dB at minimum attenuation
Intermodulation Distortion	-50 dBc at 0 dBm Total Output
Spurious (In-band) Carrier Related	-60 dBc
Non-Carrier Related	-60 dBm
	-55 dBm Max (-60 dBm typ.) for option 1 and 2 Ku BDC
2nd Harmonic	20 dBc max. (-40 dBc typical)
Lo Leakage	-60 dBm
60 Hz & Harmonics	<-36 dBc (typically <-50 dBc)
Phase Non-Linearity	
per 20 MHz BW	3 degrees p-p
per 36 MHz BW	4 degrees p-p
Phase Noise	Exceeds MIL-STD-188-164A
100 Hz	-68 dBc/Hz
1 kHz	-78 dBc/Hz
10 kHz	-88 dBc/Hz
100 kHz	-98 dBc/Hz
1 MHz	-108 dBc/Hz

Physical & Environmental

Operating Temp.	0° to 50°C
Non-Operating Temp.	-50° to 70°C
Humidity	5 to 95% non-condensing
Operational Altitude	10,000 ft. above sea level
Weight	15 lbs nominal
Dimensions (height x width x depth)	1.75" x 19" x 15"

Prime Power

Voltage	90 – 260 VAC -48 VDC Optional
Frequency	47 to 63 Hz
Dissipation	60 W typical



2114 West 7th Street, Tempe, Arizona 85281 USA
Voice: +1.480.333.2200 • Fax: +1.480.333.2540 • Email: cefdsales@comtech.com

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