

MBT-5000A L-Band Up/Down Converter System

Converters



Introduction

The MBT-5000A Up/Down Converter System provides non-inverting 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-5000A'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. 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 188-164B system compliance
- Low phase noise
- Powerful M&C support
- Ethernet/Telnet/SNMP
- EIA-232/485
- Flexible configuration
- RF Ku Band switching in minimal time without requiring tools
- Available 1:1 redundancy in a 1RU chassis

Applications

The flexibility of the MBT-5000A 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 upconverter 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:

Frequency Bands

	RF Output	IF Input	LO
C band	5850 – 6650 MHz	950 – 1750 MHz	4900 MHz
Insat C band	6725 - 7025 MHz	965 - 1265 MHz	5800 MHz
X band	7900 – 8400 MHz	950 – 1450 MHz	6950 MHz
Ku band	13.75 – 14.50 GHz	950 – 1700 MHz	12.80 GHz
Ka band	27.50 – 28.50 GHz	1000 – 2000 MHz	26.50 GHz
Ka band	28.30 – 29.30 GHz	1000 – 2000 MHz	27.30 GHz
Ka band	29.00 – 30.00 GHz	1000 – 2000 MHz	28.00 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 RF input frequency block (C-, X-, Ku- or Ka-Band) from the LNA down to the corresponding L-Band frequency block.

Available bands include:

Frequency Bands

	RF Input	IF Output	LO
C band	3400 – 4200 MHz	950 – 1750 MHz	11600 MHz 9150 MHz
Non-Inverting, dual conversion			
Insat C band, inverting	4500 - 4800 MHz	1000 - 1300 MHz	5800 MHz
X band	7250 – 7750 MHz	950 – 1450 MHz	6300 MHz
Ku Switched LO 1	10.95 – 11.70 GHz	950 – 1700 MHz	10.00 GHz
	11.70 – 12.20 GHz	950 – 1450 MHz	10.75 GHz
	12.20 – 12.75 GHz	950 – 1500 MHz	11.25 GHz
5Ku Switched LO 2	10.95 – 11.70 GHz	950 – 1700 MHz	10.00 GHz
	11.70 – 12.75 GHz	950 – 2000 MHz	10.75 GHz
Ka band 1	17.70 – 18.70 GHz	1000 – 2000 MHz	16.70 GHz
Ka band 2	18.50 – 19.50 GHz	1000 – 2000 MHz	17.50 GHz
Ka band 3	19.20 – 20.20 GHz	1000 – 2000 MHz	18.20 GHz
Ka band 3	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	15 dB minimum
Input Connector	N Female, SMA for Redundant Option
Output Connector	N Female, SMA for Redundant Option, 2.92 mm for Ka
Gain	35 dB nominal at 0 dB Atten., +/- 2.0 dB
Gain Stability	0.75 dB/15°C
Gain Control Range	0 to 30 dB in 0.25 dB steps
Gain Control Accuracy	+/- 1.0 dB over Full Range
Step-to-Step Accuracy	0.25 dB \pm 0.1 dB
Amplitude Response	
Full RF Output Band	2.0 dB p-p, Max
Per 72 MHz	1.5 dB p-p, Max
Per 36 MHz	1.0 dB p-p, Max
Per 20 MHz	0.7 dB p-p, Max
Mute	-80 dBm, Max.
Output Compression	\geq +15 dBm at P1dB
Input Compression	\geq -12 dBm at P1dB Output 10 dB Atten.
Max IF Input, No Damage	+10 dBm
AM/PM Conversion	0.1°/dB at 0 dBm Output
Noise Figure	15 dB at 0 dB Attenuation
Intermodulation Products	-50 dBc at 0 dBm SCL
LO Leakage	-60dBm
2 nd Harmonic	-40 dBc, -35 dBm at +5 dBm Output
Spurious, +5 dBm Output	
AC Line & Harmonics	-36 dBc
1 MHz to Band Edge	-63 dBc/10 kHz
Outside Band Edge	
Adjacent 100 MHz	-63 dBc/10 kHz
Adjacent 100 – 500 MHz	-63 dBc/4 kHz
Phase Noise	Exceeds MIL-STD-188-164B
10 Hz	-38 dBc/Hz
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
10 MHz	-118 dBc/Hz
100 MHz	-118 dBc/Hz
Group Delay	1 ns p-p per 72 MHz, Max

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, 2.92 mm for Ka
Remote Interface	Ethernet, RJ-45

Reference

External Input	5 or 10 MHz, -5.0 to +10 dBm BNC Female, 50 Ω , Return Loss 15 dB
Internal Output	5 or 10 MHz, +5.0 dBm, Min BNC Female, 50 Ω
Thermal Stability	\pm 1 x 10E-08
Ageing, Per Day	\pm 3 x 10E-10
Ageing, Per Year	\pm 3 x 10E-08

Block Down Converter IDU

Input/Output Impedance	50 Ω
Input Return Loss	15 dB minimum
Output Return Loss	15 dB minimum
Input Connector	N Female, SMA for Redundant Option, 2.92 mm for Ka
Output Connector	N Female, SMA for Redundant Option
Gain	40 dB nominal at 0 dB Atten., +/- 3.0 dB
Gain Stability	0.75 dB/15°C
Gain Control Range	0 to 30 dB in 1.0 dB steps
Gain Control Accuracy	+/- 2.0 dB over Full Range
Step-to-Step Accuracy	1.0 dB \pm 0.9 dB
Amplitude Response	
Full RF Output Band	2.0 dB p-p, Max
Per 72 MHz	1.5 dB p-p, Max
Per 36 MHz	1.0 dB p-p, Max
Per 20 MHz	0.7 dB p-p, Max
Image Rejection	60 dB, Min
Output Compression	\geq + 26 dBm at P1dB Output
Input Compression	\geq -5 dBm at P1dB Output 10 dB Atten.
Max RF Input, No Damage	+20 dBm
AM/PM Conversion	0.1°/dB at 0 dBm Output
Noise Figure	15 dB at 0 dB Attenuation
LO Leakage	-60 dBm
2 nd Harmonic	-40 dBc at +5 dBm Output
Spurious, +5 dBm Output	
AC Line & Harmonics	-36 dBc
1 MHz to Band Edge	-60 dBc/10 kHz
Phase Noise	Exceeds MIL-STD-188-164B
10 Hz	-38 dBc/Hz
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
10 MHz	-118 dBc/Hz
100 MHz	-118 dBc/Hz
Group Delay	1 ns p-p per 72 MHz, Max

Physical & Environmental

Operating Temp.	-32°C to +60°C
Non-Operating Temp.	-40°C to +71°C
Humidity	5% to 95%, Non-condensing
Altitude	
Operating	-120 to 10,000 ft. above sea level
Non-Operating	-120 to 35,000 ft. above sea level
Non-Operating Shock	Sinusoidal 2.3G, 20 ms Duration Any Axis
Weight	15 lbs. nominal
Dimensions (height x width x depth)	1.75" x 19" x 15"

Prime Power

Voltage	85 – 265 VAC -48 VDC Optional
Frequency	47 to 65 Hz
Dissipation	70 W typical



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