GENERAL DESCRIPTION

The NWSICFU17009600-0-0 IF Converter Unit (IFCU) is a dual-channel, fully redundant, dual-frequency (L-Band and X-Band) up- and down-converter unit for spacecraft payload applications.

The unit has full passive redundancy switching functionality, which is commanded externally. It uses passive splitting/combination of RF signals internally to utilize the same interfacing connectors

This NWSICFU17009600-0-0 is originally designed for Synthetic Aperture Radar (SAR) applications and it interfaces with an IFCU Controller & LO unit, which provides the TM/TC and LO signals to the IFCU.

The IF Converter Unit is also designed to be connected in series with other IFCUs for the transfer of DC power signals. The IFCU is typically connected to dual-bands Transmit/Receive Modules before the interface to the antenna. It enables individual control for the each band up- and down-converters, so it can be synchronized and operated in a typical Radar mode application. The unit also has attenuation gain control for the downlink each band.

FEATURES

- Integrated 2-Channel L-Band Up Converter
- Integrated 2-Channel X-Band Up Converter
- Integrated 2-Channel L-Band Down Converter
- Integrated 2-Channel L-Band Down Converter
- Full passive redundancy
- Telemetry/Telecommands
- Radiation qualified

APPLICATIONS

- Spacecraft Payloads for LEO
- Synthetic Aperture Radar (SAR)
- New Space
- SATCOM
- Aerospace

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ELECTRICAL PARAMETERS

Parameter	Unit	Min	Typ	Max	Remarks
X-band IF In Up-Conversion	MHz	400	600	800	0.5dB end-to-end
X-band RF Out Up-Conversion	MHz	9300	9600	9900	0.5dB end-to-end
L-band IF In Up-Conversion	MHz	315	357.5	400	0.5dB end-to-end
L-band RF Out Up-Conversion	MHz	1215	1257.5	1300	0.5dB end-to-end
X-band RF In Down-Conversion	MHz	9300	9600	9900	0.5dB end-to-end
X-band IF Out Down-Conversion	MHz	1525	1700	1875	0.5dB end-to-end
L-band RF In Down-Conversion	MHz	1215	1257.5	1300	0.5dB end-to-end
L-band IF Out Down-Conversion	MHz	900	942.5	985	0.5dB end-to-end
L-band Up Converter Conversion Gain	dB	-3.77		-2.36	LO Freq. = 900MHz IF In Freq. = 315MHz – 400MHz
L-band Up Converter Conversion Amplitude	dB		-3		LO Freq. = 900MHz IF In Freq. = 315MHz – 400MHz
L-band Up Converter Conversion Gain Phase	Degrees (º)		-362		LO Freq. = 900MHz IF In Freq. = 315MHz – 400MHz
L-band Up Converter Return Loss	dB	-29.9		-26.9	IF In Freq. = 315MHz – 400MHz
	dB	-14.78		-14.56	RF Out Freq. = 1215MHz – 1300MHz
L-band Up Converter Noise Figure	dB		-40		LO Freq. = 900MHz IF In Freq. = 315MHz – 400MHz
L-band Down Converter Conversion Gain	dB	5.19		7.22	LO Freq. = 2200MHz IF In Freq. = 1215MHz – 1300MHz
L-band Down Converter Conversion Gain Amplitude	dB		6		LO Freq. = 2200MHz IF In Freq. = 1215MHz – 1300MHz
L-band Down Converter Conversion Gain Phase	Degrees (º)		-359		LO Freq. = 2200MHz IF In Freq. = 1215MHz – 1300MHz
L-band Down Converter Return Loss	dB				RF In Freq. = 1215MHz – 1300MHz IF Out Freq. = 900MHz – 985MHz
L-band Down Converter Phase Response Ripple [1)]	Degrees (º)			<4	LO Freq. = 2200MHz IF In Freq. = 1215MHz – 1300MHz
L-band Down Converter Dynamic Range	dBm	-0.8		1.5	LO Freq. = 2200MHz IF In Freq. = 1215MHz – 1300MHz
X-band Up Converter Conversion Gain	dB	-3.85		-2.39	LO Freq. = 9000MHz IF In Freq. = 400MHz – 800MHz
X-band Up Converter Conversion Gain Amplitude	dB		-3		LO Freq. = 9000MHz IF In Freq. = 400MHz – 800MHz
X-band Up Converter Conversion Gain Phase	Degrees (º)		-731		LO Freq. = 9000MHz IF In Freq. = 400MHz – 800MHz
X-band Up Converter Return Loss	dB		-16		IF In Freq. = 400MHz – 800MHz RF Out Freq. = 9400MHz – 9800MHz

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Parameter	Unit	Min	Typ	Max	Remarks
X-band Up Converter Noise Figure	dB		-30		LO Freq. = 9000MHz IF In Freq. = 400MHz – 800MHz
X-band Down Converter Conversion Gain	dB	-1.26		-0.66	LO Freq. = 7900MHz IF In Freq. = 9550MHz – 9650MHz
X-band Down Converter Conversion Gain 3dB BW	dB	3.83		4.71	LO Freq. = 7900MHz IF In Freq. = 9452.5MHz – 9747.5MHz
X-band Down Converter Conversion Gain Amplitude	dB		-1		LO Freq. = 7900MHz IF In Freq. = 9550MHz – 9650MHz
X-band Down Converter Conversion Gain Phase	Degrees (°)		-359		LO Freq. = 7900MHz IF In Freq. = 9550MHz – 9650MHz
X-band Down Converter Return Loss	dB			<-14	RF In Freq. = 9550MHz – 9650MHz IF Out Freq. = 1650MHz – 1750MHz
X-band Down Converter Phase Response Ripple **1)**	Degrees (°)			<4	LO Freq. = 7900MHz IF In Freq. = 9550MHz – 9650MHz
X-band Down Converter Dynamic Range	dBm	4.2		5.2	LO Freq. = 7900MHz IF In Freq. = 9550MHz – 9650MHz
L-band Down Converter Attenuation	dB	0		14	In steps of 2dB
X-band Down Converter Attenuation	dB	0		14	In steps of 2dB

Notes:

1) The ripple is the deviation from the average over bandwidth

Mechanical and Environmental Parameters

Parameter	Unit	Min	Typ	Max	Remarks
Operating Temperature Range	°C	-35		+45	
RF Connectors			SMA		
Tolerable load impedance	Ohm	0		∞	Unconditionally stable
Size (L x W x H)	inch mm		5.58 x 6.49 x 1.37 141.6 x 164.8 x 34.8		
Weight	Grams			1140	
Input Bus Voltage	V		+6.0 +4.0 -5.0		
DC Power	W			6.1	Combined on the three input voltage lines **1)**
Total Ionizing Dose (TID)	krad			40	Including RDM = 2
LET	MeVcm2/mg	20			

Notes:

1) Based on 20% duty cycle for Up-Converter and 80% duty cycle for Down-Converter

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Digital Control Interface

The power lines generation and the monitor and control subsystem (MCS) are not located in the IFCU. The signals come to the IFCU Channel via two separate harnesses, one for the power lines (including redundant option) and one for the TM/TC. The IFCU has also the capability to be connected in a network with other IFCUs where the power lines are connected in series from IFCU to the other.

Monitored parameters are:

- Temperature for each channel
- Positive voltages

The following functions can be remote controlled:

- Prime/Redundant Control
- L-band Up-converter ON/OFF
- L-band Down-converter ON/OFF
- X-band Up-converter ON/OFF
- X-band Down-converter ON/OFF
- L-band Down-converter Attenuation Control
- X-band Down-converter Attenuation Control
- MUTE Mode
- (further options on request)

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Outline Drawing

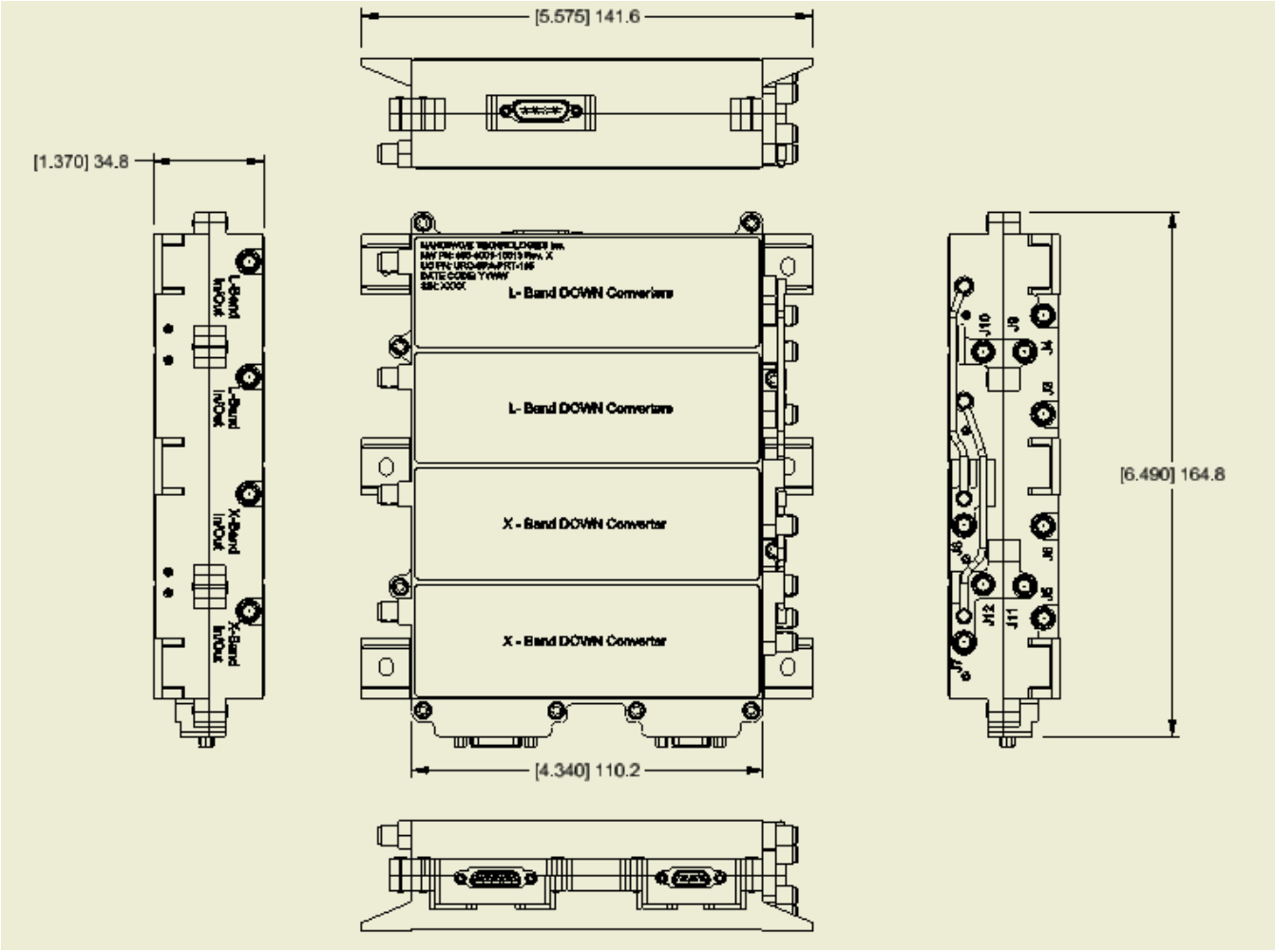

Fig 1: Outline Drawing of IFCU Channel

ADDITIONAL FEATURES

- Marking: The unit is marked with Manufacturer Part Number, Date Code, and Serial Number.
- All plating and painting is RoHS compliant

For further information please contact NANOWAVE Technologies Inc. at *sales@nanowavetech.com* , or call at (+1) 416-252-5602.

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