Transceiver Module

17-21 & 27-30 GHz

ReliaSat™

Product Datasheet

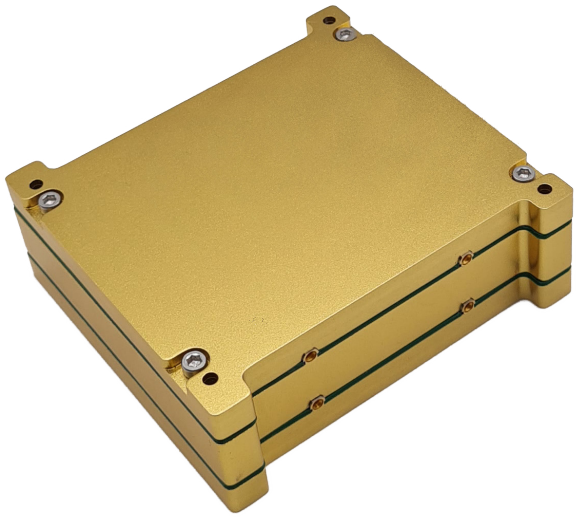
UDC400

Integrated transceiver module for Ka-band frequencies.

Overview

UDC400 is a fully integrated standalone transceiver module designed for Ka-band communication systems. The Transceiver operates as a wideband up/down converter when combined with a modem/ Software Defined Radio (SDR) to enable a fully functional Ka-band satellite communications system designed for use in Low Earth Orbit (LEO).

This Transceiver offers up to 250 MHz of instantaneous bandwidth. On-board frequency synthesizers are able to lock to an external or on-board 10 MHz or 100 MHz reference signal are included on the Transceiver. The on-board reference signals are provided by high precision, low power consuming Temperature Compensated Crystal Oscillators (TCXO) with frequency stability of ±0.28ppm between -40°C to 85°C. The Transceiver is fully enclosed in an aluminium housing with SMP and SMPM RF connectors, DC Flying Leads for DC power and 6-Pin Pico-Lock connectors for DC power enable, PLL lock, current and temperature sensor connections.



Features

- TX output frequency 17-21 GHz
- RX input frequency 27-30 GHz
- TX IF frequency 1-5 GHz
- RX IF frequency 1-4 GHz

Applications

- Satellite communications
- High speed data communications
- IOT
- Security
- 5G

Space Heritage 20th January 2021

Rocket Labs Mission 18, OHB SatComm

SPACE HERITAGE

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Specification Overview

Transmitter

Parameter		Typical		Unit
TX Output Frequency Range		17-21		GHz
TX Saturated Output Power (Pin=-15 dBm)		27		dBm
TX Output Power at P1dB Compression (Pin=-14 dBm)		26		dBm
IF Input Frequency Range		1-5		GHz
IF Input Power		-40 to -15		dBm
Reference Frequency		10 or 100 (on-board or external)		MHz
Reference Stability		±0.28 (-40 °C to +85 °C)		PPM
Conversion Gain		38-43		dB
Gain Flatness Across Full 1 - 5 GHz Band		±2.5		dB
Gain Flatness Over 250 MHz Channel bandwidth from SDR		±1		dB
Typical Phase Noise		10 MHz	100 MHz	dBc/Hz
	1 kHz	-80	-94	dBc/Hz
	10 kHz	-81	-95	dBc/Hz
	100 kHz	-104	-110	dBc/Hz
	1 MHz	-124	-120	dBc/Hz
Spurious (in band 1-5 GHz)		-50		dBc
Supply Voltage Range		7-42		Vdc
DC Power @ 12 VDC		<11.5		W
DC Current @ 12 VDC		1		A

Receiver

Parameter		Typical		Unit
Rx Input Frequency Range		27-30		GHz
RX Input Power Range		-120 to -30		dBm
IF Output Frequency Range		1-4		GHz
IF Output Power Range		-90 to 0		dBm
Reference Frequency		10 or 100 (on-board or external)		MHz
Reference Stability		±0.28 (-40 °C to +85 °C)		PPM
Conversion Gain		30-35		dB
Gain Flatness Across Full 1-4 GHz Band		±2.5		dB
Gain Flatness Over Typical Channel Bandwidth from SDR		±1		dB
Typical Phase Noise		10 MHz	100 MHz	dBc/Hz
	1 kHz	-83	-89	dBc/Hz
	10 kHz	-86	-90	dBc/Hz
	100 kHz	-108	-95	dBc/Hz
	1 MHz	-122	-119	dBc/Hz
Spurious (in band1-4 GHz)		-60		dBc
Image Rejection		62		dB
Noise Figure		<2.5		dB
Supply Voltage Range		7-42		Vdc
DC Power @ 12 VDC		<6		W
DC Current @ 12 VDC		0.5		A

Mechanical and Environmental

Mechanical

Parameter	Typical	Unit
PCB Dimensions	96 x 91 x 1 (max)	mm
Mechanical Enclosure Required	Yes	
Mechanical Enclosure Dimensions	96 x 91 x 38 (max)	mm
Total Mass	<1	kg
Form Factor Requirement	Cube Sat	
Enclosure Material Requirement	>2.4 mm thick aluminium	mm
Enclosure Planting Requirement	Gold or Nickel	
RF Connector Types	SMPM edge mount	
DC Connector Types	DC flying leads	
IF Signal Connector Types	SMP edge mounts	
Current Sensor, Temperature Sensor, Frequency Synthesiser Lock & DC Power Enable Connections	6-pin Pico-Lock Connector	

Environmental

Parameter	Typical
Operating Temperature Range	-40 °C to +85 °C
Operating Environment	
Radiation Tolerance (kRad)	
Vibration Requirement	
Vacuum Requirement	
Compliance Standards	

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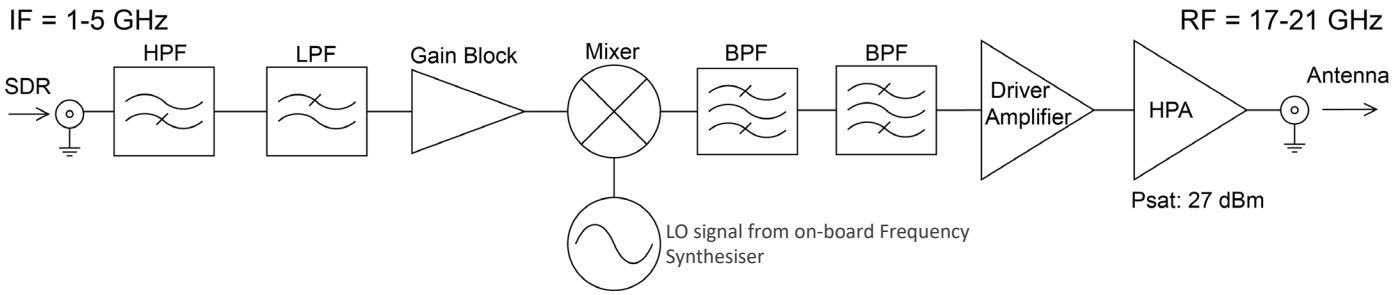
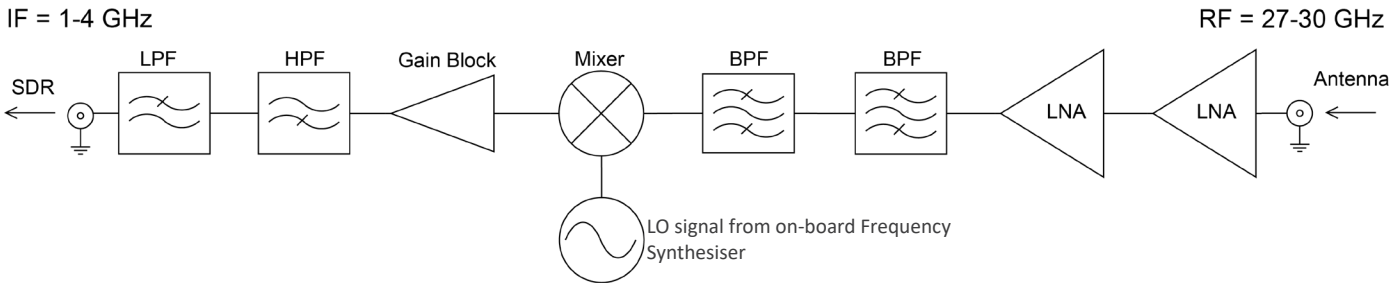
Simplified Schematic Diagram

Upconverter K-band 17-21



Downconverter Ka-band 27-30



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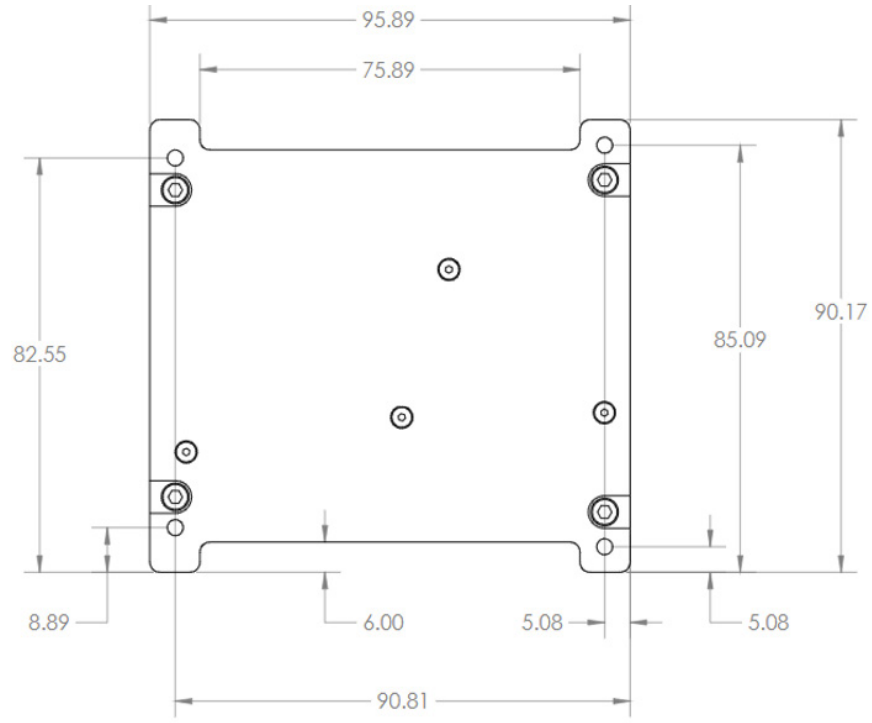
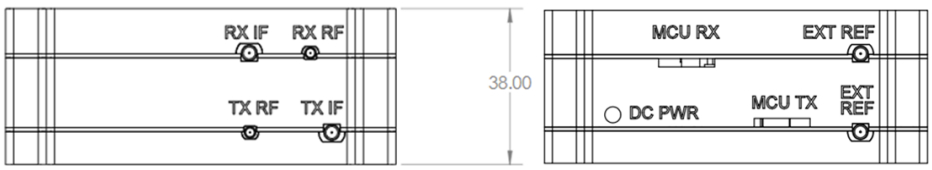
Mechanical Enclosure Preliminary Dimensions





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