

Transceiver Downlink Module 7-7.5 & 8-8.5 GHz

X-TR-DL-78

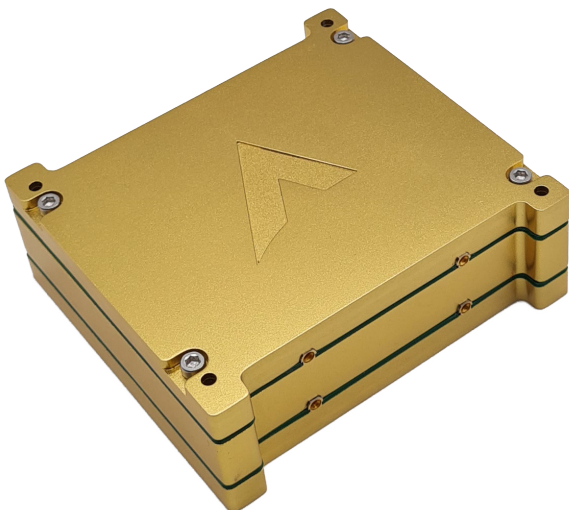
Fully integrated standalone transceiver downlink module for X-band communication systems.

Overview

The transceiver operates as a up/down converter designed for use in Low Earth Orbit (LEO). The transceiver operates in dual conversion superheterodyne mode using two LO's allowing for greater rejection of unwanted frequencies. The transmitter provides +30 dBm of linear power, up to 2 W PSAT and the receiver has a noise figure of 1.8 dB. This transceiver offers <1 dB signal flatness over 50 MHz of instantaneous bandwidth.

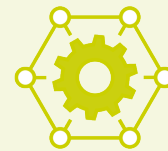
It also includes a high-precision clock for LO generation; this clock can be used as a reference for other modules, or lock to an external system reference.

This transceiver can be used as a standalone up/down converter or combined with a modem/ Software Defined Radio (SDR) enabling a full-function X-band satellite communication system.



Features

- TX output frequency 8-8.5 GHz
- RX input frequency 7-7.5 GHz
- TX IF frequency 200-700 MHz
- RX IF frequency 200-700 MHz
- 1 W linear power
- 10 MHz internal reference



Applications

- High speed data communications
- Space communications
- IOT
- Security

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Specification Overview

Transmitter

Parameter	Typical	Unit
TX Output Frequency Range	8-8.5	(GHz)
TX Output Linear Power	30	(dBm)
TX Output Saturated Power	2	(W)
IF Input Frequency Range	200-700	(MHz)
IF Input Power	-30 to 0	(dBm)
Reference Frequency	10 (on-board or external)	(MHz)
Reference Stability	+0.28 (-40 °C to +85 °C)	(PPM)
Conversion Gain	30	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (50 MHz)	<1 (specified over max channel bandwidth (50 MHz) across entire 500 MHz TX bandwidth. (SDR input channel band)	
Typical Phase Noise		(dBc/Hz)
1 kHz	-94	(dBc/Hz)
10 kHz	-80	(dBc/Hz)
100 kHz	-100	(dBc/Hz)
1 MHz	-123	(dBc/Hz)
Spurious (in band)	-60	(dBc)
Supply Voltage Range	12-36	(Vdc)
DC Power	17	(W)

Receiver

Parameter	Typical	Unit
Rx Input Frequency Range	7-7.5	(GHz)
RX Input Power Range	-90 to -30	(dBm)
IF Output Frequency Range	194-694	(MHz)
IF Output Power Range	-30 to 30	(dBm)
Reference Frequency	10 (on-board or external)	(MHz)
Reference Stability	+0.28 (-40 °C to +85 °C)	(PPM)
Conversion Gain	30	(dB)
Gain Flatness Over Typical Channel Bandwidth from SDR (50 MHz)	<1 (specified over max channel bandwidth (50 MHz) across entire 500 MHz RX bandwidth. (SDR input channel band)	
Typical Phase Noise		(dBc/Hz)
1 kHz	-94	(dBc/Hz)
10 kHz	-80	(dBc/Hz)
100 kHz	-100	(dBc/Hz)
1 MHz	-123	(dBc/Hz)
Spurious (in band)	-60	(dBc)
Noise Figure	1.8	(dB)
Supply Voltage Range	6-42	(Vdc)
DC Power	<6	(W)

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Mechanical and Environmental

Mechanical

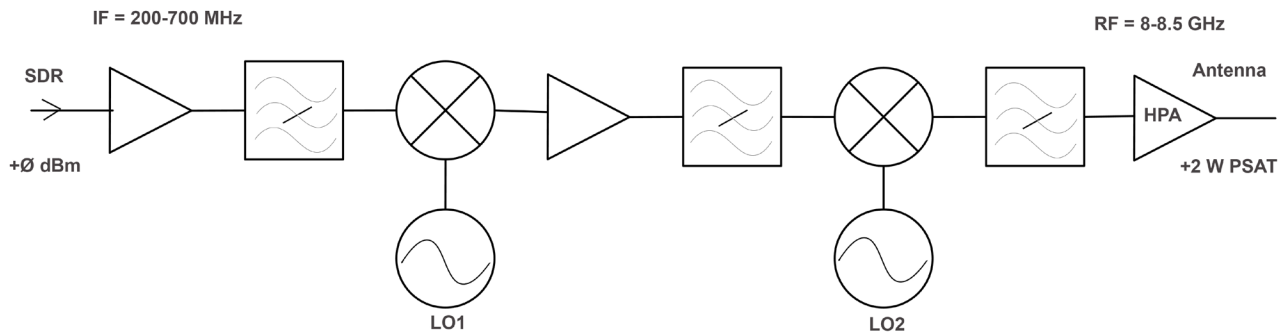
Parameter	Typical	Unit
PCB Dimensions	96 x 91 x 2 (max)	(mm)
Mechanical Enclosure Required	Yes	
Mechanical Enclosure Dimensions	96 x 91 x 33 (max)	(mm)
Total Mass	<1	(kg)
Form Factor Requirement	Enclosure	
Enclosure Material Requirement	>2.4 mm aluminium	(mm)
Enclosure Plating Requirement	Gold	
RF Connector Types	SMPM edge mount	
DC Connector Types	DC feedthrough or alt. high rel. panel mount	
IF Signal Connector Types	SMA edge mount	

Environmental

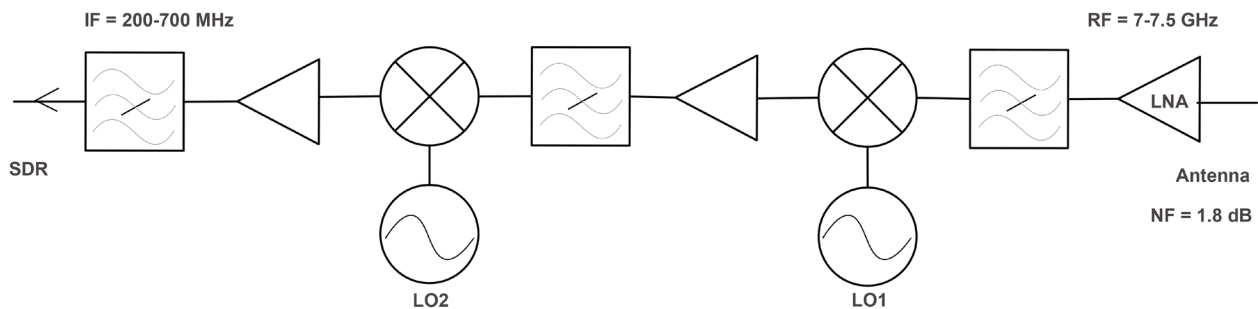
Parameter	Typical
Operating Temperature Range	-40 °C to +70 °C
Operating Environment	
Radiation Tolerance (kRad)	
Vibration Requirement	
Vacuum Requirement	
Compliance Standards	

Simplified Schematic Diagram

Transmitter block diagram



Receiver block diagram



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