X Band Transceiver

IQ spacecom

SDR for Small Satellites
➜ **physical layer according to CCSDS**

Highlights

- **SDR high-speed data links**
- **Micro, nano or pico satellite usage**
- **Bidirectional communication links**
- **Downlink/ TM & Payload 100 Mbps**
- **Uplink/ Telecommand   64 kbps**

XLink is an advanced transceiver system (Software Defined Radio - SDR) for X band communication links of small satellites in LEO environment. The mechanical dimensions fit a 1U CubeSat as well as larger satellites. The radio interface and radio protocol were developed according to standard CCSDS protocols.

Downlink data rates with net payload rates of up to 100 Mbps are possible. Supported modulation schemes include BPSK, QPSK and higher order types of modulation with appropriate FEC encoding schemes. Based on the general concept, higher data rates of more than 100 Mbps may be feasible. Adaptive modulation and coding schemes (AMC) are applicable to maximize data throughput.

The satellite receiver (Uplink) used for telecommand purposes of the satellites is designed for a standard CCSDS BPSK with BCH coding and data rates of at least 64 kbps. Alternative X band or S band uplink receiver frequencies are usable.

Data interface is based on CCSDS transfer frames.

A special feature of the **XLink** transceiver is the optional application of two separate TX channels. They can be used either for an increase of the transmit power or for redundancy purposes.

Features

- Fully featured and transparent bidirectional X band transceiver (SDR)
- CCSDS compliant for physical and synchronisation layer
- Flight grade tested design
- Compact case and low power consumption
- Extra flat patch antenna design matched to customer specific frequencies
- Low cost COTS design
- Short delivery time

Key Specifications

- X band Tx operation: 8.025-8.400 GHz
- X band Rx operation: 7.145-7.250 GHz
- S band Rx operation: 2.025-2.120 GHz
- Operational mode: FDD/Full duplex/ Half duplex
- Data rate Sat2Ground: 0.5 … 100 Mbps
- Data rate Ground2Sat: 64 kbps+
- Linear RF output power: up to +30 dBm (2 x +27 dBm)
- Automatic Doppler shift compensation in Rx: up to 200 kHz
- Low power consumption   max 15W (TX+RX) 3.5W (RX-S) 4.5W (Rx-X)
- DC supply voltage: 6 – 18 V
- Ultra small volume: < 0.2U
- Low mass: 180 grams
- TRL: 7

	Default Configuration	Optional Configuration
Tx Frequency Band	8.025-8.400 GHz	7.900-8.500 GHz
Data rate (Tx Payload Data)	500 kbps … 100 Mbps	100 Mbps+
Tx RF Bandwidth	Depends on Modulation Scheme	Maximum 56 MSymbols/s
RF Power Output (w/o aerial)	Up to +30 dBm (2 channels +27 dBm combined)	Higher output power with external PA possible
Tx Modulation Scheme	BPSK, QPSK, OQPSK	8PSK, 16APSK
FEC scheme	Convolutional code	
RF Connector Type	SMP, 50 Ω	
Rx Frequency Bands	X-Band 7.145-7.250 GHz S-Band 2.025-2.120 GHz	
Data rate (Rx Payload Data)	64 kbps	Up to 256 kbps
Doppler shift compensation	+/-200 kHz	
Rx Modulation Scheme	BPSK with BCH coding	
RF Connector Type	SMP, 50 Ω	
Data Interfaces	IEEE 802.3 1000BASE-T	SPI (LVDS, RS422)
Connector Type	3 x Nano-D-Sub (Power, Ethernet, I/O)	
Applicable CCSDS Standards	CCSDS 231.0-B, 132.0-B, 131.0-B, 401.0-B	on request
DC supply	6 – 18 V	Other on request
DC Power Consumption	<15 W TX+RX, <3.5 W Rx only	
Mechanical Dimensions	90 x 65 x 25.3 mm³	
Mass	180 grams (incl. housing)	
Antenna Configuration	Separate TX & RX antenna	Custom-specific antenna incl. MIMO and Diversity
Temperature Range	-20°C … +50°C	
Case	Passivated aluminum	

Optional equipment

- TX/RX X- & S-band patch antennas for satellite transceiver applications
- Customer-specific designs and turn-key solutions

Product specification may be subject to change without notification.