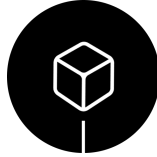


xHF Comms by TakeMe2Space





Description:

The xHF Comms board is a communication module designed to facilitate robust and reliable communication between a satellite and a ground station. It operates in both the Very High Frequency (VHF) and Ultra High Frequency (UHF) bands, with the specific frequency determined by the configuration. The VHF channel operates at a frequency of 100-200 MHz, while the UHF channel operates at 300-500 MHz. This dual-band capability allows for flexibility in communication, depending on the mission requirements, environmental conditions, and regulatory constraints.

Communication Protocol and Mode

The communication mode is half-duplex, meaning that the board can either transmit or receive data at any given time, but not both simultaneously. This mode is particularly suitable for satellite communication, where the ground station sends a telecommand (a command signal) to the satellite, and the satellite responds with telemetry (data about the satellite's status, health, and other mission-critical information). The half-duplex operation ensures that the communication is efficient and minimizes the risk of signal interference.

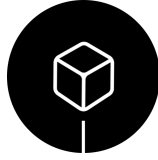
Interfaces for Satellite Communication

The xHF Comms board interfaces with the satellite using two primary communication protocols, both of which are designed to ensure high-speed, reliable data transfer:

1. Dual Isolated FD-CAN (Flexible Data Rate Controller Area Network)

Interface:

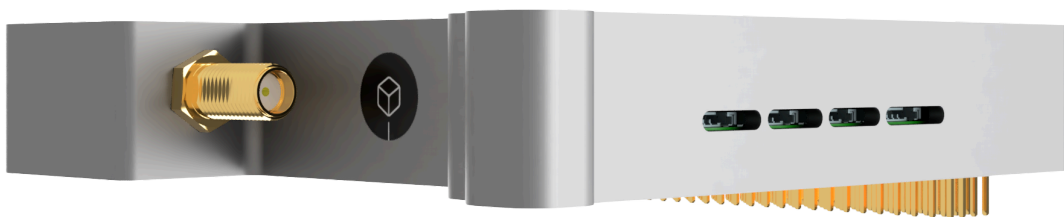
- The FD-CAN interface is a high-speed, robust communication protocol commonly used in aerospace and automotive applications due to its reliability and fault-tolerant design.
- The dual isolated configuration ensures redundancy, which is critical for satellite missions where communication failure is not an option. If one CAN channel fails, the other can take over, ensuring continuous communication.
- The isolation in the FD-CAN interface protects the communication system from electrical noise, ground loops, and voltage spikes, which are common in the harsh environment of space.

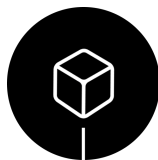


2. Single Channel Full Duplex RS-485 Interface:

- The RS-485 interface is a widely used standard for long-distance communication, known for its noise immunity and ability to support multiple devices on a single bus.
- The full-duplex capability of this interface allows for simultaneous transmission and reception of data, although the overall communication mode of the xHF Comms board remains half-duplex due to the nature of satellite-ground communication.
- The single-channel configuration is simpler and may be used in scenarios where redundancy is not a critical requirement.

Both interfaces support data rates of up to 5 Mbps, ensuring high-speed communication for telecommands and telemetry. This is particularly important for missions requiring the transmission of large volumes of data, such as Earth observation satellites or scientific missions.





Power Supply

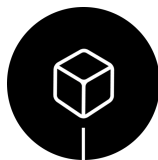
The xHF Comms board is powered by an isolated power supply, which is critical for ensuring the reliability and safety of the communication system. The isolation prevents electrical faults or noise from propagating through the system, which could otherwise disrupt communication or damage sensitive components. The input voltage to the power supply is 5V, which is a standard voltage level for many electronic systems, making it compatible with a wide range of satellite power systems.

UHF Configuration Datasheet:

Properties	Specification
Frequency Range	300 - 500 MHz
Maximum Symbol Rate	433333.33 kbps
Bandwidth	1.1 - 850KHz
Modulation	FSK, GFSK, GMSK ,OOK
Power consumption during TX	5W
Power consumption during RX	3.5W
EIRP	30dBm
RSSI	-110dBm
System Noise Figure	3.66 at 25°C
Frequency Stability	-2 - +2 ppm

VHF Configuration Datasheet:

Properties	Specification
Frequency Range	100 - 200 MHz
Maximum Symbol Rate	433333.33 kbps
Bandwidth	1.1 - 850KHz



Modulation	FSK, GFSK, GMSK ,OOK
Power consumption during TX	5W
Power consumption during RX	3.5W
EIRP	30dBm
RSSI	-110dBm
System Noise Figure	3.66 at 25°C
Frequency Stability	-2 - +2 ppm

Supported Interfaces:

Controller	ARM® Cortex®-M4 Microcontroller 32-Bit Single-Core 80MHz 1MB Flash
Supported Interfaces	2x Isolated FDCAN Controller - upto 5Mbps
	1x Isolated RS485 Full Duplex - upto 5Mbps
	1x Isolated UART
	4x Isolated GPIO Outputs
Interface	CCSDS

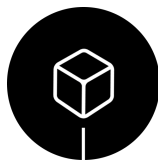
Electrical and Thermal Characteristics:

Nominal Voltage	5.5V
Maximum Voltage	12V
Maximum Power Draw	7W
Temperature range	-40 to 85°C

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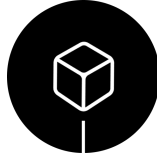
<https://tm2.space>

CIN: U61900TS2024PTC186392



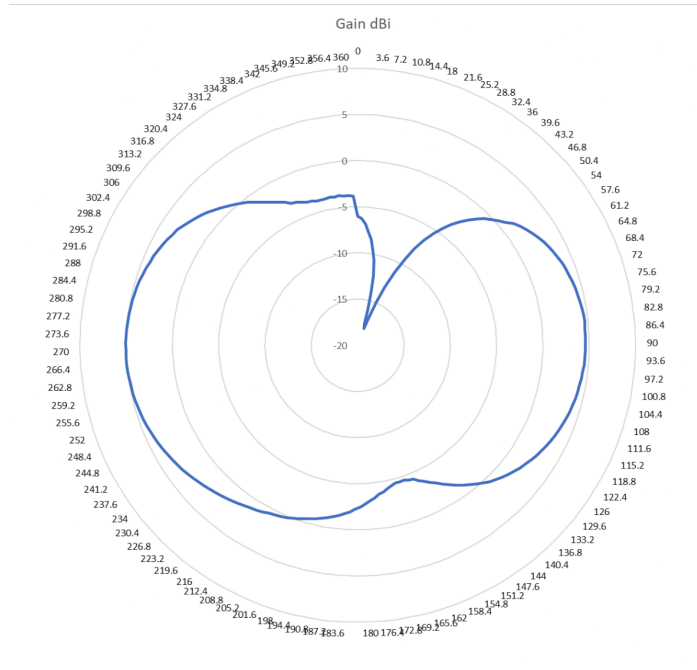
UHF Antenna Datasheet:

Parameter	Value
Antenna Type	Uplink & Downlink
Frequency operation band	370 - 420 MHz
Realised Antenna Bandwidth (<10 dB S11 consideration)	50 MHz
Axial Ratio	<3dB
Maximum Isotropic gain	5 dBi
Polarisation	RHCP
Directionality	Bi-Directional
FOV Azimuth (>0 dBi)	240 deg
FOV Elevation (>0 dBi)	120 deg
Dimensions (Each element)	135 mm x 3 mm Ø
Connector type	Jack SMA Female
Material	Gold plated copper
Operating Temperature	-55°C to 150°C
Impedance	50 Ω
VSWR (feed point)	1.22
Mass	50 g
Type of Antenna	Turnstile



Radiation Pattern:

a. Azimuth



b. Elevation

