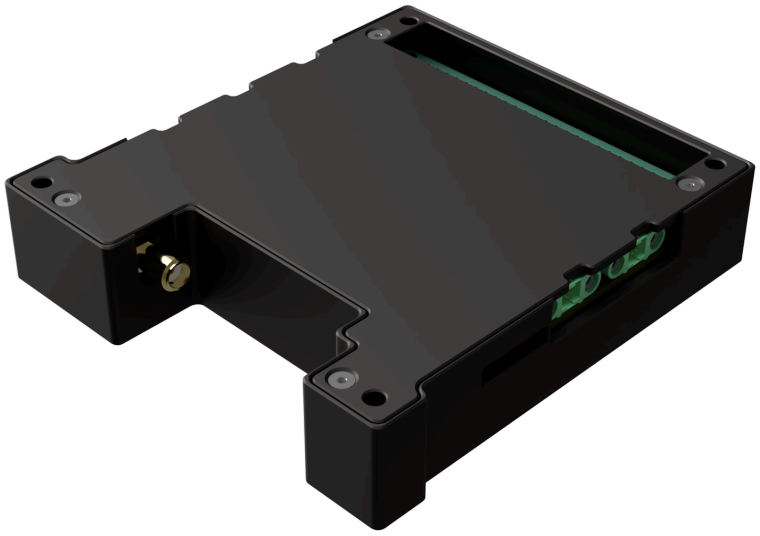
TAKE ME 2 SPACE

xHF

Technical Specifications



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 the Ultra High Frequency (UHF) band, with the specific frequency determined by the configuration. The UHF channel operates at 300-500 MHz. This capability allows for flexibility in communication, depending on the mission requirements, environmental conditions, and regulatory constraints.

The default configuration supports a data rate of 9.6 kbps using GMSK modulation over a 14.4 kHz bandwidth in the 401–402 MHz frequency range.

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.

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 - 1000 MHz
Maximum Symbol Rate	333.3 kbps
Bandwidth	1.1 - 850KHz
Modulation	OOK, 2FSK, 4FSK, 2GFSK, 4GFSK, GMSK
Power consumption during TX	8.5 W
Power consumption during RX	3.5 W
EIRP	30dBm
System Noise Figure	3.66 at 25°C
Frequency Stability	-2 - +2 ppm
RX Sensitivity	-110 dBm

Supported Interfaces:

Controller	ARM® Cortex®-M4 Microcontroller 32-Bit Single-Core 80MHz 1MB Flash
Supported Interfaces	1x CAN Controller - upto 1Mbps
	2x RS485 Full Duplex - upto 5Mbps
	3x GPIO Outputs
Interface	CCSDS

Electrical, Mechanical and Thermal Characteristics:

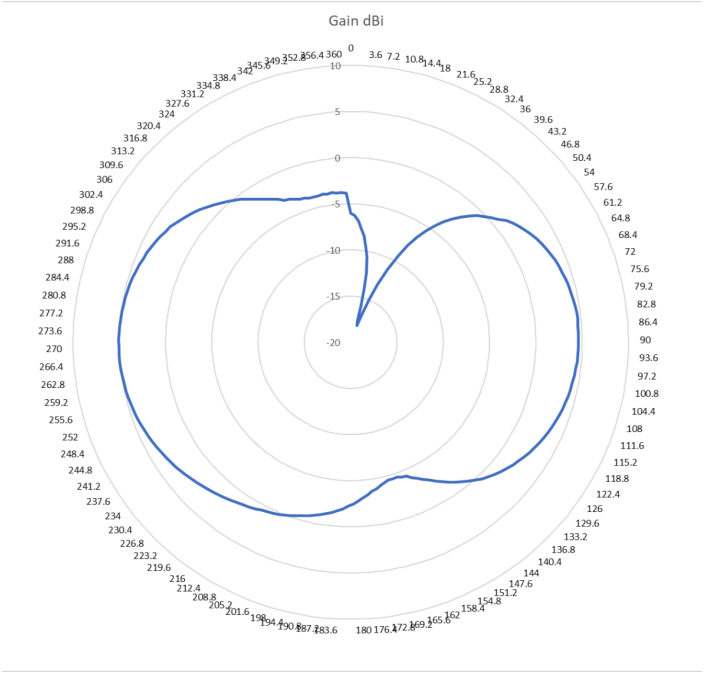
Nominal Voltage	5V
Maximum Voltage	12V
Temperature range	-40 to 85°C
T-Vac	2 Cycles with temperature range of +60°C to -25°C
Vibration	Random vibration acceptance test levels 20 - 2000 Hz at 4.47grms for 60 seconds
Shock	100 Hz at 30g 1000 Hz at 1500g 5000 Hz at 1500g
Dimensions	90.83 mm x 85.21 mm x 25.36 mm
Mass	170 g

UHF Antenna Datasheet:

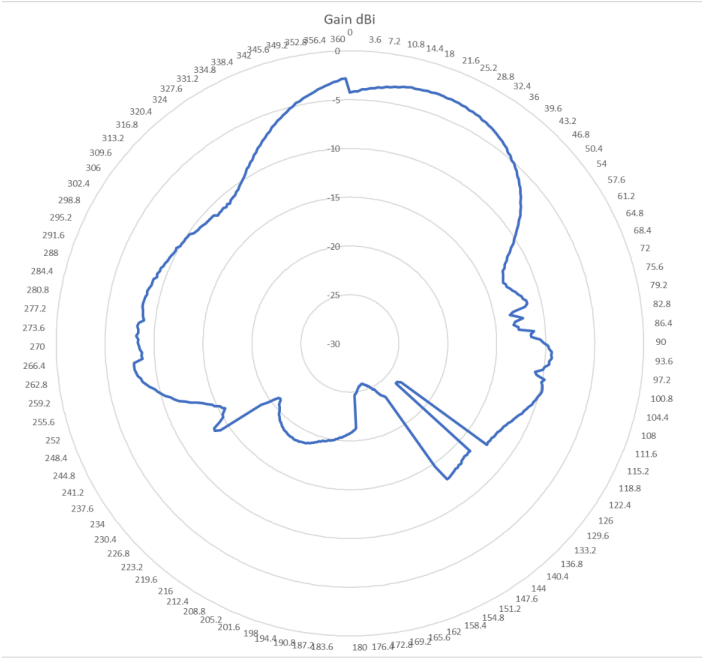
Parameter	Value
Antenna Type	Turnstile - Uplink & Downlink
Frequency operation band	370 - 420 MHz
Realised Antenna Bandwidth (<10 dB S11 consideration)	50 MHz
Axial Ratio	<3dB
Maximum Isotropic gain	5 dBi
Polarisation	RHCP
Directionality	Bi-Directional
FOV Azimuth (>0 dBi)	240 deg
FOV Elevation (>0 dBi)	120 deg
Dimensions (Each element)	135 mm x 3 mm ∅
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

Radiation Pattern:

a. Azimuth



b. Elevation



Questions? Queries? Contact us at info@tm2.space