AAC CLYDE SPACE

COMMUNICATIONS

PULSAR-HSTX

The PULSAR-HSTX-A and PULSAR-HSTX-C are compact S-Band transmitters designed for CubeSat missions operating at amateur and commercial frequencies, respectively. They are compatible with the CubeSat standard, with a CubeSat Kit PC/104 form factor. The transmitters implement OQPSK and QPSK modulation with transmission data rates of up to 10 Mbps (HSTX-A) and 8 Mbps (HSTX-C), respectively. The transmitters are ideal for space missions where a high data rate downlink is required. They implement an open network encoding scheme based on the IntelSAT IESS-308 specification, which allows this product to be used with low-cost commercial satellite demodulators.

The PULSAR-HSTX solution is compatible with our S-Band Patch Antenna. A nadir facing S-Band patch antenna can also be incorporated into the CubeSat design. Its small size, low profile, rugged design and high directionality make it an excellent addition to the system. The S-Band patch antenna is designed to be mounted on the nadir facing side of a CubeSat. A wide beamwidth ensures satellite communication through a wide range of elevation angles. It is machined from solid aluminium.

POWER

The PULSAR-HSTX-A and PULSAR-HSTX-C have a low power consumption and total power consumption of < 5 W (for maximum RF power output). With a selection of transmit output power levels from 24 dBm to 30 dBm in 2 dB steps makes the PULSAR-HSTX an attractive solution. Powered from unregulated bus or regulated 5V.

FREQUENCIES

The PULSAR-HSTX-C and PULSAR-HSTX-A support commercial (2.2 - 2.3 GHz) and amateur (2.4 - 2.45 GHz) bands, respectively, and are user programmable within the bands.

RELIABILITY

The PULSAR-HSTX solution has been tried, tested and trusted on an array of on- orbit missions proving to be not only reliable but efficient.

TECHNICAL SPECIFICATIONS

General	
Temperature	-25°C to +61°C
Power	< 5 W
Voltage	6 V – 12 V (5 V alternative)
Mass	< 100 g
TX SNR	> 20 dB
Frequency	2.2 GHz – 2.3 GHz (PULSAR-HSTX-C) 2.4 GHz – 2.45 GHz (PULSAR-HSTX-A)
RF Power	24 - 30 dBm (1 W RF) in 2 dB steps
Channel Spacing	500 kHz
Spurious Response	< -60 dBc
Design Life	2 years in LEO

Performance	
Processing	• Low-power Flash-based FPGA • V.35 IntelSAT scrambler • ½ rate convolutional encoding (K=7) • Differential encoding • Pulse shaping filter
Interfaces	• Low-speed I^2C Bus – 400 kHz (telemetry and control) • High-speed SPI Bus – 8 MHz (payload data) • 50 Ω SMA connector
Transmission rates	• Up to 10 Mbps (HSTX-A) • Up to 8 Mbps (HSTX-C) • Full, ½ rate modes (HSTX-A/C) • ¼ rate included in HSTX-C
Modulation	• Compatible with commercial demodulators • QPSK or OQPSK • IntelSAT IESS-308 • 6 MHz OBW at 8 Mbps conforms to ECSS-E-ST-50-05C Rev. 2 above 0°C (HSTX-C only) • Conforms to SFCG 21-2R4 emissions mask recommendation at full, ½ rate only (HSTX-A/C)

Dimensions	
Length	96 mm
Width	90 mm
Height	17.41 mm

*Height from top PCB to lowest component

AAC CLYDE SPACE

#SPACEISAWESOME

www.aac-clyde.space