AAC CLYDE SPACE

CUBECOM

Cape Peninsula University of Technology

Communications

PULSAR-DATA

PULSAR-DATA compact transmitter solutions are designed for advanced missions where a high data rate downlink is required.

PULSAR-STX

The low power consumption PULSAR-STX solution operates at amateur and commercial bands respectively and is user programmable within bands. The transmitter implements QPSK modulation with transmission data rates of up to 2 Mbps. It utilises an open network encoding scheme based on the IntelSAT IESS-308 specification which allows this product to be used with low-cost commercial satellite receivers.

PULSAR-XTX

The PULSAR-XTX is an extremely compact X-Band transmitter designed for CubeSat missions. The transmitter implements OQPSK and QPSK modulation with transmission data rates of up to 50 Mbps. It implements a CCSDS specification which allows this product to be compatible with commercial off-the-shelf satellite demodulators.

These solutions are supplied with user manuals, flight boards and STEP files for seemless system integration

FREQUENCIES

The PULSAR-STX support commercial (2.2 – 2.3 GHz) and amateur (2.4– 2.45 GHz) bands. The PULSAR-XTX is in-flight configurable in 100kbps steps, covers the 8.025 – 8.375 GHz frequency range in-flight configurable in 1 MHz steps.

PERFORMANCE

Both solutions have low power requirements with < 5 W (for maximum RF power output) for the PULSAR-STX and <10 W for the PULSAR-XTX and are powered from unregulated battery bus or regulated 5V.

RELIABILITY

The PULSAR-STX and PULSAR-XTX solutions have been tried, tested and trusted on an array of on orbit missions proving to be not only reliable but efficient. The PULSAR-STX was part of the UKube-1 mission, the UK Space Agency's first national spacecraft.

The PULSAR-DATA range has extensive flight heritage and are compatible with our low profile patch antenna.

TECHNICAL SPECIFICATIONS

S-band Transmitter

General	
Temperature	-25°C to +60°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 (HSTXC) 2.4 GHz – 2.45 GHz (HSTX)
RF Power	1 Watt (30 dBm)
Tx Data Rate	2 Mbps (STX) 8 Mbps (HSTXC) 10 Mbps (HSTX)

Performance	
Processing	• Low-power Flash-based FPGA • V.35 IntelSAT scrambler • ½ rate convolutional encoding • Differential encoding • Pulse shaping filter
Interfaces	• Low-speed I2C Bus – 400 kHz • High-speed SPI Bus – 8 MHz • 50 Ω SMA connector
Modulation	• OQPSK or QPSK • IntelSAT IESS-308

Dimensions	
Length	96 mm
Width	90 mm
Height*	17.41 mm

*Height from top of enclosure to lowest component on bottom.

X-band Transmitter

General	
Temperature	-25°C to +60°C
Power Consumption	< 15 W
Mass	< 130 g
Input Voltage	6.2 V - 17 V
Frequency	8.025 GHz – 8.375 GHz
Maximum RF Power	2 Watt (33 dBm)
Channel Spacing Frequency	1 MHz
TX SNR	> 20 dB
Spurious Response	< 60 dBc
Tx Data Rate	10-50 Mbps
Transmit Frequency Stability	50 ppm
Output Spectral Mask	SFCG 21-2R4
Configuration	HPA included (2W)
Unit Telemetries	3x currents sensors, 3x temperature sensors, RF Power, P-LL status

Perfomance	
Processing	• Low-power flash-based FPGA • ½ rate convolutional encoding (K=7) • CCSDS FEC and scrambler • Pulse shaping filter
Interfaces	• SPI payload data bus or optional LVDS interface using quad SPI for high data rates • 50 Ω SMP connector
Modulation	• OQPSK or QPSK • CCSDS • Conforms to SFCG 21-2R4 emissions mask specification

Dimensions	
Length	96 mm
Width	90 mm
Height*	11.7 mm

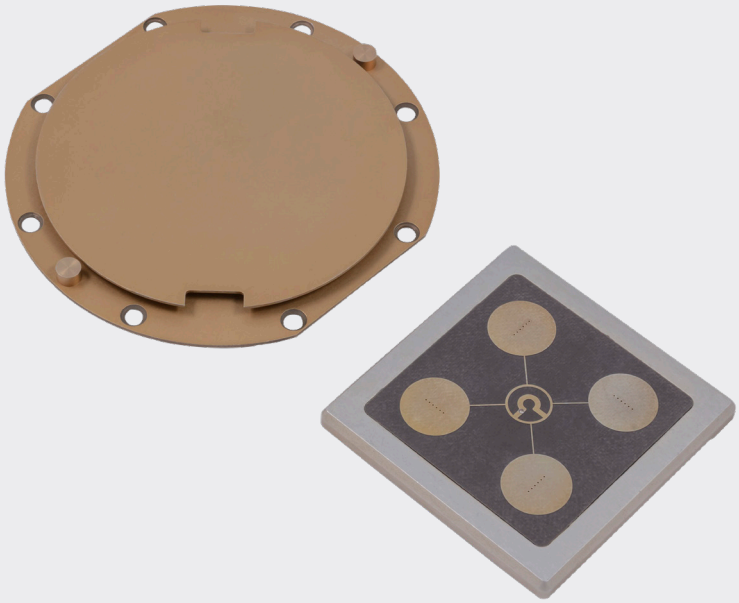
* Height from top of enclosure to lowest component on bottom.

TECHNICAL SPECIFICATIONS

Patch Antenna

	PULSAR-SANT	PULSAR-XANT	XANT-PLUS
Frequency	2.2 - 2.3 GHz (C) 2.4 - 2.45 GHz (A)	8.025 - 8.45 GHz	8.025 - 8.45 GHz
Band / Beamwidth	60°	200 MHz	425 MHz
Gain	7 dBi	7.75 ± 0.5 dBi	11.5 ± 0.5 dBi
S_{11}	< -15 dB	< -15 dB	< -14 dB
Mass	< 50 g	< 10 g	< 29 g
Length	81.5 (A) 78 (C) mm	36 mm	58 mm
Width	89 (A) 79.1 (C) mm	36 mm	58 mm
Height	4.1 (A) 4.7 (C) mm	4.7 mm	4.7 mm

PULSAR-DATA series are compatible with our low profile patch antenna. They meet CubeSat Design Standard height limitations for mounts on the exterior chassis and are available in both LHCP and RHCP. Their small size, low profile, rugged design and high directionality make it an excellent addition to the system.



To make an enquiry, request a quotation or learn about AAC Clyde Space's other products and services, please contact:
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