NanoCom AX2150

The NanoCom AX2150 is a half-duplex software configurable radio transceiver specifically designed for Telemetry and Telecommand (TMTC) in the S-band.

The combination of Forward Error Correction (FEC), Automatic Frequency Control (AFC), and digital channel filtering results in a high sensitivity receiver, without sacrificing flexibility.

The radio module supports full in-flight reconfiguration of the carrier and intermediate frequencies, bitrate, modulation options, and channel-filter bandwidth.

Smart CSMA/CA (listen before talk) medium access control combined with a short RX/TX switching time ensures a short satellite ping time, thus effectively eliminating the need for full-duplex radios.
The integrated design of microcontroller, peripherals, transceiver, and RF front-end results in a compact PCB module that fits up to four times onto a CubeSat PCB (stack board).

The Software and multiple hardware components are based on the GomSpace NanoCom AX100 product, which has been extensively space proven with a long and successful flight heritage by our customers worldwide since 2014.

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Technical Information

NANOCOM AX2150 - KEY FEATURES:	
Transceiver/Controller	• Advanced high-performance narrow-band transceiver for S-band TMTC operation • Compact daughter-board form-factor (compatible with GomSpace NanoDock DMC series) • 32 kB FRAM for persistent configuration storage • Temperature monitoring, adjustable over-temperature protection, and brown-out detection • Tested to ECSS-22900 level E (20 kRad(Si))
RF Features	• Spacecraft variant: Uplink / Downlink: 2025-2110 MHz / 2200-2290 MHz, for use in SO, EE, EO bands • Bitrate from 2.4 kbps to 90 kbps • RF carrier frequency programmable in 1 Hz steps • Configurable modulation frequency deviation (modulation index) • Transmitter with adjustable (8 mW to 500 mW) output power. • RX front-end protection against high-power RF signals up to +20 dBm • Antenna port interface both the RX and TX paths • Automatic frequency control (AFC)

Baseband and Protocol	• GFSK/GMSK modulation schemes
	• Frame encapsulation:
	   – 32-bit ASM + Golay encoded variable length field.
	   – HDLC and AX25 available for legacy systems
	   – HDLC with r ½ k=7 Viterbi encoding
	   – AX.25
	• Framing options:
	   – Reed-Solomon FEC (223,255)
	   – CRC32
	   – CCSDS Randomization
	   – HMAC (authentication)

Interfaces	• Multiple CSP data interfaces: I2C, UART, CAN • ESD protected UART/GOSH console interface for easy use in development laboratory setup
Mass	• <32 gram including aluminum shield