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MARS UHF TRANSCEIVER

(C/TT-510) ELECTRA-LITE

TRANSCEIVERS

Input Characteristics

Tx Data and Clock	LVDS (1-12 Mbps)
Tx Clock Valid	TTL
Power On Reset	TTL (isolated)
Command and Control	MIL-STD-1553B
RF In	-130 dBm to -70 dBm
Rx RF Frequency	UHF 435 to 450 MHz tunable (56 kHz steps)
Noise Figure	4.0 dB FD (max) 3.9 dB HD (max)

Operating Modes

Half Duplex or Full Duplex (factory set)	
Modulation/Demodulation	BPSK; QPSK; residual carrier Scrambling; differential; Reed-Solomon (255, 239): FEC (R=1/2, k=7); Manchester
Coding	Manchester; Viterbi (soft R=1/2, k=7); differential; descrambling
Decoding	Tx (1, 6, 12 Mbps) Rx (up to 10 Mbps) Relay (1, 2, 4, 8, 16, 32, 64, 128, 256, 1024, 2048, 4096 kbps)
Data Rates	2-way
Doppler Observables	

Output Characteristics

Rx Data and Clock	LVDS (1 to 10 Mbps)
Tx RF Out	8.5 W FD (min) 10.7 W HD (min)
Tx RF Frequency	UHF 390 to 405 MHz; tunable (56 kHz steps)
Frequency Source	Internal ± 2 ppm
RF Power TLM	0 to 5 V analog
Secondary V TLM	0 to 5 V analog
Temperature TLM	Thermistor

Radiation

Total Dose	20 krad 100 mil Al
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Environmental Specifications

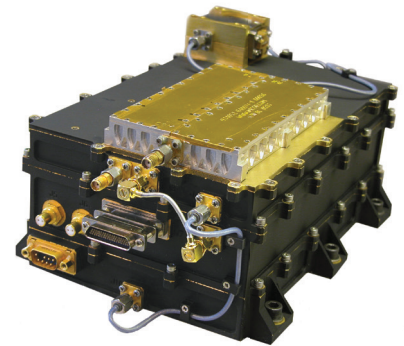
Temperature	- 50 °C to + 110 °C (non-operating) - 45 °C to + 72 °C (operating)
Vibration	Random, 7.9 grms, 3-axis
Shock	2,000 g's

Physical Characteristics

Footprint	6.35" W x 8" D x 4.11" H
Weight	3 kg / 6.61 lb (typical)

Power Requirements

Input Voltage	+ 22 to + 36 VDC
Input Power	65 W FD (typical); 15 W standby 12.6 W boot safe (typical)



The C/TT-510 Electra-Lite Transceiver is flexible enough in its design to accommodate many mission scenarios where data links are required between two spacecraft. The unit can be configured in the factory for full-duplex or half-duplex operation. A unit configured for full-duplex operation with coherent transponding offers navigation capabilities like two-way Doppler ranging as well as the capability to be upgraded with future ranging algorithms. The bands are in-flight tunable in 56 kHz steps over 390 to 405 MHz for transmit and 435 to 450 MHz for receive. This is the reduced mass version of the C/TT-508 Electra Transceiver. This transceiver is ideal for lander missions with stringent mass and energy constraints. Electra-Lite maintains the core functionality, performance and reprogrammability of the standard Electra.

The baseband processor module offers the mission designer a multitude of waveform options. Supported modulation formats include suppressed carrier binary phase shift keying, quadrature phase shift keying or residual carrier in addition to baseband pulse shaping. Encoding options include scrambling (v.38), differential, Reed-Solomon (255, 239), forward error correction ($R=1/2$, $k=7$) and Manchester coding. Decoding options include Manchester, Viterbi, descrambling (v.38) and differential decoding. Additionally, in-flight reprogrammability gives the mission designer virtually unlimited options.



CCSDS PROXIMITY-1 PROTOCOL

The Consultative Committee for Space Data Systems Proximity-1 Protocol incorporated in this transceiver provides error-free communication by employing an error detection and re-transmission service. Additionally, the Proximity-1 Protocol provides an automatic link establishment feature that allows the primary transceiver to reconfigure the secondary transceiver with no intervention from the secondary spacecraft.

C/TT-510 ELECTRA-LITE

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