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T-740E S-BAND LAUNCH VEHICLE TRANSMITTER

Tracking and Data Relay Satellite System (TDRSS) transmitter

The T-740E Transmitter is a rugged, flight-proven Tracking and Data Relay Satellite System (TDRSS) transmitter with successful launches on multiple launch vehicles. It provides the critical connection between a launch vehicle and NASA's TDRSS for complete telemetry coverage during ascent and staging, alleviating dependence on downrange telemetry gathering stations.

SPECIFICATIONS

Frequency Range	2200 to 2300 MHz
Frequency Source	Low-phase noise TCXO
Modulation	QPSK/BPSK/AQPSK/SOQPSK-TG
RF Power Output	Commandable
Single Output	40 W min
Dual Output	15 W min per output
Low-Power Output	3 W min
Input Power	175 W (max) 140 W (typical) 22 to 36 VDC input > 1 MΩ isolation from chassis
Command Inputs	RF mode select commands <ul style="list-style-type: none"> > Full power to any one of J4, J5, J6, J7 > Split power to J4/J5 or J6/J7 combinations > Low power to J8 FEC on/off FEC mode select Modulation select Tx frequency select Tx modulation rate select
Data Inputs	Primary and secondary clock/data (RS-422)
Data Rates	64 Kbps to 10 Mbps
Telemetry Outputs	Analog <ul style="list-style-type: none"> > RF power output (4) > RF reflected power (4) > SSPA temperature Digital <ul style="list-style-type: none"> > RF output state > FEC on/off > Modulation > FEC mode > Tx frequency select > Tx modulation rate select
Weight	15.5 lbs max
Temperature	QTP: -45°C to +85°C ATP: -35°C to +75°C (baseplate temperature)
Mechanical	8.5 L x 10 W x 4.6 H in (277 cubic inches)



KEY FEATURES

- > 40 W RF output supports BPSK, QPSK, AQPSK and SOQPSK-TG modulation formats at data rates up to 10 Mbps
- > Capable of connecting to four S-Band antennas
- > Seamlessly switches between antennas on command
- > Provides continuous antenna coverage throughout the flight with a single transmitter
- > Able to drive two S-Band antennas simultaneously at 15 W or focusing the entire 40 W through one antenna
- > Delivers critical data through the most challenging of channels and conditions

The center frequency of the T-740E transmitter can be set across the TDRSS S-band with simple tuning changes. It uses a low-phase noise temperature-compensated crystal oscillator for the frequency source. Phase noise is less than 5° RMS under vibration conditions experienced during launch. Premodulation shaping of the data is available for optimum spectral containment.

The solid-state power amplifier (SSPA) employs high-efficiency, space-qualified gallium nitride field-effect transistor power devices to generate the 40-watt RF power. Design of the SSPA minimizes compression of the shaped signals over all environments.



EXPERT SUPPORT

The T-740E is designed, built, assembled and tested all within one facility and is serviced and supported by engineering professionals with decades of spaceflight design experience. Every T-740E delivered is accompanied by domain expertise in parts, materials, radiation analysis, mechanical engineering, power supply design, digital signal processing, radio frequency design and manufacturing engineering. For most applications, existing data items can be provided for review, reducing the analysis and testing required.

T-740E S-Band Launch Vehicle Transmitter

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