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# T-748 HIGH DATA RATE TRANSMITTER

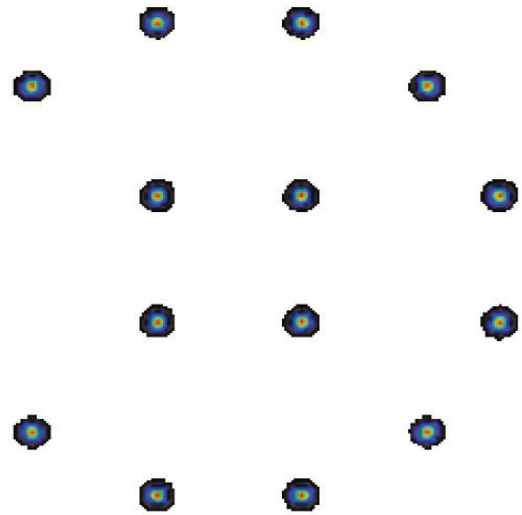
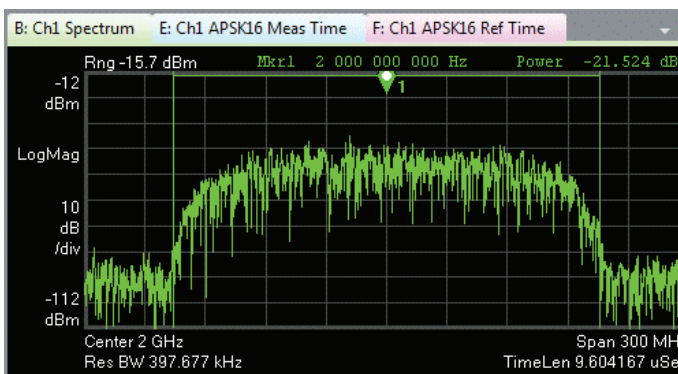
TRANSMITTER		
<b>Modulator (X-Band or Ka-Band)</b>		
Center Frequency	7.8 GHz to 8.4 GHz (X-Band) or 25.25 GHz to 27.5 GHz (Ka-Band)	
Center Frequency Accuracy	< 1.1 ppm	
Modulation Formats	BPSK, (O)QPSK, 8-PSK, 16-QAM, 16-APSK	
Data Framing	CCSDS 401.0, CCSDS 131.0, CCSDS 732.0, CCSDS 355.0, DVB-S2	
Embedded Filters	Digital raised-cosine, root-raised cosine	
Spectral Compliance	NTIA, SFCG, ITU	
Data Rates	100 kbps to 800 Mbps (on-orbit configurable)	
FEC Options	RS (255, 223), Convolutional, BCH, LDPC	
Encryption	NIST-validated AES-256 Counter, cypher feedback, galois counter modes	
Key Loading	Simple key loader DS-101 over RS-232D	
Key Protection	AES KEK and TEK support via EKMS 308 and SP800-38F	
Output Power	-10 dBm to +10 dBm; variable in 0.5 dB steps and compensated over temp	
Size	6.325" L x 7.1" W x 4.0" H	
Weight	< 5.4 lb	
Control Interface	RS-422 UART, redundant	
Data Interface	LVDS (standard)	
RF Interface	SMK; WR-34 available for Ka-Band	
DC Power Interface	Redundant 22-36 Volts	
Power Consumption	< 30 W	
Operating Temperature	-34 °C to +71 °C	
Radiation: TID	50 krad	
Radiation: SEL	75 MeV/mg/cm <sup>2</sup>	
Fatigue Lifetime	> 100,000 cycles	
Telemetry (analog)	Secondary power supplies (1.2V, 3.3V, 5.8V, 12V)	
Telemetry (digital)	Temperature, RF reflected power, 12V secondary	
<b>Solid State Power Amplifier (SSPA) (Available as separate module)</b>		
	<b>X-BAND</b>	<b>KA-BAND</b>
Output Power	12 W	10 W
Size	2.68" x 6.75" x 7.25"	1.5" x 4.75" x 6.5"
Weight	8.5 lb	3.5 lb
Power Consumption	< 75 W	< 60 W



The High Data-Rate Transmitter (T-748) is a software-defined radio that provides several design enhancements including: advanced high-speed digital signal processing, integrated forward error correction and AES-256 encryption and digital modulation and filtering techniques. With firmware reconfigurable to support CCSDS, DVB-S2, or proprietary formats, the T-748 can be made to interoperate with any ground station. The design is inherently flexible to support X- or Ka-Band frequencies (factory configurable).

Designed from the ground up via a traditional EEE Level 2 parts and material program, the T-748 adapts the latest technologies within our proven parts and design methods resulting in 100 percent on-orbit reliability. When paired with our high-efficiency Gallium Nitride (GaN) solid-state power amplifier (SSPA), the combined platform provides a robust, high-rate connection to Earth from any platform or orbit.

The T-748's robust signal processing provides the highest levels of signal integrity, integrating digital filtering that greatly simplifies external analog filtering requirements. The figures below showcase a 400 MHz wide 16-APSK modulation – generated with very low levels of realized distortion, ensuring ground station reception. Our SSPA technology provides proven high-power capability, based on mature GaN devices that are readily extensible to 20 W or higher outputs in X-Band. Adaptable and modular to integrate with a variety of spacecraft and satellite buses, the T-748 has been delivered into multiple platforms and customers. Data inputs are generally received via 8-bit parallel LVDS formats, but other formats can be accommodated with minor modifications to the platform. The T-748 can be configured to provide a reference clock to the data source, or the data source can provide its own timing reference.



## EXPERT SUPPORT

The T-748 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-748 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.

### High Rate Data Transmitter (T-748)

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L3Harris Technologies is an agile global aerospace and defense technology innovator, delivering end-to-end solutions that meet customers' mission-critical needs. The company provides advanced defense and commercial technologies across air, land, sea, space and cyber domains.



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