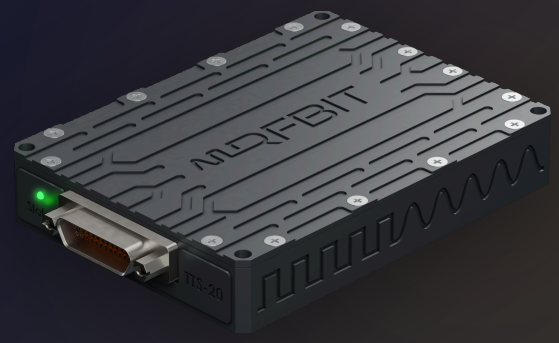
TTS

Telemetry Transmitter

The TTS-20 is a 125 g IRIG-106 telemetry transmitter for UAV, missile, rocket and manned flight test: 20 W of RF from 1 to 3 GHz, six waveforms and AES-256 on the payload, on the same connector and pinout as every other TTS.



TTS-20

FREQUENCY RANGE	MAX RF POWER	MAX SYMBOL RATE	WEIGHT
1 – 3 GHz	20 W	20 MSps	125 g

The TTS-20 is a software-defined telemetry transmitter for airborne flight test. It operates anywhere from 1 to 3 GHz in 500 kHz steps and transmits PCM/FM, MSK, GMSK, GFSK, SOQPSK-TG and SOQPSK-MIL at symbol rates from 50 kSps to 20 MSps — up to 40 Mbps of telemetry data. Frequency, power, waveform and rate are configuration items, changed by the user over the Ethernet or serial interface; nothing on the unit is fixed at the factory.

Output power is set from 0.01 mW to 20 W in 1 dB steps; with a tracking ground antenna the link holds past 250 km. LDPC, Reed-Solomon and convolutional coding correct errors at the receiver without retransmission, an IRIG 15-bit randomizer keeps the spectrum well behaved, and AES-256 encrypts the full payload. The output stage is fully VSWR protected, so an open or mismatched antenna port cannot damage the transmitter.

All power, data and control lines come in on a single 25-pin Micro-D connector: one Fast Ethernet port, two RS-422 channels, two RS-232 channels and four TTL discrete I/O lines. RF output is on a 50 Ω SMA connector. The connector, pinout, M3 mounting pattern and configuration software are identical across the TTS family, so any model can be substituted for another without changes to the platform. All TTS transmitters are ITAR-free and qualified to MIL-STD-810G and MIL-STD-461F.

Key Features

SDR Based Architecture
Frequency, output power, modulation and symbol rate are user-configurable via the Ethernet or serial interface

IRIG-106 Compatible
Standard PCM encodings and 15-bit randomizer; works with existing IRIG-106 ground stations and any compatible receiver

Six Modulations
PCM/FM, MSK, GMSK, GFSK, SOQPSK-TG and SOQPSK-MIL, selectable per mission

FEC & Encryption
AES-256 payload encryption with LDPC, Reed-Solomon and convolutional forward error correction

Built-in Protection
ESD and lightning transient protection, OVP / UVP / OCP / OSCP / OOLP on the supply, inrush current limiting and a VSWR-protected RF output

ITAR-Free
Designed and manufactured in Türkiye with no ITAR-controlled content

UAV | MISSILE | ROCKET | FLIGHT TEST

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Technical Specifications — TTS-20

RF PERFORMANCE

Frequency Range	1 – 3 GHz Changed by the user via software
Frequency Step	500 kHz
Frequency Tolerance	±1 ppm
RF Output Power	0.01 mW – 20 W Changed by the user via software
Power Step	1 dB
TX Channels	1
Phase Noise @ 10 kHz	−98 dBc/Hz
Phase Noise @ 100 kHz	−104 dBc/Hz
Phase Noise @ 1 MHz	−121 dBc/Hz
Phase Noise @ 10 MHz	−138 dBc/Hz
Impedance	50 Ω
Output Protection	Fully VSWR protected

INTERFACES & POWER

Digital Interfaces	1× Ethernet · 2× RS-422 · 2× RS-232 · 4× TTL
Data Connector	1× 25-Pin Micro-D
RF Connector	1× SMA
Input Voltage	12 – 36 VDC
Power Consumption	< 75 W
Supply Protection	OVP · UVP · OCP · OSCP · OOLP
Transient Protection	ESD & lightning
Power Conditioning	Inrush current limiter

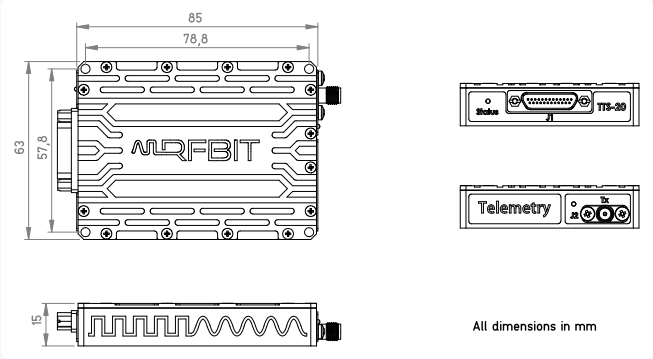
MODULATION & ENCODING

Symbol Rate	50 kSps – 20 MSps, 1 kSps steps Changed by the user via software
Data Rate	50 kbps – 40 Mbps Changed by the user via software
Modulations	PCM/FM · MSK · GMSK · GFSK · SOQPSK-TG · SOQPSK-MIL Changed by the user via software
Randomizer	IRIG 15-bit, self-synchronising
FEC	LDPC, Reed-Solomon, Convolutional Changed by the user via software
Encryption	AES-256, full payload
Bit Encoding	RNRZ-L, NRZ-L/S/M, RZ, Bi-Phase-L/M/S

ENVIRONMENTAL & EMC

Operating Temperature	−40 to +85 °C, baseplate MIL-STD-810G 501.5 / 502.5 Proc II
Storage Temperature	−40 to +85 °C MIL-STD-810G 501.5 / 502.5 Proc I
Operating Altitude	Up to 100,000 ft MIL-STD-810G 500.5 Proc I & II
Humidity	95% R.H. MIL-STD-810G 507.5 Proc II
Acceleration	MIL-STD-810G 513.6 Proc I & II
Vibration	MIL-STD-810G 514.6D-2 Proc I · 514.8D-1 Proc I
Mechanical Shock	MIL-STD-810G 516.6 Proc I & II
EMC	MIL-STD-461F CE102 · CS114 · CS115 · CS116 · RE102 · RS103

MECHANICAL DRAWING



DIMENSIONS	WEIGHT	MOUNTING	MATERIAL
85 × 63 × 15 mm	125 g	4× M3	Aluminium

CONNECTOR PINOUT

1	PWR IN+	14	PWR IN−
2	PWR IN+	15	PWR IN−
3	ETH TX+	16	ETH TX−
4	ETH RX+	17	ETH RX−
5	422-1 TX+	18	422-1 TX−
6	422-1 RX+	19	422-1 RX−
7	422-2 TX+	20	422-2 TX−
8	422-2 RX+	21	422-2 RX−
9	232-1 TX	22	232-1 RX
10	232-2 TX	23	232-2 RX
11	TTL 1	24	TTL 4
12	TTL 2	25	DGND
13	TTL 3		

Pin 25 (DGND) is the ground reference for the TTL and RS-232 lines.

Accessories

PART NUMBER	DESCRIPTION
TTS-ACC-CBL-25D	25-Pin Micro-D Interface Cable, 1 m (extra)
TTS-ACC-ANT-S24	S-Band Omnidirectional Antenna (2.2–2.4 GHz)
TTS-ACC-PSU-28V	28 VDC Power Supply Unit
TTS-ACC-SMA-M	SMA Male to N-Type Female RF Adapter
TTS-ACC-CFG-USB	USB Configuration & Monitoring Cable

Ordering Information

PART NUMBER	RF POWER	COLOUR
TTS-2-G / TTS-2-B	2 W	Tactical Grey / Stealth Black
TTS-10-G / TTS-10-B	10 W	Tactical Grey / Stealth Black
TTS-20-G / TTS-20-B	**20 W**	**Tactical Grey / Stealth Black** ◀ This model
TTS-D-20-G / TTS-D-20-B	2 × 20 W	Tactical Grey / Stealth Black

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