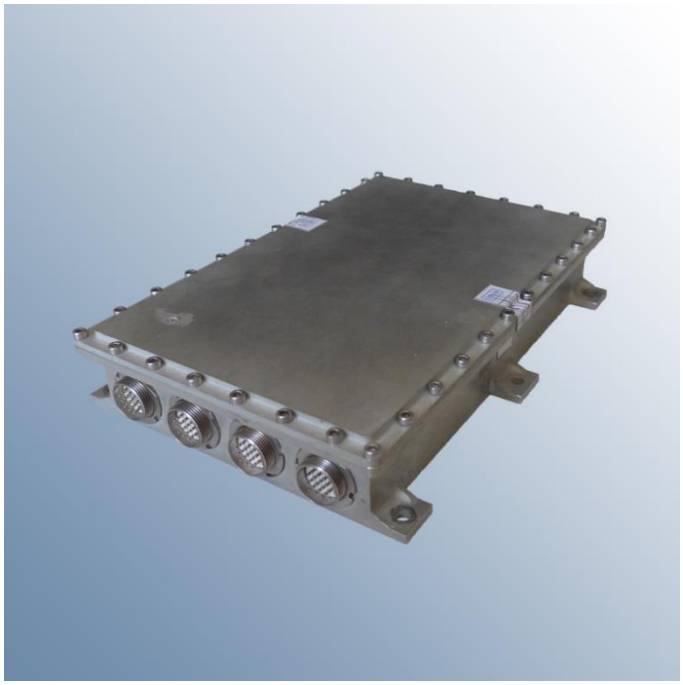
High-speed X-band Downlink Transmitter

The High-speed X-band Downlink Transmitter (PRD3) provides reliable high throughput communication channel from the spacecraft to ground stations.



Applications

- Small satellites
- Larger spacecraft with steerable antennas
- Human-rated spacecraft (ISS)

Features

- Flexible state-of-the-art modulation and error correction coding
- Compact size
- Customizable data and control interfaces
- Benign thermal control requirements

Specifications

Carrier frequency			8225 MHz (factory settable 8.1-8.5 GHz)
Frequency stability, including temperature and aging			±4 ppm
Output power			8 W (max T, EOL)
Modulation			QPSK, 8PSK, 16APSK and 32APSK (in development)
Symbol rate			200 Msymb/s (customizable)
Error correction coding and framing			CCSDS 131.0-B-2 par.7.3 (LDPC (8160,7136)) or DVB-S2
Throughput			520 Mbps (CCSDS), up to 880 Mbps (DVB-S2)
Spectral mask			NTIA; baseband SRRC 0.35
Power consumption			70 W
Power supply			27 V (23-34 V)
Weight	1.8 kg	Size	230x154x45 mm
Operating temperature			-20 °C to +50 °C
Survival temperature			-50 °C to +65 °C
MTBF	250k hours	Design life	7 years
Radiation at the component level			>6 krad (average enclosure shielding 1.5 g/cm^2)
SEL tolerance			>40 MeV·cm^2/mg
Data interface			Customizable LVDS. Two ports with 4 pairs each (clock input/output, data, optional enable)
Control and telemetry interface			RS-422 or MIL-STD-1553
Discrete telemetry			2 temperature sensors, 3 optoisolated outputs (OK, overheat, output power loss)

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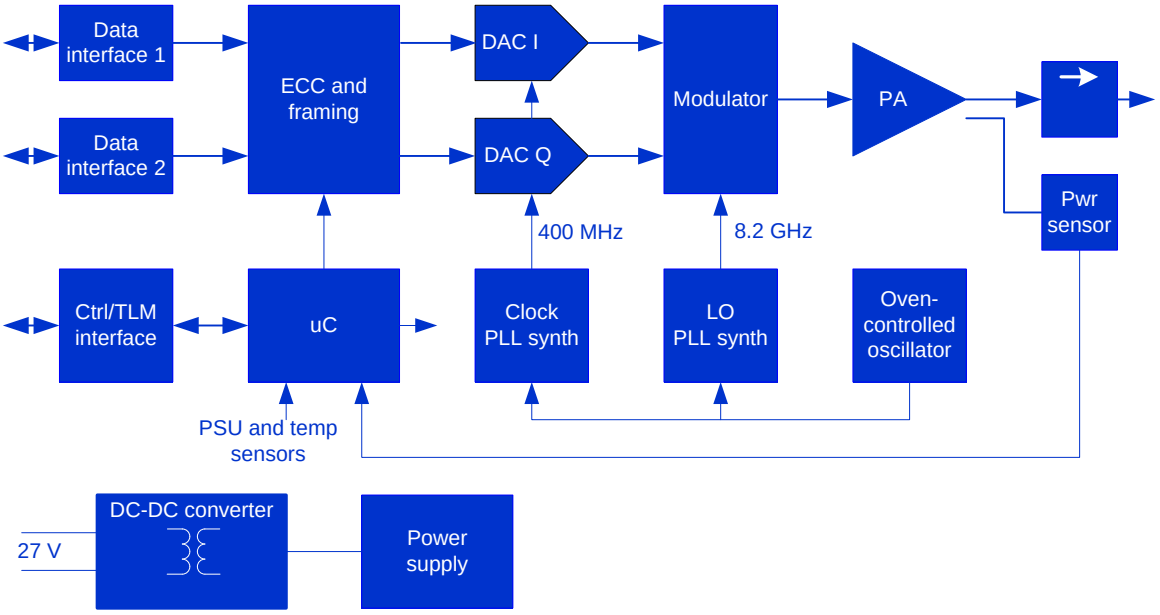
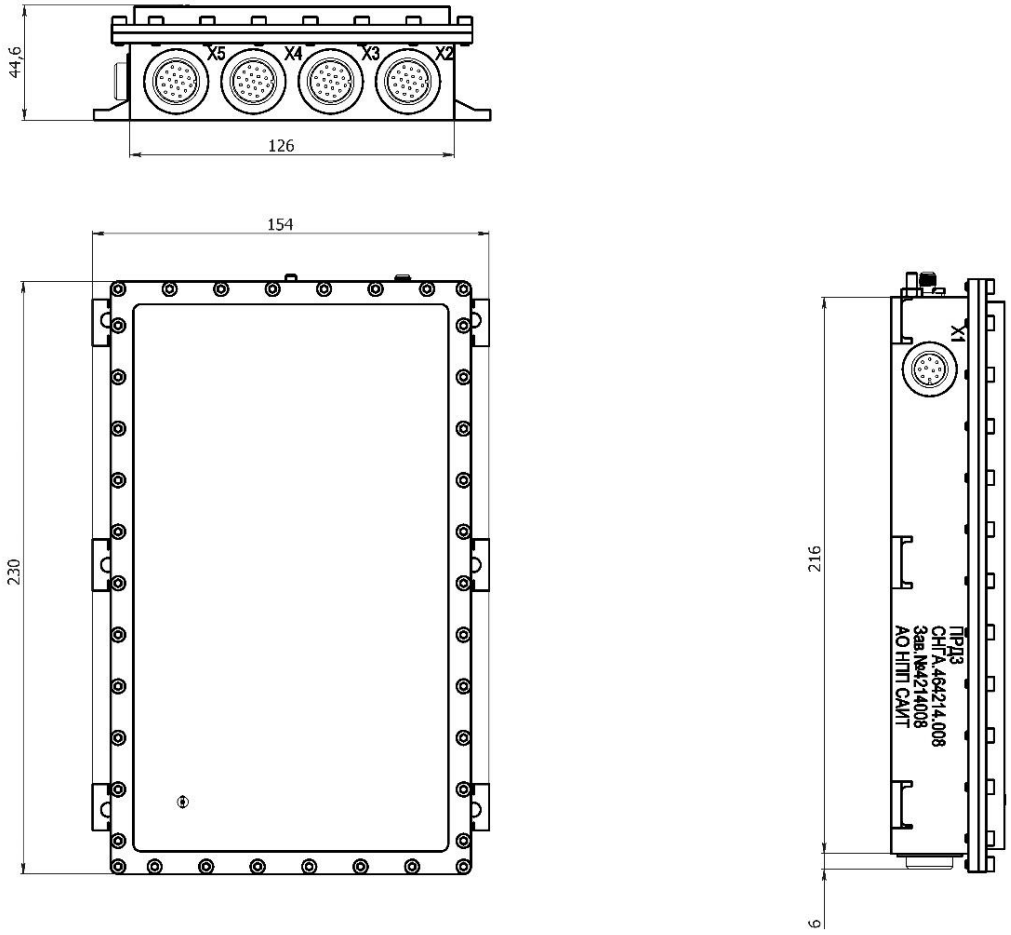
Block diagram



Mechanical outline drawing



Heritage

High-speed X-band transmitters successfully work on the following spacecraft: ISS (previous generation transmitter) – 8.5 years, AIST-2D – 3 years and on other satellites.