

High-speed X-band Downlink Transmitter

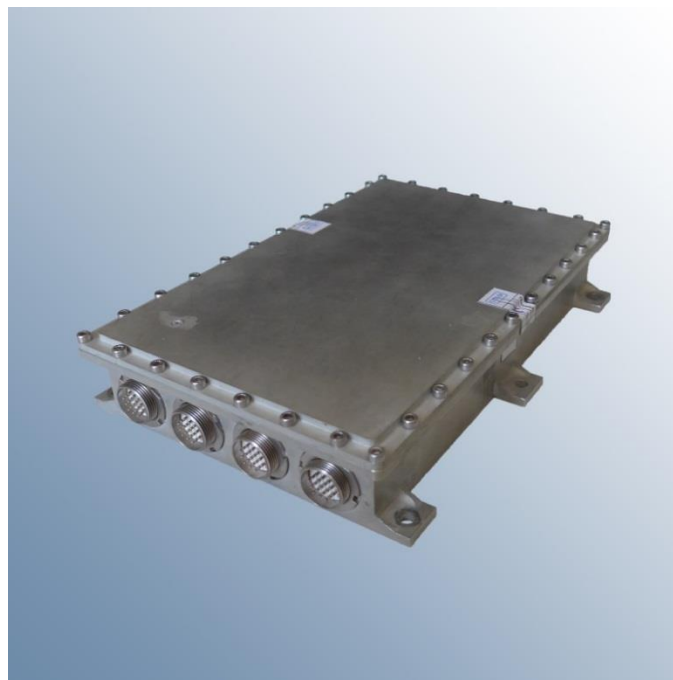
The High-speed X-band Downlink Transmitter (PRD3) provides reliable high throughput communication channel from the spacecraft to ground stations.

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) | | |

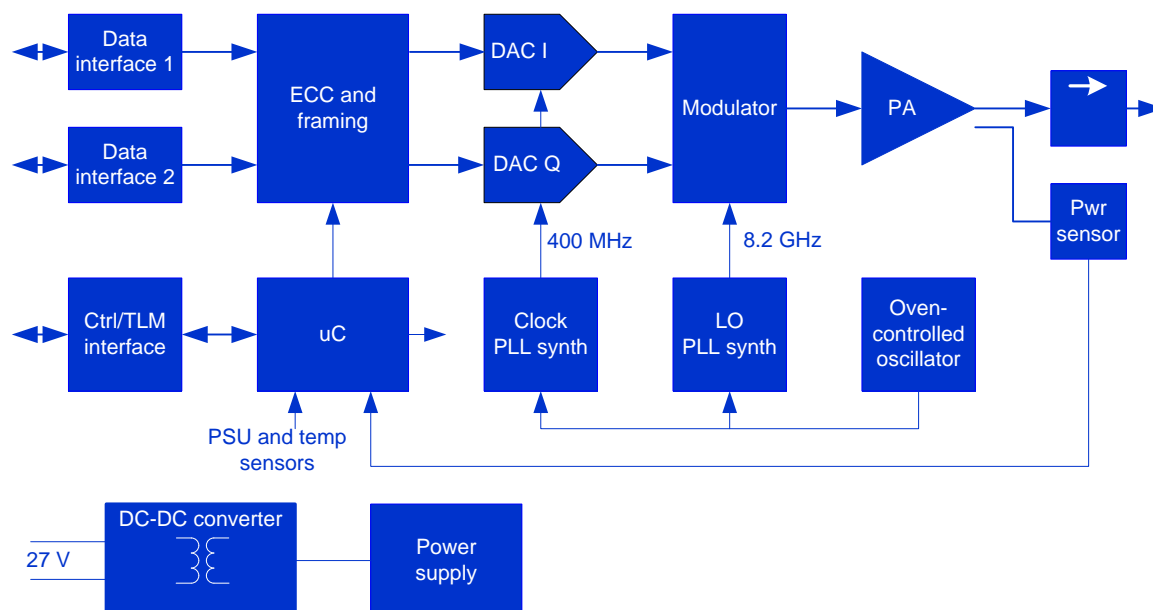
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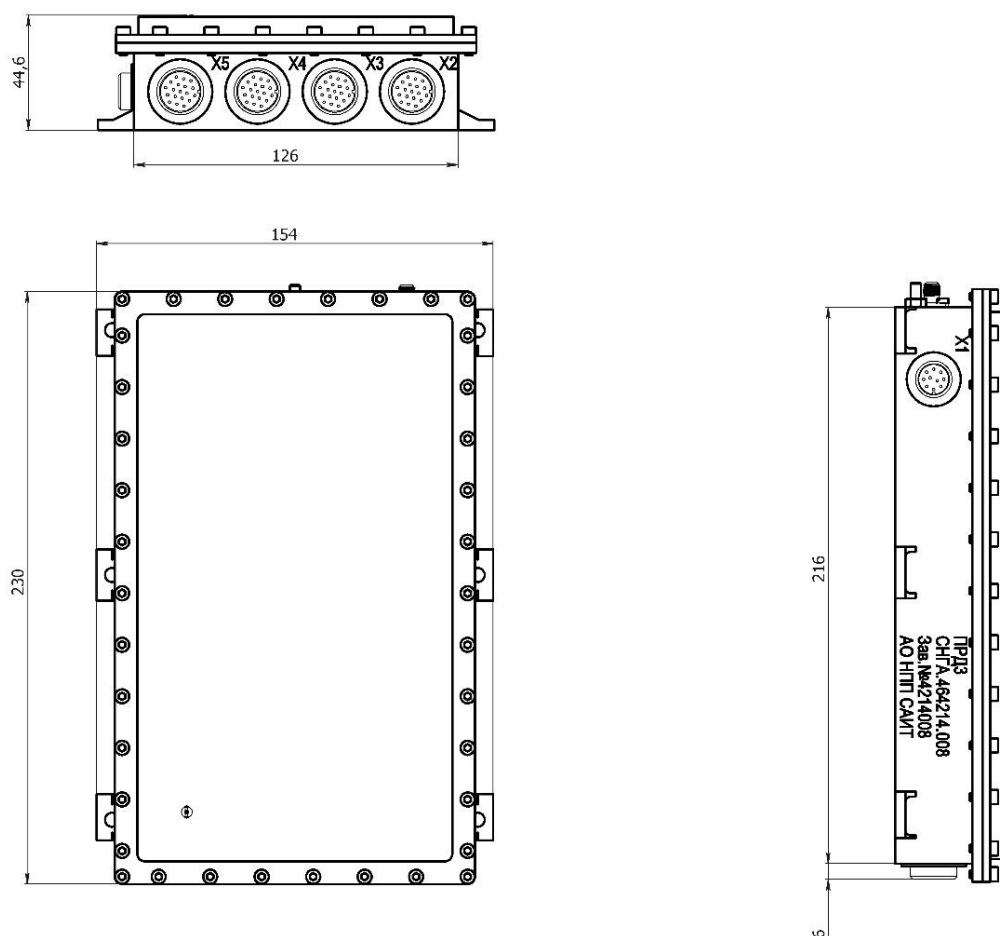
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Block diagram



Mechanical outline drawing



Heritage

High-speed X-band transmitters successfully work on the following spacecraft: ISS (previous generation transmitter) – 7.5 years, AIST-2D – 2 years and on other satellites.