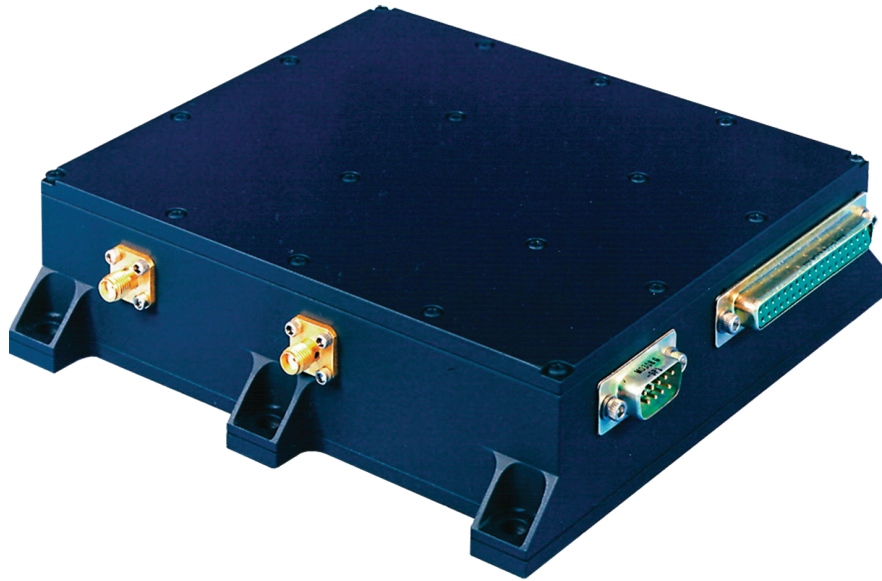


Viceroy-4 GPS Spaceborne Receiver

Superior positioning with 100+ years of on orbit performance



Design based on legacy space qualified digital design

20 years of trouble-free spaceflight heritage

Same reliable position, velocity, time, pseudorange and carrier phase at 1Hz

Same form-factor and interface control as heritage Viceroy receiver

General Dynamics' Viceroy™-4 Global Positioning System (GPS) Spaceborne Receiver provides position, velocity, and time information for Low Earth Orbit (LEO) and Geostationary Earth Orbit (GEO) applications. Performance and satellite visibility are enhanced through the use of dual antennas; each of the 12 GPS channels can be assigned to either antenna. The design supports RS-422 interface.

Features

- Space Qualified Digital Design
- Full Spaceborne Capability
- Autonomous Operation
- Pseudorange and Integrated Carrier Phase at One Second Rate
- One PPS Clock Output Synchronized to GPS Time
- Radiation Hardened Static RAM
- Up to 12 Receive Tracking Channels
- 53 Cubic Inches
- 2.4 Pounds
- 20 to 35 VDC Operation
- Improved Radiation Hardened Digital Electronics
- 12 Channels Support All-in-View Tracking
- Dual Antenna – Any Channel Assigned to Either Antenna
- Fast Cold Start Mode Simplifies Integration and Autonomous Operation
- Low Signal Acquisition and Tracking Supports GEO Sidelobe Tracking
- Enhanced Resolution 1 Pulse per Second Output
- Time-Strobe Input

Standard positioning service in space

Performance Characteristics

Receiver Architecture

- 12 channels with enhanced fast acquisition
- Dual antenna – any channel to either antenna
- L1: 1575.42 MHz, C/A code
- Carrier-aided code tracking
- Based on legacy Viceroy architecture (hardware and software)

Input/Output

- RS-422 serial I/O (standard)
- MIL-STD-1553B (optional)
- X.25 protocol with ECEF position, velocity, time, longitude, latitude, pseudorange, carrier phase
- One pulse per second (GPS, UTC, or Measurement Epoch Time)
- Time strobe input signal
- 9-pin male Micro-D for prime power
- 37-pin female Sub-D for command and telemetry

Solution Accuracy

- Autonomous Position: < 15 meters, 1 sigma
- Autonomous Velocity: < 0.05 meters/second, 1 sigma
- 1PPS time: < 100 ns, 1 sigma

Time to First Fix

- 60 seconds, cold start

Orbital Dynamics

- Altitude: LEO to GEO (200 km – 45,000 km)
- Velocity: up to 16,000 meters/second
- Acceleration: 1G

Optional and Custom Features

- Serial Port – 1553 or standard RS422
- Code Types: L1 C/A
- Kalman filter or least squares solution
- Single string or redundant configurations
- Low signal acquisition and tracking to 20 dB-Hz (GEO side lobes)
- Precision internal reference Ovenized Crystal Oscillator (OCXO)
- External 10 MHz reference oscillator
- Time Strobe Input: < 100 ns, 1 sigma

Antenna

- Active microstrip patch antenna (LEO), 0.4 lbs
- High gain multi-element antenna (GEO), 1.0 lb
- Power supplied by Viceroy-4
- SMA female connection on receiver and antenna

Physical/Environmental

- Size: 6.0" x 5.2" x 1.7" (152 x 132 x 43 mm)
- Weight: 2.4 lbs (1.1 kg) max
- DC Power: 7 W max; steady-state tracking (20-35 V)
- Vibration: 17 Grms
- Shock: 1750 G @ 500 Hz
- Temperature: -20°C to +60°C

GENERAL DYNAMICS

Mission Systems

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