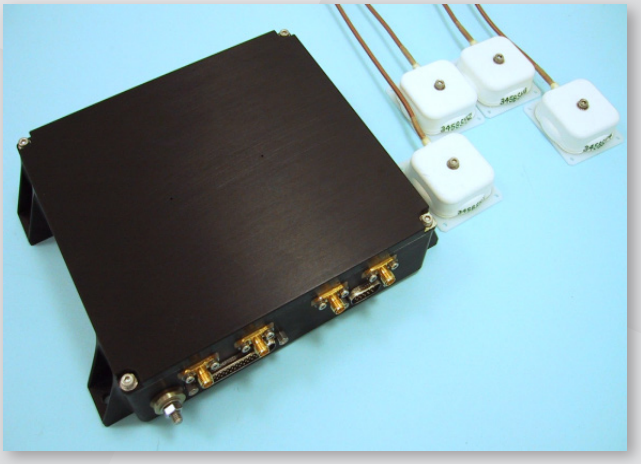
Changing the economics of space

SURREY
SATELLITE TECHNOLOGY US

Subsystem

SGR-20

Positioning and timing information provided by the receiver can be processed to obtain orbital information. Surrey can provide expertise on orbit determination solutions using the Surrey space GPS receiver.



Applications

- Navigation for LEO missions
- Orbit and position determination
- Post-maneuver orbit determination
- Payload data time stamping
- Accurate timing and synchronization
- Three-axis attitude determination

Features

- 24-channel L1 C/A code space GPS receiver
- Extensive flight heritage
- Manufactured to ECSS standards
- Fast start-up
- High visibility and redundancy
- Radiation tolerant design
- Four active patch antennas included
- 7-year design life

Heritage

- 20 receiver units flown
- NASA, USAF, and ESA missions
- >100 orbit years in operation

Antenna Configurations

- Co-visible: antennas on space facing facet, 24 channels available for rapid acquisition; attitude determination capability when suitably mounted
- Extra-visible: antennas on opposite facets of satellite, 12 channels allocated to each, permits parallel search and operation

Interfaces

- 50-ohm antenna interfaces (SMA)
- CAN (ISO11898) and RS422 TM/TC interface
- Pulse-per-second (IEE442) (TTL, RS422, LVDS)

Options

- Low-profile box configuration available
- Passive antenna and external LNA

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Specifications

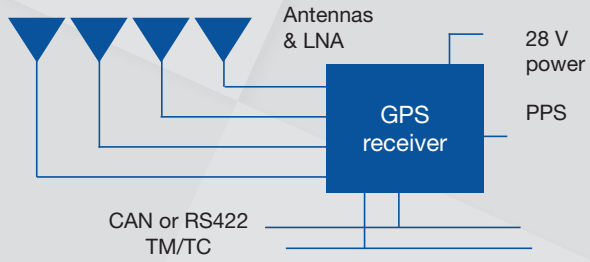
	Typical (95%)	Max (95%)
Orbital Position (3D)	10 m	20 m
Orbital Velocity (3D)	0.15 m/s	0.25 m/s
Time	0.5 µs	1 µs
Time to First Fix	70 s warm 210 s cold	90 s warm 300 s cold
Mass	950 g	
Dimensions	195 x 162 x 48 mm	
Power	5.5 W at 28 V (supply 18–38 V)	
Temperature	-20ºC to +50ºC (operating)	
Random Vibration	15 g_{rms} in all axes	
Radiation Tolerance	10 kRad (Si)	

Typical Measurement Precision

Pseudo Range	0.9 m
Carrier-Smoothed Range	0.15 m
Carrier Phase Noise	2 mm
Doppler Velocity	0.5 m/s
Carrier Range Rate Velocity	0.03 m/s

Product specification subject to change without notification

Typical Use



- Radiation: unit designed to be radiation tolerant with counter measures against SELs and a watchdog reset function
- Antenna: active patch antenna weighing 50 g and having dimensions of 45 x 45 x 20 mm
- Non-volatile memory: flash-memory-stored software to allow rapid booting and upgrades
- Performance: based on circular polar low-Earth orbit with typical ionospheric and ephemeris error levels on signals and co-visible antenna configuration
- EMC: tested as per MIL-STD-462D
- Flight software: extensive flight heritage software used on many missions
- User interface: PC software provided for receiver monitoring, control, and data processing

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The small satellite revolution started 30 years ago with Surrey Satellite Technology—the world's premier provider of operational and commercial satellite programs with over 40 satellites launched successfully and 240 years of on-orbit experience gained.

From its Englewood, Colorado, facilities, Surrey supplies complete in-house design, manufacture, launch, and operation of small satellites, to include remote sensing, navigation, and communications payloads, avionics suites and subsystems, ground infrastructure, and training and consulting services.

Surrey Satellite Technology US LLC 345 Inverness Drive South, Suite 100 | Englewood, CO 80112 | 303.790.0653 | www.surreysatellite.com