GEMINI
GPS RECEIVER & ANTENNA

The NSS Gemini Receiver range is L1 frequency GPS Receivers which utilises a heritage GPS chipset. Targeted towards low-cost SmallSat constellations, it allows for space altitude and velocity use cases. The Gemini-SR5 operates from a 5V supply voltage while the Gemini-SR28 operates from an unregulated 28V supply voltage incorporating latch-up protection/detection and a watchdog timer for increased reliability and robustness. The Gemini Receiver range is based on the existing NGPS-01-422 and NGPS-03-422 GPS Heritage Receivers with improved performance and accuracy. The Gemini range introduces two new protocol options, NMEA083 and a Binary protocol.

GEMINI - GPS RECEIVERS

PERFORMANCE	GEMINI-SR28	GEMINI-SR5
FUNCTIONAL CHARACTERISTICS		
Position accuracy [1σ]	<2 m CEP	<2 m CEP
Velocity accuracy [1σ]	<0.1 m/s	<0.1 m/s
Update rate	1 / 2 / 4 / 5 / 8 / 10 / 20 Hz (default 1 Hz)	1 Hz
Operating frequency	L1 (1575.42 MHz)	L1 (1575.42 MHz)
PHYSICAL CHARACTERISTICS		
Dimensions	155 mm x 76 mm x 34mm (excluding connectors)	96 mm x 91 mm x 18 mm
Mass	<500 g	<128 g
Power	<1.5 W (excluding active antenna)	<0.5 W (excluding active antenna)

ENVIRONMENTAL CHARACTERISTICS

Operating Temperature	-10 °C to +70 °C	-10 °C to +70 °C
Mechanical Tests (Qualification)	X-Axis 14 gRMS (random) Y-Axis 14 gRMS (random) Z-Axis 14 gRMS (random)	X-Axis 14.51 gRMS (random) Y-Axis 15.98 gRMS (random) Z-Axis 14.25 gRMS (random)
Radiation (TID) (Qualification)	30 krad (component level)	30 krad (component level)

INTERFACES

Power supply	24 VDC to 36 VDC unregulated (isolated)	5 VDC
Data	RS-422 NMEA	RS-422 (NMEA083 /Binary)
Connector	SMA Female (antenna), D-Sub standard density 9-pin (power) & D-Sub high density 26-pin (communication)	2 x SMA Female (antenna), 15-pin Nano-D
Mechanical	4 x M4 mounting holes	4 x M3 on Cubesat PC104 footprint

Fugro SPACESTAR®
REAL-TIME ACCURATE POSITIONING
SYSTEM ENABLED

FUTURE: Gemini-FR28 & Gemini-FR05: a software-defined, improved performance receiver that is Fugro SpaceStar® enabled.

ACCEPTANCE TESTING: *All FM parts undergo random vibration (10 rms) as well as thermal cycling (four-cycle ambiant pressure) to five degrees beyond operational thermal specifications. However, NewSpace can perform additional environmental testing if required by a client.*
CONFIGURATION MANAGEMENT: *Specifications are subject to change. Please refer to the latest version.*

FEATURES

- L1 receiver
- Small size and low mass
- Radiation tolerant COTS
- Simple to interface

APPLICATIONS

- Accurate determination of orbital position
- Accurate knowledge of time
- Orbit maneuvers
- Time and/or position stamping of payload data

QUALIFICATION

The NewSpace Systems (NSS) GPS Receivers are are based on the NSS NGPS-01-422 and NGPS-03-422 which has been flying for more than a decade. To date, >60 Receivers and >70 Antennae have delivered globally to a variety of international missions and constellation programmes. The Gemini-SR5 has been extensively qualified and has deliveries scheduled for 2024.




GEMINI - ANTENNA

PERFORMANCE

GEMINI-A01
NANT-PTCL1

FUNCTIONAL CHARACTERISTICS

Frequency	1575.42 MHz
Bandwidth	20 MHz
-3 dB beamwidth	≥100˚ (phi = 0˚); ≥100˚ (phi = 90˚)
Return loss	≤-5 dB
Impedance	50 Ohm (matched)
Active gain	≥16 dBiC (@ Zenith)
Polarization	Right Hand Circular (RHCP)
Noise figure	<2 dB
Axial Ratio	<10 dB (@ Zenith)

PHYSICAL CHARACTERISTICS

Dimensions	54 mm x 54 mm x 14.1 mm
Mass	<80 g
Power	<80 mW

ENVIRONMENTAL CHARACTERISTICS

Thermal (operational)	-25 ˚C to +55 ˚C operating, -30 ˚C to +60 ˚C non-operating
Vibration (qualification)	17.28 gRMS (random)
Radiation (TID)	10 krad (component level)

INTERFACES

Power supply	5 VDC nominal
Connector	50 Ω SMA female
Mechanical	4 x M3 through hole

NEWSPACE SYSTEMS

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