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GPS-NAVIC-SBAS RECEIVER

Satellite Positioning System

GPS-NavIC-SBAS Receiver for Space Application

< 10m 3D POSITION ACCURACY	**< 20 cm/s** 3D VELOCITY ACCURACY	**10 km/s** 3D VELOCITY LIMIT	**< 100ns** 1PPS ACCURACY
GPS-NavIC-SBAS CONSTELLATIONS SUPPORTED	**20k rad** RADIATION TOLERANCE	**< 2 W** POWER CONSUMPTION	**1,000 kms** ALTITUDE LIMIT

PRODUCT OVERVIEW

Satellite Positioning System is a combined GNSS receiver and microcontroller device designed for nanosatellite applications. The GNSS receiver processes GPS L1, NavIC L5, and SBAS L1 signals to compute the navigation solution, which is communicated to the on-board computer. The integrated microcontroller can be used to run user's proprietary algorithms. The receiver system provides 25 pin data and power interface connectors, and an SMA connector is provisioned for interface with an active antenna



KEY PERFORMANCE FEATURES

- Satellite Positioning System is designed for Nano-satellites
  - High performance NavIC-GPS receiver
  - Supports 48 Acquisition and 33 Tracking channels
  - Supports 10 Km/s velocity profile
- RS232 UART, SPI & I2C interface
- 25 pin micro-D Male Connector for power and signal interface
- Works with power supply from 12V to 16.8V
- The Satellite Positioning System is populated with SAMV71 microprocessor to execute proprietary algorithms by the user

PHYSICAL & ELECTRICAL

Dimensions	70mm X 60mm
Weight	55 gms (Approx.)
Supply Voltage	12V to 16.8V
Board-to-Board Interface	25 pin micro-D male connector
RF connector	SMA female connector

Specifications of Satellite Positioning System

System Specifications

Channels	GPS SBAS : 19 Acquisition 19 Tracking	NavIC : 14 Acquisition 14 Tracking
Cold Start TTFF @ -130dBm (Combined)	120 sec	
Reacquisition	10 s	
Position Accuracy Open sky, C/N0 of 40 dB-Hz or higher,HDOP < 2, VDOP < 3)	< 10 m (1σ)	
Velocity Accuracy (Combined)	< 0.2 m/sec (1σ)	
Update rate	1 Hz	
Dynamics	Velocity: 10000 m/s	Acceleration: 2 g
Acquisition Sensitivity Cold Start (with active antenna with noise temperature of 100K)	GPS : -133 dBm	NavIC : -133 dBm
Tracking Sensitivity (with active antenna with noisefemperature of 100K)	GPS : -136 dBm	NavIC : -136 dBm
Reference Oscillator stability	0.5 ppm	

Input Messages

Proprietary ASCII	Reset, Message configuration, Version query

Output Messages

NMEA Ver 4.11 (OFF by default)	GGA, RMC, GSV, VTG, GSA, ZDA, GLL
Proprietary binary (ON by default)	As defined in the ICD (measurement counter, navigation state, antenna status, number of satellites used for fix, GPS time, position, velocity, GDOP, PDOP)

Environmental

Operating Temperature	-15°C to +55°C
Storage temperature	-40°C to +85°C
Vibration	$14g_{RMS}$ (random)
Altitude	1000 Km
Radiation (TID)	20 krad

Mechanical

Dimensions (without consideration of connector lengths)	70mm X 60mm
Weight	55 gms (Approx.)
Board-to-Board Interface	25 pin micro-D male connector
RF connector	SMA female connector

Electrical

Operating Voltage	12V - 16.8V
Current	<55 mA

Host Communication over UART

Configuration	TX, RX
Baud Rate	115200 bps
Message Formats	8 data bits, 1 start bit, 1 stop bit,

Antenna (Desirable Specifications)

Receiving Frequency Range	GPS : 1557 MHz - 1606 MHZ NavIC : 1164 MHz - 1189 MHZ
Gain	27dB
VSWR at Center Frequency	< 1.5
Polarization	RHCP
Noise Figure	2.5 dB
DC Voltage	2.5 V - 16 V
DC Current	24 mA

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