

# Navika-300 – Miniature High Performance GPS-SBAS Module



## Features

- ◆ Stand-alone GPS-SBAS positioning module
- ◆ 16 parallel channels for Acquisition and Tracking
- ◆ High performance Correlator for ultra low signal detection and tracking
- ◆ Extremely fast fix times
- ◆ 12.2mm x 16mm form-factor
- ◆ Single 3.3V input supply
- ◆ Edge half-PTH connection points for easy assembly
- ◆ NMEA0183 compatible message format and Custom binary message for host communication



Figure 1: Navika-300

## Product Description

Navika-300 is a L1, C/A code based GPS-SBAS receiver module. Its superior acquisition and tracking sensitivity ensures continuous location availability under poor visibility conditions and even indoors.

Navika-300 is a 12.2mm x 16mm module catering to applications that demand high performance from a GPS module at a form-factor that is compatible with several GPS modules in the market.

Navika-300 supports sub-second positioning in hot start and reacquisition while providing faster location under warm and cold start modes too.

Navika-300 can be interfaced to either active or passive GPS antenna. In addition, the module provides protection/detection circuitry for accidental short/open of the active GPS antenna.

The module provides plethora of interfaces. An SPI port, TWI port, UART port and a full-speed USB port allow the module to be interfaced in a variety of ways to the outside world. The module also supports three general purpose I/O's that can be used to drive LED's or accept external interrupt signal.

Navika-300 supports NMEA-0183 message protocol to communicate the location information. In addition, Accord proprietary messages convey additional information for a tighter integration with the end application.



## Navika-300 Module Details

The Navika-300 brings out some of the essential peripherals for host interface such as SPI port, TWI port, UART port, USB port and GPIO's.

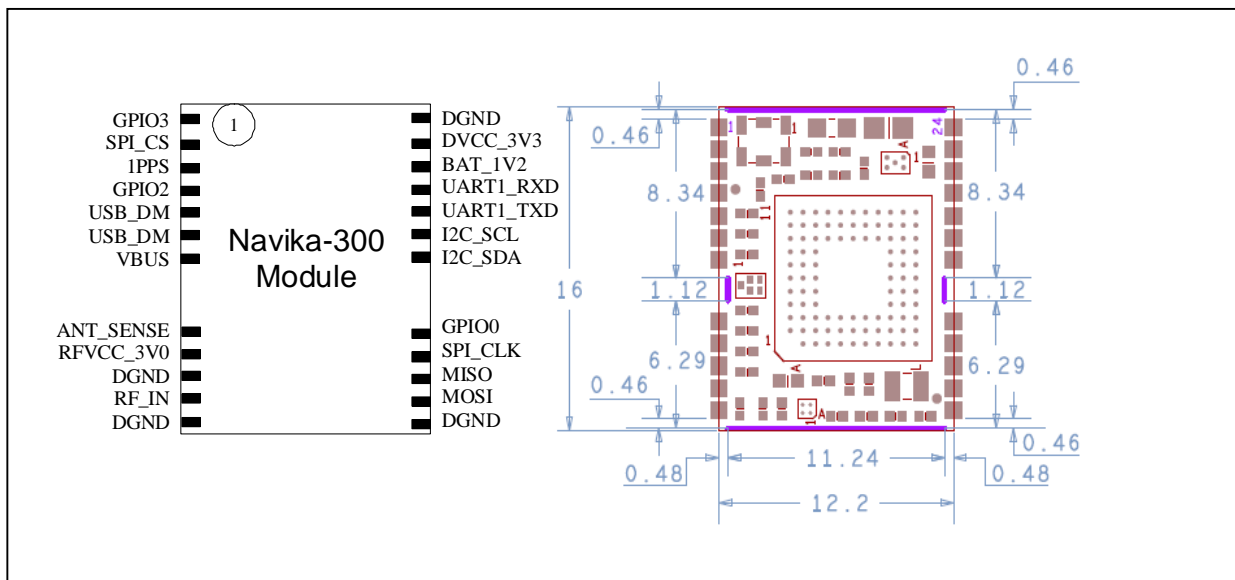
The Navika-300 is targeted for applications that require positioning and/or timing outputs. In addition to the user co-ordinates, Navika-300 is capable of delivering unmatched timing accuracy. Typical applications where Navika-300 could be integrated are –

- ◆ Vehicle tracking
- ◆ Security
- ◆ Geo-tagging
- ◆ Wireless base-stations

The Navika-300 is a 12.2mm x 16mm sized GPS module. It requires a 3.3V supply for the digital section, 3.0V for RF section and 1.2V battery feed that would enable the user to fully exploit all its features.

The module has been designed keeping all components on one side of the PCB and provides half plated through holes (PTH) on two sides for electrical and mechanical connectivity. The module has a metal shield over the component area.

The connection details and the mechanical information are provided below.





## Navika-300 – Connection Diagram

In order to build a complete GPS receiver using the module, all it takes are a few connections. The diagram below depicts the interconnections to be done in order to use the Navika-300.

1. Connect a 50Ω trace between the RF\_IN pad and the antenna connector
2. Connect a 20Ω, 1W resistor between the ANT\_SENSE and RfVCC\_3V0 pads. This is required to sense a short circuit on the antenna power line as well as to protect the power-ground short circuit. If this function is not required, the ANT\_SENSE and RfVCC\_3V0 pads can be directly connected
3. The host communication can be tapped at the UART1\_RXD and UART1\_TXD lines
4. Mains power of 3.3V +/- 5% should be applied at DVCC\_3V3 pad. The maximum current draw of the board would be about 50mA (excluding antenna current). It is recommended to mount a decoupling capacitor of 1uF close to the DVCC\_3V3 pad
5. A backup battery of 1.2V should be applied at VBAT\_1V2 pad. The recharge circuitry (in case of a rechargeable battery) should be provisioned on the motherboard

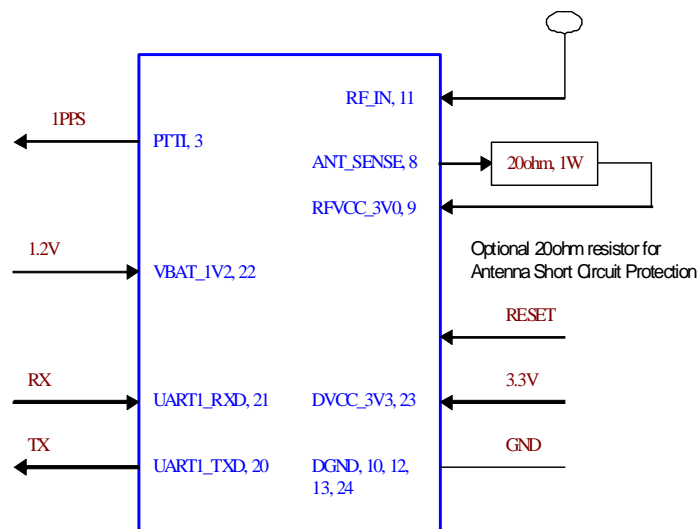


Figure 2. Circuit Interconnection using Navika-300 module

## Specifications of Navika-300 Module

### Performance Characteristics

Receiver	16 channels L1-C/A code GPS-SBAS
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### Sensitivity

Acquisition	-155dBm (Hot start, 1SV @ -140dBm) -160dBm (Reacquisition)
Tracking	-163dBm

### Time to First Fix

Hot Start (with valid ephemeris, almanac, position and time estimate)	2 sec (typical) switch OFF/ON cycle less than 1 hour
Warm Start (with almanac, position and time estimate)	30 sec (typical)
Cold Start (without almanac, time, or position)	35 sec (typical)

### Accuracy

Position (Horizontal)	10 m (90% without S/A)
Velocity	0.1 m/sec (90% without S/A)

### Reacquisition

Signal	< 1 sec
Position	< 1 sec
Blockage Time	3 minutes

### Navigation Solution

PVT	2D/3D position, velocity, and time 183 geodetic datum supported (default) (WGS84)
Position Update Rate	1 Hz

### PC/Host Communication

Interface	UART
Baud Rate	115200
Message Formats	NMEA0183 Ver. 3.01 ASCII, as well as proprietary messages

### Environmental Characteristics

Operational Temperature Range (Ambient)	-40°C to +85°C
Storage Temperature Range	-65°C to +150°C
Humidity	95% non-condensing +30°C to 60°C
Altitude	18,000 meters

### Electrical Characteristics

Total Current Consumption	50mA @ 3.3V
GPS MIPS on ARM	25

### Output Messages

NMEA	\$GPGGA, \$GPGSA, \$GPRMC, \$GPGLL, \$GPGSV, \$GPVTG, \$GPZDA
ASCII	Version, Kalman Filter, Receiver Configuration, Antenna Status, PPS mode

### Input Messages

ASCII	NMEA message control and configuration, Elevation mask, DOP settings, Factory reset, Restart, 1PPS configuration
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*Table 1: Specifications of Navika-300 Module*

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