

# Navika-350 – Miniature High Performance GPS-GLONASS Module



## Features

- ◆ GPS-GLONASS positioning and timing module
- ◆ 32 channel architecture with large correlator banks
- ◆ Fast Time-To-First-Fix
- ◆ Precise 1PPS output with configurable pulse characteristics
- ◆ GPS-only, GLONASS-only and GPS-GLONASS position output
- ◆ Common GPS and GLONASS antenna interface
- ◆ 12.2mm x 16mm module 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-350

## Product Description

The Navika-350 is a 12.2mmx16mm module combining the advantages of multiple GNSS constellations. By making use of GPS and GLONASS signals, the Navika-350 provides better availability and accuracy of position as compared to a stand-alone GPS or GLONASS module.

Navika-350 caters to applications that demand high performance where a GPS-only module cannot deliver.

Navika-350 supports sub-second positioning in hot start and reacquisition while providing faster location under warm and cold start modes too.

Navika-350 can be interfaced to either active or passive GPS-GLONASS antenna.

The module provides industry standard interfaces for easy interconnection in an application scenario. An SPI 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 four general purpose I/O's that can be used to drive LED's or digital input-output ports.

For applications that require precise timing, Navika-350 outputs a highly precise pulse every second that is synchronized to the GPS / UTC second boundary. The pulse can be adjusted for edge, width and delay to cater to the equipment that requires the time synchronization. In addition, the timing information can be derived from GPS-only, GLONASS-only or combined modes.

Navika-350 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-350 Module Details

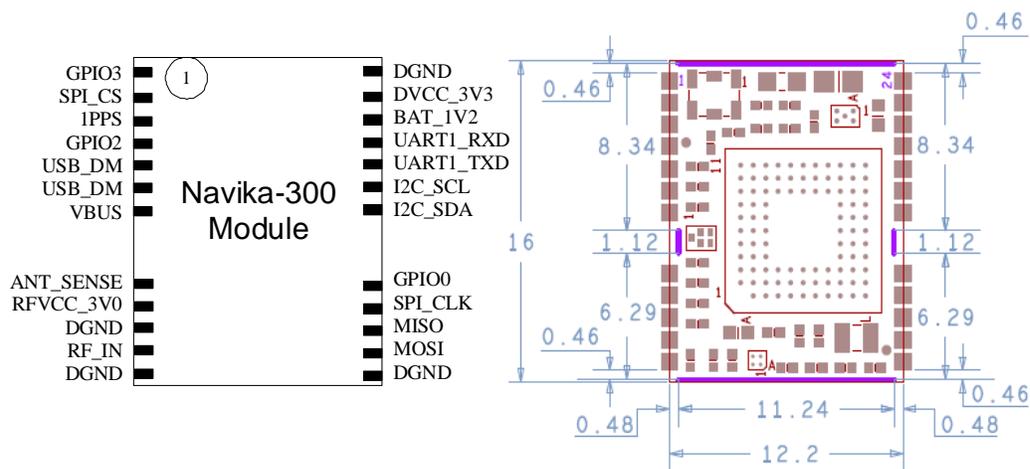
The Navika-350 brings out some of the essential peripherals for host interface such as SPI port, UART port, USB port and GPIO's.

The Navika-350 is targeted for applications that require positioning and/or timing outputs. In addition to the user co-ordinates, Navika-350 is capable of delivering unmatched timing accuracy. Typical applications where Navika-350 could be integrated are –

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

The Navika-350 is a 12.2mm x 16mm sized GPS-GLONASS module. It requires a single 3.3V supply and a 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.





## Navika-350 – Connection Diagram

In order to build a complete GPS-GLONASS 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-350.

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

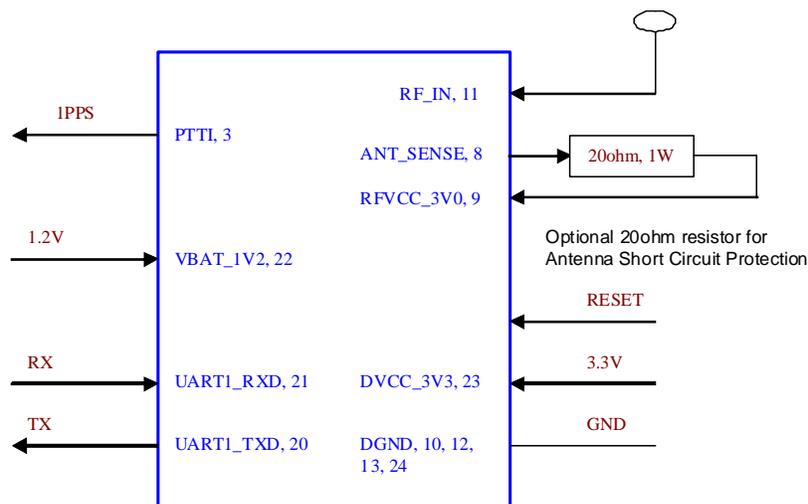


Figure 2: Circuit Interconnection using Navika-350 module

# Specifications of Navika-350 Module

## Performance Characteristics

Receiver	32 channels L1-C/A code GPS-GLONASS, SBAS
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## Sensitivity

Acquisition (both GPS and GLONASS)	-155dBm (Hot start, 1SV @ -140dBm) -160dBm (Reacquisition)
Tracking	-162dBm (GPS) / -159dBm (GLONASS)

## Time to First Fix

Hot Start (with valid ephemeris, almanac, position and time estimate; combined fix)	1 sec (typical) switch OFF/ON cycle less than 1 hour
Warm Start (with almanac, position and time estimate; combined fix)	18 to 36 sec (typical, open sky)
Cold Start (without almanac, time, or position; combined fix)	18 to 36 sec (typical, open sky)

## 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

## Timing

1PPS	< +/- 10ns, 1 $\sigma$ without errors
Pulse Width	400us (adjustable between 400us to 39.6ms in steps of 400us)
Pulse Edge	Rising (configurable)
Pulse Delay	0ns (adjustable between -999 to +999ns)

## Single Satellite PPS

Min. C/N0	12dB-Hz (adjustable between 12dB-Hz and 60dB-Hz; default is 35dB-Hz)
Min. Elevation Mask	7 deg
Position averaging	50s minimum, extends upto 1000s
Validity of 1PPS	6 hours continuously in single satellite PPS mode

## 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	80mA @ 3.3V
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## Output Messages

NMEA	\$GP, \$GL, \$GN messages
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-350 Module

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