

Features

- ◆ 17mm x 22.4mm module form-factor
- ◆ GPS-SBAS positioning module
- ◆ More than 16K Correlators for fast acquisition and robust tracking
- ◆ Fast Time-To-First-Fix
- ◆ Precise 1PPS output with configurable pulse characteristics
- ◆ 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-200

Product Description

Navika-200 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.

With a form-factor of 17mm x 22.4mm, Navika-200 lends itself for integration into applications with severe space constraints.

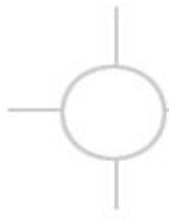
Navika-200 supports sub-second positioning in hot start and reacquisition while providing faster location under warm and cold start modes too.

Navika-200 can be interfaced to either active or passive GPS antenna.

For applications that demand precise time synchronization, Navika-200 provides an accurate time pulse with associated GPS / UTC time stamping.

The module provides several standard interfaces such as SPI port, UART port and a full-speed USB port that enable 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.

Navika-200 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-200 Module Details

The Navika-200 brings out some of the essential peripherals for host interface such as SPI port, UART port, USB port and GPIO's.

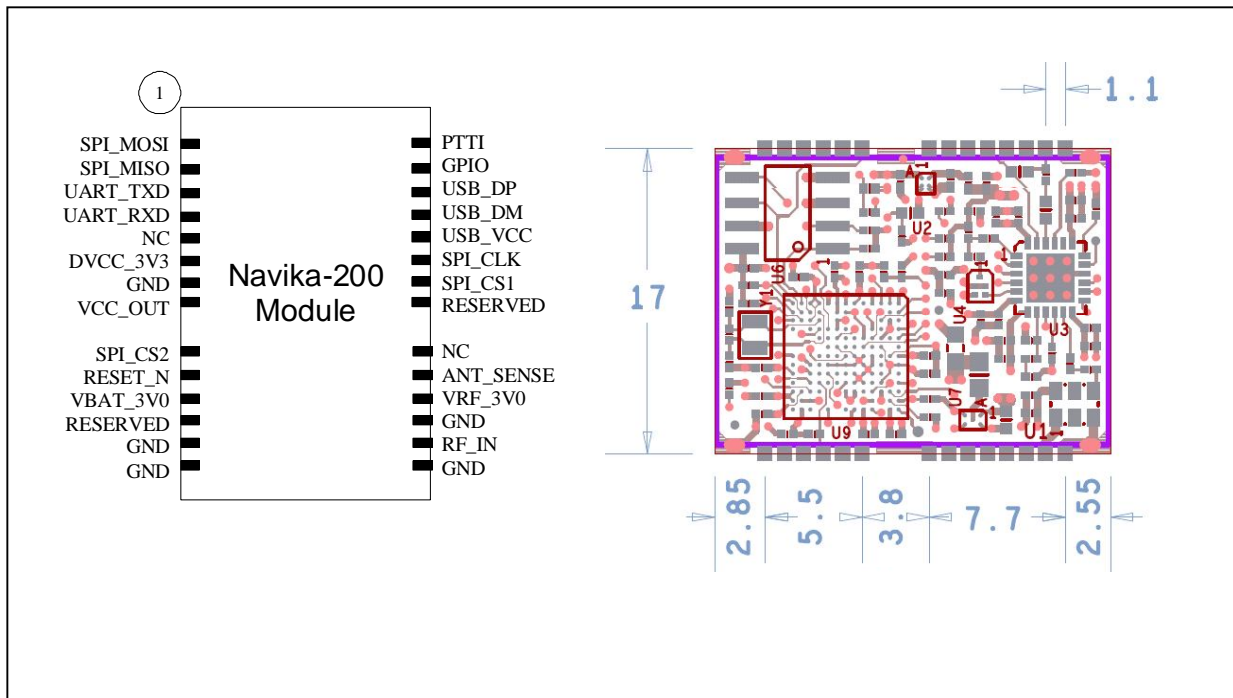
The Navika-200 is targeted for applications that require positioning and/or timing outputs. In addition to the user co-ordinates, Navika-200 is capable of delivering unmatched timing accuracy. Typical applications where Navika-200 could be integrated are –

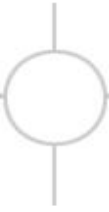
- ◆ Vehicle tracking
- ◆ Security
- ◆ Geo-tagging
- ◆ Wireless base-stations

The Navika-200 is a 17mmx22.4mm sized GPS module. It requires a single 3.3V supply and a 3.0V 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 connection details and the mechanical information are provided below.





Navika-200 – 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-200.

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 ANT_VCC_3V pads. This is required to sense a short circuit on the antenna power line as well as to protect the power-ground short circuit
3. An active low power ON reset of at least 25ms should be provided on the /RESET pad
4. The host communication can be tapped at the UART_RXD and UART_TXD lines
5. 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
6. A backup battery of 3.0V should be applied at VBAT_3V0 pad. The recharge circuitry (in case of a rechargeable battery) should be provisioned on the motherboard

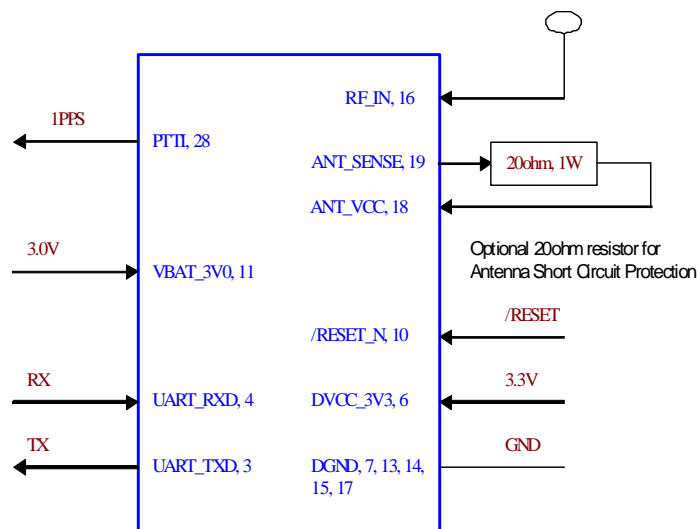


Figure 2. Circuit Interconnection using Navika-200 module

Specifications of Navika-200 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	-162dBm

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

Timing

1PPS	< +/- 10ns, 1 σ 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

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

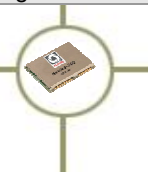
Output Messages

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-200 Module



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