



NAVIKA-200 Technical Document

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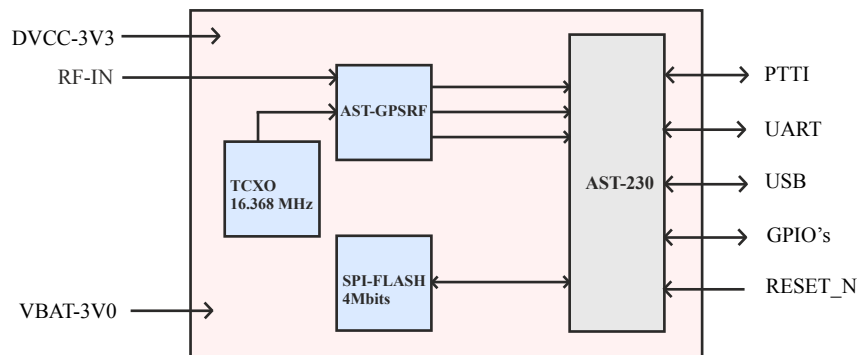
Overview

Navika-200 is a L1, C/A code based GPS-SBAS receiver module. With a form-factor of 17mm x 22.4mm, Navika-200 lends itself for integration into applications with severe space constraints. 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
(17mm x 22.4mm)

Block Diagram



Navika-200 Block Diagram

- ❑ AST-230 is a high performance GPS baseband with an ARM7 processing core and integrated peripherals.
- ❑ AST-GPSRF is a high performance, fully integrated GPS RF front-end chip for down conversion and signal amplification. It is designed for GPS L1 (1575.42MHz), C/A and Galileo OS (1575.42MHz) receivers.

Specifications of Navika-200 Module

Performance Characteristics

Receiver :32 channels L1-C/A code GPS-SBAS

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) : 2-3 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)

Note: Active antenna kept under open sky with HDOP<2 and C/N0 > 40dB-Hz

Accuracy

Position (Horizontal) : <2.5 m (RMS)
Velocity : 0.1 m/sec (90% without S/A)

Note: Active antenna kept under open sky with HDOP<2 and C/N0 > 40dB-Hz

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, RMS without errors
Pulse Width : 386us (adjustable between 386us to 500ms in steps of 386us)
Pulse Edge : Rising (configurable)
Pulse Delay : 0ns (adjustable between -999 to +999ns)

PC/Host Communication

Interface : UART
Baud Rate : 115200 (by default)
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 : -40°C to +85°C
Humidity : 95% non-condensing +30°C to 60°C
Altitude : 18,000 meters

Electrical Characteristics

Total Current Consumption : 85mA @ 3.3V

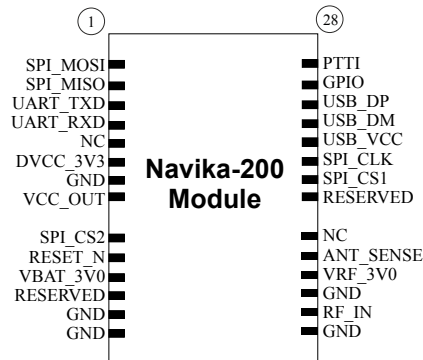
Output Messages

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

Input Messages

ASCII : NMEA message control and Configuration, Elevation Mask, DOP settings, Factory reset, Restart, 1PPS configuration

Pin Diagram

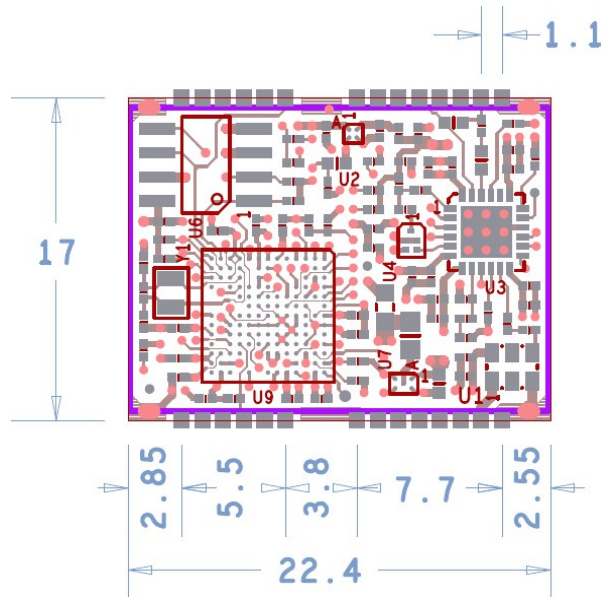


Pin Description

Pin number	NAME	I/O	Description
1	SPI_MOSI	O	SPI MOSI
2	SPI_MISO	I	SPI MISO
3	UART_TXD	O	Serial port
4	UART_RXD	I	Serial Port
5	NC		
6	DVCC-3V3	I	Supply voltage
7	GND		Ground
8	VCC-OUT		Reserved
9	SPI_CS2	O	SPI chip select2
10	RESET_N	I	External Reset
11	VBAT_3V0	I	Back-up voltage supply
12	RESERVED		Reserved
13	GND		Ground
14	GND		Ground
15	GND		Ground
16	RF_IN	I	GPS signal input
17	GND		Ground
18	VRF-3V0	I	Antenna Bias voltage
19	ANT_SENSE	I	Active antenna detect
20	NC		
21	RESERVED		Reserved
22	SPI_CS1	I	SPI chip select1
23	SPI_CLK	O	SPI clock
24	USB_VCC	I	USB supply
25	USB_DM	I/O	USB Data -
26	USB_DP	I/O	USB Data +
27	GPIO	I/O, I by default	Reserved
28	PTTI	O	Time pulse (IPPS)

Mechanical details

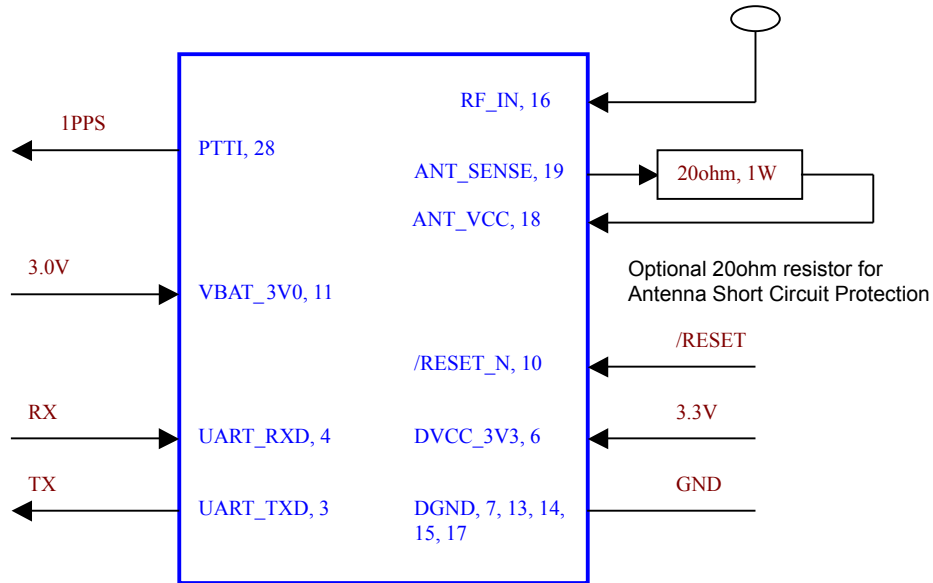
Length = 22.4 mm
Width = 17 mm
Height = 3.32mm
Pad Pitch = 1.1 mm
Pad Width = 0.8128 mm



Operating conditions

Parameter	Symbol	Min.	Typ.	Max	Units
Power supply voltage	DVCC_3V3	3.14	3.3	3.47	Volts
Supply voltage USB	USB_VCC	3.0	3.3	3.6	Volts
Backup battery voltage	VBAT_3V0	2.7	3.0	3.3	Volts
Antenna gain	Gain		28	50	dB
Operating temperature	Temp	-40		+85	^o C

Application Circuit Recommendations



Recommendations

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.

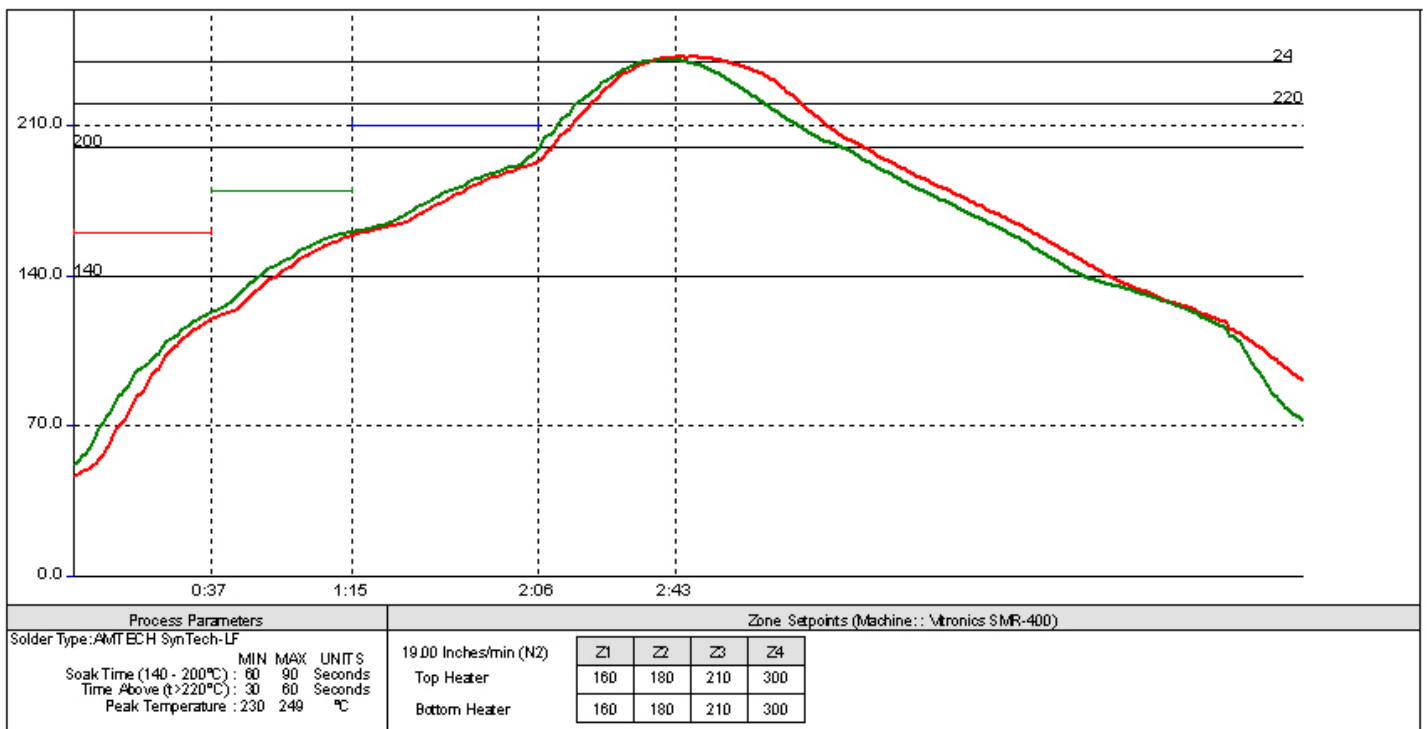
- Connect a 50 Ohm trace between the RF_IN pad and the antenna connector
- Connect a 20W, 1W resistor between the ANT_SENSE and ANT_VCC_3V pads. This is required to sense a short circuit on the antenna power line as well as to protect the power-ground short circuit
- An active low power ON reset of at least 25ms should be provided on the /RESET pad
- The host communication can be tapped at the UART_RXD and UART_TXD lines
- Mains power of 3.3V +/- 5% should be applied at DVCC_3V3 pad. The maximum current draw of the board would be about 85mA. It is recommended to mount a decoupling capacitor of 1uF close to the DVCC_3V3 pad
- 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

Solder paste details

Below is the information on Solder paste details

Make : AMTECH or similar
 Type : 3
 Profile : Normally available with supplier. Also dependent on the PCB finish. The Navika-200 is finished with ENIG.

Reflow - Temperature profile



Ordering Information

Navika-200 : GPS module

Navika-200-Eval: Evaluation board of Navika-200 Contains Navika-200 module mounted on an evaluation PCB and packaged into a plastic enclosure, USB cable, active GPS antenna and GUI installation CD