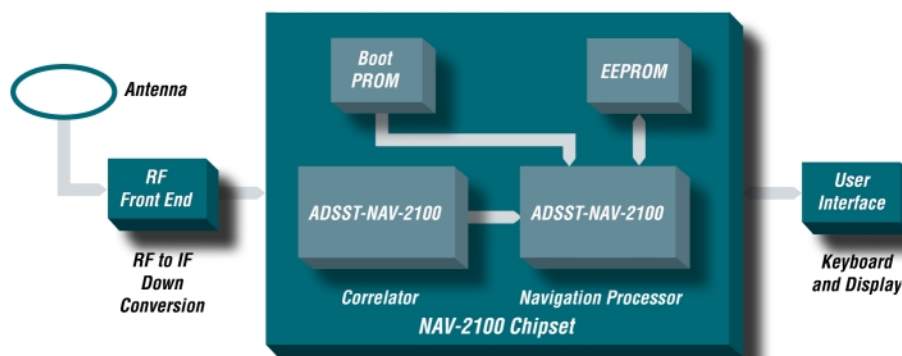


NAV-2K Family

ADSST-NAV-2100/2300 GLOBAL POSITIONING SYSTEM RECEIVER CHIPSET REFERENCE DESIGN

HIGHLIGHTS

- Single-Frequency Standard-Positioning Service (SPS)
- Twelve Parallel Channels
- DSP-Based Programmable Solution
- Computes User's Position, Velocity and Time
- Efficient Algorithms for Very Low Time to First Fix (TTFF), Even Without Almanac
- Soft Solution Approach for Correlation
- Easy Upgradability and Expandability
- TTL Output Through Serial Link
- Designed for Easy Customization
- Based on Either One or Two Fixed-Point Digital Signal Processors (DSPs) with On-Chip SRAM and Integrated I/O Peripherals Support
- Two Implementations with Four Form Factors Facilitate Design
- Spare Processing Power for Additional Features and Integrated Applications
- Carrier-Aided Tracking
- Supports 47 Geodetic Data
- NMEA-0183-Compatible Message Format for Host Communication
- Custom Binary Message Format for Host Communication
- Real-Time Executive-Based Software Architecture
- DGPS Compatibility



GPS Receiver Based on NAV-2100 Chipset

NAV-2K Family

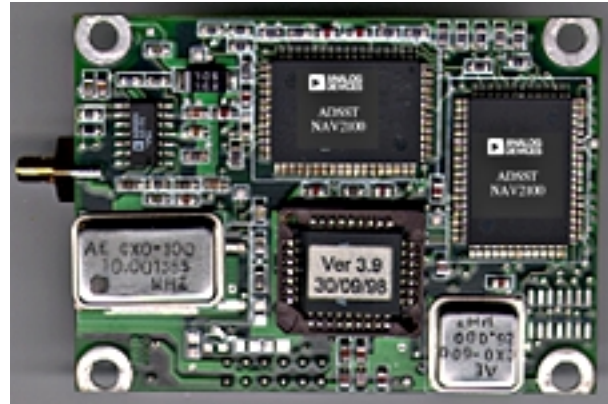
NAV-2100

Description

The NAV-2100 is a 12-channel Global Positioning System Receiver (GPSR) chipset reference design. It is designed around a programmable platform—two Analog Devices' ADSST-NAV-2100 fixed-point Digital Signal Processors with on-chip SRAM and integrated I/O peripherals support. The NAV-2100, together with a standard RF front end and GPS antenna, forms a complete GPS receiver.

The NAV-2100 chipset consists of the following:

- ADSST-NAV-2100
- Software License



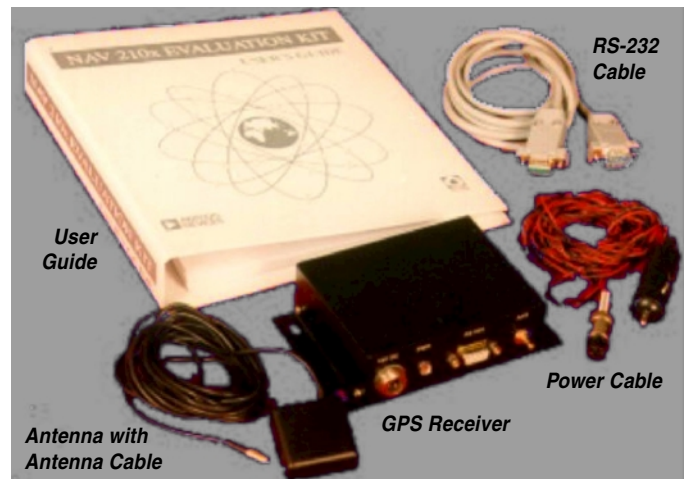
Power Supply Voltage +5 V and +3.3 V
Board Dimensions 70 mm × 50 mm × 12 mm

NAV-2100 Evaluation Kit

The evaluation kit is an easy way to become familiar with the different features of the NAV-2100 chipset.

NAV-2100 GPS Evaluation Kit

1. NAV-2100 GPS receiver unit
 - NAV-2100 GPS receiver board
 - Motherboard
 - Connectors and LED
 - Metallic enclosure
2. Antenna with antenna cable
3. RS-232 cable and power cable
4. GVISION, PC-based user interface software on a 3½" disk, provides information such as user position, velocity, heading, waypoint navigation in text and graphic form.
5. NAV-2100 User's Guide



GPSR Chipset Reference Design

Following are the different elements that comprise the NAV-2100 GPS Evaluation Kit.

NAV-2100 GPS Receiver Board: The NAV-2100 GPS receiver is the top board in the receiver unit. The receiver chipset comprises a footprint of 70 mm × 50 mm × 12 mm, which is smaller than a credit card. A dual in-line male connector interfaces at TTL levels.

Motherboard: The motherboard is the bottom board of the NAV-2100 GPS Evaluation Kit. This board supplies the various power supply voltages required for the operation of the GPS receiver. It is tolerant to a wide range of input voltages ranging from 9 to 45 volts. It also provides a serial interface to the PC via a standard RS-232 driver.

Connectors and LED: The NAV-2100 GPS receiver unit has three connectors on its front panel. The power connector is a 3-pin male socket for 12-volt input from a standard car battery or any other source. The RS-232 connector is a bidirectional interface between the GPS receiver unit and any host system like the PC. In addition to the serial communication, the connector can also receive the RTCM corrections on a separate line. The antenna connector is an SMB-type receptacle to receive the satellite signals from the antenna. The LED indicates the availability of the power supply to the GPS receiver.

Metallic Enclosure: The enclosure ensures that no stray interference signal affects the performance of the GPS receiver board. The enclosure and the receiver board share a common ground.

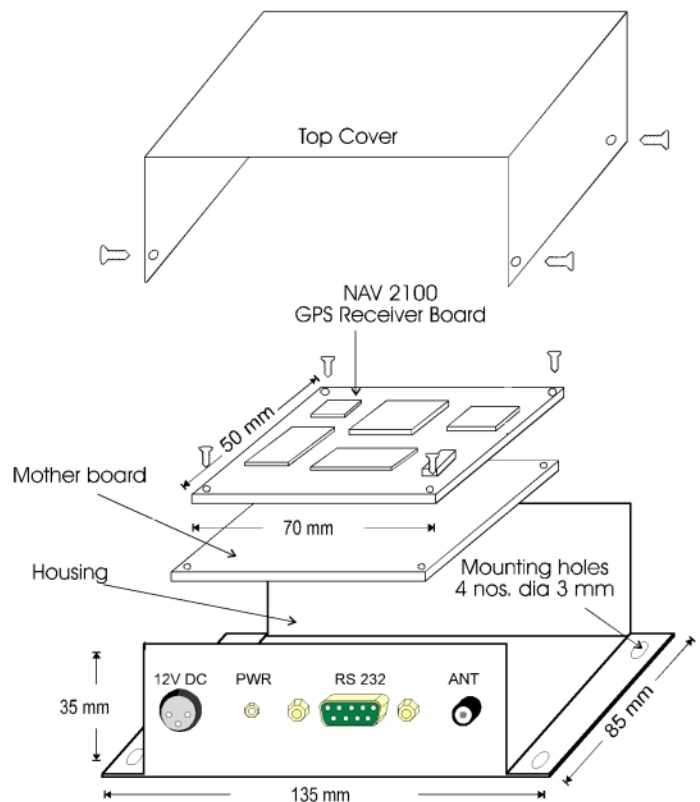
Antenna with Antenna Cable: The antenna supplied is an active patch antenna with a magnetic base and built-in cable. The built-in feature decreases the number of joints in the signal path, minimizing loss. The cable is of adequate length (three meters) for ease of routing. The SMB end of the cable fits into the mating connector on the NAV-2100 GPS receiver unit.

RS-232 Cable and Power Cable: The RS-232 cable is a 9-pin cable with D-type connectors at both ends in a null modem configuration. In addition, a separate line is reserved for the RTCM data for DGPS.

The Power cable has a cigarette lighter connector at one end and a female 3-pin connector at the other end. Both cables are three meters long, which is considered adequate for most configurations.

GVISION: This is PC-based user interface software, which enables the user to configure the receiver and monitor the messages to/from the receiver. GVISION provides information such as user position, speed, heading and other GPS parameters. It also provides a data logging command, which facilitates capturing data (binary and NMEA) output from the receiver into files for post processing and analysis. The graphic screen of GVISION provides a clear trace of the route covered by the receiver on field test. Waypoints can be set to aid in waypoint navigation.

NAV-2100 User's Guide: The User's Guide gives a complete description of the NAV-2100 GPS receiver operation. A Quick Start Guide provides the user with most elementary steps to be followed in order to use the receiver. A comprehensive description of GVISION is also included. The input/output message structure for all binary and NMEA messages will aid the user to transmit/receive commands and data from software other than GVISION.



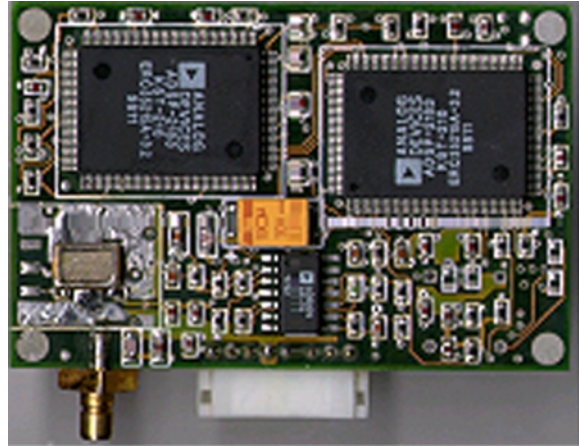
NAV-2K Family

NAV-2K Family

NAV-2100A

Description

The NAV-2100A is a +3.3 V version, which includes a real-time clock and is packaged in a smaller form factor compatible with the Ashtech G8.

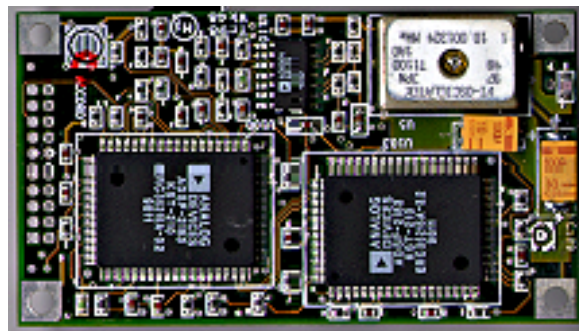


Power Supply Voltage +3.3 V
Board Dimensions 60 mm × 40 mm × 12 mm

NAV-2100R

Description

The NAV-2100R is a +5 V version, which includes a real-time clock and is packaged in a narrower form factor compatible with Conexant Jupiter and SiRF products.



Power Supply Voltage +5 V
Board Dimensions 71 mm × 41 mm × 12 mm

GPSR Chipset Reference Design

NAV-2300 Preliminary Information

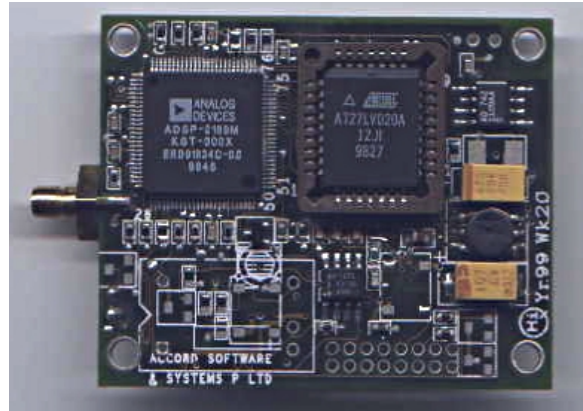
Description

The NAV-2300 is a low power version, packaged in a smaller form factor, implemented with a single DSP. It is designed around a high performance programmable platform—the Analog Devices ADSST-NAV-2300 fixed-point Digital Signal Processor with on-chip SRAM and integrated I/O peripherals support. The NAV-2300 together with a standard RF front end and GPS antenna forms a complete GPS receiver.

The NAV-2300 chipset consists of the following:

- ADSST-NAV-2300
- Software License

The NAV-2300 reference design includes a real-time clock.

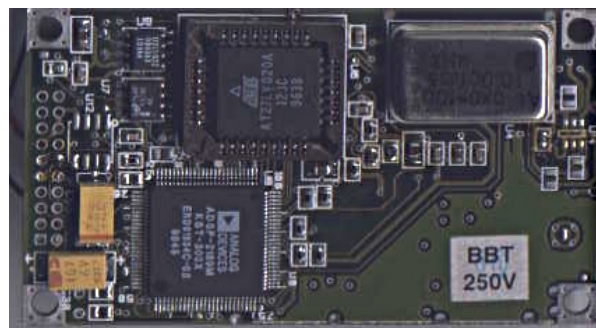


Power Supply Voltage	+3.3 V
Power Consumption	<0.6 watt
Board Dimensions	52 mm × 42 mm × 12 mm

NAV-2300R Preliminary Information

Description

The NAV-2300R is a +5 V version, which includes a real-time clock and is packaged in a narrower form factor compatible with Conexant Jupiter and SiRF products.



Power Supply Voltage	+5 V
Power Consumption	<0.6 watt
Board Dimensions	71 mm × 41 mm × 12 mm

NAV-2K Family

NAV-2K Family

Performance Characteristics

Receiver	12 channels L1-C/A code SPS
Time To First Fix (TTFF)	
Warm Start (with Almanac, Position and Time Estimate)	40 seconds (typical)
Cold Start (without Almanac, Time, Position)	60 seconds (typical)
Hot Start (with Almanac, Position, Time and Ephemeris)	20 seconds (typical)
Position Accuracy	20 meters (1 σ without S/A) 1-5 meters with DGPS
Horizontal Velocity	0.1 meters/second (1 σ without S/A)
Dynamics	
Velocity	600 m/sec
Acceleration	4 g
Jerk	7 m/sec ³
Reacquisition	
Signal	Less than 1 second with a blockage time of up to 180 seconds
Position	1 second
Satellite Data Collection	2 to 11 seconds for synchronization Continuous data collection and parity checking on all twelve channels
Position Solution	2D/3D position, velocity and time 47 geodetic datum supported (default WGS84)
Position update rate	1 second

Environmental Characteristics

Operational Temperature Range (Ambient)	-45°C to +85°C
Storage Temperature Range	-65°C to +150°C
Humidity	95% noncondensing +30°C to +60°C
Altitude	-1000 to +18,000 meters

PC/Host Communication

Interface	Serial TTL output
Baud Rate	9600 baud
Message Formats	NMEA0183 Ver 2.00 ASCII, as well as Accord's proprietary binary

Output Messages

Binary

User's present position in terms of Latitude, Longitude, Altitude, ECEF Coordinates, Speed, Heading, Time, DOP, Receiver Status, Satellite Data, Error Messages, Almanac

NMEA

\$GPGGA, \$GPGSA, \$GPRMC, \$GPGSV, \$GPGLL,
\$GPZDA, \$GPVTG

Input Messages (Binary)

Force Satellite Reselection, Factory Reset, Almanac, Position, Time, Date and Geodetic Datum, Message Control and Configuration, DGPS Parameters, Receiver Startup Mode, DOP and Visibility Settings

Application Interface (Optional)

The Real Time Executive of the NAV-2100 GPS chipset provides a programmatic interface to integrate OEM application software

Analog Devices' NAV-2K GPS Family was developed in conjunction with Accord Software & Systems Pvt., Ltd.

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