



GPS Receiver with Active Antenna, RS232

The ultra-sensitive GPS receiver can acquire GPS signals from 32 channels of satellites and generate fast position fixes with high accuracy in extremely challenging environments and under poor signal conditions due to its active antenna and high sensitivity. The bi-directional NMEA 0183 v3.0 protocol offers industry standard data messages and a command set for easy interface to mapping software and embedded devices.



Features

- High sensitivity -159dBm
- Searching up to 32 Channel of satellites
- Fast Position Fix with LED indication of status
- Low power consumption
- RTCM- in ready
- Built-in WAAS/EGNOS/MSAS Demodulator
- Supports NMEA0183 V 3.01 data protocol
- Real time navigation for location based services
- For Car Navigation, Marine Navigation, Fleet Management, AVL and Location-Based Services, Auto Pilot, Personal Navigation or touring devices, Tracking devices/systems and Mapping devices application

Applications

- Automotive and Marine Navigation
- Automotive Navigator Tracking
- Emergency Locator
- Geographic Surveying
- Personal Positioning
- Sporting and Recreation
- Embedded applications

Specification

Parameter	Value	Unit
Operating Voltage	10-40 V (12V Typical)	V DC
Operating Current	150	mA
Sensitivity	-159	dBm
Channels	32	32 channels all in view searching
Protocol output baud rate	4800	bps no handshaking(8-N-1)

Protocol format	NMEA0183 V 3.01	GGA, GLL, GSA, GSV, RMC, VTG
Output Voltage level	RS232 signals (+12/-12V)	
Frequency	1,1575.42	Mhz
C/A Code	1.023	Mhz chip rate
Accuracy in Position	3	Meters
Accuracy in Velocity	0.1	Meters/Second
Accuracy in Time	0.1	Microsecond. Sync GPS time
Datum	WGS84(Default)	total 219 datum's
Time to First Fix for first power on	36	Second approx.
Time to Reacquisition	1	Second
Update Rate	1	Hz
Acceleration Limit	4	G
Altitude Limit	18,000	Meters
Velocity Limit	515	Meters/Second
Jerk Limit	20	Meters/Second ³
Operating Temperature	-40 to +85	Degree Celcius

Software for monitoring GPS data

The NMEA data from GPS device can be monitored by a software.

Download GPS monitoring software

<http://www.sunrom.com/files/TrimbleStudio-V1-00-1.exe>

The image shows the Trimble GPS Studio software interface. The top window is titled "Trimble GPS Studio" and has a menu bar with "File", "Connections", "Tools", "Window", and "Help". Below the menu bar, there is a "New Connection..." button and a "Data Log" button. A yellow callout bubble points to the "New Connection..." button with the text "Create 'New Connection...'".

The "Select Port & Set..." dialog box is open, showing the "COM Port" set to "COM 3". Other settings include "Baud Rate" set to "4800", "Parity" set to "None", "Data Bits" set to "8", and "Stop Bits" set to "1". A yellow callout bubble points to the "COM Port" dropdown with the text "Select COM port to which GPS is connected and configure setting for 4800".

The main window is titled "Monitor [COM 1]" and shows various GPS data fields. The "Time [UTC]" section displays "Thu 07:11:13", "Date: December 04, 2008", and "Week: 1508 TOW: 371487". The "Speed and Heading" section shows "Speed: 0.0 km/hr" and "Heading: 352.8 deg". The "Position" section shows "Latitude: N 23° 0.15500'" and "Longitude: E 72° 37.20960'". The "Receiver Mode & Status" section shows "Mode: 3-D, Auto (6 SV)" and "Status: doing position fixes". The "Satellite Data" section shows a table of satellite data with columns "SV", "C/No", "Az.", and "Elev.". A yellow callout bubble points to the "Satellite Data" table with the text "It takes around 30 second for data to be shown after power up."

NMEA Protocol

This section provides a brief overview of the NMEA 0183 protocol, and describes both the standard and optional messages offered by the GPS Receiver.

NMEA 0183 is a simple, yet comprehensive ASCII protocol which defines both the communication interface and the data format. The NMEA 0183 protocol was originally established to allow marine navigation equipment to share information. Since it is a well established industry standard, NMEA 0183 has also gained popularity for use in applications other than marine electronics. The GPS receiver supports the latest release of NMEA 0183, Version 3.0 (July 1, 2000). The primary change in release 3.0 is the addition of the mode indicators in the GLL, RMC, and VTG messages.

For those applications requiring output only from the GPS receiver, the standard NMEA 0183 sentences are a popular choice. Many standard application packages support the standard NMEA output messages.

The standard NMEA output only messages are: GGA, GLL, GSA, GSV, RMC, VTC, and ZDA.

NMEA RECORD	Description
GGA	GPS fix data
GLL	Geographic
GSA	GNSS DOP and active satellite
GSV	GNSS Satellites in view
RMC	Recommended minimum specific GNSS data
VTG	Course Over Ground and Ground Speed
ZDA	Time&Data

NMEA 0183 Message Format

The NMEA 0183 protocol covers a broad array of navigation data. The entire protocol encompasses over 50 messages, but only a sub-set of these messages apply to this GPS receiver. The NMEA message structure is described below.

`$IDMSG,D1,D2,D3,D4,.....,Dn*CS[CR][LF]`

"\$"	The "\$" signifies the start of a message.
ID	The identification is a two letter mnemonic which describes the source of the navigation information. The GP identification signifies a GPS source.
MSG	The message identification is a three letter mnemonic which describes the message content and the number and order of the data fields.
","	Commas serve as delimiters for the data fields.
Dn	Each message contains multiple data fields (Dn) which are delimited by commas. The length of the fields can be variable.
"*"	The asterisk serves as a checksum delimiter.
CS	The checksum field contains two ASCII characters which indicate the hexadecimal value of the checksum.
[CR][LF]	The carriage return [CR] and line feed [LF] combination terminate the message.

NMEA 0183 standard messages vary in length, but each message is limited to 79 characters or less. This length limitation excludes the "\$" and the [CR][LF]. The standard message data field block, including delimiters, is limited to 74 characters or less.

Related links

GPS - NMEA sentence information

<http://home.mira.net/~gnb/gps/nmea.html>

AVR Library for parsing GPS Data

http://www.mil.ufl.edu/~chrisarnold/components/microcontrollerBoard/AVR/avrlib/docs/html/nmea_8c.html

Interface to GPS - Article

<http://www.kronosrobotics.com/Projects/GPS.shtml>

AVR Project and Source code

http://www.avrfreaks.net/index.php?module=Freaks%20Academy&func=viewItem&item_id=1062&item_type=project×tamp=2007-08-19%2015:46:24