VPN1513 GPS Receiver Module (#28506)

The VPN1513 GPS Receiver Module provides a fully open source and customizable GPS Receiver solution for your microcontroller projects. The VPN1513 uses a SiRF Star III chipset capable of tracking up to 20 satellites. The module supports both "raw" output mode for raw NMEA 0183 strings and the default "smart" mode for specific user-selected data through a serial interface.

The VPN1513 GPS Receiver Module also features a Propeller co-processor for easy interface with any BASIC Stamp 2 module. The Propeller is also fully reprogrammable and includes access to all 32 IO pins, allowing the GPS Receiver Module to be easily transformed into a standalone device.

Features

- Track up to 20 satellites
- Fast satellite acquisition time
- High tracking sensitivity (-159 dBm)
- Navigation update rate of once per second (1 Hz)
- Position accuracy of +/- 10 meters; 2D RMS +/- 5 meters
- Velocity accuracy of +/- 0.1 meters per second
- Maximum altitude of 18,000 meters
- Propeller co-processor allows for easy transition to a standalone device
- Onboard LED for satellite acquisition feedback
- 9 ft. external antenna w/ MCX connector included
- Battery-backed SRAM & RTC
- Open source design

Key Specifications

- Power requirements: 4.5 to 12 VDC; 80 mA @ 5 V
- Communication: 3.3 V asynchronous serial @ 9600 bps
- Operating temperature: -22 to +185 °F (-30 to +85 °C)
- Dimensions: 1.85 x 1.80 x 0.35 in (4.7 x 4.57 x 0.90 cm)

Application Ideas

- Robotic navigation & positioning
- Geocaching
- Guidance systems
- Automotive navigation
- Fleet management

Packing List

- (1) VPN 1513 GPS Receiver Module PCB
- (1) External GPS Antenna

Resources and Downloads

Check for the latest version of this document, firmware, example programs, and product schematic from the VPN1513 GPS Receiver Module product page. Go to www.parallax.com and search 28506.

Product Details

The VPN1513 GPS Receiver Module provides a powerful off-the-shelf GPS solution for microcontroller projects. The onboard Propeller microcontroller co-processor allows for easy interface to all BASIC Stamp modules and with access to all 32 (fully reprogrammable) Propeller IO pins, provides an easy port to a standalone device.

Mode Selection

By default, users receive GPS data utilizing a serial interface through a Propeller co-processor (also known as "Smart" mode). Users may also choose to receive raw NMEA0183 strings utilizing the /RAW pin. Details on both modes are included in the table below.

Mode	Details
SMART	Selected by default. User retrieves GPS information by sending ASCII commands to the module @ 9600 baud.
RAW	Selected by pulling the /RAW pin LOW. When low, the module outputs raw NMEA0183 strings @ 4800 baud.

Indicator LED

Satellite acquisition with this module is fast: ~47 seconds for a cold start, ~38 seconds for a warm start, and ~1 second for a hot start. The VPN1513 GPS Receiver Module has an onboard red indicator LED for easy visual feedback of satellite acquisition.

Status	Details
Blinking	No satellites acquired, searching
Solid	Satellite fix, transmitting data

Pin Definitions and Ratings

Pin	Name	Type	Function
1	GND	G	Ground: 0 V
2	Vdd	P	Supply Voltage: 5 VDC
3	SIO	IO	3.3V asynchronous serial communication to/from the module
4	/RAW	I	Mode selection. Active low, pulled high by default.

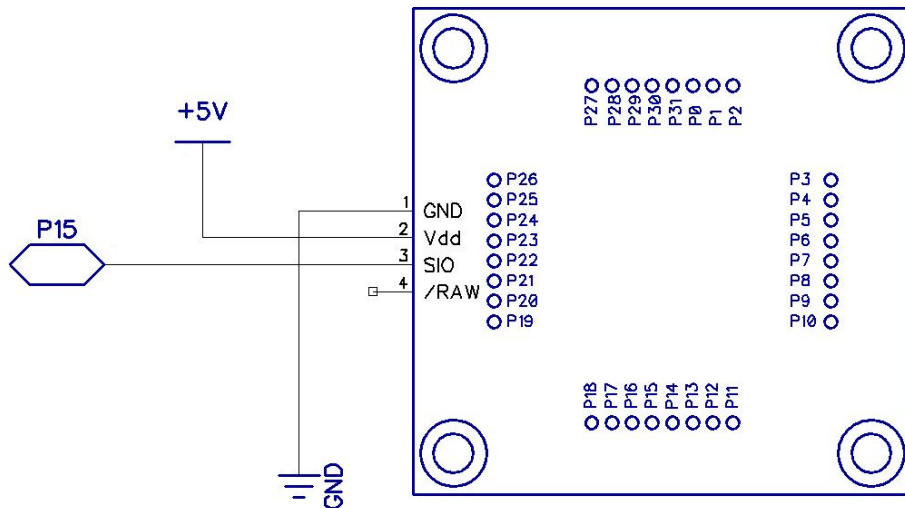Pin Type: P = Power, G = Ground, I = Input, O = Output

Module Schematic
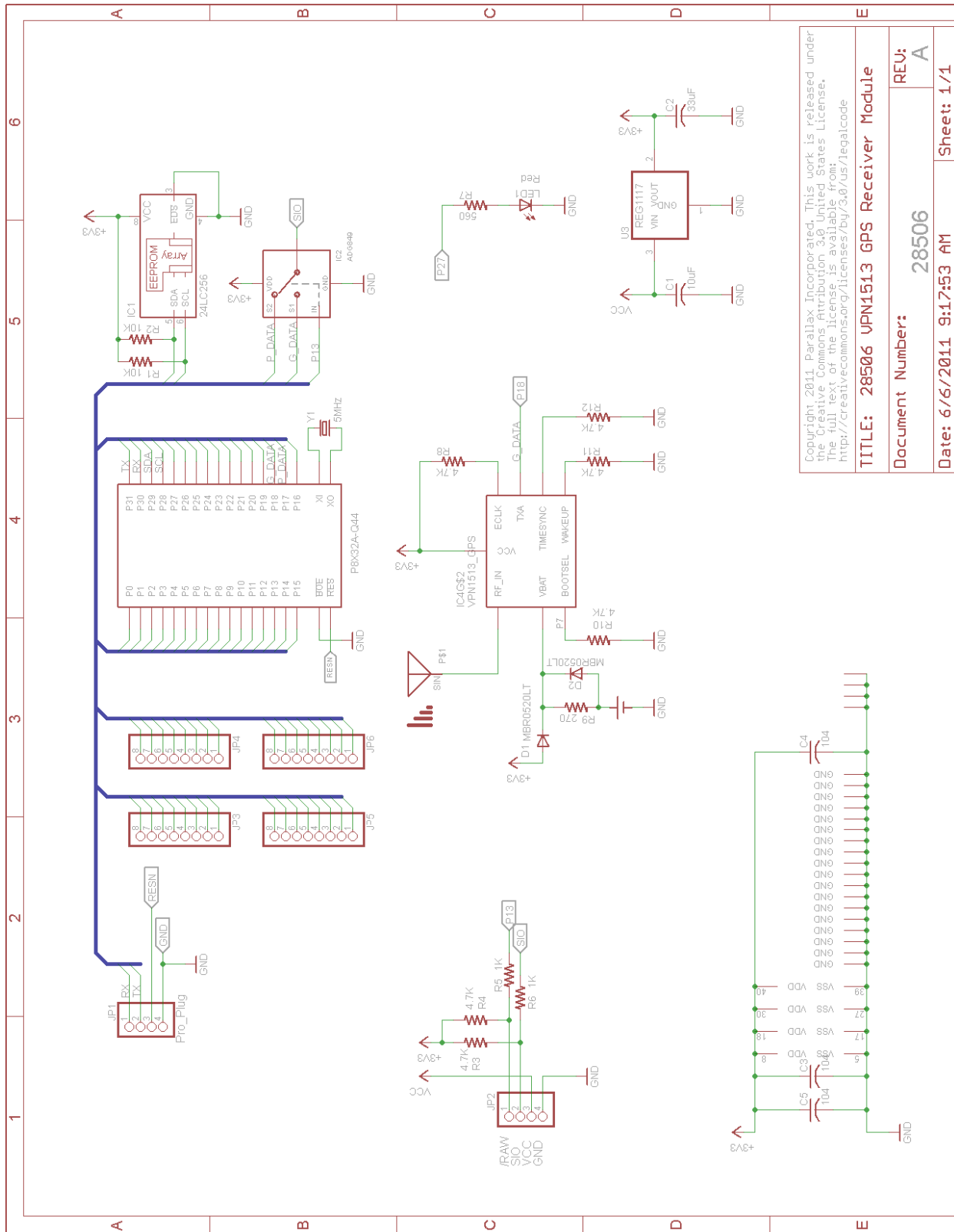
Connection Diagrams

For use with the BASIC Stamp 2, example code available as a download from the VPN1513 GPS Receiver Module product page.

Command Set

By default, the VPN1513 GPS Receiver Module runs in "Smart Mode," where the user can send serial messages to the GPS Module and have data returned to a microcontroller through the Propeller microcontroller co-processor. (These values are identical to the #28146 Parallax GPS Receiver Module.)

Command	Constant	Description	Returned Bytes	Variables*
0x00	GetInfo	GPS Receiver Module Version	2	Hardware, Firmware
0x01	GetValid	Check validity of data string	1	0 = Not Valid, 1 = Valid
0x02	GetSats	Number of acquired satellites (20 max)	1	Satellites
0x03	GetTime	Time (UTC/Greenwich Mean Time)	3	Hours, Minutes, Seconds
0x04	GetDate	Date (UTC/Greenwich Mean Time	3	Month, Day, Year
0x05	GetLat	Latitude	5	Degrees, Minutes, Fractional Minutes (Word), Direction (0 = N, 1 = S)
0x06	GetLong	Longitude	5	Degrees, Minutes, Fractional Minutes (Word), Direction (0 = E, 1 = W)
0x07	GetAltitude	Altitude above mean-sea level (in tenths of meters), 6553.5 m max	2	Altitude (Word)
0x08	GetSpeed	Speed (in tenths of knots), 999.9 knots max	2	Speed (Word)
0x09	GetHead	Heading/Direction of travel (in tenths of degrees)	2	Heading (Word)
0x0A	GetAltExt	Extended altitude mode. Altitude above mean-sea-level (in meters), 18000m (variable size of 65535) max.	2	Altitude (Word)

* Variables are 1 byte unless otherwise noted

BASIC Stamp® Example Code

The VPN1513 GPS Receiver Module is compatible with the GPSDemoV1.1.bs2 code written by Joe Grand for the Parallax GPS Receiver Module (#28146), by changing the baud rate to 9600. This modified code can be downloaded from the VPN1513 GPS Receiver Module's product page, visit www.parallax.com and search "28506".

This program also uses the Debug Terminal, which is built into the BASIC Stamp Editor software. The software is a free download from www.parallax.com/basicstampsoftware.

Revision History

Version 1.1: Added Module Schematic and external antenna information.
Version 1.2: Updated serial interface voltage, added that RAW mode communicates at 4800 baud.
Version 1.3: Updated power requirements from 5 VDC to full range.