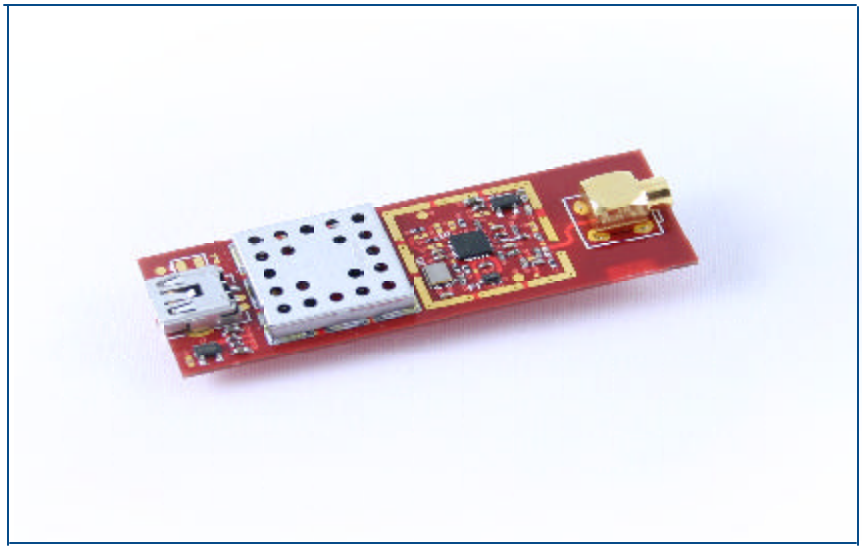
GPS1A
A Software-Defined GNSS Receiver

Key Features

- Software Defined Receiver
- Minimal Hardware
- Support for Open Source code
- Economical Solution

GPS Creations



GPS Creations Intoduces a software-defined GPS receiver

The GPS1A is a L1 frequency-band downconverter designed for using software in place of hardware for reception of GNSS satellite radio trasnmissions. A high-speed USB device is used to transfer data to/from the RF section to the host PC.

Work is underway by the OSGPS community to minimize hardware content and maximize software as this method will provide greatest flexibility in reception of existing as well as the new GPS satellite signals now being deployed. The GPS1A is a self-contained unit consisting of a LNA, SAW filter, mixer, and an ADC for SIGN and MAG digital outputs fed to a USB interface. This product has been designed to meet the hardware requirements described in the publication "*Fundamentals of Global Positioning System Receivers - A Software Approach*" by James Bao-Yen Tsui[1].

The GPS1A uses the USB connection from the host system for power, including voltage for feeding the external GPS antenna. The GPS1A, a GPS antenna and the host PC are all that's required in the way of hardware. The balance of the GPS receiver is accomplished through software. This is an excellent way for one to learn the techniques involved in GPS signal structure, acquisition, tracking and how to collect digitized data for a software-defined GPS receiver.

At the time of this printing, the OSGPS source code is still under development. The GPS1A is being sold as a product in support of that effort.

Applications

GPS Creations Open-Source Receivers are ideal for a wide range of GPS applications including:

- Educational
- Engineering
- Scientific
- Research & Development

1- John Wiley & Sons, Inc., ISBN 0-471-38154-3

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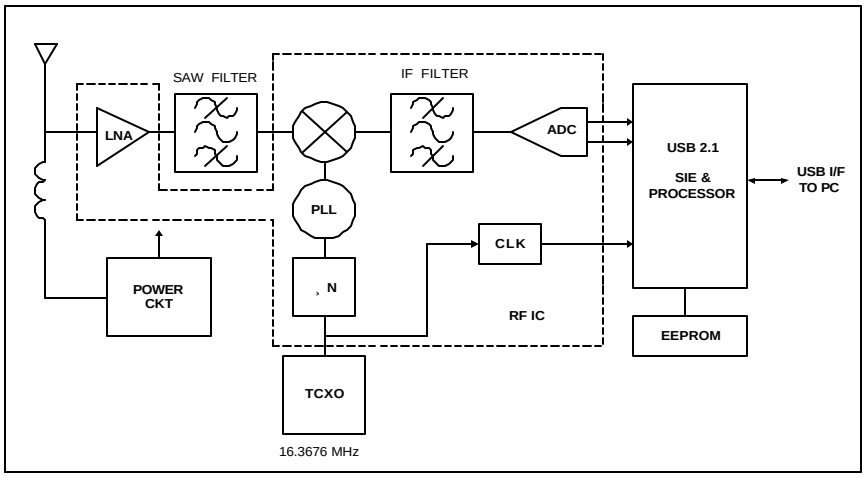
GPS1A

A Software-Defined Open-Source GPS Receiver

The GPS1A block diagram is shown to the right. The GPS antenna connection is shown to the left of the block diagram with the USB connection at the right. Power for operating the GPS receiver is provided by the USB connection from the host PC. Power filtering and regulation is on-board and also supplies 5 volts for the GPS antenna pre-amp.



GPS1A Block Diagram

The RF downconverter is a SiGe Semiconductor SE4110L IC which has a very low-noise LNA (1.6 dB typ.) as the first active stage. The output of the LNA is connected to an external SAW filter tuned to 1575.42 MHz. Output from the SAW filter is fed back to the RF IC mixer input. Downconversion is accomplished by a single stage low-side injection mixer with an output at 4.092 MHz. The low IF goes through an internal filter before going to the ADC. The ADC stage has SIGN and MAG outputs along with a clock signal which is fed to an USB device where the signals can be processed by the software on the host system.

The GPS1A comes installed a plastic housing and includes a mobile type GPS antenna with a matching MCX connector, a USB cable and a CD with documentation and driver. In some user environments, it may be necessary to substitute a different GPS antenna in order to get proper GPS signal reception. The GPS antenna pre-amp should provide 25 dB gain minimum using a 5 volt DC input.

STANDARD FEATURES

- PC based solution (Requires High-Speed USB Interface)
- Open-Source code
- Designed for acquisition at -130 to -150 dBm signal levels

PHYSICAL CHARACTERISTICS

Size:	In Plastic Housing: 67L x 32W x 20H mm Board Only: 60L x 20W x 10.6H mm
Weight:	28g (1 oz)

TECHNICAL SPECIFICATIONS

- RF Downconverter consists of SiGe SE4110L IC
- USB I/F Device: Cypress CY7C68013A-56LFXC
- Power Consumption: @ 5V, 45mA
- Operating Temperature: 0° to 65° C

ORDERING INFORMATION

Open-Source Receiver	**Part Number - GPS1A**
GPS Antenna (Included)	**Part Number - GPS1013**

Warranty: One year parts and labor FOB Germantown, TN USA

Visit us on the web at gpscreations.com for more information

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