

# MN5515HS Evaluation Kit User Guide



## 1 Evaluation Kit Introduction

The MN5515HS Evaluation Kit is designed to allow the user to quickly evaluate the Micro Modular Technologies MN5515HS GPS receiver module. This kit can be used in either a laboratory or a mobile environment. The MN5515HS Evaluation Kit implements the necessary circuitry to attach an MN5515HS GPS receiver module to a PC-compatible computer. In addition, the Evaluation Kit provides the necessary 3 VDC power for the supplied active antenna.

Primary power is supplied through the USB connector from the PC. If it is desired to keep the MN5515HS powered up when disconnected from the USB port, a set of (4) size AA batteries may be installed in the battery holder. Please see Paragraph 4.2, Battery Pack for further details.

The MN5515HS Evaluation Kit software is supplied on a CD ROM. This software is installed onto a personal computer and allows the user to control the MN5515HS GPS receiver module as well as display and record the receiver output message data.

### 1.1 Document Applicability

This document applies to the MN5515HS Evaluation Kit (MN5515HS-EVK).

### 1.2 Kit Identification

The version of the Evaluation Kit can be identified as follows: There is a MN5515HS module in the center towards the rear of the board and there are three LED indicator lights on the front edge.

## 2 Description of the Evaluation Kit

The MN5515HS Evaluation Kit features a USB translator from the logic levels utilized by the MN5515HS GPS Receiver module.

In addition, the MN5515HS Evaluation Kit includes an active antenna power supply to provide power to an external active antenna, internal DC regulators which are used to provide the necessary power to the MN5515HS itself, as well as the ancillary circuitry on the MN5515HS evaluation board.

The MN5515HS module includes a Real Time Clock (RTC) chip internally which provides the receiver with precise time allowing it to execute a Hot Start (assuming that ephemeris and position data is current). The user can therefore evaluate the Hot Start capability of the MN5515HS.

### 2.1 Supplied Equipment

The MN5515HS Evaluation Kit contains the following items:

1. MN5515HS GPS receiver module installed on the evaluation board which includes a USB interface, power regulators, and switches.
2. MN5515HS Evaluation Kit CD which contains the following:
  - a. Evaluation Software for operation of the MN5515HS Evaluation Kit
  - b. Documentation for the MN5515HS Evaluation Kit in PDF format.
3. USB cable
4. Active Patch Antenna

### 2.2 Additional Required Equipment

The MN5515HS Evaluation Kit requires the following customer-supplied items at a minimum for testing the MN5515HS GPS receiver module: PC-compatible desktop or laptop (preferred) equipped with the Windows XP operating system, one available USB port and a CD ROM drive.

## 3 Detailed Interface Description

### 3.1 Indicator Lights

Three indicator lights are provided on the faceplate to provide visual status of the MN5515HS evaluation board.

1. The leftmost light is the PWR light, which illuminates when DC power is active within the MN5515HS evaluation board.
2. The middle light is the DATA light, which flashes to indicate the MN5515HS evaluation board is sending serial data to the host computer. Note that this light will not flash unless the USB cable is connected to a computer and an application program has opened the COM port.
3. The rightmost light is the 1PPS light, which flashes at a 1 Hz rate driven by the 1PPS signal from the MN5515HS GPS Receiver module. It is synchronized when the receiver has a valid fix.

### 3.2 USB Serial Port

The USB Serial Port supports communications between the MN5515HS evaluation board and the PC-compatible computer. Communications on this port use the National Marine Electronics Association (NMEA)-0183 format or the SiRF binary protocol for data and command messages. The configuration (protocol, port speed, etc.) can be changed by user commands.

### 3.3 Antenna connector

J1, the SMA type antenna connector provides the L1 GPS signal from an active antenna to the MN5515HS evaluation board. Refer to the description of jumper J4 for supplying power to the antenna.

### 3.4 Power Switch

The left (toggle) switch on the face of the MN5515HS evaluation board is the power switch which controls power to the evaluation board. If the switch is in the lower position, power is turned off to the evaluation board. Note that the switch does not interrupt the DC power, but places the onboard regulators into shutdown mode. Therefore, there is a very small amount of leakage current drawn from the DC power source.

### 3.5 On-Off Button

The right (pushbutton) switch toggles the state of the GPS module between the On and Hibernate states. In the Hibernate state, RAM remains powered up and the RTC continues running but the receiver itself does not operate, thus reducing power consumption.

## 4 Configuring the Evaluation Kit

As shipped, the MN5515HS Evaluation Kit is useable without having to reconfigure internal options. The default configuration applies 3 volts DC superimposed upon the RF antenna connection to supply power to the included active antenna. If the antenna will be externally powered (see precautionary note below for Jumper J4), the user can remove the shunt on J4.

### 4.1 Jumpers

The J3 jumper block is used to connect the BOOT pin to logic high so the module's flash memory can be re-programmed if necessary. Leave the shunt off for normal operation.

The J4 jumper block on the MN5515HS evaluation board is provided to supply +3 volts for an active antenna. If an antenna or antenna distribution system powered in some other fashion is to be used, then remove the shunt across J4 to prevent possible damage to the MN5515HS evaluation board.

The J5 jumper block provides access to the 1PPS output signal. The pin on the right (viewed from the front) is the 1PPS signal, and the pin on the left is ground.

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The J6 jumper block is unused.

The J7 jumper block provides power to the VBK (backup voltage) pin of the MN5515HS module. A shunt should normally be installed (to permit hot start testing).

## 4.2 Battery Pack

The battery pack allows for the installation of four AA-size batteries. Battery orientation is molded into the plastic case.

If installed, the internal batteries can provide power to the module when the USB cable is disconnected. This allows the module to retain data in battery-backed RAM such as ephemeris, almanac, clock bias, and configuration parameters. If desired testing does not require this data to be retained, it is not necessary to install the batteries.

If the MN5515HS evaluation board is not to be used for more than two weeks, remove the batteries to avoid the possibility of electrolyte leakage from the battery. Although rechargeable batteries may be used in the MN5515HS evaluation board, the kit provides no means to recharge the batteries.

In addition, rechargeable batteries will have a shorter life than standard alkaline cell batteries. The MN5515HS evaluation board contains protection diodes to prevent damage in case the batteries are inserted incorrectly.

## 5 Setup and Initial Checkout of the MN5515HS Evaluation Kit

Follow this procedure to initially check out the proper operation of the software and MN5515HS Evaluation Kit hardware.

1. If required for your testing procedures, install four AA batteries in the battery holder on the MN5515HS evaluation board.
2. Remove the shunt on Jumper J4 if antenna power is not to be supplied by the Evaluation Kit. Note that the included active antenna requires the shunt to be installed on J4 to provide antenna power.
3. On the CD supplied with the Evaluation Kit, go to the "USB Driver" folder and run the program "CDM 2.04.06.exe". This will install the driver for the USB interface chip.  
The link for the current version of this driver is: <http://www.ftdichip.com/Drivers/VCP.htm> .  
Choose the driver for the FT232R chip.
4. Connect the supplied USB cable from the MN5515HS evaluation board to a USB port of the host PC. The USB driver will provide a virtual COM port. You may use Windows' Device Manager to identify the COM port number assigned on your particular PC.
5. Connect the supplied active antenna to the RF connector on the MN5515HS evaluation board.
6. Place the active antenna where it has a clear and unobstructed view of the open sky.
7. Start up the MN5515HS evaluation program on the host computer and enable the connection. Please refer to the SiRFDemo documentation for details.
8. Turn on the power switch of the MN5515HS evaluation board and verify the power LED glows green.
9. The MN5515HS evaluation program should indicate communication with the MN5515HS evaluation board, and after a short delay of a minute or so display current time and position.
10. Allow the receiver to operate for approximately 15 minutes to collect current almanac data from the GPS satellites.

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## 6 Evaluation Board Layout

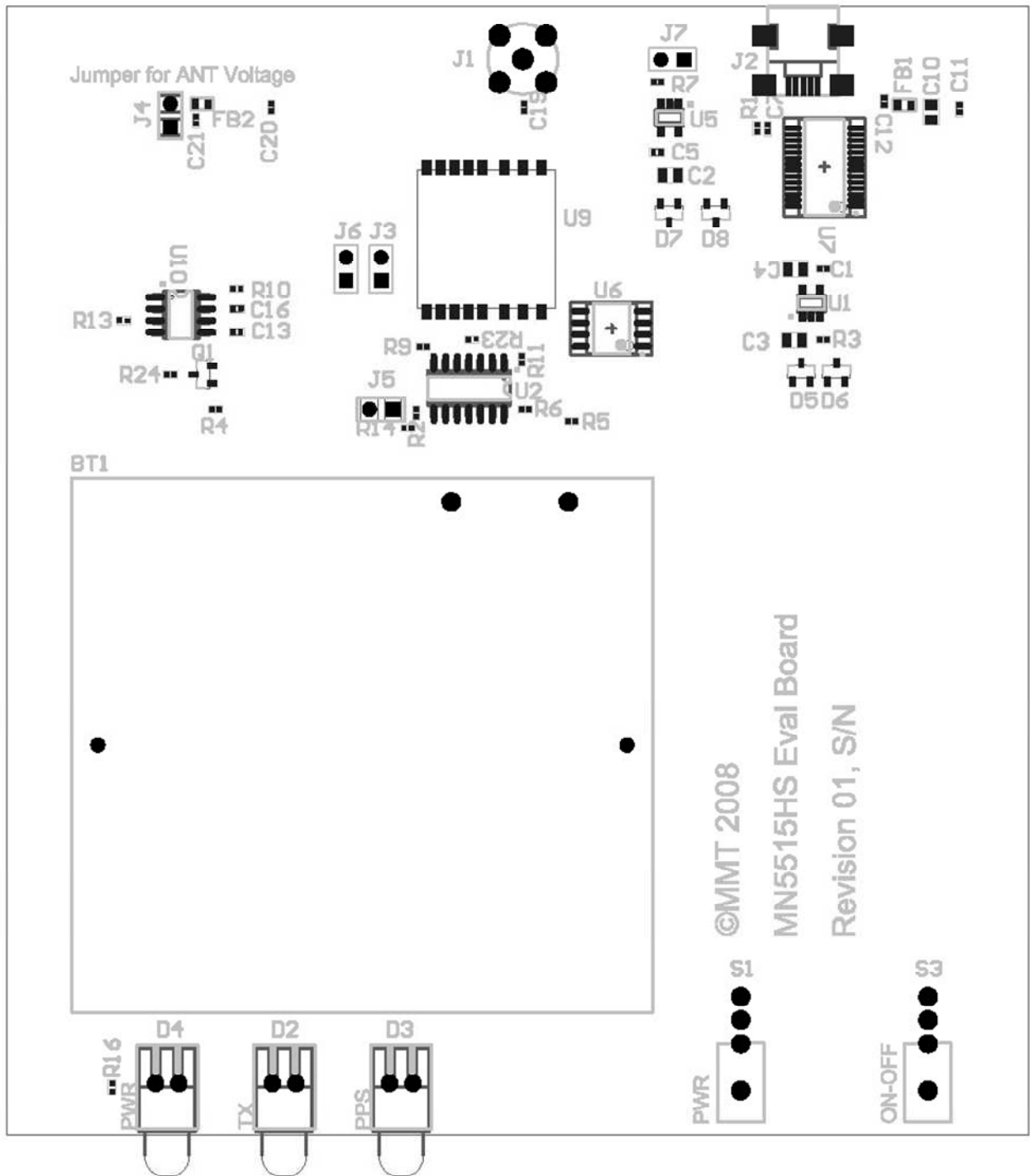


Figure 1 – MN5515HS Evaluation Board Layout

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## 7 Evaluation Board Schematic

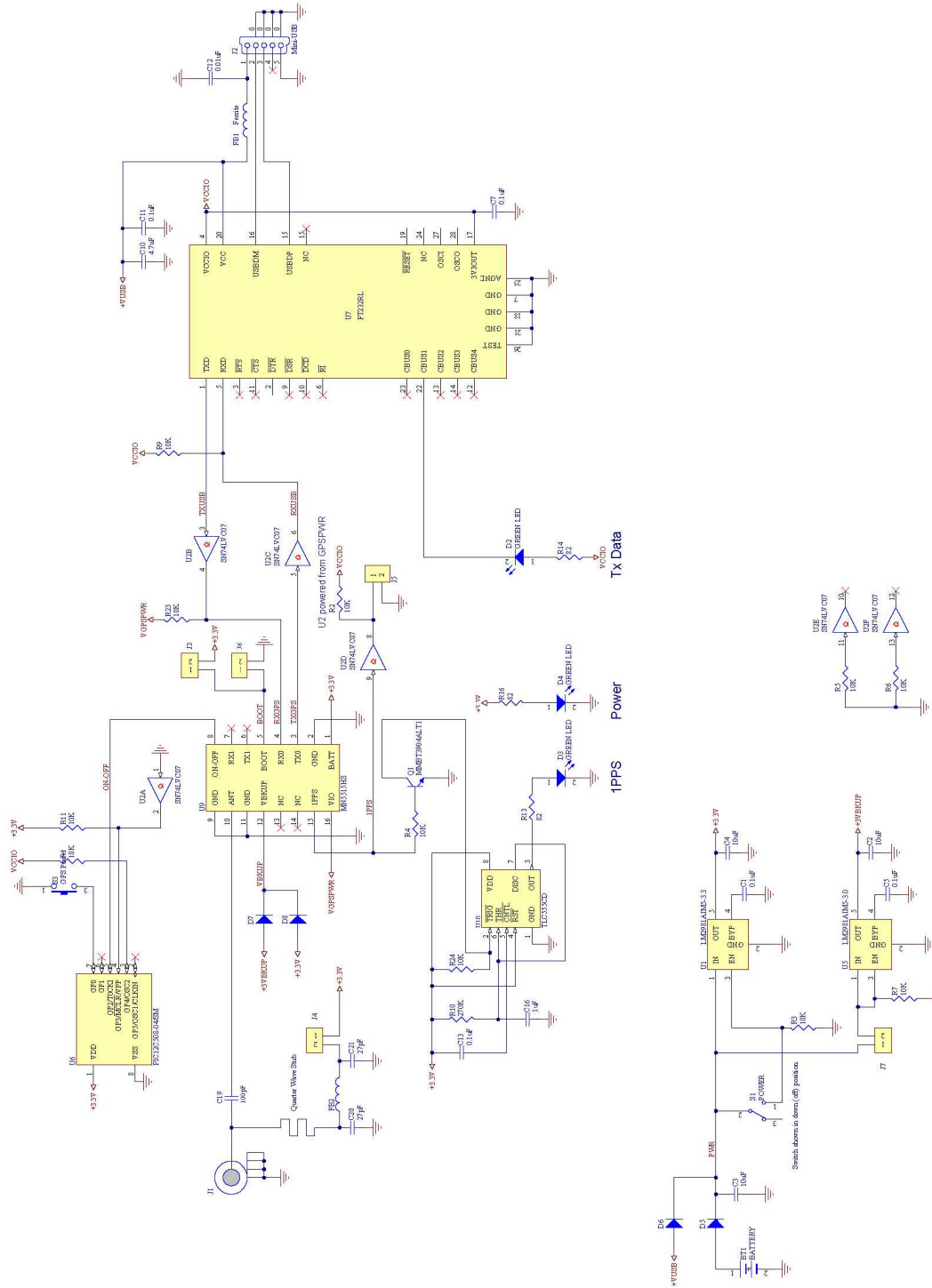


Figure 2 – MN5515HS Evaluation Board Schematic

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## 8 Notices

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