

MN5010HS Evaluation Kit User Guide

micro modular
technologies

1 Evaluation Kit Introduction

The MN5010HS Evaluation Kit is designed to allow the user to quickly evaluate the Micro Modular Technologies MN5010HS GPS receiver module. This kit can be used in either a laboratory or a mobile environment. The MN5010HS Evaluation Kit implements the necessary circuitry to attach an MN5010HS 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 MN5010HS 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 4.3, Battery Pack for further details.

The MN5010HS Evaluation Kit software is supplied on a CD ROM. This software is installed onto a personal computer and allows the user to control the MN5010HS GPS receiver module as well as display and record the receiver output message data.

1.1 Document Applicability

This document applies to the MN5010HS Evaluation Kit (MN5010HS-EVK).

1.2 Kit Identification

The version of the Evaluation Kit can be identified as follows: There is a MN5010HS module in the center towards the rear of the board and there are four LED indicator lights on the front edge.

2 Description of the Evaluation Kit

The MN5010HS Evaluation Kit features a USB translator from the logic levels utilized by the MN5010HS GPS Receiver module.

In addition, the MN5010HS 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 MN5010HS itself, as well as the ancillary circuitry on the MN5010HS evaluation board.

The MN5010HS 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 MN5010HS.

2.1 Supplied Equipment

The MN5010HS Evaluation Kit contains the following items:

1. MN5010HS GPS receiver module installed on the evaluation board which includes a USB interface, power regulators, and switches.
2. MN5010HS Evaluation Kit CD which contains the following:
 - a. Evaluation Software for operation of the MN5010HS Evaluation Kit
 - b. Documentation for the MN5010HS Evaluation Kit in PDF format.
3. USB cable
4. Active Patch Antenna

2.2 Additional Required Equipment

The MN5010HS Evaluation Kit requires the following customer-supplied items at a minimum for testing the MN5010HS 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

Four indicator lights are provided on the faceplate to provide visual status of the MN5010HS evaluation board.

1. The leftmost light is the PWR light, which illuminates when DC power is active within the MN5010HS evaluation board.
2. The second from left light is the DATA light, which flashes to indicate the MN5010HS 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 third from left light is the 1PPS light, which flashes at a 1 Hz rate driven by the 1PPS signal from the MN5010HS GPS Receiver module. It is synchronized when the receiver has a valid fix.
4. The rightmost light is the NAV light, which flashes at a 1 Hz rate driven by the NAV signal from the MN5010HS GPS Receiver module when the receiver has a valid fix.

3.2 USB Serial Port

The USB Serial Port supports communications between the MN5010HS 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 default power-on configuration is controlled by the OPT1 and OPT2 pins. The configuration (protocol, port speed, etc.) can be changed by user commands.

3.3 Antenna connector

The antenna connector provides the L1 GPS signal from an antenna into the MN5010HS evaluation board. Either an active or passive antenna is supported and the MN5010HS Evaluation Kit includes an active antenna. To use a passive antenna, remove the shunt on jumper J4.

3.4 Power Switch

The leftmost switch on the face of the MN5010HS 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 Reset Button

The middle (pushbutton) switch, issues a hardware reset signal to the MN5010HS GPS Receiver module. This button is used whenever the user desires to issue a hardware reset to the MN5010HS module.

3.6 On-Off Button

The rightmost (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.

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4 Configuring the Evaluation Kit

As shipped, the MN5010HS 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 passive antenna operation is desired (see precautionary note below), the user can remove the shunt on J4.

4.1 Jumpers

The J4 jumper block on the MN5010HS evaluation board is provided to supply +3 volts for an active antenna. If a passive antenna is used, or 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 MN5010HS evaluation board.

4.2 DIP switches

1. Switch 1 is connected to the OPT1 pin (13) of the MN5010HS. See Table 1 – Option Pin Descriptions for usage.
2. Switch 2 is connected to the OPT2 pin (14) of the MN5010HS. See Table 1 – Option Pin Descriptions for usage.
3. Switch 3 is connected to the RESERVED pin (4) of the MN5010HS. It must be in the OFF position for normal operation.
4. Switch 4 is reserved for future use.

OPT1	OPT2	Description
0	0	<ul style="list-style-type: none">• NMEA 4800 bps, {GGA, GSA, GSV(5 sec), RMC, VTG},• SBAS Off, Static Filter Off, Internal DR Off,• Extended Ephemeris is not available.
0	1	SiRF Binary 57600 bps
1	0	<ul style="list-style-type: none">• NMEA 57600 bps, {GGA, GSA, GSV, RMC, VTG, EE SiRF Proprietary}• SBAS On, Static Filter On, Internal DR On (15 second timeout),• Extended Ephemeris is available. <p>Note - the receiver powers up in hibernate state for this configuration.</p>
1	1	Reserved

Table 1 – Option Pin Descriptions

4.3 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 MN5010HS 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 MN5010HS evaluation board, the kit provides no means to recharge the batteries.

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In addition, rechargeable batteries will have a shorter life than standard alkaline cell batteries. The MN5010HS evaluation board contains protection diodes to prevent damage in case the batteries are inserted incorrectly.

5 Setup and Initial Checkout of the MN5010HS Evaluation Kit

Follow this procedure to initially check out the proper operation of the software and MN5010HS Evaluation Kit hardware.

1. If required for your testing procedures, install four AA batteries in the battery holder on the MN5010HS evaluation board.
2. Set DIP switches 1 and 2 for the desired configuration (see Section 4.2). If you are not sure, set both to the OFF position.
3. Make sure that DIP switches 3 and 4 are in the "OFF" position.
4. 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.
5. 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.
6. Connect the supplied USB cable from the MN5010HS 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.
7. Connect the supplied active antenna to the RF connector on the MN5010HS evaluation board.
8. Place the active antenna where it has a clear and unobstructed view of the open sky.
9. Start up the MN5010HS evaluation program on the host computer and enable the connection. Please refer to the SiRFdemo documentation for details.
10. Turn on the power switch of the MN5010HS evaluation board and verify the power LED glows green.
11. The MN5010HS evaluation program should indicate communication with the MN5010HS evaluation board, and after a short delay of a minute or so display current time and position.
12. 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

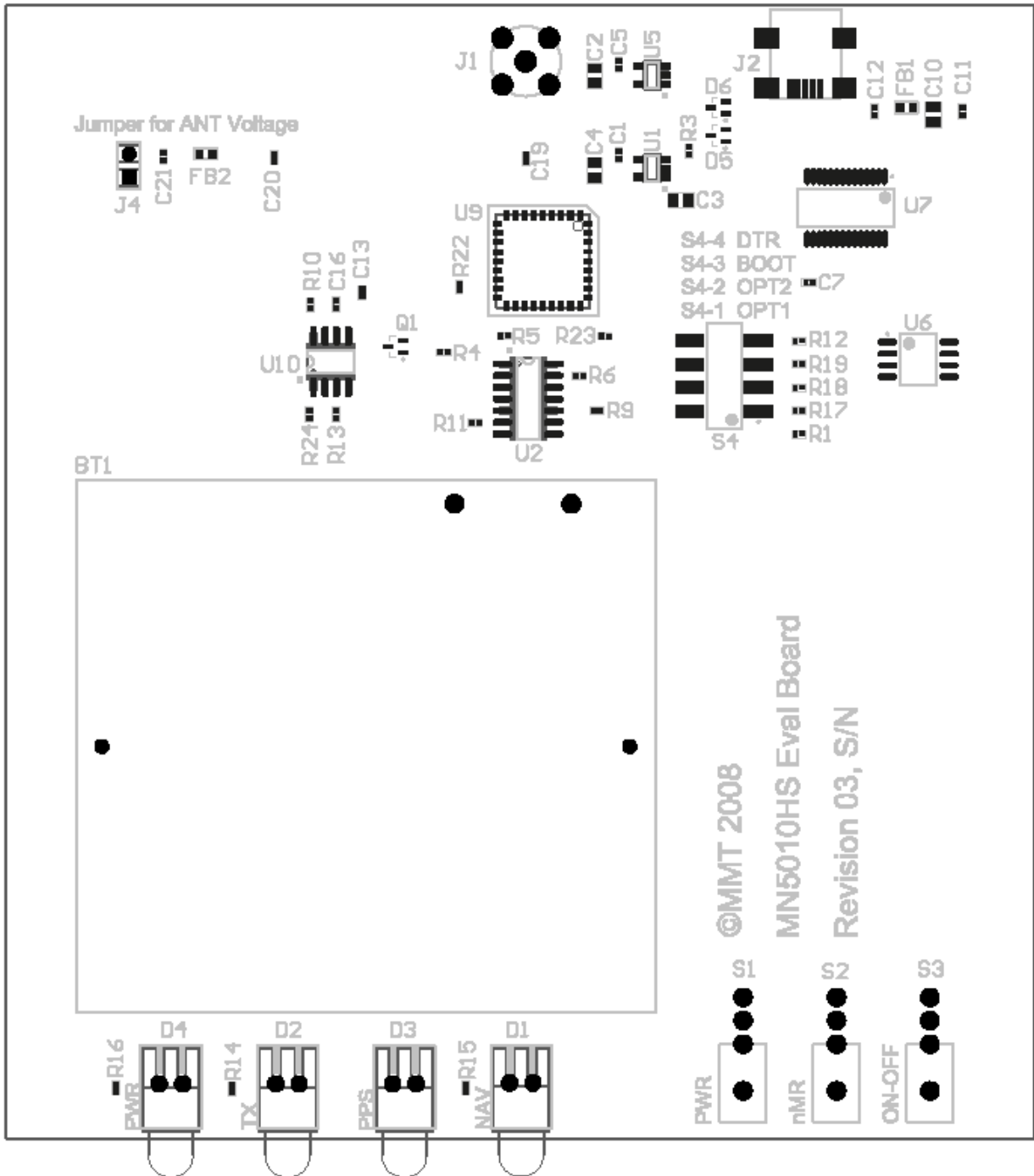


Figure 1 – MN5010HS Evaluation Board Layout

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7 Evaluation Board Schematic

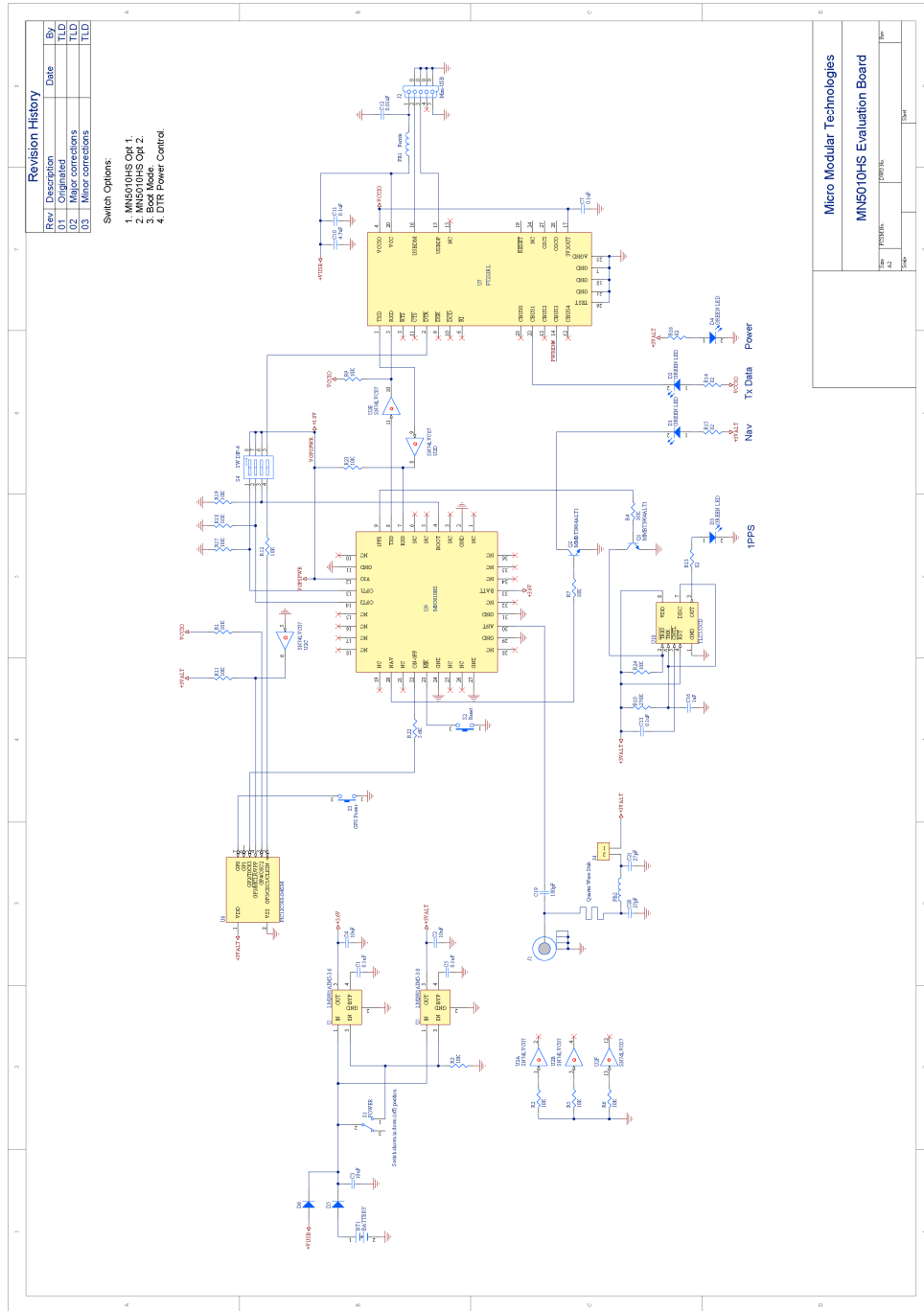


Figure 2 – MN5010HS Evaluation Board Schematic

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8 Notices

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