



GeoS-3M[®]

Demo Board rev2.0

Technical Description

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Scope

The document is the technical description of the GeoS-3M Demo Board and intended for the users of GPS/GLONASS/SBAS OEM module GeoS-3M.

The document contains three chapters and appendix as follows:

- [Chapter 1](#): list of abbreviations
- [Chapter 2](#): technical description
- [Chapter 3](#): how to use the board
- [Appendix A](#): schematic diagram.

1. Abbreviations

DC-DC:	DC-DC Converter
IO:	Input Output
LED:	Light Emission Diode
LDO:	Low Drop Out Linear Regulator
OS:	Operating System
PC:	Personal Computer
SW:	Soft Ware
VCP:	Virtual COM Port

2. Technical Description

2.1. Introduction

The Demo Board is the part of GeoS-3 Demo Kit that contains following items:

- GLONASS/GPS Antenna
- GeoSDemo3[®]* PC-based Demo SW
- GeoS-3M User Manual*.

* Downloadable from www.geostar-navigation.com.

2.2. Overall View

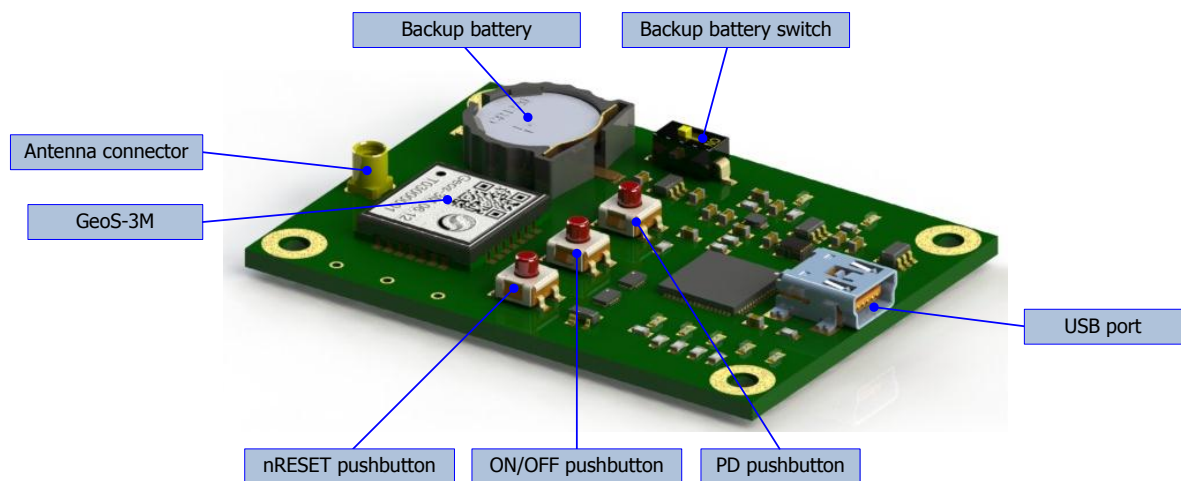


Figure 1: General View

2.3. Block Diagram

The board comprises following main parts:

- GeoS-3M module
- DC-DC voltage converters
- USB port
- Dual RS232-to-USB data converter
- Voltage level translators
- Pushbuttons, connectors, switches
- LED indicators.

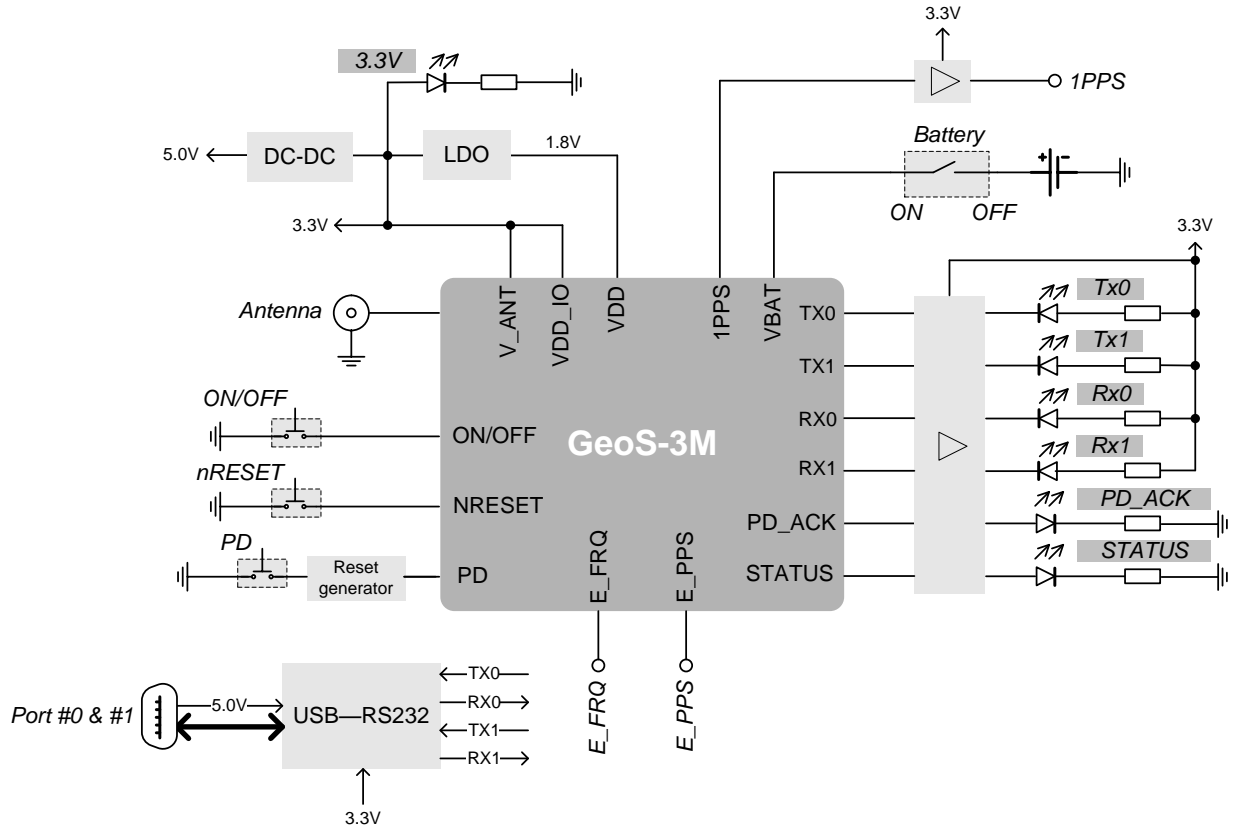


Figure 2: Block Diagram

Refer to [Appendix A](#) for schematic diagram.

2.3.1 GeoS-3M Connections

The module is connected to the following supply voltages:

- VDD: 1.8V
- VDD_IO: 3.3V
- V_ANT: 3.3V
- VBAT: on-board battery.

2.3.2 Power Plan

The board is powered with USB bus 5.0V voltage. There are two DC-DC converters to generate two secondary voltages: 3.3V (switch regulator) and 1.8V (LDO). Li-Ion battery CR1220 (38mAh) is the source of backup voltage.

2.3.3 Serial Ports

GeoS-3M serial ports are converted to USB in USB—RS232 FT232 chip (FTDI). The chip's supply voltage 3.3V comes directly from DC-DC converter output so it is powered right after the board's USB port is attached to the active USB Host.

2.3.4 Connectors

- *Antenna*: antenna port.
Type: MMCX female, straight.
- *Port #0 & #1*: USB port.
Type: mini USB.

2.3.5 Switches, pushbuttons

Switches:

- *Battery*: backup voltage control.
If the switch is set to *ON* then the battery is connected to the module; when *OFF*, the battery is disconnected.

Pushbuttons:

- *ON/OFF*: on/off control.
Pushing the button forces the module to "OFF" state.
- *nRESET*: manual reset control.
Pushing the button forces the module to "RESET" state.
- *PD*: wake-up control (PD signal).
Pushing the button generates single PD pulse. The signal wakes the module up in FIX-BY-REQUEST[®] power-saving mode.

2.3.6 LEDs

- *3.3V*: power indicator.
Continuously lighting if 3.3V is OK.
- *Tx0, Tx1*: serial ports transmit data indicators. Flashing if the module sends data.
- *Rx0, Rx1*: serial ports receive data indicators. Flashing if the Host sends data to the module.

- **STATUS:** indicator of the module status.
Reflects following states of the module: ACQUISITION, POSITIONING, and FAILURE.
- **PD_ACK:** “ACTIVE”/”SLEEP” indicator.
Lighting if the module is in “ACTIVE” state.

2.3.7 Signal Pads

The following signals are available at on-board signal pads: E_PPS, E_FRQ, 1PPS. The voltage levels of the signals are referred to 3.3V supply voltage.

2.4. Assembly Drawing

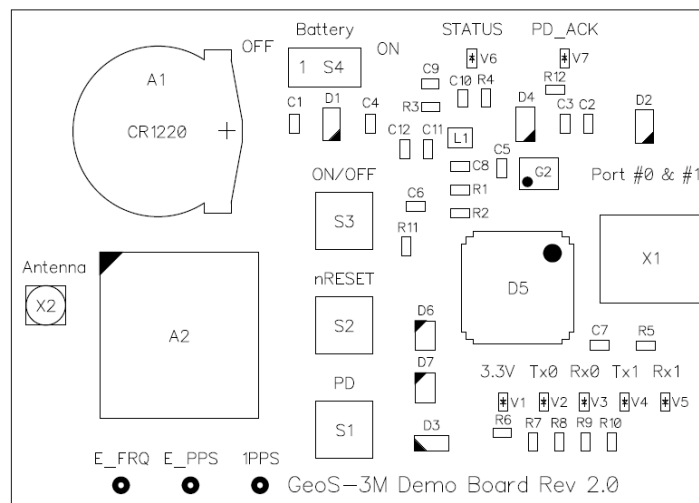


Figure 3: Assembly Drawing

3. How to Use the Board

3.1. USB Driver

If the board is going to be used with personal computer, it should have USB driver been installed. The driver establishes two virtual COM ports for communicating with GeoS-3M over serial ports. If demo SW **GeoSDemo3®** is used for evaluating GeoS-3M module then it's not necessary to install USB driver as USB driver is already integrated into **GeoSDemo3®** installer.

If **GeoSDemo3®** is not used, USB driver (VCP Driver) should be installed; it is downloadable from the following URL link: <http://www.ftdichip.com/Drivers/VCP.htm>.

3.2. External Connections

The board requires following hardware connections (Figure 4):

- GLONASS/GPS antenna
- USB cable for attaching to USB port of the Host PC.

For proper communication via USB, USB connections should be done after PC is powered up and operating system is loaded.

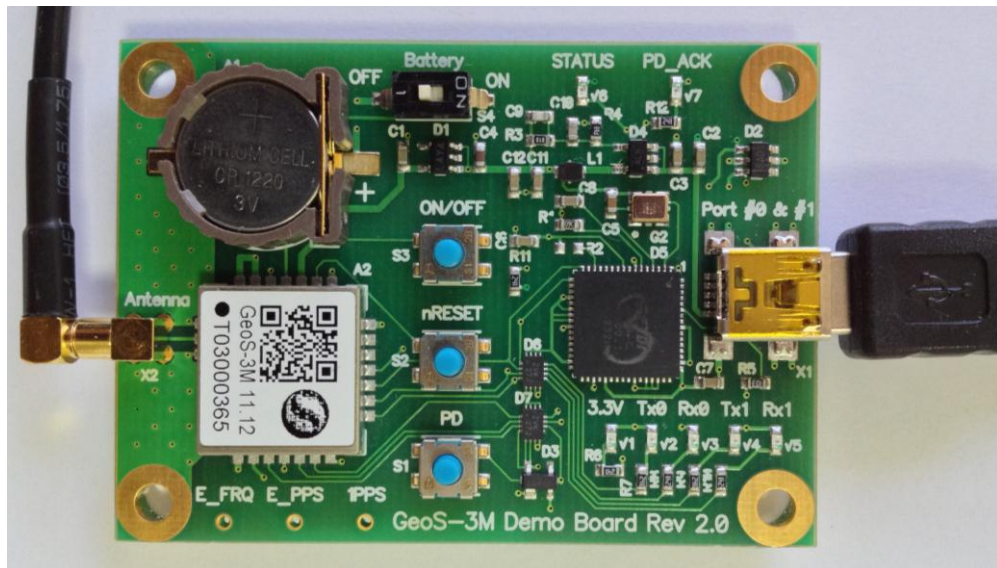


Figure 4: Antenna and USB Connections



The on-board battery provides backup power to the module for arranging warm/hot starts only.

3.3. Getting Started. Operation in Full-power Mode

After making hardware connections as described in section [3.2](#), the module is powered up and starts automatically in full-power mode. On default, Port #0 works on binary protocol, and Port #1 – on NMEA protocol.

LED devices behave as follows:

- 3.3V: constantly lighting
- Tx0, Tx1: flashing once per second
- Rx0, Rx1: flashing as soon as the Host is sending data to the module

- **STATUS:** flashing rate depends on current module status:
 - ACQUISITION:** period is 2 seconds (1 second on, 1 second off); indicates the module is at signal acquisition phase, and no position fix yet
 - POSITIONING:** period is 1 second (0.2 seconds on, 0.8 seconds off); indicates position fix is available
 - FAILURE:** period is 0.5 seconds (0.2 seconds on, 0.3 seconds off); indicates the module has found hardware failure, and no position fix can be calculated.
- **PD_ACK:** lighting if the module is in “ACTIVE” state.

Warm/hot starts can be organized in following ways:

- If on-board backup battery is OK and *Battery* switch is on, recycle main power by reconnecting USB port or click *ON/OFF* or *nRESET* pushbutton
- If *Battery* switch is off, click *ON/OFF* or *nRESET* pushbutton.

3.4. Operation in Power-saving Mode

In this mode LED devices behave as follows:

- **3.3V:** constantly lighting
- **Tx0, Tx1:** flashing as soon as the module is transmitting data
- **Rx0, Rx1:** flashing as soon as the Host is sending data to the module
- **STATUS:** off in “SLEEP” state; while in “ACTIVE” state, behaves the same way as in full-power mode
- **PD_ACK:** off in “SLEEP” state; lighting in “ACTIVE” state.

To quit power-saving mode:

- Send dedicated message to the module
- Reconnect USB port
- Click *ON/OFF* pushbutton
- Click *nRESET* pushbutton.

4. Appendix A. Schematic Diagram

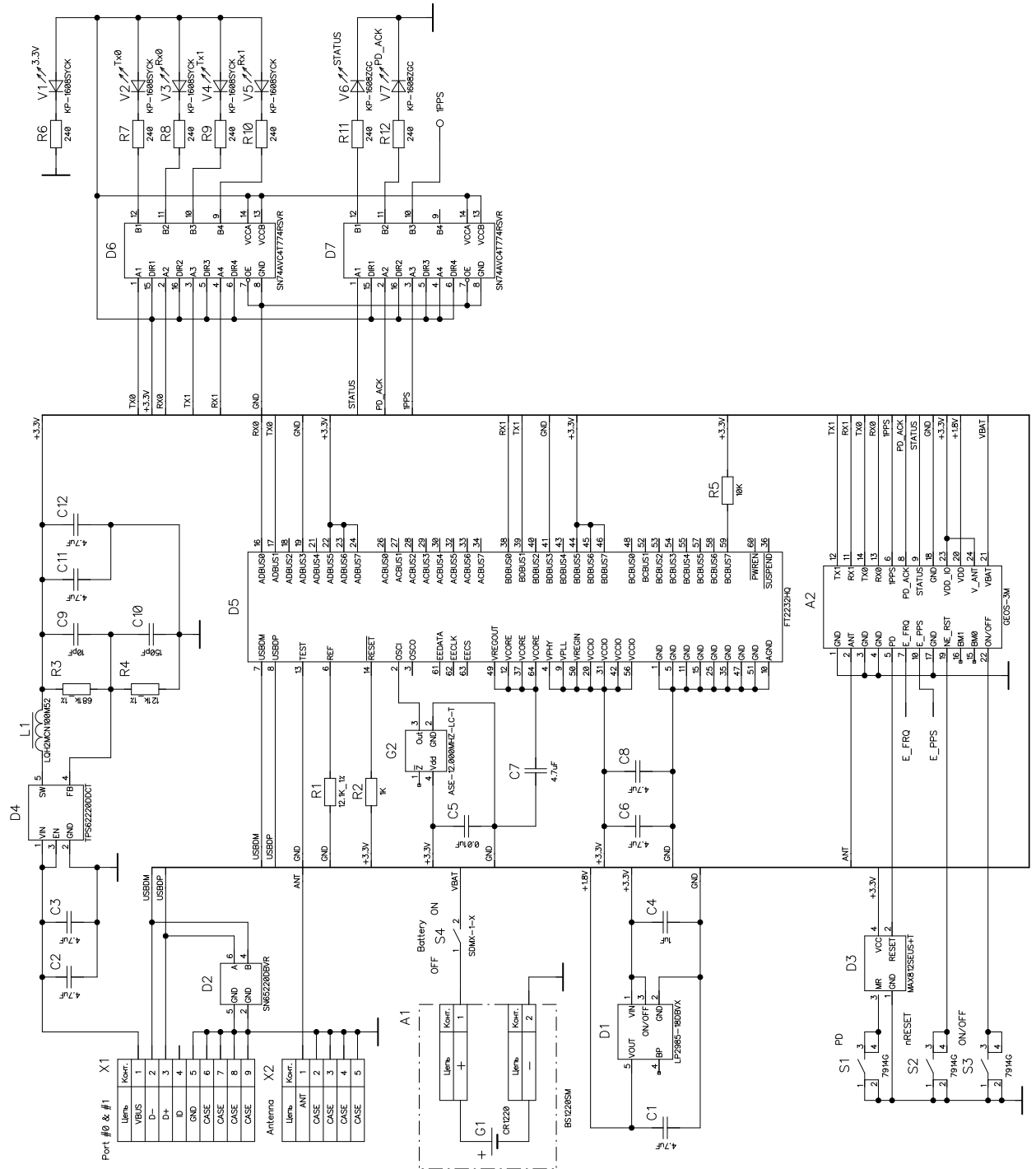


Figure 5: Schematic Diagram