



GeoS-3[®]

Evaluation Board rev2.0

Technical Description

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Scope

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

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

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

* Downloadable from www.geostar-navigation.com.

2.2. Overall View

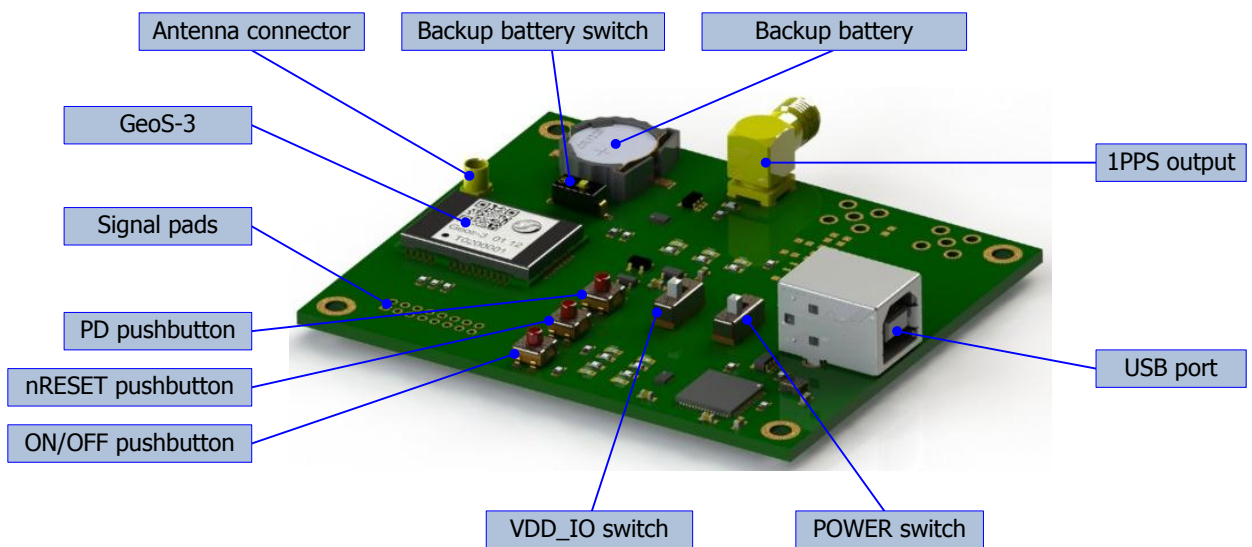


Figure 1: General View

2.3. Block Diagram

The board comprises following main parts:

- GeoS-3 module
- DC-DC voltage converters
- USB port
- Dual RS232-to-USB data converter
- Voltage level translators

- Pushbuttons, connectors, switches
- LED indicators
- Signal pads.

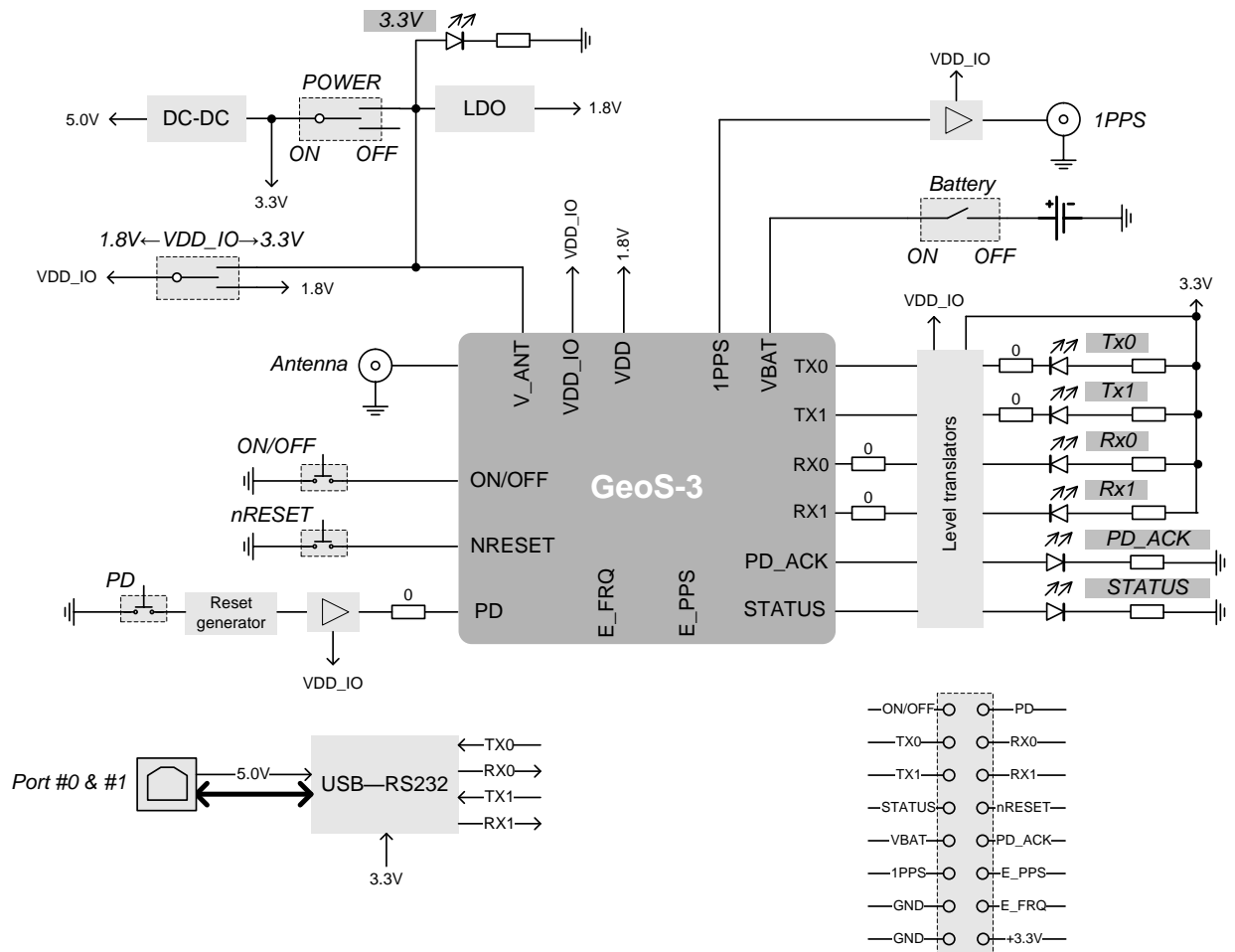


Figure 2: Block Diagram

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

2.3.1 GeoS-3 Connections

The module is connected to the following supply voltages:

- VDD: 1.8V
- VDD_IO: 1.8V or 3.3V (defined by dedicated switch)
- V_ANT: 3.3V
- VBAT: on-board battery.

There are on-board signal pads for direct connection to the module (see section [3.1.3](#)).

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-3 serial ports are converted to USB in USB—RS232 FT2232 chip (FTDI). The chip's supply voltage 3.3V comes directly from DC-DC converter output so it is powered right after 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: USB type B.
- *1PPS*: 1PPS output.
Signal levels are referred to VDD_IO.
Type: SMA female, right angle.

2.3.5 Switches, pushbuttons

Switches:

- *POWER*: GeoS-3 power control.
Moving switch to *ON* turns the module on; moving switch to *OFF* removes the power.
- *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.
- *VDD_IO*: VDD_IO voltage select.
If the switch is set to 3.3V, then VDD_IO=3.3V. If the switch is set to 1.8V, then VDD_IO=1.8V.

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 *POWER* switch is on and 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 can be connected directly to the module via on-board signal pads:

ON/OFF, PD, TX0, TX1, RX0, RX1, STATUS, nRESET, PD_ACK, E_PPS, E_FRQ, 1PPS, VBAT, +3.3V.

The voltage levels of ON/OFF, PD, TX0, TX1, RX0, RX1, STATUS, nRESET, PD_ACK, E_PPS, E_FRQ, 1PPS are referred to VDD_IO supply voltage.

For detailed description of direct connections to the module, see section [3.1.3](#).

2.4. Assembly Drawing

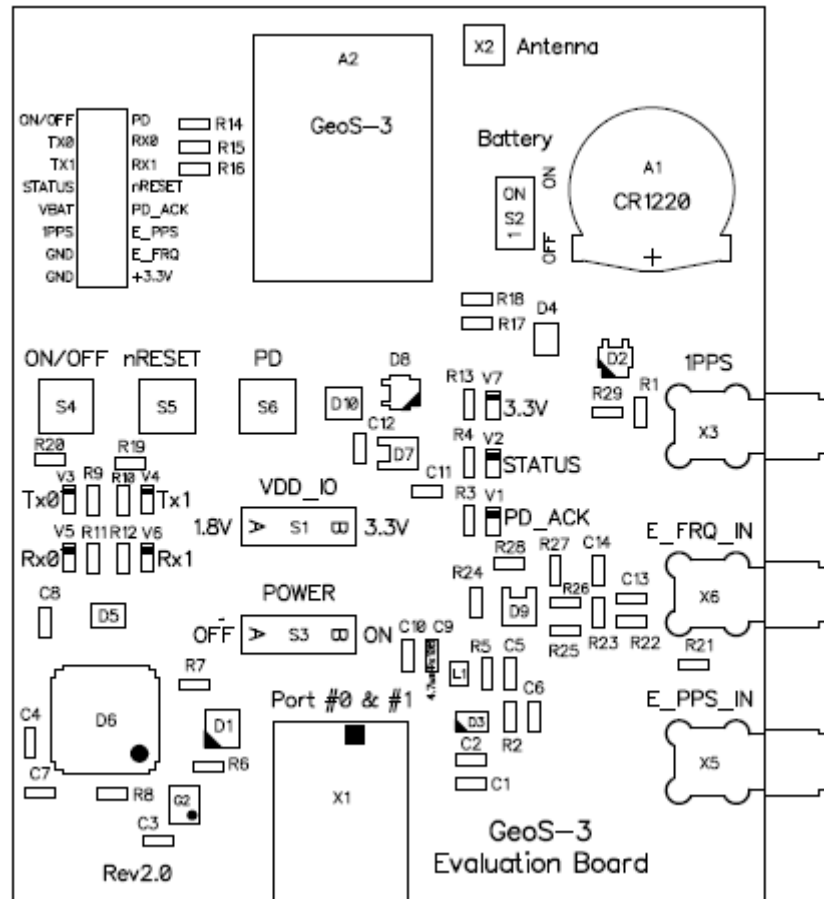


Figure 3: Assembly Drawing

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-3 over serial ports. If demo SW **GeoSDemo3®** is used for evaluating GeoS-3 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.

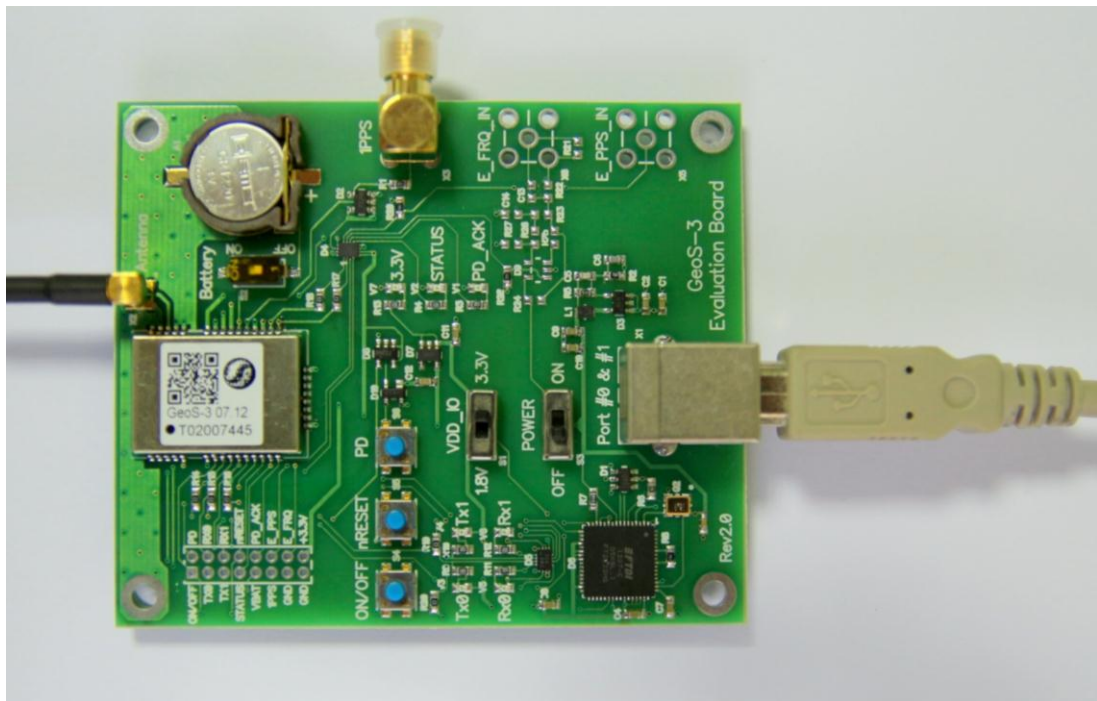


Figure 4: Antenna and USB Connections



1. For correct operation of GeoS-3 module and on-board LED devices, the selected value of VDD_IO voltage has no sense
2. The on-board battery provides backup power to the module for arranging warm/hot starts only.

3.3. Direct Access to GeoS-3 IO Pads

No any action required to access to Tx0, Tx1, 1PPS, STATUS, PD_ACK, ON/OFF, and nRESET pads.

For accessing to Rx0, Rx1, PD pads it's necessary to remove 0 Ohm resistors R14, R15, and R16.

When supplying external power 3.3V to +3.3V pad, turn off the *POWER* switch.

When supplying external backup source to VBAT pad, turn off the *Battery* switch.

3.4. Getting Started. Operation in Full-power Mode

After making hardware connections as described in section [3.2](#), turn the module on by turning *POWER* switch to *ON* direction.

After power-up, the module 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 turning off and then turning on *POWER* switch or click *ON/OFF* or *nRESET* pushbutton
- If *Battery* switch is off, click *ON/OFF* or *nRESET* pushbutton.

3.5. 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
- Recycle main power
- Click *ON/OFF* pushbutton
- Click *nRESET* pushbutton.

4. Appendix A. Schematic Diagram

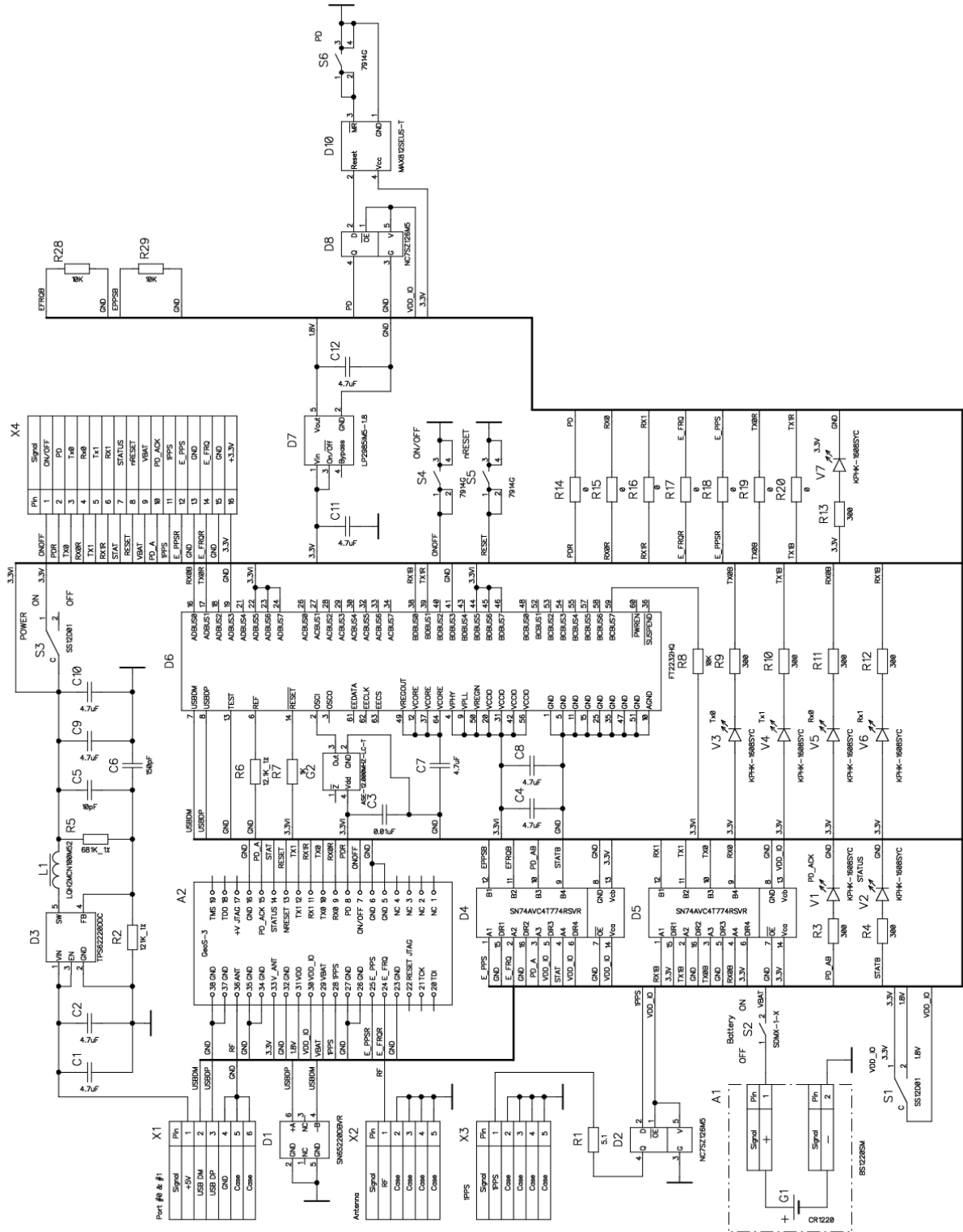


Figure 5: Schematic Diagram