LANTRONIX®

PNT-SG3FS Evaluation Kit
User Guide

Intellectual Property

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Disclaimer

Revision History

Date	Rev.	Comments
July 2023	A	Initial release.

For the latest revision of this product document, please check our online documentation at https://www.lantronix.com/support/documentation/.

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1. Introduction

The PNT-SG3FS-EVAL evaluation kit is a complete standalone evaluation platform for the PNT-SG3FS GNSS module.

The PNT-SG3FS module is an easy-to-use Global Navigation Satellite System (GNSS) standalone module, with an integrated Teseo-III receiver working simultaneously on multiple constellations (GPS/Galileo/Glonass/BeiDou/QZSS).

2. Features

The PNT-SG3FS-EVAL has the following features:

- ◆ USB power supply
- ◆ Internal backup battery option (battery not provided)
- ◆ Power and Reset buttons
- ◆ I2C and current measurement connectors
- ◆ UART connector via USB
- ◆ PPS and Power output LEDs

3. PNT-SG3FS-EVAL Evaluation Kit Contents

The PNT-SG3FS-EVAL evaluation kit consists of the following:

- PNT-SG3FS-EVAL evaluation board
- GNSS active antenna
- USB cable
- Quick start guide

4. Interfaces

The PNT-SG3FS-EVAL offers a variety of user interfaces:

♦ Power (On/Off) button

♦ Reset button

♦ UART interface via micro-USB

♦ 5V power input (supplied via USB)

♦ GNSS antenna input

♦ LED indicators

Power Input

Power is supplied to the PNT-SG3FS-EVAL via the micro-USB connector highlighted in Figure 1 below.

Figure 1. Power Input

Power (On/Off) Button

The power button is highlighted in Figure 2 below.

Figure 2. Power (On/Off) Button

When the power button is depressed (down), the board is switched ON and the power LED (see LED Indicators) is lit.

When the power button is raised (up), VBAT is connected to GND, the board is switched OFF, and the power LED is unlit.

Reset

The reset button is highlighted in Figure 3 below. Press the reset button to reset the PNT-SG3FS module.

Figure 3. Reset Button

LED Indicators

The PNT-SG3FS-EVAL offers two LED indicators as shown below.

♦ The red power LED indicator (highlighted in Figure 4 below) shows whether the unit is On (LED is lit) or Off (LED is unlit).

Figure 4. Power LED Indicator

♦ The green PPS LED indicator (highlighted in Figure 5 below) blinks once per second when the PNT-SG3FS is up and running.

Figure 5. PPS LED Indicator

UART Interface

The UART interface (highlighted in Figure 6 below) is provided via the micro-USB connector.

Figure 6. USB/UART Connector

The UART interface is used to trace NMEA messages and to upload binary files.

Before using Silicon Labs' CP2104 UART-USB bridge chip located inside the PNT-SG3FS-EVAL unit, install the Virtual COM Port (VCP) driver. The driver can be downloaded from the Silicon Labs (Silabs) web page:

https://www.silabs.com/documents/public/software/CP210x_Universal_Windows_Driver.zip

The VCP device drivers allow the CP2104 device on the PNT-SG3FS-EVAL to appear to the PC's application software as a standard COM port. Application software running on the PC accesses the CP2104 device as it would a standard hardware COM port configured as shown in Table 1. Data transfer between the PC and the CP2104 device is performed over the USB interface.

Table 1. UART Configuration

Baud Rate	Data Bits	Stop Bits	Parity	Handshake
9600 Baud	8 Bits	1 Bit	none	none

GNSS Input Antenna

GNSS input is available through an SMA female connector, highlighted in Figure 8 below.

Figure 7. GNSS SMA Connector

A passive or active antenna can be used on the PNT-SG3FS-EVAL.

The DC power supply for active antenna is 3V3 with current limitation in case of a short circuit.

Note: *Please use a DC blocker for passive antenna or connection of a GNSS simulator to the PNT-SG3FS-EVAL unit.*

I2C and Power Connector Interface

The 10-pin CN302 connector highlighted in Figure 9 below provides I2C bus signal and pins to measure power consumption.

Figure 8. I2C and Power Measurement Connector

Table 2. Connector Pin Description

Pin	Connector Signal	Description
1	VCC_IO	3V3 power supply
2	GND	Ground connection
3	Module.Pin#5	
4	Module.Pin#18	
5	I2C_CLK	I2C clock signal
6	I2C_SD	I2C SDA signal
7	VBAT	VBackup power supply
8	PM_VBAT	VBackup measure point
9	VCC	VCC power supply
10	PM_VCC	VCC measure point

The VCC_IO (pin #1), GND (#2), I2C_CLK (#5), and I2C_SD (#6) pins allow connection of an external I2C-Master-device to the PNT-SG3FS.

The PNT-SG3FS always acts as slave on I2C-bus.

5. Current Measurement Process

The current measurement pins identified in Table 2 of the previous section are highlighted in Figure 10 below.
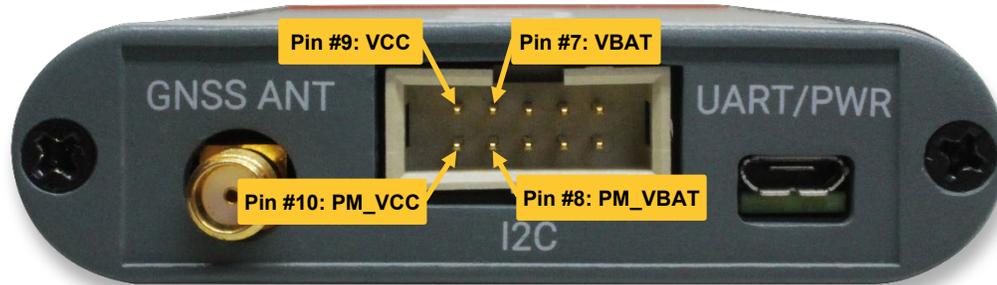
Figure 9. Current Measurement Connector Pins

To measure the current consumption of the PNT-SG3FS in different operating modes:

1. Connect a true-RMS voltmeter to:

    ♦   VCC (pin #9) and PM_VCC (pin #10)

    ♦   VBAT (pin #7) and PM_VBAT (pin #8)

2. Wait 15 minutes to download all GNSS orbital data.

3. Read the voltage (and average if necessary); the current value is determined with the following conversions:

    ♦   VCC: 1 mV equals 1 mA

    ♦   VBAT: 100 mV equals 1 mA

Note: *Perform the test with good signals and a clear sky view to ensure that the receiver can acquire the satellite signals.*

6. Teseo-Suite Connection

Install and start Teseo-Suite (https://www.st.com/en/embedded-software/teseo-suite.html), and follow the directions in the following sections.

Getting Started with Teseo-Suite

When the Teseo-Suite application starts, Teseo-Suite opens the Configuration Session panel as shown in Figure 11 below.

Enter a session name to enable the "Add Device" button.
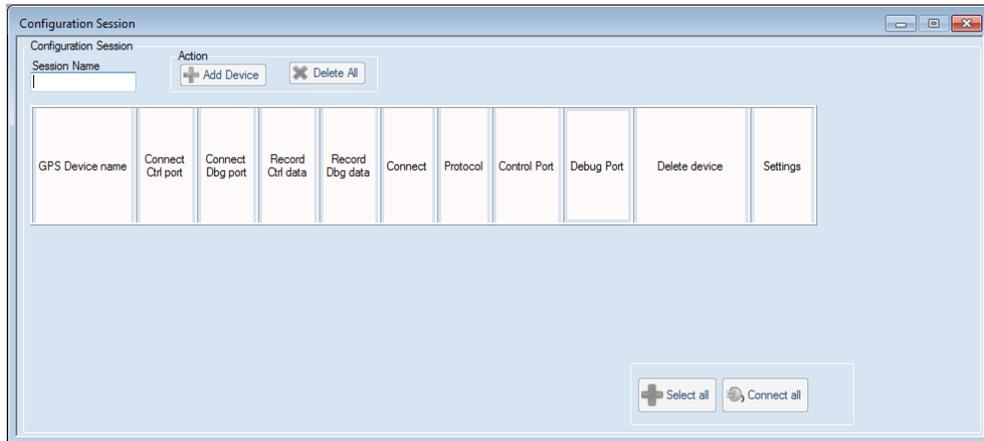
Figure 10. Configuration Session Panel

If the Configuration Session panel does not appear, either open the File menu and select "New Session" or click the "Edit Session Configuration" button shown in Figure 12.

Figure 11. Edit Session Configuration Button

Add/Delete Device

In the Configuration Session panel, you can add/delete PNT-SG3FS-EVAL devices in the work session and monitor existing devices.

Click the "Add Device" button to bring up the Configuration Device form shown in Figure 14.

Configure the following fields as described:

- ◆ Hardware type: STA8090
- ◆ Control Port Protocol: NMEA
- ◆ The following Control Port fields should use the same parameters of the serial connection as defined in Table 1: Baud Rate – 9600; Data Bits – 8; Parity – None; Stop Bits – One

Click Ok to add the device.
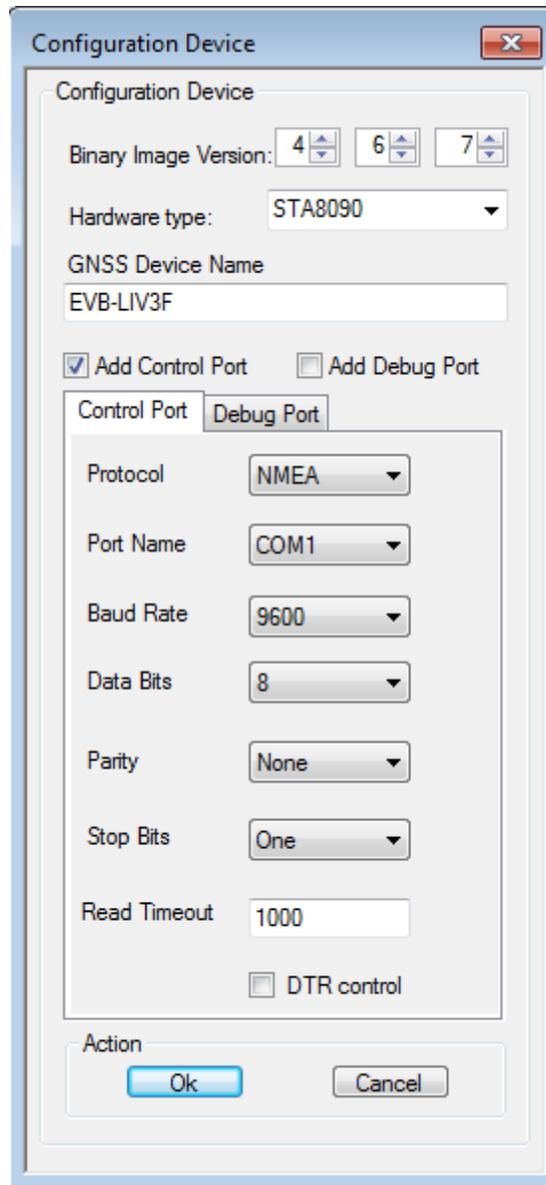
Figure 12. Configuration Device panel

Note: When selecting the Port Name, Teseo-Suite lists all COM ports available, even if these COM ports are already in use by another application.

The GNSS Device Name and Protocol cannot be changed once the device has been added.
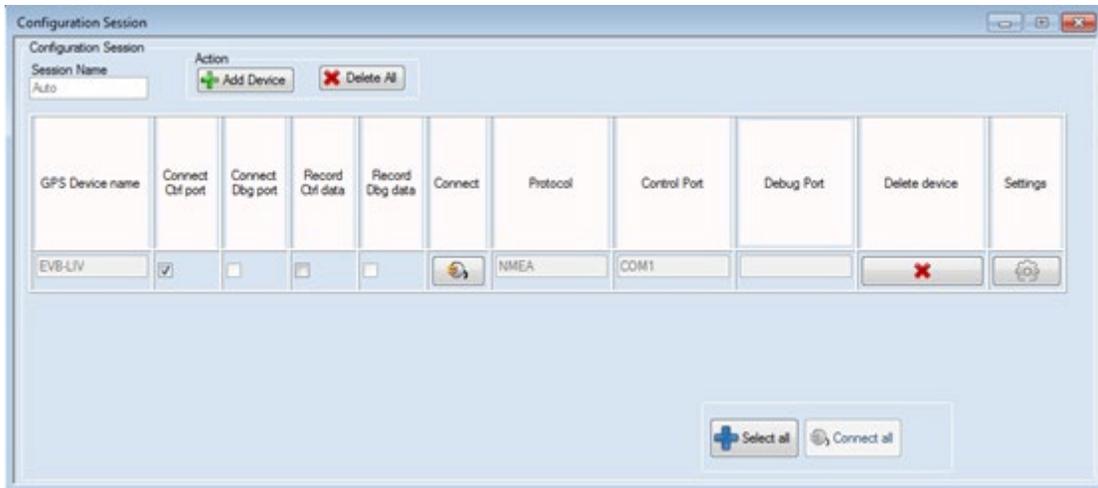
Figure 13. Configuration Session Panel with One Device Added

To delete a device from the session, click the corresponding button in the Delete Device column.

The Delete All button removes all devices from the current session.

Connect or Disconnect Control Port

After the Control Port has been defined, its corresponding checkbox is enabled. Clicking the checkbox in the Connect Ctrl Port column allows or disallows the port to be connected via the Connect button.

Click the Connect (electrical plug) button to open the selected ports; the appearance of the button changes to show that you can disconnect the device as shown in Figure 15 below.
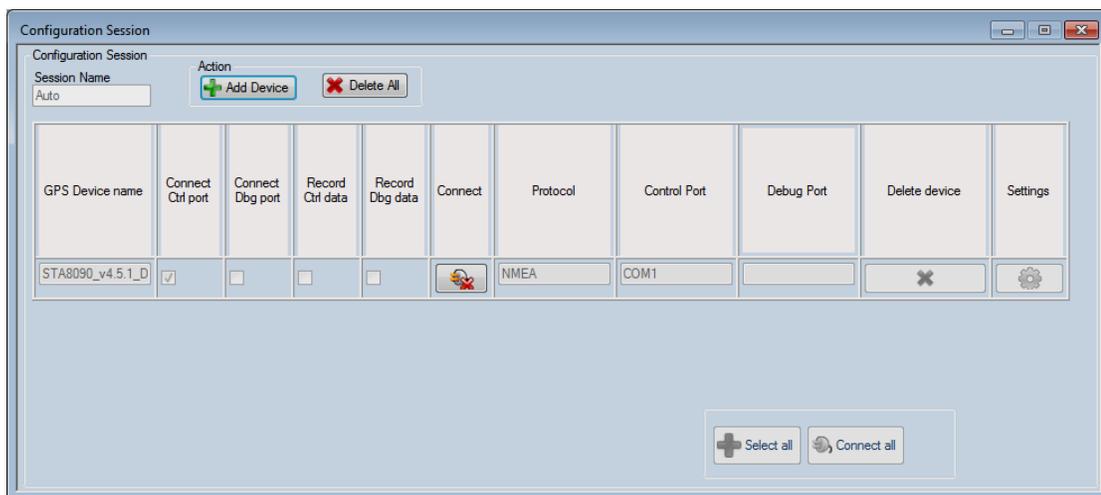
Figure 14. Port Connections Active

Open the NMEA output window to confirm proper NMEA output using the button shown in Figure 16.
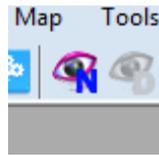
Figure 15. View NMEA Output Button

The NMEA output panel displays the NMEA stream coming from the PNT-SG3FS-EVAL as shown in Figure 17 below.

Figure 16. NMEA Output Panel

7. Board General View

Internal Top View and Jumper Configuration
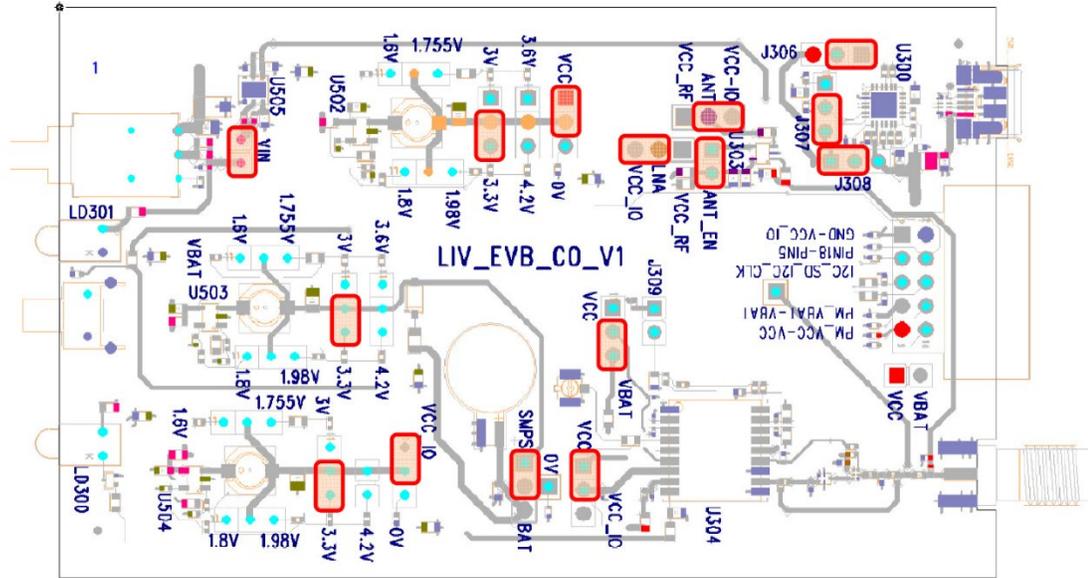
Figure 17. Internal Board View

Block Diagram Overview
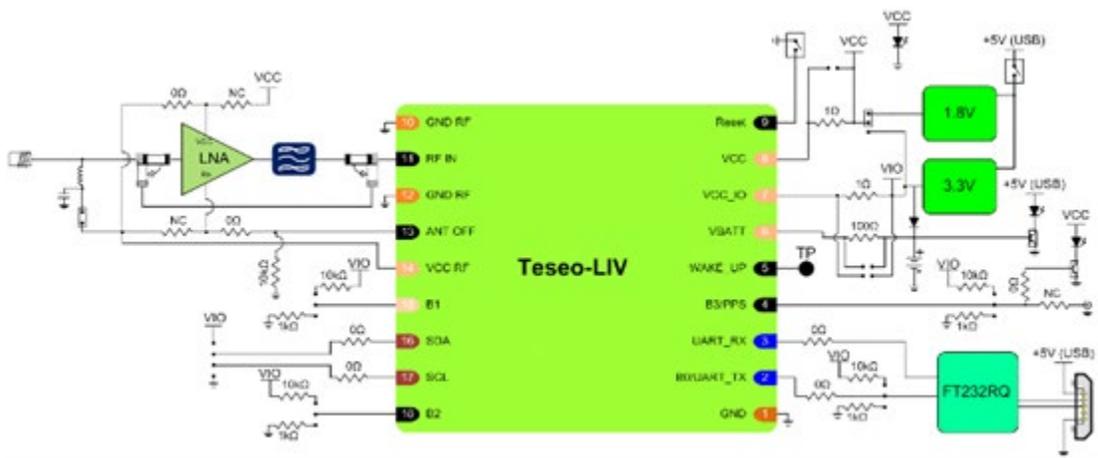
Figure 18. Block Diagram

8. Reference Documents

♦ Additional documentation for the PNT-SG3FS GNSS module can be found at https://www.lantronix.com/support/documentation/.

♦ Teseo-Suite data brief: http://www.st.com/resource/en/data_brief/teseo-suite.pdf (DB3224, DocID030398)