UM3212

User manual

EVB-LIV4F evaluation board

Introduction

The EVB-LIV4F evaluation board is a complete standalone evaluation platform for Teseo-LIV4F tiny dual band GNSS module.

Teseo-LIV4F module is an easy to use dual-band global navigation satellite system (GNSS) standalone module, embedding Teseo IV single die standalone positioning receiver IC working simultaneously on multiple constellations (GPS/Galileo/GLONASS/BeiDou/QZSS).

The EVB-LIV4F is designed for top performance Teseo-LIV4F GNSS module.

1 Features

The EVB-LIV4F has the following features:

- USB power supply
- Internal backup battery placing (battery not provided)
- Push buttons to switch ON and OFF
- I²C and Current measurement connector
- Reset button
- UART by USB connector
- PPS output LED
- Power output LED

2 EVB-LIV4F general presentation

The EVB-LIV4F kit is composed of several elements:

- EVB-LIV4F evaluation board;
- GNSS active antenna;
- 1 USB cable;
- EVB-LIV4F - Quick starting guide.

3 Interfaces

The EVB-LIV4F offers a different interface to the user:

- ON/OFF button;
- Reset button;
- µUSB use for interface with UART of EVB-LIV4F;
- Supply by USB (5 V);
- GNSS antenna input;
- LED indicators.

3.1 Power by USB

A micro USB connector (see the Figure 1) allows supplying the board identified in yellow below.

Figure 1. Power input

3.2 ON/OFF switch

Figure 2. ON/OFF switch

When button (see the Figure 2) is lifted if user presses the ON/OFF switch the board turns ON and power LED turns on.

When ON/OFF switch is lifted, VBAT is connected to GND and the board is switched OFF.

3.3 Reset

A reset button (see the Figure 3) is present on the front panel of the case and it resets the Teseo-LIV4F module.

Figure 3. Reset button

3.4 LED indicators

The EVB-LIV4F offers two LED Indicators as shown below:

- The PWR red LED (see the Figure 4) indicator shows whether the unit is ON (led is turned on) or OFF (led is turned off).

Figure 4. Power LED indicator

- The PPS green LED (see the Figure 5) indicator blinking every second indicates that Teseo-LIV4F is up and running.

Figure 5. PPS LED indicator

3.5 UART by USB

The UART interface (see the Figure 6) is provided via a USB connector.

Figure 6. USB/UART connector

The UART interface is used to trace NMEA messages and to upload the binary file on the system.

Before using the UART/USB bridge CP2104, the VCP driver must be installed. It can be downloaded from the Silicon Labs webpage.

The virtual COM port (VCP) device drivers allow the CP2104 device on EVB-LIV4F to appear on the PC's application software as a standard COM port. Application software running on the PC accesses the CP2104 device as it would access a standard hardware COM port configured as shown in the Table 1. However, actual data transfer between the PC and the CP2104 device is performed over the USB interface as shown in the following figure.

Figure 7. UART to USB path through converter

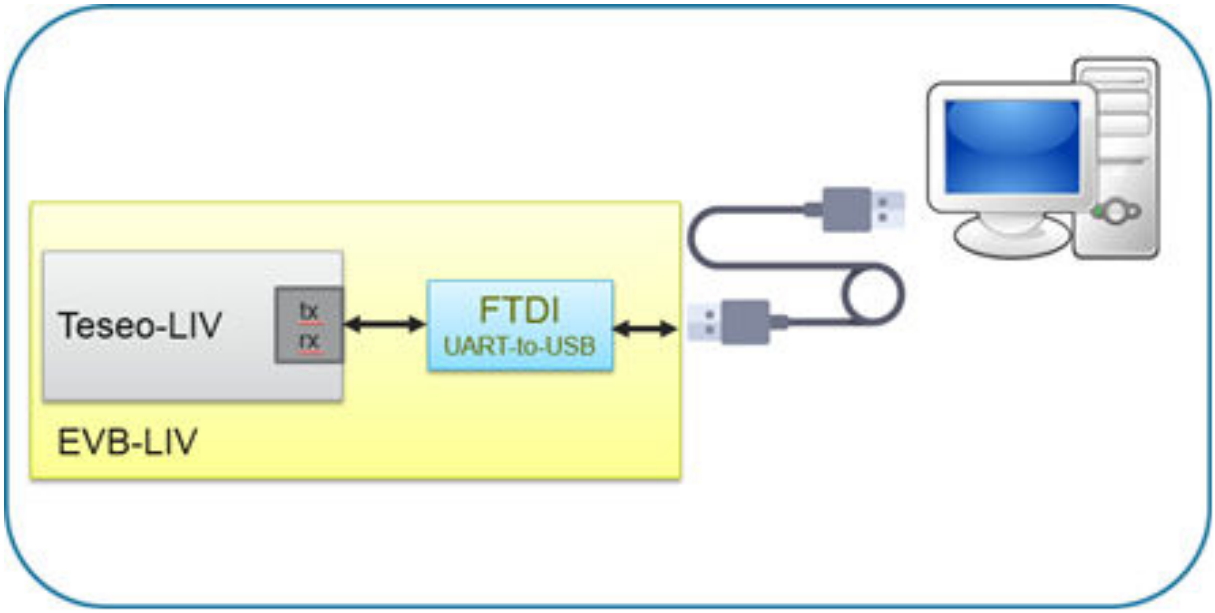


Table 1. UART configuration

Baud rate	Data Bits	Stop Bits	Parity	Handshake
115200	8 Bits	1 Bit	-	-

3.6 GNSS input antenna

The GNSS input (see the Figure 8) is available through a SMA female connector.

Figure 8. GNSS SMA antenna connector

The passive or active antenna can be used on EVB-LIV4F.

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

Note: Use DC blocker for passive or simulator connected to EVB-LIV4F.

3.7 I²C and power connector interface

The 10-pin connector (CN302) provides I²C bus signal and power supply to evaluate current consumption as shown in the Figure 9

Figure 9. I²C and power measure connector

Table 2. Connector pin-out description

Pin	Connector signal	Comment
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 four pins VCC_IO (#1), GND (#2), I2C_CLK (#5), I2C_SD (#6) allow connection of an external I²C-master-device to the Teseo-LIV4F.

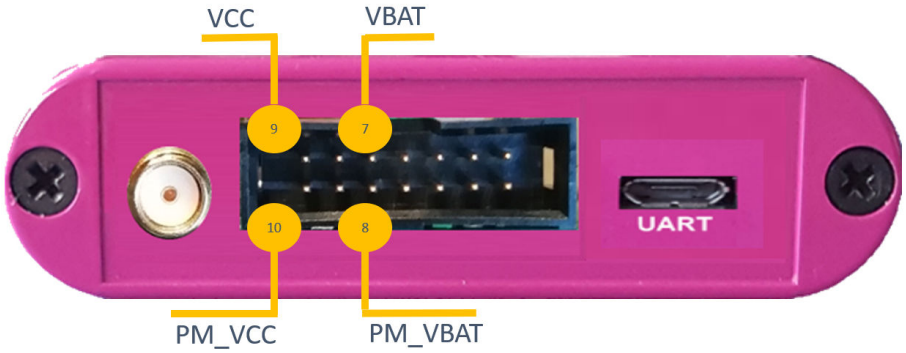
Teseo-LIV4F always acts as slave on I²C-bus.

4 Current measurement process

To measure the current consumption of Teseo-LIV4F in different operating modes, based on the pins placement as shown in the Figure 10, follow these steps:

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 done by the following conversion:
   – VCC → 1 mV equals 1 mA
   – VBATT → 100 mV equals 1 mA

Figure 10. Pins placement in the current measurement connector



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

5 TESEO-SUITE connection

Download the TESEO-SUITE from STMicroelectronics website.

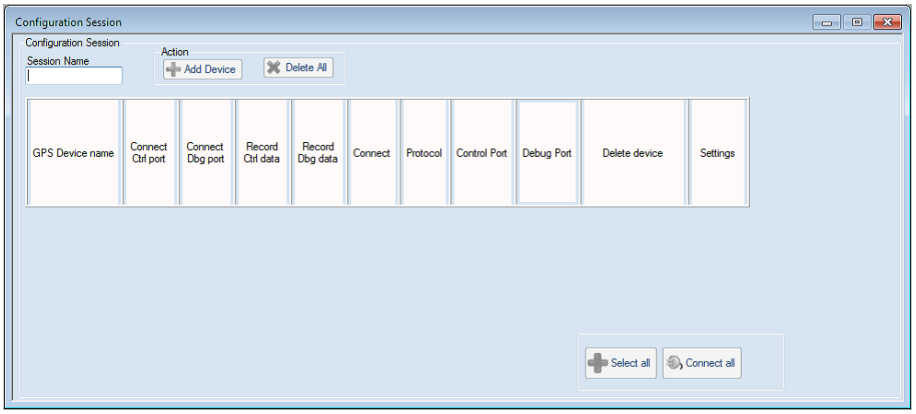
Install and start TESEO-SUITE, and follow the directions described in the following chapters.

5.1 Getting started with the TESEO-SUITE

When the application starts, TESEO-SUITE opens the *Configuration Session* panel, as shown in the Figure 11 below, to allow the user to add the EVB-LIV4F.

Then enter a session name to enable the *Add Device* button.

Figure 11. New session panel



If the *Configuration Session* panel is not opened, 2 ways either go to *File* menu and select *New Session* or click the *Edit Configuration Session* button shown in the Figure 12.

Figure 12. Edit Configuration Session button

5.2 Add/delete device

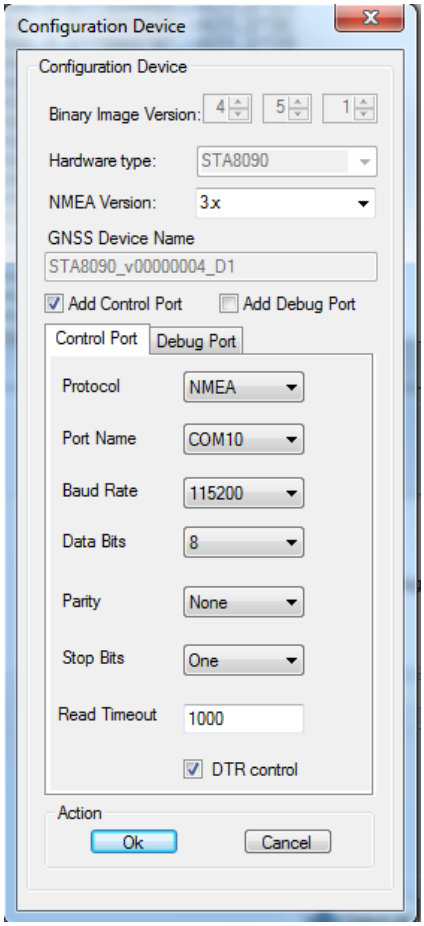
In the *Configuration Session* panel, it is possible to add/remove EVB-LIV4F devices in the work session and monitor the existing ones.

Pressing the button *Add Device* brings up the *Configuration Device* form, as shown in the Figure 13.

In the *Configuration Device*:

- Set the *Hardware type* with *STA8090* value;
- Select the *Control Port* and choose the parameters of the serial connection as in the Table 1;
- On *Control Port*, the user can select the NMEA protocol;
- Press the *OK* button to create the device.

Figure 13. Configuration Device panel

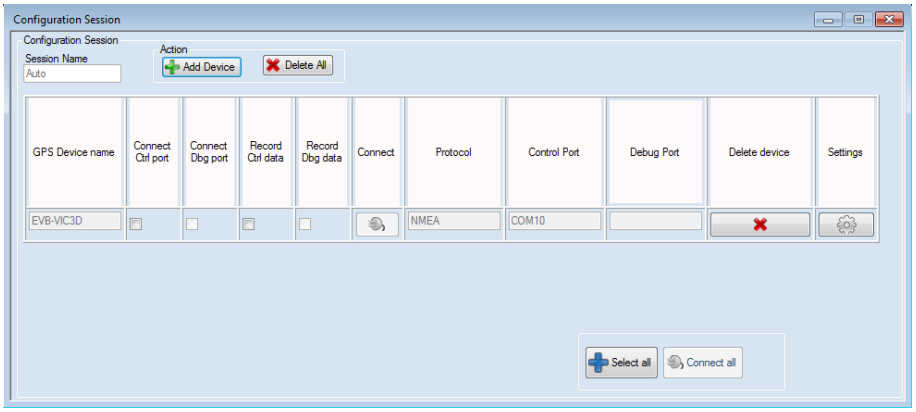


When selecting the port name, the TESEO-SUITE provides an enumeration of all the COM ports available even if these COM ports are already used by another application.

Note: The protocol of the device and its name cannot be changed once the OK button has been clicked.

To delete a device from the session, press the corresponding delete button in the *Delete device* column from the *Configuration Session* form (see the following figure).

Figure 14. Configuration Session panel with one device added



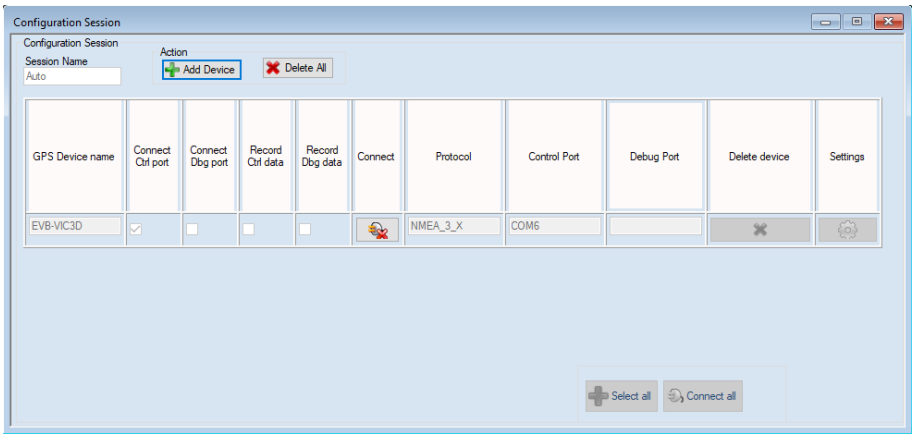
The button *Delete All* removes all the devices of the current session.

5.3 Connect or disconnect Control Port

The Control Port defined when a device has been added can be opened. If a port is defined, the corresponding checkbox is enabled. Selecting the checkboxes in the *Connect Ctrl port* column enables the corresponding connection buttons, as shown in the Figure 14 above.

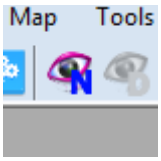
Click the *Connect* (Electrical Plug) button to open the selected ports, and a red X shows up, as shown in the Figure 15 below.

Figure 15. Port connections active



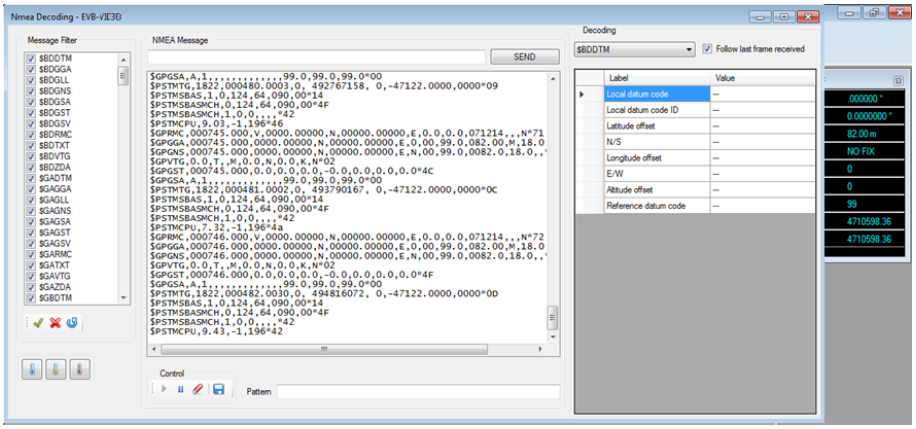
Open the NMEA output window to confirm proper NMEA output using the button shown in the Figure 16.

Figure 16. NMEA output view



On NMEA panel view the NMEA stream coming from EVB-LIV4F can be seen as shown in the Figure 17.

Figure 17. NMEA view panel

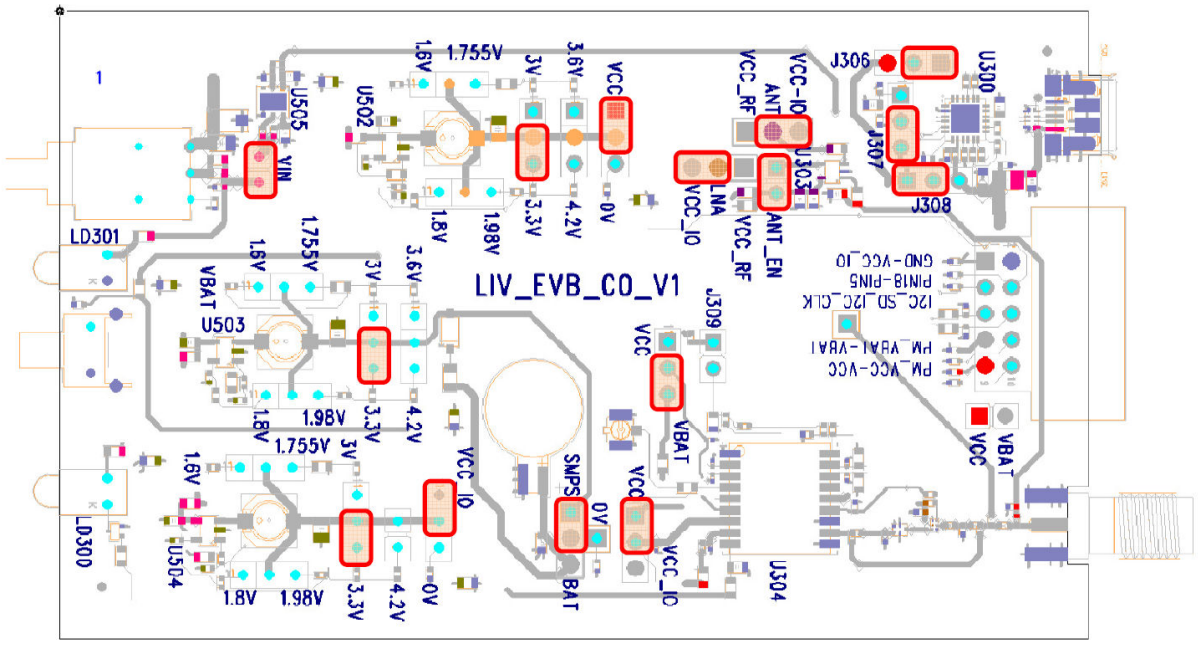


Now your EVB-LIV4F is fully working.

6 Board general view

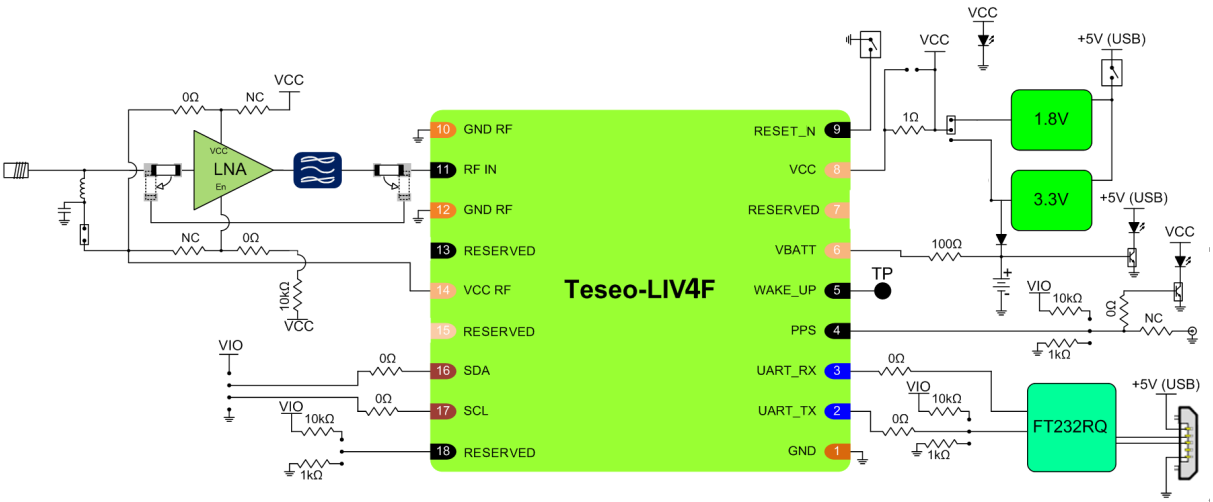
6.1 Internal board view

Figure 18. **Internal board view and jumper configuration**



6.2 Block diagram overview

Figure 19. **Block diagram**



Appendix A Reference documents

Table 3. **Reference documents**

Document name	Document title
DS12152	Tiny GNSS module
UM3009	Teseo-LIV4F GNSS Module - Software manual
UM3004	Teseo-LIV4F and Teseo-LIV4FM hardware documentation
DB3224	PC GUI software to control, configure and performance analyze of Teseo GNSS family

Revision history

Table 4. **Document revision history**

Date	Revision	Changes
07-Jul-2023	1	Initial release.
01-Apr-2025	2	Added Teseo subbrand logo on cover page. Updated Figure 19. Block diagram. Updated Table 3. Reference documents, removed "*A.1 Reference documents*" and moved its content to "*Appendix A Other information*" that is renamed as Appendix A: Reference documents. Minor text changes.

Contents

1 **Features** 2
2 **EVB-LIV4F general presentation** 3
3 **Interfaces** 4
3.1 Power by USB 4
3.2 ON/OFF switch 4
3.3 Reset 5
3.4 LED indicators 5
3.5 UART by USB 6
3.6 GNSS input antenna 7
3.7 I²C and power connector interface 7
4 **Current measurement process** 8
5 **TESEO-SUITE connection** 9
5.1 Getting started with the TESEO-SUITE 9
5.2 Add/delete device 9
5.3 Connect or disconnect Control Port 11
6 **Board general view** 12
6.1 Internal board view 12
6.2 Block diagram overview 12
Appendix A **Reference documents** 13
Revision history 14

List of tables

Table 1. UART configuration 6
Table 2. Connector pin-out description 7
Table 3. Reference documents 13
Table 4. Document revision history 14

List of figures

Figure 1. Power input . . . 4
Figure 2. ON/OFF switch . . . 4
Figure 3. Reset button . . . 5
Figure 4. Power LED indicator . . . 5
Figure 5. PPS LED indicator . . . 5
Figure 6. USB/UART connector . . . 6
Figure 7. UART to USB path through converter . . . 6
Figure 8. GNSS SMA antenna connector . . . 7
Figure 9. I²C and power measure connector . . . 7
Figure 10. Pins placement in the current measurement connector . . . 8
Figure 11. New session panel . . . 9
Figure 12. Edit Configuration Session button . . . 9
Figure 13. Configuration Device panel . . . 10
Figure 14. Configuration Session panel with one device added . . . 10
Figure 15. Port connections active . . . 11
Figure 16. NMEA output view . . . 11
Figure 17. NMEA view panel . . . 11
Figure 18. Internal board view and jumper configuration . . . 12
Figure 19. Block diagram . . . 12