

## **Introduction**

EVB-LIV3F evaluation board is a complete standalone evaluation platform for Teseo-LIV3F Tiny GNSS module.

Teseo-LIV3F module is an easy to use Global Navigation Satellite System (GNSS) standalone module, embedding Teseo III single die standalone positioning receiver IC working simultaneously on multiple constellations (GPS/Galileo/Glonass/BeiDou/QZSS).

EVB-LIV3F is designed for top performance Teseo-LIV3F GNSS module.

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# 1 Features

EVB-LIV3F has the following features:

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

## 2 EVB-LIV3F general presentation

EVB-LIV3F kit is composed of several elements:

- EVB-LIV3F evaluation board
- GNSS active antenna
- 1 USB cable
- EVB-LIV3F Quick starting guide

## 3 Interfaces

EVB-LIV3F offers different interfaces to the user:

- ON/OFF button
- Reset button
- $\mu$ USB use for interface with UART of Teseo-LIV3F
- Supply by USB (5V)
- GNSS antenna input
- LED indicators

### 3.1 Power by USB

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

Figure 1. Power input



### 3.2 ON/OFF switch

Figure 2. ON/OFF switch



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

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

### 3.3 Reset

A reset button (*Figure 3*) is present on the front case panel and it resets the Teseo-LIV3F module.

Figure 3. Reset button



### 3.4 LED indicators

EVB-LIV3F offers two LED Indicators as shown below.

The PWR Red LED (*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 (*Figure 5*) indicator blinking every second indicates that Teseo-LIV3F is up and running;

Figure 5. PPS LED indicator



### 3.5 UART by USB

UART interface (*Figure 6*) is provided via USB connector.



Figure 6. USB/UART connector



UART interface is used to trace NMEA messages and to upload the binary file on system. Before using the UART/USB bridge FT232RQ the Virtual COM Port (VCP) driver needs to be installed. It can be downloaded from FTDIChip web site. The VCP device drivers allow the FT232RQ device on EVB-LIV3F to appear on the PC's application software as a standard COM port. The application software running on the PC accesses the FT232RQ device as it would access a standard hardware COM port configured as shown in [Table 1](#). However, the actual data transfer between the PC and the FT232RQ device is performed over the USB interface as shown in [Figure 7](#).

Figure 7. UART to USB path through the FTDI converter

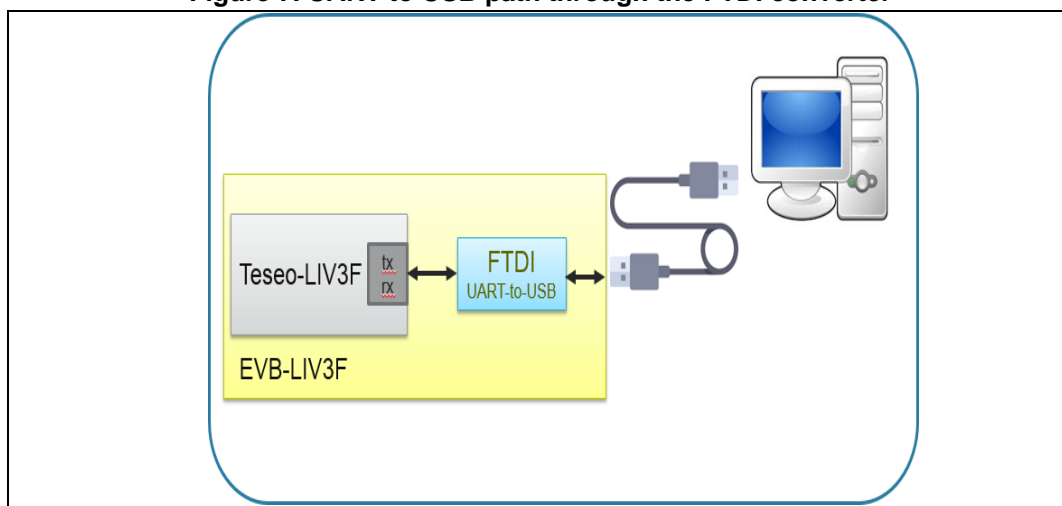


Table 1. EVB-LIV3F – UART Configuration Parameters

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

### 3.6 I2C interface

The 4-pin connector (CN302) provides I2C bus signal and power supply as shown in [Figure 8](#).

Figure 8. I2C connector

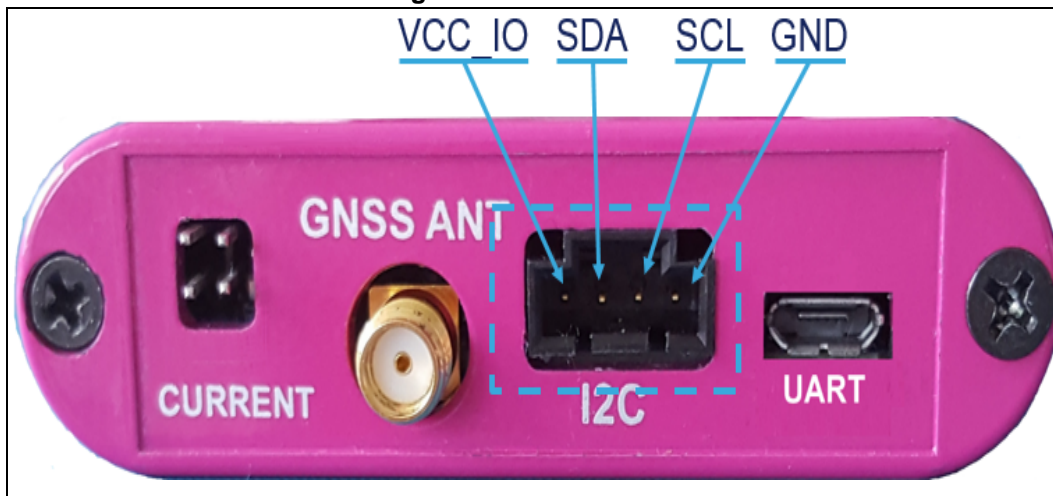


Table 2. I2C connector pin description

Pin	Connector Signal	Comment
1	VCC_IO	3V3 power supply
2	I2C_SDA	I2C Data line
3	I2C_SCL	I2C clock line
4	GND	Ground connection

This header allows connection of an external I2C-Master-device to the Teseo-LIV3F. Teseo-LIV3F always acts as slave on I2C-bus.

### 3.7 GNSS input antenna

GNSS input [Figure 9](#) is available through a SMA female connector.

Figure 9. GNSS SMA connector



Passive or active antenna can be used on EVB-LIV3F.

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

*Note:* Please use a DC blocker for passive or simulator connected to EVB-LIV3F.

### 3.8 Current measurement connector

EVB-LIV3F provides a connector ([Figure 10](#)) to evaluate current consumption.

**Figure 10. Current measurement connector**



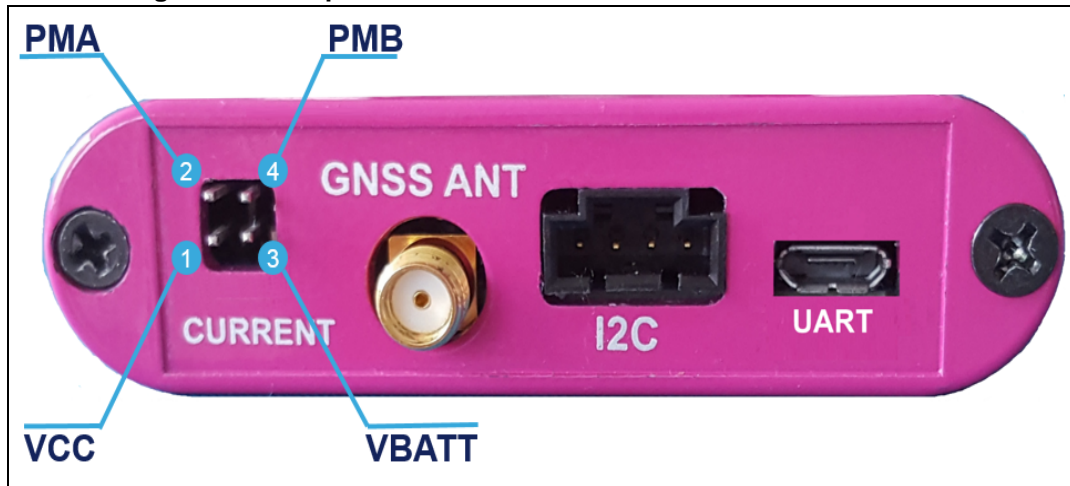
**Table 3. Current measurement connector pin description**

Pin	Connector Signal	Comment
1	VCC	power supply
2	PMA	Vcc measure point
3	VBATT	power supply
4	PMB	Vbatt measure point

## 4 Current measurement process

To measure the current consumption of Teseo-LIV3F in the different operating modes based on the pins placement as shown in [Figure 11](#), these steps should be followed:

**Figure 11. Pins placement in the current measurement connector**



1. Connect a true-rms voltmeter to:
  - Vcc (pin-1) and PMA (pin-2)
  - Vbat (pin-3) and PMB (pin-4)
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

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

To measure the current while in Standby mode with EVB-LIV3F, follow these steps:

- a) With antenna connected, powered up, put EVB-LIV3F into Standby mode by sending \$PSTMFORCESTANDBY command.
- b) Perform steps 1, 2 and 3.

To measure the current while acquiring GNSS satellites with EVB-LIV3F, follow these steps:

- a) Disconnect antenna and powered up EVB-LIV3F
- b) Perform steps 1, 2 and 3

*Note:* The acquisition current will vary based on the number of constellations you have configured the firmware to acquire, so please take note of that when taking and comparing measurements.

## 5 Teseo Suite Light connection

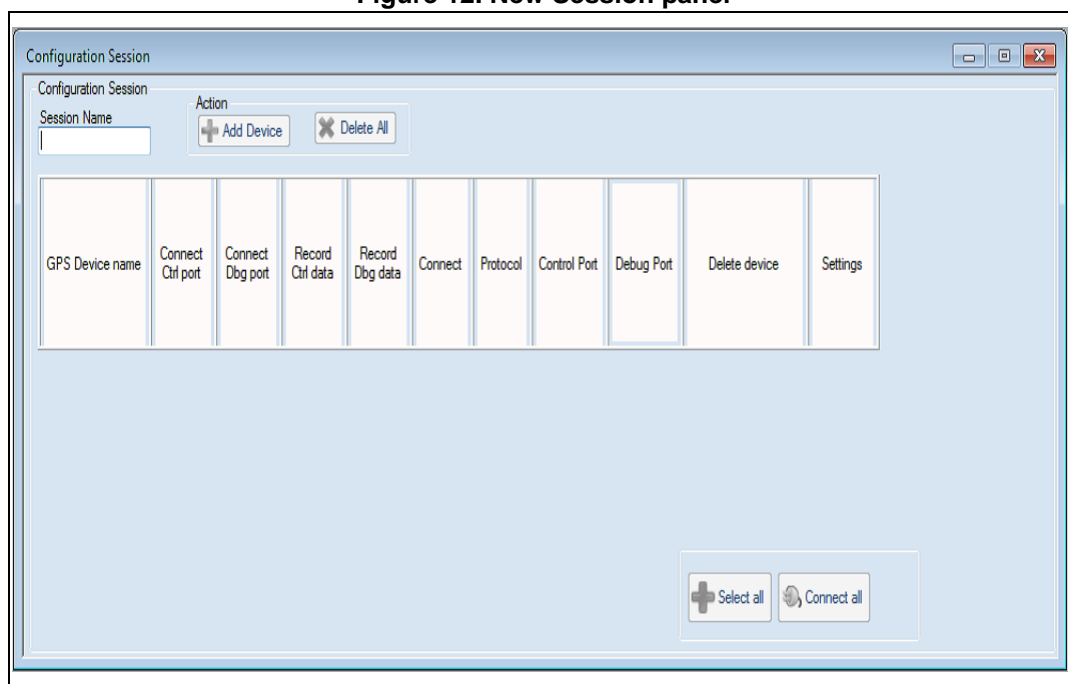
Install and start Teseo Suite Light, and follow the directions below.

### 5.1 Getting started with the Teseo-Suite Light

When the application starts, Teseo-Suite Light opens the configuration session panel, as shown in [Figure 12](#) below, to allow the user to add the EVB-LIV3F.

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

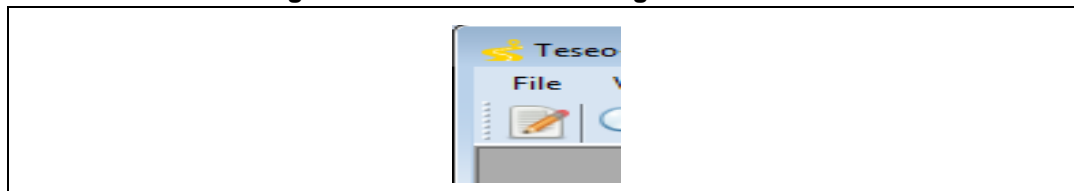
**Figure 12. New Session panel**



If the “Configuration Session” panel is not opened, two ways either can be followed as shown in [Figure 13](#):

1. Go to the "File" menu and select "New Session"
2. Click the "Edit Session Configuration" button.

**Figure 13. Edit Session Configuration button**



## 5.2 Add/Delete Device

In the "Configuration Session" panel, you can add/remove EVB-LIV3F devices in the work session and monitor the existing ones.

Pressing the button "Add Device" brings up the "Device Configuration" form, as shown in [Figure 14](#).

Set the hardware type 'STA8090' value.

Select the Control port and choose the parameters of the serial connection as in [Table 1](#)

On the Control port, the user can select the NMEA protocol

Press the "OK" button to create the device.

Figure 14. Configuration Device panel

Configuration Device

Configuration Device

Binary Image Version: 4 6 8

Hardware type: STA8090

GNSS Device Name  
EVB-LIV3F

Add Control Port  Add Debug Port

Control Port Debug Port

Protocol NMEA

Port Name COM1

Baud Rate 9600

Data Bits 8

Parity None

Stop Bits One

Read Timeout 1000

DTR control

Action

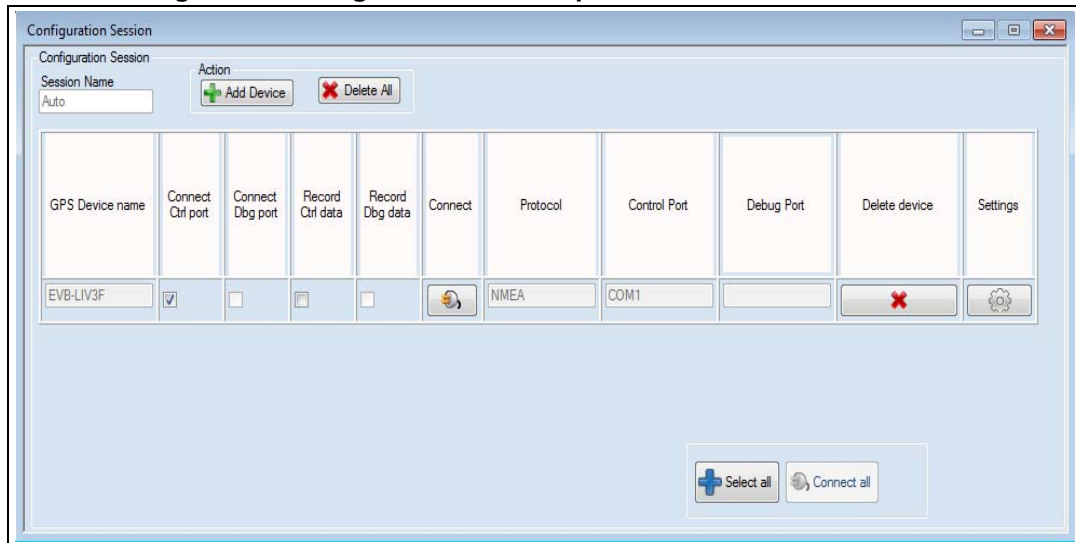
Ok Cancel

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

Please note that 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.

Figure 15. Configuration Session panel with one device added



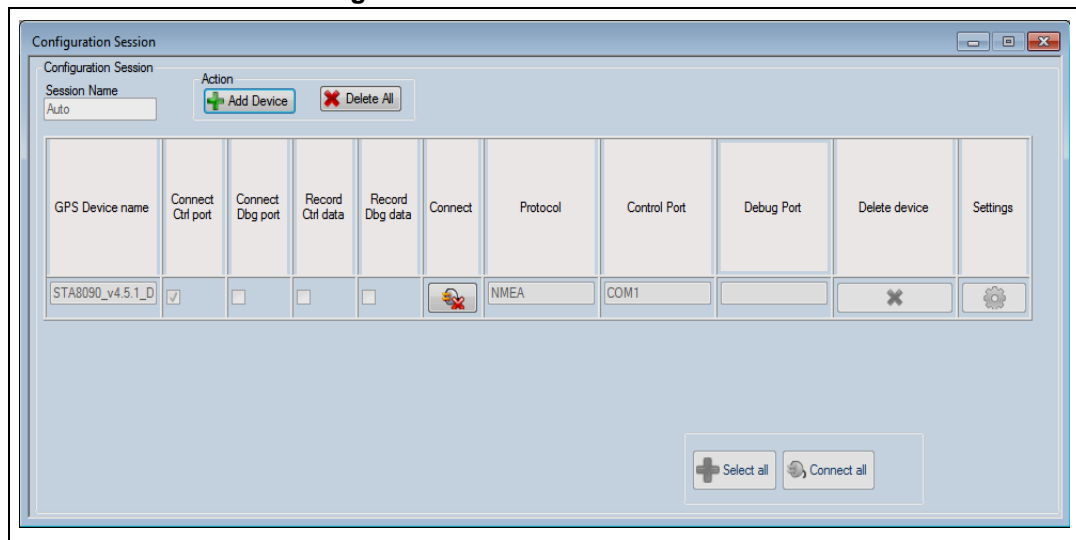
The button “Delete All” removes all the devices of the current session.

### 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 [Figure 15](#) above.

Click the “Connect” (Electrical Plug) button to open the selected ports, and a red X shows up, as shown in [Figure 16](#) below.

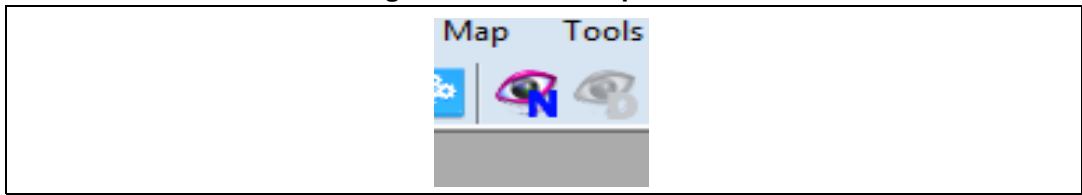
Figure 16. Port connections active



Open the NMEA output window to confirm the proper NMEA output using the button shown in [Figure 17](#).

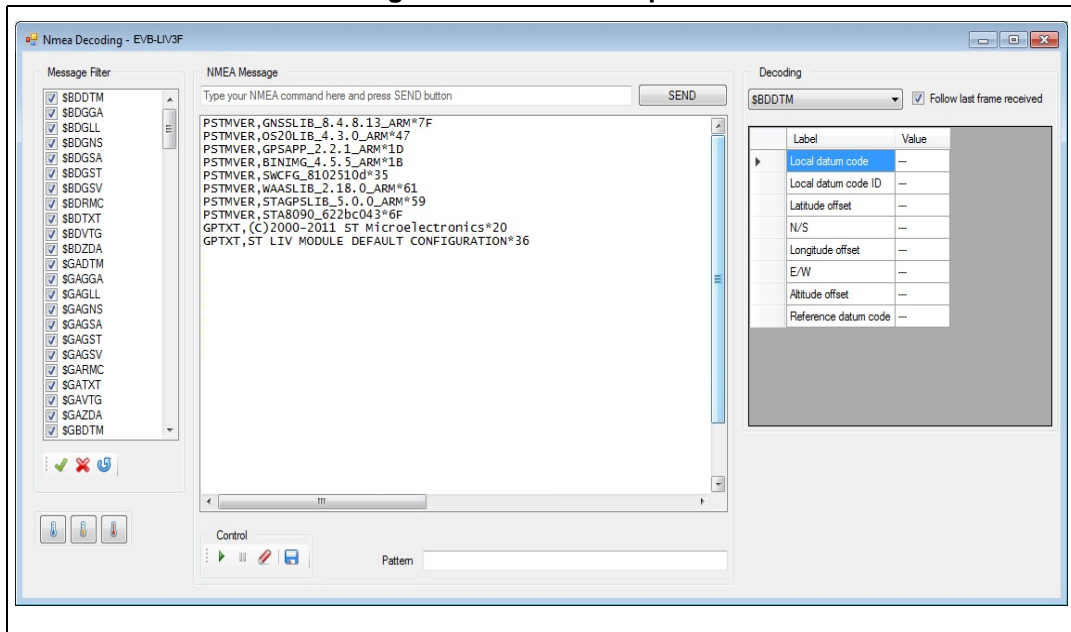


Figure 17. NMEA output view



On NMEA panel view the NMEA stream coming from EVB-LIV3F can be seen as shown in [Figure 18](#).

Figure 18. NMEA view panel



Now your EVB-LIV3F is fully working.

## 6 Board general view

### 6.1 Default jumper configuration

J300 : leave open

J302 : 2-3 : no use of VCC\_RF to optimize Teseo-LIV3F current

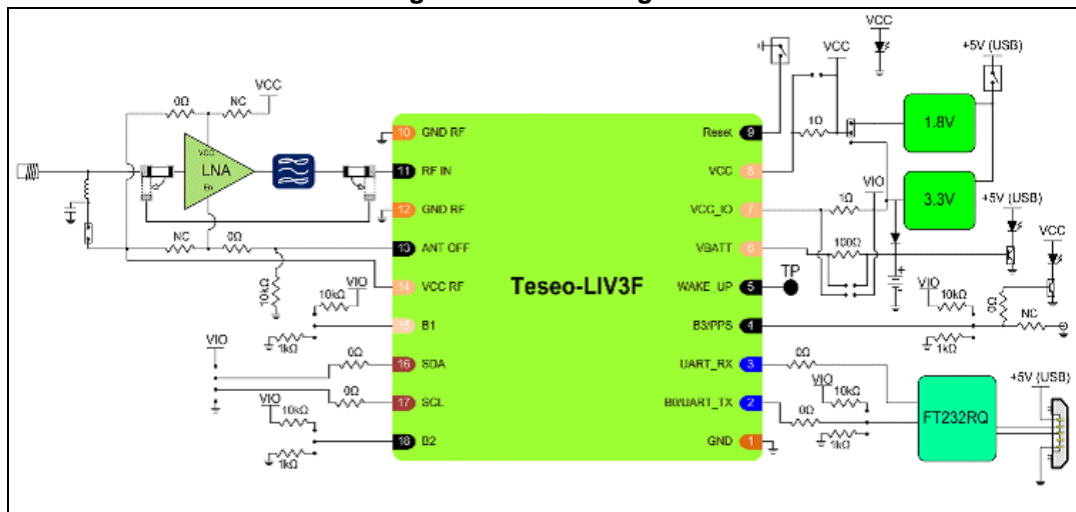
J303 : 2-3 : VCC\_IO=3.3V

J400 : 2-3 : same reason as J302

J500 : 1-2 : use 2.1V to supply Teseo-LIV3F in order to optimize current consumption

### 6.2 Block diagram overview

Figure 19. Block diagram



## 7 Reference documents

- Teseo-LIV3F GNSS module - Datasheet ( DS12152, DocID030642)
- Teseo-LIV3F GNSS module - Software manual ( UM2229, DocID030669 )
- Teseo-LIV3F GNSS module - Hardware manual ( UM2232, DocID030671 )
- Teseo Suite – Data brief ( DB3224, DocID030398 )

## 8 Revision history

Table 4. Document revision history

Date	Revision	Changes
28-Mar-2018	1	Initial release.

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