

GE863-PRO³ GPS Evaluation Board User Guide

With Atheros AR1511 GPS Module

1v0300809 Rev.0 - 21/04/09



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Applicable Products

GSM / GPRS	
GE 863-PRO ³ <small>Embedded</small>	
GE863-PRO3	GE863PR3***_***
<p>The suffix “***_***” depends on the module HW/SW configuration. Please contact your Telit representative for details</p>	



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1 Overview

1.1 Scope

This document describes the hardware implementation, as an evaluation board for the **EVK-PRO³ EVALUATION KIT**, of a GPS Reference Design equipped with GPS chip Atheros AR1511. The interface board has been designed to be plugged on the Telit **EVK-PRO³ EVALUATION KIT** with the specific aim to provide the Customer with a ready to use evaluation and development platform for the Telit GE863-PRO³ + GPS system: the assembly includes Atheros AR1511 GPS chip and surrounding components, SMA antenna connector and power supply system.

The topics covered in this document are the following:

- board hardware description,
- board software description and
- how to setup the board

1.2 Audience

This User Guide is intended for software developers who develop applications on the ARM processor of GE863-PRO³ module.

This Guide specifically refers to the installation, setup and usage of the GPS evaluation board extension for the Telit **EVK-PRO³ EVALUATION KIT**, the Evaluation board for GE863-PRO³ module based applications.

1.3 Contact Information, Support

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

For general contact, technical support, report documentation errors and to order manuals, contact Telit's Technical Support Center at:

TS-EMEA@telit.com or <http://www.telit.com/en/products/technical-support-center/contact.php>

Telit appreciates feedback from the users of our information.



1.4 Related Documents

The following documents are related to this user guide:

- [1] Telit GE863-PRO³ Hardware User Guide 1vv0300773a
- [2] Telit GE863-PRO³ EVK User Guide 1VV0300776
- [3] Telit GE863-PRO³ GPS Reference Design User Guide 1vv0300812
- [4] Telit GE863-Pro3 Extension Memory Board User Guide 1vv0300793

All documentation can be downloaded from Telit's official web site www.telit.com if not otherwise indicated.

1.5 Document History

Revision	Date	Changes
ISSUE #0	21/04/09	First Release



2 Reference design evaluation board

2.1 Mechanical description

The Telit GPS Reference Design Interface overall dimensions are:

- Length: 60 mm
- Width: 68 mm
- Height: 13 mm
- Weight: 15 gr

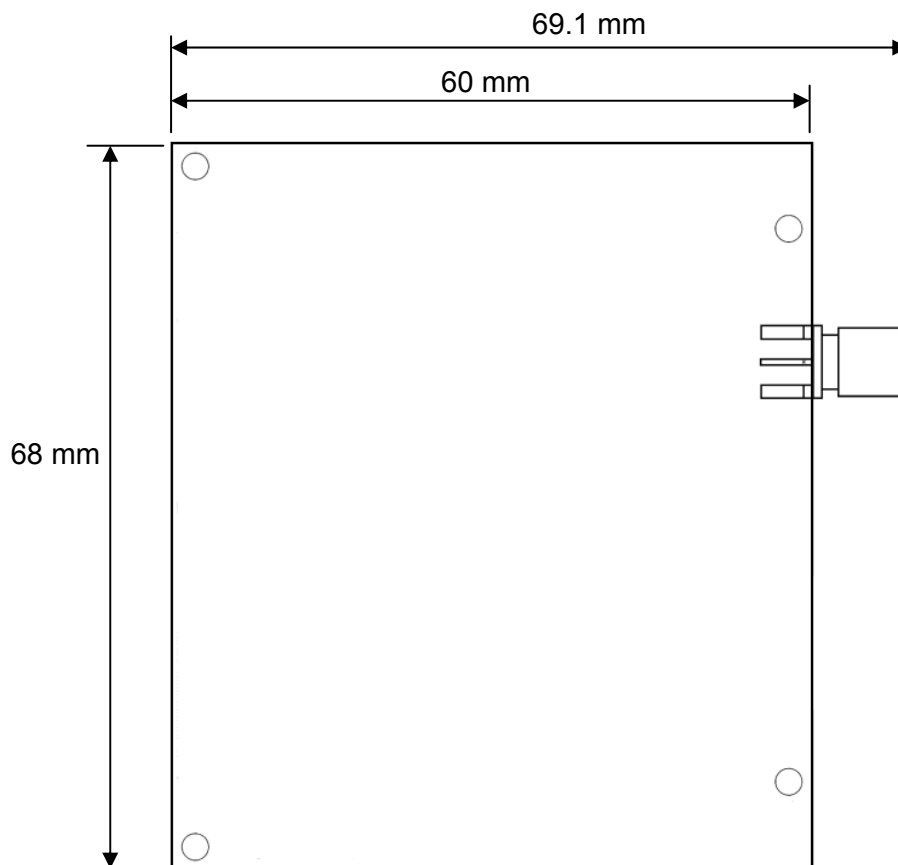


Figure 1 - Dimensions



2.2 Board placement

The upper view of the board presents a FMA antenna connector and the Atheros AR1511 circuitry near S102 connector.

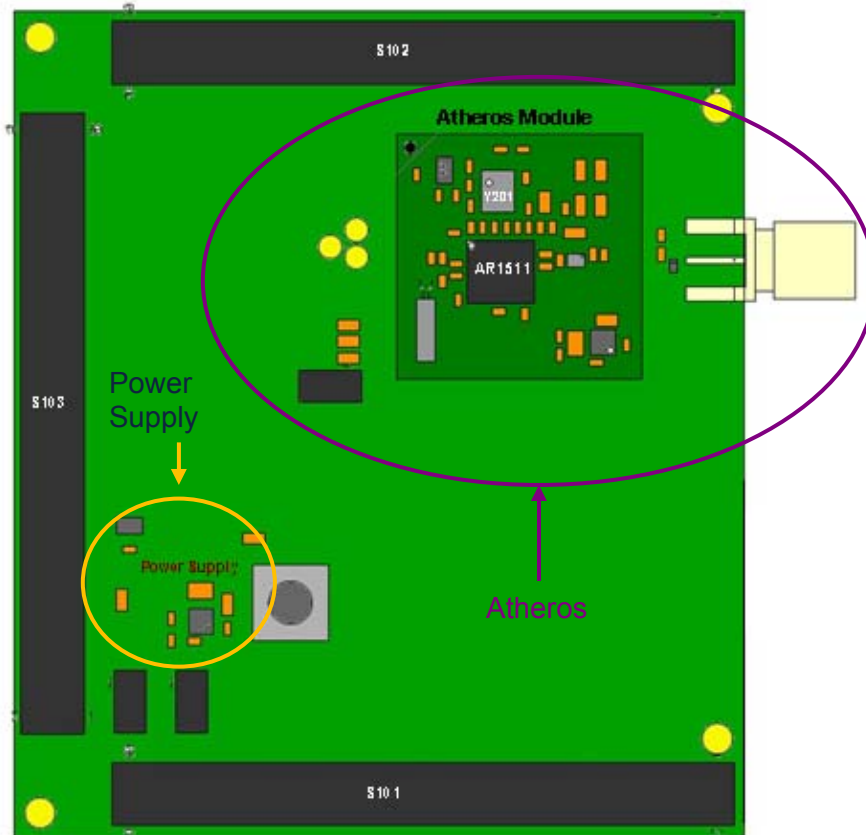


Figure 2 - Board placement



2.2.1 Main components top side

Connector	Description
PL101, PL102, PL103	2 pin Jumper
SW101	Reset Button (only Atheros AR1511)
SO201	RF Connector
SH201	Atheros Module (Shield)

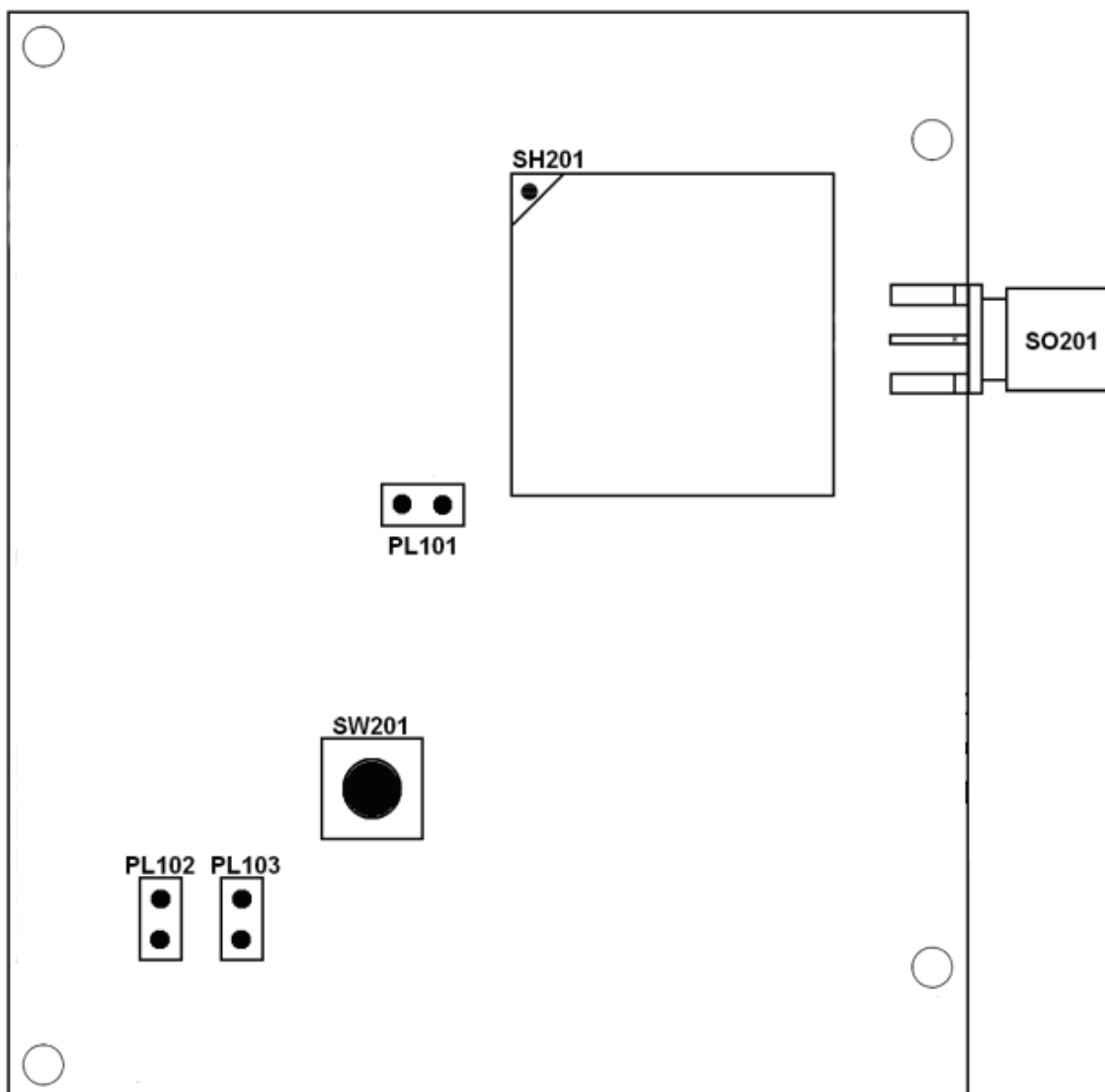


Figure 3 - Main components top side



2.2.2 Main components bottom side

Connector	Description
SO101, SO102, SO103	Interface Connectors
SO201	RF Connector

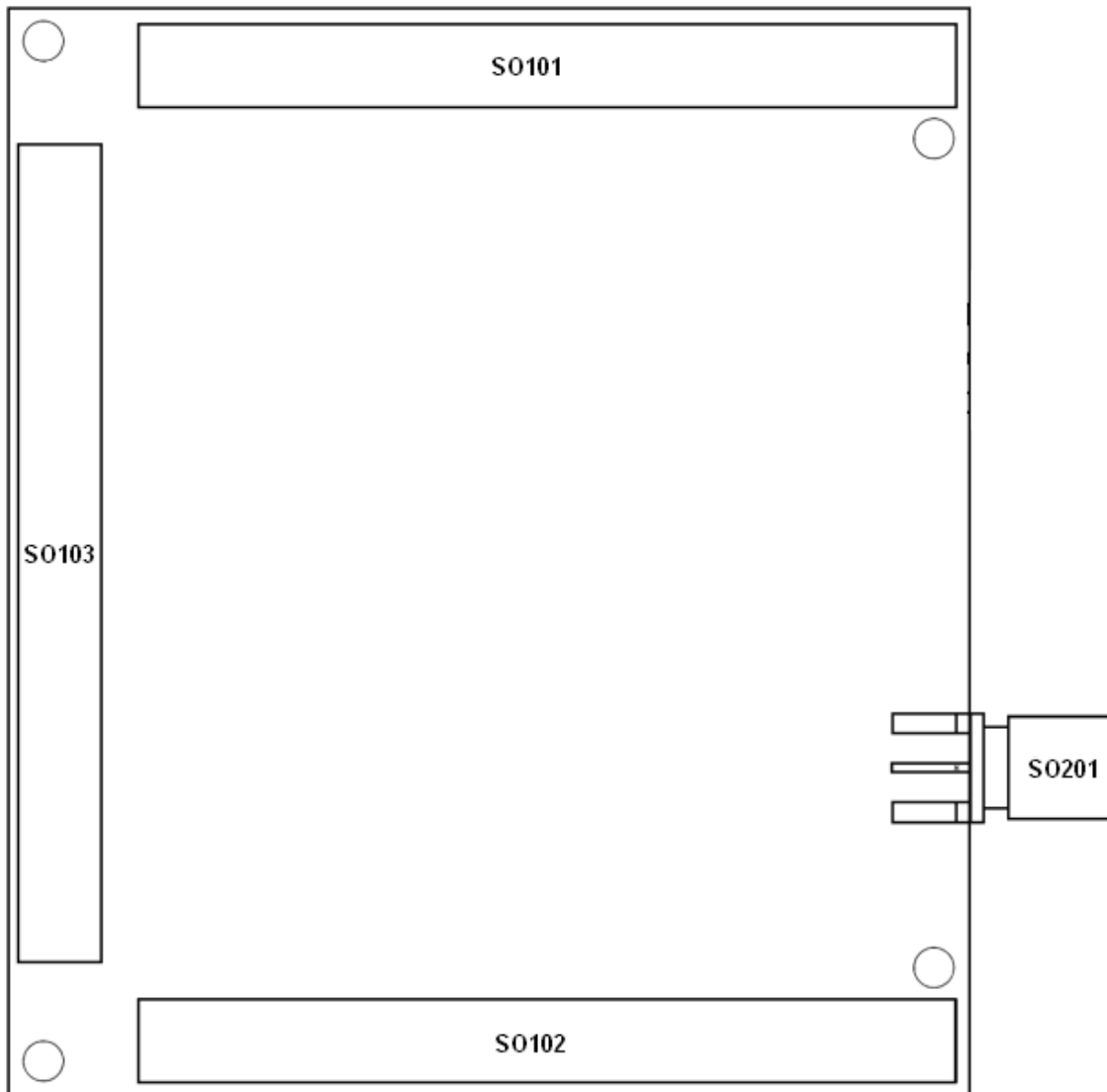


Figure 4 - Main components bottom side



2.3 Functional description

2.3.1 Main functional blocks

The board can be split into two functional blocks: power supply and Atheros AR1511 single chip based module, as depicted in the drawings below.

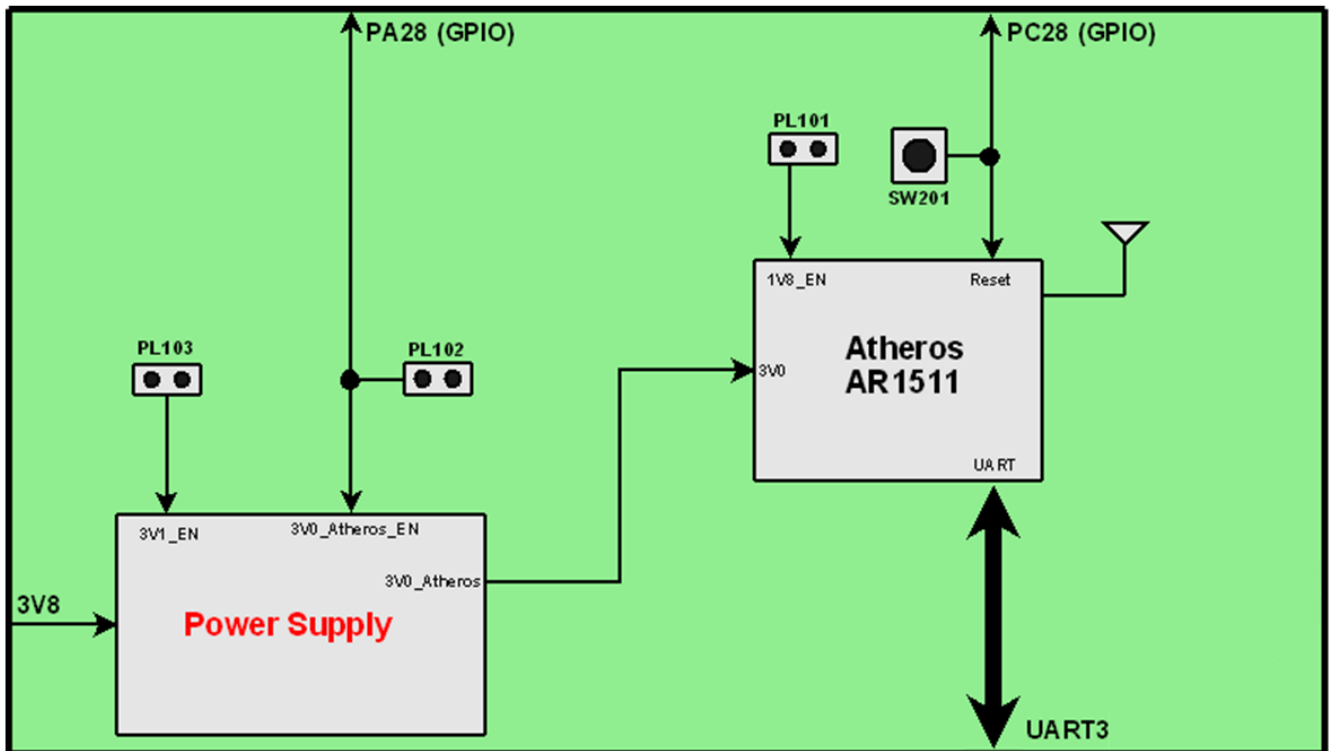


Figure 5 - Main functional blocks

2.3.2 Power supply

The power supply, shown in the diagram below, receives the main voltage (3V8) from **GE863-PRO³** interface board and, through an adjustable LDO, supplies with a voltage of 3V1 the GPS module mounted on the interface.

The supply may be managed through two jumpers as explained below.

The first jumper referenced PL103 must be left open to provide main supply to both modules (notice that 3V1_EN input is active high and that a pull-up resistor to 3.8V has been mounted on this line).

The second one, referenced PL102, must be shortened in order to supply the Atheros module until no signal is present in the GPIO PA28 line (notice that 3V0_Atheros_EN input is active low and that a pull-up resistor to 3.1V has been mounted on this line), otherwise it can be left open and the 3V0_Atheros_EN signal can be driven by the GPIO PA28 coming from the **GE863-PRO³**.

Make sure that GPIO outputs are held floating status when the jumpers are shorted in order to prevent a short circuit on the GPIO outputs that may damage the **GE863-PRO³**.



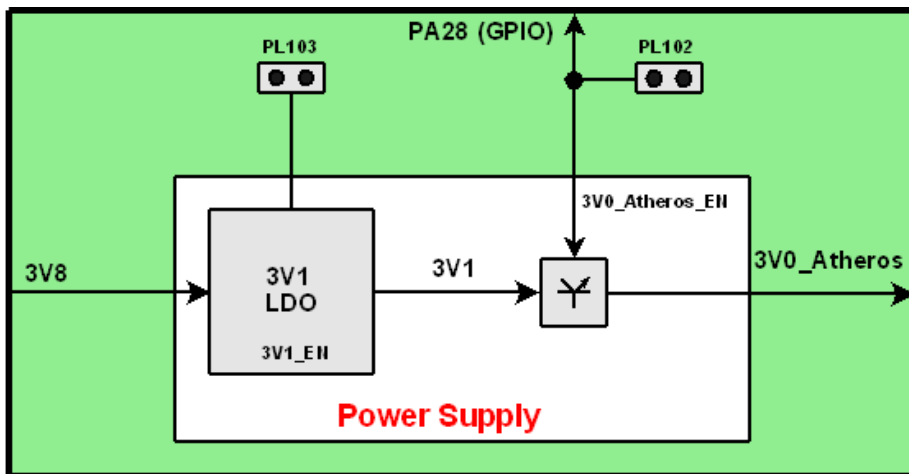


Figure 6 - Power supply section

2.3.3 Atheros Module (AR1511 Chipset)

The Atheros module is a Host based GPS Receiver using the AR1511 Chipset.

The main supply 3V0_Atheros coming from power supply provides all needed voltages to the chipset. An internal adjustable LDO generates the 1V8 voltage level, whereas LC filters are used to obtain both the digital and RF voltage for both voltage level (3V0 and 1V8).

The 1V8 voltage level is enabled by leaving open the jumper referenced PL101; in normal GPS operation, this jumper must be held open (notice that 1V8_EN input is active high with a pull-up to 3.0V). The 3V0_RF enable is managed by an internal circuit directly controlled by the AR1511 (see fig. 3).

The module can be reset both by pressing the SW201 button and by PC28 GPIO signal (please be sure to have the PC28 GPIO line floating or in open drain status before pressing the SW201 button to avoid shorts on the GE863-PRO³ GPIO line). A pull-up resistor has been mounted on the active low reset line (see schematics).



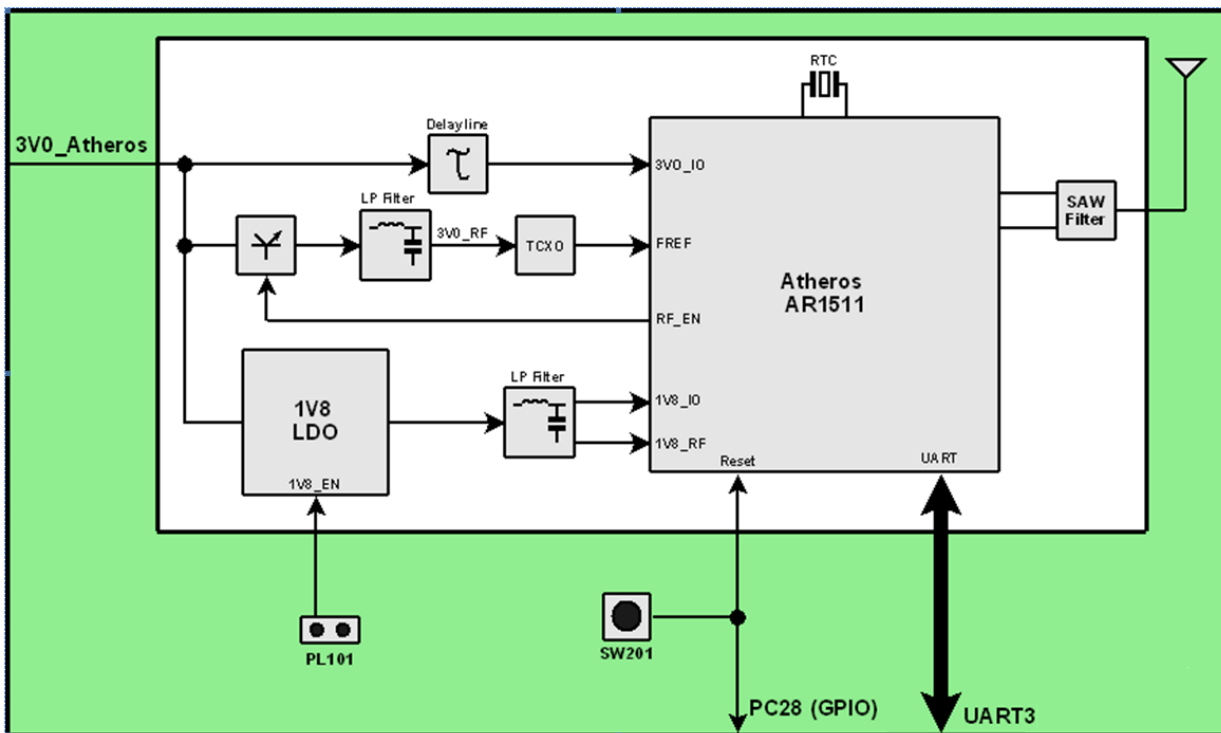


Figure 7 - Atheros AR511 section

2.4 How to set up the board

2.4.1 Plugging the board

The GPS Reference Design board is an extension of **EVK-PRO³ EVALUATION KIT**, to be plugged on to **GE863-PRO³** adapter board.

The figure below shows how the boards must be assembled in order to allow the system working.



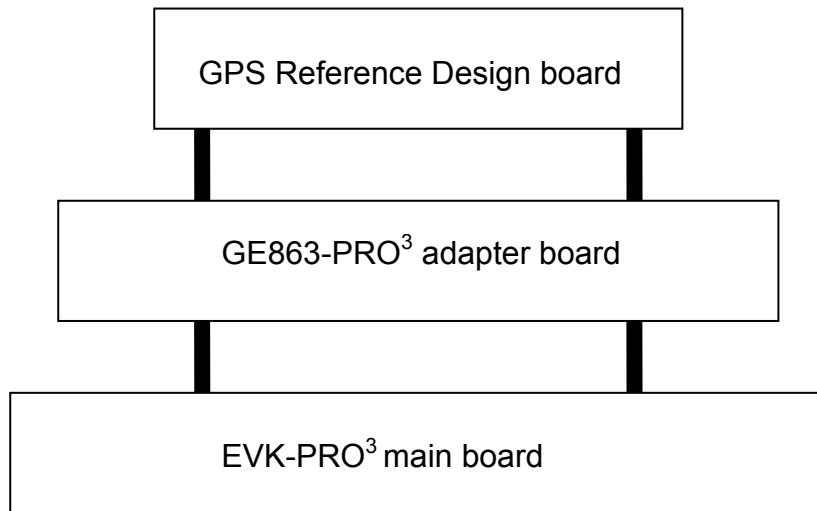


Figure 8 - Mounting schema

2.4.2 Plugging the board with memory Extension board

GPS Reference design Evaluation board requires 8 MB of free Flash memory to work correctly. This can be accomplished either by connecting to the **EVK-PRO³**

- a SD card,
- a USB pen drive
- the Telit GE863-PRO³ Memory Extension board.

In the latter case, the mounting schema is shown in the figure below. For further information on the Telit GE863-PRO³ Memory Extension board please refer to [4]

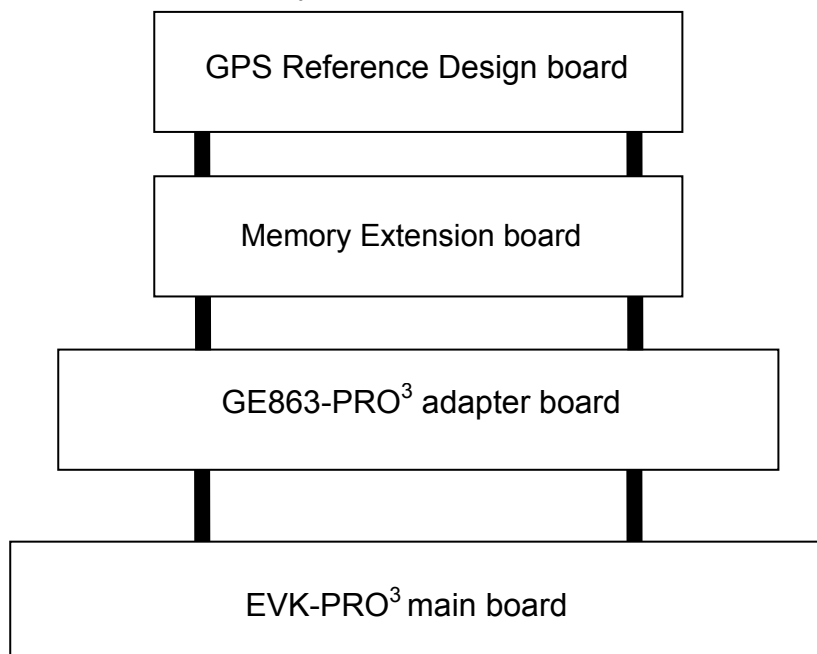


Figure 9 - Mounting schema with Extension board



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The core of the evaluation system is the **EVK-PRO³ EVALUATION KIT**, which can be split into several functional blocks depending on the implemented function. Refer to the “EVK-PRO³ User Guide” for additional information on the **EVK-PRO³** description and usage.

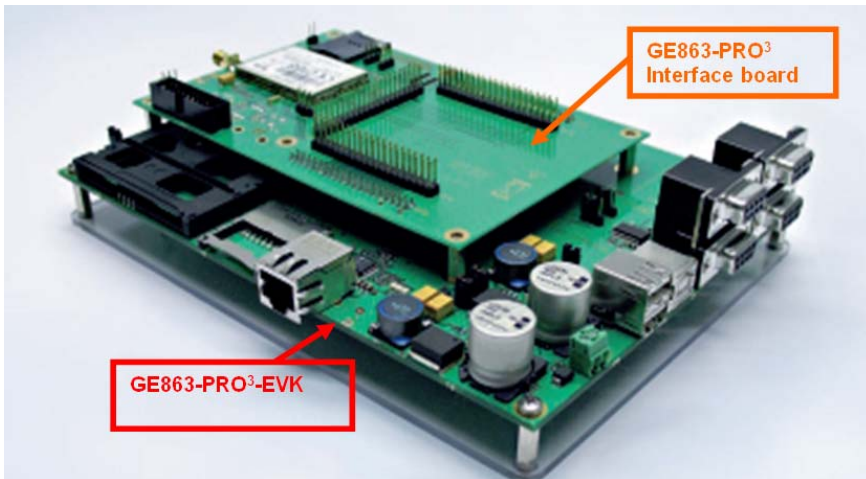


Figure 10 - Interface board mounting

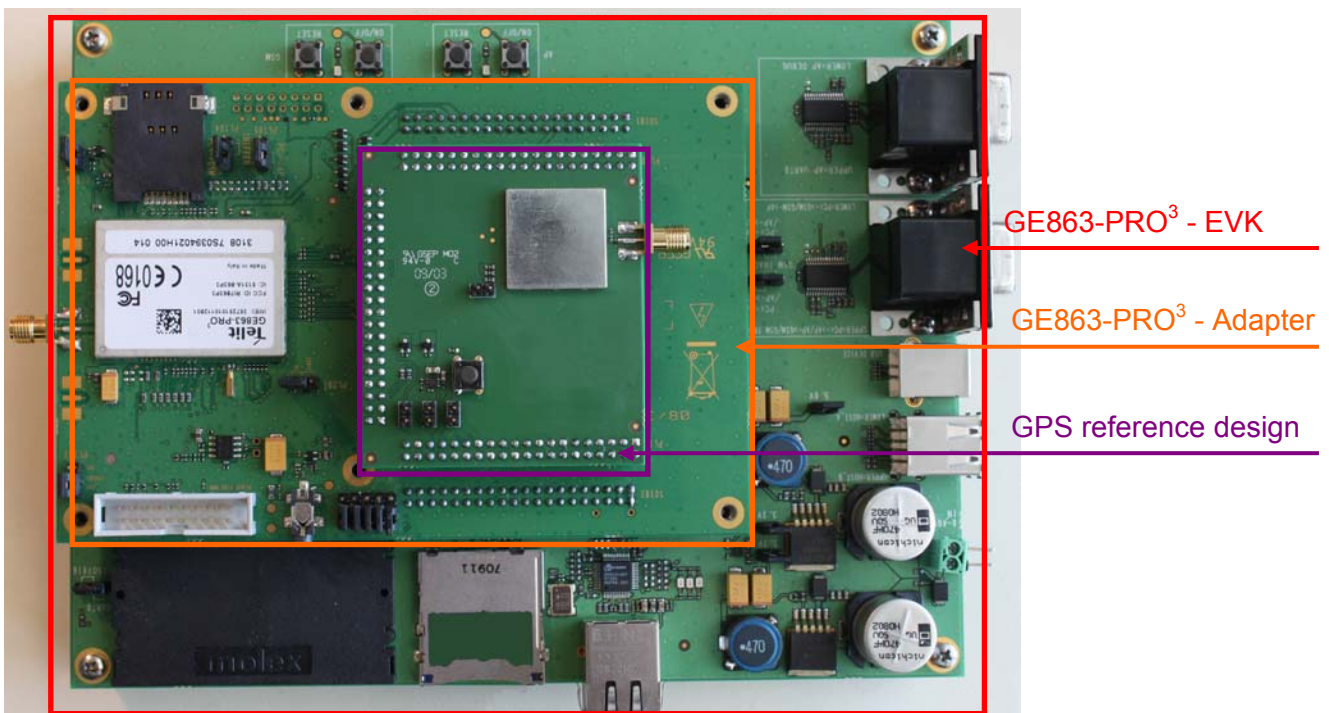


Figure 11 - GPS reference design board plugged on GE863-PRO3 interface and EVK



2.4.3 Jumper settings

The table below explains how to set the PL101, PL102, PL103 jumpers.

	Shorted	Open	Comments
PL101	Disable 1V8_EN	Enable 1V8_EN	normally open
PL102	Disable 3V0_Atheros_EN supply*	Enable 3V0_Atheros_EN Supply	normally open (GPIO driven) plugged only without GPIO signal
PL103	Disable 3V1_EN main supply	Enable 3V1_EN main supply	normally open

* make sure that GPIO outputs are held floating when the jumpers are shorted in order to prevent a short circuit on the GPIO outputs that may damage the GE863-PRO3. When the module Enables are managed by software through GPIO signal, no jumper must be plugged.

2.5 Pin-out table

Pin n.	SO101	SO102	SO103
	Signal name	Signal name	Signal name
1	RESERVED	RESERVED	RESERVED
2	RESERVED	RESERVED	RESERVED
3	RESERVED	RESERVED	RESERVED
4	RESERVED	RESERVED	RESERVED
5	RESERVED	RESERVED	RESERVED
6	RESERVED	RESERVED	RESERVED
7	RESERVED	RESERVED	RESERVED
8	RESERVED	RESERVED	RESERVED
9	RESERVED	RESERVED	RESERVED
10	RESERVED	RESERVED	RESERVED
11	RESERVED	TX – UART3	RESERVED
12	RESERVED	RX – UART3	RESERVED
13	RESERVED	RESERVED	RESERVED
14	RESERVED	RESERVED	RESERVED
15	RESERVED	RESERVED	RESERVED
16	RESERVED	RESERVED	RESERVED
17	RESERVED	RESERVED	RESERVED
18	RESERVED	RESERVED	RESERVED
19	RESERVED	RESERVED	RESERVED
20	RESERVED	RESERVED	RESERVED
21	RESERVED	RESERVED	RESERVED
22	RESERVED	RESERVED	RESERVED
23	RESERVED	RESERVED	RESERVED
24	RESERVED	RESERVED	RESERVED
25	RESERVED	RESERVED	RESERVED
26	RESERVED	RESERVED	RESERVED
27	RESERVED	RESERVED	RESERVED
28	RESERVED	RESERVED	RESERVED
29	PA28 (GPIO)	RESERVED	PC28 (GPIO)
30	RESERVED	RESERVED	RESERVED
31	RESERVED	RESERVED	RESERVED
32	RESERVED	RESERVED	RESERVED
33	RESERVED	RESERVED	RESERVED
34	RESERVED	RESERVED	RESERVED
35	RESERVED	RESERVED	RESERVED
36	VBATT	RESERVED	RESERVED



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37	RESERVED	RESERVED	GND
38	RESERVED	RESERVED	RESERVED
39	GND	GND	GND
40	GND	GND	RESERVED

2.6 Antenna requirements

The reference design is supposed to work with an appropriate active antenna in order to obtain higher sensitivity and performances.

The recommended specifications for an active antenna working with the Atheros module are (excluding allowed tolerances):

- **Center frequency:** 1575.42MHz
- **Bandwidth:** 10MHz
- **Gain:** ≤ 28dB
- **NF:** ≤ 1.5dB
- **Power supply:** 3.0V

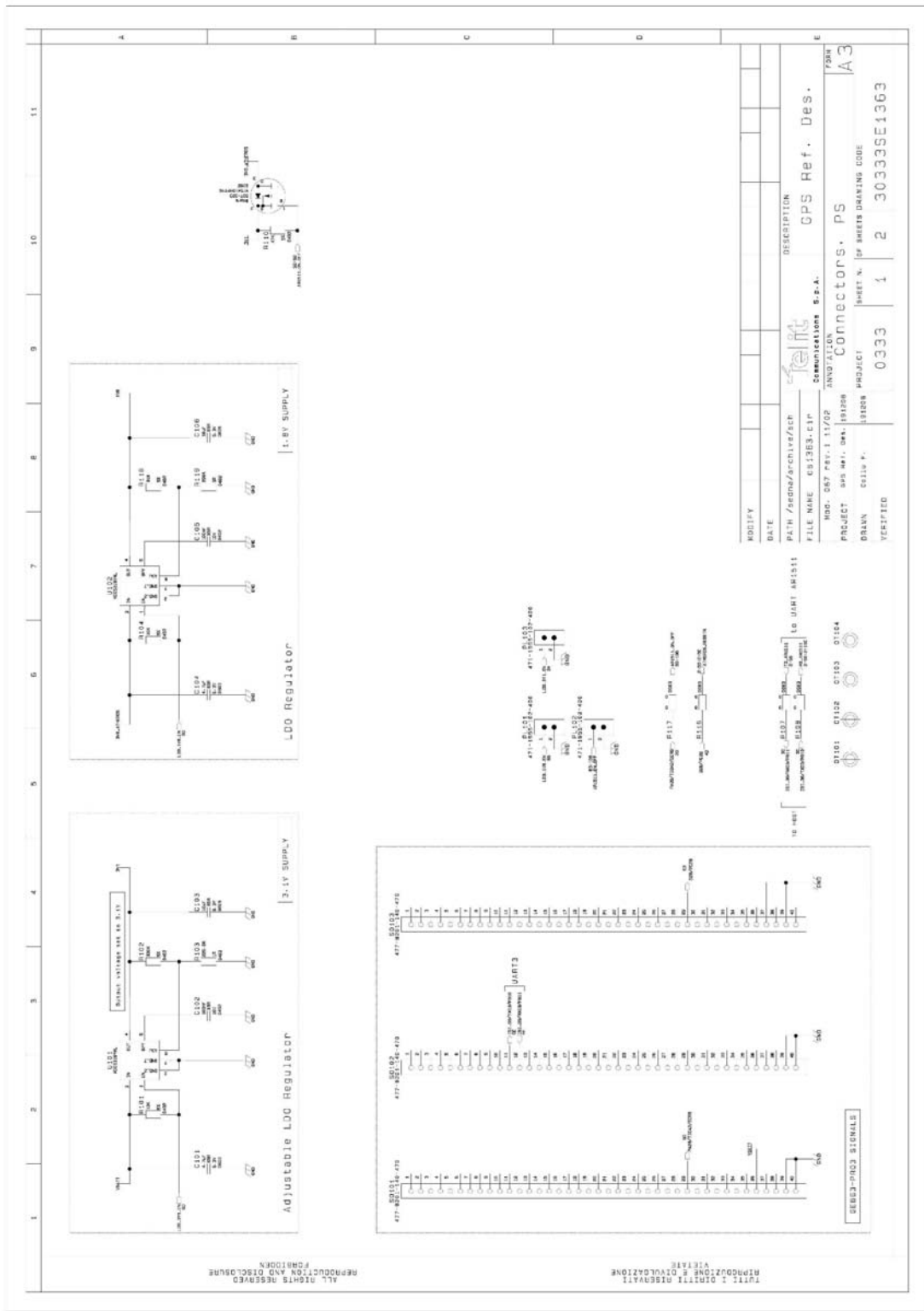
2.7 Evaluation board schematics and placement

Schematics and board placement are attached in the following pages.



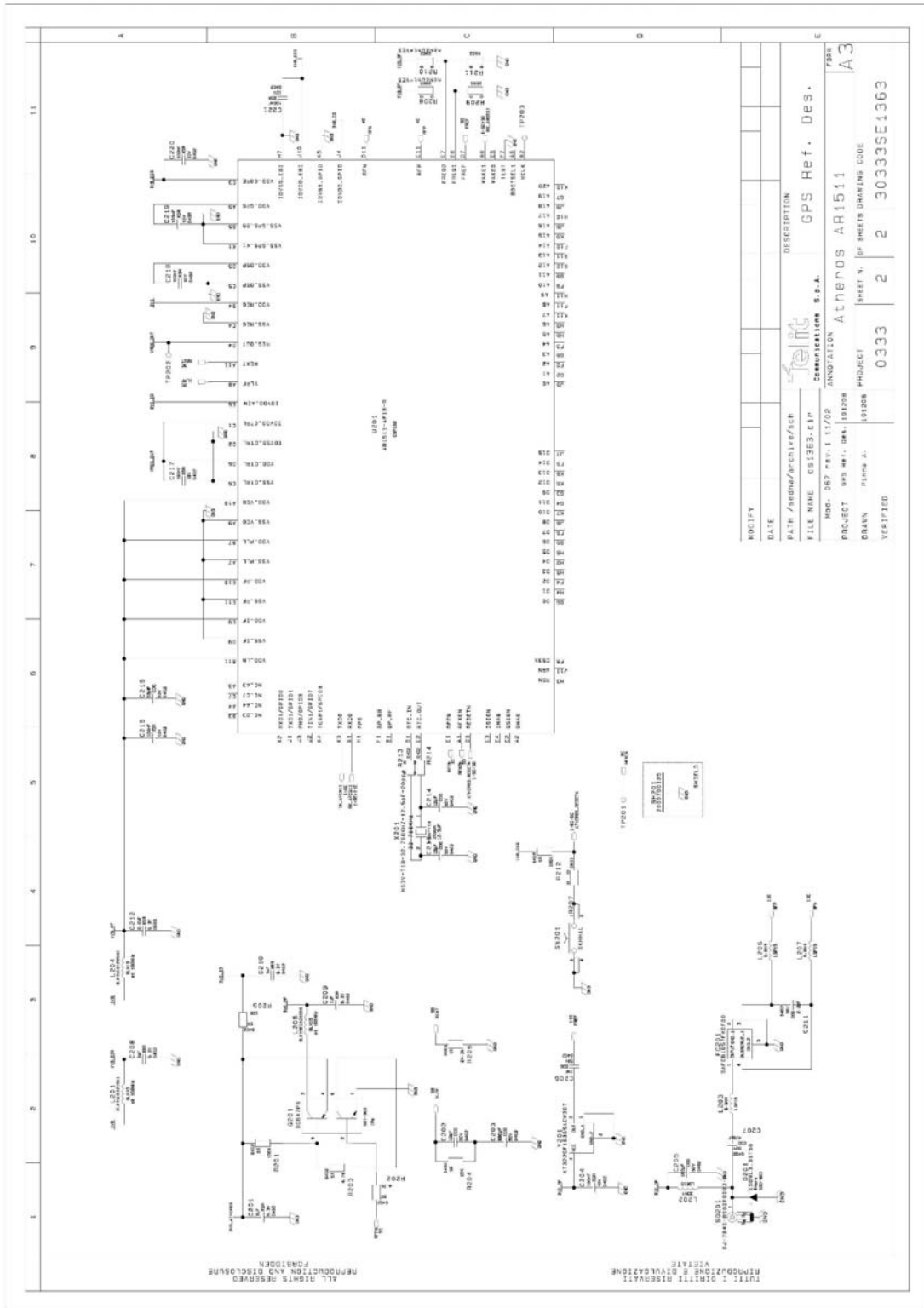
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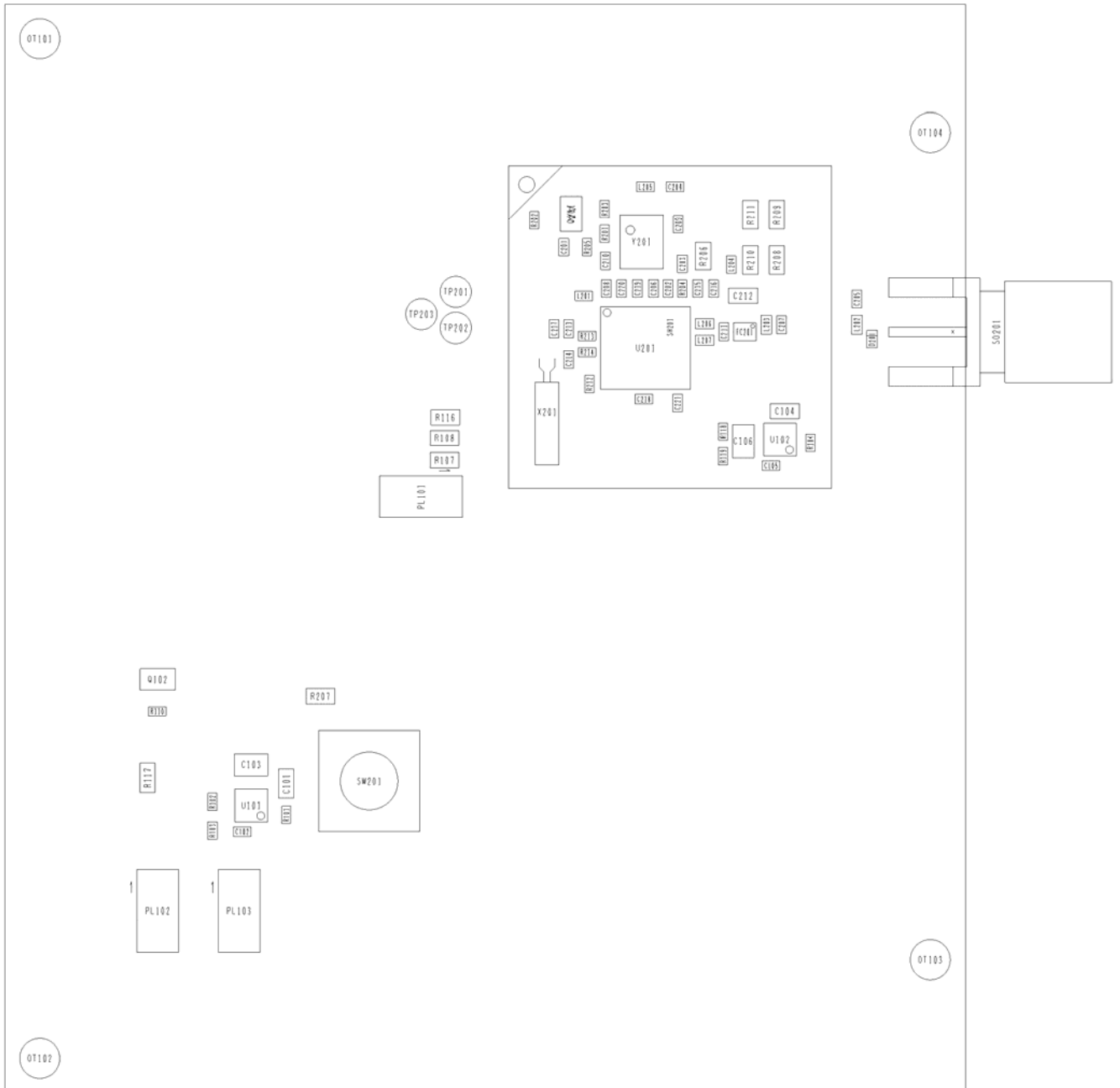
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2.7.1 Board placement



3 Safety recommendation

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc.
- Where there is risk of explosion such as gasoline stations, oil refineries, etc.

It is responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity.

We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations.

The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself.

The European Community provides some Directives for the electronic equipments introduced on the market. All the relevant information's are available on the European Community website: <http://europa.eu.int/comm/enterprise/rtte/dir99-5.htm>

The text of the Directive 99/05 regarding telecommunication equipments is available, while the applicable Directives (Low Voltage and EMC) are available at:

http://europa.eu.int/comm/enterprise/electr_equipment/index_en.htm

