EVK2
HW User Guide

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APPLICABILITY TABLE

PRODUCTS	PART NUMBER
■ ■ EVK2	3990150474
■ ■ EVK2-M2MAIR EU	3990150502
■ ■ EVK2-M2MAIR NA	3990150525

Contents

1. INTRODUCTION

1.1.   Scope

The Aim of this document is the handling description of the developer's Evaluation KIT second edition, a laboratory tool named EVK2.

1.2.   Audience

All given information shall be used as a guide and a starting point for properly developing of your product. Obviously this document cannot cover all the hardware solutions and products that may be designed.

1.3.   Contact Info and Support

For general contact, technical support services, technical questions and report documentation errors contact Telit Technical Support at:

- TS-EMEA@telit.com
- TS-AMERICAS@telit.com
- TS-APAC@telit.com
- TS-SRD@telit.com

Alternatively, use:

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For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

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

Telit appreciates feedback from the users of our information.

1.4.   Text Conventions

STOP Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

⚠ Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

ⓘ Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- N.A.

2. OVERVIEW

The Telit Evaluation Kit (EVK2) provides a robust, future-proof and flexible environment to streamline all application development based on Telit GSM/GPRS, UMTS/HSPA, CDMA 1x/EV-DO, and LTE module families, significantly reducing time-to-market. The kit includes a motherboard where to connect the Interface board of a Telit module.

This concept allows the EVK2 to be used across various form factors and product generations, both present and future. The kit includes a motherboard where to connect the Interface board of a Telit module. This concept allows the EVK2 to be used across various form factors and product generations, both present and future. The motherboard includes the basic interfaces such as power input, SIM card holder, audio monitor outputs, RS-232, and USB; as well as a Reset button and power switch. The circuit implemented in the EVK2 motherboard is based on the recommended reference design for the module's peripheral components and I/O connections. Adapter boards are available for all the different module families. Adapter boards for modules with board-to-board connectors may be used for development with a number of different target modules sharing the same form factor.

2.1. Key Benefits

The Telit EVK2 is a tool designed for engineers, programmers and developers who are looking to:

- Develop and test applications based on current and future Telit GSM/GPRS, UMTS/HSPA, CDMA 1x/EV-DO and LTE module families via AT commands through serial ports.
- Program and/or update any Telit module
- Debug and/or Improve applications based on Telit modules
- Implement simple applications (stand alone function) by executing scripts with a Python interpreter-equipped module without the need for an external microprocessor.
- Develop a first-pass proof-of-concept device for a new application

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2.2. Content of the Kit

The Telit EVK2 package is containing the following items:

Description	Quantity
EVK2 Motherboard	1
EVK2 Quick start Guide	1
2 pin Jumper Female connectors	18
USB A-B Cable	1
Red & Black Cable with Plugs	1
GSM-UMTS-LTE MAGNETIC ANTENNA with RG174 cable SMA/M	1
Power Supply 12V	1
M2M SIM and Instructions (only in EVK2-M2MAir)	1
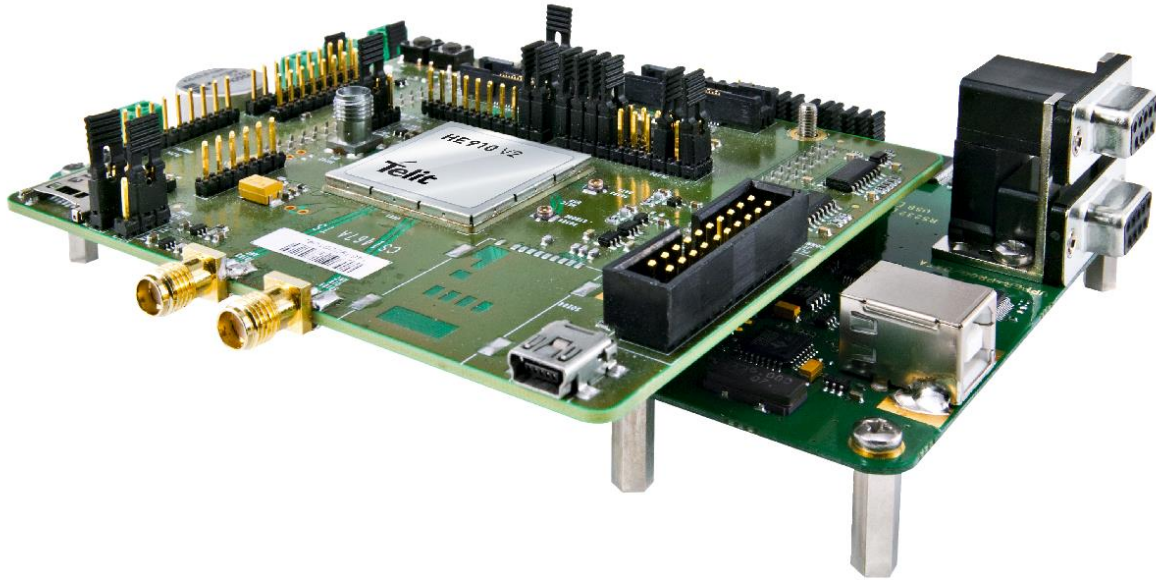
Figure 2-1 EVK2 Motherboard

3. DESCRIPTION

The EVK2 (CS1139B) is a motherboard that permits to connect and use all the Telit Module's Interfaces.

It can be split into several functional blocks depending on the implemented function; the following drawings show a block diagram and the displacement of the main blocks on motherboard.
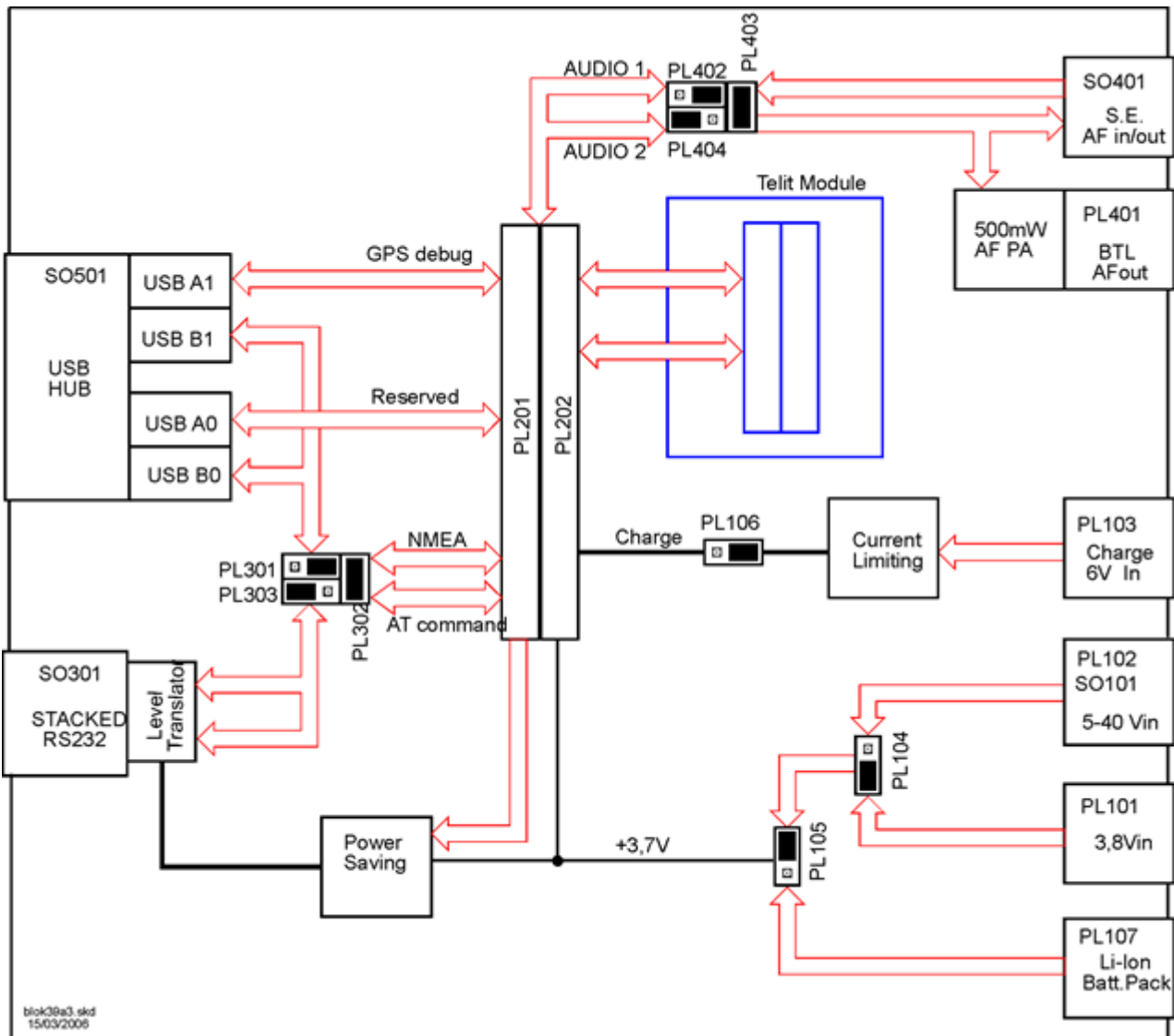

Figure 3-1 Block Diagram

The following Image is showing the position of the main functional blocks on the EVK2:
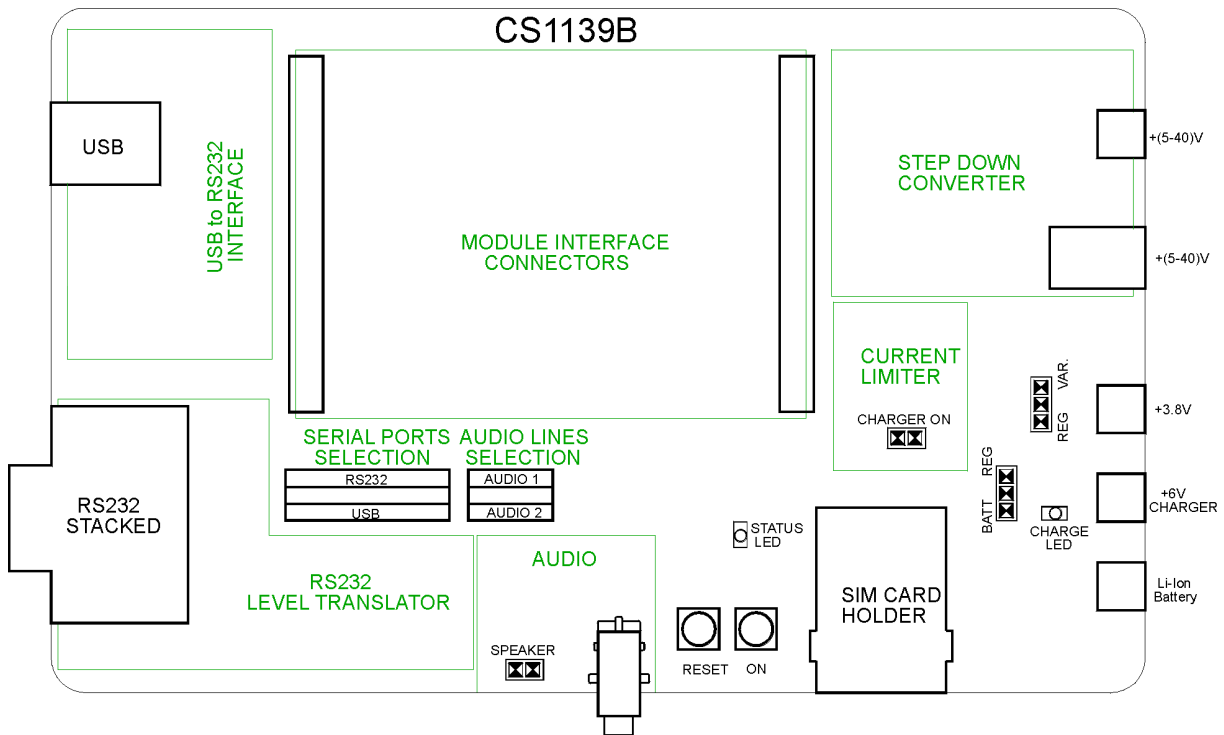
Figure 3-2 Functional blocks

3.1. Physical Dimensions

Item	Value
Length	100 mm (max 102,6 mm)
Width	160 mm (max 166,10mm)
Height	47,6 mm (included the support with columns)
Weight	200 gr (without any interface)

4. POWER SUPPLY

The EVK2 could be powered by different external sources, only one at time. The requested setting is made inserting the proper jumper connectors in the right position as described in the following paragraphs.

Be careful to the connections, even if every supply line is protected by a diode against "polarity reversing" and by a 0Ω resistor against "short circuiting".

4.1. Fixed DC Source

Connect a +3,8V / >= 2A fixed DC source to PL101 respecting the polarization; short pin2 & pin3 – PL104 and pin1 & pin2- PL105 by 2 contacts jumper connectors. No other jumpers are needed.
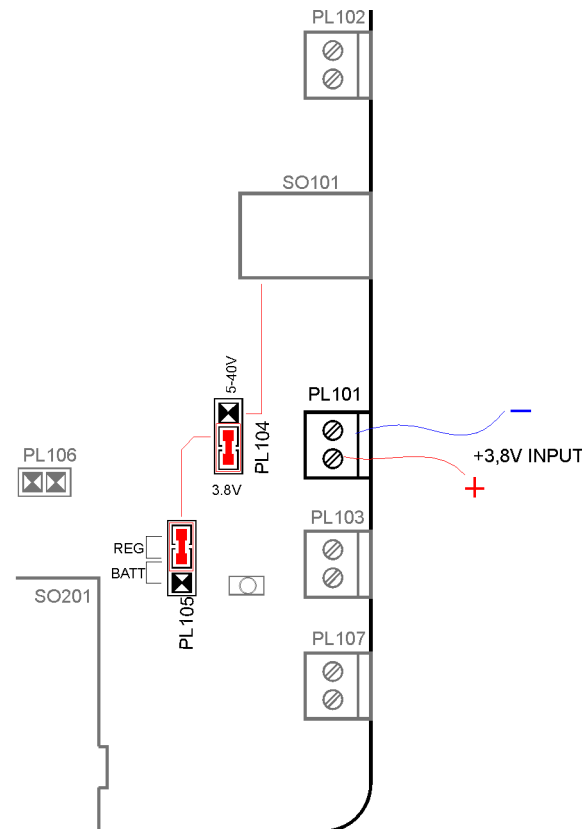
Figure 4-1 Connection Fixed DC Source

4.2. Variable DC Source

Connect a + 5÷40 V / >= 1A variable DC source to PL102 (by wires) or to SO101 (by coaxial plug), with care to the polarities. Short pin1& pin2-PL104 and pin1& pin2-PL105 by inserting 2 contacts jumper connectors.

No other jumpers are needed.
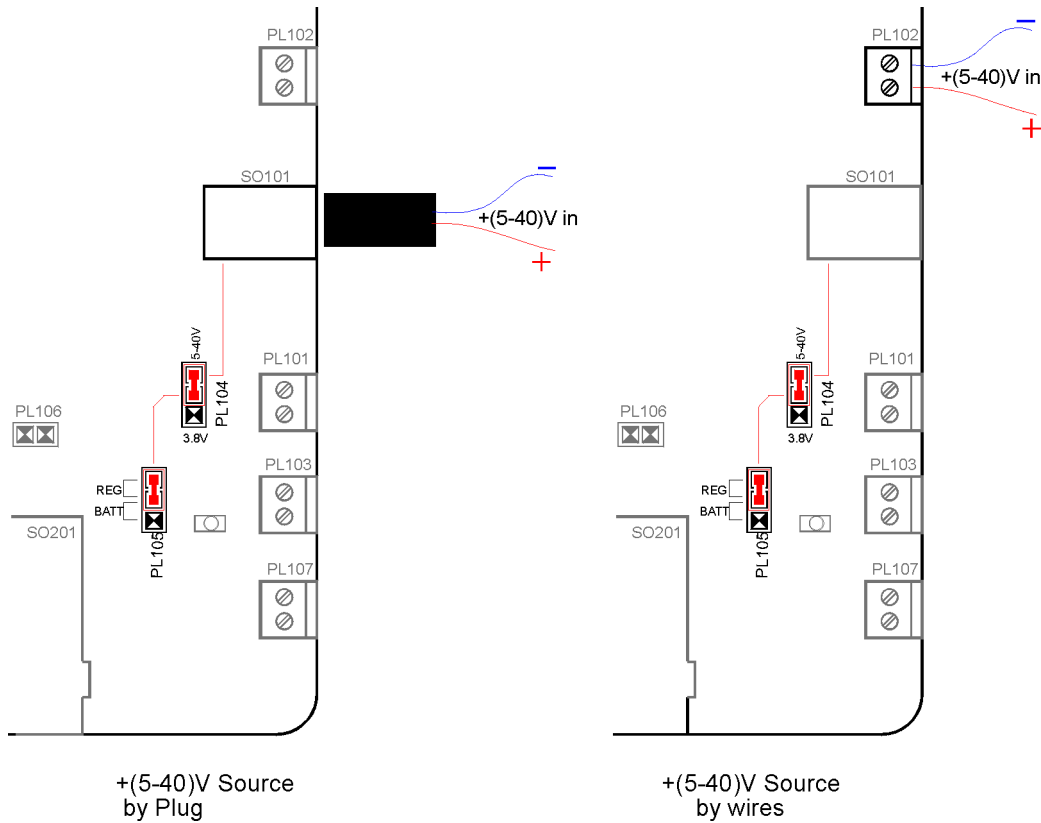
Figure 4-2 Connection Variable DC Source

NOTE:

It is useful set the variable DC source at 6V minimum to avoid problems with voltage drops due to the length of the wires or the conductors gauge.

4.2.1. Power Plug

The following image shows the Power Plug connections for SO101
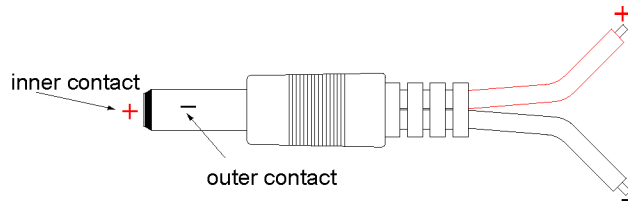
Figure 4-3 Power Plug

4.3. Li-Ion Battery pack and Charger

Connect a Li-Ion battery pack to PL107 with care to the polarity then short pin 2& pin3-PL105 by inserting the 2 contacts jumper connector.

If the battery pack needs to be recharged, connect a +6V /□ 0,5A fixed DC source to PL103, with care to the polarity; short PL106 inserting a 2 contacts jumper connector as shown in figure 4-4: the yellow CHARGE LED will be on during the initial phase of charge.

If you remove the battery pack when the charge stops (no current flows), immediately REMOVE also the jumper of PL106.

The connections example is in the following image:

Figure 4-4 Connections with Li-Ion battery

⚠️ WARNING

NEVER CONNECT any Battery Charging source to PL102 without a connected Battery!!

4.4. Application Notes

4.4.1. Li-Ion Battery Pack

The 3.7V Li-Ion rechargeable Battery Pack should be connected directly to PL107 connector. Remember to use the connection cables as short as possible, with the appropriate conductors gauge and the other attributes, such as device power budget and cable flexibility, in order to match the specified voltage drop (especially during the high current absorption periods).
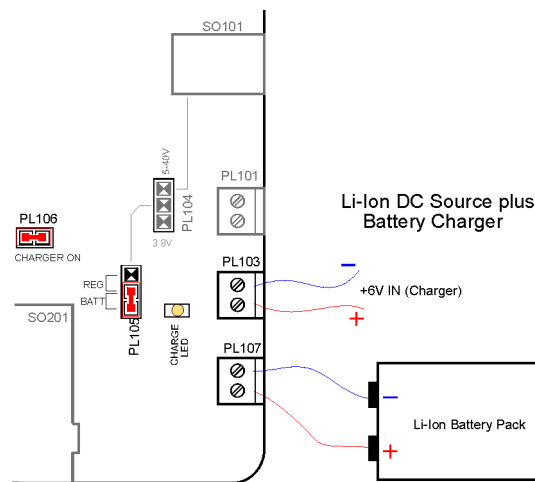
To obtain the best performance we suggest a capacity of 1000 mAh (not lower than 500 mAh).

4.4.2. About Current Charger

With a +6V Current Unlimited Source connected to PL103 connector, the battery pack will be directly charged through VBATT connector pins of the Telit Modules, under control of the Internal Charge Algorithm (only on models where is implemented).

Depending of the size, the Li-Ion cell manufacturers suggest a charge current value not greater than 1,5C (C= Capacity of the battery pack, expressed in mAh); even if a lower current means a longer charging time, a current equal to 0,5C is considered to be a good choice.

With reference to the schematic diagram, sheet1, the Current Limiting Circuit (Q102, Q103, R106, R107, R108, R109, R110, R111, R112, R113, C105) sets the maximum value of the Charge Current in respect to the law:

$$I_{ch} = \frac{V_{beQ102}}{R_{par}} \rightarrow where$$
$$R_{par} = //R110, R111, R112, R113$$

With the default values, the charge current will be ~ 470mA, which will charge Battery Packs with a capacity from 350mAh to 1000mAh, without any dissipation problem.

If a higher capacity Battery Pack is needed, you must increment the Time Out in the Telit Modules.

WARNING

SET THE MAXIMUM VOLTAGE OF the CURRENT UNLIMITED SOUCE LOWER than +8V.

5. SERIAL INTERFACES

The EVK2 has a set of switches and level adapters to easily interface the UART (RS232) port of the modem. The following figure shows the architecture of the available ports.
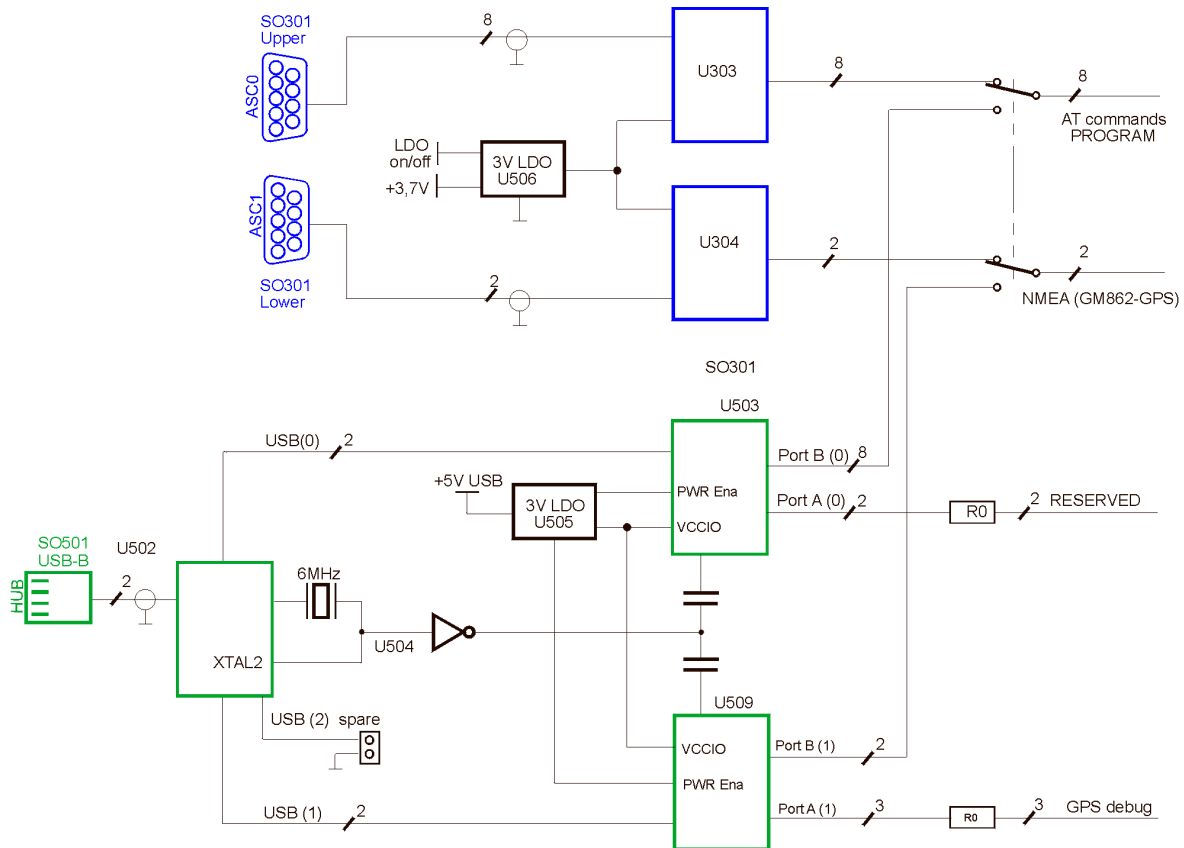
Figure 5-1 Serial Interfaces

5.1. Serial Port Setup

Communications between your application and the Telit modules are allowed connecting the DTE to the Asynchronous Serial Interfaces of Base-Band Chip, ASC0 and ASC1, through the stacked standard RS232 communications port (double 9 way D-socket connector at slow data rates of RS232 protocol) or a standard USB-B Series receptacle (at higher data rates of USB1.1 specification through a CMOS HUB that realizes a multiple attachment point device).

Figure 5-2 Double 9 way D-Socket Connector

The selection is made short circuiting PL302&PL303 (RS232 mode) or PL302&PL301 (USB 1.1 mode) by 10 pieces of 2 contacts jumpers. This solution has been implemented because you can isolate every single line during the development.

Figure 5-3 RS232 mode or USB 1.1 mode

6. AUDIO SECTION

6.1. Overview

Some Telit modules provides one or two (depending of model) analogic audio paths.

Only one could be active at time.

To turn on the audio section on EVK2, please refer to "AF Amplifiers Setting "paragraph and followings.
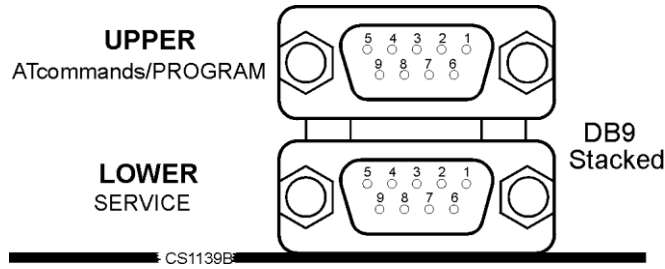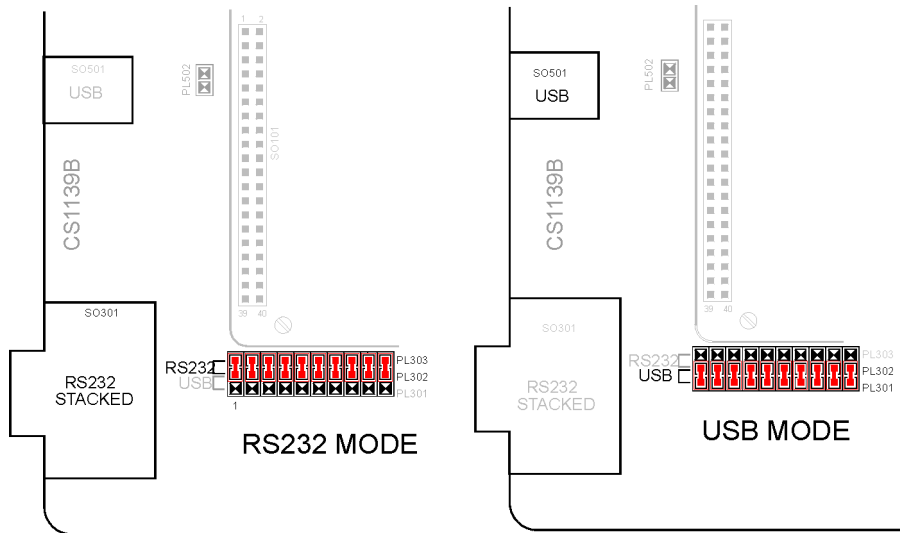
To know which are the suggested performances of the EVK2 audio transducers, refer to "Audio Accessories "paragraph.

6.1.1. Background

The module's baseband supporting the Analog Audio requires two separated amplifiers both in RX and in TX section. A couple of amplifiers had to be used with internal audio transducers (Handset mode, HS) while the other couple of amplifiers must be used with external audio transducers (Handsfree mode, HF).

Transducers definitions:

Headsets are transducers that receive an electrical signal from a receiver and use speakers placed in close proximity to the ears to convert the signal into audible sound waves.

In the context of telecommunication, the word Headset is also commonly understood to refer to a combination of Headphone and Microphone used for two-way communication, like with a mobile phone.

Earphones are small Headphones that are placed directly outside of the ear canal, but without fully enveloping it. They are generally inexpensive and are preferable for their portability and convenience.

Earpiece A part whether of a telephone receiver or hearing aid, that fits in or is held next to the ear.

The HS and HF definitions have been kept in the product specification, but with EVK2 we will refer to Audio1 and Audio2 section instead of Handset and Hands-free respectively, remembering that:

- they can have fully equivalent electrical performances (like the two microphone amplifiers)
- they can activate the same functionalities (like the Echo Canceller module)
- they can offer slightly different performances (like the two speaker buffering stages)

6.1.2. Audio Path Selection

The activation of the audio path is made Hardware by AXE line or Software by AT#CAP command.

If you don't have any load driving constraint (like a speaker with an impedance coil lower than 16 ohm), the choice between one or other "block" could be done without consideration related to the electrical performances; for example in order to overcome the PCB design difficulties.

6.2. Differential and Single Ended

6.2.1. Concepts

Any voltage can be characterized by a potential difference between two terminals.

The configuration of the two terminals and how the signal is delivered from output to input allows the signal to be more generally described in one of three ways:

Single-ended signal. This is a signal delivered between a signal trace and a ground. One terminal for a single-ended connection is always at fixed potential (usually Ground).

Differential Signals. These are signals that travel through a pair of traces. On the signal pair, neither of the terminals is Ground.

Common mode Signals. They represent a special case of differential signals, also travelling between a pair of traces, where the voltage potential on both signals is the same.

6.2.2. Benefits and disadvantages

Differential amplifiers are desirable to use, especially in audio applications where signal levels are very low such as those from microphones.

Classically, the benefits obtained from differential amplification are:

Increase of Common Mode Rejection Ratio (CMRR)

Differential inputs enable cancellation of any noise common on both inputs. Noise generated at the input of the amplifier has a greater effect than noise generated at the output, because any noise on the input is multiplied by the gain of the amplifier.

Increase Signal to Noise Ratio (SNR)

The inputs to the amplifier are especially sensitive to noise because they are typically not driven by a very low impedance source.

High Rejection in Electromagnetic Interference (EMI)

Noise immunity is very important in wireless phones because the RF signal is sent in bursts such that the frequency between bursts is in the audio band. RF rectification is such a problem that many manufacturers shield the audio portion of the phone.

Double Useful signals level

The signal levels from microphone and the voltage swing to the load are doubled. Then the AF power to the load it is 4 times the single-ended Afpower at the same voltage supply.

No output blocking capacitor is needed

Even if the differential outputs are biased at half-supply; no DC voltage exists across the load. You do not need the big, expensive and heavy blocking capacitors (generally from 33 µF to 1000 µF), lowering the cost and saving PCB space

There is no frequency limiting effect due to the high pass filter network created with the speaker impedance and the coupling capacitance.

Less shielding is required from amplifier to load

Mainly we have only one disadvantage using differential amplification: the routing of one more signal line could be more difficult and the additional trace requires more board space.

6.2.3. Settings

Connecting your accessories to SO401 in/out connector, you will implement Single Ended Input/Output configurations.

Removing all 2 contacts jumpers inserted between PL402&PL403 or PL403&PL404, the in/out lines of our modules will be directly available on PL402 and PL404 connectors.

In such a way, you will be able to implement fully Differential Input/Output configurations.

Only with GC864-QUAD/PY-C2 modules the Ear output lines are AC coupled.
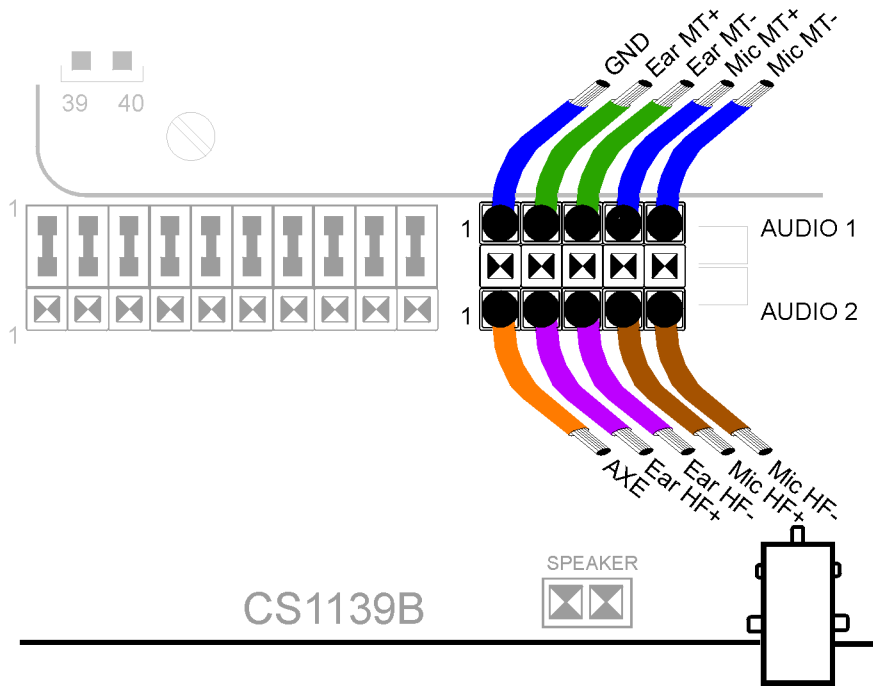

Figure 6-1 PL402 and PL404 Fully Differential audio lines

6.3. AF Amplifiers Setting

The Audio Amplifiers selection is made short-circuiting PL403&PL402 (RX Amplifier 1) or PL403&PL404 (RX Amplifier 2). In such a way you could verify the complete performance of both audio paths.
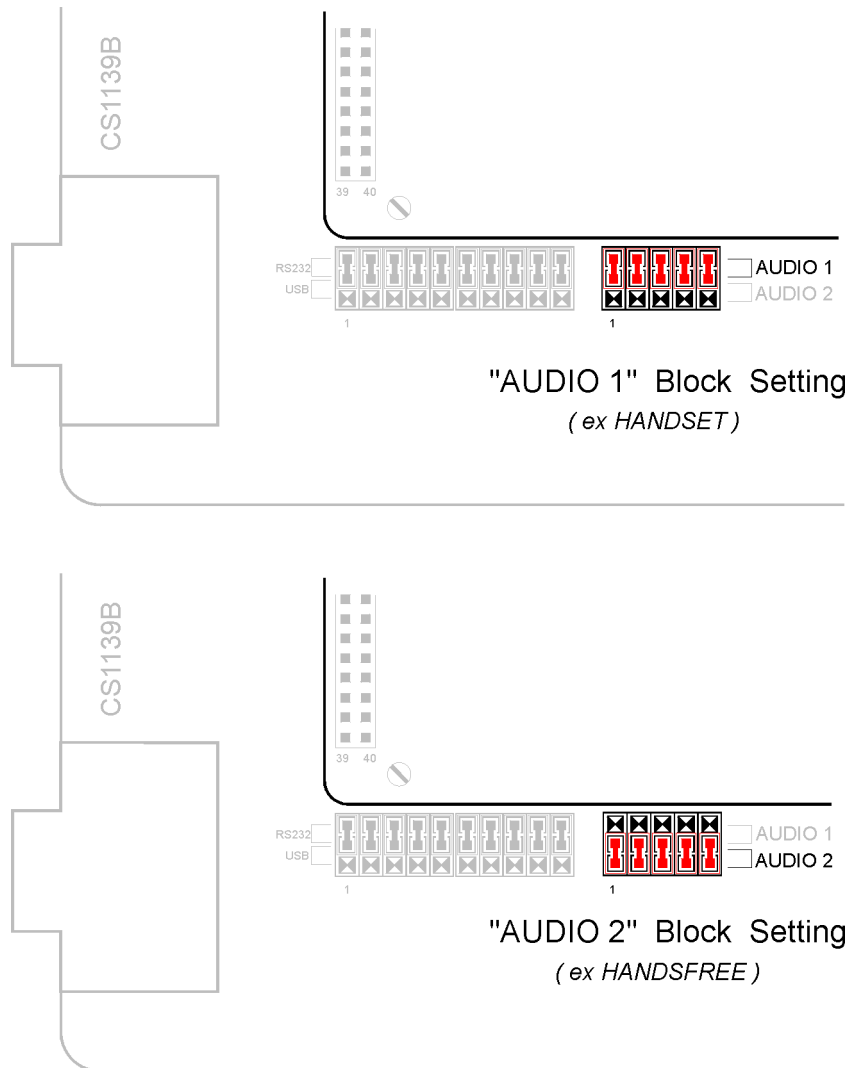

Figure 6-2 Base Band Audio Amplifiers selection

6.4. Audio outputs

The EVK2 output audio signals could be drive a device connected to SO401 (LOW AF POWER mode) or to PL401 (HIGH AF POWER mode).

6.4.1. Low AF Power Mode

Inserting the 2 contacts jumpers as explained at paragraph 9A, a standard off-the-shelf Headset should be connected to the SO401 (3 contacts, 2.5mm diameter jack connector). With such an insertion, the Telit Modules will power the Microphone through a Single Ended input circuit and the Earpiece through a Single Ended/ AC coupled output circuit.
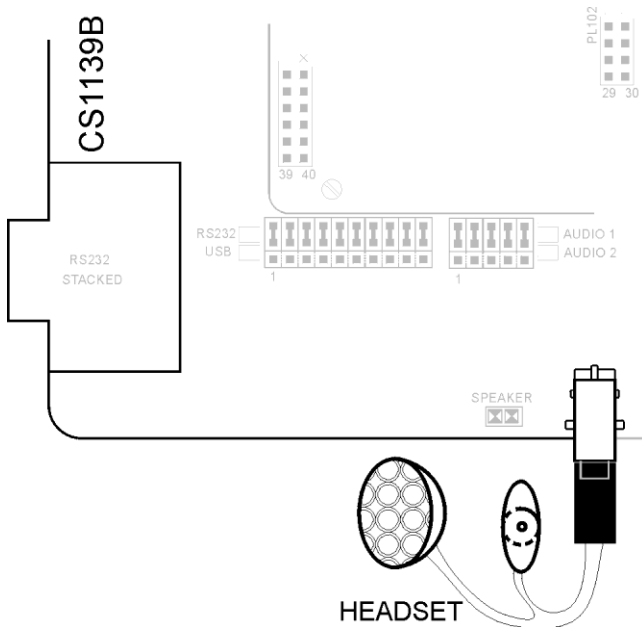

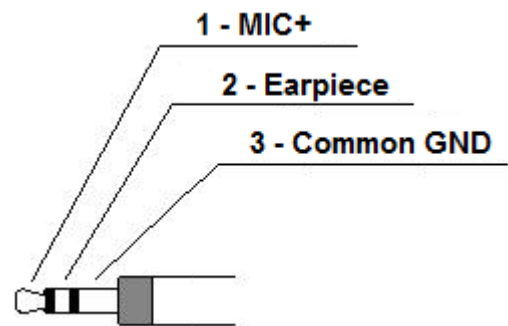*Figure 6-3 LowAF Power Mode*   *Figure 6-4 Jack Connector*

The acoustic performance of the Headset (frequency response, loudness) largely depends by its housing, fitting and acoustic impedance.

The coil impedance of the Headset should be higher than 15 ohm @ 1KHz.

6.4.2.   High AF Power Mode

Connecting an 8 ohm Speaker to PL401 by a 2 contacts female connector, you could drive it through the 500mW Power Amplifier. In this case the Speaker will be driven in fully differential configuration, with no side connected to ground and without any output coupling capacitor. Therefore care must be taken because there is DC voltage on both sides of the Speaker.

The overall gain of this amplifier can be modified varying the ratios R406/R404 and R407/R410:

$$A_v = 2 \bullet \frac{R404}{R406} = 2 \bullet \frac{R407}{R410} \quad \text{if} \quad R404=R407 \text{ and } R406=R410$$

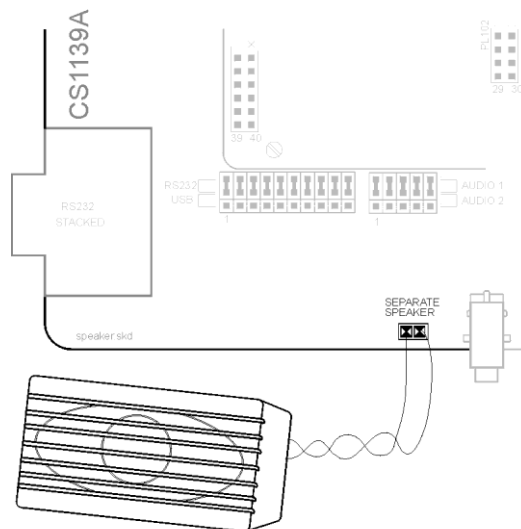The coil impedance of the Speaker should be higher than 8 ohm @ 1KHz .

Figure 6-5 Speaker Connection

6.4.2.1. Speaker and Stand-aloe Microphone

If you are using a Speaker, you can connect a stand-alone electret microphone by a coaxial 2,5mm plug to SO401, respecting the following pin-out:
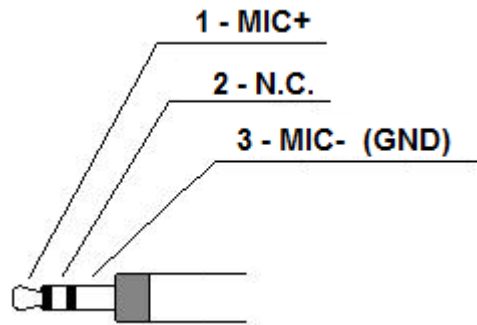
Figure 6-6 Microphone Plug pinout
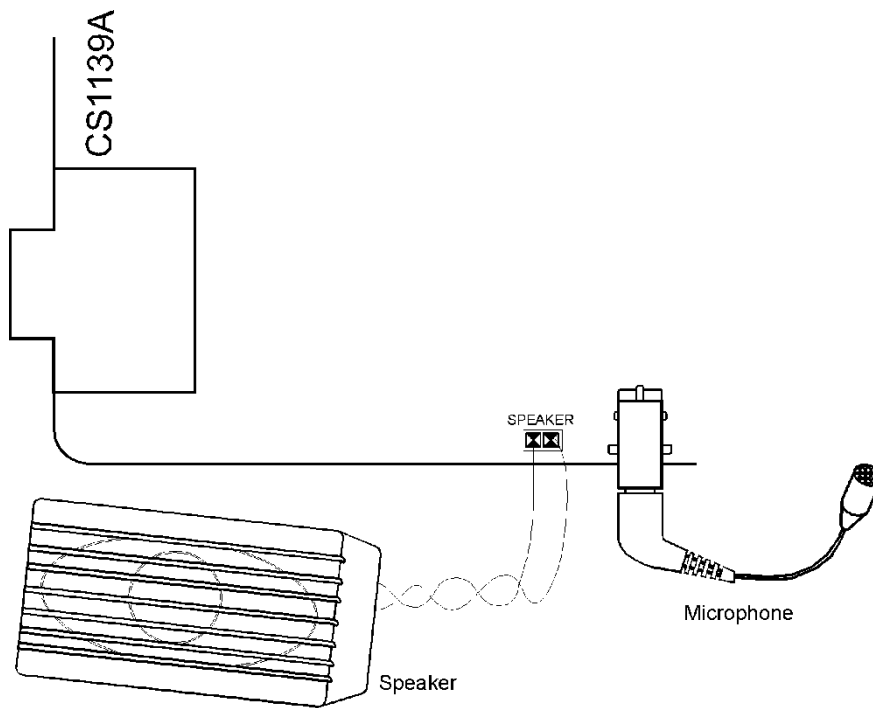
Figure 6-7 Speaker & Microphone connections

6.4.2.2.   Speaker & Headset

If you have chosen to connect the Speaker to HIGH AF POWER output, without having a stand-alone electret microphone, it is also possible to connect a standard off-the-shelf Headset to SO401 without any problem, as shown in the image: the AF output signal will be heard on both Speaker and Earpiece.

⚠️ WARNING

You must use the right coil impedance depending from audio output you want to use.

If you sort out the LOW AF POWER solution connecting your Headset to SO401, the coil impedance must be at least 16Ω@1KHz or higher.

If you sort out the HIGH AF POWER solution connecting your Speaker to PL401, the coil impedance must be at least 8Ω@1KHz or higher.
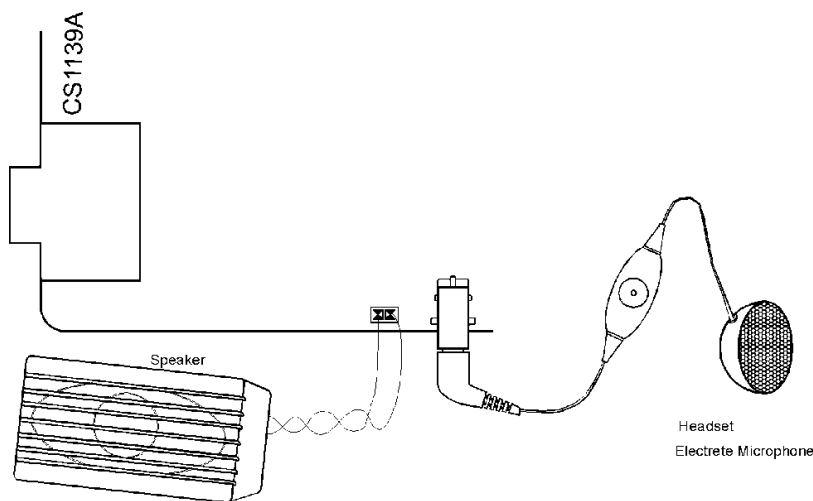
Figure 6-8 Speaker & Headset connections

6.5. Electrical Characteristics

The following tables show the suggested specification to obtain the best performance from off-the-shelf accessories.

6.5.1. Headset

Microphone electrical characteristics	
Item	Value
Nominal sensitivity	-45dBVrms/1Pa (+/- 3dB)
Line coupling	AC
Nominal Voltage	2V
Range of Using Voltage	(1÷10)V
Consumption Current	(150÷500) µA
Impedance	2,2KΩ
Signal to Noise Ratio	56dB /1KHz/1Pa (A curve)
Inner EMI capacitor between terminals	10pF, 33pF

Earpiece electrical characteristics	
Item	Value
Rated Input Power	5mW
Maximum Input Power	20mW
Coil Impedance	$32\Omega \pm 5\Omega$ @ 1kHz
SPL	95 ± 3 dB @ 1KHz/1mW sine wave

Resonance frequency (Fo)	< 350Hz
Useful Bandwidth	Fo ÷ 8000 Hz @ -3dB

6.5.2.   Stand-Alone microphone

Microphone electrical characteristics	
Item	Value
Nominal sensitivity	-45dBV$_{rms}$/1Pa (+/- 3dB)
Line coupling	AC
Nominal Voltage	2V
Range of Using Voltage	(1÷10)V
Consumption Current	(150÷500) µA
Impedance	2,2KΩ
Signal to Noise Ratio	56dB /1KHz/1Pa /A curve
EMI capacitor between terminals	10pF, 33pF

6.5.3.   Speaker

Speaker electrical characteristics	
Item	Value
Rated Input Power	500 mW
Maximum Input Power	1W
Coil Impedance	≥ 8Ω

SPL	$\geq$ 85$\pm$3 dB @ 1KHz
Resonance frequency (Fo)	< 350Hz
Useful Bandwidth	Fo $\div$ 8000 Hz @ -3dB

7. INDICATION AND SERVICES

7.1. Optical Indicators

7.1.1. Status LED

It is a debug aid that shows information on the network service availability and Call status.

The LED status is depending on the used module. However an example of behaviour is the following:

LED Status	Device Status
Permanently off	Device off
Fast blinking (period 1s, Ton 0,5s)	Net search / Not registered / turning off
Slow blinking (period 3s, Ton 0,3s)	Registered: full service
Permanently on	A call is active

The STAT LED position is shown in the following image:
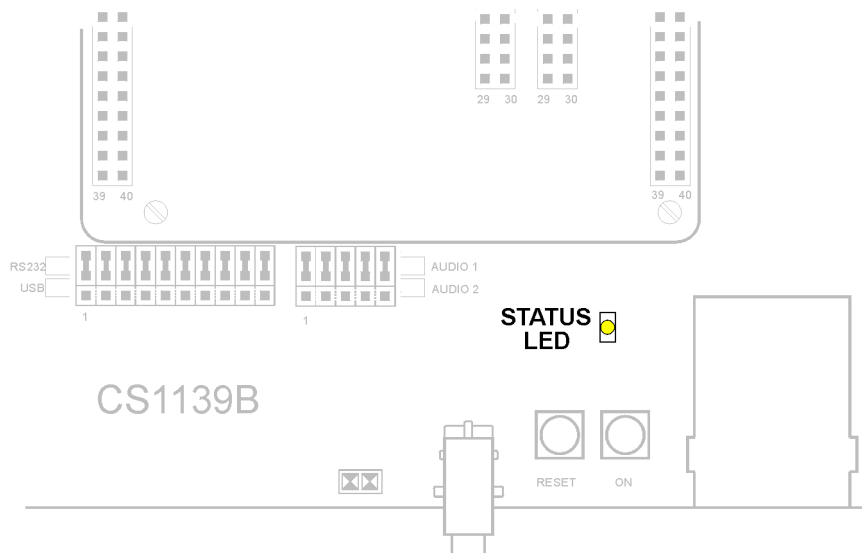
Figure 7-1 STAT LED

7.1.2. Charge LED

LED Status	Meaning
Always on	Start Charge/ Hugh current Charge in act
Always off	Low current Charge in act/Charge stop

The LED position on PCB is described in the following image:
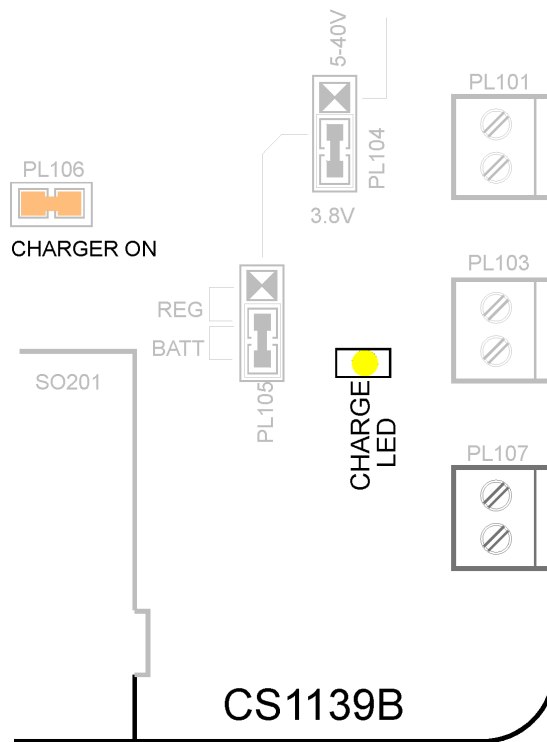
Figure 7-2 Charge LED

7.2. Switches

It is possible to power On/Off or Reset the EVK2/Module using two push buttons.

7.2.1. Power ON Switch

With this button is possible to Power On the module.

The ON/OFF functionality and its use is depending on the used module.

Please refer to the related Module's Hardware User Guide and Interface's User Guide.

7.2.2. RESET/SHUTDOWN Switch

With this button is possible to RESET or unconditionally power off the module. Whenever the RESET SWITCH is pressed, you could reset the Telit module in use.

When the device is reset, it stops any operation without doing any detach operation from the network where it is registered and it reboots after the release of the Reset Switch.

This behaviour is not a proper shut down because any Wireless module is requested to issue a detach request at turning off. For this reason the Reset pressing action must not be used to normally reboot/shutting down the device, but only as an emergency exit in the rare case the device remains stuck waiting for some network response.

The RESET is internally controlled at start-up to achieve always a proper power-on reset sequence, so there is no need to control this pin on start-up. It may only be used to reset a device already on that is not responding to any command.

The RESET functionality and its use is depending on the used module.

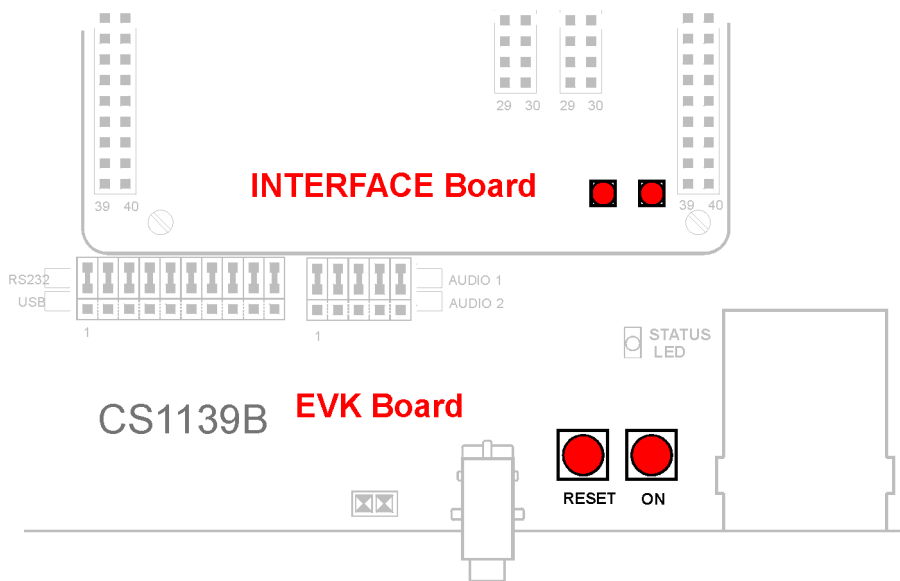Please refer to the related Module's Hardware User Guide and Interface's User Guide.

Figure 7-3 Buttons Position

8. MODULE'S INTERFACE

8.1. General Description

The interface boards convert the module connection technology (board-to-board or BGA soldering) into a PTH pin connector. The part of the basic interfaces is served by the motherboard, whereas specific interfaces according to the type of the module (antenna, general purpose inputs/outputs GPIO, ADC/DAC, UART) are available on the adapter board to connect it to the user applications, extension boards, measurements equipment or other tools. All connections are made through 2x40 contacts connectors.

It is possible to use these Interface Boards also in stand-alone mode, inserting the "not mounted" components (related to RESET BUTTON, ON BUTTON, SIM HOLDER and STATUS LED functions) plus the use of an external level translator circuit.

Please refer to the module's Hardware User guide and Interface User guide for their compatibility with EVK2 mainboard and the related Interface part number to be used.

8.2. Interface Connection

The connections between CS1139B and any Telit module's Interface are made through two 40 pin male connectors (PL201 and PL202).

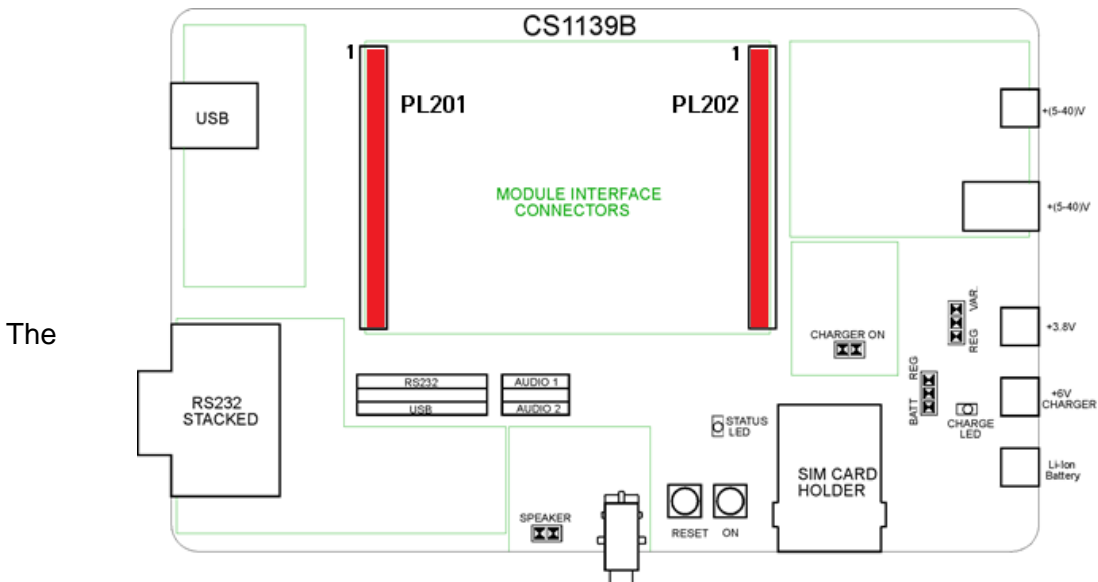The following image is showing their position on EVK2:

The

Figure 8-1 Interface Connection

Interface Board must be inserted on CS1139B paying great attention to match the position of the main connectors; this has been made easy with a mechanical key. See the following example:
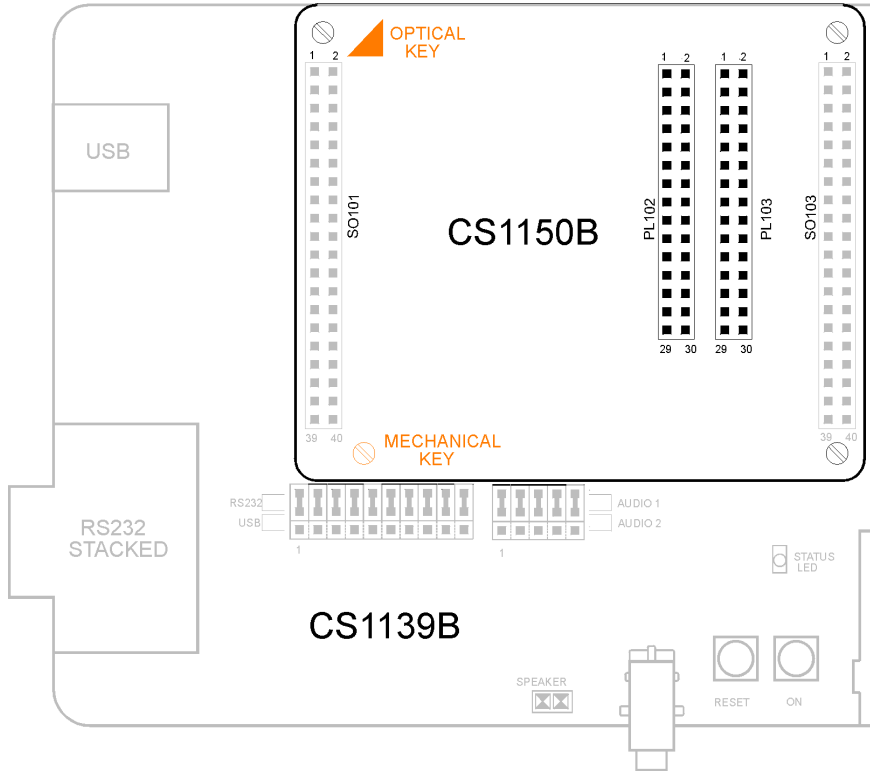

Figure 8-2 Connection interface Board

8.3. Interface Connection Pinout

The connections between CS1139B and every Telit module Interface Board are made through two 40 pin male connectors. Theirs pin functions are listed in the following tables:

PL201			
Pin	**Signal**	**Type**	**Function**
1	NC	-	Do not connect
2	TX_Trace	Digital Output	to RS232 or USB level translators
3	RX_Trace	Digital Input	from RS232 or USB level translators
4	IIC_SDA_HW	Digital In/Out	from/to USB level translators
5	GND	DC voltage	Power
6	IIC_SCL_HW	Digital Input	from USB level translators
7	SSC0_CLK	Digital Output	to USB level translators
8	SSC0_MTSR	Digital In/Out	from/to USB level translators
9	SSC0_MRST	Digital In/Out	from/to USB level translators
10	NC	-	-
11	GND	DC voltage	Power
12	GND	DC voltage	Power
13	GND	DC voltage	Power
14	GND	DC voltage	Power
15	C109/DCD	Digital Output	to RS232 or USB level translator
16	C104/RXD	Digital Output	to RS232 or USB level translator

17	C103/TXD	Digital Input	from RS232 or USB level translator
18	C108/DTR	Digital Input	from RS232 or USB level translator
19	GND	DC voltage	Power
20	C107/DSR	Digital Output	to RS232 or USB level translator
21	C105/RTS	Digital Input	from RS232 or USB level translator
22	C106/CTS	Digital Output	to RS232 or USB level translator
23	C125/RING	Digital Output	to RS232 or USB level translator
24	NC	-	-
25	GND	DC voltage	Power
26	GND	DC voltage	Power
27	GND	DC voltage	Power
28	GND	DC voltage	Power
29	EAR_HF+	AC Out Voltage	Audio
30	EAR_MT-	AC Out Voltage	Audio
31	EAR_HF-	AC Out Voltage	Audio
32	EAR_MT+	AC Out Voltage	Audio
33	AXE	DC voltage	INT/EXT Switching
34	MIC_HF-	AC In Voltage	Audio
35	MIC_MT+	AC In Voltage	Audio
36	MIC_HF+	AC In Voltage	Audio

37	MIC_MT-	AC In Voltage	Audio
38	GND	DC voltage	Power
39	GND	DC voltage	Power
40	GND	DC voltage	Power

PL202			
Pin	**Signal**	**Type**	**Function**
1	VBATT	DC voltage	Power
2	VBATT	DC voltage	Power
3	VBATT	DC voltage	Power
4	VBATT	DC voltage	Power
5	GND	DC voltage	Power
6	GND	DC voltage	Power
7	GND	DC voltage	Power
8	GND	DC voltage	Power
9	CHARGE	DC voltage	Power
10	CHARGE	DC voltage	Power
11	GND	DC voltage	Power
12	GND	DC voltage	Power

13	GND	DC voltage	Power
14	GND	DC voltage	Power
15	ON_OFF*	DC voltage	Pull up to VBATT
16	NC	-	-
17	RESET*	DC voltage	Module Reset
18	NC	-	-
19	NC	-	-
20	NC	-	-
21	STAT_LED	Open Collector	Status Indicator LED
22	NC	-	-
23	NC	-	-
24	NC	-	-
25	GND	DC voltage	Power
26	GND	DC voltage	Power
27	GND	DC voltage	Power
28	GND	DC voltage	Power
29	NC	-	-
30	NC	-	-
31	SIMIO	3V Only	SIM Data I/O
32	SIMCLK	Digital Signal	SIM Clock

33	SIMRST	DC voltage	SIM Reset
34	SIMVCC	DC voltage	SIM Power
35	SIMIN	DC voltage	SIM inside detector
36	NC	-	-
37	NC	-	-
38	GND	DC voltage	Power
39	GND	DC voltage	Power
40	GND	DC voltage	Power

9. STARTUP PROCEDURE

The motherboard factory setup is:

Item	Value
Serial port	RS232
DC source	+ (5÷40) V / ≥ 1A
Batt.Charger connector (PL106)	On
Audio Amplifier	Audio 1

Respect the following order to use the EVK2:

- insert your SIM card
- set properly all jumpers in the desired position
- plug the module Interface board into PL201 and PL202
- connect the antenna to RF connector (on module or on Interface Board)
- connect the audio accessories if required
- plug the external power supply into the right socket, depending from DC source
- switch ON the power supply
- connect the serial cable between your PC and UART (RS232 or USB 1.1)
- push ON/OFF button on EVK Board to power on the module (function depending on used Module)

Your EVK2 should now be operational and with the module ready to receive AT Commands.

NOTE:

When you use USB port, it is very important to respect the following sequences:

Start: first turning ON the EVK2 and then connecting it to the PC

Stop: first disconnecting the PC and then turning OFF the EVK2
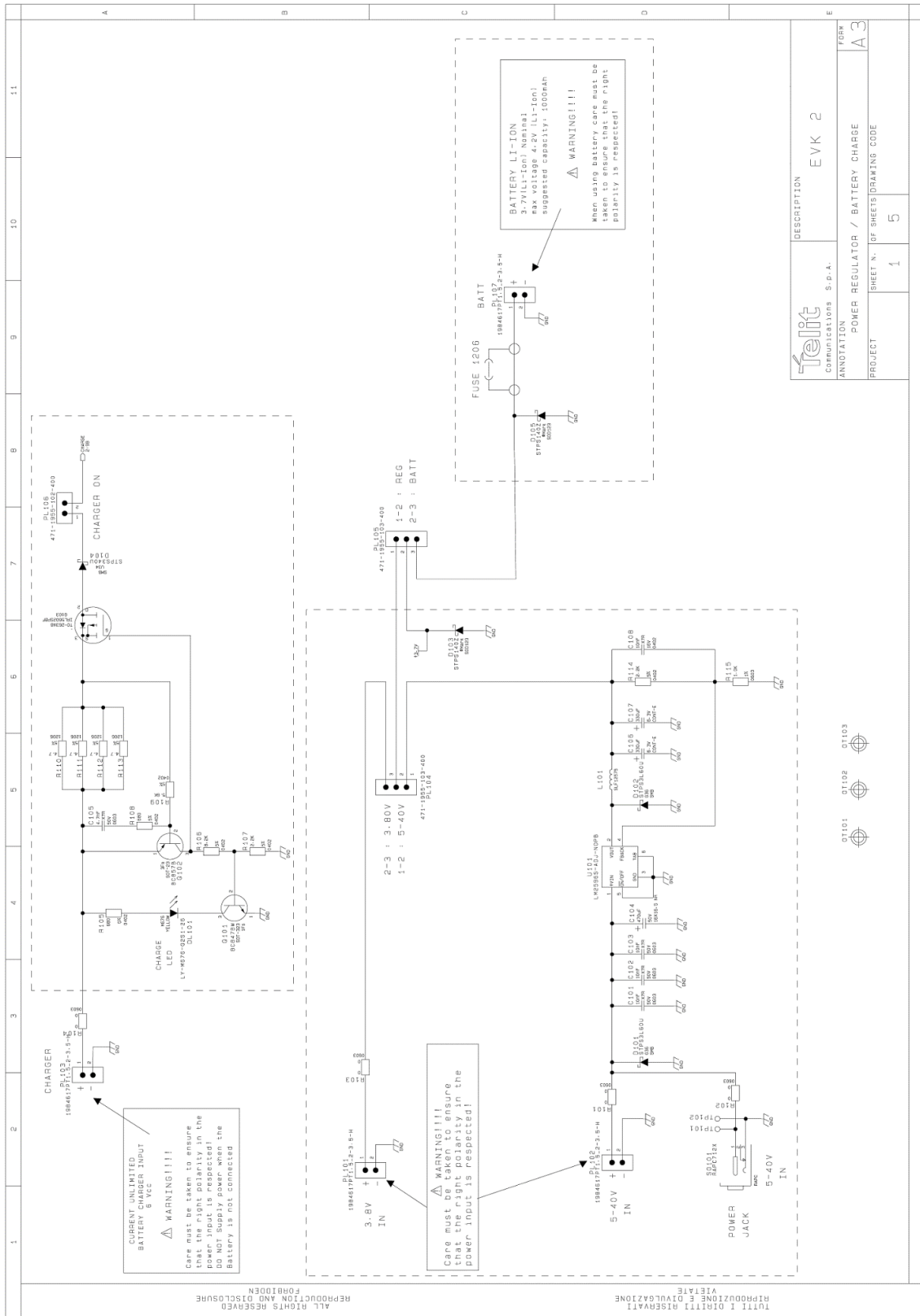
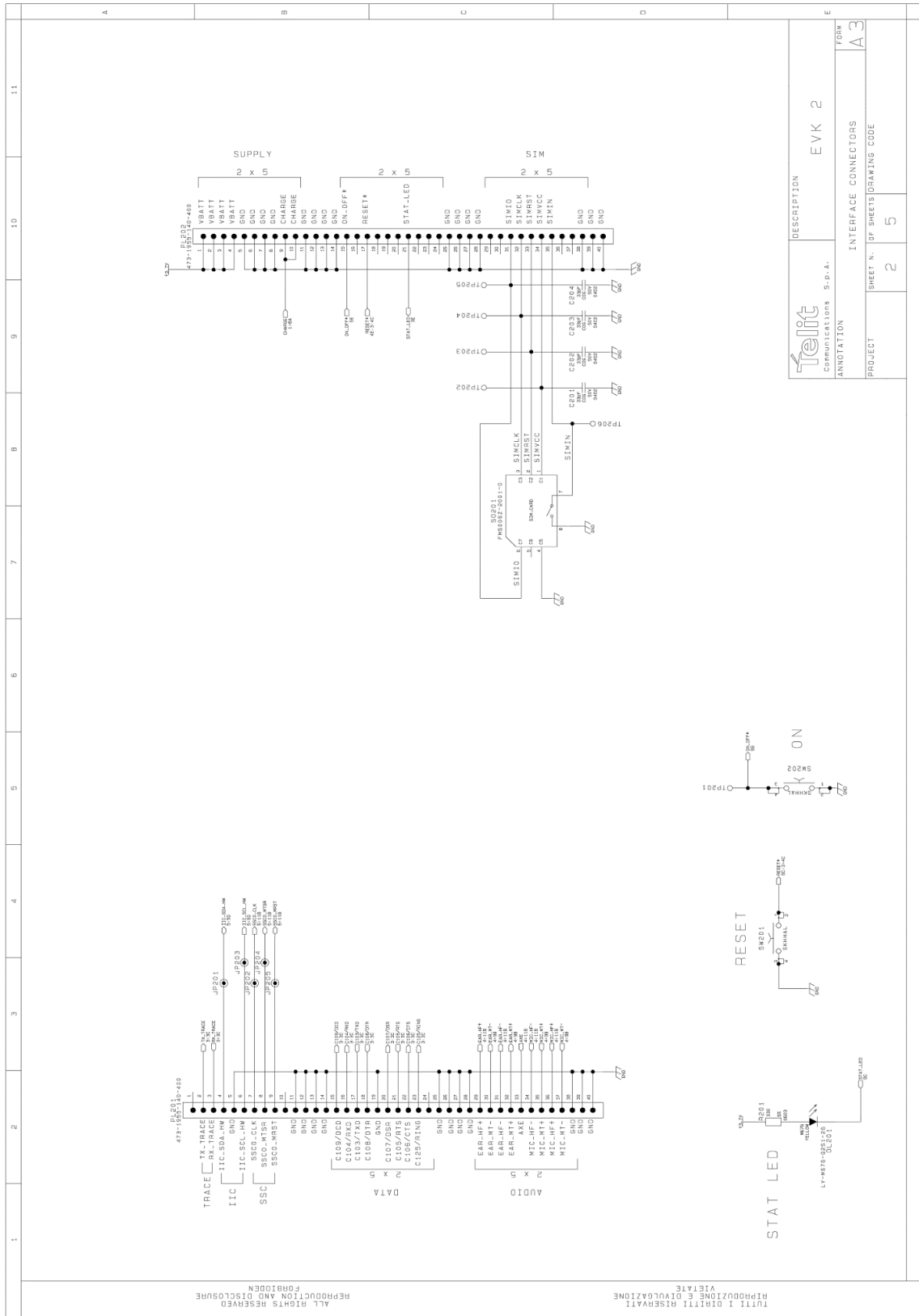# 10. EVK2 SCHEMATICS

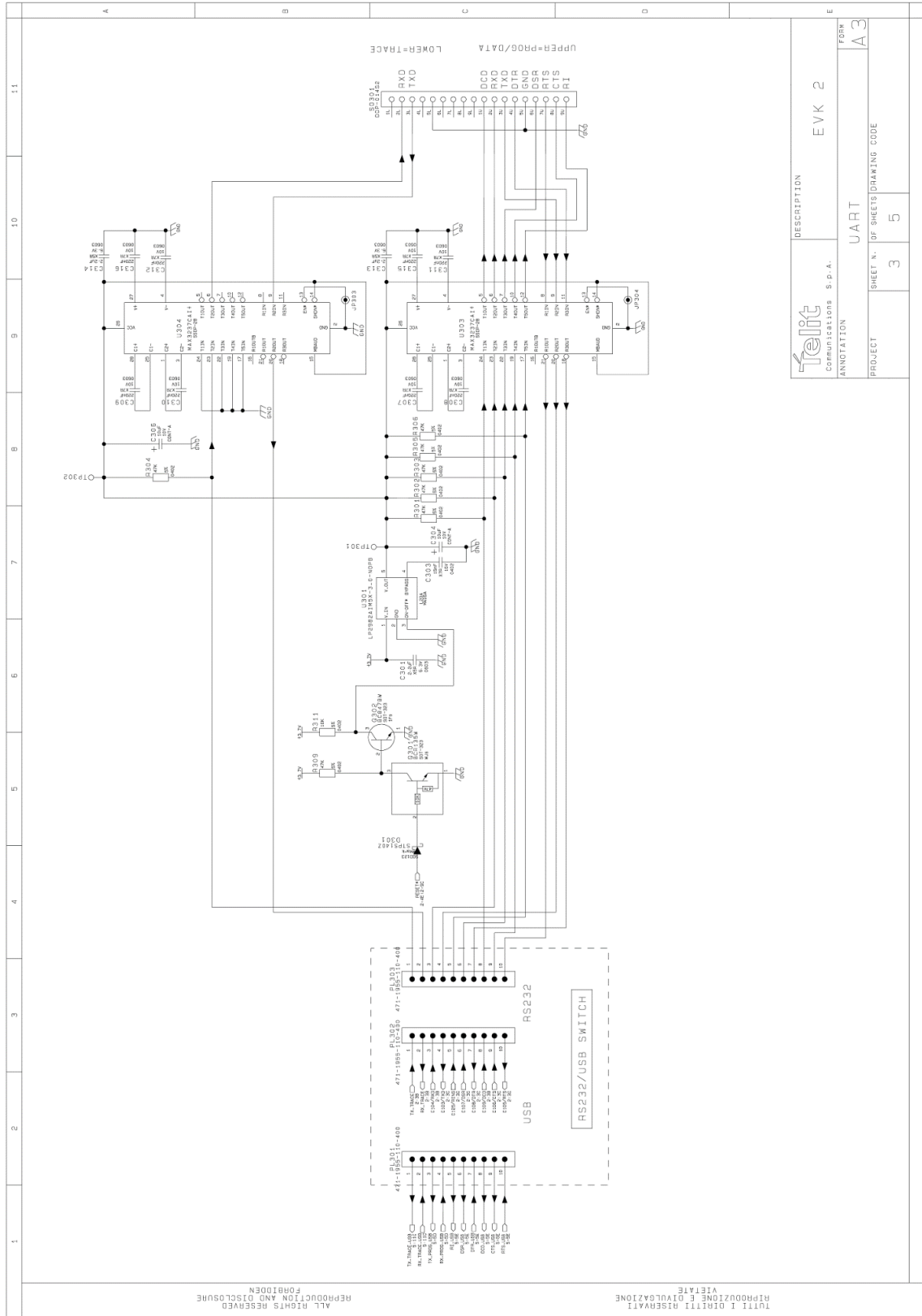*Figure 10-1 Scheme*
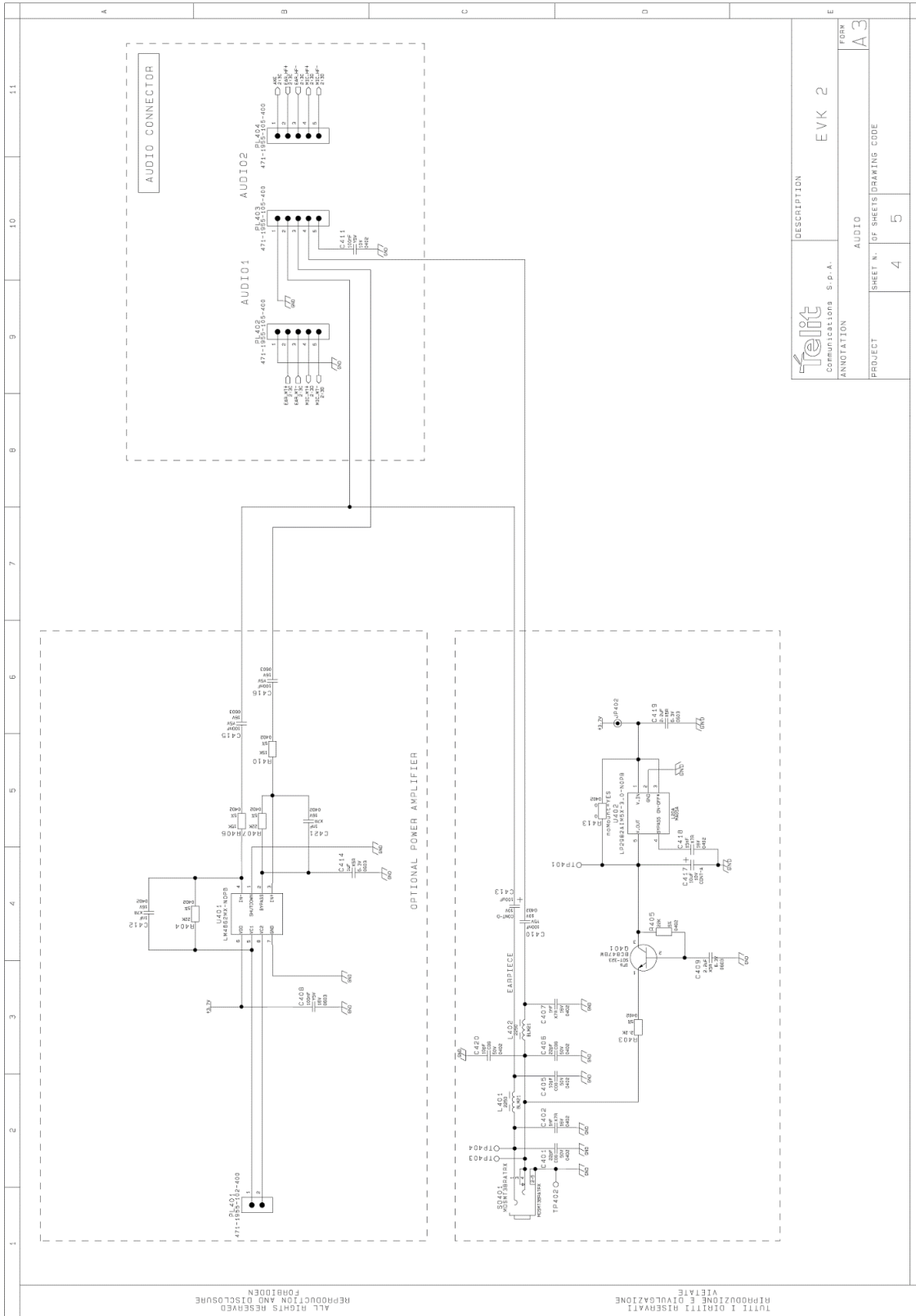
Figure 10-2 Scheme

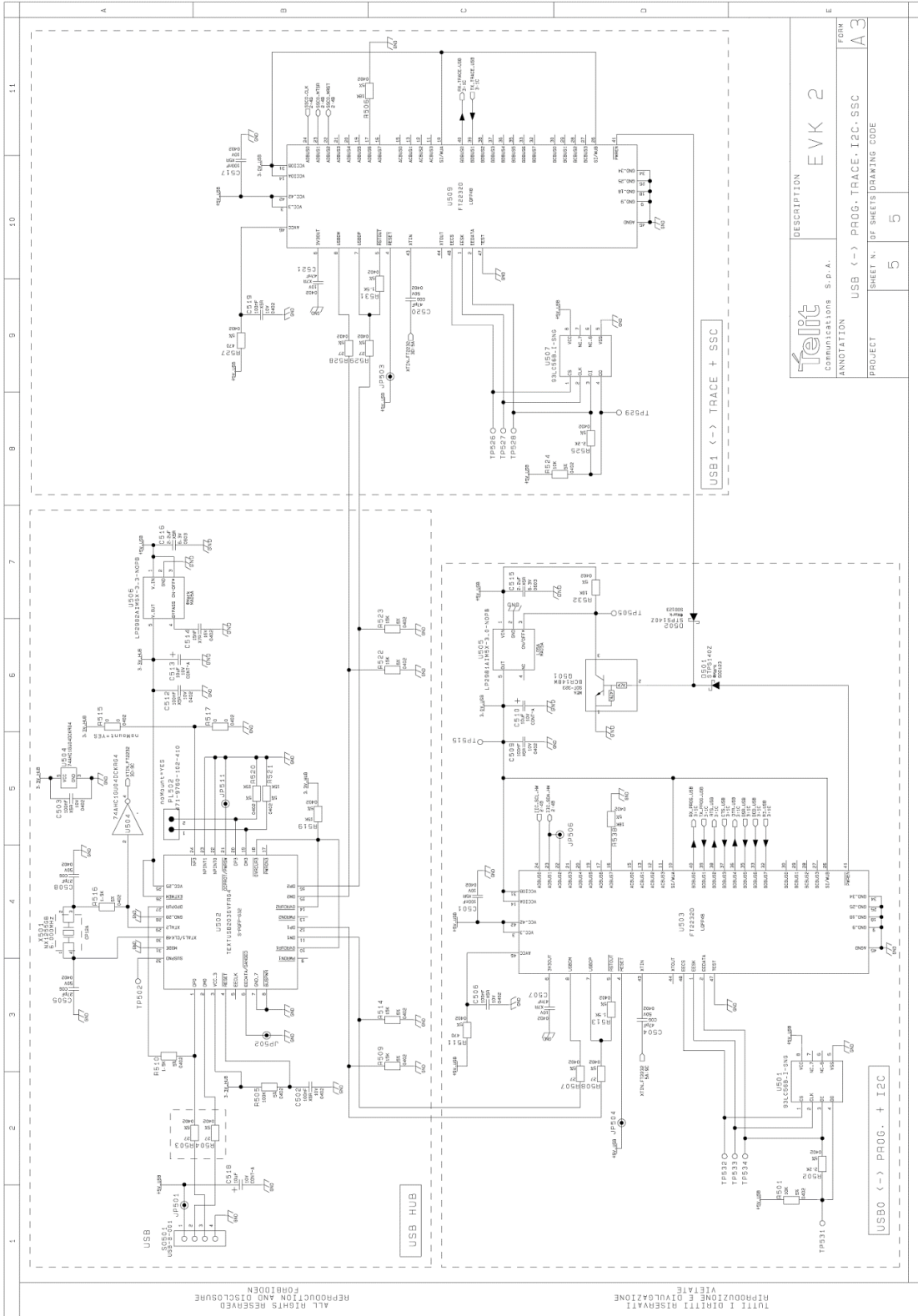*Figure 10-3 Scheme*

Figure 10-4 Scheme

Figure 10-5 Scheme
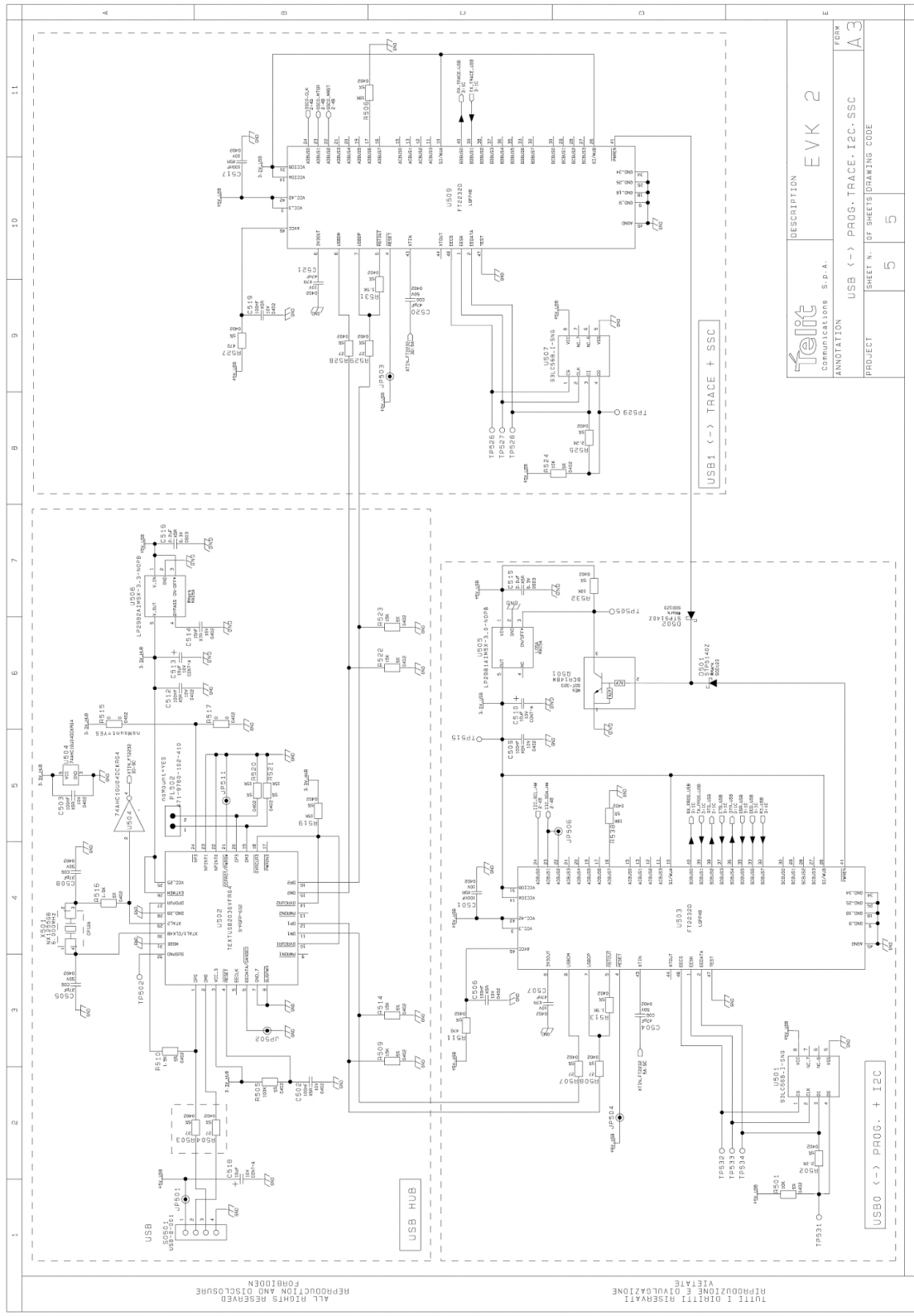
Figure 10-6 Scheme

10.1.   Component's Layout
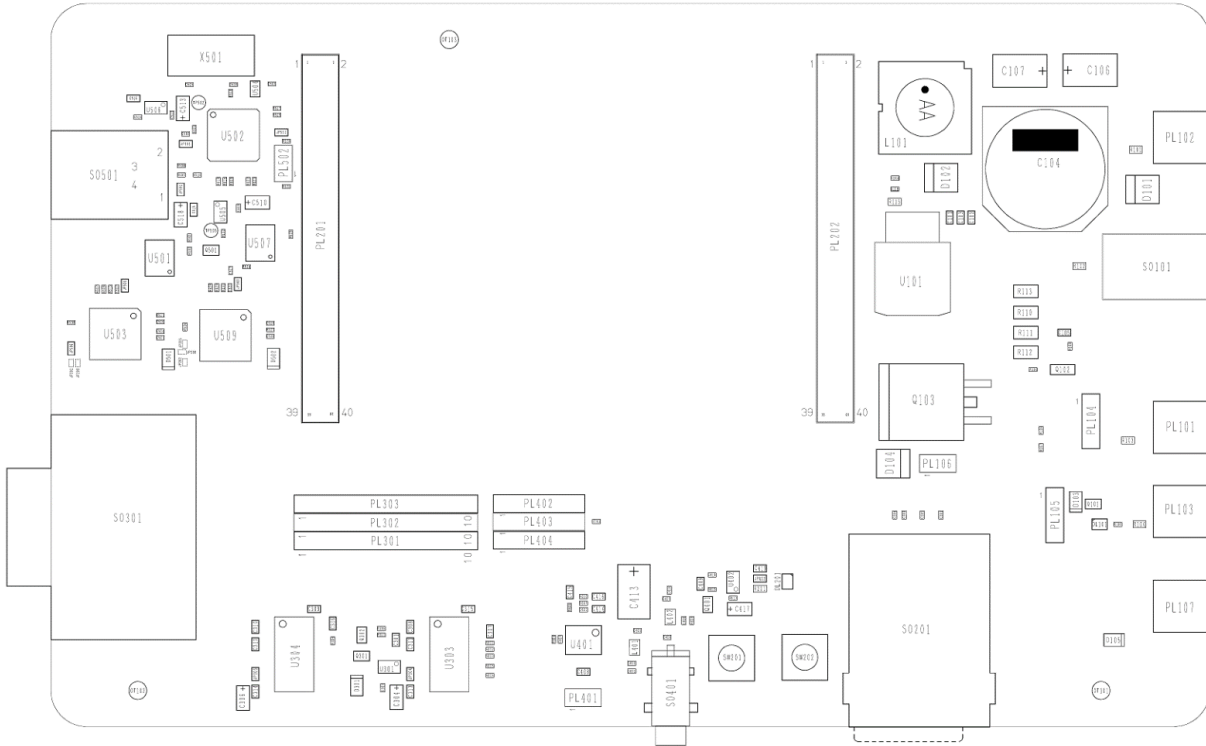
Figure 10-7 Scheme

10.2.   Default Jumpers Settings
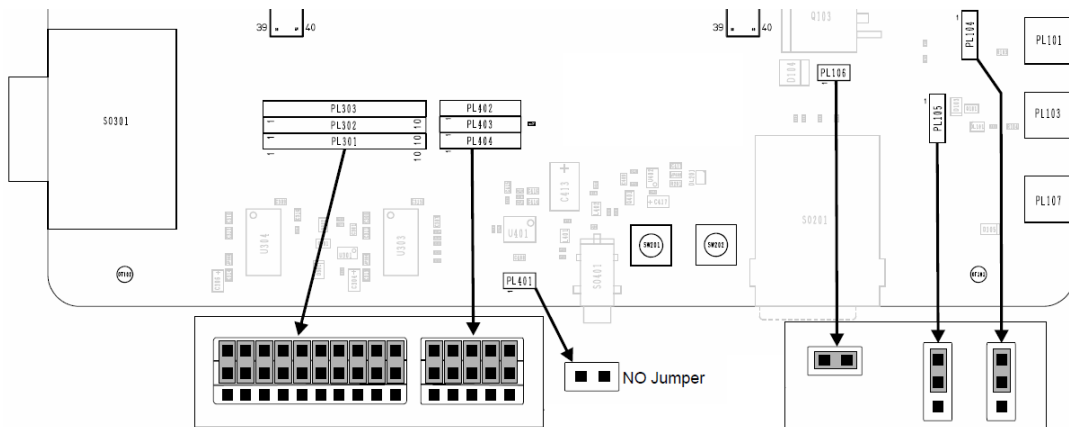
Figure 10-8 Default Jumpers Settings

11. FIRMWARE UPDATE

You can update the Telit Module firmware through the serial cables (RS232 or USB depending on module's characteristics) used for the communication with a PC. The firmware update can be done with a specific software tool provided by Telit that runs on windows based PCs.

All levels are conformed to RS232 and V.24 standard and a PC serial port can be directly connected to this connector.

12. SAFETY RECOMMENDATIONS

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 the 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 correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conformed 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. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible for the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force. Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipment introduced on the market. All of the relevant information is available on the European Community website:

http://ec.europa.eu/enterprise/sectors/rtte/documents/

The text of the Directive 99/05 regarding telecommunication equipment is available,

while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/sectors/electrical/

12.1. Disposal of this product in the European Union

According to the WEEE Directive 2012/19/EU, the crossed-out wheeled bin symbol on the product or on its packaging indicates that the product must not be disposed of with your other household waste.
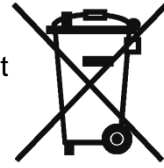
For equipment in private household, it's user's responsibility to dispose of his waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. For more information about where you can drop off your waste equipment from private household for recycling, please contact your local city office, your household waste disposal service or the retailer where you purchased the product. As a producer of electronic devices, TELIT provides for the financing of the treatment and recycling of waste returned through the designated collection points in accordance with local requirements. If you have professional electronic equipment that you purchased directly from TELIT that you wish to have picked up for recycling, please contact us to receive necessary information and instructions. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment.

Reference Directives:

2012/19/EU Directive of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).

12.2. Disposal of this product in other countries outside the European Union

Please dispose of this product in accordance with local requirements; contact your local authorities or dealer and ask for the correct method of disposal.

13. ACRONYMS

ARFCN	Absolute Radio Frequency Channel Number
AT	Attention command
CTS	Clear To Send
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DCS	Digital Cellular System
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
GLONASS	Global positioning system maintained by the Russian Space Forces
GNSS	Any single or combined satellite navigation system (GPS, GLONASS and combined GPS/GLONASS)
GPRS	Global Packet Radio Service
GPS	Global Positioning System
GSM	Global System Mobile
IMEI	International Mobile Equipment Identity
ME	Mobile Equipment
NMEA	National Marine Electronics Association
RTS	Request To Send
SMS	Short Message Service

TE	Terminal Equipment
LTE	Long Term Evolution

14. DOCUMENT HISTORY

Revision	Date	Changes
0	2006-01-05	First issue
1	2006-01-23	Added PCB weight and dimensions pag.9
		Added default setup pag.8
		Correct mA/h with mAh pag.16
		Unified the scripting "impedance coil" pag.19 and pag.20
		Insert the power supply pag.7
		Correct the serial lines scripting on block diagrams
		Insert the pin number of CS1150 connector.
		Correct the serial interfaces descriptions pag.7
2	2006-01-31	Modified in chapter 11.1 description of CS1170 pag. 29
3	2008-04-14	Moved par.2.2 to par.4 and extended the STARTUP PROCEDURE to pag.11
		Par.3 pag.9: Added mother boards block diagrams
		Pag.11: Correct GE863 Interface physical dimensions and added Dual Camera Interface physical dimensions.
		Moved par.4.4 and 4.5 to par.6.5 as Application Notes
		Moved par.7.3, 7.4 and 7.5 to par.9.3 as Warning
		Pag.26: Correct the Reset Button function description.
		Pag.20: Updated the Cross List Table
		From par.14 to par.18: Added interfaces description
		Removed all "Interface Board" "Printed Circuits Name" cross references
		Par.20: Added all electric diagrams.
4	2006-07-14	Replaced GC864 interface photo pag.46
5	2006-10-13	Renamed figure from 38 to 42
		Pag.2 Added products name and P/N for GE863-PY/QUAD interface and GC864-C2

interface

3.2.6 Added mechanical characteristics GC864-C2 interface

5.0   Correct Optically Positioning Guide system description

7.1   Correct the line selection description

6.5.2 Updated Current Charger footnote

Generality: added note for the VGA camera

Added in the Cross List GE864-PY/QUAD interface and GC864-C2 interface

15.2.1 Inserted P/N of GE863-GPS version

Added GC864-C2 interface description

20.1   Corrected GPIO location and added p/n of GM862 interface

20.2   Corrected GPIO location and added p/n of GE863-GPS interface

Corrected GPIO location and added p/n of GE863 interface

Corrected GPIO location and added p/n of GE864 interface

Corrected GPIO location and added p/n of GC864 interface

Corrected GPIO location and added p/n of GC864-C2 interface

Added GC864-C2 interface Schematic

GM862 Interface p/n 3990250670: added RoHS certification

GE863-PY Interface p/n 3990250669: added RoHS certification

GE863-GPS Interface p/n 3990250671: added RoHS certification

GE863-PY Interface p/n 3990250684: added RoHS certification

GC864-QUAD   Interface   p/n   3990250685: added RoHS certification

GE864-PY Interface p/n 3990250672: added RoHS certification

GC864-PY Interface p/n 3990250680: added RoHS certification

| 6 | 2007-05-24 | Pag.2   Product Table updated |
| | | Pag.10 Table 1 updated |

		Pag.24 Modified the formula
		Pag.22 Inserted the Audio Section chapter
		Pag.39 Table 10 modified
		PCB release updating
		Erased all Dual Camera paragraph
		Figures and table updated
		Paragraph 15.3 16.2 17.3 18.3 19.3 inserted
		24.1 EVK2 SYS p/n 3990150463: added RoHS certification
		24.9 GE864-QUAD Interface p/n 3990250688: added RoHS certification
		24.11 GE864-QUAD-C2 Interface p/n 3990250683: added RoHS certification
7	2008-01-22	Pag.2 Product Table updated with UC864-E and GE863-SIM
		Pag.7 Disclaimer Date modified
		Pag.13 Inserted UC864 Interface dimensions
		Pag.36 Inserted refer to GE863-SIM
		Pag.38 Table 10 Inserted UC864 and GE863-SIM Interface Code
		Pag.38 Order Code Table updated
		Pag.42 Added figure 24 with GE863-SIM photo
		Pag.43 Added GE863-SIM version kit list
		Pag.54 Inserted UC864 Interface photo
		Pag.64 Inserted figure 40 and Table 17 of UC864 GPIO positioning
		Pag.77-78 Inserted UC864 Interface Schematic diagrams
		Removed notes regarding interface board of phased out models from the GE863 family (Please refer to the previous version of this document if you need information for the interfaces with the following P/N: 3990250669 & 3990250677)
8	2008-03-20	Pag.64 Updated 40 and Table 19 of UC864 GPIO positioning
		Pag.66-70 Updated EVK mother board schematics
		Pag.81 Added new European WEEE directive

9	2008-05-28	Pag.77-78 Replaced UC864 Interface board schematics with more readable drawings.
10	2011-06-20	Pag.02 Replaced the applicability list – Pag.123 replaced the RoHS certifications
12	2012-05-21	Added GE865-JF2 sections
13	2012-06-25	Updated fig.48 Updated HE910 interface board P/N in applicability Table. Update GE865+JF2 drawings §27.1
14	2012-12-11	Updated with GE910 interface board; P/N in applicability Table. Updated Startup procedure chapter with XX910 products and timings; Updated Power ON Switch chapter with XX910 products and timings; Updated Figure 22 Switches position Added info for DE910 and CE910 20 2.2.15 DE910 Interface CS1467D 20 2.2.16 CE910 Interface CS1467D 27 DE910 family Interface 28 CE910 family Interface 29.1.12 DE910 Interface 29.1.13 CE910 Interface 30.17 DE910 Interface board schematic 30.18 CE910 Interface board schematic
15	2013-02-19	Added §20 about JN3+GL865 Interface board.
16	2013-03-15	Added GL865 V3 interface board
17	2013-05-30	Added GE910-GNSS; GE910-QUAD V3, UE910, LE920 interface board
18	2014-06-30	Added HE920, HE910 V2, UE910 V2, CL865, UL865 and LE910 interface boards Updated 45.1 Disposal of product in the European Union Added 45.2 Disposal of product outside the European Union
19	2015-01-12	Updated 39. And 43.28 chapters GE866-QUAD interface

20	2016-02-05	Updated Document Template
		Document now dedicated to EVK2 only. The Module's Interfaces are now documented on dedicated User Guides.
		Updated EVK2 schematics
		Updated Overview chapter
		Added Component's Layout and Default jumper settings
21	2017-02-08	2017 Template applied

SUPPORT INQUIRIES

Link to **www.telit.com** and contact our technical support team for any questions related to technical issues.

www.telit.com

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Mod. 0805 2017-01 Rev.6