# Telit EVK2 User Guide for GC868-DUAL

1vv0300803 Rev.1- May 2009


Making machines talk.

This document is relating to the following product:


| Model | P/N | GSM Engine |
|---|---|---|
| EVK2 | 3 990 150 463 | - |
| GC868-DUAL Interface | 3 990 250 719 | - |

# Contents



 

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# 1 Overview

Aim of this document is the handling description of the *developer's Evaluation KIT* second edition, a laboratory tool named ***EVK2*** in the rest of this document.
All given information shall be used as a guide and a starting point for properly developing of your product. Obviously this document cannot embrace all the hardware solutions and products that may be designed.

# 2 Generality

Telit supplies the ***EVK2*** to assist the designer during his developing project phase to develop his own applications based on Telit modules.
The ***EVK2*** provides a fully functional solution for a complete data/phone application.
The ***EVK2*** is formed by a motherboard *CS1139B* and GC868-DUAL *Interface Boards CS1364* with RF antenna connectors.
The motherboard has multiple power supply possibilities and is equipped with SIM card housing, RS 232 serial port level translator, direct USB1.1 connection, and two audio input/output paths.

The only items you have to provide are:

1) a personal computer or microcontroller;
2) a SIM card with a valid Network subscription;
3) the audio accessories;
4) a knowledge of AT commands programming;
5) a power supply.

The connection between the ***EVK2*** and your PC (or other DTE) are realized by standard *RS232* or *USB 1.1* ports.

The communications between your application and Telit Modules are realized connecting the Asynchronous Serial Interfaces of the module's Base Band Chips (*ASC0* and *ASC1*) through:
→ *a double stacked standard DB9 connector,* that provides 2 serial communication paths *RS232* protocol up to 115Kbit/sec;
→ a CMOS *HUB,* that makes both serial interfaces accessible through one physical connection providing two-way communication in compliance with *USB version 1.1* specification up to 1,5Mbytes/sec.
The second one is the only possibility with portable personal computers that generally have not the RS232 port.

The development of the applications utilizing Telit modules presents a proper design of all the interfaces towards and from the module (e.g. power supply, audio paths, level translators), otherwise a decrease in performance will be introduced or, in the worst case, a wrong design can even lead to an operating failure of the module.
It is also easily feasible the use of the Telit modules in the so called " *stand-alone configuration* ", connecting the module mounted on its own interface board directly to your application, through 2x40 pin header connectors.

## 2.1 Content of the kit

Please check out the content of your ***EVK2*** kit; if any of the items is missing, please contact your supplier.

| Description | Quantity |
|---|---|
| EVK2 MOTHERBOARD | 1 |
| INFORMATION NOTE | 1 |
| 2 PIN JUMPER FEMALE CONN | 18 |
| ASSEMBLED USB A-B CABLE L-1800 | 1 |
| RED & BLACK CABLE WITH PLUGS L-60cm | 1 |
| GSM-UMTS MAGNETIC ANTENNA CABLE RG174 WITH SMA/M | 1 |

Table 1

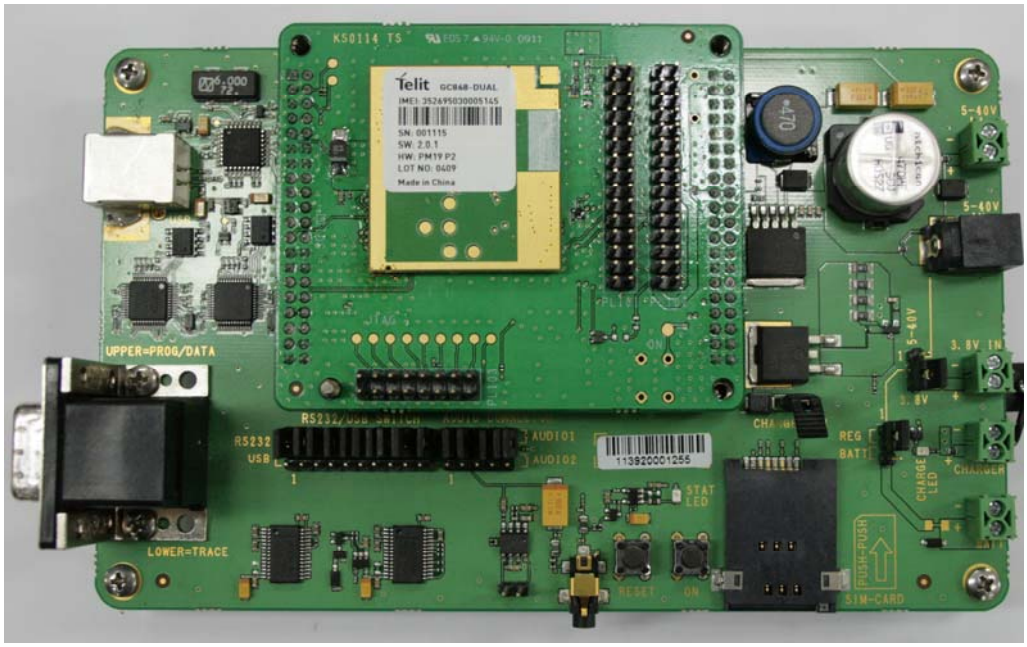



Figure 1: ***GC868-DUAL Interface Board*** (upper) fitted on ***EVK2 Motherboard*** (lower).

# 3 Description

The motherboard *CS1139B* 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.

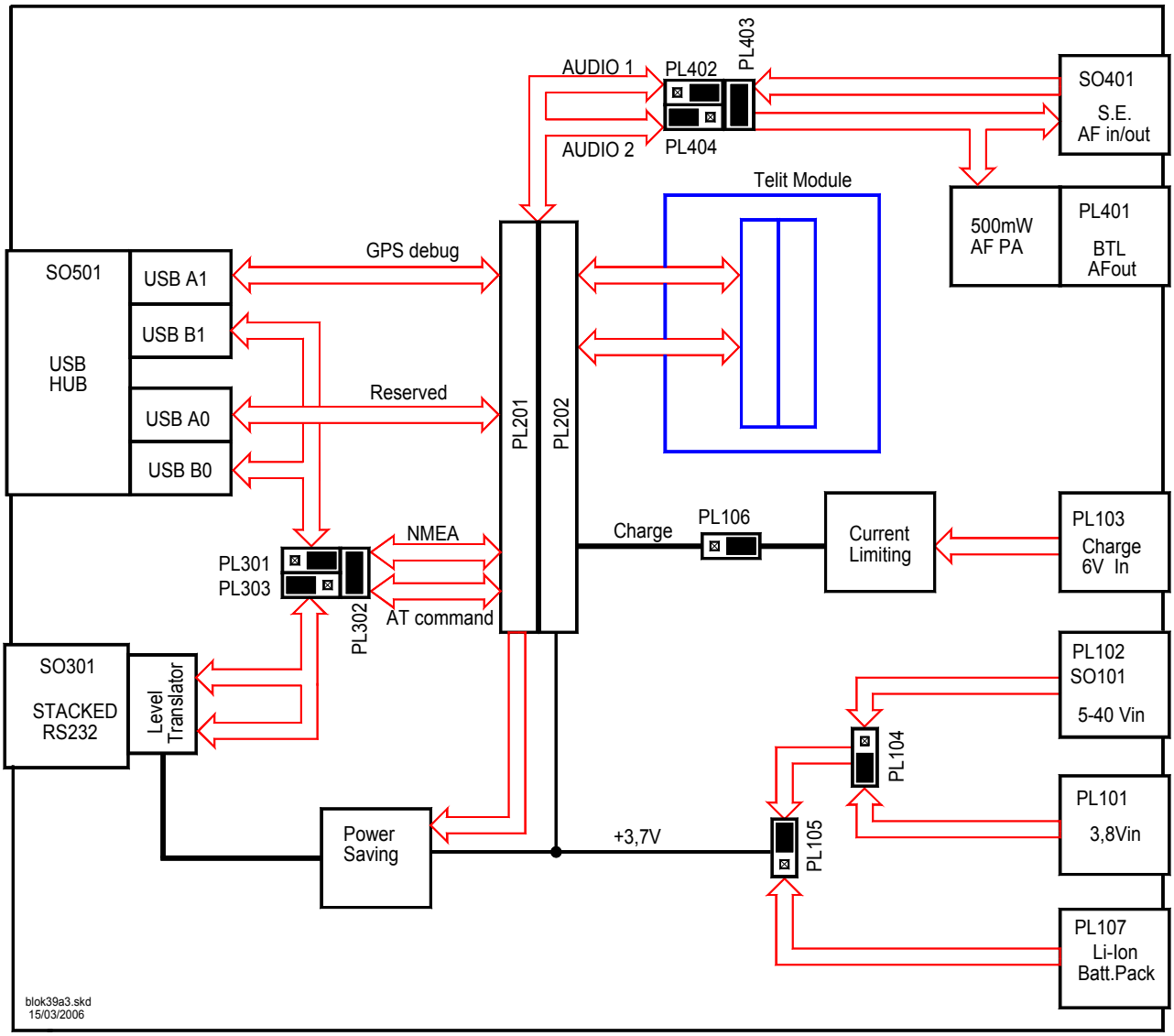



Figure 2: Miscellaneous signals, connections and routing on *CS1139B*.

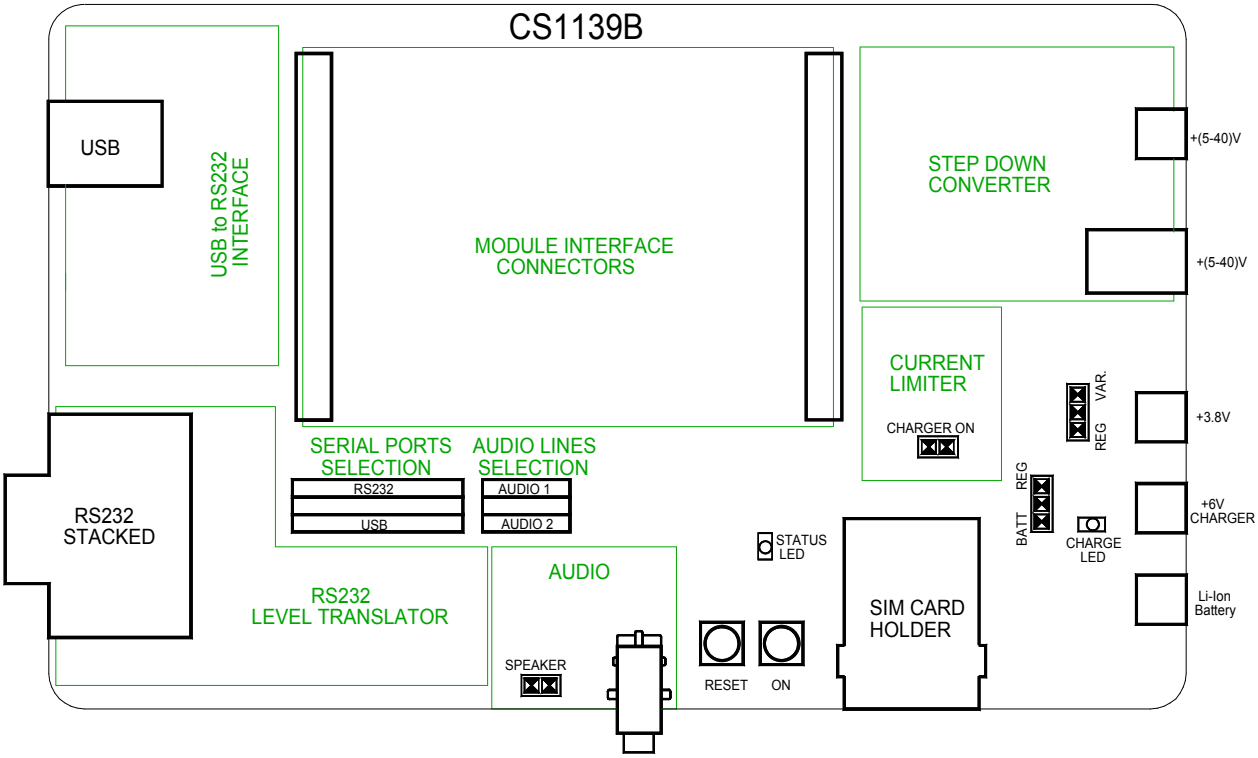



Figure 3: *CS1139B* circuital displacement

# 3.1 PCB characteristics

| | |
|---|---|
| Material | FR4 |
| Thickness | 0, 95 mm |
| Surface finishing | Chemical gold plate Ni 5um/ Au 0,1um |

# 3.2 Mechanical characteristics of the assembled PCBs

## 3.2.1 Mother Board CS1139B

| | | |
|---|---|---|
| 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) |

### 3.2.2 GC868-DUAL Interface CS1364

| | | |
|---|---|---|
| Length | 78.74 | mm |
| Width | 66.04 | mm |
| Height | 18.0 | mm |
| Weight | 29.3 | gr (without the module) |

Note: The overall height for every combination *(mother board+interface board)* is still the height of the mother board

# 4 Startup procedure

The motherboard factory setup is:

Serial port ..... ***RS232***
DC source .....***+ (5÷40) V /≥ 1A***
Batt.Charger connector (PL106)…***On***
RX 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 for at least 2 seconds until the STATUS LED is on

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

## 4.1 Golden rule

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

start first turning *ON* your *EVK2* and then connecting it to your *PC* ;
stop first disconnecting your PC and then turning *OFF* your *EVK2* .

# 5 Insertion of the Interface Boards

Every *Interface Board* must be inserted on *CS1139B* paying great attention to match the position of the main connectors; this has been made easy:

→ *optically* by a triangle drawn on both printed circuits (except CS1231X) ;
→ *mechanically* shifting a column out of regular square cross position.

Both guide systems are highlighted by orange color as shown on the next figure.

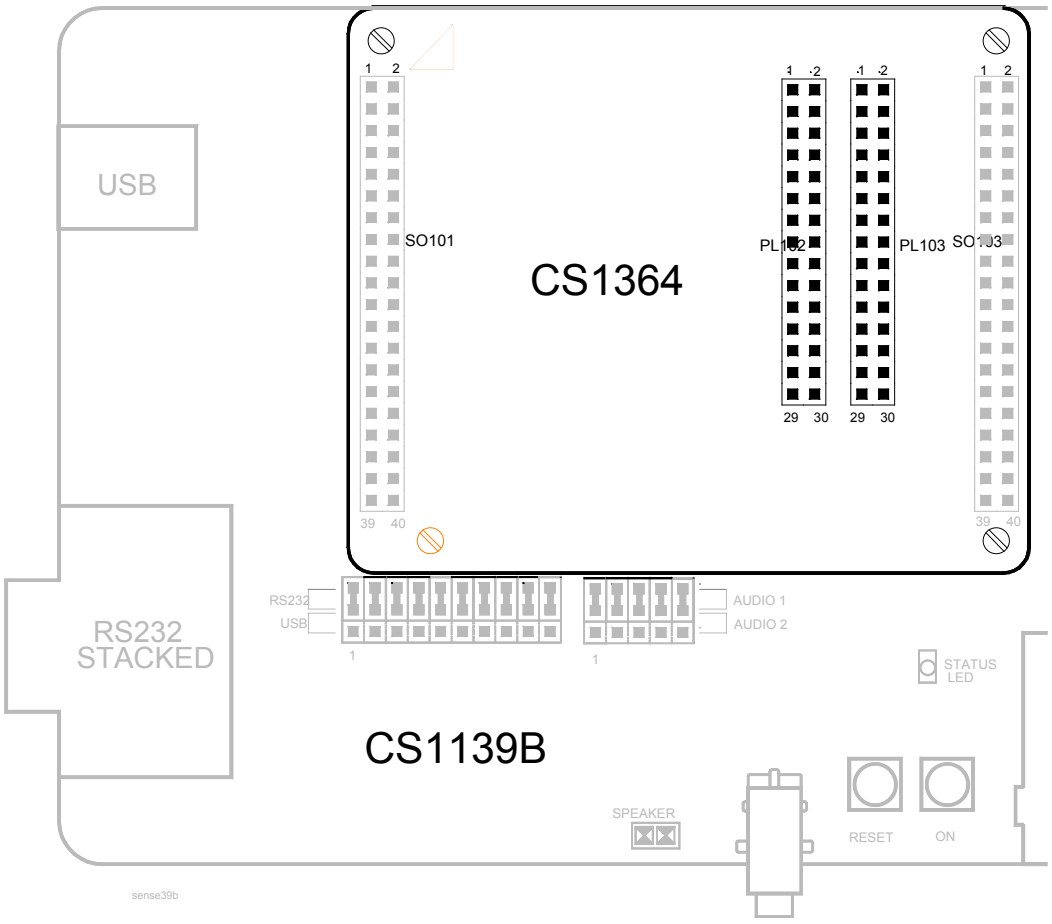



Figure 4: Positioning Guide Systems of *GC868-DUAL Interface Board* on CS1139B.

# 6 Power supply setting

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*".

## 6.1 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.

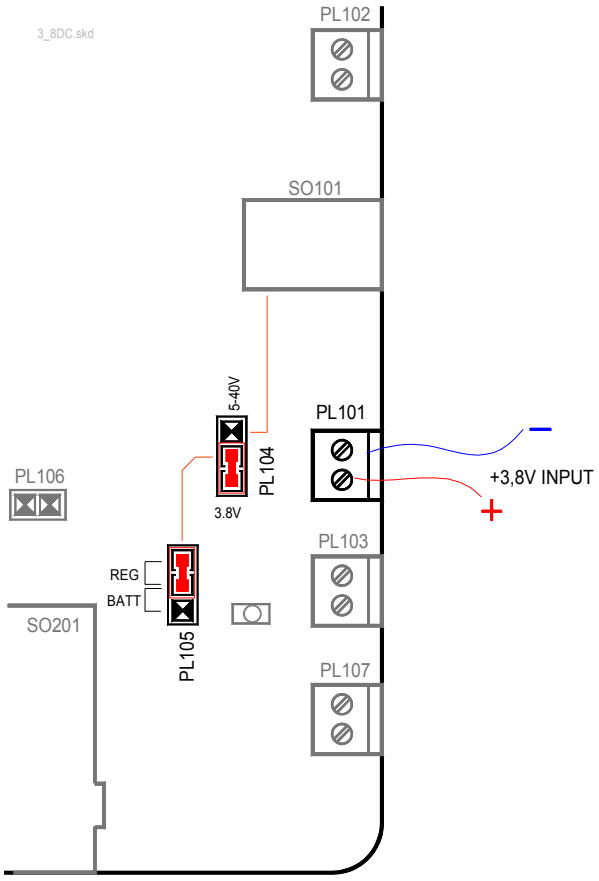



Figure 5: *+3,8V fixed* source setting

## 6.2 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.

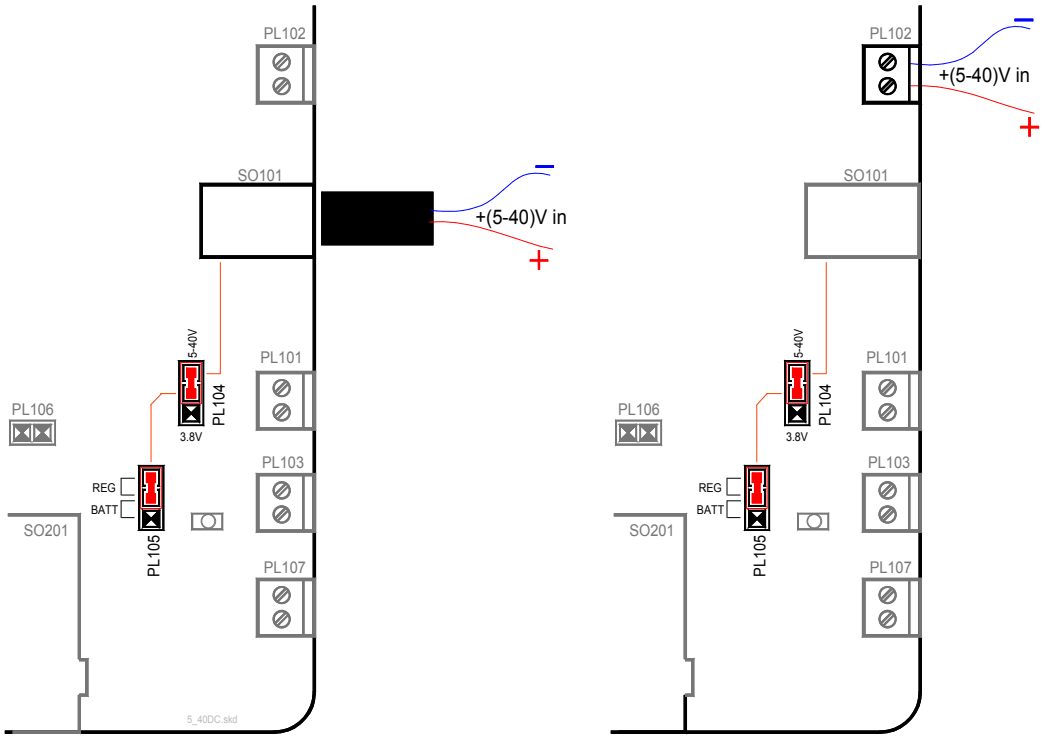



Figure 6: Variable DC source setting

### 6.2.1 Suggestion

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 .

### 6.2.2 Coaxial Plug

The figure 7 shows the connections of the Power Plug of left part of figure 6.

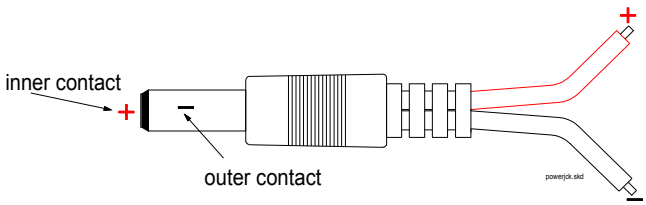



Figure 7: Coaxial "*Power Plug*" connection.

## 6.3 Li-Ion Battery pack and Charger(Not Applicable for GC868-DUAL)

Connect a ***Li-Ion battery pack*** to PL107 with care to the polarity then short p*in2*&*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 8: 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.

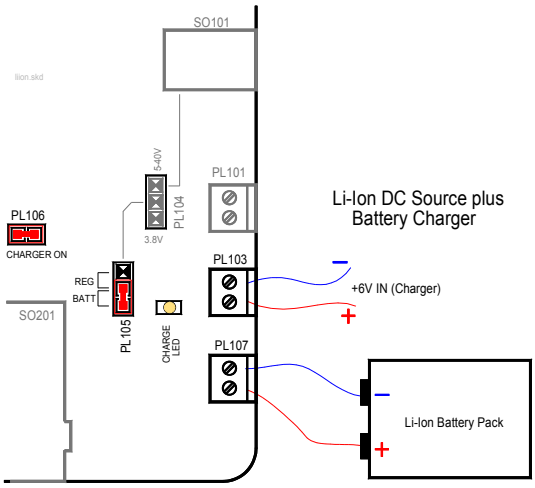



Figure 8: Battery Pack and Battery Charger wired connections and setting.

***NEVER** CONNECT any Battery charging source to PL103 of CS1139B **WITHOUT the Battery Pack***

# 7 Serial interface

The following figure shows the architecture of the serial ports.

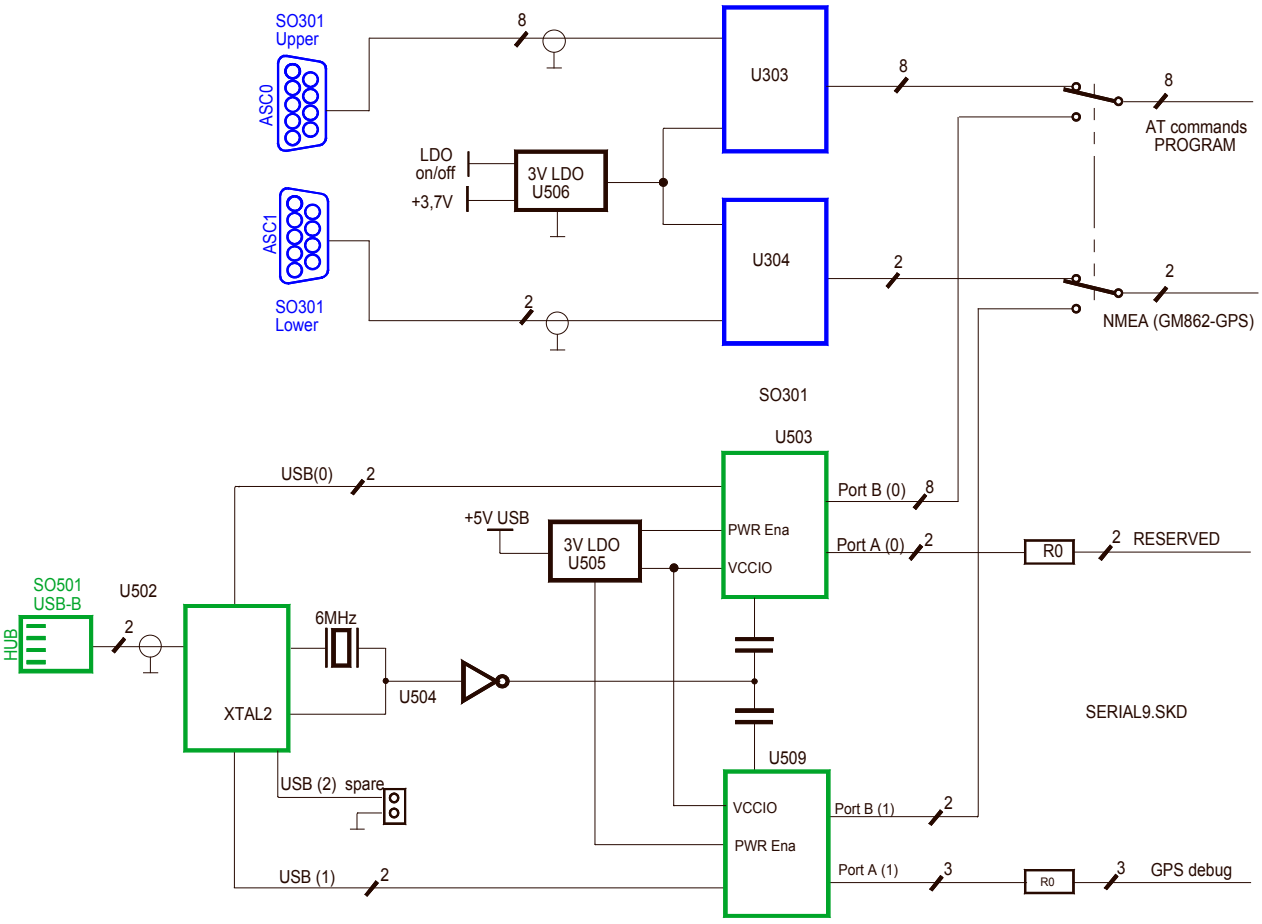



Figure 9: Serial ports block diagram.

## 7.1 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 9way 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*).

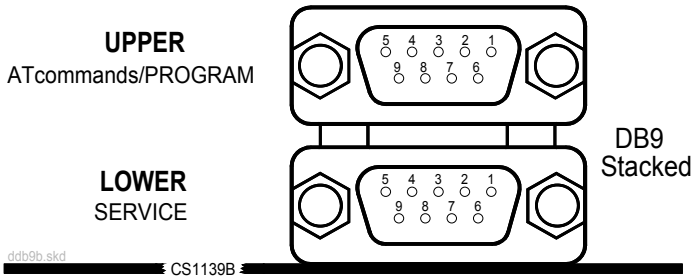



Figure 10: Double 9way D-Socket Connector

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.

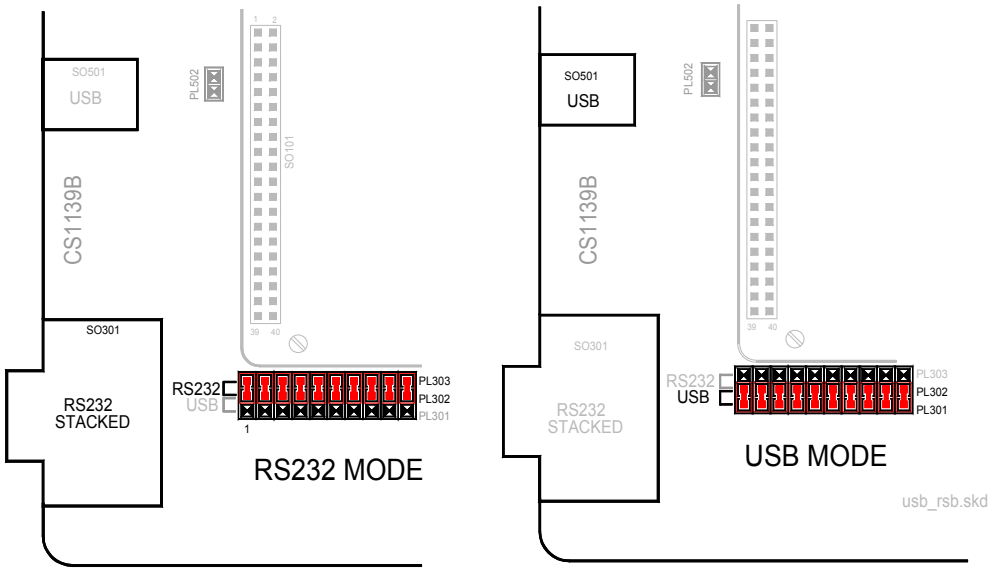



Figure 11: Serial Ports selection

# 8 Audio Section

## 8.1 Overview

The BaseBand chip of our modules provides two audio paths both in receive and in transmit sections, which could be active only one at time.
To turn on your well-suited 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.

### 8.1.1 History

The Baseband chip of our modules was developed for the cellular phones, which needed 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*).

#### 8.1.1.1 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 favored 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.

### 8.1.2 Actual

The *HS* and *HF* definitions have been kept in the Software and on the schematics of theTelit modules. But with EVK2 we will refer to *Audio1* or *Audio2* section instead of *Handset* and *Handsfree* 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)*

### 8.1.3 The choice

The activation of the audio path is made Software by ***AT#CAP*** command.
If you don't have any load driving constraint (*like a speaker with an impedance coil lower than 16Ω*), 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.

## 8.2 Differential and Single Ended

### 8.2.1 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 traveling between a pair of traces, where the voltage potential on both signals is the same.*

### 8.2.2 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.

## 8.2.3 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.

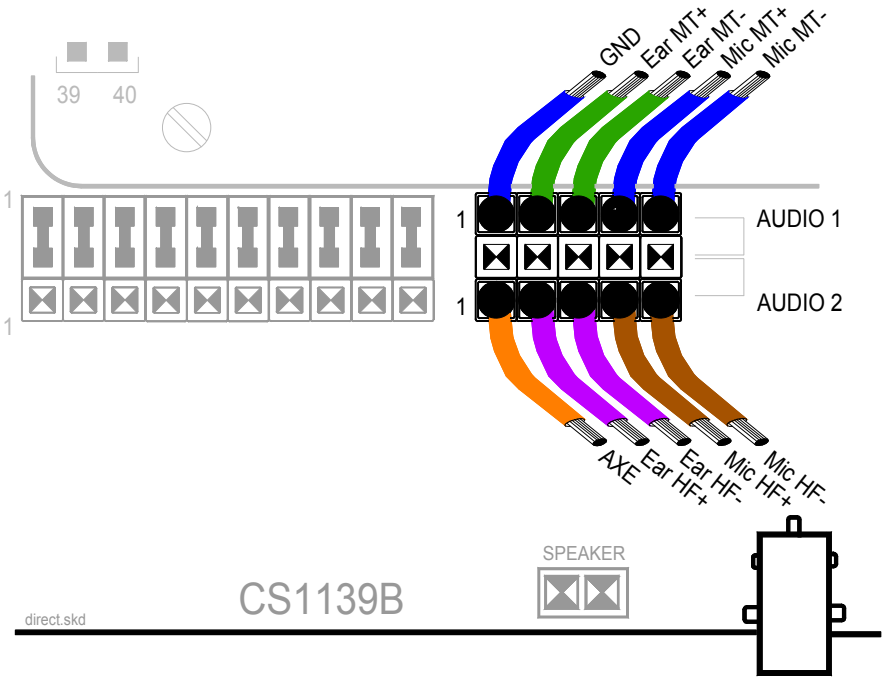



Figure 12: *PL402* and *PL404 Fully Differential audio lines.*

# 9 AF Amplifiers Setting

The *Base Band Processor 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.

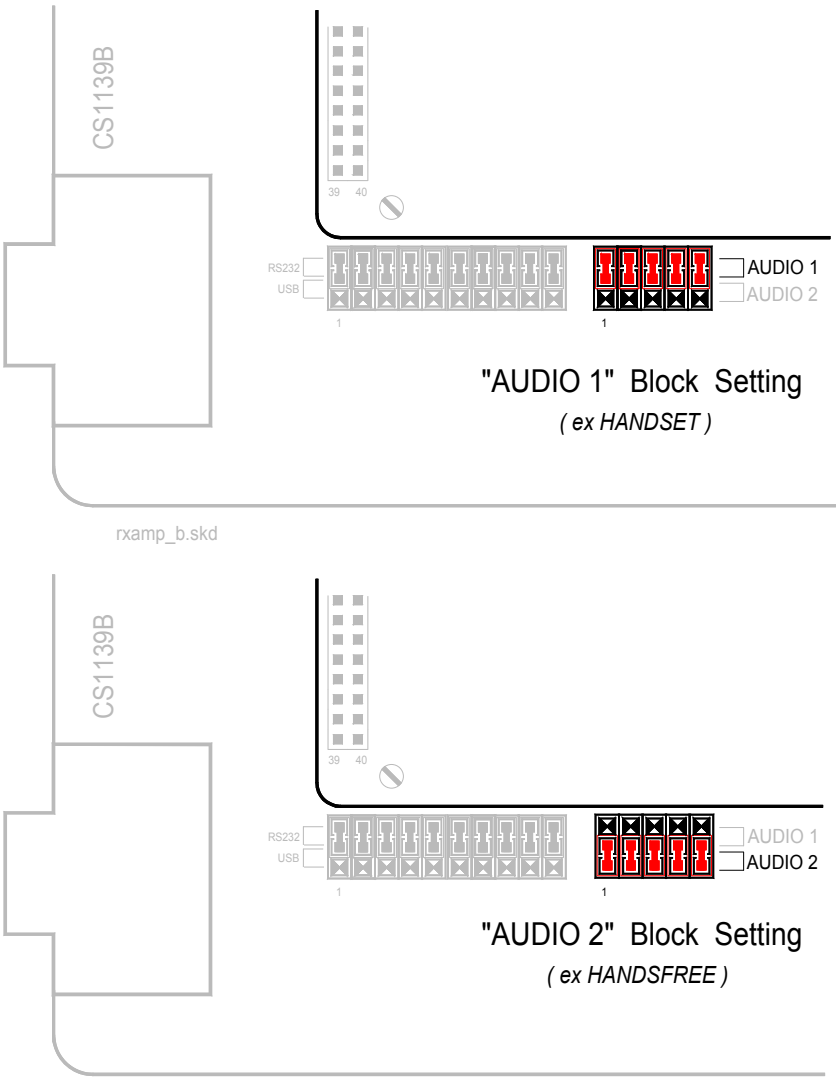



Figure 13: BaseBand Audio Amplifiers selection

# 10 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).

## 10.1 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.

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

**REMINDER: the coil impedance of the *Headset* should be higher than 15Ω@1KHz**

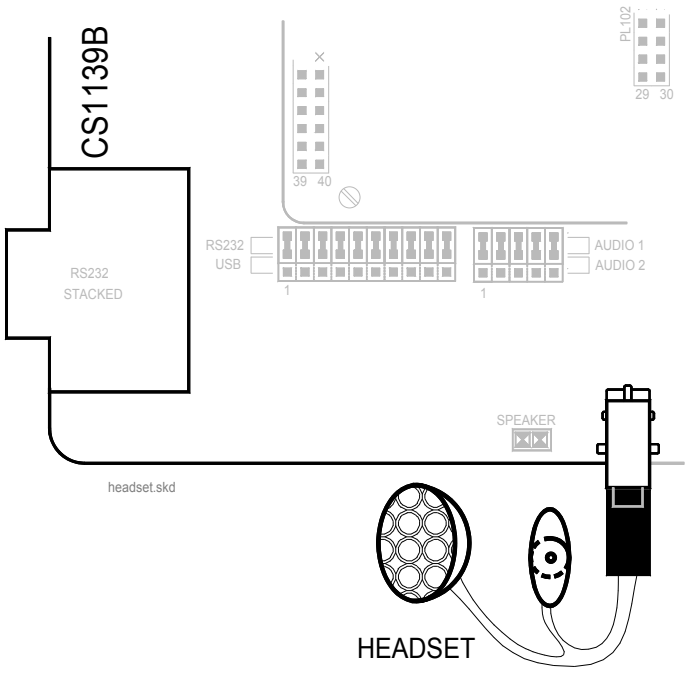



Figure 14: Headset insertion

### 10.1.1 Audio connector

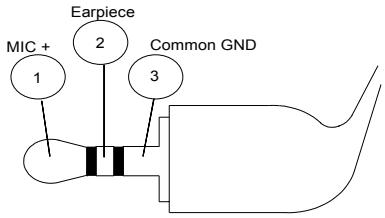



Figure 15: Audio Plug Pin-out

## 10.2 High AF Power Mode

Connecting an ***8Ω*** 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:

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

**REMINDER: the coil impedance of the Speaker should be higher than 8Ω@1KHz**

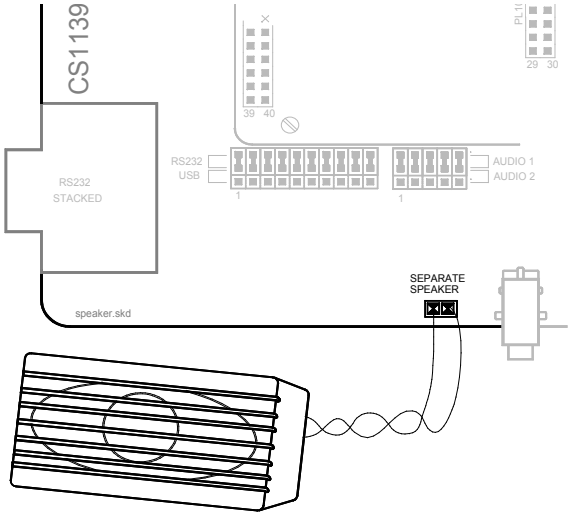



Figure 16: Speaker insertion

## 10.2.1 Speaker and Stand-alone Microphone

If you are using a Speaker, you can connect a *stand-alone electrete microphone* by a coaxial 2,5mm plug to SO401, respecting the following pin-out.

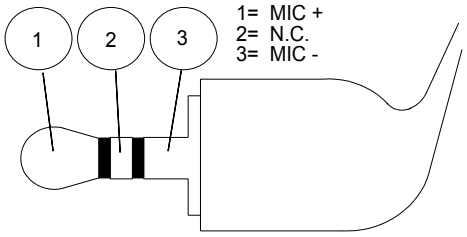



Figure 17: Electrete Microphone Plug Connection

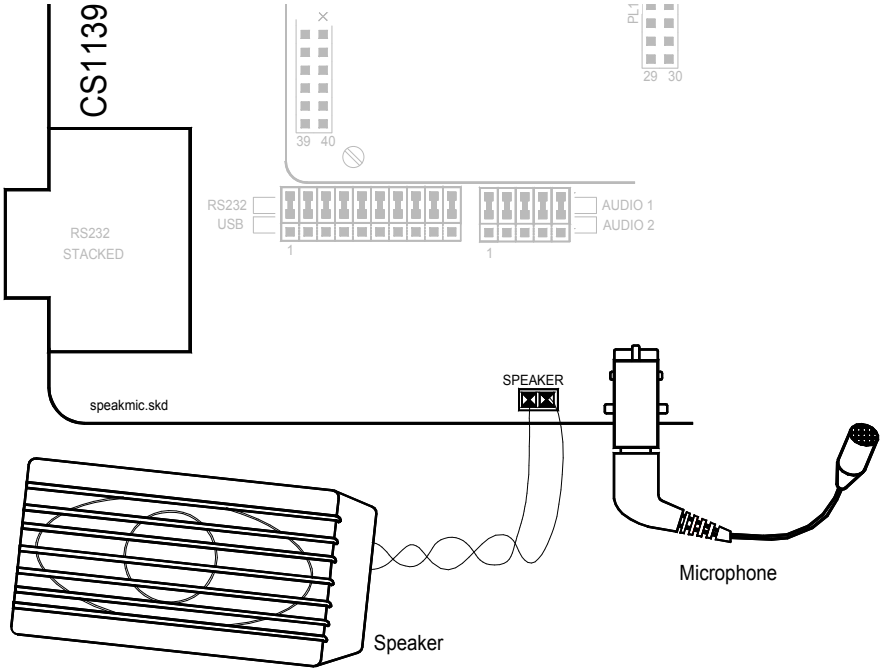



Figure 18: *Speaker & Electret Microphone* case insertion

### 10.2.2 Speaker plus 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 figure 18: the AF output signal will be heard on both Speaker and Earpiece.

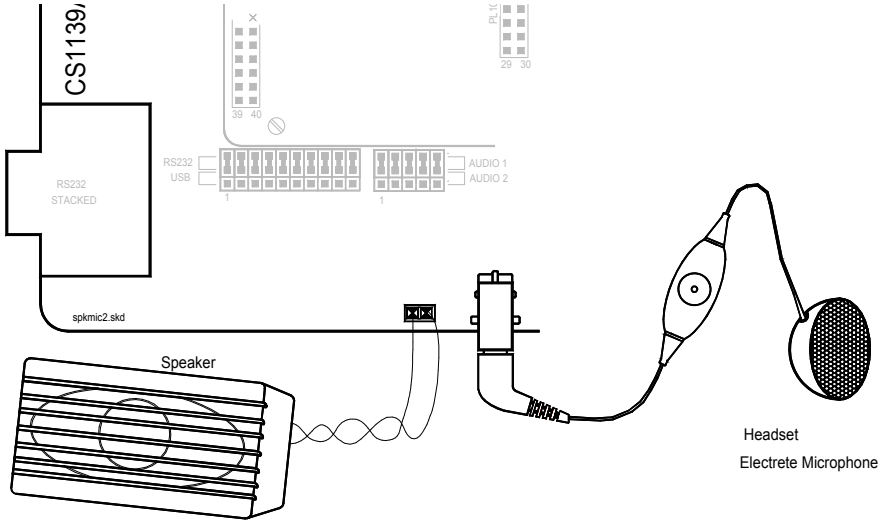



Figure 19: Speaker plus Headset insertion

## 10.3 Warning

### 10.3.1 Coil impedance

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

### 10.3.2 Earpiece

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.***

### 10.3.3 Speaker

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.***

# 11 Audio Accessories

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

## 11.1 Headset

| | |
|---|---|
| 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) |
| Inner EMI capacitor between terminals | 10pF, 33pF |

Table 2: Microphone electrical characteristics

| | |
|---|---|
| Rated Input Power | 5mW |
| Maximum Input Power | 20mW |
| Coil Impedance | 32Ω ± 5Ω @ 1kHz |
| SPL | 95±3 dB @ 1KHz/1mW sine wave |
| Resonance frequency (Fo) | < 350Hz |
| Useful Bandwidth | Fo ÷ 8000 Hz @ -3dB |

Table 3: Earpiece electrical characteristics

## 11.2 Stand-alone microphone

| | |
|---|---|
| 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 |

Table 4: Microphone electrical characteristics

## 11.3 Speaker

| | |
|---|---|
| Rated Input Power | 500 mW |
| Maximum Input Power | 1W |
| Coil Impedance | ≥ 8Ω |
| SPL | ≥ 85±3 dB @ 1KHz |
| Resonance frequency (Fo) | < 350Hz |
| Useful Bandwidth | Fo ÷ 8000 Hz @ -3dB |

Table 5: Speaker electrical characteristics

# 12 Indication and services

## 12.1 Optical Indicators

### 12.1.1 Status Led

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

| 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 |

Table 6: STAT_LED indications

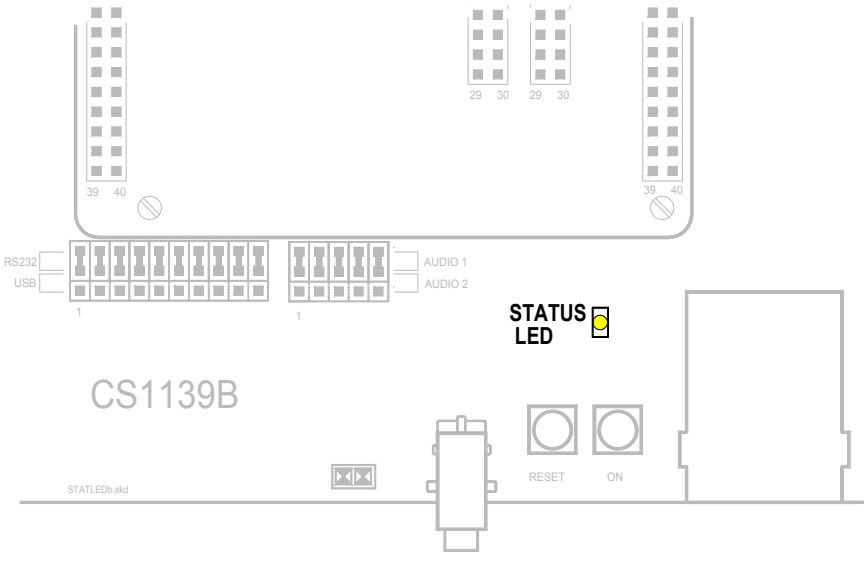



Figure 20: STAT_LED position

## 12.2 Switches

You *turn On/Off* the EVK2 by push button.

### 12.2.1 POWER ON Switch

Pressing for at least 2 seconds the *Power ON SWITCH*, you turn *On/Off* the whole ***EVK2*** and the Telit module in use: the *STAT_LED* starts to slowly blink (*ON state*) or stops to blink (*OFF state*).

### 12.2.2 RESET Switch

RESET function is not available for GC868-DUAL at this moment.

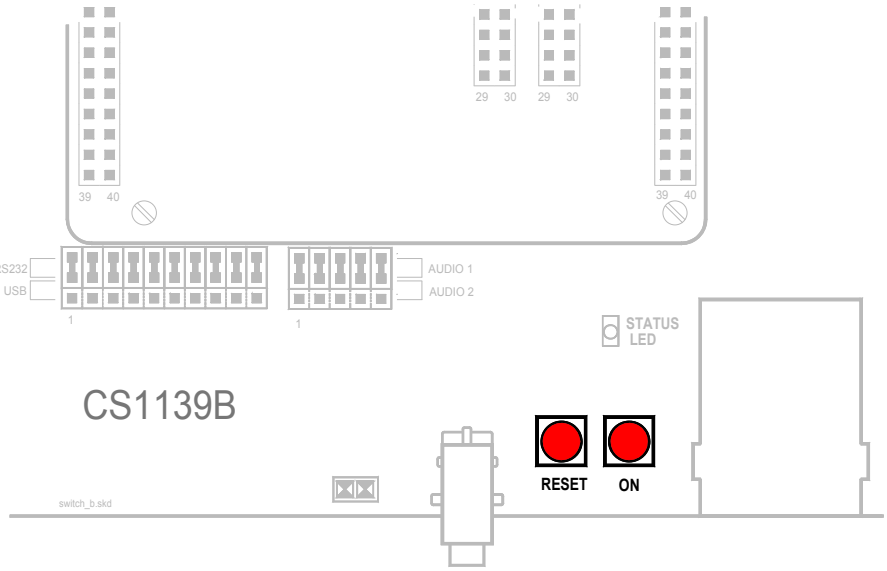



Figure 22: SWITCHES position

# 13 Connectors pinout

## 13.1 Motherboard to Module

The connections between CS1139B and every Telit module Interface Board are made through *2x 40contacts male* connectors. Theirs pin functions are listed in the following tables.

| Pin | Signal | Type | Function |
|---|---|---|---|
| 1 | NC[1] | | |
| 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 |

[1] DO NOT CONNECT

| | | | |
|---|---|---|---|
| 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 |

Table 8: PL201-CS1139B

| Pin | Function | Type | NOTES |
|---|---|---|---|
| 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* | | Not applicable for GC868-DUAL |
| 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 |

Table 9: PL202-CS1139B

# 14 Module Interface Boards

## 14.1 Generality

You can use your **EVK2** with GC868-DUAL Telit modules fitted on its own *Interface Board;* all connections are made through *2x40 contacts* connectors.
It's possible to use these *Interface Boards* also in stand-alone mode, inserting the "*not mounted"* components (*related to ON BUTTON, SIM HOLDER and STATUS LED functions*) plus the use of an external *level translator* circuit.

***For more information please refer to Telit Product Specification***

## 14.2 Short Description

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.

## 14.3 Interface Boards List

| Function | GSM engine | Interface Boards | Order Code |
|---|---|---|---|
| EVK2 Mother Board | - | CS1139B | 3990150463 |
| GC868-DUAL interface | N/A | CS1364 | 3990250719 |

Table 10: Interface Boards List Table.

N/A=NOT APPLICABLE. Because the module is not soldered on its *Interface Board,* all signals are routed by connectors (*RF, Audio & Data*) and you can insert on Interface Board every version of the module

## 14.4 Stand-alone setup

If you need to use the interface out of EVK2 (*Stand-alone* setup) you have to mount the following missing components:

- the ON Button;
- the STATUS LED and its load resistance.

## 14.5 Interface connectors

The following connectors are available:

- 2 male connectors (30 pins each one: PL102, PL103), on which it is possible to connect external devices like user's application, Telit extension boards, measurements equipment or other tools
- 2 female connectors (40 pins each one: SO101, SO102), to connect the interface to the EVK2 mother board circuits (power supply lines, serial in/out lines, audio in/out lines).

## 14.6 Content of the kit

Please check out the contents of your interface kit; if any of the items is missing, please contact your supplier.

| Description | Quantity |
|---|---|
| GC868-DUAL INTERFACE | 1 |
| ASSEMBLED CABLE L–250 RG174 TERMINALS SMA F & MMCX 90 M | 1 |

Table 12.

## 14.7 Serial port configuration

To switch the serial lines you must short-circuit the PL101-PL102 connectors by 2 contacts jumpers.

The 2 contacts jumpers have to be fitted between ***pin1&pin2*** of PL101-PL102 connectors.
This carries out the *Python Debug Port* on Trace Port of EVK2.

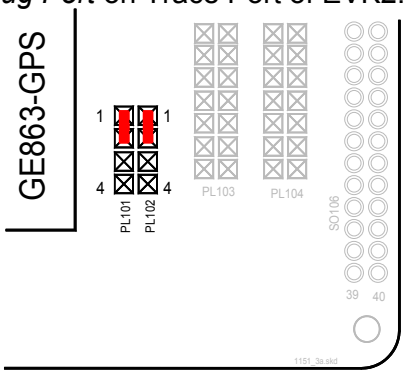



Figure 27: Jumpers setting for GC868-DUAL

# 14.8 ANTENNA connectors

## 14.8.1 ANTENNA connector

There is the connector in the module for both RF test and antenna connection.

# 15 GC868-DUAL Interface

This board allows easily interfacing the module with the EVK2 and testing its functionalities; any version of GC868-DUAL can be inserted.
No settings are needed.

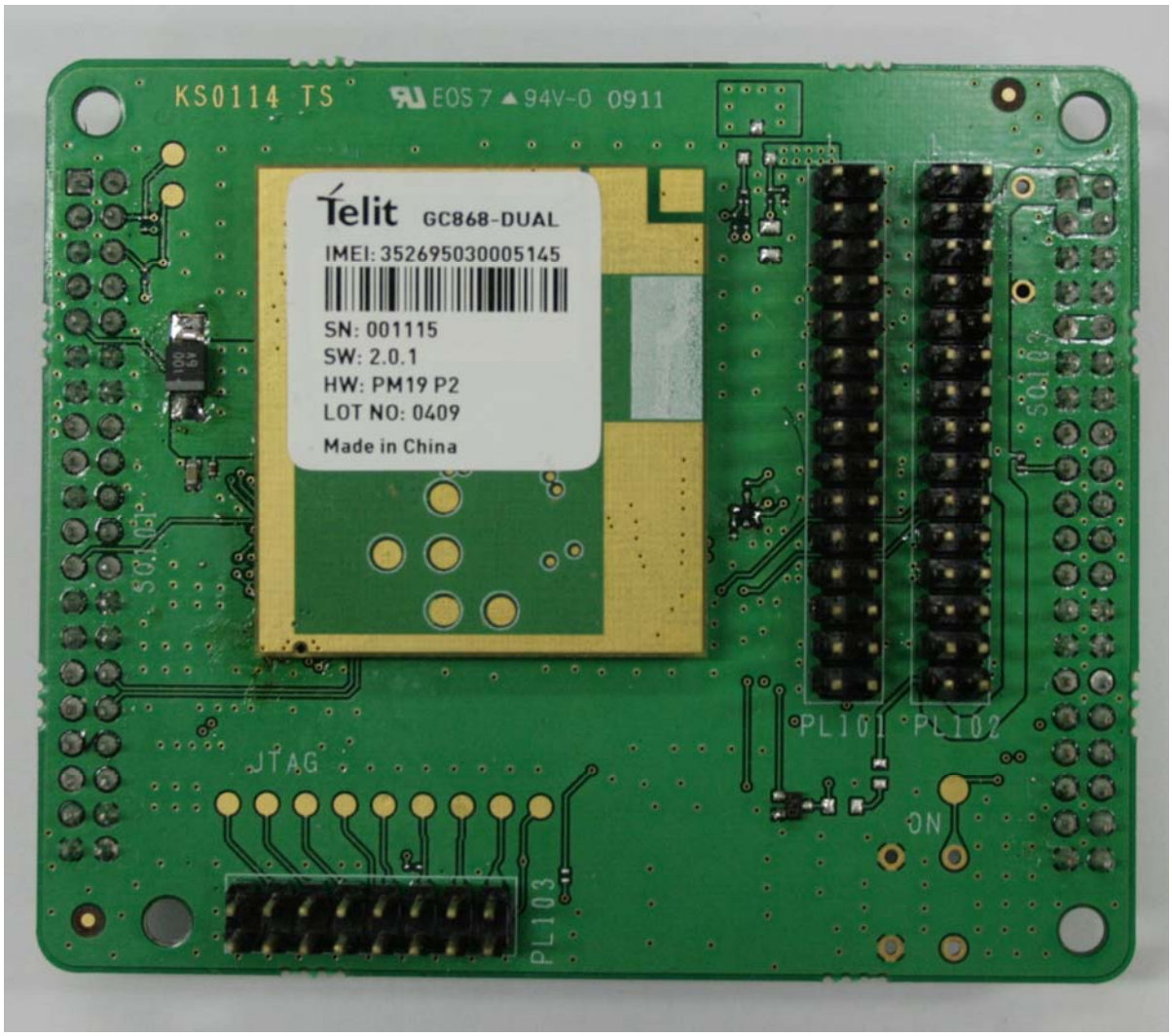



Figure 32. GC868-DUAL Interface Board

## 15.1 Stand-alone setup

If you need to use the interface out of EVK2 (*Stand-alone* setup) you have to mount the following missing components:

- the SIMCARD Holder ;
- the ON Button ;
- the STATUS LED and its load resistance.

## 15.2 Interface connectors

The following connectors are available:

- 2 male connectors (*30 PTH pins each one: PL101, PL102*), by which it is possible to connect external devices, user's application, Telit extension boards, measurements equipment or other tools;
- 2 female connectors (*40 PTH pins each one: SO101, SO104*), to connect the interface to the EVK2 mother board circuits (*power supply lines, serial in/out lines, audio in/out lines*);

## 15.3 Content of the kit

Please check out the contents of your interface kit; if any of the items is missing, please contact your supplier.

| Description | Quantity |
|---|---|
| GC868-DUAL INTERFACE | 1 |
| ASSEMBLED CABLE L–250 RG174 TERMINALS SMA F & MMCX 90 M | 1 |

Table 18

# 16 GPIO ports

A certain number of GPIO ports (General Purpose Input/Output) are available on every Telit Module Interface Board, giving you the possibility to drive digital devices and report their own status.
Some of these ports are dedicated. *Refer to Telit Product Specification to have all information about characteristics of every GPIO port.*

You can consult the following paragraphs to see the displacement of GPIO on every Interface Board.

## 16.1 GC868-DUAL Interface (p/n 3990250719)

There are 8 GPIO ports available on PL101and PL102
(Refer to schematic diagram)

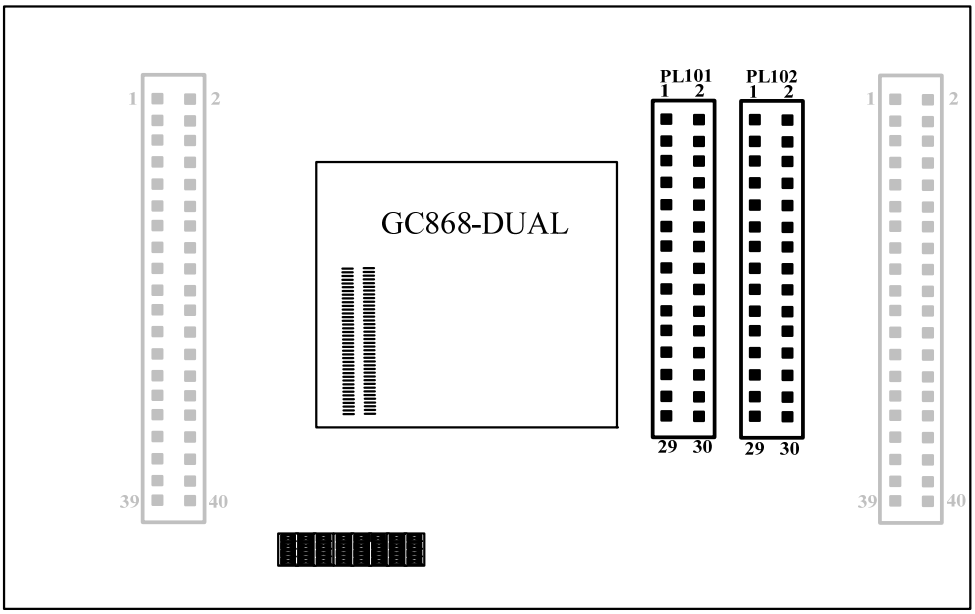
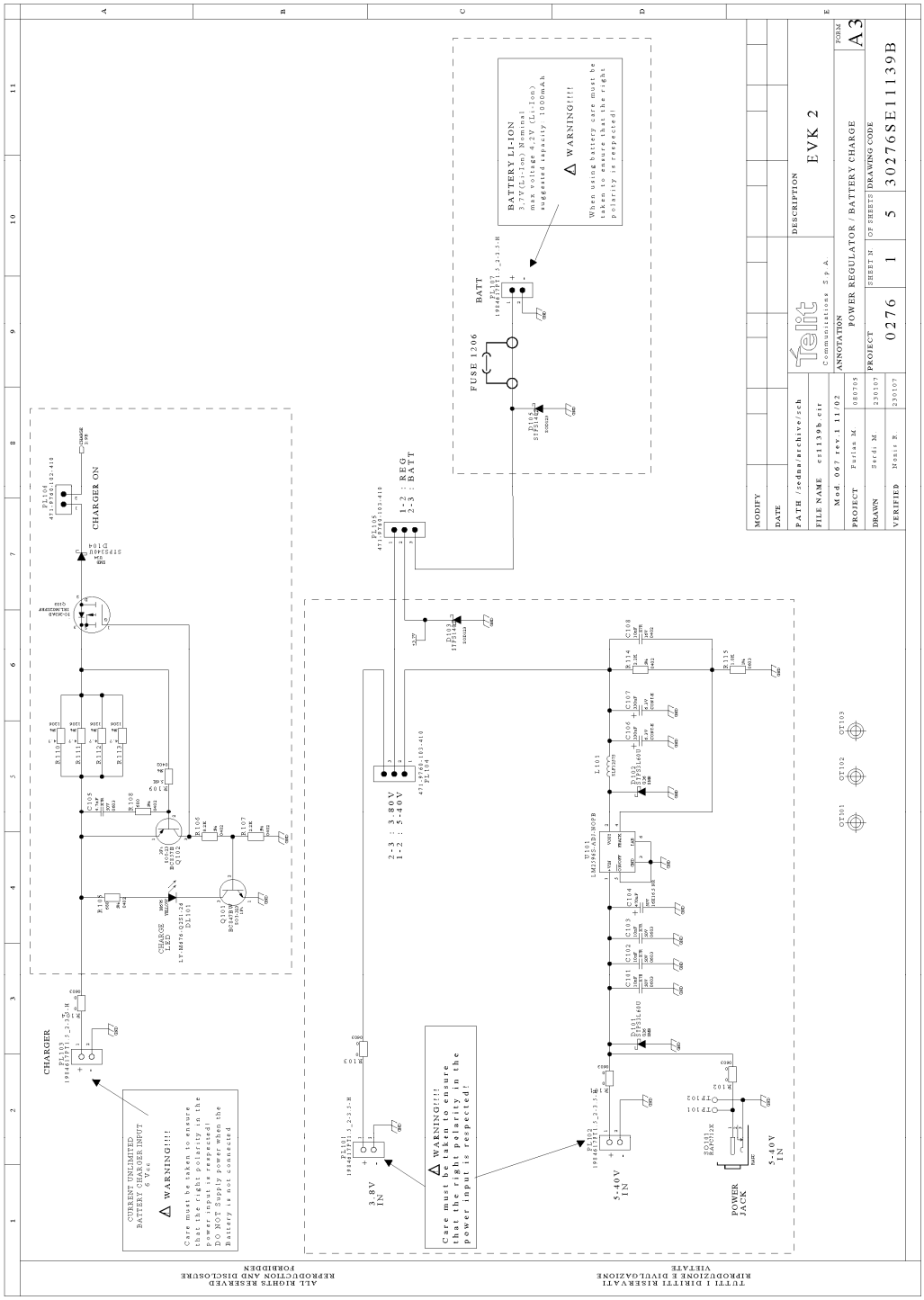


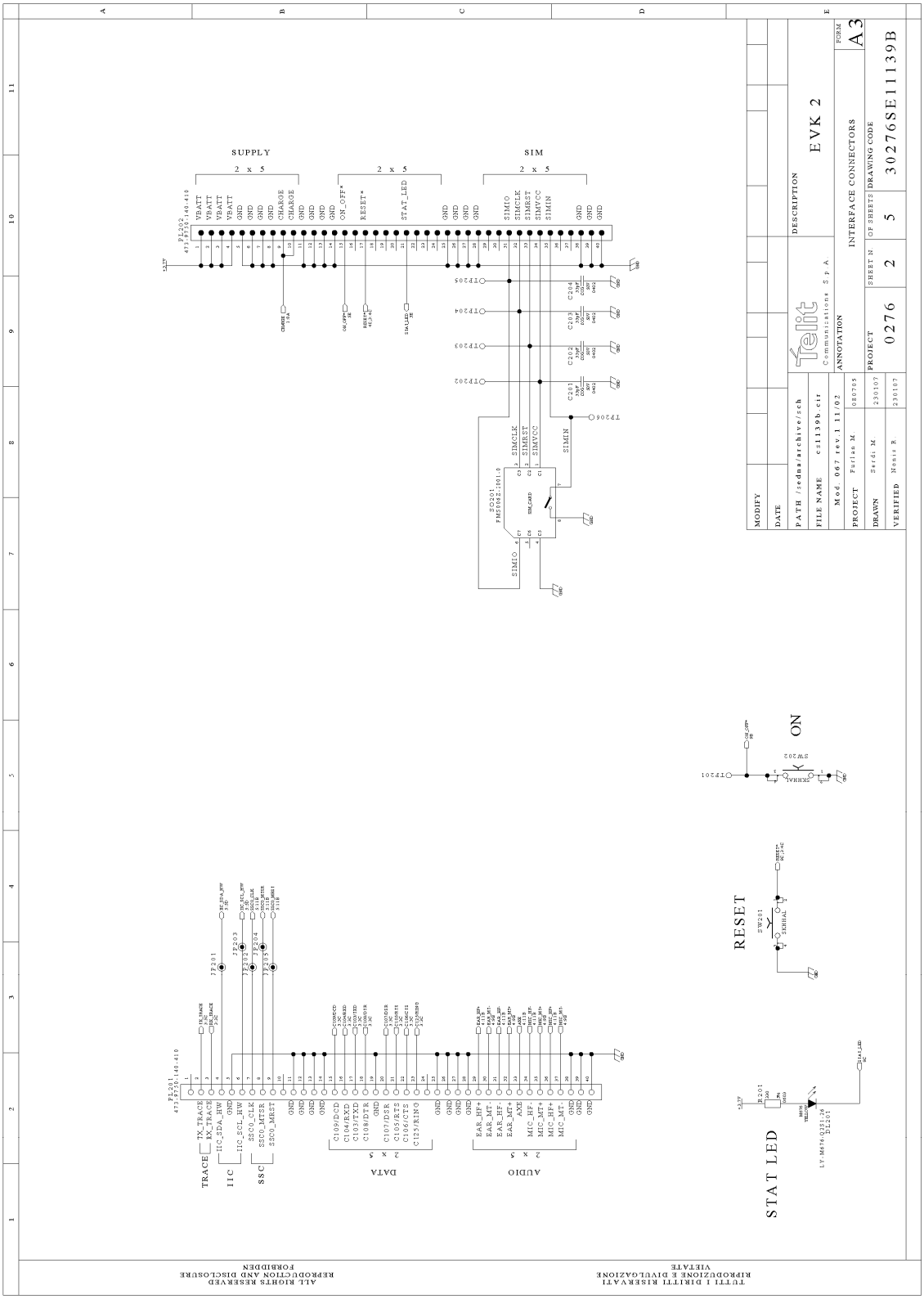

Figure 39. GC868-DUAL interface

# 17 SCHEMATICS

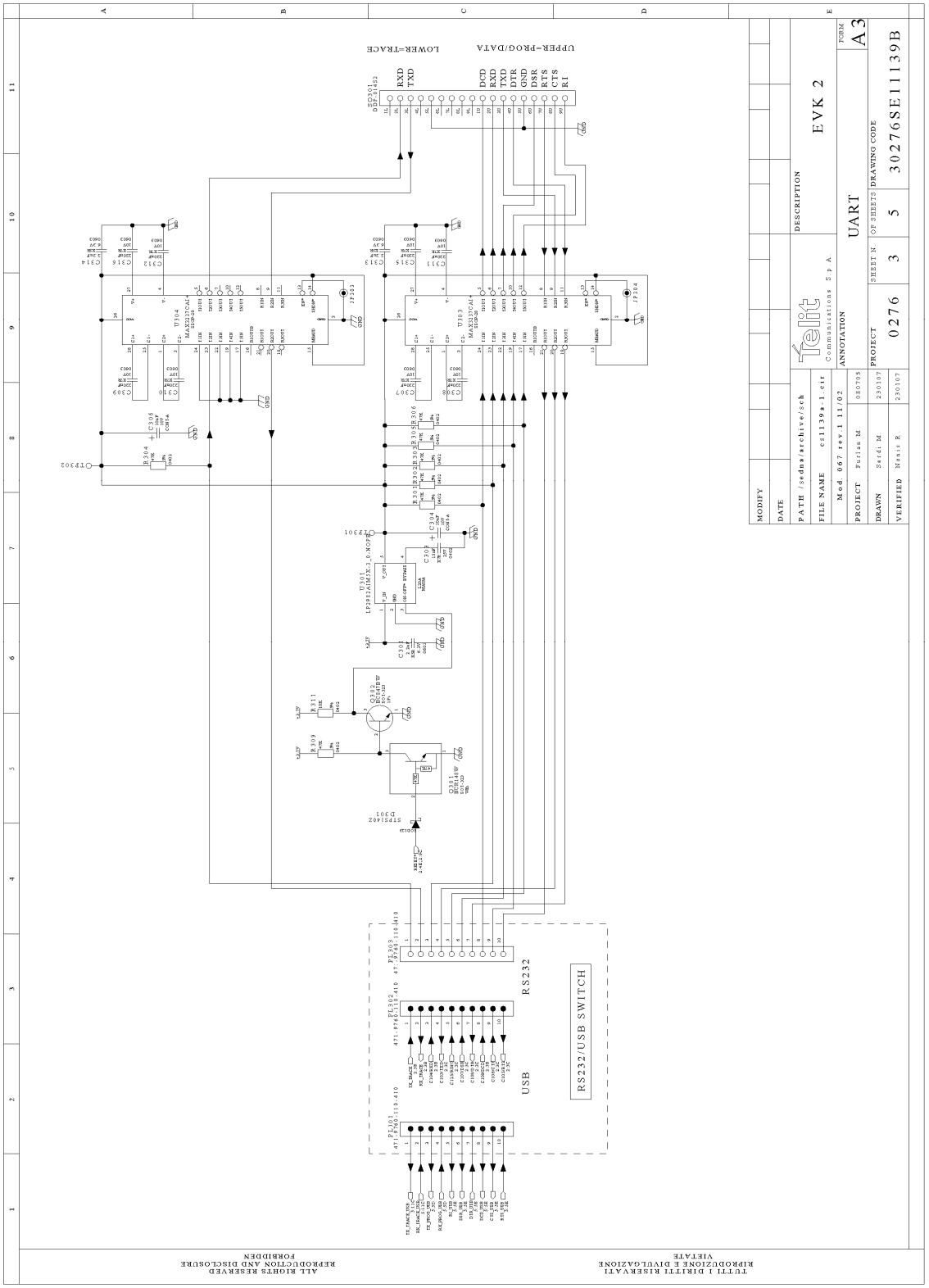
In the following paragraphs the user can find the schematics related to all EVK2 boards, therefore to the Mother Board, to the Interface Boards and to the Extension Boards.

# 17.1 EVK2 Mother Board







UPPER=PROG/DATA
LOWER=TRACE
RS232
USB
RS232/USB SWITCH
EVK 2
UART
A3
30276SE11139B
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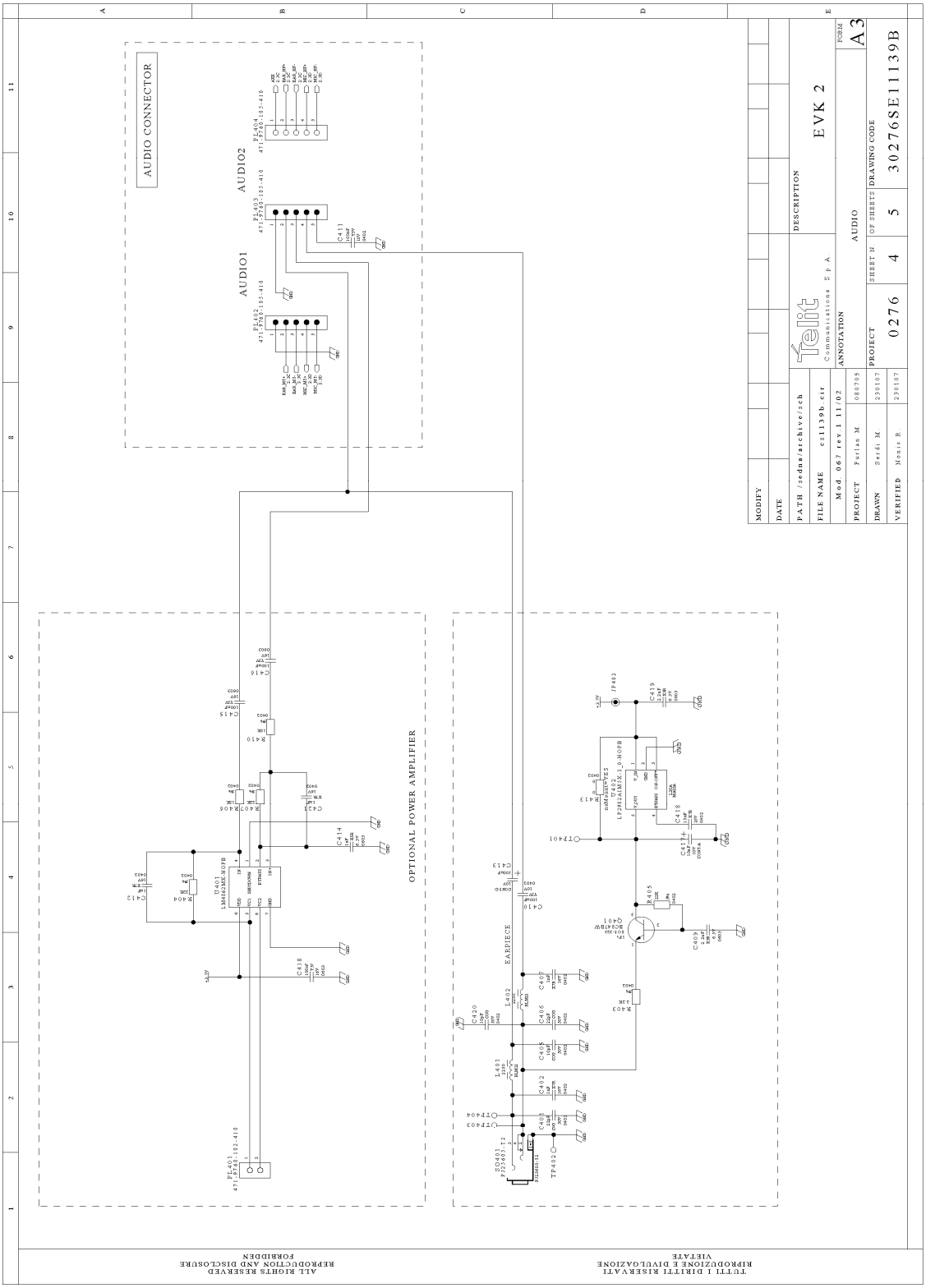
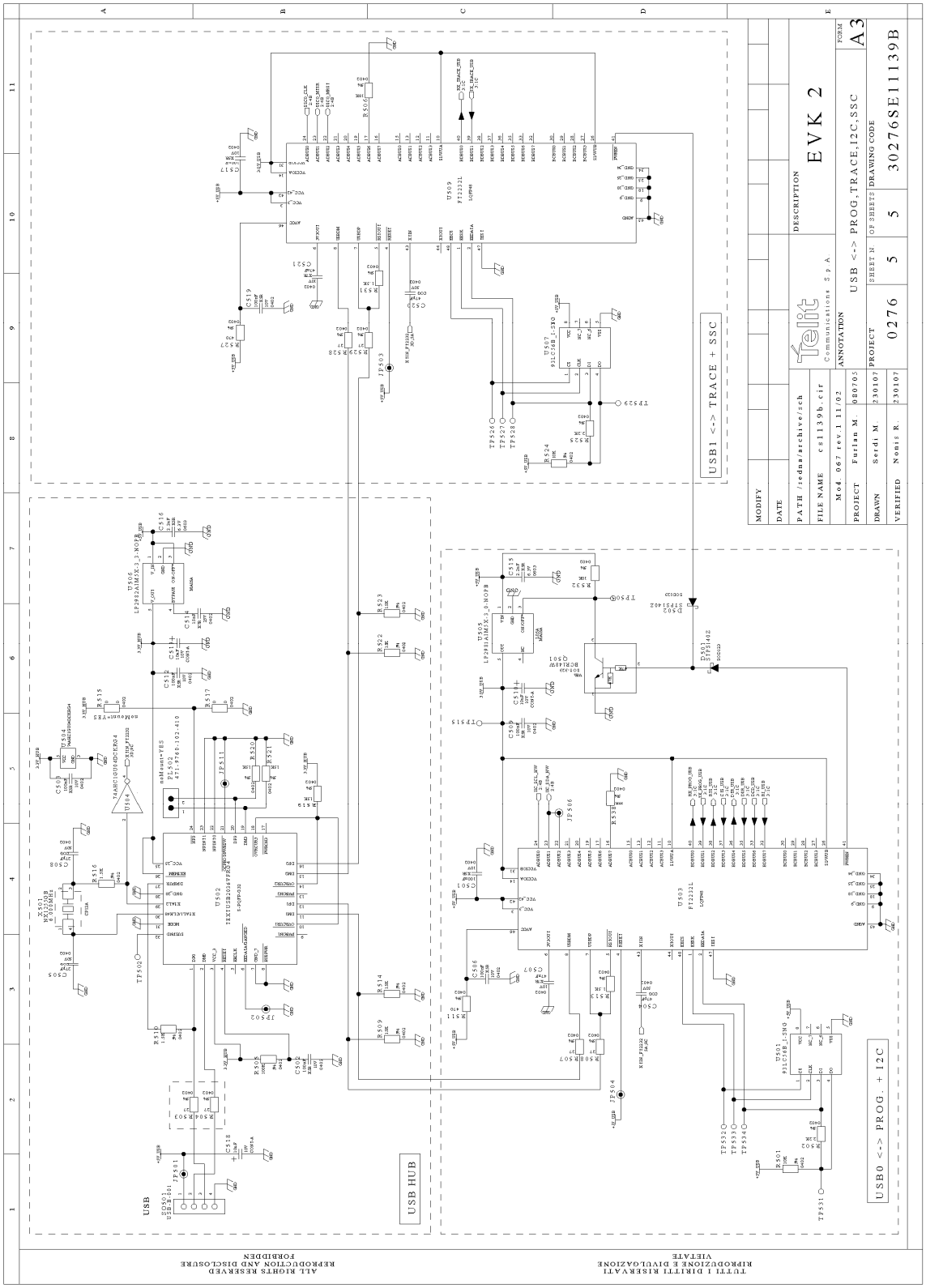
VIETATE







USB1 <-> TRACE + SSC
USB0 <-> PROG. + I2C
USB HUB
USB
DESCRIPTION
EVK 2
USB <-> PROG,TRACE,I2C,SSC
A3
30276SE11139B
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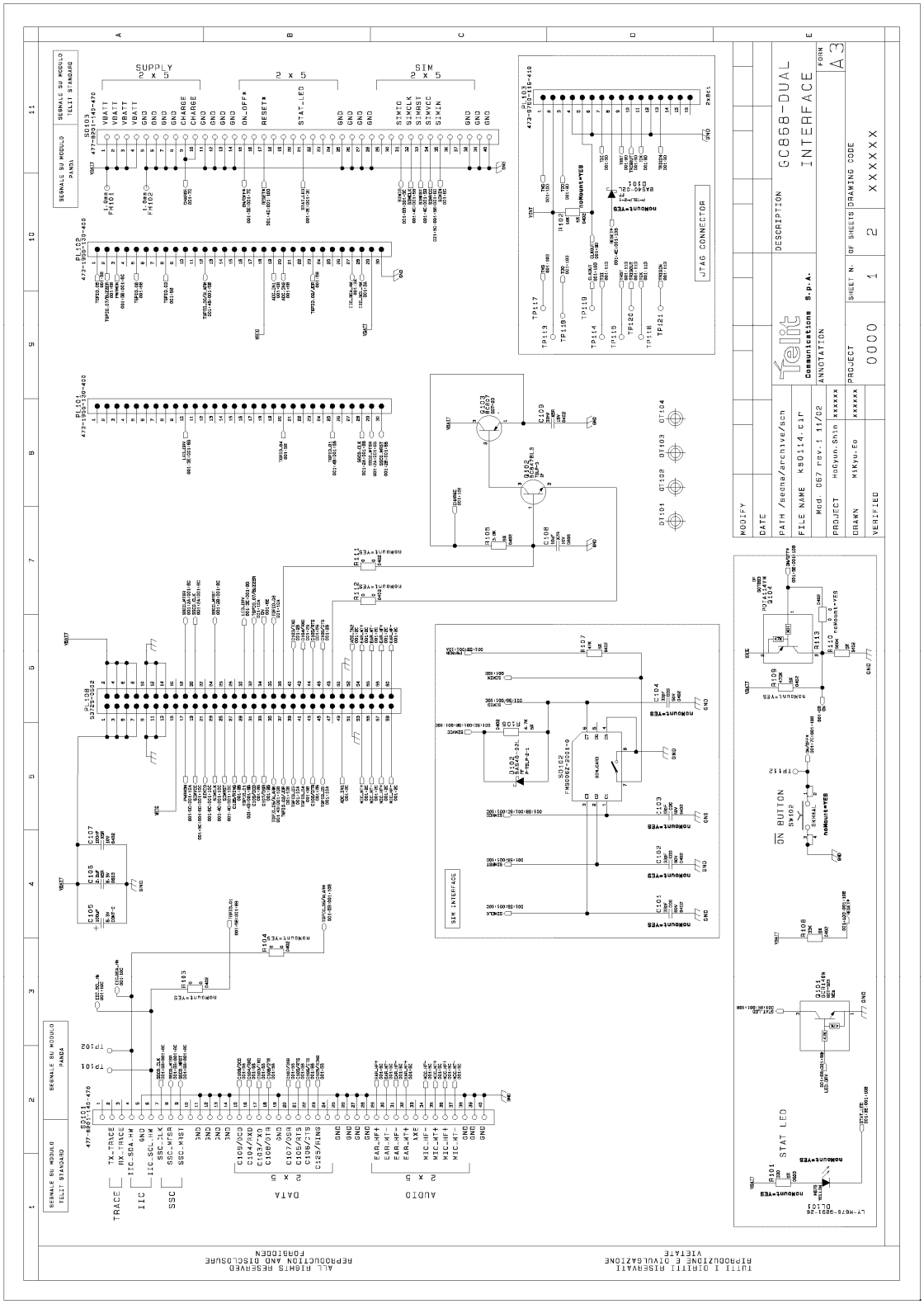
VIETATE

## 17.2 GC868-DUAL Interface board



# 18 Service and firmware update

You can update the Telit Module firmware through the serial cables (RS232 or USB 1.1) 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.

# 19 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 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. 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 of the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as of 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 people (20 cm). In case of 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 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

# 20 RoHS Certifications

## 20.1 EVK2 Mother Board p/n 3990150463

Telit Communications S.p.A.

### DECLARATION OF EU RoHS Compliance

We,

***Telit Communications S.p.A***

Of:

***Via Stazione di Prosecco, 5/b***
***34010 Sgonico (TRIESTE)***
***ITALY***

declare under our sole responsibility that the products

***SYS EVK2 (commercial name)***

***3990150463 (internal code)***

to which this declaration relates, is in full compliance with EU Directive 2002/95/EC and subsequent amendments, on restriction of the use of certain Hazardous Substances in electrical and electronic equipment (RoHS).

The technical documentation or other information showing that electrical and electronic equipment which has put on the market, complies the requirements of regulation, will be held at:

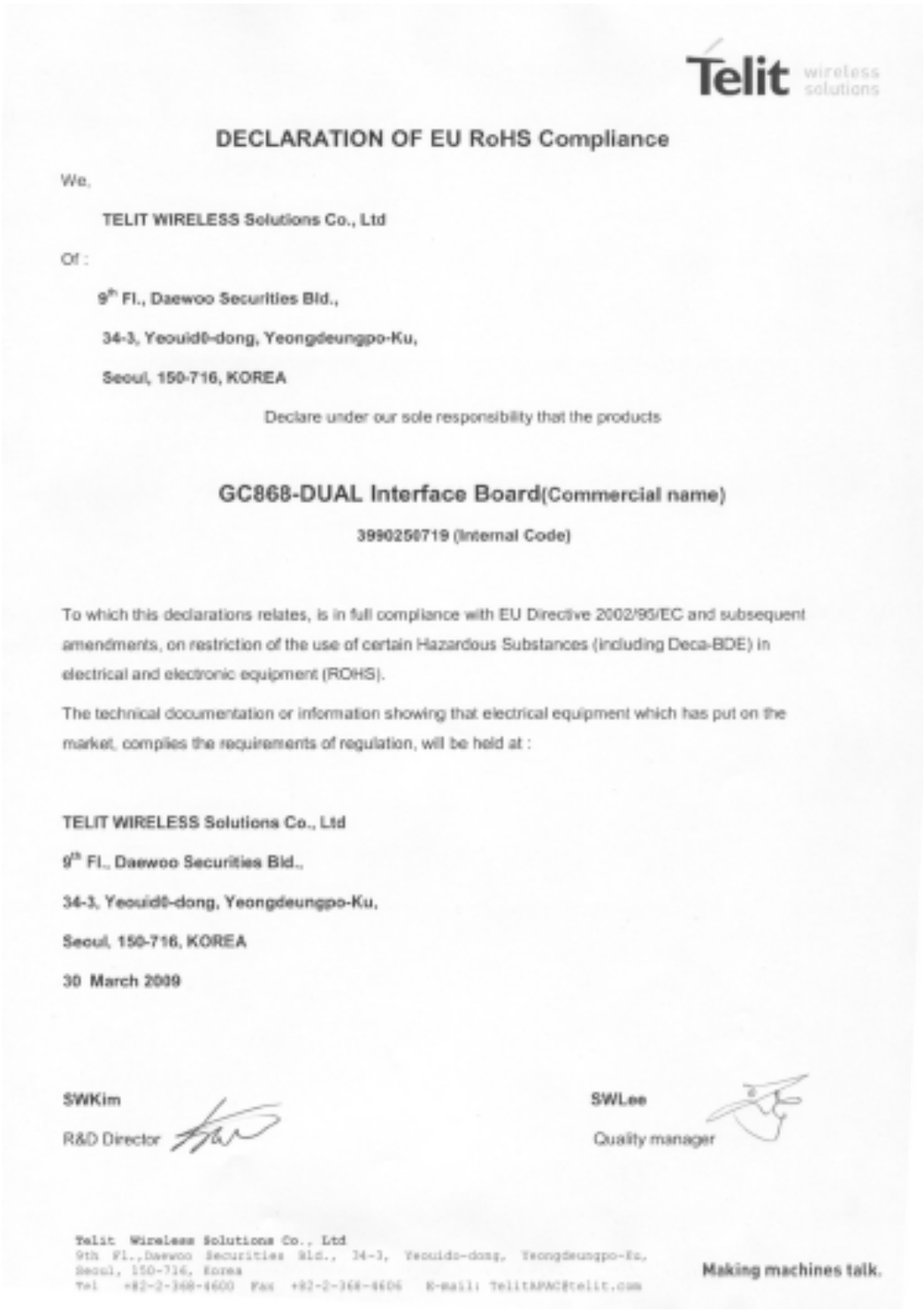
***Telit Communications S.p.A***
***Via Stazione di Prosecco, 5/b***
***34010 Sgonico (TRIESTE)***
***ITALY***

Trieste, ***24 March 2007***

Dott. Giuseppe Surace
R&D Technical Director

Ing. Guido Walcher
Qualiy Director

# 20.2 GC868-DUAL Interface p/n 3990250719



Telit wireless solutions

**DECLARATION OF EU RoHS Compliance**

We,

**TELIT WIRELESS Solutions Co., Ltd**

Of :

**9th Fl., Daewoo Securities Bld.,**

**34-3, Yeouidō-dong, Yeongdeungpo-Ku,**

**Seoul, 150-716, KOREA**

Declare under our sole responsibility that the products

**GC868-DUAL Interface Board(Commercial name)**

**3990250719 (Internal Code)**

To which this declarations relates, is in full compliance with EU Directive 2002/95/EC and subsequent amendments, on restriction of the use of certain Hazardous Substances (including Deca-BDE) in electrical and electronic equipment (ROHS).

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**TELIT WIRELESS Solutions Co., Ltd**

**9th Fl., Daewoo Securities Bld.,**

**34-3, Yeouidō-dong, Yeongdeungpo-Ku,**

**Seoul, 150-716, KOREA**

**30 March 2009**

**SWKim**

R&D Director

**SWLee**

Quality manager

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Seoul, 150-716, Korea
Tel +82-2-368-4600 Fax +82-2-368-4606 E-mail: TelitAPAC@telit.com

Making machines talk.

# 21 Technical Support

Telit Communications S.p.A. technical support to **EVK2** customer is included into official Website *www.telit.com*, which contains also all available technical documentation to download.

# 22 Document Change Log

| Revision | Date | Changes |
|---|---|---|
| Rev 0 | April 2009 | First issue |
| Rev 1 | May 2009 | Removed charger function |
| | | |