GT863-PY Hardware User Guide

1vv0300737 Rev.1 - 20/09/06

Making machines talk.

Model	P/N
GT863-PY	3990150466

Contents

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1   Overview

The aim of this document is the description of some hardware solutions useful for developing a product with the Telit GT863-PY Terminal.
In this document all the basic functions of a mobile phone will be taken into account; for each one of them a proper hardware solution will be suggested and eventually the wrong solutions and common errors to be avoided will be evidenced. Obviously this document cannot embrace the whole hardware solutions and products that may be designed. The wrong solutions to be avoided shall be considered as mandatory, while the suggested hardware configurations shall not be considered mandatory, instead the information given shall be used as a guide and a starting point for properly developing your product with the Telit GT863-PY Terminal. For further hardware details that may not be explained in this document refer to the Telit GT863-PY Product Description document where all the hardware information is reported.

NOTICE

(EN) The integration of the GSM/GPRS **GT863-PY**   cellular module within user application shall be   done according to the design rules described in this manual.

(IT) L'integrazione del modulo cellulare GSM/GPRS **GT863-PY**   all'interno dell'applicazione dell'utente dovrà rispettare le indicazioni progettuali descritte in questo manuale.

(DE) Die Integration des **GT863-PY**   GSM/GPRS Mobilfunk-Moduls in ein Gerät muß gemäß der in diesem Dokument beschriebenen Konstruktionsregeln erfolgen

(SL) Integracija GSM/GPRS **GT863-PY**   modula v uporabniški aplikaciji bo morala upoštevati projektna navodila, opisana v tem priročniku.

(SP) La utilización del modulo GSM/GPRS **GT863-PY**   debe ser conforme a los usos para los cuales ha sido diseñado descritos en este manual del usuario

(FR) L'intégration du module cellulaire **GT863-PY**   GSM/GPRS dans l'application de l'utilisateur sera faite selon les règles de conception décrites dans ce manuel

(HE) האינטגרטור מתבקש ליישם את ההנחיות המפורטות במסמך זה בתהליך האינטגרציה של המודם הסלולרי **GT863-PY** עם המוצר.

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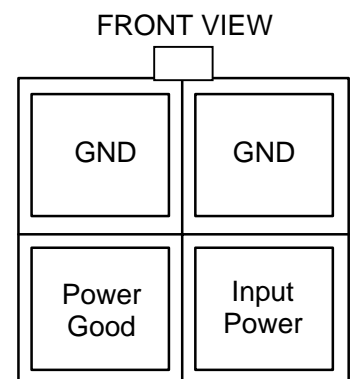
2   Power Supply

2.1 Power Connector

The power connector is available on the left side of the terminal.

Pin description:
- GND = Ground reference
- Input power = 9 - 24V $=\!=\!=$ @ 1.2A min, low ripple (120 mV)
- Power Good = GPIO3 input (CMOS 2.8)

FRONT VIEW

GND	GND
Power Good	Input Power

2.2 Power Supply Requirements

The GT863-PY is powered through a Molex 4 pin connector (part no.: 43045-0400)
It must be plugged to the POWER connector.
- Input voltage range: 9 – 24V $=\!=\!=$ (Nominal Voltage : 12V $=\!=\!=$)
- Input current: 8mA in idle mode, 110mA in communication GSM 1800/1900 @ 12V $=\!=\!=$
- The Supply must be provided by a short circuit protection
- The Supply Cable must be provided by a Fuse in series (2A).

2.2.1   Maximum Consumptions

Avg. consumption (9V $=\!=\!=$ supply , active call in GSM pow lev 5, 1 TS): 160mA
Avg. consumption (9V $=\!=\!=$ supply , active call in GSM pow lev 5, 2 TS): 250mA
Peak consumption (9V $=\!=\!=$ supply , active call in GSM pow lev):   1280mA

2.3 Turning ON the GT863-PY

To turn on the GT863-PY is sufficient to plug the power supply to the "POWER" connector.
The module will automatically switch on itself.

2.4   Turning OFF the GT863-PY

This could be done only switching off the power supply applied to the "POWER" connector of GT863-PY.

3   Antenna

The antenna connector is available on the left side of the terminal. It is Female SMA connector.

3.1   GSM Antenna Requirements

The antenna for a Telit GT863-PY device shall fulfil the following requirements:

ANTENNA REQUIREMENTS	
Frequency range	Standard Dual Band GSM/DCS frequency range or Standard Quad Band GSM/DCS/PCS frequency range if used for all four bands
Bandwidth	70 MHz in GSM850, 80 MHz in GSM & 170 MHz in DCS & 140 MHz PCS band
Gain	Gain < 3dBi
Impedance	50 ohm
Input power	> 2 W peak power
VSWR absolute max	<= 10:1
VSWR recommended	<= 2:1

This device is to be used only for mobile and fixed application. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-Users must be provided with transmitter operation conditions for satisfying RF exposure compliance. OEM integrators must ensure that the end user has no manual instructions to remove or install the GT863-PY Terminal. Antennas used for this OEM module must not exceed 3dBi gain for mobile and fixed operating configurations.

3.2   GSM Antenna - installation Guidelines

- Install the antenna in a place covered by the GSM signal.
- The Antenna must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter;
- Antenna shall not be installed inside metal cases
- Antenna shall be installed also according Antenna manufacturer instructions.

4   Serial Ports

The serial port on the Telit GT863-PY is the core of the interface between the module and OEM hardware.

4.1 MODEM SERIAL PORT

The RS-232 port is available through D-TYPE 9 pin connector

The main characteristics are:

Baud rate from 300 to 115,200 bits/s
Autobauding (300 to 38,400 bits/s)
Short circuit (to Ground) protection on all outputs.

Input voltage range : -12V to +12V

Pin out (refers to DTE side):

Pin 1 = DCD Output
Pin 2 = RX Output
Pin 3 = TX Input
Pin 4 = DTR Input
Pin 5 = Ground
Pin 6 = DSR Output
Pin 7 = RTS Input
Pin 8 = CTS Output
Pin 9 = RI Output

To connect to a PC a pin to pin, 9 pin cable
needed with D type connectors (male & female) on both sides.

Pin5   Pin1

Pin9   Pin6
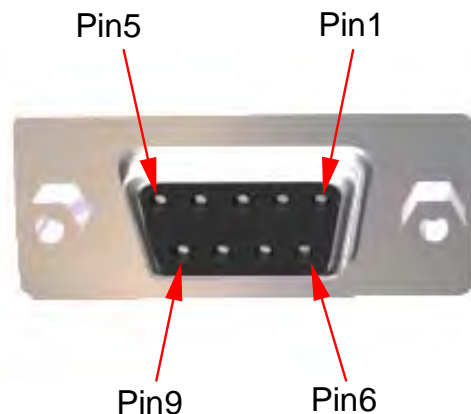
5 General Purpose I/O

The general purpose I/O pads can be configured to act in three different ways:
- input
- output
- alternate function (internally controlled)

Input pads can only be read and report the digital value (high or low) present on the pad at the read time; output pads can only be written or queried and set the value of the pad output; an alternate function pad is internally controlled by the GT863-PY firmware and acts depending on the function implemented.

- GPIO4 supports all three modes
- GPIO5 supports all three modes and can be input, output, RFTX monitor output (Alternate function)
- GPIO6 supports all three modes and can be input, output, alarm output (Alternate function)
- GPIO7 supports all three modes and can be input, output, buzzer output (Alternate function)

All GPIO pads are 2.8V CMOS signals and their interface levels are the same specified in the paragraph 5.1

5.1 Logic level specifications

The following table shows the logic level specifications used in the interface circuits:

Absolute Maximum Ratings -Not Functional

Parameter	Min	Max
Input level on any digital pin when on	-0.3V	+3.6V
Input voltage on analog pins when on	-0.3V	+3.0 V

Operating Range - Interface levels (2.8V CMOS)

Level	Min	Max
Input high level	2.1V	3.3V
Input low level	0V	0.5V
Output high level	2.2V	3.0V
Output low level	0V	0.35V

5.2   Using a GPIO pad as INPUT

The GPIO pads, when used as inputs, can be connected to a digital output of another device and report its status, provided this device has interface levels compatible with the 2.8V CMOS levels of the GPIO.
If the digital output of the device to be connected with the GPIO input pad has interface levels different from the 2.8V CMOS, then it can be connected to GPIO1 or can be buffered with an open collector transistor, provided with a 47KΩ pull-up resistor.

5.3   Using a GPIO pad as OUTPUT

The GPIO pads, when used as outputs, can drive 2.8V CMOS digital devices or compatible hardware. When set as outputs, the pads have a push-pull output and therefore the pull-up resistor may be omitted.

5.4 Using the Alarm Output GPIO6

The GPIO6 pad, when configured as Alarm Output, is controlled by the GT863-PY Terminal and will rise when the alarm starts and fall after the issue of a dedicated AT command.
This output can be used to power up the GT863-PY controlling microcontroller or application at the alarm time, giving you the possibility to program a timely system wake-up to achieve some periodic actions and completely turn off the application during sleep periods.

## 5.5   Using the Buzzer Output GPIO7

The GPIO7 pad, when configured as Buzzer Output, is controlled by the GT863-PY Terminal and will drive with appropriate square waves a Buzzer driver.
This permits to your application to easily implement Buzzer feature with ringing tones or melody played at the call incoming, tone playing on SMS incoming or simply playing a tone or melody when needed by your application.
A sample interface scheme is included below to give you an idea of how to interface a Buzzer to the GPIO7:
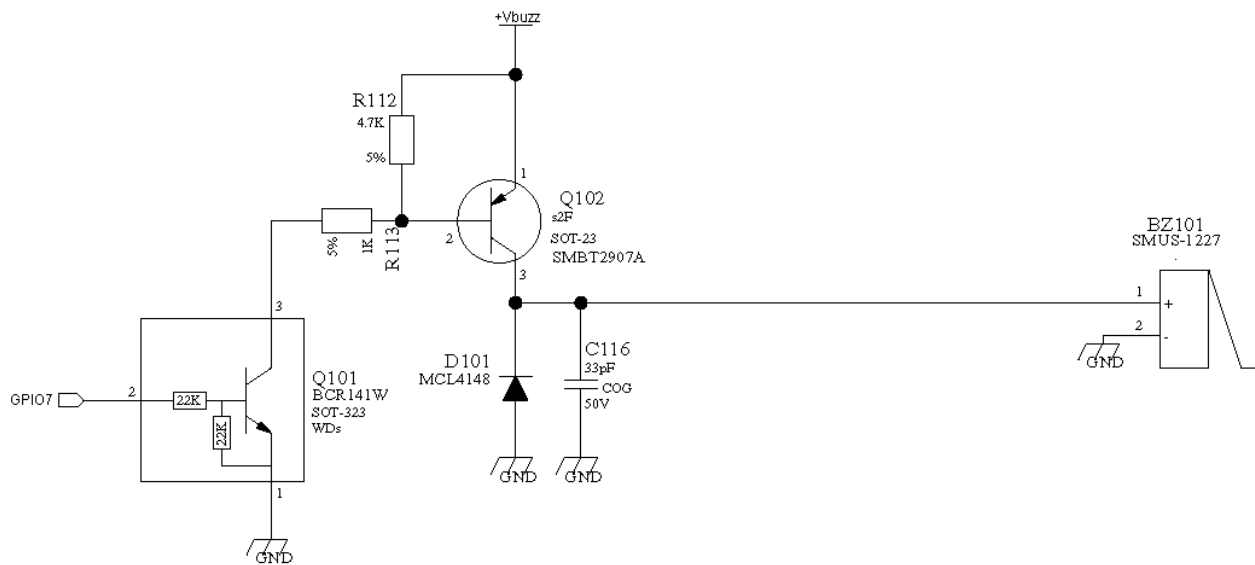
NOTE: To correctly drive a buzzer a driver must be provided, its characteristics depend on the Buzzer and for them refer to your buzzer vendor.

6   Conformity Assessment Issues

The GT863-PY Terminal is assessed to be conform to the R&TTE Directive as stand-alone products, so If the module is installed in conformance with Dai Telecom installation instructions require no further evaluation under Article 3.2 of the R&TTE Directive and do not require further involvement of a R&TTE Directive Notified Body for the final product.

In all other cases, or if the manufacturer of the final product is in doubt then the equipment integrating the radio module must be assessed against Article 3.2 of the R&TTE Directive**.**
In all cases assessment of the final product must be made against the Essential requirements of the R&TTE Directive Articles 3.1(a) and (b), safety and EMC respectively, and any relevant Article 3.3 requirements.

The GT863-PY Terminal is conform with the following European Union Directives:
- R&TTE Directive 1999/5/EC (Radio Equipment & Telecommunications Terminal Equipments)
- Low Voltage Directive 73/23/EEC and product safety
- Directive 89/336/EEC for conformity for EMC

  In order to satisfy the essential requisite of the R&TTE 99/5/EC directive, the GT863-PY Terminal is compliant with the following standards:

- GSM (Radio Spectrum). Standard: EN 301 511 and 3GPP 51.010-1
- EMC (Electromagnetic Compatibility). Standards: EN 301 489-1 and EN 301 489-7
- LVD (Low Voltage Directive) Standards: EN 60 950

In this document and the Hardware User Guide, Software User Guide all the information you may need for developing a product meeting the R&TTE Directive is included.

7   SAFETY RECOMMANDATIONS

<u>READ CAREFULLY</u>

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 body (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

Document Change Log

Revision	Date	Changes
ISSUE #0	05/09/06	First release
ISSUE #1	20/09/06	Added requirement for fuse on supply cable Supply with short circuit protection Added Maximum consumption paragraph Added GSM850 Antenna Bandwidth (70MHz)