

GT863-PY Terminal Product Description

80269ST10026a Rev. 2 - 18/03/08



GT863-PY Terminal Product Description
80269ST10026a Rev. 2 - 18/03/08

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1 Overview

Aim of this document is the description of features, functions and interfaces of the **Telit GT863-PY Terminal** which is a complete modem solution for wireless m2m applications based on the GE863-PY core. Since this Terminal is ready for use as a subsystem for wireless connections, Safety Information and basic instructions for taking the GT863-PY into operation are included, as well as guidance to other documentation and practical hints for the first steps.



The **Telit GT863-PY Terminal** is GSM Mobile Stations (MS class B) capable of using the GSM Circuit Switched Data (CSD), Fax and Short Message Services (SMS).

NOTE: **Telit GT863-PY Terminal** is an evolution of EZ10-PCS with PYG option and EZ10-QUAD-PY fully compatible with the previous models.

The frequency bands and GPRS class are reported in the following table:

Frequency Bands	GPRS	RJ11 AUX Connector	Product Name
GSM-850 / EGSM-900 / DCS-1800 / PCS-1900 MHz Quad-Band	Class 10	GPIO	Telit GT863-PY

The embedded PYTHON engine allows to perform stand-alone operations with the EASY SCRIPT feature, interpreting user-defined scripts in PYTHON language, e.g. to read external sensors connected to the General Purpose Inputs / Outputs (GPIO) on the RJ11 connector. Refer to the chapter about Software Features in this Product Description.



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The following table summarizes the possible interface configurations (for details refer to the dedicated chapters of this document):

	GT863-PY (GPIO & PYTHON)
RS232 Serial Interface for AT commands, data, fax, SMS	YES
POWER 12V DC	YES
AUX RJ11 6-pin configuration	GPIO: GND GPIO 4, GPIO 6 / Alarm GPIO 7 / Buzzer GPIO 5 Vmod (3,8 V DC) Remarks: <ul style="list-style-type: none"> • Automatic POWER ON. • GPIOs can be configured as I²C or SPI bus by PYTHON script elements.

The GT863-PY allows to be remotely controlled by AT commands (GSM 07.07 and 07.05) and the connection to the host controller (Data Terminal Equipment DTE) is established through one RS232 standard port. This port serves also for serial bi-directional Data and Fax transfer. All the interfacing is done by 4 connectors placed on the front and rear panels. The Quad-band evolution **Telit GT863-PY** includes features like sensing of hot removal of the SIM, the higher upload speed of the GPRS Class 10 Packet Data transfer and the entire structure results in a RoHS compliant product.

EASY GPRS® Embedded

Telit GT863-PY embeds TCP/IP stack and DNS query protocol. Static and dynamic IP allocation, PPP and UDP as well as FTP Client are supported. Developers just need to add Telit Proprietary AT commands to establish a TCP/IP connection through the GPRS network.

EASY FREQUENCY SCAN® Function

Telit GT863-PY includes a dedicated set of AT commands to scan all the GSM channels, reporting all available parameters. With EASY FREQUENCY SCAN® the GSM network coverage at the location of the GT863-PY Terminal can be examined even without inserted SIM in order to select the provider with the best field strength, the most channels or base transceiver stations and to optimize the antenna position.

EASY SCRIPT® Function

Telit GT863-PY includes a dedicated set of AT commands to run scripts in PYTHON¹ language within the module. By using this EASY SCRIPT® feature, the script inside the module interacts with the interfaces, allowing other tasks to interrupt it. The script interpreter engine of **Telit GT863-PY** is allowing self controlled operations.

With the **Telit GT863-PY** it is possible to configure the available GPIOs 4-7 as I²C or SPI bus.

¹ PYTHON is a registered trademark of the Python Software Foundation.



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JAMMING DETECTION and REPORT

The **Telit GT863-PY** offers the Jamming Detection and Report functionality, which allows the unit to detect attempts to discontinue GSM communication by interfering with the GSM radio signal. The “Jammed” status is reported as unsolicited message through the AT-Command interface on the RS232 connection.

CMUX

CMUX (Converter-Multiplexer) is a multiplexing protocol implemented in the Telit module that can be used to send any data, SMS, fax, TCP data.

SAP (SIM Access Profile)

The SAP feature allow the module to use the SIM of a remote SIM Server. This feature is implemented using special AT Command on a Virtual circuit of the CMUX interface.

Multisocket

New functionality of the Telit modules, multisocket is an extension of Telit Easy GPRS feature, which allows the user to have two contexts activated (that means two different IP address), more than one socket connection (with a maximum of 6) and simultaneous FTP client service

The GT863-PY is compliant with the relevant parts of ETSI GSM Phase 2+ specifications (Normal MS). Furthermore, **Telit GT863-PY** is certified after the full conformity assessment against 1995/5 EC and R&TTE Directive and they don't require any further certification test effort and expense. The Terminal GT863-PY can be used in all EU countries and in other countries where a GSM-850/E-GSM-900/DCS-1800MHz or PCS 1900 MHz network is available.

It is necessary to insert a SIM (Subscriber Identity Module) on which the level of worldwide access to the services of the related GSM/GPRS network depends.



2 General Product Description

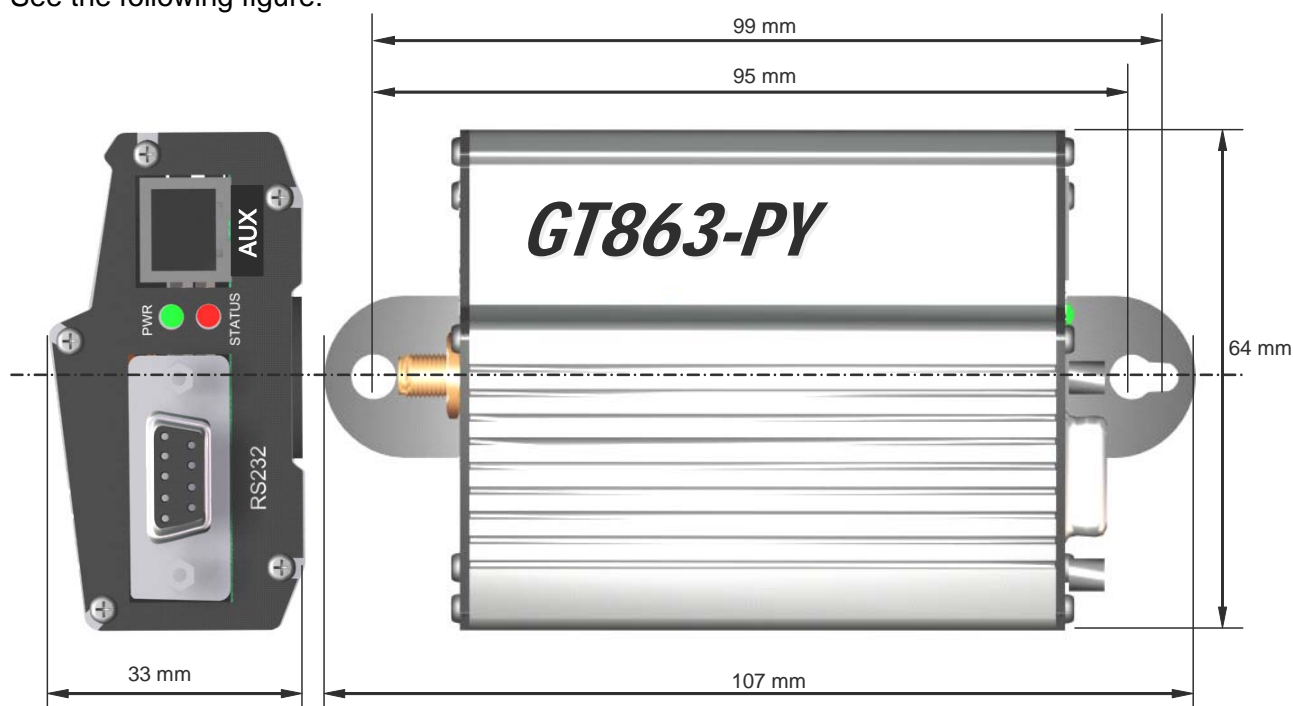
NOTE: The illustrations in this Product Description are only schematic and do not assure fidelity to construction or layout details, finishes, writings or colours.

2.1 Dimensions

The **Telit GT863-PY** dimensions are:

- Housing Length: 83 mm (without connectors)
- Overall Length: 107 mm (including fixtures)
- Width: 64 mm
- Thickness: 33 mm

See the following figure:



2.2 Weight

The net weight of the **Telit GT863-PY** is 135 grams.



2.3 Installation

The **Telit GT863-PY** can be fixed on a suitable surface by two screws through the holes (3,3 / 5,8 mm diam.) in the lids forming part of the front and rear panels. The figure shows the maximum and minimum inter-axis distance between the fixing holes.

In case of a permanent vertical installation in dusty environment, it is recommended to cover the SIM slot with a self-adhesive tape.

2.4 Environmental requirements

The **Telit GT863-PY** is compliant with the applicable ETSI reference documentation GSM 05.05 Release1999 ETSI EN300910 V8.4.1

2.4.1 Temperature range

	GT863-PY	Note
Operation temperature	-20°C ÷ +55°C	Full function; Full specification compliance
	-20°C ÷ +70°C	Full function*
Temperature in not functional conditions	-30°C ÷ +85°C	

* Temperature outside the -20°C ÷ +55°C range can affect the sensitivity, the performance and the MTBF of the terminal.

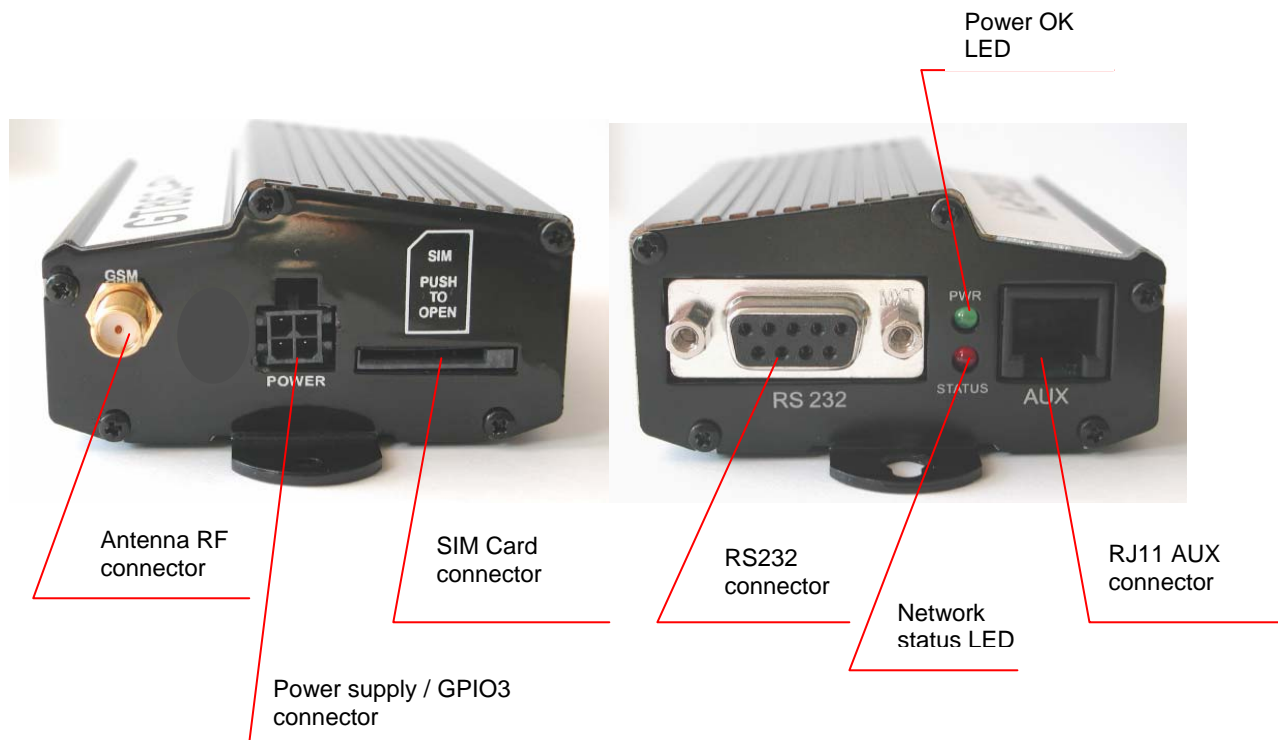
2.4.2 RoHS compliance

The **GT863-PY** is fully RoHS compliant to EU regulation.



2.5 GT863-PY Interfaces

The interfaces of the **GT863-PY Terminal** are distributed on 4 connectors on the front and rear panels, see figure.



2.5.1 Product Versions Identification - Documentation

2.5.1.1 Hardware Identification



Each Terminal has a Serial Number on the TYPE label, by which the IMEI of the Telit module Engine inside can be retrieved from a production database at the manufacturer. In addition, the IMEI can be obtained in functional conditions with a Data Terminal Equipment (DTE) as response to a specific AT command: AT+CGSN, AT#CGSN.

The following accessories for the GT863-PY can be made available separately:

Article	Telit Part No.
GSM Quad-Band Antenna 2.5dBi gain, magnetic surface mount with ca. 2,5 m coaxial cable RG174 and SMA m connector;	1rr0100056tlb
RS232 data cable, ca. 1,8m SubD9 m-f, straight	1ff1400065ezr
AC adapter: Input 100-240V AC 50..60Hz, Euro Plug Output 12V DC 1,2 A, ca. 1,8m cable with 4-pin plug (Molex 43025-400), GPIO3 bridged to GND at plug	1jj0400034ezr
AC adapter: Input 100-240V AC, 50..60Hz, UK Plug Output 12V DC 1,2 A, ca. 1,8m cable with 4-pin plug (Molex 43025-400), GPIO3 bridged to GND at plug	1jj0400035ezr
AC adapter: Input 100-240V AC, 50..60Hz, US Plug Output 12V DC 1,2 A, ca. 1,8m cable with 4-pin plug (Molex 43025-400), GPIO3 bridged to GND at plug	1jj0400036ezr

NOTE: Specifications and Part Numbers are subject to modifications.

2.5.1.2 Software identification

The version of the Software (SW) (firmware) implemented in production (on the Telit Cellular Engine inside) can be read from the SW label. In addition, the SW version can be obtained in functional conditions with a Data Terminal Equipment (DTE) as response to a specific AT-command: AT+CGMR. This is especially useful when the SW has been updated after delivery.



2.5.1.3 Documentation and User Guides

The description of the AT Commands that are implemented in the GT863-PY is available on www.telit.com >Products >Modules >GE863-PY² as a separate document: AT Commands Reference Guide.

The Software Features are described in a dedicated chapter of this Product Description.

Practical examples for the use of AT commands and some applications can be found in the GT863-PY Software User Guide available on the same location on www.telit.com

Technical information and reference designs for external circuitry partially relevant for the GT863-PY can be found in the GT863-PY Hardware User Guide available on www.telit.com

² For all additional documentation please refer always to the following products:

terminal	core engine
GT863-PY Order-Num.: 3990150471	GE863-PY with Order-Num.: 3990250661



2.6 Power Supply

2.6.1 Supply voltage requirements

The DC power supply must be connected to the POWER input:

- Input voltage range 9 - 24V DC
- Nominal Voltage 12V DC

NOTE: these are the absolute maximum ratings – for use e.g. in trucks with 24V nominal voltage, an additional DC/DC converter has to be used.

- Power Supply current rating: min. 1,2A @12V
- Power Supply ripple: max. 120mV
- Input current in idle mode (when the serial port is not connected) : 8mA @ 12V
- Input average current in communication mode: 110mA @ 12V

NOTE: In case that power supply equipment is to be ordered, its conformity needs to be verified with the mains supply voltage, frequency, connector type and other national requirements (e.g. certifications) in the countries of its use.

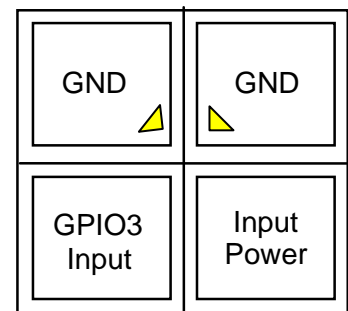
2.6.2 Power Connector

The power connector is on the left side of the terminal is Molex 4-pin connector (part no.:43045-0400 male)

Pin description:

- GND = Ground reference (1x POWER, 1x Signal)
- Input Power = 9 - 24VDC @ 1.2A min
- GPIO3 input CMOS 2.8

FRONT VIEW



2.7 General Purpose I/O

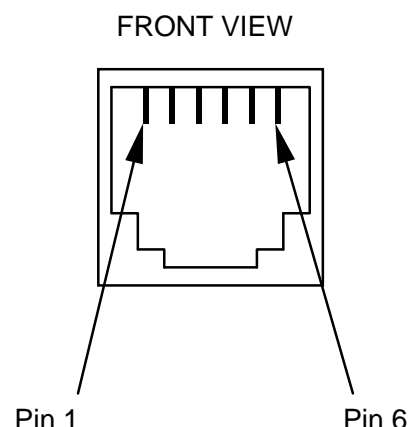
2.7.1 RJ11 (AUX) connector

The signals on the RJ11 connector has 4 digital general purpose inputs/outputs (GPIO). Connector type on the terminal is:

- Molex RJ11/6pin, part no.:95001-2661

The voltage range allowed on each pin is:

terminal	voltage range on GPIO vs. GND	
	min-max	absolute max
GT863-PY Order-Num.: 3990150466	0-3.6VDC	3.75VDC
GT863-PY Order-Num.: 3990150471	0-3.3VDC	3.6VDC



AUTO POWER ON is enabled.

VMOD = direct connection to the pin of the power supply voltage input of the Telit module (3.8V typical) and the output of the internal switching voltage regulator. The presence of this line at pin6 is to be considered as a low power output (<30mA) for pull-up potential (requires external reduction of voltage to max. 3.6V/3.3V DC!).

NOTE: Connections to VMOD shall be made only when familiar with designing circuits conform to EMC requirements.

All General Purpose input / output lines on the RJ11 GPIO interface have a 100 pF bypass capacitor to ground and are connected to the related pins of the Telit module over a 100 Ohms series resistor.

pin	Signal	I/O	Function	Internal Pull UP	Type
1	GND	-	Power Ground (negative)/ Signal Ground		POWER/GND
2	GPIO4	I/O	Configurable general purpose I/O pin /		CMOS 2.8V
3	GPIO6 / ALARM	I/O	Configurable general purpose I/O pin / ALARM		CMOS 2.8V
4	GPIO7 / BUZZER	I/O	Configurable general purpose I/O pin / BUZZER		CMOS 2.8V
5	GPIO5	I/O	Configurable general purpose I/O pin		CMOS 2.8V
6	VMOD	O	Low power supply output (typically +3.8V DC)		POWER OUT



2.7.2 GPIO Interface Specification

Where not specifically stated, all the interface circuits work at 2.62V CMOS logic levels.

All General Purpose input / output lines on the RJ11 GPIO interface have a 100 pF bypass capacitor to ground and are connected to the related pins of the Telit module over a 100 Ohms series resistor.

The following table shows the logic level specifications in the Telit GT863-PY terminal interface circuits:

LEVEL	MIN	MAX
Input high level	2.1 V	3.6V/3.3V
Input low level	0 V	0.5 V
Output high level	2.2 V	3.0 V
Output low level	0 V	0.35 V

See the GT863-PY HW and SW User Guides for

- Examples how to use the GPIO, e.g. setting over the air, sensing (polling) over the air or locally by the DTE,
- Configuration as ALARM output or BUZZER,
- Example input circuit (e.g. to detect a 12-V signal or a passive contact),
- Example output circuit (e.g. to drive a Relay in 12-V-environment or to connect a LED).



2.8 Serial Ports

The RS232 standard interface serves to connect a PC, Data Terminal Equipment (DTE) or an application, which acts as host controller of the GT863-PY Terminal with all its functions. Through the RS232 interface it can be used as GSM/GPRS modem for sending and receiving of SMS, Data and Fax calls.

The **Telit GT863-PY**, on the basis of the EASY SCRIPT® feature and with a PYTHON script developed by the user, can allow self-controlled operations which put the RS232 interface in a different serial data transmission mode, e.g. to communicate with a sensor or actuator.

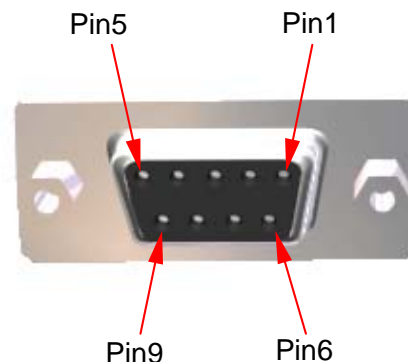
2.8.1 RS232 standard interface connector

Connector type on the terminal is:

- RS-232 through D9-pin female
- Baud rate from 300 to 115.200 bit/s
- Autobauding (300 to 38.400 bit/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



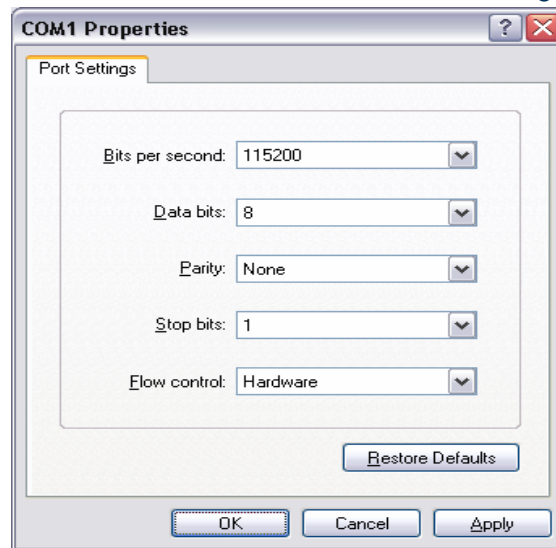
To connect to a PC as DTE, a pin-to-pin, 9 pin cable with D9 type connectors on both sides is needed (1 male & 1 female). Shielding of this cable is recommended and its length shall not exceed 3m.

2.8.2 The PC as Data Terminal Equipment (DTE)

The software application for using the PC RS232 standard serial interface (COM-port) as Data Terminal Equipment (DTE) is usually Hyper Terminal. Connect using the COM-port to which the GT863-PY Terminal is connected with the following settings:



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For more information about which AT Commands are implemented on the GT863-PY Terminal can be found in the “GT863-PY Software User Guide” and “AT Commands Reference Guide”, available on www.telit.com



2.9 SIM Interface Characteristics

The **Telit GT863-PY** support plug-in type Subscriber Identity Modules (SIM) according to GSM11.14 Phase 2 – with 1.8 and 3 Volts supply.

For the technical characteristics of the SIM, refer to the documentation supplied together with the SIM by the Mobile Network Operator or Service Provider.

The **Telit GT863-PY** has an enhanced SIM card reader with a sensor that allows detecting of a “hot” removal of the SIM, therefore the SIM can be extracted and re-inserted while the module is still on.

NOTE: On the **Telit GT863-PY** the sensing of a hot removal of the SIM is not supported during power saving mode (AT+CFUN=5).

2.9.1 Insertion and Removal of the SIM

The terminal has a built-in toggle spring (Push-Push) SIM holder, accessible through a slot in the panel at the antenna side of the housing.

Do not insert or remove the SIM when the product is in power saving mode.

To insert and remove the SIM, a plastic strip of the same width of the SIM and appropriate length of ca. 50-100 mm shall be prepared as a tool. The figure printed on the panel shows the position of the cut edge and the direction, how the SIM shall be inserted.

Insert the SIM and push it with the tool slightly inside until the spring snaps in. Removing the tool, the SIM shall remain inside the GT863-PY. For removing the SIM, push the tool slightly inside until the spring is released so that it pushes the SIM outside when the tool is retracted.



2.10 Antenna

2.10.1 Antenna Output

NOTE: BEFORE connecting the GT863-PY to a Power Supply source, a suitable Antenna shall be connected and properly installed.

As accessory, a magnetic surface mount antenna with 2.5dBi gain, ca. 2.5 m of coaxial cable and SMA connector is available.

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 persons (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

For a good efficiency of the antenna and minimum interference with other electronic systems, a space of min. 40 cm around the radiating part should be free, at least of electrically conducting materials (except the ground plane on which it is attached).

Less distance and less obstacles there are between the antenna connected to the GT863-PY Terminal and the antenna of the GSM/GPRS network base station, the less power is radiated by the Terminal under normal conditions and the higher is the safety margin in case of disturbances.

A check of eventual interferences can be made when the GT863-PY Terminal transmits at maximum power level to register to a GSM 900 network (see frequency channel numbers), immediately after being switched on.

2.10.1.1 Antenna Connector

The **Telit GT863-PY** includes a SMA bulkhead female, class 4 (2W) co-axial connector for the external antenna.

2.10.1.2 Antenna Specification

The antenna to be connected shall fulfil the following requirements:

Frequency range	Depending by frequency band(s) provided by the network operator, the customer shall use the most suitable antenna for that/those band(s)
Bandwidth	80 MHz in EGSM 900, 70 MHz if GSM 850, 170 MHz in DCS, 140 MHz PCS band
Gain	1.5dBi ≤ Gain < 3dBi (referenced to isotropic radiator)
Impedance	50 Ohm
Input power	> 2 W peak power
VSWR absolute max	≤ 10:1
VSWR recommended	≤ 2:1



2.11 Operating Frequency

The operating frequencies in GSM, DCS, PCS modes are conform to the GSM specifications.

Mode	Freq. TX (MHz)	Freq. RX (MHz)	Channels (ARFC)	TX - RX offset
E-GSM-900	890.0 - 914.8	935.0 - 959.8	0 – 124	45 MHz
	880.2 - 889.8	925.2 - 934.8	975 - 1023	45 MHz
GSM-850	824.2 – 848.8	969.2 – 893.8	128 - 251	45 MHz
DCS-1800	1710.2 - 1784.8	1805.2 - 1879.8	512 – 885	95 MHz
PCS-1900	1850.2 - 1909.8	1930.2 - 1989.8	512 - 810	80 MHz

2.12 Transmitter output power

GSM–850 / 900

The GT863-PY wireless modem in GSM–850/900 operating mode are class 4 in accordance with the specification which determine the nominal 2W peak RF power (+33dBm) on 50 Ohm.

DCS–1800 / PCS-1900

The GT863-PY wireless modem in DCS–1800/PCS-1900 operating mode are of class 1 in accordance with the specifications which determine the nominal 1W peak RF power (+30dBm) on 50 Ohm.

2.13 Reference sensitivity

GSM–850 / 900

The sensitivity of the GT863-PY wireless modem according to the specifications for the class 4 GSM–850/900 portable terminals is –107dBm typical in normal operating conditions.

DCS–1800 / PCS-1900

The sensitivity of the GT863-PY wireless modem according to the specifications for the class 1 portable terminals DCS-1800 / PCS-1900 is –106 dBm typical in normal operating conditions.



2.14 User Interface

The user interface of the GT863-PY Terminal is accessible from a Data Terminal Equipment DTE connected to the RS232 interface and it is managed by AT commands according to the GSM 07.07 and 07.05 specification and the supported commands are listed in the AT Commands Reference Guide.

2.14.1 Switching the GT863-PY Terminal ON and OFF

In this paragraph will be explained the way to switch the GT863-PY Terminals ON or OFF.

NOTE: Switching OFF the GT863-PY by disconnecting the external power supply line requires to wait enough time that the load capacitor of the DC/DC converter inside the GT863-PY discharges so that the Telit module inside goes to OFF condition.

- The GT863-PY Terminal switches on automatically each time the Power Supply is connected the first time or re-connected.

NOTE: Do not use the command AT#SHDN to switch off the GT863-PY terminal since it has a different effect.

2.14.1.1 GSM/GPRS Standard Modem

It is always worth a trial to install the GT863-PY Terminal as modem on a PC in the following way: First add it in the PC's Control Panel – Telephone and Modem. Select from the list the “Standard 33600 bps Modem” with connection to the related COM port, then make a new “Dial-up connection to private network” using this modem with the dial-up parameters of the GSM/GPRS Network in use. Sometimes the parameters indicated for the use of the WAP-Browser of mobile phones (over GSM CSD call or GPRS) will work.

Example for a GPRS connection set-up:

Under “Properties-General Configure” the initialization has to be entered in the text box selecting “Run Script”. The parameters are examples for subscribers of Italian GSM network operators.

Initialization: AT+CGDCONT=1,"IP","web.omnitel.it"

Dial number : *99***1#

User Name : none

Password : none

Initialization: AT+CGDCONT=1,"IP","internet.wind.biz"

Dial number : *99***1#

User Name : none

Password : none



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Initialization: AT+CGDCONT=1,"IP","uni.tim.it"

Dial number : *99***1#

User Name : phone number without international prefix

Password : as defined at registration to the service uni tim (e.g. via SMS)

2.14.2 Functions of the RJ11 Interface

The interface at the RJ11 6-pin connector of the GT863-PY Terminal has the following functions and physical connections.

- Connection to General Purpose Inputs/Outputs 4, 5, 6, 7, which can be used to communicate between the GT863-PY Terminal and external devices, like switches or relays. With a user defined PYTHON script element, it is possible within certain limits to configure these GPIOs as I²C or SPI bus. See Chapter on PYTHON of this Product Description.
- The GPIO6 can be set by AT commands as output for the ALARM (wake-up) signal, generated by the Real Time Clock RTC.
- The GPIO7 can be set by AT commands as output for the BUZZER (incoming call or SMS) signal.
- VMOD: connection to the +3,8V DC internal supply voltage. Attention to low power rating and EMC requirements.

Although no audio devices can be connected, voice calls can be established and received e.g. for transferring of the Calling Line Identification (**CLI**, phone number).

2.14.3 SMS

The **Telit GT863-PY** supports the following SMS types:

Mobile Terminated (MT) class 0 – 2 with signalling of new incoming SMS, SIM full, SMS read

Mobile Originated class 0 – 3 with writing, memorize in SIM and sending

Cell Broadcast compatible with CB DRX with signalling of new incoming SMS.

2.14.4 Real Time Clock and Alarm

The **Telit GT863-PY** supports the Real Time Clock and Alarm functions through the AT command interface.

Furthermore, an alarm output pin (GPIO6) can be configured to indicate the alarm with a hardware line output.

2.14.5 Data/fax transmission

The **Telit GT863-PY** supports:

- Packet Data transfer GPRS Class B, Multi-slot Class 8.
- Packet Data transfer GPRS Class B, Multi-slot Class 10.
- Data transmission according to the GSM 07.07, 07.05



- CSD up to 14.4 Kbps
- Fax service, Class 1 Group 3

2.14.6 Local security management

With lock of Subscriber Identity module (SIM), and security code request at power-up.

2.14.7 Call control

Call cost control function.

2.14.8 Phonebook

Function available to store the telephone numbers in SIM memory.
Capability depends on SIM version/memory

2.14.9 Characters management

Availability of lowercase, uppercase and IRA characters (International Reference Alphabet), in TEXT and PDU mode.

2.14.10 SIM related functions

Activation/deactivation of the numbers stored in phone book FDN, ADN and PINs. Extension at the PIN2 for the PUK2 insertion capability for lock condition.

Do not insert or remove the SIM when the product is in power saving mode.

NOTE: The SIM (Subscriber Identity Module) from the Network Operator or Service Provider can be configured in different ways, e.g. related to

- The presence of SIM Applications (not supported by the current Software of GT863-PY Terminal),
- The possibility to de-activate the necessity to enter the PIN (Personal Identification Number) as condition for registering in the network;
- The possibility that the Terminal can be locked by factory SW settings to a certain SIM of a certain Network Operator.
- The presence and format of certain phone book directories (PB, FDN, ADN) or SMS memories.
- The presence, content and format of other registers in the SIM, e.g. network operator's name, list of preferred networks (names change from time to time), etc.
- The possibility to roam between several mobile networks even in the home country.

2.14.11 Call status indication

The call status indication by AT commands and Status LED is supported.



2.14.12 LED Indicators

The GT863-PY Terminal has 2 LED indicators, one for Power, one for Status.

2.14.12.1 Power LED

When on, the green Power LED indicates that the supply voltage is arriving at the GSM Engine inside the GT863-PY Terminal.

2.14.12.2 Status LED: Indication of network service availability

The red Status LED is connected internally to the STAT_LED output of the module by an inverting circuit. In addition to the status information obtainable via AT commands, this LED shows information on the network service availability and Call status.

Status LED indications

LED status	Device Status
permanently on	a call is active
fast interrupt sequence (period 0,5s, Ton 1s)	Net search / Not registered / turning off
slow interrupt sequence (period 0,3s, Ton 3s)	Registered full service
permanently off	device off

2.14.13 Automatic answer (Data or FAX)

After a specified number of rings, the module will automatically answer with a beep. The user can set the number of rings by means of the command `ATS0=<n>`.

2.14.14 Supplementary services (SS)

- Call Barring,
- Call Forwarding,
- Calling Line Identification Presentation (CLIP),
- Calling Line Identification Restriction (CLIR),
- Call Waiting, other party call Waiting Indication,
- Closed User Group supplementary service (CUG),
- Advice of Charge,
- Unstructured SS Mobile Originated (MO)



3 Software Features

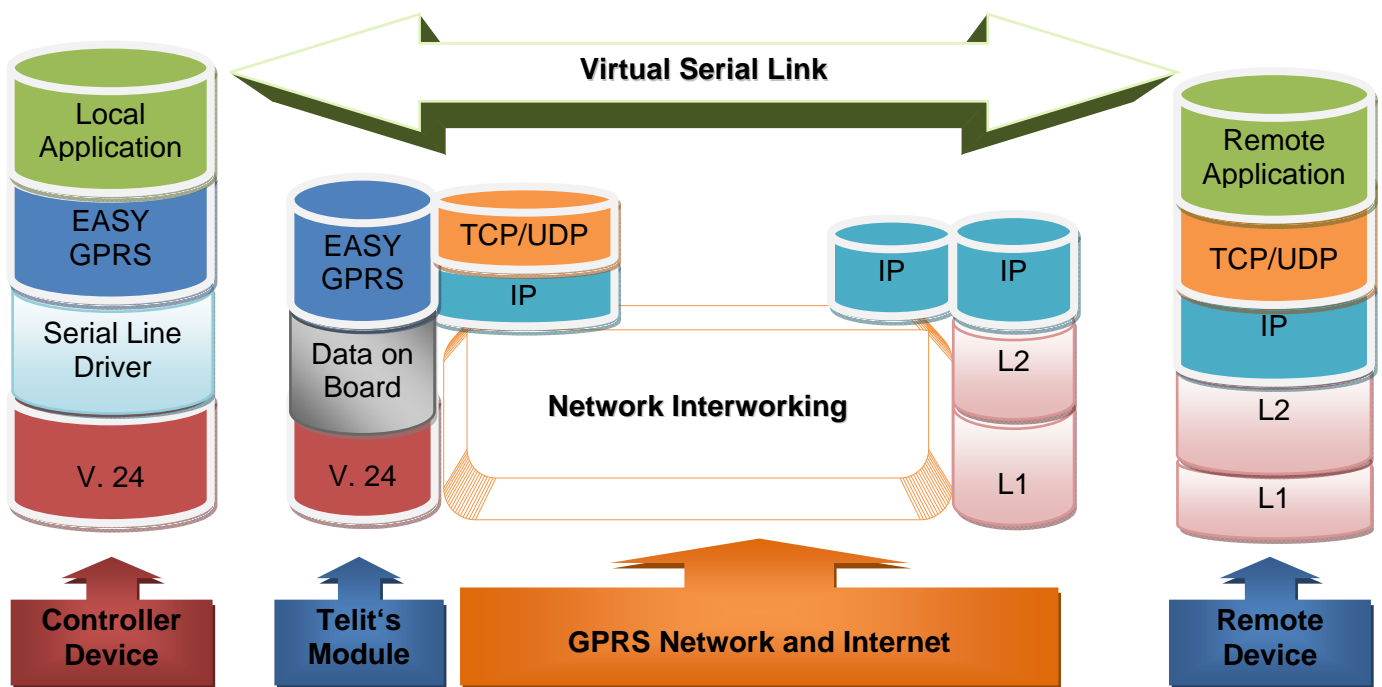
3.1 Enhanced EASY GPRS Extension

3.1.1 Overview

The EASY GPRS feature allows a user of the **Telit GT863-PY** to contact a device in the Internet and establish with it a raw data flow over the GPRS and Internet networks.

This feature can be seen as a way to obtain a "virtual" serial connection between the Application Software on the Internet machine involved and the controller of the **Telit GT863-PY**, regardless of all the software stacks underlying.

An example of the protocol stack involved in the devices is reported:



This particular implementation allows to the devices interfacing to the **Telit GT863-PY** the use of the GPRS and Internet packet service without the need to have an internal TCP/IP stack since this function is embedded inside the module.

The EASY GPRS overcomes some of the known limitations of the previous implementation and implements some features such as:

- Keep the GPRS context active even after the closing of a socket, allowing the application to keep the same IP address;
- Also Mobile terminated (incoming) connections can be made, now it is possible to receive incoming TCP connection requests;



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- A new internal firewall has been implemented in order to guarantee a certain level of security on internet applications.
-

3.1.2 EASY GPRS definition

The EASY GPRS feature provides a way to replace the need of an Internet TCP/IP stack at the terminal equipment side. The steps that will be required to obtain a virtual serial connection (that is actually a socket) to the Internet peer are:

- configuring the GPRS Access
- configuring the embedded TCP/IP stack behaviour
- defining the Internet Peer to be contacted
- request the GPRS and socket connections to be opened (host is connected)
- exchange raw data
- close the socket and GPRS context

All these steps are achieved through AT commands.

As for common modem interface, two logical status are involved: command mode and data traffic mode.

- In Command Mode (CM), some AT commands are provided to configure the Data Module Internet stack and to start up the data traffic.
- In data traffic mode (Socket Mode, SKTM), the client can send/receive a raw data stream which will be encapsulated in the previously configured TCP / IP packets which will be sent to the other side of the network and vice versa. Control plane of ongoing socket connection is deployed internally to the module.

For more detailed information regarding GPRS please consult Easy GPRS User Guide and AT Commands Reference Guide.

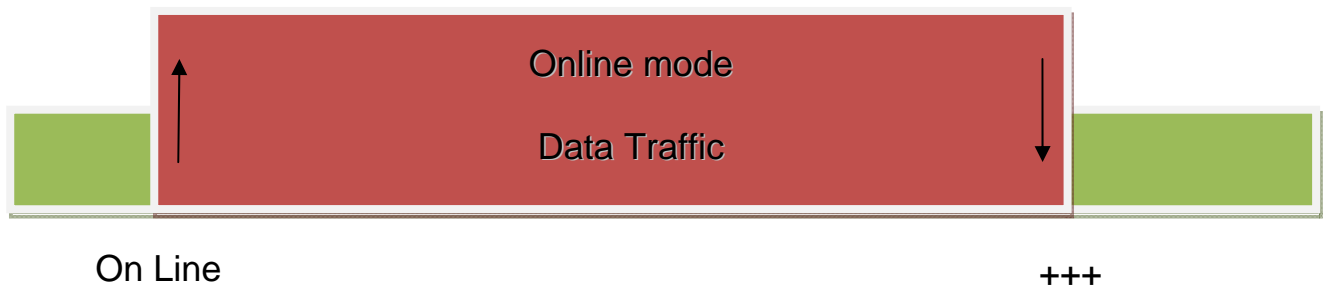


3.2 Multisocket

New functionality of the Telit modules, multisocket is an extension of Telit Easy GPRS feature, which allows the user to have two contexts activated (that means two different IP address), more than one socket connection (with a maximum of 6) and simultaneous FTP client service.

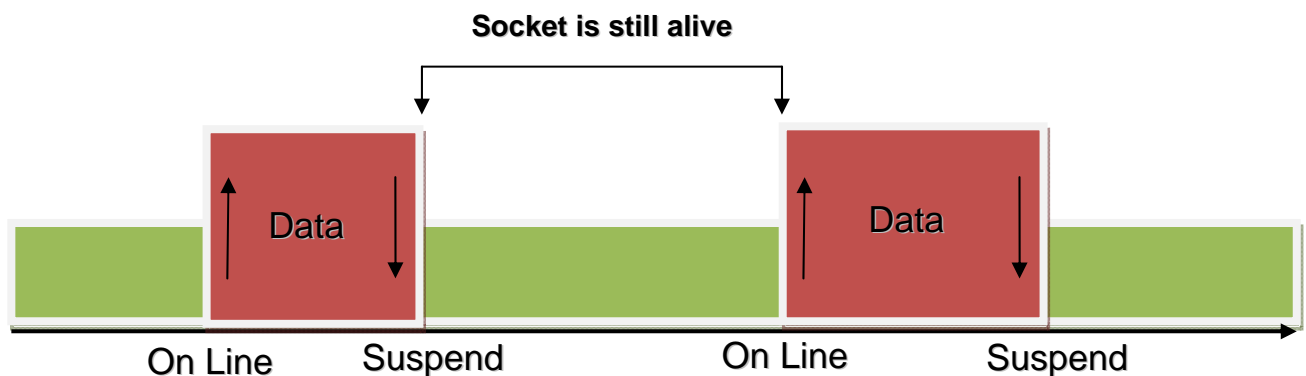
The basic idea of multisocket is the possibility of suspend a socket connection with the escape sequence +++.

With IP Easy we can use a SKTD to open a socket connection and go online. After online activities we use +++ sequence to close the connection (see the figure below).



Where the green part represents the module command mode while the red part is the online mode.

Now, the online mode can be suspended with the escape sequence by using the multisocket feature. During suspend mode the data received by the socket will be buffered. These data will be displayed after socket resumption, as shown in the figure below:



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This new feature allows the user to switch between online mode and command mode without closing the connection and eventually opening another socket (or resuming the suspended one) or FTP connection.

Another feature is the possibility to associate any socket connection to a specific context, this means that we can use different IP addresses for the connections (max 2). Socket identifier is called Connection Id (selects which socket we want to use from 1 up to 6) and every Connection Id is associated to a context.

For more detailed information please consult Multisocket User Guide.



3.3 Jammed Detect & Report Extension

3.3.1 Overview

The Jammed Detect & Report feature allows a **Telit GT863-PY** to detect the presence of a disturbing device such as a Communication Jammer and give indication to the user and/or send a report of that to the network.

This feature can be very important in alarm, security and safety applications that rely on the module for the communications. In these applications, the presence of a Jammer device can compromise the whole system reliability and functionality and therefore shall be recognized and reported either to the local system for countermeasure actions or to the network providing remote actions.

An example scenario could be an intrusion detection system that uses the module for sending the alarm indication for example with an SMS to the system owner, and thief incomes using a Jammer to prevent any communication between the GSM module and the network.

In such a case, the module detects the Jammer presence even before the break-in and the host controller can trigger an alarm siren, other communication devices (PSTN modem) or directly report this condition to the network that can provide further security services for example sending SMS to the owner or police. Obviously this last service depends also from network infrastructure support and it may not be supported by some networks.



3.4 CMUX

CMUX (Converter-Multiplexer) is a multiplexing protocol implemented in the Telit module that can be used to send any data, SMS, fax, TCP data.

3.4.1 Product architecture

The Multiplexer mode enables one serial interface to transmit data to four different customer applications. This is achieved by providing four virtual channels using a Multiplexer (Mux).

This is especially advantageous when a fax/data/GPRS call is ongoing. Using the Multiplexer features, e.g. controlling the module or using the SMS service can be done via the additional channels without disturbing the data flow; access to the second UART is not necessary.

Furthermore, several accesses to the module can be created with the Multiplexer. This is of great advantage when several independent electronic devices or interfaces are used.

To access the three virtual interfaces, both the GSM engine and the customer application must contain Mux components, which communicate over the multiplexer protocol.

In Multiplexer mode, AT commands and data are encapsulated into packets. Each packet has channel identification and may vary in length.

3.4.2 Implementation feature and limitation

- 7.10 CMUX Basic Option used
- CMUX implementation support four full DLCI (Serial Port)
- Every CMUX instance has its own user profile storage in NVM
- Independent setting of unsolicited message.
- In case of GPS product one serial port can be dedicated to NMEA output.
- Every CMUX instance has its own independent flow control

NOTE: More details about the Multiplexer mode are available in the Cmux User Guide.

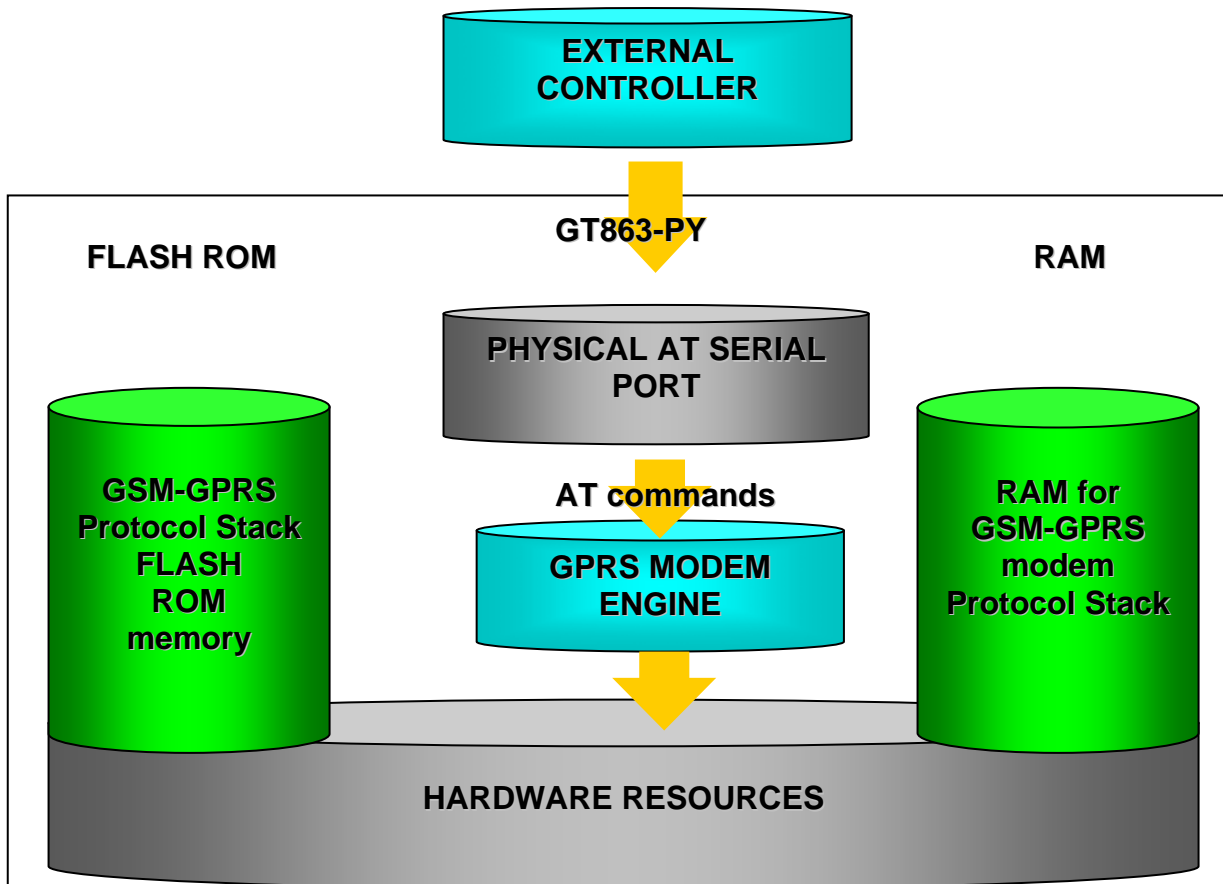


3.5 Easy Script Extension - Python interpreter

NOTE: Embedding the PYTHON GSM/GPRS Engine into the **Telit GT863-PY**, the second serial interface is not accessible from outside. The only general purpose input output ports usable are the GPIO3, GPIO4, 5, 6 and 7. This implicates restrictions on the creation of I²C and SPI busses. Of course, all scripts taking care of these restrictions can be run on **Telit GT863-PY**, whereas for script development, the Python Kit or EVK are recommended because of their extra interfaces for debugging the script software.

3.5.1 Overview

The Easy Script Extension is a feature that allows driving the modem "internally", writing the controlling application directly in a nice high level language: Python. The Easy Script Extension is aimed at low complexity applications where the application was usually done by a small microcontroller that managed some I/O pins and the GT863-PY through the AT command interface. A schematic of such a configuration can be:

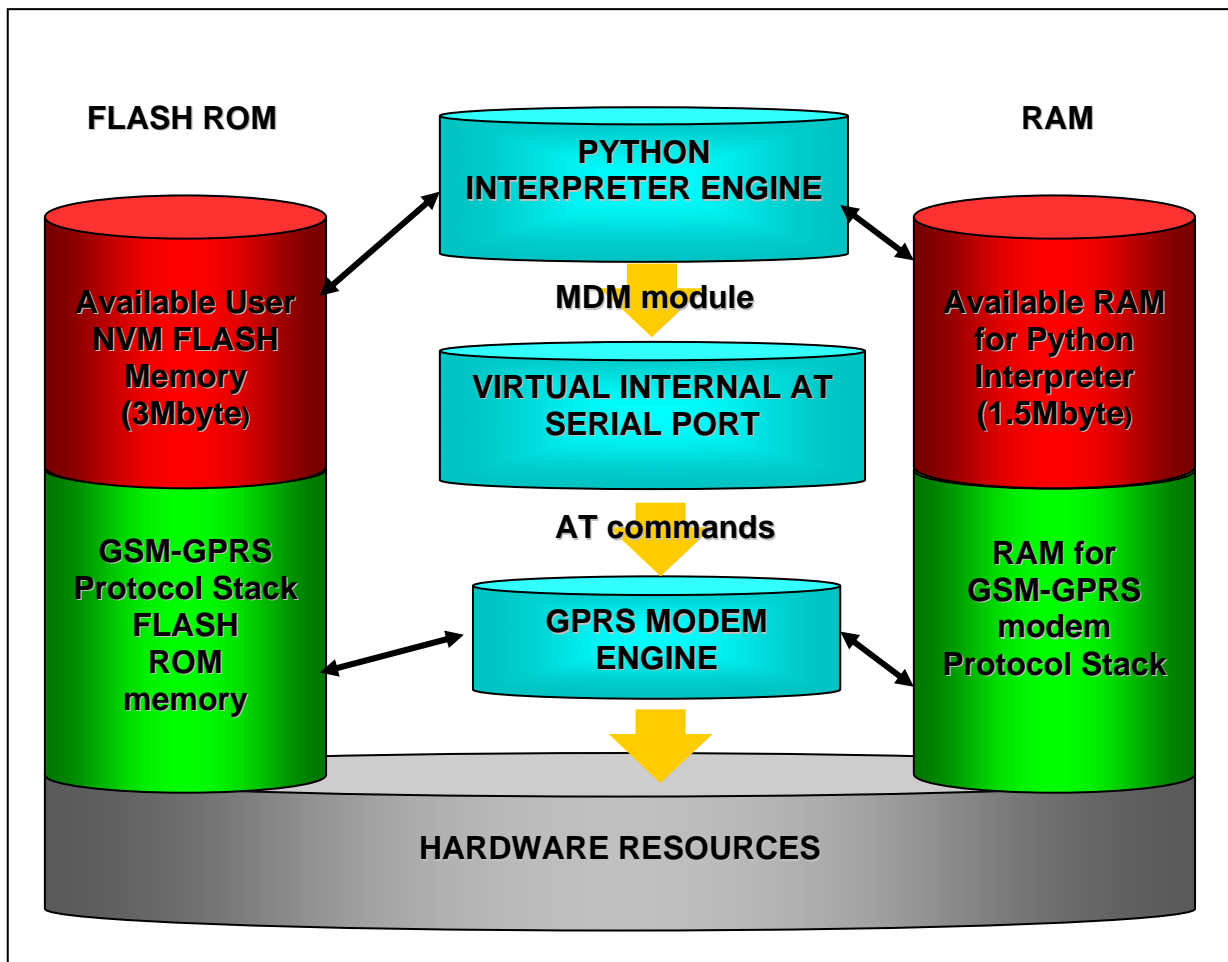
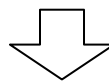


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In order to eliminate this external controller, and further simplify the programming of the sequence of operations, inside the GT863-PY it is included:

- Python script interpreter engine v. 1.5.2+
- around 3MB of Non Volatile Memory room for the user scripts and data
- 1.2 MB RAM reserved for Python engine usage

A schematic of this approach is:



3.5.2 Python 1.5.2+ Copyright Notice

The Python code implemented into the GT863-PY is copyrighted by Stichting Mathematisch Centrum, this is the license:

Copyright © 1991-1995 by Stichting Mathematisch Centrum, Amsterdam, The Netherlands.

All Rights Reserved

Copyright (c) 1995-2001 Corporation for National Research Initiatives; All Rights Reserved.

Copyright (c) 2001, 2002, 2003, 2004 Python Software Foundation; All Rights Reserved.

Copyright (c) 2001-2008 Python Software Foundation; All Rights Reserved.

All Rights Reserved are retained in Python.

Permission to use, copy, modify, and distribute this software and its documentation for any purpose and without fee is hereby granted, provided that the above copyright notice appear in all copies and that both that copyright notice and this permission notice appear in supporting documentation, and that the names of Stichting Mathematisch Centrum or CWI or Corporation for National Research Initiatives or CNRI not be used in advertising or publicity pertaining to distribution of the software without specific, written prior permission.

While CWI is the initial source for this software, a modified version is made available by the Corporation for National Research Initiatives (CNRI) at the Internet address <ftp://ftp.python.org>.

STICHTING MATHEMATISCH CENTRUM AND CNRI DISCLAIM ALL WARRANTIES WITH REGARD TO THIS SOFTWARE, INCLUDING ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS, IN NO EVENT SHALL STICHTING MATHEMATISCH CENTRUM OR CNRI BE LIABLE FOR ANY SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES OR ANY DAMAGES WHATSOEVER RESULTING FROM LOSS OF USE, DATA OR PROFITS, WHETHER IN AN ACTION OF CONTRACT, NEGLIGENCE OR OTHER TORTIOUS ACTION, ARISING OUT OF OR IN CONNECTION WITH THE USE OR PERFORMANCE OF THIS SOFTWARE.



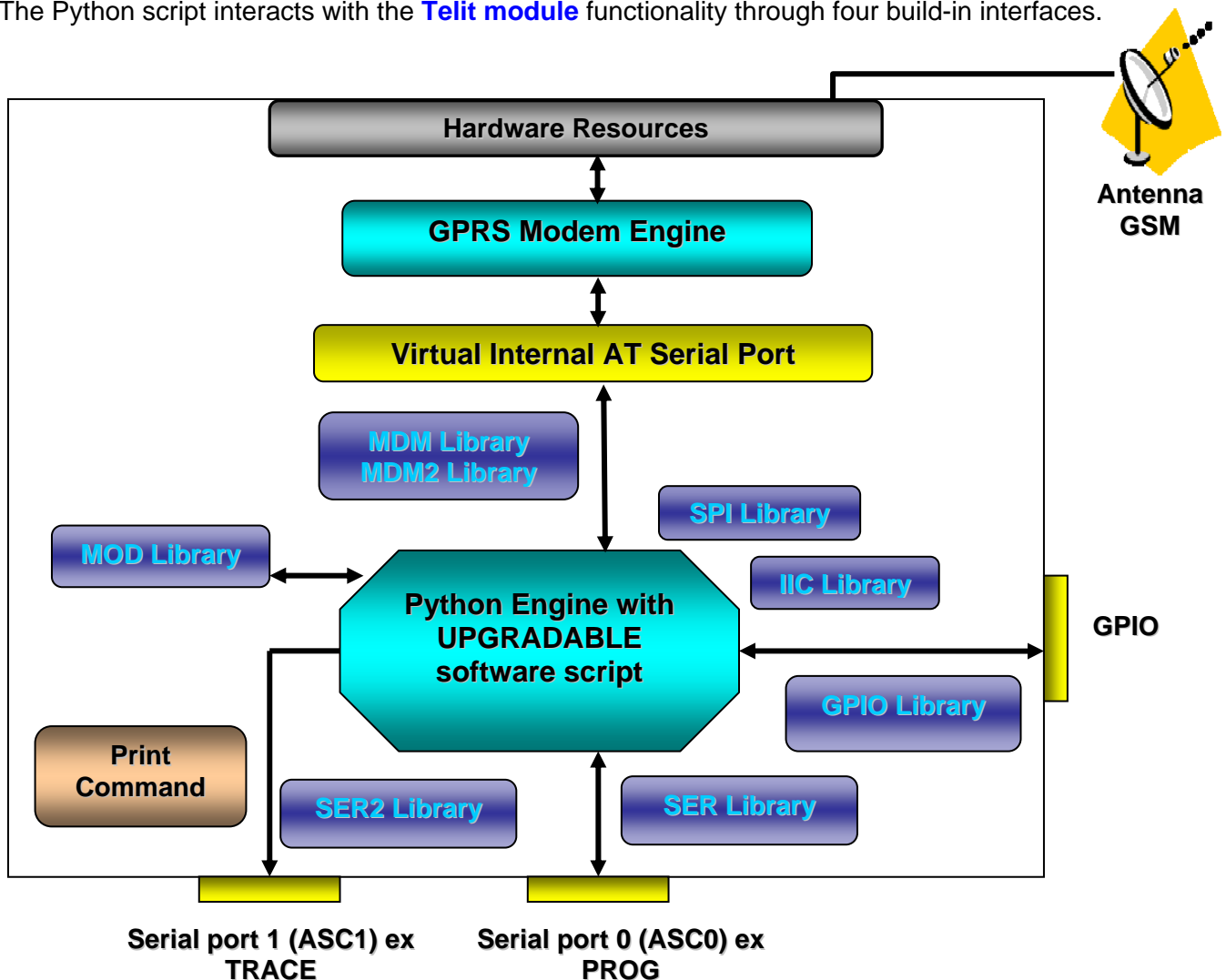
3.5.3 Python implementation description

Python scripts are text files stored in NVM inside the **Telit module**. There's a file system inside the module that allows to write and read files with different names on one single level (no subdirectories are supported).

ATTENTION: it is possible to run only one Python script at the time.

The Python script is executed in a task inside the **Telit module** at the lowest priority, making sure this does not interfere with GSM/GPRS normal operations. This allows serial ports, protocol stack etc. to run independently from the Python script.

The Python script interacts with the **Telit module** functionality through four build-in interfaces.



- **The MDM interface** is the most important one. It allows Python script to send AT commands, receive responses and unsolicited indications, send data to the network and receive data from the network during connections. It is quite the same as the usual serial port interface in the **Telit module**. The difference is that this interface is not a real serial



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port but just an internal software bridge between Python and mobile internal AT command handling engine. All AT commands working in the **Telit module** are working in this software interface as well. Some of them have no meaning on this interface, such as those regarding serial port settings. The usual concept of flow control keeps its meaning over this interface, but it's managed internally.

- **The MDM2 interface** is the second interface between Python and mobile internal AT command handling. It is used to send AT commands from Python script to mobile and receive AT responses from mobile to Python script when the classic MDM built-in module already in use.
- **The SER interface** allows Python script to read from and write to the *real*, physical serial port where usually the AT command interface resides, for example to read NMEA information from a GPS device. When Python is running this serial port is free to be used by Python script because it is not used as AT command interface since the AT parser is mapped into the internal virtual serial port. No flow control is available from Python on this port.
- **The SER2 interface** allows Python script to read from and write to the *real* physical serial port ASC1, that is usually available for trace and debug.
- **The GPIO interface** allows Python script to handle general purpose input output faster than through AT commands, skipping the command parser and going directly to control the pins.
- **The MOD interface** is a collection of useful functions.
- **The IIC interface** is an implementation on the Python core of the IIC bus Master. It allows Python to create one or more IIC bus on the available GPIO pins.
- **The SPI interface** is an implementation on the Python core of the SPI bus Master. It allows Python to create one or more IIC bus on the available GPIO pins.

For the debug, the print command is directly forwarded on the EMMI TX pin (second serial port) at baud rate 115200 bps 8N1.



3.5.4 Python core supported features

The Python core version is 1.5.2+ (string methods added to 1.5.2).
You can use all Python statements and almost all Python built-in types and functions.

Built-in types and functions not supported	Available modules (all others are not supported)
complex	marshal
float	imp
long	_main_
docstring	_builtin_
	sys
	md5

3.5.5 Python Build-in Custom Modules

Several build in custom modules have been included in the python core, specifically aimed at the hardware environment of the module.

The build in modules included are:

MDM	interface between Python and mobile internal AT command handling
MDM2	second interface between Python and mobile internal AT command handling
SER	interface between Python and mobile internal serial port ASC0 direct handling
SER2	interface between Python and mobile internal serial port ASC1 direct handling
GPIO	interface between Python and mobile internal general purpose input output direct handling
MOD	interface between Python and mobile miscellaneous functions
IIC	custom software Inter IC bus that can be mapped on creation over almost any GPIO pin available
SPI	custom software Serial Protocol Interface bus that can be mapped on creation over almost any GPIO pin available

More details about the Python modules are available in the Python Reference Guide.

NOTE: The **Telit GT863-PY** does not have the second serial interface at the outside of the Terminal for receiving these Python script debug messages.



3.6 SAP: SIM Access Profile

3.6.1 Product architecture

The SAP feature allow the module to use the SIM of a remote SIM Server. This feature is implemented using special AT Command on a Virtual circuit of the CMUX interface.

3.6.2 Implementation feature

- SAP is based on 7.10 CMUX Basic Option used
- Only SAP Client features
- Logic HW flow control is recommended on the Virtual instance selected for the SAP command.

3.6.3 Remote SIM Message Command Description

The module sends request commands to the client application through a binary message that is crowned in the CMUX message. The client application shall extract the message and send it to the SAP server, through the appropriate protocols (e.g. by RFCOMM, that is the Bluetooth serial port emulation entity).

The client application shall extract all the messages sent by SAP server and put them in the CMUX message, to sent to the module.

The module satisfies the following feature requirements:

- Connection management
- Transfer APDU
- Transfer ATR
- Power SIM on
- Report Status
- Error Handling

Every feature needs some procedures support:

Feature	Procedure
Connection Management	Connect
	Report Status
	Transfer ATR
	Disconnection Initiated by the Client
	Disconnection Initiated by the Server
Transfer APDU	Transfer APDU



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Transfer ATR	Transfer ATR
Power SIM on	Power SIM on
	Transfer ATR
Report Status	Report Status
Error Handling	Error Response

Report Status, Disconnection Initiated by the Server and Error Response are independent messages sent by server. The other procedures consist of couples of messages, started by client.

NOTE: More details about the SAP are available in the SAP User Guide.



3.7 AT Command Interface

The **Telit GT863-PY** can be driven via the serial interface using the standard AT commands³. The **Telit GT863-PY** is compliant with:

1. Hayes standard AT command set, in order to maintain the compatibility with existing SW programs.
2. ETSI GSM 07.07 specific AT command and GPRS specific commands.
3. ETSI GSM 07.05 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)
4. FAX Class 1 compatible commands

Moreover the **Telit GT863-PY** supports also Telit proprietary AT commands for special purposes. The GE863-PY AT Commands Reference Guide document, shows a dedicated detailed description of all supported AT commands and how to use the AT commands with the **Telit GT863-PY** through some example scripts.

³ The AT is an ATTENTION command and is used as a prefix to other parameters in a string. The AT command combined with other parameters can be set up in the communications package or typed in manually as a command line instruction.



4 Service and SW / Firmware Update

The RS232 serial interface on the Terminal used for the communication with a PC can also be used to update the **Telit GT863-PY Terminal** firmware (Software).

The firmware update can be done with a specific software tool provided by Telit that runs on windows based PCs.

The update procedure requires switch-on the Terminal at a prompt within the running update tool. Thus, the power supply line shall be disconnected before the launch of the update tool on the PC and prepared for re-connection.

NOTE: Switching OFF the GT863-PY by disconnecting the external power supply line requires to wait enough time (depending on the HW version!) that the load capacitor of the DC/DC converter inside the GT863-PY discharges so that the module inside goes to OFF condition.

4.1 Step-by-Step upgrade procedure

First the program will erase the content of flash memory, then the program will write on the flash memory. To update the firmware of the module, we suggest the following procedure:

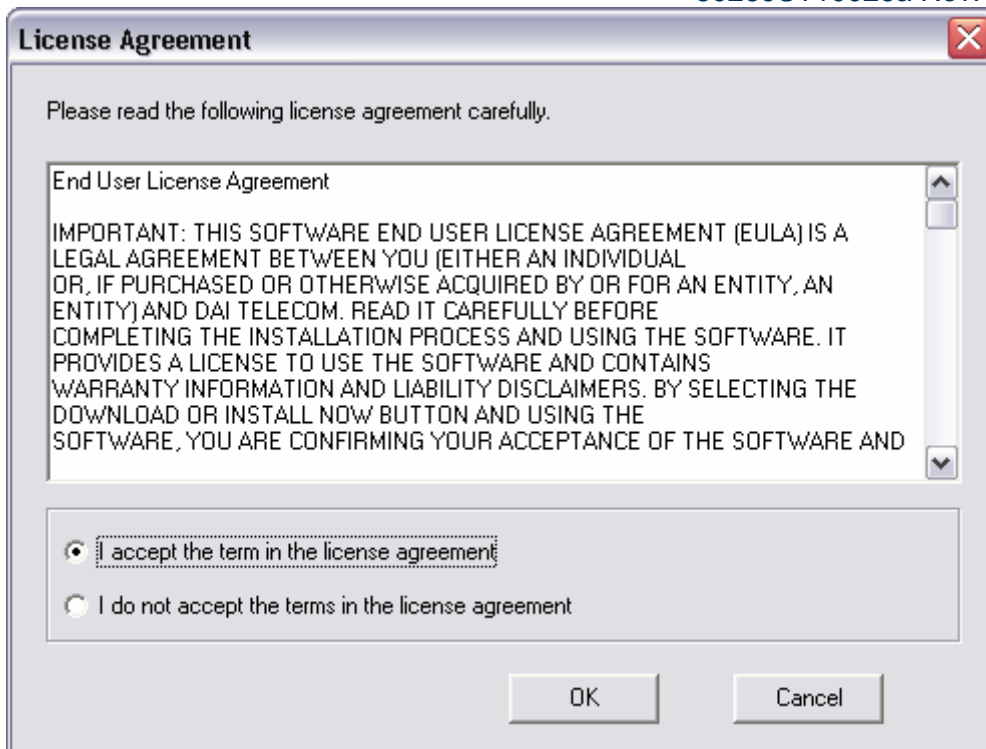
- Collect information about the Hardware and implemented version of Software by the command
 - AT+CGMR<enter>, which returns the Software version information;
 - AT+CGMM<enter>, which returns the Model Identification.
- Switch OFF the module.
- Run the file *TFI_xxxx.exe*. The following window should be displayed, Select the language preferred by pressing the correspondent button.



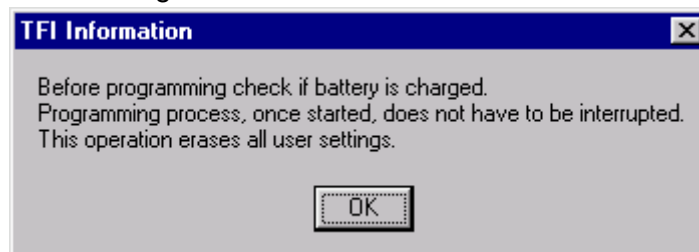
- The End User License Agreement will appear. Please, read it and accept the terms if you are going to proceed.



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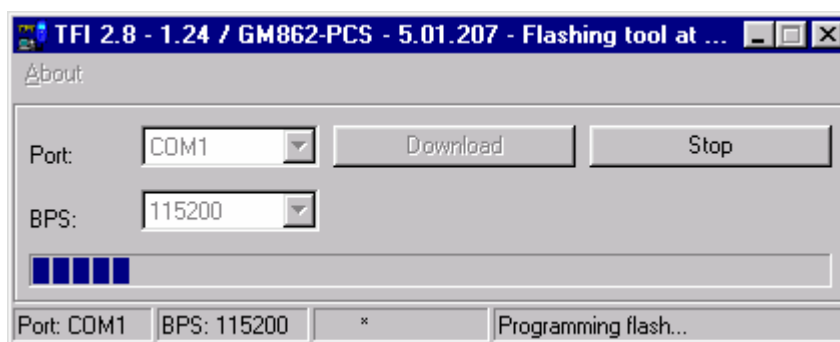


- Press OK to the initial message.



NOTE: In connection with the GT863-PY Terminal, charged battery has to be understood that the power supply must not be disconnected during the firmware update.

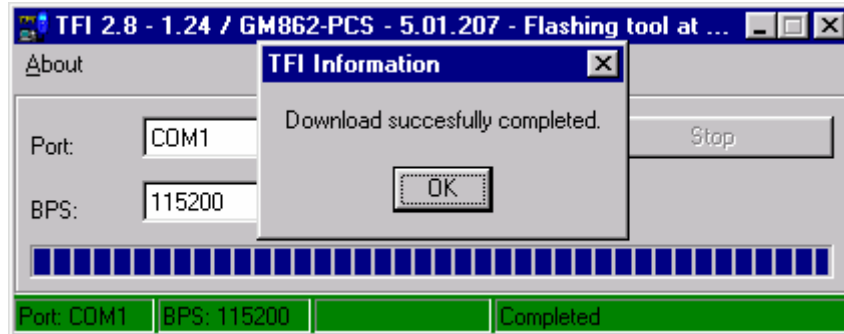
- Select the right COM port and speed. Note that to go faster than 115200 you need a special hardware on the PC. Then Press the Download button and within 5 seconds power-on the GT863-PY.



Wait for the end of programming green message OK



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The **Telit GT863-PY Terminal** is now programmed with the new firmware.



5 Conformity Assessment Issues

The **Telit 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 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



5.1 Declaration of conformity



DECLARATION OF CONFORMITY

We, **Telit Communications S.p.A**

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

declare under our sole responsibility that the product

GT863-PY

to which this declaration relates is in conformity with all the essential requirements of Directive 1999/05/EC

The conformity with the essential requirements of the European Directive 1999/05/EC has been verified against the following harmonized standards:

- ETSI EN 301 511 Mobile stations in GSM 900 and DCS1800;
- CENELEC EN 60950 Safety of information technology equipments;
- ETSI EN 301 489-7 EMC&ERM Specific for GSM and DCS telecommunications systems.

The conformity assessment procedure has been followed with the involvement of the following Accredited Test Laboratory:

SICOM Test, Area Science Park – Padriciano 99 – 34012 Trieste - Italy

The technical documentation relevant to the above equipment will be held at:

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

Trieste, **25 September 2006**



Ing. Guido Walcher
Quality Assurance Director

06DOC17 MOD.003 02/06 REV.9



6 GT863-PY Technical Support

Telit's technical support to [Telit GT863-PY wireless modem](#) customers:

- All available technical documentation is included for download into the Website www.telit.com
- Telit's engineering support is accessible via a selective E-Mail service with 48h replies assured under normal conditions.

In case of technical inquiries, the following information would be relevant to optimize Technical Support:

- Write Company, Project, Product Type, Trouble and Person reference in the "subject" field of the e-mail so that all mails can be easily retrieved also after several forwards
- The e-mail text should report:
 - Product Type
 - Delivery Date
 - Serial Number S/N of the GT863-PY Terminal
 - LOT N.
 - HW and SW code xSxxxxxxHxx
 - HW version of the GT863-PY Terminal: v.xx
 - Installed SW version (AT+CGMR)
 - IMEI (AT+CGSN)
 - Description of the Application, reference to its version (SW, HW)
 - SIM Type (issued by which Mobile Network Operator of Home PLMN or Service Provider and SIM type & supplier)
 - Network Conditions: location, registered network, coverage (AT#CSURV)
 - Antenna type
 - Used Services (MO, MT, voice, SMS, data, fax, GPRS)

...and then the question or trouble:

- Command & Response sequences
- Listing of the relevant parts of a Python Script
- Signal / pin, timing, levels...

Thank you!



7 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. The 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.



7.1 Disposal of this product in the European Union

According to the directives 2002/95/CE, 2002/96/CE and 2003/108/CE, which have been transposed in Italian Legislative Decree of July 25, 2005, n. 151, Telit Communications S.p.A informs that:

- The symbol of the crossed-out wheeled bin reproduced on the product or on the packaging, indicates that the product, at the end of life cycle, must be gathered separately from the other waste.
- The separate collection of rubbish for this product at the end of its life cycle is arranged and managed by the manufacturer. The user, who wants to dispose the product, must contact the manufacturer and follow the available system that allows the separate collection of rubbish for this product that has reached the end of the life cycle.
- The suitable separate collection of rubbish, necessary for the subsequent transfer of the obsolete product for the recycling, the treatment and the compatible environment disposal, contributes to avoid possible negative effects to the environment and the health, and helps in the re-use and/or recycle of the materials from which this product is composed.
- The illegitimate disposal of the product by the holder implies the enforcement of the administrative penalties provided for the regulations in force.
- The company is enrolled on the register of the manufacturers of Electric and Electronic Equipment (EEE) of the Italian Minister for the Environment with the number:
IT08020000002357



Reference Directives and Laws

2002/95/EC	Directive of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS)
2002/96/EC	Directive of the European Parliament and of the Council on waste electrical and electronic equipment (WEEE)
2003/108/EC	Directive of the European Parliament and of the Council of 8 December 2003 amending directive 2002/96/EC on waste electrical and electronic equipment (WEEE)
Italian Legislative Decree of July 25, 2005, n. 151	Attuazione delle direttive 2002/95/CE, 2002/96/CE e 2003/108/CE, relative alla riduzione dell'uso di sostanze pericolose nelle apparecchiature elettriche ed elettroniche, nonche' allo smaltimento dei rifiuti.



8 List of Acronyms

ACM	Accumulated Call Meter
ASCII	American Standard Code for Information Interchange
AT	Attention commands
CB	Cell Broadcast
CBS	Cell Broadcasting Service
CCM	Call Control Meter
CLIP	Calling Line Identification Presentation
CLIR	Calling Line Identification Restriction
CMOS	Complementary Metal-Oxide Semiconductor
CR	Carriage Return
CSD	Circuit Switched Data
CTS	Clear To Send
DAI	Digital Audio Interface
DCD	Data Carrier Detected
DCE	Data Communications Equipment
DRX	Data Receive
DSR	Data Set Ready
DTA	Data Terminal Adaptor
DTE	Data Terminal Equipment
DTMF	Dual Tone Multi Frequency
DTR	Data Terminal Ready
EMC	Electromagnetic Compatibility
ETSI	European Telecommunications Equipment Institute
FTA	Full Type Approval (ETSI)
GPRS	General Radio Packet Service
GSM	Global System for Mobile communication
HF	Hands Free
I²C, IIC	Inter IC Bus
IMEI	International Mobile Equipment Identity
IMSI	International Mobile Subscriber Identity
IRA	Internationale Reference Alphabet
ITU	International Telecommunications Union
IWF	Inter-Working Function
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LF	Linefeed
ME	Mobile Equipment
MMI	Man Machine Interface
MO	Mobile Originated
MS	Mobile Station
MT	Mobile Terminated
OEM	Other Equipment Manufacturer
PB	Phone Book
PDU	Protocol Data Unit



GT863-PY Terminal Product Description

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PH	Packet Handler
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUCT	Price per Unit Currency Table
PUK	PIN Unblocking Code
RACH	Random Access Channel
RLP	Radio Link Protocol
RMS	Root Mean Square
RTS	Ready To Send
RI	Ring Indicator
SAR	Specific Absorption Rate (e.g. of the body of a person in an electromagnetic field)
SCA	Service Center Address
SIM	Subscriber Identity Module
SMD	Surface Mounted Device
SMS	Short Message Service
SMSC	Short Message Service Center
SPI	Serial Protocol Interface
SS	Supplementary Service
TIA	Telecommunications Industry Association
UDUB	User Determined User Busy
USSD	Unstructured Supplementary Service Data



9 Document Change Log

Revision	Date	Changes
ISSUE #0	27/09/2006	First Issue
ISSUE #1	28/09/2007	Added new the terminal with the Order-Num.: 3990150471 and its new features such as CMUX, SAP e Multisocket
ISSUE #2	18/03/2008	Updated applicability table Removed info regarding phased out product 3990150466 Added new WEEE directive

