

# GT864-3G Terminal Product Description

80269ST10071a Rev.0 - 14/09/09





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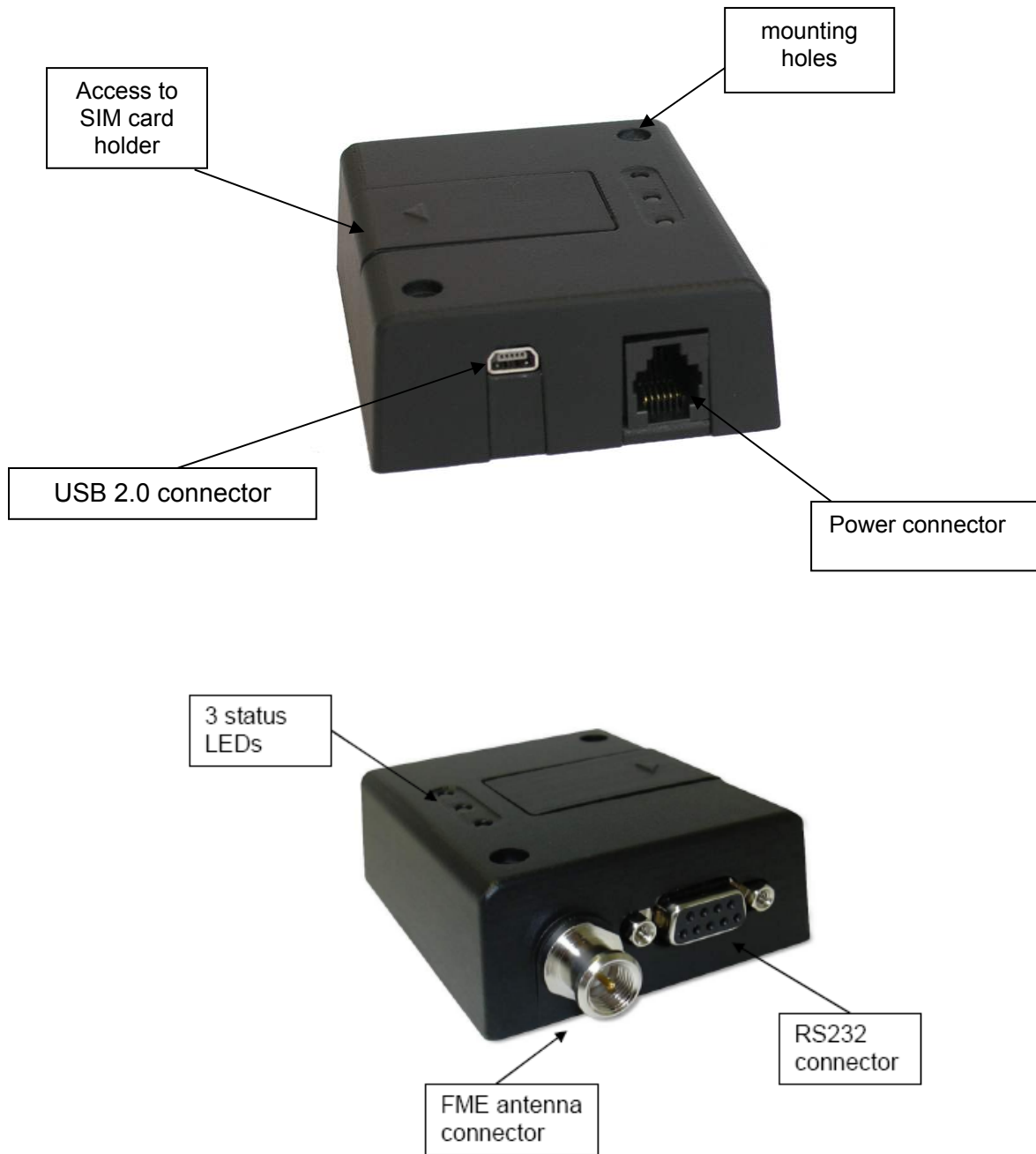






## 2.5 GT864-3G Terminal Interfaces

The interfaces of the **GT864-3G Terminal** are the following industry standard connectors distributed on the front and rear panels, see figure. The GT864-3G Terminal case is made of durable PC/ABS plastic.





## 2.6 Power Supply

### 2.6.1 Supply voltage requirements

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

- Input voltage range 5 - 32V DC
- Nominal Voltage 12V DC

Application of the supply voltage does not switch the modem on. To do so an additional active-high control signal, TO\_IN, must be applied for > 1s.

VCC and GND are reverse-polarity and over-voltage protected. Please note: this does not apply for the GND on the antenna connector if this coax GND/shield are connected to your applications ground-plane.

The measurement was realised by 4 different Voltages (5 V, 12V, 24 V and 32 V).

GT864-3G	@ 5V	@12V	@ 24V	@ 32V
Terminal switched off <sup>1</sup>	60µA	150µA	308µA	415µA
On, network connection (Idle mode) <sup>2</sup>	27mA	10mA	6mA	5mA
On, network connection (Idle mode) <sup>3</sup>	40mA	15mA	9mA	7mA

**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

An RJ11 6-way connector, as shown and described below, serves as a means of supplying and controlling DC power to the modem.

<sup>1</sup> Off means: GT864 powered via VCC; switched off via HR\_IN, DTR low

<sup>2</sup> high impedance RS232

<sup>3</sup> impedance 4,7kΩ





## 2.6.3 Mini USB type connector

The modem supports a standard USB 2.0 interface for AT-commands. The maximum baud rate to communicate with the GT864-3G Terminal is up to 12 Mbit/s.

Drivers for several operating systems (e.g. Windows/Linux) are available on the telit official web site [www.telit.com](http://www.telit.com) in the download zone under software tools for UC864-E.

If you have not received your personal login code, pls. contact: [wireless.solutions@telit.com](mailto:wireless.solutions@telit.com)

**GT864-3G Pin Layout for Mini USB connector:**

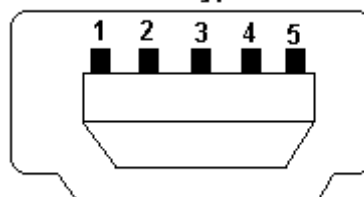
Pin	Signal
1	VUSB
2	D -
3	D +
4	ID
5	GND



Pin 5

Pin 1

**Mini-USB Type A/B**



**Female (Receptacle)**



## 2.7 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 GT864-3G Terminal with all its functions. Through the RS232 interface it can be used as GSM/GPRS/UMTS modem for sending and receiving of SMS, Data and Fax calls.

### 2.7.1 RS232 standard interface connector

Connector type on the terminal is:

- standard RS232 Sub-D 9pin female
- Maximum baud rate to communicate with the GT864-3G is 230,4 kbit/s

The electrical characteristics of the serial port signals are shown below:

PIN	Signal	Direction	Voltage levels	Description
1	DCD	Output	> + 4 V < - 4 V	Data carrier detect
2	RD	Output	> + 4 V < - 4 V	Received data
3	TD	Input	> + 2,4 V < 0.8 V	Transmitted data
4	DTR	Input	> + 4 V < 0.8 V	Data terminal ready
5	GND	-	0 V	Ground connection
6	DSR	Output	> + 4 V < - 4 V	Data set ready
7	RTS	Input	> + 2,4 V < 0.8 V	Request to send
8	CTS	Output	> + 4 V < - 4 V	Clear to send
9	RI	Output	> + 4 V < - 4 V	Ring indicator

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.



## 2.7.2 Serial Data

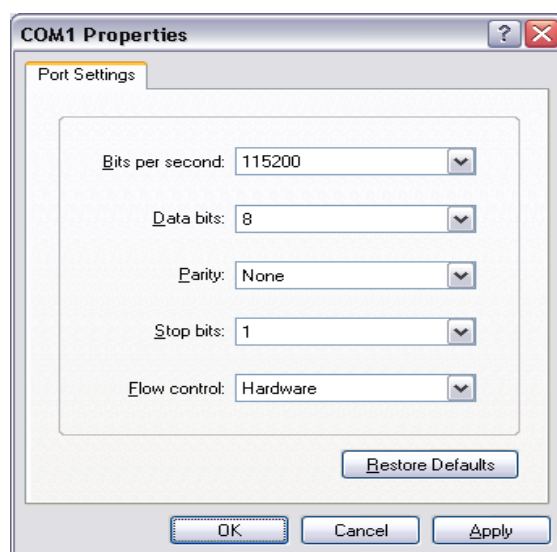
**GT864-3G** does not support autobauding. Users have to set the right speed for serial communication before device initialization. If the right speed is set, the device responds with OK. The default baudrate is 115200.

- send command AT+IPR=<rate><cr>
- wait for OK response

where rate is the port speed and can be 0, 300,1200,2400,4800,9600,19200,38400,57600,115200, 230400 bps.

## 2.7.3 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 GT864-3G Terminal is connected with the following settings:



For more information about which AT Commands are implemented on the GT864-3G Terminal can be found in the “UC864 Software User Guide” and “UC864 AT Commands Reference Guide”, available on [www.telit.com](http://www.telit.com)

**NOTE:** We remind you that when you consult the AT Commands Reference Guide referring to the UC864 please consider that due to the limitations of the GT864-3G Terminal, such as no access to GPIO, not all AT Commands can be implemented.







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from the antenna the field strength may be up to 70V/m and at 1m it will have reduced to 7V/m. In general, CE-marked products for residential and commercial areas, and light industry can withstand a minimum of 3V/m.

### 2.9.3.1 The antenna cable

Use 50Ω impedance low-loss cable and high-quality 50Ω impedance connectors (frequency range up to 2GHz) to avoid RF losses. Ensure that the antenna cable is as short as possible. The Voltage Standing-Wave Ratio (VSWR) may depend on the effectiveness of the antenna, cable and connectors. In addition, if you use an adapter between the antenna cable and the antenna connector, it is crucial that the antenna cable is a high-quality, low-loss cable. Minimize the use of extension cables, connectors and adapters. Each additional cable, connector or adapter causes a loss of signal power.

### 2.9.3.2 Antenna Connector

The **Telit GT864-3G Terminal** antenna connector allows transmission of radio frequency (RF) signals between the modem and an external customer-supplied antenna. The modem is fitted with a 50Ω FME male coaxial jack.

Description of antenna connector parameters:

Parameter	Limit	Description
Nominal impedance	50Ω	
Output Power	2 Watt peak (Class 4) 1 Watt peak (Class 1) 0.25 Watt Peak (Class 3)	GSM900/850 MHz GSM1800/1900 MHz UMTS/HSDPA 2100MHz

### 2.9.3.3 Antenna precautions

If the antenna is to be mounted outside, consider the risk of lightning. Follow the instructions provided by the antenna manufacturer.

- Never connect more than one modem to a single antenna. The modem can be damaged by radio frequency energy from the transmitter of another modem.
- Like any mobile station, the antenna of the modem emits radio frequency energy. To avoid EMI (electromagnetic interference), you must determine whether the application itself, or equipment in the application’s proximity, needs further protection against radio emission and the disturbances it might cause. Protection is secured either by shielding the surrounding electronics or by moving the antenna away from the electronics and the external signals cable.
- The modem and antenna may be damaged if either come into contact with ground potentials other than the one in your application. Beware, ground potential are not always what they appear to be.





## 2.12 Reference sensitivity

### WCDMA-2100

The sensitivity of the GT864-3G wireless modem according to the specifications for the class 3 portable terminals WCDMA2100 (2100 MHz) is **-108.2 dBm** typical in normal operating conditions.

### GSM-850 / 900

The sensitivity of the GT864-3G 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 GT864-3G wireless modem according to the specifications for the class 1 portable terminals DCS-1800 / PCS-1900 is **-106 dBm** typical in normal operating conditions.





### 2.13.1.2 Switching OFF the modem

There are three ways to switch off (power down) the modem as described below:

- use the AT#SHDN command; DTR permanently to low (0,8V)
- HR\_IN to high level for  $t < 5s$

A delay of up to 10s is experienced as the modem logs off the network

## 2.13.2 SMS

The **Telit GT864-3G** supports the following SMS types:

- Mobile Terminated (MT) class 0 – 3 with signaling 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 signaling of new incoming SMS.

## 2.13.3 Data/fax transmission

The **Telit GT864-3G** supports:

- WCDMA/HSDPA category 8, MS Class A Simultaneous Voice and Data
- EGPRS/GPRS CLASS 12, MS Class B
- CSD up to 14.4 Kbps
- Fax service, Class 1 Group 3.

## 2.13.4 Phonebook

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

## 2.13.5 Characters management

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

## 2.13.6 LED Indicators

The GT864-3G Terminal has 3 LED indicators, two are status LEDs and one is power up LED.

### 2.13.6.1 Power up LED (green LED in the middle)

The modem has a green power up LED, as depicted below, which is used to indicate





# 3 Software Features

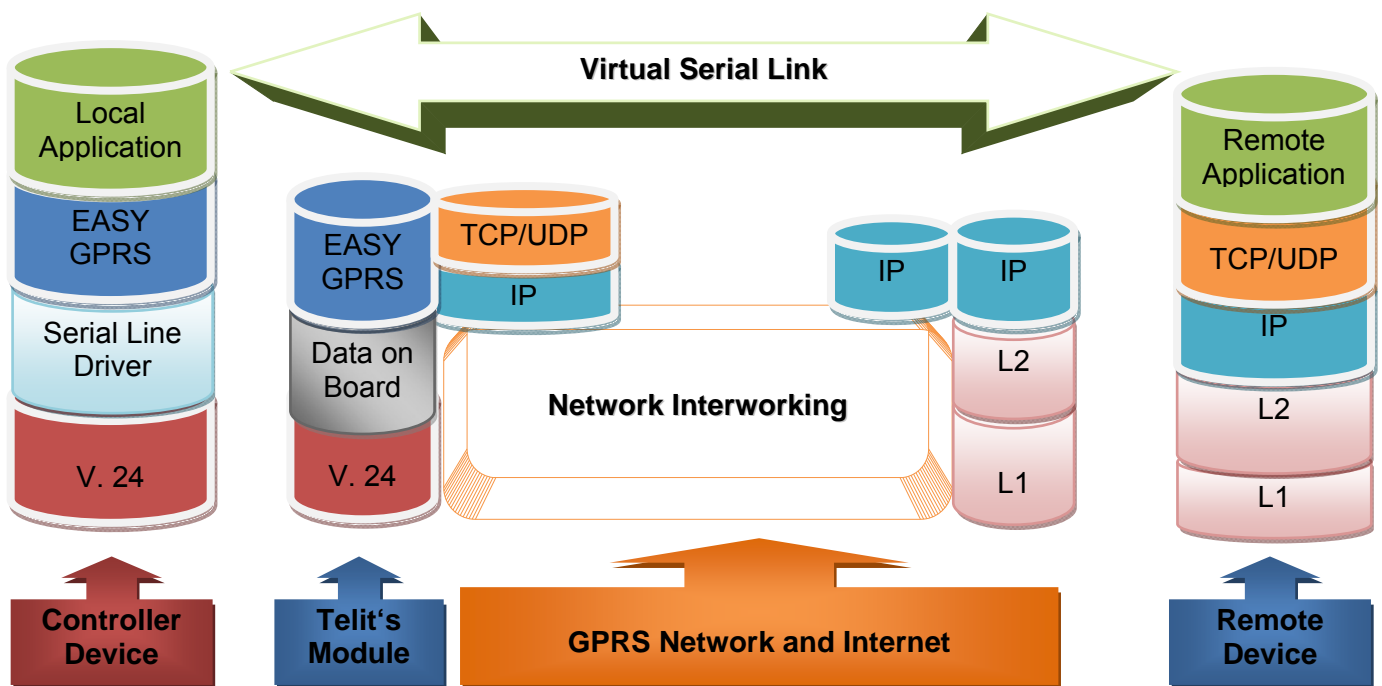
## 3.1 Enhanced EASY GPRS Extension

### 3.1.1 Overview

The EASY GPRS feature allows a user of the **Telit GT864-3G Terminal** to contact a device in the Internet and establish with it a raw data flow over the WCDMA/EDGE/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 GT864-3G Terminal**, 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 GT864-3G Terminal** the use of the WCDMA/EDGE/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 new features such as:

- Keep the WCDMA/EDGE/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 WCDMA/EDGE/GPRS Access
- configuring the embedded TCP/IP stack behaviour
- defining the Internet Peer to be contacted
- request the WCDMA/EDGE/GPRS and socket connections to be opened (host is connected)
- exchange raw data
- close the socket and WCDMA/EDGE/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 WCDMA/EDGE/GPRS please consult Easy GPRS User Guide and AT Commands Reference Guide.







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	Disconnection Initiated by the Server
Transfer APDU	Transfer APDU
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.

## 3.4 PFM (Premium FOTA Management)

Premium FOTA Management (PFM) provides a cost-effective, fast, secure and reliable way for wirelessly update the firmware on mobile devices, ensuring that embedded software is up-to-date with the latest enhancements and features. Customers, who want to benefit from this service, must pass through the Telit certification program, where Telit will assist the customer in validating the correct implementation of FOTA.

### 3.4.1 5.2.1 FOTA (Firmware Over The Air)

Telit, which has signed a partnership agreement with the worldwide leader of Firmware OTA technology Red Bend, has integrated its unique vCurrent® Mobile client software for use in its m2m product portfolio. Telit is therefore able to upgrade its products by transmitting only a delta file, which represents the difference between one firmware version and another.

All Telit modules, starting from SW version 8.01.x06, support Over-the-Air firmware update. Note that this service will be enabled only after signing specific agreement with Telit. See <http://www.telit.com/en/infinita-services.php> for details.





## 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 GT864-3G Terminal** firmware (Software). The firmware update can be done with a specific software tool provided by Telit that runs on windows based PCs.

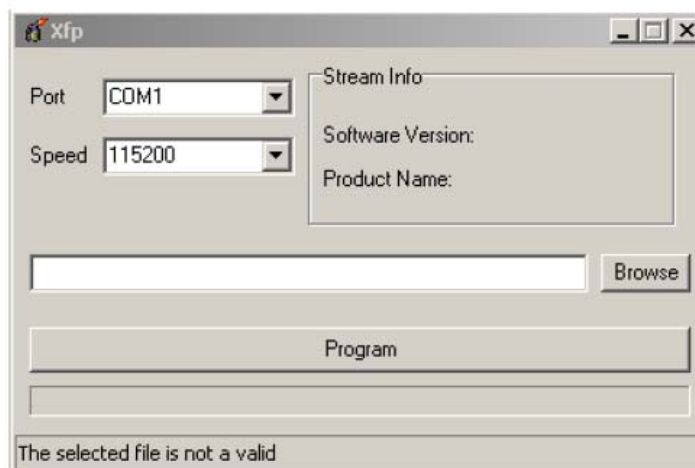
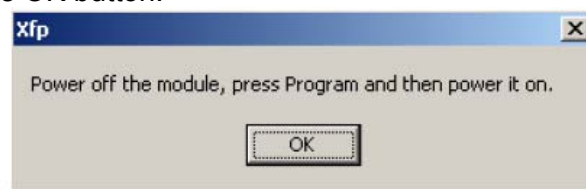
### 4.1 Xfp Tool

The firmware update of the module can be performed with the Xfp Tool provided by Telit. It runs on Windows based PCs. It erases the flash memory content, then it downloads the new firmware on the flash memory.

#### 4.1.1 Step-by-Step Upgrade Procedure

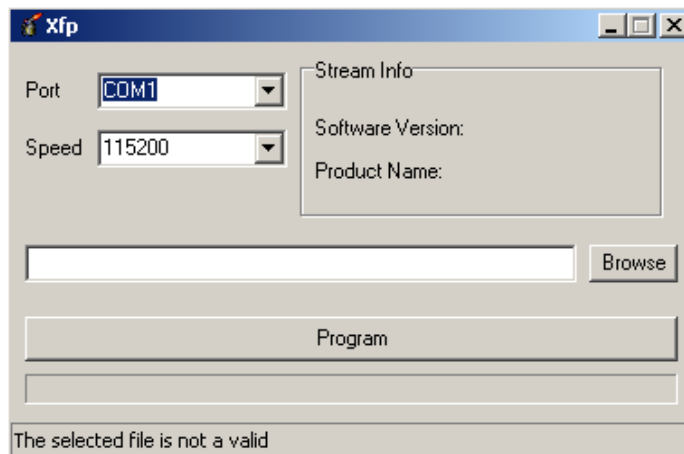
To update the **GT864-3G** firmware, follow the procedure:

1. collect information about the **GT864-3G** and Software version using the following AT commands:
  - AT+CGMR<cr>, returns the Software version information;
  - AT+CGMM<cr>, returns the **GT864-3G** identification.
2. Switch OFF the terminal.
3. Run the Xfp.exe tool, the following windows are displayed. Power OFF the module if needed then press OK button.

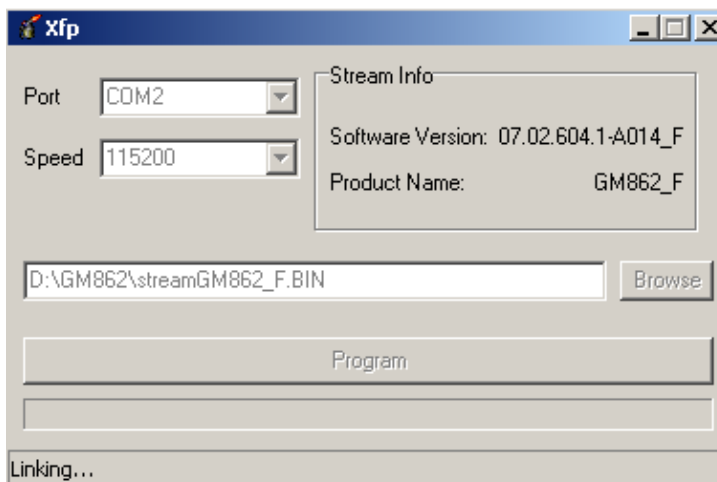


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4. After pressing OK button on the screen is displayed only the following windows.



5. After selecting COM port, speed<sup>5</sup> and stream file (stream files holds new firmware) press Program button, a flashing blue bar appears on the displayed window. The following window is displayed on the screen.

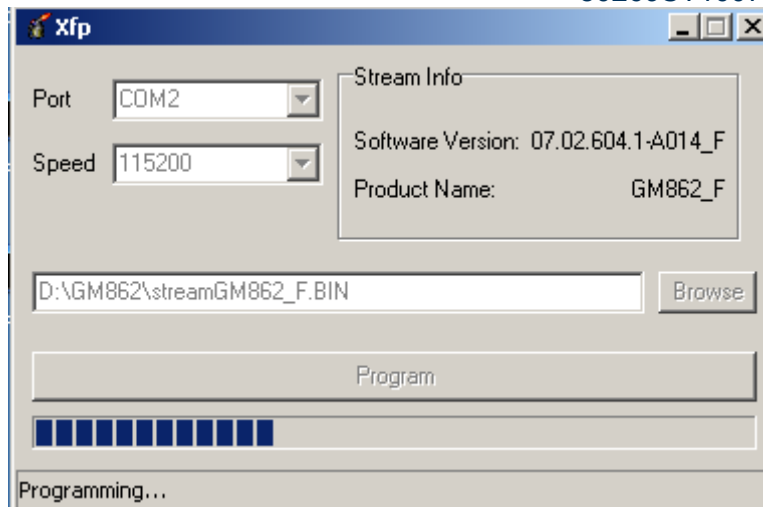


6. After powering ON the module the following window is displayed on the screen. The programming is in progress

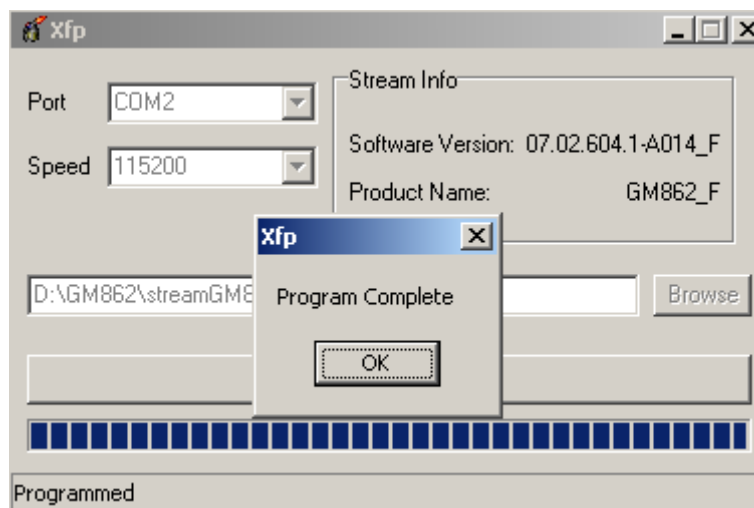
<sup>5</sup> To use speed greater than 115200 Bps a dedicated hardware on PC is needed.



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7. The following window is displayed on the screen when the module is successfully programmed.



8. Now the **GT864-3G** is programmed with the new firmware. Press OK button and exit the tool.









# 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, nonché allo smaltimento dei rifiuti.







