

# GT863-3GG Product Description

80269ST10077a Rev.0 – 2010-09-22



## APPLICABILITY TABLE

PRODUCT
GT863-3GG

















## 2.2. Product Features

Feature	Implementation
Incorporates Telit UC864-G module	The Telit module handles all GSM/UMTS processing for, signal and data within the <b>GT863-3GG</b> .
Frequency bands	Quad band: GSM 850/900/1800/1900/ Tri-band UMTS 850/1900/2100MHz
Power supply	Single supply voltage 5V to 30V
Operating temperature	-20°C to +65°C ambient temperature
Physical	Dimensions: 83mm x 64m x 33m Weight: 180g
RoHS, WEEE	All hardware components are fully compliant with the EU RoHS and WEEE Directives
3 GPIO inputs 1 ADC input	inputs 0-24V 1 input ADC up to 11V with voltage divider of 1:5.75
Communication	RS232 /USB
GPS	Telit UC864-G embedded GPS 12 channels fully integrated GPS







### 3. Power Supply

The power supply of the **GT863-3GG** Terminal has to be a single voltage source of POWER 5V-30V capable of providing a peak during an active transmission. The power supply recommended being any safety approved power supply certified IEC 60950-1 or EN 60950-1 or UL 60950-1 with limited output current up to 2A.

#### 3.1. Supply voltage requirements

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

Input voltage range	5 - 30V DC
Nominal Voltage	12V DC

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

#### 3.2. Power Consumption

The typical current consumption of the GT863-3GG expressed in mA is:

GT863-3GG – GPS switched Off				
GT863-3GG	@ 5V	@12V	@ 24V	@ 32V
Terminal switched off	9	8	11	12
On, network connection (Idle mode) <sup>2</sup>	24	16	15	16
On, network connection (Idle mode) <sup>3</sup>	35	21	18	18

GT863-3GG – GPS switched ON				
GT863-3GG	@ 5V	@12V	@ 24V	@ 32V
On, network connection (Idle mode) <sup>2</sup>	100	50	34	32
On, network connection (Idle mode) <sup>3</sup>	110	55	37	34

<sup>2</sup> High impedance

<sup>3</sup> Impedance 4,7kΩ





## 4. Operating Frequency

The operating frequencies in GSM, DCS, PCS, WCDMA 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	869.2 - 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
WCDMA-2100	1922.4 - 1977.6	2112.4 - 2167.6	Tx : 9612-9888 Rx : 9662-9938	190MHz
WCDMA-850	826.4-846.6	871.4-891.6	Tx : 4132-4233 Rx : 4357-4458	45MHz
WCDMA-1900	1852.4-1907.6	1932.4-1987.6	Tx : 9262-9538 Rx : 9662-9938	80MHz

### 4.1. Transmitter output power

#### WCDMA850/1900/2100

The GT863-3GG transceiver modem in WCDMA-2100 (2100 MHz) operating mode are class 3 in accordance with the specifications which determine the nominal 0.25W peak RF power (+24dBm) on 50 Ohm.

#### GSM-850 / 900 (GSM/GPRS mode)

The GT863-3GG transceiver 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.

#### GSM850/900(EGPRS mode)

The GT863-3GG transceiver modem in GSM850/900(850 ,900 MHz) operating mode are class E2 in accordance with the specifications which determine the nominal 0.5W peak RF power (+27dBm) on 50 Ohm.

#### DCS-1800 / PCS-1900 (GSM/GPRS mode)

The GT863-3GG transceiver 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.



DCS1800/PCS1900(EGPRS mode)

The GT863-3GG transceiver modem in DCS1800/PCS1900(1800 ,1900 MHz) operating mode are class E2 in accordance with the specifications which determine the nominal 0.4W peak RF power (+26dBm) on 50 Ohm.

## 4.2. Reference sensitivity

WCDMA-850/1900/2100

The sensitivity of the GT863-3GG wireless modem according to the specifications for the class 3 portable terminals is -108.2 dBm typical in normal operating conditions.

GSM-850 / 900

The sensitivity of the GT863-3GG 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 GT863-3GG wireless modem according to the specifications for the class 1 portable terminals DCS-1800 / PCS-1900 is -106 dBm typical in normal operating conditions.



## 5. GPS Features

The **GT863-3GG** has an integrated 12 channels, low consumption & high sensitive, GPS receiver.

GPS receiver works in standalone mode, but the handset is ready to implement, In standalone mode, the handset demodulates the data directly from the GPS satellites and it requires no server interaction and works out of network coverage.

As main features of such GPS receiver, we can mention:

- Simultaneous GPS and Voice/Data
- High sensitivity for indoor reception, up to -157dBm (with active antenna)
- Extremely fast TTFF's at low signal levels
- Supports 12-Channel GPS L1 1575.42 MHz
- Accuracy: 3m (CEP68: 68% Circular Error Probable)
- GPS NMEA 0183 output format
- Date WGS-84
- Dedicated GPS AT commands
- Low power consumption

### 5.1. GPS Sensitivity\*

Time to first fix	
Hot start	Autonomous < 1s
Warm start	Autonomous < 32s
Cold start	Autonomous < 40s
Sensitivity	
Tracking	Up to -157 dBm



**\* NOTE:**

Performance will vary depending on environment, antenna type, signal conditions, satellite geometry, and handset implementation





## 6. GT863-3GG Terminal Interface Description

### 6.1. Overview

GT863-3GG provides the following connectors for power supply, Interface and antennas:

1. SMA connector (female) for GSM/WCDMA antenna
2. 4-pole 3mm Micro Mate-N-LOK connector for power supply
3. SIM card holder
4. 9-pole (female) SUB-D plug for RS-232 serial interface or RS485
5. PWR led and Status Led
6. 6-pole RJ11 plug (female) for GPIO's and ADC
7. 5-pole mini-USB type B plug
8. SMA connector (female) for GPS antenna



Figure 1: GT863-3GG side A view



Figure 2: GT863-3GG side B view



## 6.2. Block Diagram GT863-3GG

Figure 3 shows a block diagram of a sample configuration that incorporates a GT863-3GG and typical accessories.

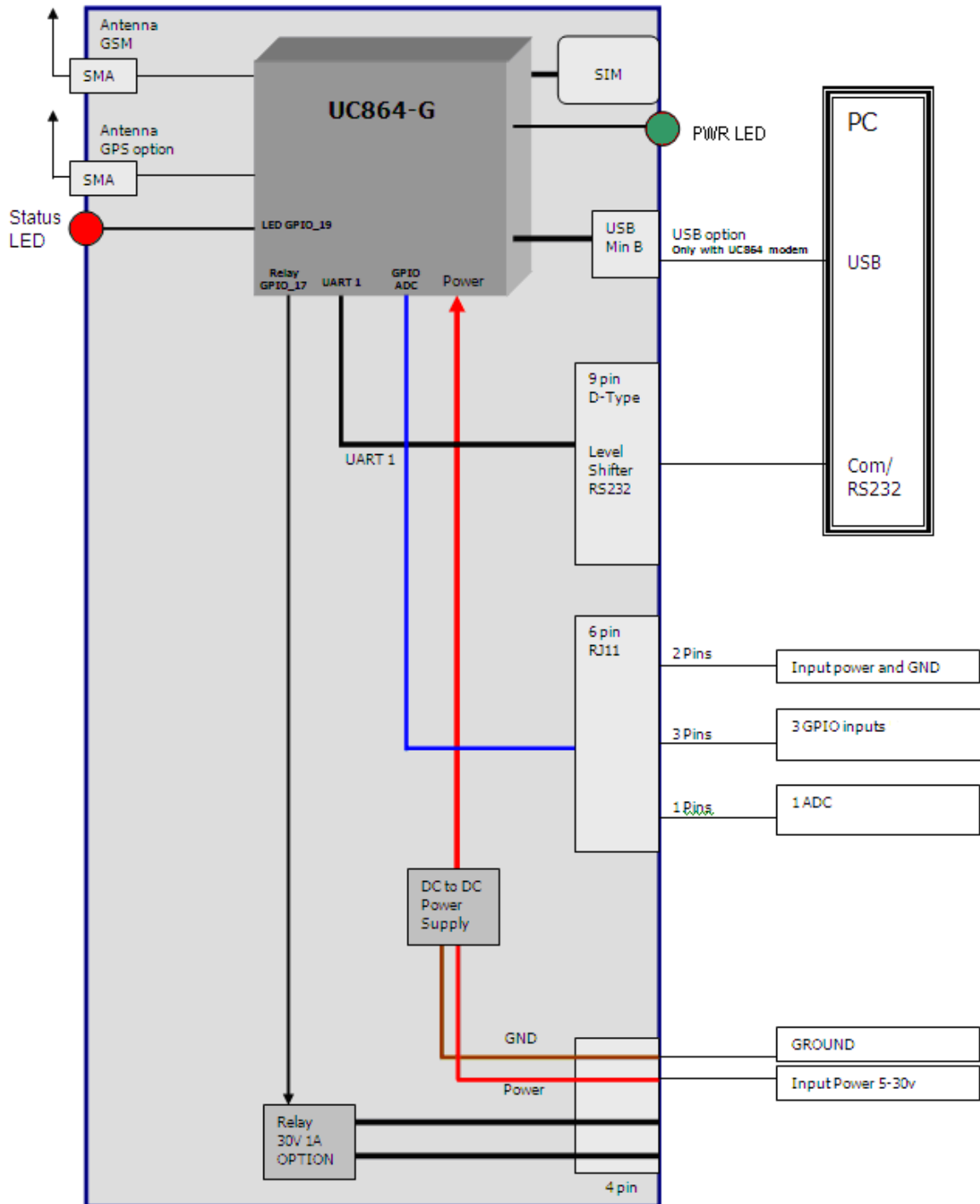


Figure 3: Block diagram







## 6.4.2. USB Interface

GT863-3GG Terminal includes an integrated universal serial bus (USB) transceiver, compliant with USB 2.0 specifications and supporting the USB Full-Speed (12 Mb/s) mode. In HSDPA (High Speed download Packet Access) mode, the downlink data speed rates up to 7.2Mbps. Hence OEMs need to interface GT863-3GG to applications in full-speed (12Mbps/s) mode

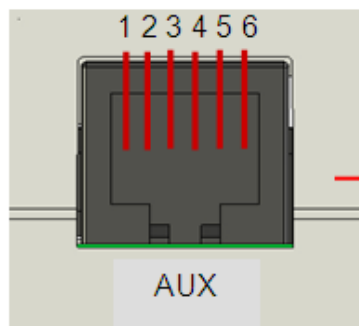
Connector type is Mini-USB type B.

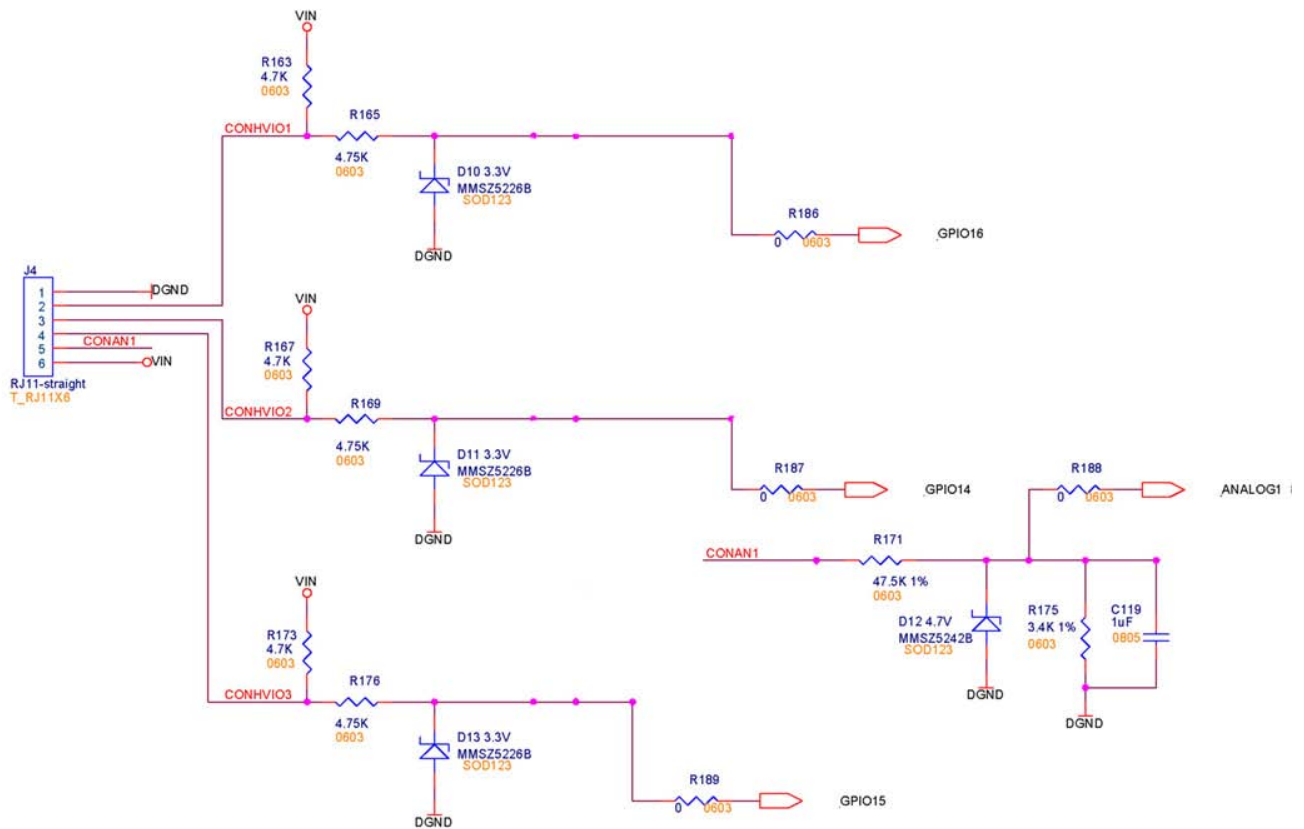
## 6.5. GPIO Interface

The GPIO interface provides via 6 pins RJ11 connector the following options:

- 3 inputs 2 GPIO digital.
- 1 input ADC.
- 1 power pin and 1 digital Ground pin

Pin assignment  
1 – Digital GND  
2 – GPIO 16  
3 – GPIO 14  
4 – GPIO 15  
5 – ADC1  
6 – Power VIN





## 6.6. Status LED

Red LED displays the network status of the GT863-3GG.

Red 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

Table 3: RED LED Status









## 7. Software Features

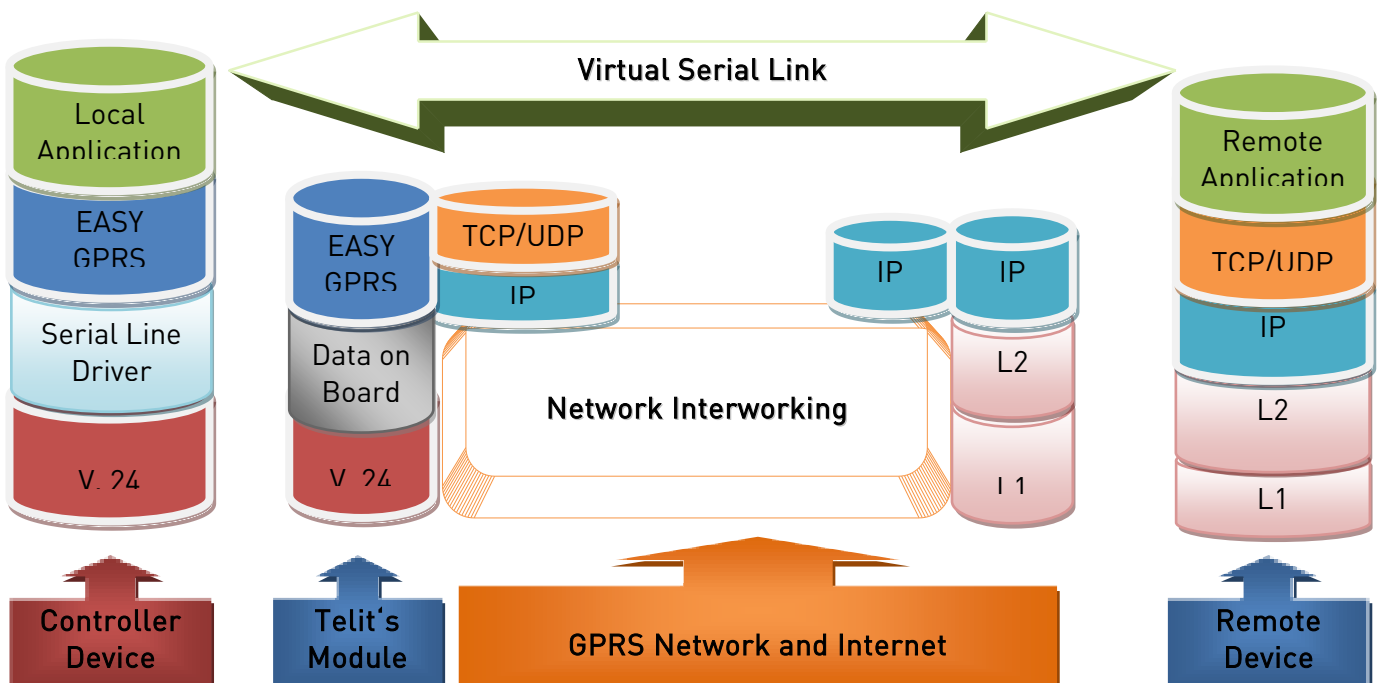
### 7.1. Enhanced EASY GPRS Extension

#### 7.1.1. Overview

The EASY GPRS feature allows a user of the **Telit GT863-3GG 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 GT863-3GG 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 GT863-3GG 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;
- A new internal firewall has been implemented in order to guarantee a certain level of security on internet applications.

## 7.1.2. 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.





## 7.3. SAP: SIM Access Profile

### 7.3.1. Product architecture

The SAP feature allows 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.

### 7.3.2. 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.

### 7.3.3. 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
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.

## 7.4. 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.

### 7.4.1. 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.





## 8. 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 GT863-3GG Terminal firmware (Software). The firmware update can be done with a specific software tool provided by Telit that runs on windows based PCs.

### 8.1. Xfp Tool

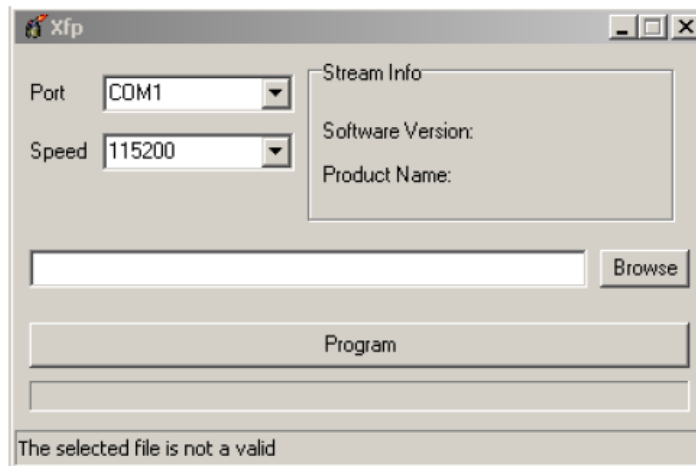
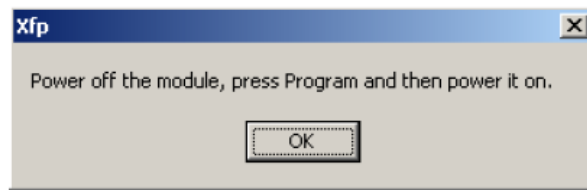
The firmware update of the module can be performed with the Xfp Tool provided by Telit. It runs on Windows based PCs. It erases the flash memory content, then it downloads the new firmware on the flash memory.

#### 8.1.1. Step-by-Step Upgrade Procedure

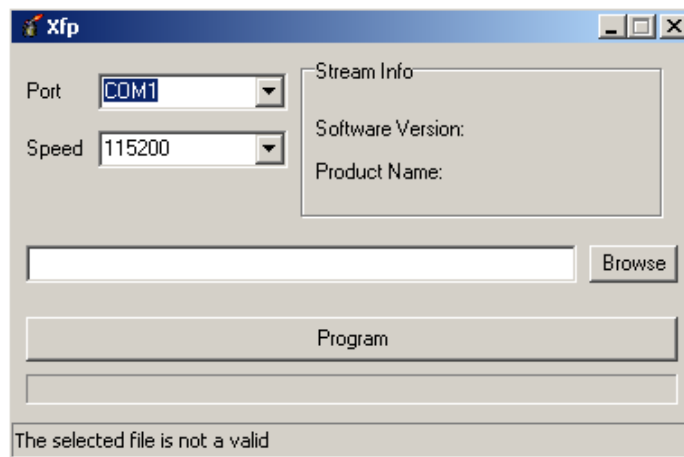
To update the GT863-3GG firmware, follow the procedure:

1. collect information about the GT863-3GG and Software version using the following
  - a. AT commands:
  - b. AT+CGMR<cr>, returns the Software version information;
2. AT+CGMM<cr>, returns the GT863-3GG identification.
3. Switch OFF the terminal.
4. Run the Xfp.exe tool, the following windows are displayed. Power OFF the module if needed then press OK button.





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

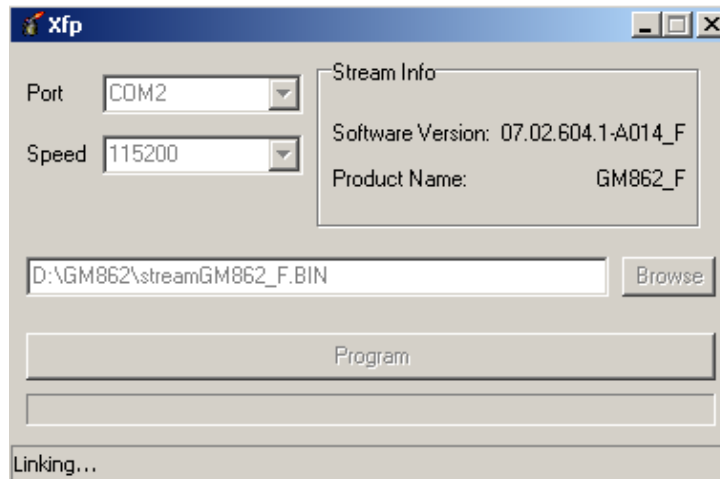


2. After selecting COM port, speed<sup>5</sup> and stream file (stream files holds new firmware) press Program button, a flashing blue bar appears on the displayed window. The following window is displayed on the screen.

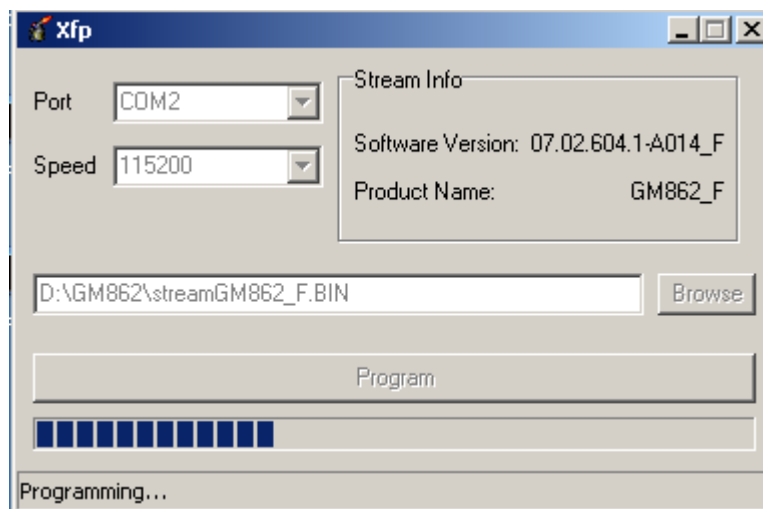
<sup>5</sup> To use speed greater than 115200 Bps a dedicated hardware on PC is needed.





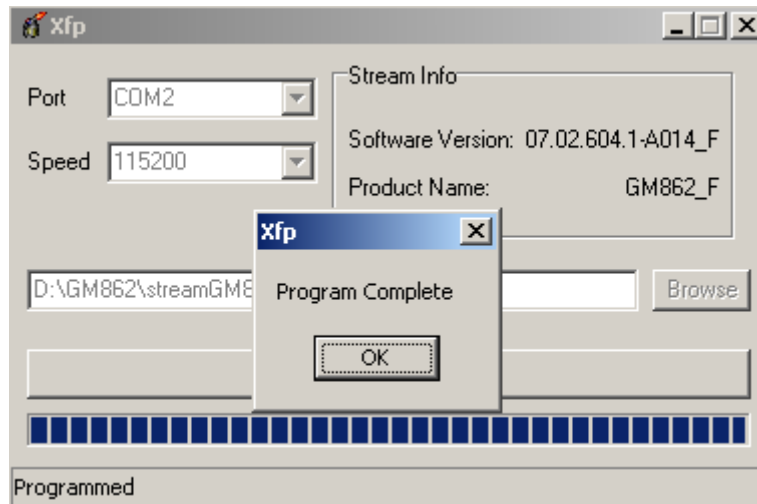


3. After powering ON the module the following window is displayed on the screen. The programming is in progress

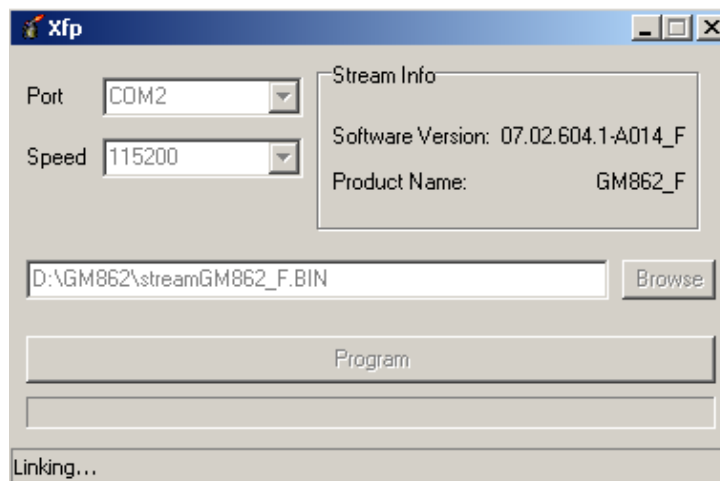


4. The following window is displayed on the screen when the module is successfully programmed.





- After selecting COM port, speed<sup>6</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.



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

<sup>6</sup> To use speed greater than 115200 Bps a dedicated hardware on PC is needed.





## 9. Product specified approval for CE

Name: Industrial GSM/UMTS Communication unit  
Model: GT863-3GG

Reference standard(s):

Radio

Note: test only for GC864 module

Number	Market	Standard	Procedure
1	Europe	EN 301 511 V9.0.2	Spurious Emissions testing

EMC

Number	Market	Standard	Procedure
2	Europe	EN 301 489-7 V1.2.1	partial testing and report
3	USA	47 CFR part 15:06 sb.B	Verification

Safety

Number	Market	Standard	Procedure
4	Europe	EN 60950-1:06	DoC



