

# GM862 Product Description

GM862-GPS, GM862-QUAD-PY , GM862-QUAD

80272ST10019a Rev. 4 – 04/08/2006



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

This document is relating to the following products:

 <p><b>GM862-GPS</b> Modem</p>	 <p><b>GM862-QUAD</b> Modem <b>GM862-QUAD-PY</b> Modem</p>
<p>GM862-GPS 3 990 250 657</p>	<p>GM862-QUAD 3 990 250 655 GM862-QUAD-PY 3 990 250 656 GM862-QUAD 3 990 250 659 GM862-QUAD-PY 3 990 250 658</p>



# Contents

<b>1</b>	<b>Overview.....</b>	<b>7</b>
<b>2</b>	<b>General Product Description .....</b>	<b>9</b>
2.1	Dimensions .....	9
2.2	Weight.....	10
2.3	Environmental requirements.....	11
2.3.1	Temperature range .....	11
2.3.2	Vibration Test (non functional).....	11
2.3.3	RoHS compliance .....	11
2.4	Operating Frequency.....	12
2.5	Transmitter output power .....	12
2.6	Reference sensitivity.....	12
2.7	Antennas.....	13
2.7.1	GSM Antenna .....	13
2.7.2	GPS Antenna.....	14
2.7.3	Antenna connector.....	14
2.8	GPS Module features.....	15
2.8.1	GPS Specifications .....	15
2.8.1.1	GPS Sensitivity .....	15
2.8.1.2	GPS Average Power Consumption .....	15
2.8.1.3	GPS Driving .....	15
2.8.1.4	GPS NMEA.....	15
2.8.1.5	NMEA sentences .....	16
2.9	Supply voltage .....	19
2.10	GSM Power consumption .....	19
2.11	Embodied Battery Charger .....	19
2.12	User Interface .....	20
2.12.1	Speech Coding .....	20
2.12.2	SIM Reader.....	20
2.12.3	SMS .....	20
2.12.4	Real Time Clock and Alarm .....	21
2.12.5	Data/fax transmission .....	21
2.12.6	Local security management.....	21
2.12.7	Call control .....	21
2.12.8	Phonebook.....	21
2.12.9	Characters management .....	21
2.12.10	SIM related functions .....	21
2.12.11	Call status indication.....	21
2.12.12	Indication of network service availability.....	22
2.12.13	Automatic answer (Voice, Data or FAX).....	22
2.12.14	Supplementary services (SS) .....	22
2.12.15	Acoustic signaling .....	22



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

2.12.16	DTMF tones .....	23
2.12.17	Buzzer Output .....	23
2.12.18	RF Transmission Monitor .....	23
<b>2.13</b>	<b>EMC</b>	<b>24</b>
<b>2.14</b>	<b>Logic level specifications .....</b>	<b>24</b>
2.14.1	Reset signal .....	25
<b>2.15</b>	<b>Audio levels specifications.....</b>	<b>26</b>
<b>2.16</b>	<b>Camera compatibility (EASY CAMERA) .....</b>	<b>27</b>
<b>2.17</b>	<b>ADC Converter (GM862-GPS only) .....</b>	<b>27</b>
<b>2.18</b>	<b>Interface connectors on GM862 modules .....</b>	<b>28</b>
<b>2.19</b>	<b>Mounting the GM862 modules on your Board.....</b>	<b>34</b>
2.19.1	Antenna Coaxial cable fixing .....	34
2.19.2	Precautions .....	36
<b>3</b>	<b>Evaluation Kit.....</b>	<b>37</b>
<b>3.1</b>	<b>Evaluation Kit description .....</b>	<b>38</b>
3.1.1	Power Supply .....	38
3.1.2	Serial interface .....	38
3.1.3	Audio .....	38
3.1.4	GPIO and Leds .....	38
3.1.4.1	Telit GM862 Family modules interface connector .....	38
<b>4</b>	<b>Service and firmware update.....</b>	<b>40</b>
<b>4.1</b>	<b>Step-by-Step upgrade procedure.....</b>	<b>40</b>
<b>5</b>	<b>Software Features.....</b>	<b>43</b>
<b>5.1</b>	<b>Enhanced Easy GPRS Extension.....</b>	<b>43</b>
5.1.1	Overview .....	43
5.1.2	Easy GPRS definition .....	44
5.1.2.1	Configuring the GPRS access .....	44
5.1.2.2	Configuring the embedded TCP/IP stack .....	44
5.1.2.3	Defining the Internet peer to be contacted .....	44
5.1.2.4	Open the connection with the internet host .....	45
5.1.2.5	Close the Socket and deactivate the context .....	45
5.1.3	Enhanced Easy GPRS Outgoing connection .....	45
5.1.3.1	Configuring the GPRS access .....	46
5.1.3.2	Configuring the embedded TCP/IP stack .....	46
5.1.3.3	Defining the Internet peer to be contacted .....	46
5.1.3.4	Request the GPRS context to be activated .....	46
5.1.3.5	Open the connection with the internet host .....	47
5.1.3.6	Close the Socket without deactivating the context .....	47
5.1.4	Enhanced Easy GPRS Incoming Connection .....	48
5.1.4.1	Defining the Internet Peer that can contact this device (firewall settings).....	48
5.1.4.2	Request the socket connection to be opened in listen .....	49
5.1.4.3	Receiving connection requests.....	49
5.1.5	FTP Client .....	50
5.1.6	Known limitations .....	50
<b>5.2</b>	<b>Jammed Detect &amp; Report Extension.....</b>	<b>51</b>



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

5.2.1	Overview .....	51
<b>5.3</b>	<b>Easy Script Extension - Python interpreter .....</b>	<b>52</b>
5.3.1	Overview .....	52
5.3.2	Python 1.5.2+ Copyright Notice .....	54
5.3.3	Python implementation description .....	55
5.3.4	Python core supported features .....	56
5.3.5	Python Build-in Custom Modules .....	57
<b>5.4</b>	<b>CMUX .....</b>	<b>58</b>
5.4.1.1	Product architecture .....	58
5.4.1.2	Implementation feature and limitation .....	58
<b>5.5</b>	<b>SAP:SIM Access Profile .....</b>	<b>59</b>
5.5.1	Product architecture .....	59
5.5.2	Implementation feature .....	59
5.5.3	Remote SIM Message Command Description .....	59
<b>6</b>	<b>AT Commands .....</b>	<b>61</b>
<b>7</b>	<b>Conformity Assessments .....</b>	<b>69</b>
7.1	GM862-QUAD(P/N:3990250655): Conformity Assessment .....	71
7.2	GM862-QUAD-PY(P/N:3990250656): Conformity Assessment .....	75
7.3	GM862-QUAD : RoHS certificate .....	79
7.4	GM862-QUAD-PY : RoHS certificate .....	80
7.5	GE862-GPS : RoHS certificate .....	81
7.6	GM862-QUAD FCC Equipment Authorization .....	82
7.7	GM862-QUAD-PY: Conformity Assessment .....	83
7.8	GM862-QUAD-PY FCC Equipment Authorization .....	84
7.9	GM862-GPS: Conformity Assessment .....	85
7.10	GM862-GPS FCC Equipment Authorization .....	89
<b>8</b>	<b>SAFETY RECOMMENDATIONS .....</b>	<b>90</b>
<b>9</b>	<b>GM862 Family Technical Support .....</b>	<b>92</b>
<b>10</b>	<b>Acronyms .....</b>	<b>93</b>
<b>11</b>	<b>Document Change Log .....</b>	<b>95</b>



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# 1 Overview

The **GM862** family gets rich of a new generation of modules such as the **GM862-GPS**, **GM862-QUAD-PY** and **GM862-QUAD**, which combine the access to digital communication services in GSM 850, 900, DCS 1800, PCS1900 MHz networks with an additional key feature of the integrated GPS receiver (GM862-GPS only).

The **Telit GM862-GPS** includes a 20 channels GPS receiver. It provides all the features of the **GM862-QUAD** version such as Voice, Circuit Switched Data transfer, Phonebook, SMS, four bands GSM capability, hot removal sensing on board SIM Reader, GPRS Class 10 and battery charger circuitry. Moreover, the **GM862-GPS** and **GM862-QUAD-PY** models, integrate the “**EASY SCRIPT**” functionality. This is a PYTHON engine script interpreter allowing self-controlled operations. With the EASY SCRIPT feature the **GM862-GPS** and **GM862-QUAD-PY** become a finite product, they just need your script to be run.

The **GM862** is specifically designed and developed by **Telit** for OEM usage and dedicated to portable data, voice and telematic applications, such as:

- **Telemetry and Telecontrol**
- **Security systems**
- **Vending Machines**
- **POS terminals**
- **Phones and Payphones**
- **Return channel for digital broadcasting**
- **Applications, where the external application processor can be replaced by the PYTHON engine provide by GM862-GPS or GM862-QUAD-PY**

Moreover, for the **GM862-GPS**:

- **Automotive and Fleet Management applications**
- **Position reporting and tracking**

All three models supports the following functionalities:

- ***EASY GPRS (AT driven embedded TCP/IP protocol stack)***
- ***EASY CAMERA (AT driven direct connection CAMERA function)***
- ***EASY SCAN (full GSM frequency scanning)***
- ***JAMMING DETECT & REPORT (detect the presence of disturbing devices)***

From the interface point of view, the **GM862-GPS**, **GM862-QUAD-PY** and **GM862-QUAD** provide the following features:

- ***Full RS232 UART, CMOS level (ASC0) interface for AT commands:***  
- ***Auto-bauding from 2.4 up to 57.6 Kbps***



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

### *- Fixed baud rate up to 115.2 Kbps*

- *Two wires RS232, CMOS level (ASC1) for PYTHON debug:*
- *SIM card interface, 3 volts and 1.8 volts (GM862-GPS only)*
- *13 x GPIO ports (max)*
- *x A/D converters (GM862-GPS only)*
- *1 x buzzer output*
- *1 x led status output indicator*

In order to meet the competitive OEM and vertical market stringent requirements, Telit supports its customers with a dedicated Technical Support Policy with:

- [Telit Evaluation Kit EVK2](#) to help you to develop your application;
- a Website with all updated information available;
- a high level technical support to assist you in your development;

For more updated information concerning product Roadmap and availability, technical characteristics, commercial and other issues, please check on the Telit website [www.telit.com](http://www.telit.com) > Products > Modules.

**NOTE:** Some of the performances of the [Telit GM862 modules](#) depend on the SW version installed on the module itself.

The [Telit GM862](#) SW group is continuously working in order to add new features and improve the overall performances.

The [Telit GM862 modules](#) are easily upgradeable by the developer using the [Telit GM862 module](#) Flash Programmer.

Furthermore, all the [Telit GM862 products](#) have the full conformity assessment against R&TTE.

Telit **GM862 Module Pin-to-Pin Upgrade Policy** will enable you to include in your application the new and future products of the GM862 family, allowing you to save your investments and to successfully penetrate new markets.





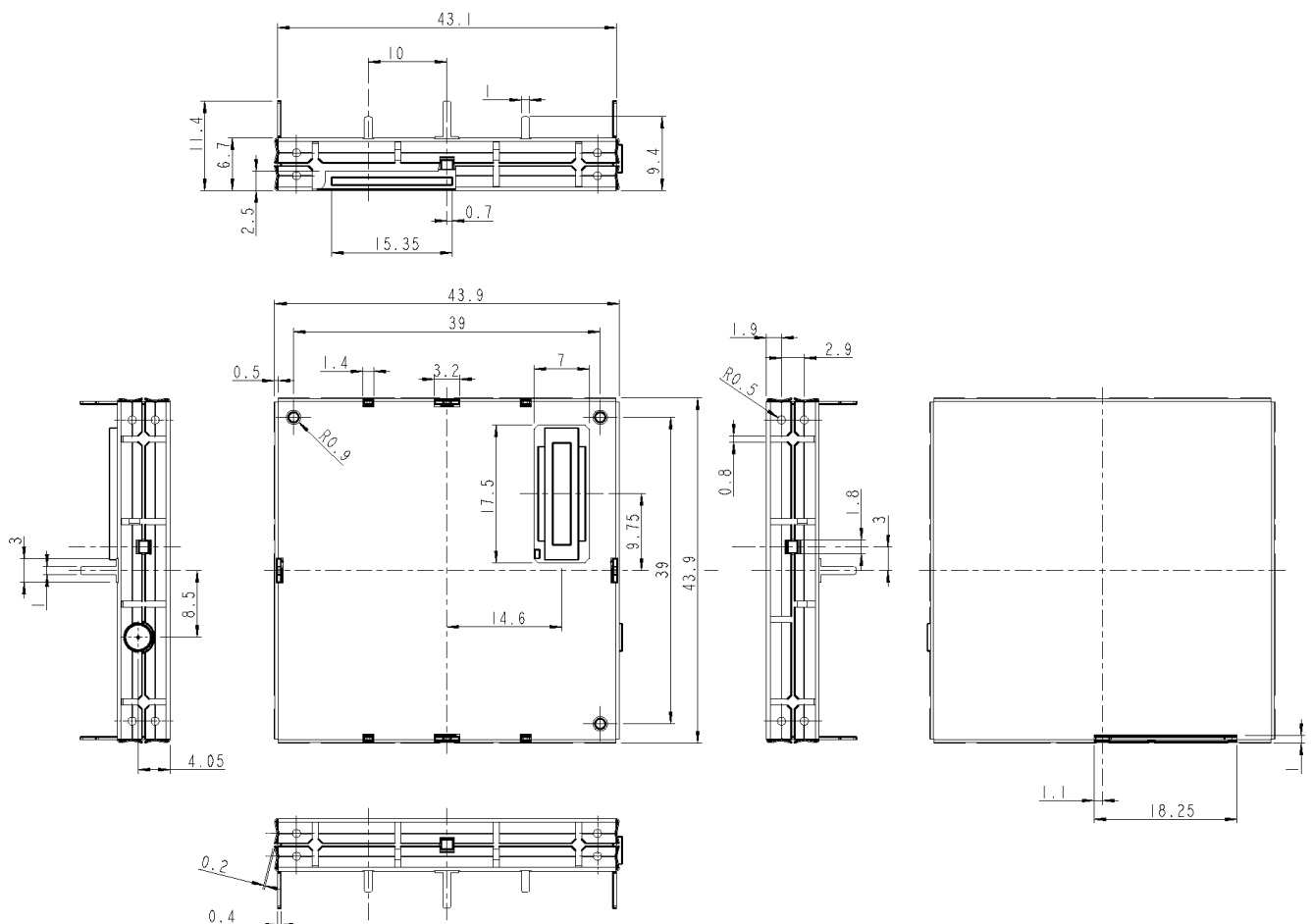
## 2 General Product Description

### 2.1 Dimensions

The **Telit GM862-QUAD-PY** and **GM862-QUAD** modules overall dimension are:

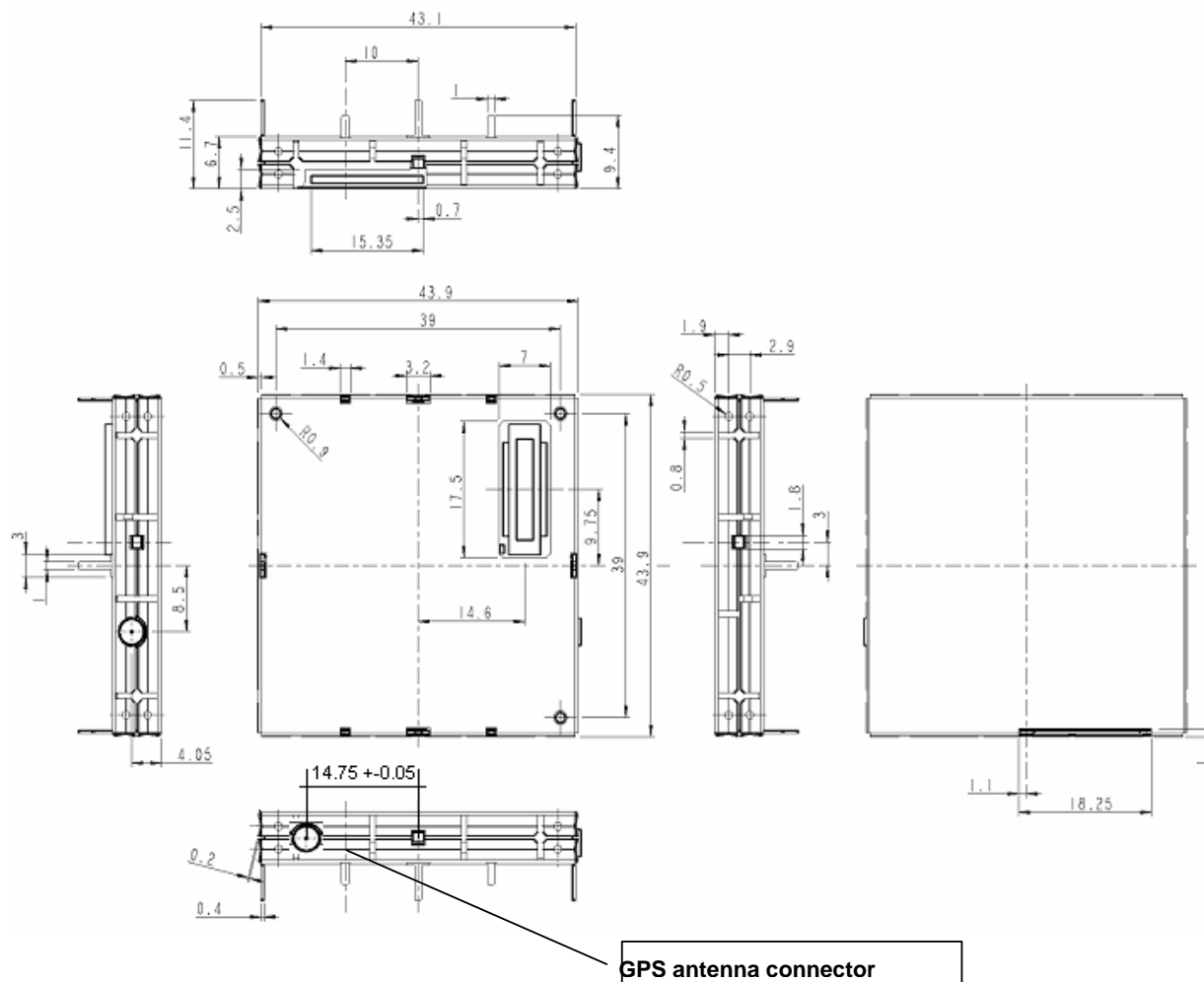
- **Length:** 43.9 mm
- **Width:** 43.9 mm
- **Thickness:** 6.9 mm
- **Volume:**  $\cong 13 \text{ cm}^3$

The layout is shown in the following figure:



**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006

The layout of **Telit GM862 GPS module** is shown in the following figure:



## 2.2 Weight

The **Telit GM862 Family modules** weight is:

	<b>weight (gr)</b>
with shield	23÷28 gr
without shield	16÷21 gr



## 2.3 Environmental requirements

The [Telit GM862 modules](#) are compliant with the applicable ETSI reference documentation GSM 05.05 Release1999 ETSI EN300910 V8.4.1

### 2.3.1 Temperature range

	<b>GM862-QUAD / GM862-QUAD-PY</b>	<b>GM862-GPS</b>
Temperature in normal operating conditions	-10°C ÷ +55°C	-10°C ÷ +55°C
Temperature in extreme operating conditions*	-30°C ÷ +80°C	-30°C ÷ +80°C (preliminary)
Temperature in storage conditions	-30°C ÷ +85°C	-30°C ÷ +85°C

\* Temperature exceeding the range of normal functional conditions can affect the sensitivity, the performance and the MTBF of the module.

### 2.3.2 Vibration Test (non functional)

- 10 ÷ 12Hz ASD = 1.92m 2 /s 3
- 12 ÷ 150Hz -3dB/oct

### 2.3.3 RoHS compliance

The GM862-QUAD /QUAD-PY and GM862-GPS are fully RoHS compliant to EU regulation.



## 2.4 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

## 2.5 Transmitter output power

### GSM–850 / 900

The [Telit GM862](#) modules in GSM–850 / 900 operating mode are of **class 4** in accordance with the specification which determine the nominal **2W** peak RF power (**+33dBm**) on 50 Ohm.

### DCS–1800 / PCS–1900

The [Telit GM862](#) modules 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.

## 2.6 Reference sensitivity

### GSM–850 / 900

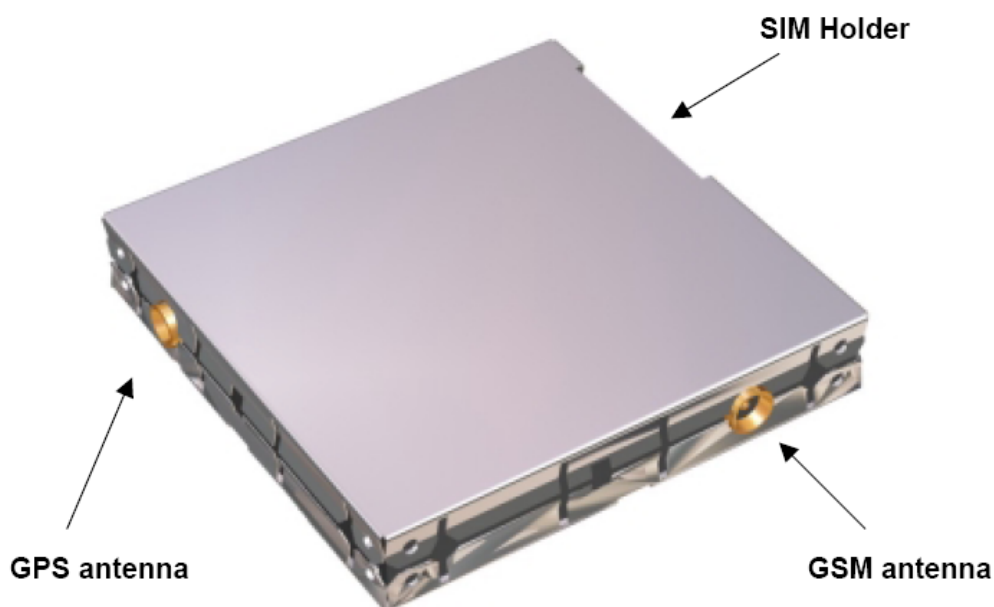
The sensitivity of the [Telit GM862](#) modules according to the specifications for the class 4 GSM–850/900 portable terminals is **–107 dBm** typical in normal operating conditions.

### DCS–1800 / PCS–1900

The sensitivity of the [Telit GM862](#) modules according to the specifications for the class 1 portable terminals DCS-1800 / PCS-1900 is **–106 dBm** typical in normal operating conditions.



## 2.7 Antennas



### 2.7.1 GSM Antenna

The antenna that the customer chooses to use, should fulfill the following requirements:

<b>Frequency range</b>	Depending by frequency band(s) provided by the network operator, the customer shall use the most suitable antenna for that/those band(s)
<b>Bandwidth</b>	80 MHz in EGSM, 150 MHz if GSM 850, 170 MHz in DCS, 140 MHz PCS band
<b>Gain</b>	$1.5\text{dBi} \leq \text{Gain} < 3\text{dBi}$ (referenced to $l/2$ dipole)
<b>Impedance</b>	50 ohm
<b>Input power</b>	> 2 W peak power
<b>VSWR absolute max</b>	$\leq 10:1$
<b>VSWR recommended</b>	$\leq 2:1$





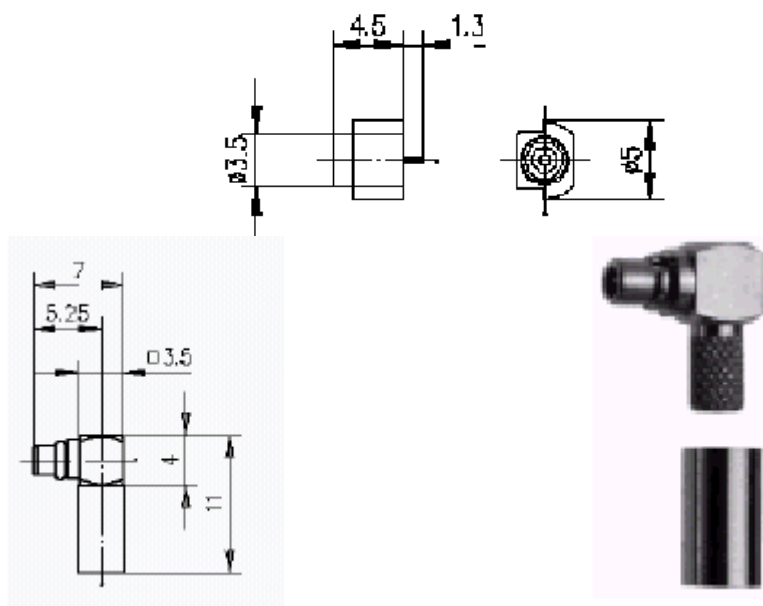
## 2.7.2 GPS Antenna

The Telit GM862-GPS Transceiver module includes a 50 Ohm MMCX connector for the GPS antenna. The GPS antenna should fulfil the following requirements:

<b>Frequency range</b>	GPS L1 (1575.42 MHz),
<b>Power supply</b>	3.4 – 4.2 V DC
<b>Gain</b>	3 dBi > Gain > 1,5 dBi
<b>Impedance</b>	50 ohm
<b>Power consumption</b>	20 mA max

## 2.7.3 Antenna connector

The [Telit GM862 Family modules](#) includes a 50 Ohm MMCX coaxial female. On the user application side the following connector must be used:



a) Telegärtner  
crimp - Order n. J01340A0121

MMCX angle plug

**NOTE:** be very careful when connecting the [Telit GM862 Family modules](#) RF connector. The RF connector can be damaged if not connected with the proper antenna RF connector. The minimum number of insertion cycles are recommended.



## 2.8 GPS Module features

The GM862 include a SiRFstarIII™ single chip GPS receiver, that supports real-time location in urban area and wherever a high sensitivity acquisition is needed. As main features of such GPS receiver, we can mention:

- High sensitivity for indoor fixes
- Extremely fast TTFF's at low signal levels
- Hot starts < 2 seconds
- 200,000+ effective correlators
- Supports 20-Channel GPS

### 2.8.1 GPS Specifications

#### 2.8.1.1 GPS Sensitivity

Type of Fix	Minimum Signal Strength (Signal Condition For All Satellites)
Hot Start (first fix after standby)	-159 dBm

#### 2.8.1.2 GPS Average Power Consumption

The typical current consumption of the GPS part of the [Telit GM862-GPS modules](#) is:

<b>Stand-by current</b>	1 mA <sub>rms</sub> ±20%
<b>Operating current</b>	70 mA <sub>rms</sub> ±20%, including 50 mA for the GPS hardware and 20 mA for the antenna LNA

#### 2.8.1.3 GPS Driving

The GPS functions are driven from the GSM BB processor trough a dedicated AT command set available in a separately specification.

#### 2.8.1.4 GPS NMEA

The GPS data stream (NMEA 0183 format) is also available on the connector (pins 35 and 41 : TX\_GPS and RX\_GPS) in RS232 format 8N1, 4800 bps (9600, 19200, 38400, and 57600 bps are available too).



## 2.8.1.5 NMEA sentences

The following GPS sentences are available:

**GGA** - essential fix data which provide 3D location and accuracy data.

```
$GPGGA,123519,4807.038,N,01131.000,E,1,08,0.9,545.4,M,46.9,M,,*47
```

Where:

GGA	Global Positioning System Fix Data
123519	Fix taken at 12:35:19 UTC
4807.038,N	Latitude 48 deg 07.038' N
01131.000,E	Longitude 11 deg 31.000' E
1	Fix quality: 0 = invalid
	1 = GPS fix (SPS)
	2 = DGPS fix
	3 = PPS fix
	4 = Real Time Kinematic
	5 = Float RTK
	6 = estimated (dead reckoning) (2.3 feature)
	7 = Manual input mode
	8 = Simulation mode
08	Number of satellites being tracked
0.9	Horizontal dilution of position
545.4,M	Altitude, Meters, above mean sea level
46.9,M	Height of geoid (mean sea level) above WGS84 ellipsoid
(empty field)	time in seconds since last DGPS update
(empty field)	DGPS station ID number
*47	the checksum data, always begins with *

If the height of geoid is missing then the altitude should be suspect. Some non-standard implementations report altitude with respect to the ellipsoid rather than geoid altitude. Some units do not report negative altitudes at all. This is the only sentence that reports altitude.

**VTG** - Velocity made good. The gps receiver may use the LC prefix instead of GP if it is emulating Loran output.

```
$GPVTG,054.7,T,034.4,M,005.5,N,010.2,K
```

Where:

VTG	Track made good and ground speed
054.7,T	True track made good
034.4,M	Magnetic track made good
005.5,N	Ground speed, knots
010.2,K	Ground speed, Kilometers per hour

Note that, as of the 2.3 release of NMEA, there is a new field in the VTG sentence at the end just prior to the checksum.



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

**GSA** - GPS DOP and active satellites. This sentence provides details on the nature of the fix. It includes the numbers of the satellites being used in the current solution and the DOP. DOP (dilution of precision) is an indication of the effect of satellite geometry on the accuracy of the fix. It is a unitless number where smaller is better. For 3D fixes using 4 satellites a 1.0 would be considered to be a perfect number, however for overdetermined solutions it is possible to see numbers below 1.0.

There are differences in the way the PRN's are presented which can effect the ability of some programs to display this data. For example, in the example shown below there are 5 satellites in the solution and the null fields are scattered indicating that the almanac would show satellites in the null positions that are not being used as part of this solution. Other receivers might output all of the satellites used at the beginning of the sentence with the null field all stacked up at the end. This difference accounts for some satellite display programs not always being able to display the satellites being tracked. Some units may show all satellites that have ephemeris data without regard to their use as part of the solution but this is non-standard.

```
$GPGSA,A,3,04,05,,09,12,,,24,,,,,2.5,1.3,2.1*39
```

Where:

GSA	Satellite status
A	Auto selection of 2D or 3D fix (M = manual)
3	3D fix - values include: 1 = no fix
	2 = 2D fix
	3 = 3D fix
04,05...	PRNs of satellites used for fix (space for 12)
2.5	PDOP (dilution of precision)
1.3	Horizontal dilution of precision (HDOP)
2.1	Vertical dilution of precision (VDOP)
*39	the checksum data, always begins with *

**GSV** - Satellites in View shows data about the satellites that the unit might be able to find based on its viewing mask and almanac data. It also shows current ability to track this data. Note that one GSV sentence only can provide data for up to 4 satellites and thus there may need to be 3 sentences for the full information. It is reasonable for the GSV sentence to contain more satellites than GGA might indicate since GSV may include satellites that are not used as part of the solution. It is not a requirement that the GSV sentences all appear in sequence. To avoid overloading the data bandwidth some receivers may place the various sentences in totally different samples since each sentence identifies which one it is.

The field called SNR (Signal to Noise Ratio) in the NMEA standard is often referred to as signal strength. SNR is an indirect but more useful value than raw signal strength. It can range from 0 to 99 and has units of dB according to the NMEA standard, but the various manufacturers send different ranges of numbers with different starting numbers so the values themselves cannot necessarily be used to evaluate different units. The range of working values in a given gps will usually show a difference of about 25 to 35 between the lowest and highest values, however 0 is a special case and may be shown on satellites that are in view but not being tracked.



## 80272ST10019a Rev. 4 – 04/08/2006

\$GPGSV,2,1,08,01,40,083,46,02,17,308,41,12,07,344,39,14,22,228,45\*75

Where:

GSV	Satellites in view
2	Number of sentences for full data
1	sentence 1 of 2
08	Number of satellites in view
01	Satellite PRN number
40	Elevation, degrees
083	Azimuth, degrees
46	SNR - higher is better
	for up to 4 satellites per sentence
*75	the checksum data, always begins with *

**RMC** - NMEA has its own version of essential GPS PVT (position, velocity, time) data. It is called RMC, The Recommended Minimum, which will look similar to:

\$GPRMC,123519,A,4807.038,N,01131.000,E,022.4,084.4,230394,003.1,W\*6A

Where:

RMC	Recommended Minimum sentence C
123519	Fix taken at 12:35:19 UTC
A	Status A=active or V=Void.
4807.038,N	Latitude 48 deg 07.038' N
01131.000,E	Longitude 11 deg 31.000' E
022.4	Speed over the ground in knots
084.4	Track angle in degrees True
230394	Date - 23rd of March 1994
003.1,W	Magnetic Variation
*6A	The checksum data, always begins with *

Note that, as of the 2.3 release of NMEA, there is a new field in the RMC sentence at the end just prior to the checksum.

**GLL** - Geographic Latitude and Longitude is a holdover from Loran data and some old units may not send the time and data active information if they are emulating Loran data. If a GPS is emulating Loran data they may use the LC Loran prefix instead of GP.

\$GPGLL,4916.45,N,12311.12,W,225444,A,\*31

Where:

GLL	Geographic position, Latitude and Longitude
4916.46,N	Latitude 49 deg. 16.45 min. North
12311.12,W	Longitude 123 deg. 11.12 min. West
225444	Fix taken at 22:54:44 UTC
A	Data Active or V (void)
*31	checksum data





## 2.9 Supply voltage

The external power supply must be connected to VBATT signal (see paragraph 2.18, Interface connectors on GM862) and must fulfil the following requirements:

<b>Nominal operating voltage</b>	3.8 V
<b>Operating voltage range</b>	3.4 V – 4.2 V

**NOTE:** Operating voltage range must never be exceeded, care must be taken in order to fulfill min/max voltage requirements and peak current supply.

## 2.10 GSM Power consumption

The typical current consumption of the [Telit GM862 Family modules](#) are:

<b>Power off current (typical)</b>	< 26 $\mu$ A;
<b>Stand-by current (GSM Idle)</b>	< 17 mA <sub>rms</sub> (< 4 mA <sub>rms</sub> using command AT+CFUN)
<b>Operating current in voice channel</b>	250 mA <sub>rms</sub> $\pm$ 20% @ typical network conditions
<b>Operating current in voice channel</b>	< 350 mA <sub>rms</sub> / 1.9 A <sub>peak</sub> @ worst network conditions
<b>Operating current in GPRS class 10</b>	< 700 mA <sub>rms</sub> @ worst network conditions

The total power consumption of GM862-GPS is the sum of the consumptions of GSM and GPS part.

## 2.11 Embodied Battery Charger

The battery charger is suited for 3.7V Li-Ion rechargeable battery (suggested capacity 500-1000mAh). The Charger needs only a CURRENT LIMITED power source input and charges the battery directly through VBATT connector pins.

<b>Battery charger input pin</b>	CHARGE
<b>Battery pins</b>	VBATT, GND
<b>Battery charger input voltage min</b>	5.0 V
<b>Battery charger input voltage typical</b>	5.5 V
<b>Battery charger input voltage max</b>	7.0 V
<b>Battery charger input current max</b>	400mA
<b>Battery type</b>	Li-Ion rechargeable



**NOTE:** If embodied battery charger is used, then a LOW ESR capacitor of at least 100 $\mu$ F must be mounted in parallel to VBATT pin.

**NOTE:** when power is supplied to the CHARGE pin, a battery must always be connected to the VBATT pins.

## 2.12 User Interface

The user interface is managed by AT commands specified on the ITU-T V.250, GSM 07.07 and 07.05 specification.

### 2.12.1 Speech Coding

The [Telit GM862](#) voice codec supports the following rates:

- Half Rate.
- Full rate,
- Enhanced Full Rate
- Adaptive Multi Rate

### 2.12.2 SIM Reader

The [Telit GM862-QUAD](#) and [QUAD-PY](#) support phase 2 GSM11.14 - SIM 3 volts. Moreover, the [GM862-GPS](#) supports 1,8V SIM too. For 5V SIM operation an external level translator can be added.

The [Telit GM862-QUAD, QUAD-PY and GPS](#) have an internal built-in SIM card reader that allows also hot removal of the SIM sensing. Therefore, the SIM can be extracted and reinserted while the module is still on, so there's no need for an external SIM housing.

---

**NOTE:** *the hot removal of the SIM sensing is not supported during power saving mode (+CFUN: 5).*

### 2.12.3 SMS

The [Telit GM862 Family modules](#) supports the following SMS types:

- Mobile Terminated (MT) class 0 – 3 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.



## 2.12.4 Real Time Clock and Alarm

The [Telit GM862 Family modules](#) supports the Real Time Clock and Alarm functions through AT commands, furthermore an alarm output pin (GPIO6) can be configured to indicate the alarm with a hardware line output.

## 2.12.5 Data/fax transmission

As for the data and fax capabilities, the [GM862-QUAD,QUAD-PY](#) and [GPS](#) support the following:

	<i><b>GM862-QUAD</b></i>	<i><b>GM862-QUAD-PY</b></i>	<i><b>GM862-GPS</b></i>
GPRS Class 8, MS Class 8	•	•	•
GPRS Class 10, MS Class 8.	•	•	•
CSD up to 14.4 Kbps	•	•	•
Fax service, Class 1 Group 3	•	•	•

## 2.12.6 Local security management

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

## 2.12.7 Call control

Call cost control function.

## 2.12.8 Phonebook

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

## 2.12.9 Characters management

The GM862 supports the IRA characters set (International Reference Alphabet), in TEXT and PDU mode.

## 2.12.10 SIM related functions

The activation and deactivation of the numbers stored in phone book are supported, FDN, ADN and PINs too. The extension at the PIN2 for the PUK2 insertion capability for lock condition is supported too.

## 2.12.11 Call status indication

The call status indication by AT commands is supported.



## 2.12.12 Indication of network service availability

The STAT\_LED pin status shows information on the network service availability and Call status. The pin is an Open Collector output where it is possible to directly connect a LED to show information on the network service availability and Call status.

Therefore, the status indicated in the following table is reversed with respect to the pin status.

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

## 2.12.13 Automatic answer (Voice, 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>`.

## 2.12.14 Supplementary services (SS)

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

## 2.12.15 Acoustic signaling

The acoustic signalling of the [GM862](#) on the selected acoustic device are the following:

- Call waiting;
- Ringing tone;
- SMS received tone;
- Busy tone;
- Power on/off tone;



- Off Hook dial tone;
- Congestion tone;
- Connected tone;
- Call dropped;
- No service tone;
- Alarm tone.

## 2.12.16 DTMF tones

DTMF tones are managed by specific AT commands. These tones are generated with AT commands only during voice calls. The minimum duration of a DTMF tone can be set on 10 ms but it should be considered that this value can vary with the limitations on network.

	Group high		
Group low	1209 Hz	1336 Hz	1477 Hz
697 Hz	1	2	3
770 Hz	4	5	6
852 Hz	7	8	9
941 Hz	*	0	#

**NOTE:** The GSM system architecture defines that the audio signal of the DTMF tones is inserted by the network switches on commands sent by the Mobile Station (MS). Thus, the default duration parameters may vary from network to network. In case that the devices to be controlled by DTMF are sensitive related to the duration of the tones and timing of the sequences, dedicated investigations on the parameter settings have to be made.

## 2.12.17 Buzzer Output

The General Purpose I/O pin GPIO7 can be configured to output the BUZZER output signal, with only an external Mosfet/transistor and a diode a Buzzer can be directly driven. The ringing tone and the other signalling tones can be redirected to this Buzzer output with a specific AT command.

## 2.12.18 RF Transmission Monitor

As alternate function of the GPIO5, the GM862-GPS, QUAD-PY and QUAD provide the RF transmission monitor. When the alternate function is activated, the pin of GPIO5 changes to HIGH every time the module transmits an RF signal and remains HIGH for the duration of the transmission sequence, i.e. it does not change with every GSM signal burst.





## 2.13EMC

Compliant to EN301-489-1 and EN301-489-7 and all applicable GSM Specifications. Compliant to Directive 1999/05/CE.

## 2.14Logic level specifications

Where not specifically stated, all the interface circuits work at 2.8V CMOS logic levels. The following table shows the logic level specifications used in the [Telit GM862](#) interface circuits:

### Absolute Maximum Ratings -Not Functional

Parameter	Min	Max
Input level on any digital pin when on	-0.3V	+3.75V
Input voltage on analog pins when on	-0.3V	+3.0 V
Voltage on Buffered pins	-0.3V	25V

### Operating Range - Interface levels (2.8V CMOS)

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

For 2,0V signals:

### Operating Range - Interface levels (2.0V CMOS)

Level	Min	Max
Input high level	1.6V	3.3V
Input low level	0V	0.4V
Output high level	1,65V	2.2V
Output low level	0V	0.35V



## 2.14.1 Reset signal

Signal	Function	I/O	Pin
RESET	Phone reset	I	23 (connector SO301)

RESET is used to reset the [GM862 modules](#). Whenever this signal is pulled low, the GM862 is reset. When the device is reset it stops any operation. After the release of the reset GM862-QUAD and GM862-QUAD-PY are unconditionally rebooted, while GM862-GPS is unconditionally shut down, without doing any detach operation from the network where it is registered to. This behaviour is not a proper shut down because any GSM device is requested to issue a detach request on turn off. For this reason the Reset signal must not be used to normally shutting down the device, but only as an emergency exit in the rare case the device remains stuck waiting for some network response. The RESET is internally controlled on start-up to achieve always a proper power-on reset sequence, so there's no need to control this pin on start-up. It may only be used to reset a device already on that is not responding to any command.

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**NOTE:** do not use this signal to power off the [GM862](#). Use the ON/OFF signal (Pin 17 of SO301) to perform this function or the AT#SHDN command.

---

### Reset Signal Operating levels:

Signal	Min	Max
RESET Input high	2.2V*	3.3V
RESET Input low	0V	0.2V

\* this signal is internally pulled up so the pin can be left floating if not used.

If unused, this signal may be left unconnected. If used, then it **must always be connected with an open collector transistor**, to permit to the internal circuitry the power on reset and under voltage lockout functions.



## 2.15 Audio levels specifications

The audio path of the [Telit GM862 module](#) is organized into two main paths:

- internal path (called also MT)
- external path (called also HF)

These two paths are meant respectively for handset and headset/hands free use. The [Telit GM862 Family modules](#) has a built in echo canceller and a noise suppressor, tuned separately for the two audio paths; for the internal path the echo canceller parameters are suited to cancel the echo generated by a handset, while for the external audio path they are suited for a hands free use.

For more information on the audio refer to the Hardware User Guide. The following table reports all the audio level specifications.

### Microphone characteristics

	Internal audio mic. input	External audio mic. input
Nominal sensitivity	-45dBV <sub>rms</sub> /Pa	-45dBV <sub>rms</sub> /Pa
Distance	7cm	50cm
<b>Line input characteristics</b>		
Line coupling	AC ( 100nF cond.)	AC ( 100nF cond.)
Line type	Balanced	Balanced
Differential input resistance	25k $\Omega$ (typical)	25k $\Omega$ (typical)
Line nominal sensitivity	50mV <sub>rms</sub> $\pm$ 2dB	3mV <sub>rms</sub> $\pm$ 2dB
Max input voltage	360mV <sub>rms</sub>	22mV <sub>rms</sub>
Microphone nominal sensitivity - Analog Gain suggested	-45dBV <sub>rms</sub> /Pa ( $\pm$ 3dB) /+24dB	-45dBV <sub>rms</sub> /Pa ( $\pm$ 3dB) /+10dB
Echo canceller type	Handset	Car kit hands free

### Speaker characteristics

	Internal audio ear. output	External audio ear. output
Speaker impedance	$\geq 16\Omega \pm 5\%$ @ 1kHz	$\geq 16\Omega \pm 5\%$ @ 1kHz
Rated Input Power	100mW	100mW
<b>Line out driver</b>		
Line coupling	DC	DC
Line type	Bridged	Bridged
Minimum load impedance	15 $\Omega$	15 $\Omega$
Signal bandwidth	150-8000 Hz @ -3dB	150-8000 Hz @ -3dB
Maximum output	1700mV <sub>rms</sub>	850mV <sub>rms</sub>
Maximum power output	30mW/16 $\Omega$	7,5mW/16 $\Omega$
Volume level steps (SW)	-2dB	-2dB
Number of volume steps (SW)	10	10



## 2.16 Camera compatibility (EASY CAMERA)

The **GM862-QUAD**, **QUAD-PY** and **GPS** provide a direct support for the camera whose characteristics are the following:

<b>Model:</b>	TRANSCHIP TC5747
<b>Technology:</b>	CMOS COLOR camera
<b>Max picture size:</b>	VGA 640x480 pixels
<b>Output format:</b>	JPEG
<b>Sensitivity:</b>	4V/lux-sec (including gain)

The camera will be directly managed by the hardware/software with some interface circuitry, providing a custom AT command interface to operate with it.

The camera interface requires the pins and GPIOs:

<b><i>Signal</i></b>	<b><i>pin</i></b>
CAM_SDA	47
CAM_SCL	46
CAM_CLK	25
CAM_ON	32
CAM_RST	34

When the camera is activated, then these pins are not accessible as GPIO. The AT commands of the module allows to take a snapshot and successively download it through the serial line in various formats.

## 2.17 ADC Converter (GM862-GPS only)

The on board ADCs are 11-bit converter. They are able to read a voltage level in the range of 0÷2 volts applied on the ADC pin input, and convert it into 11 bit word.

	Min	Max	Units
Voltage range	0	2	Volt
AD conversion	11	11	bits
Resolution	1	1	mV
Sampling rate	1 (idle)	60 (on traffic)	secs



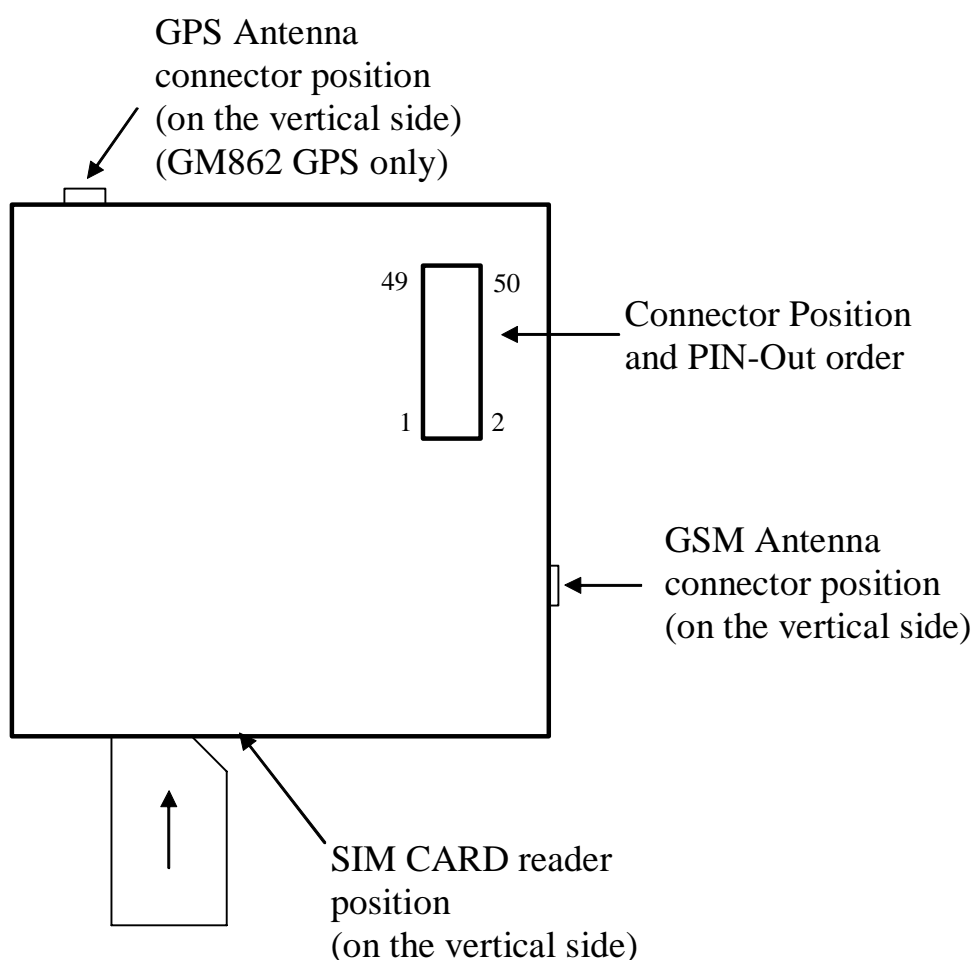
## 2.18 Interface connectors on GM862 modules

The **Telit GM862 Family modules** has the following interfaces:

- **GSM antenna connector** (see 2.7.3,)
- **Board To Board Interface connector**
- **SIM Card Reader**
- **GPS antenna connector (GM862-GPS only)**

The **Telit GM862 Family modules** board to board connector is a CSTP 50 pin vertical SMD Molex 52991–0508 (male).

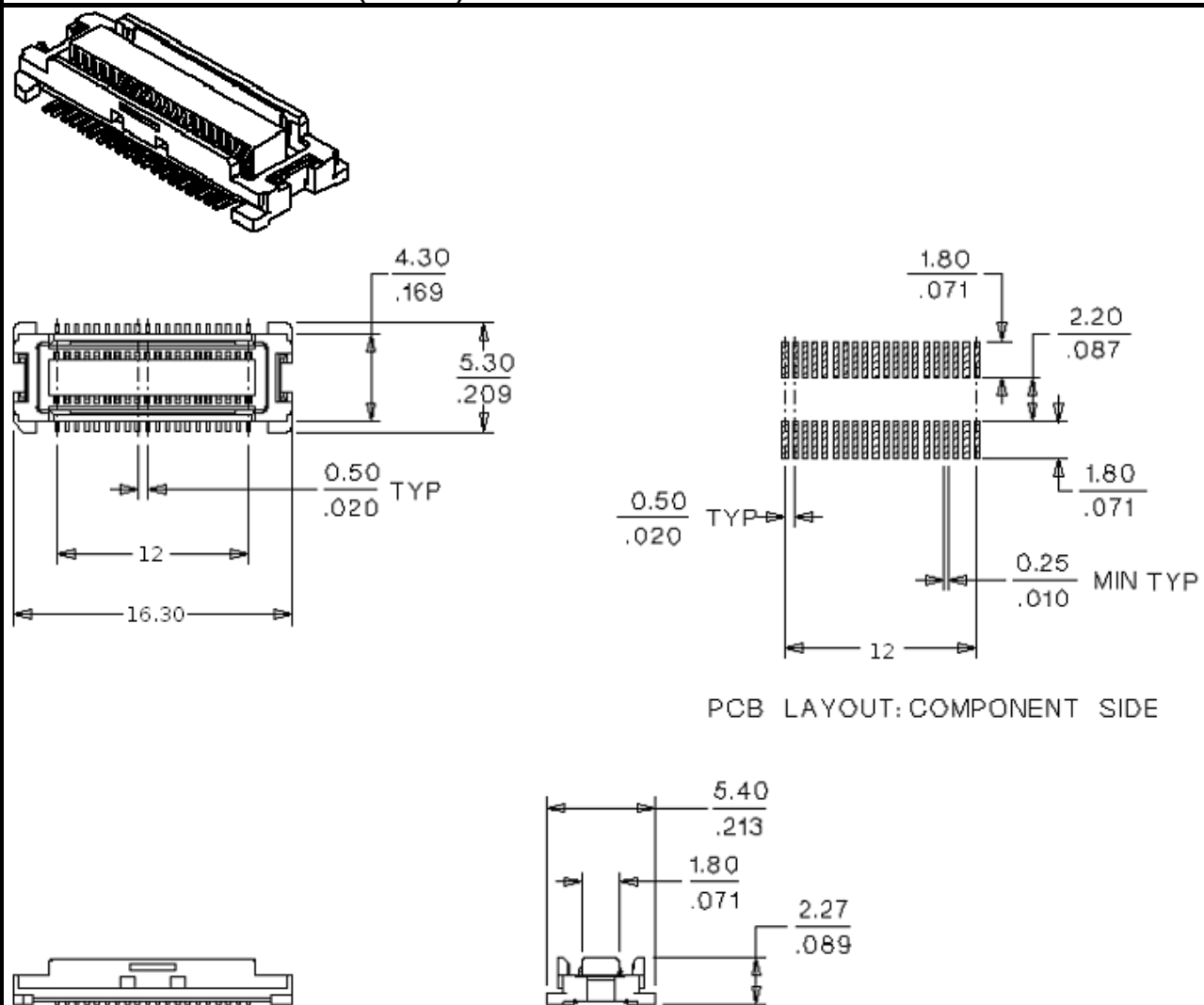
Its pin-out (down view) is:





**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006

**Molex 52991-0508 (male) GM862 Connector LAY-OUT**



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

### • Molex 52991-0508 (male) GM862 Connector PIN-OUT

In the table below, the pin assignment of the all GM862-GPS, QUAD-PY and QUAD are compared against the previous models of GM862.

The cells marked with yellow colour, highlight the differences typically because more features are available on the newest models, except for the camera (see specific paragraph and application note).

GM862-GSM, -GPRS				GM862-QUAD, -QUAD-PY GM862-PCS / -PYTHON			GM862-GPS		
PIN	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION
1	I	VBATT	Main power supply	I	VBATT	Main power supply	I	VBATT	Main power supply
2	-	GND	Ground	-	GND	Ground	-	GND	Ground
3	I	VBATT	Main power supply	I	VBATT	Main power supply	I	VBATT	Main power supply
4	-	GND	Ground	-	GND	Ground	-	GND	Ground
5	I	VBATT	Main power supply	I	VBATT	Main power supply	I	VBATT	Main power supply
6	-	GND	Ground	-	GND	Ground	I	ADC_IN1	Analog / Digital Converter Input
7	I	VBATT	Main power supply	I	VBATT	Main power supply	I	VBATT	Main power supply
8	-	GND	Ground	AI	CHARGE	Charger Input	AI	CHARGE	Charger Input
9	AO	EAR_HF+	Handsfree ear signal output, phase+	AO	EAR_HF+	Handsfree ear signal output, phase+	AO	EAR_HF+	Handsfree ear signal output, phase+
10	AO	EAR_MT-	Handset earphone signal output, phase-	AO	EAR_MT-	Handset earphone signal output, phase-	AO	EAR_MT-	Handset earphone signal output, phase-
11	AO	EAR_HF-	Handsfree ear signal output, phase-	AO	EAR_HF-	Handsfree ear signal output, phase-	AO	EAR_HF-	Handsfree ear signal output, phase-
12	AO	EAR_MT+	Handset earphone signal output, phase+	AO	EAR_MT+	Handset earphone signal output, phase+	AO	EAR_MT+	Handset earphone signal output, phase+
13	AI	MIC_HF-	Handsfree microphone signal input, phase-, nominal level 500mVpp	AI	MIC_HF-	Handsfree microphone signal input, phase-, nominal level 500mVpp	AI	MIC_HF-	Handsfree microphone signal input, phase-, nominal level 500mVpp
14	AI	MIC_MT+	Handset microphone signal input, phase+ nominal level 1030mVpp	AI	MIC_MT+	Handset microphone signal input, phase+ nominal level 1030mVpp	AI	MIC_MT+	Handset microphone signal input, phase+ nominal level 1030mVpp
15	AI	MIC_HF+	Handsfree microphone signal input; phase+, nominal level 500mVpp	AI	MIC_HF+	Handsfree microphone signal input; phase+, nominal level 500mVpp	AI	MIC_HF+	Handsfree microphone signal input; phase+, nominal level 500mVpp



## 80272ST10019a Rev. 4 – 04/08/2006

	GM862-GSM, -GPRS			GM862-QUAD, -QUAD-PY GM862-PCS / -PYTHON			GM862-GPS		
PIN	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION
16	AI	MIC_MT-	Handset microphone signal input; phase-, nominal level 1030mVpp	AI	MIC_MT-	Handset microphone signal input; phase-, nominal level 1030mVpp	AI	MIC_MT-	Handset microphone signal input; phase-, nominal level 1030mVpp
17 <sup>1</sup>	I	ON/OFF*	Input command for switched power ON or OFF (toggle command)	I	ON/OFF*	Input command for switched power ON or OFF (toggle command)	I	ON/OFF*	Input command for switched power ON or OFF (toggle command)
18	I	AXE	Handsfree switching	I	AXE	Handsfree switching	I	AXE	Handsfree switching
19	I/O	SIMIO	External SIM signal – Data I/O	I/O	SIMIO	External SIM signal – Data I/O	I/O	SIMIO	External SIM signal – Data I/O
20	I	C103/TXD	Serial data input (TXD) from DTE (RX of Module)	I	C103 / TXD	Serial data input (TXD) from DTE (RX of Module)	I	C103 / TXD	Serial data input (TXD) from DTE (RX of Module)
21	O	PWRCTL	Power sense for external devices (pull up is 10Kohm)	O	PWRCTL / CAM_SYNC	Module Status ON indication (Signal output for power on/off control of external devices) / Camera Interface. Pull up is 820 ohm	O	PWRCTL	Module Status ON indication (Signal output for power on/off control of external devices) . Pull up is 1k
22 <sup>2</sup>	I	SIMVCC	External SIM signal – Power	I	SIMVCC	External SIM signal – Power	I	SIMVCC	External SIM signal – Power
23	I	RESET*	Reset input	I	RESET*	Reset input	I	RESET*	Reset input
24	I	SIMRST	External SIM signal – Reset	I	SIMRST	External SIM signal – Reset	I	SIMRST	External SIM signal – Reset
25	-	-	RESERVED	O	MON1_CAM	Camera Interface	O	CAM_CLK	Camera Interface (CLK)
26	I	SIMCLK	External SIM signal – Clock	I	SIMCLK	External SIM signal – Clock	I	SIMCLK	External SIM signal – Clock
27	I/O	CCIN	External SIM signal – Presence (active low)	I/O	CCIN	External SIM signal – Presence (active low)	I/O	SIMIN	External SIM signal – Presence (active low)
28	O	GPO2	General purpose output Buffered	O	GPO2 / JDR	General purpose output (open collector) / Camera Interface / JDR	O	GPO2 / JDR	General purpose output (open collector) / JDR

1 This pin is pulled up internally to VBATT and has a transistor base input.

<sup>2</sup> On this line a maximum of 10nF bypass capacitor is allowed



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

GM862-GSM, -GPRS				GM862-QUAD, -QUAD-PY GM862-PCS / -PYTHON			GM862-GPS		
PIN	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION
29	O	C106/CTS	Output for Clear to send signal (CTS) to DTE	O	C106 / CTS	Output for Clear to send signal (CTS) to DTE	O	C106 / CTS	Output for Clear to send signal (CTS) to DTE
30	O	C125/RING	Output for Ring indicator signal (RI) to DTE	O	C125 / RING	Output for Ring indicator signal (RI) to DTE	O	C125 / RING	Output for Ring indicator signal (RI) to DTE
31	I	GPI1	General purpose input Buffered	I	GPI1	General purpose input Buffered	I	GPI1	General purpose input Buffered
32	-	-	RESERVED	I/O	GPIO8 / PD[0]	General Purpose I/O / Camera Interface	I/O	GPIO8 CAM_ON	General Purpose I/O / Camera Interface
33	O	C107/DSR	Output for Data set ready signal (DSR) to DTE	O	C107 / DSR	Output for Data set ready signal (DSR) to DTE	O	C107 / DSR	Output for Data set ready signal (DSR) to DTE
34	-	-	RESERVED	I/O	GPIO9 / PD[1]	General Purpose I/O / Camera Interface	I/O	GPIO9 CAM_RST	General Purpose I/O / Camera Interface
35	O	EMMI TX	TX Data for debug monitor (1)	O	EMMI TX	TX Data for debug monitor (1)	O	TX_GPS	TX Data for NMEA (GPS)
36	O	C109/DCD	Output for Data carrier detect signal (DCD) to DTE	O	C109 / DCD	Output for Data carrier detect signal (DCD) to DTE	O	C109 / DCD	Output for Data carrier detect signal (DCD) to DTE
37	O	C104/RXD	Serial data output to DTE (TX of Module)	O	C104 / RXD	Serial data output to DTE (TX of Module)	O	C104 / RXD	Serial data output to DTE (TX of Module)
38	-	-	RESERVED	I/O	GPIO10 / PD[2]	General Purpose I/O / Camera Interface	I/O	GPIO10	General Purpose I/O
39	O	STAT LED	Status indicator led	O	STAT LED	Status indicator led	O	STAT_LED	Status indicator led
40	-	-	RESERVED	I/O	GPIO11 / PD[3]	General Purpose I/O / Camera Interface	I/O	GPIO11	General Purpose I/O / Trace / Debug Python
41	I	EMMI RX	RX Data for debug monitor (1)	I	EMMI RX	RX Data for debug monitor (1)	I	RX_GPS	RX Data for NMEA (GPS)
42	-	-	RESERVED	I/O	GPIO12 / PD[4]	General Purpose I/O / Camera Interface	I/O	GPIO12	General Purpose I/O / trace / Python debug
43	O	C108/DTR	Input for Data terminal ready signal (DTR) from DTE	O	C108 / DTR	Input for Data terminal ready signal (DTR) from DTE	O	C108 / DTR	Input for Data terminal ready signal (DTR) from DTE



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

GM862-GSM, -GPRS				GM862-QUAD, -QUAD-PY GM862-PCS / -PYTHON			GM862-GPS		
PIN	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION	I/O	SIGNAL	FUNCTION
44	-	-	RESERVED	I/O	GPIO13 / PD[5]	General Purpose I/O / Camera Interface	I/O	GPIO13	General Purpose I/O
45	O	C105/RTS	Input for Request to send signal (RTS) from DTE	O	C105 / RTS	Input Request to send signal (RTS) from DTE	O	C105 / RTS	Input for Request to send signal (RTS) from DTE
46	I/O	GPIO3	General Purpose I/O	I/O	GPIO3 / PD[6]	General Purpose I/O / Camera Interface	I/O	GPIO3 / CAM_SCL	General Purpose I/O / Camera Interface
47	I/O	GPIO4	General Purpose I/O	I/O	GPIO4 / IICSDA	General Purpose I/O / Camera Interface	I/O	GPIO4 / CAM_SDA	General Purpose I/O / Camera Interface
48	I/O	GPIO5	General Purpose I/O	I/O	GPIO5 / CAM_DRDY / RFTXMON	General Purpose I/O / Camera Interface / RF Transmission Monitor	I/O	GPIO5 / RFTXMON	General Purpose I/O / RF Transmission Monitor
49	I/O	GPIO6	General Purpose I/O	I/O	GPIO6 / ALARM / PD[7]	General Purpose I/O / ALARM output / Camera Interface	I/O	GPIO6 / ALARM	General Purpose I/O / ALARM output
50	I/O	GPIO7	General Purpose I/O	I/O	GPIO7 / BUZZER / CAM_PWR_ON	General Purpose I/O / BUZZER output Pin / Camera Interface	I/O	GPIO7 / BUZZER	General Purpose I/O / BUZZER output Pin

**Note:** If not used, almost all pins should be left disconnected. The only exceptions are the following pins:

pin	signal
1,3,5,7	VBATT
2,4,6,8	GND
17	ON/OFF*
20	TXD
23	RESET*
37	RXD
45	RTS <sup>3</sup>

<sup>3</sup> RTS should be connected to the GND ( on the module side) if flow control is not used





## 2.19 Mounting the GM862 modules on your Board

In order to electrically connect your board to the [Telit GM862 Family modules](#), use a **CSTP 2x25 pin vertical SMD SCH–SCH Molex 53748 - 0504 (female, low profile)** as a counterpart to the **CSTP 50 pin vertical SMD Molex 52991–0508 (male)** of your [Telit GM862 Family modules](#).

When mounting the [Telit GM862 Family modules](#) on your board, take care of soldering the GM862 shielding reeds on a ground plane or signal.

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**NOTE:** *be very careful when connecting the [Telit GM862 module](#) RF connector. The [Telit GM862 module](#) RF connector can be damaged if not connected with the proper antenna RF connector. The minimum number of insertion cycles is recommended.*

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### 2.19.1 Antenna Coaxial cable fixing

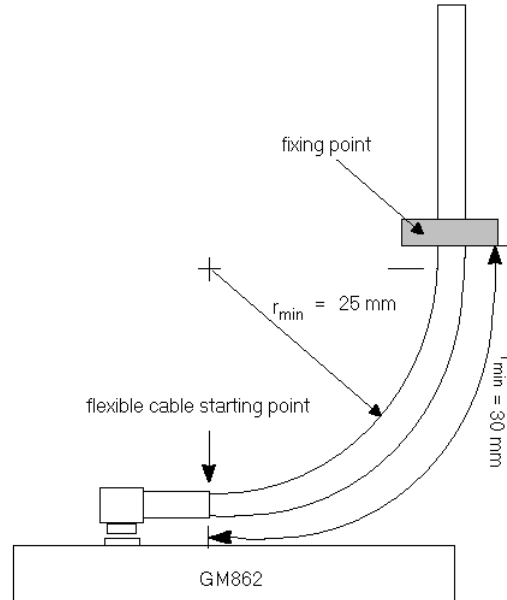
The following constraints must be respected in the [Telit GM862 Family modules](#) antenna cable connection:

- The fixing point of the coaxial cable must not be placed too close to the antenna connector of the [GM862 module](#), leaving at least 30mm of flexible cable between the fixed point and the plug end.
- The fixing point must be at the same height of the [GM862 module](#) antenna connector, eventually using a wedge between the PCB and the cable if it is directly fixed to the PCB.
- The flexible cable must never be bent with a radius lower than 25mm (RG174 cable).
- The cable must be a RG174 type or more flexible ones.

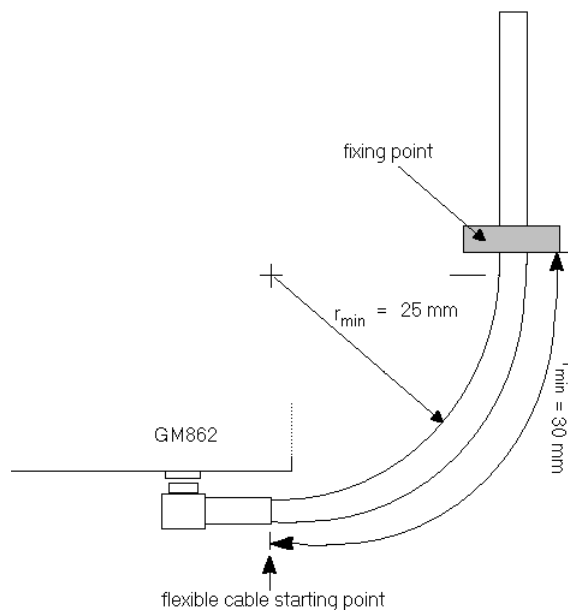


**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006

The following pictures explain these constraints:



- Angle connector fixing example -



- Angle connector fixing example 2 -

**NOTE:** in the examples the cable is always bent, this is not a constrain. If the installation does not require it, then the cable can be kept straight, ensuring that the fixing is without sliding.



## 2.19.2 Precautions

- The plug should be inserted in the connector only after the installation of the [Telit GM862 Family modules](#) in the board. This is to prevent accidental breaking of the antenna connection during the transport.
- The coaxial cable must be fixed at least in one point, without sliding possibilities.
- The plug insertion/removal must be done axially with the female connector of the GM862, keeping lateral strains to a minimum.
- The insertion/crimping pull out force must be less than 15N.



### 3 Evaluation Kit

In order to assist you in the development of your [Telit GM862 Family modules](#) based application, Telit can supply an [Evaluation Kit](#) that interfaces the [Telit GM862 Family modules](#) directly with appropriate power supply, SIM card housing, RS 232 serial port level translator and USB, direct UART connection, Handset, Headset and Hands-free (car kit) audio, antenna.

The EVK provides a fully functional solution for a complete data/phone application.

The standard serial RS232 9 pin connector placed on the [Evaluation Kit](#) allows the connection of the EVK system with a PC or other DTE.

The development of the applications utilizing the [Telit GM862 Family modules](#) must present a proper design of all the interfaces towards and from the module (e.g. power supply, audio paths, level translators), otherwise a decrease in the performances will be introduced or, in the worst case, a wrong design can even lead to an operating failure of the module.

In order to assist the hardware designer in his project phase, the EVK board presents a series of different solutions, which will cover the most common design requirements on the market, and which can be easily integrated in the OEM design as building blocks or can be taken as starting points to develop a specific one.



*GM862-Evaluation Kit*



## 3.1 Evaluation Kit description

For a detailed description of the [Telit GM862 Evaluation Kit](#) refer to the documentation provided with the Telit GM862 Hardware User Guide.

### 3.1.1 Power Supply

In the Board there are three different power supply inputs, that embrace a wide range of applications, from the automotive +12V / +24V nominal input to the stand alone battery powered device.

The power sources nominal input voltages are:

- +5 ÷ +40V input
- +3.8V direct input for stabilized laboratory power supply
- direct Li-Ion Battery power input (also with charging function of the module, when a suitable charger is connected to the charger input)

Each one of these power sources can supply both the [Telit GM862 Family modules](#) and the whole circuitry embodied in the [Evaluation Kit](#).

Only one of these power sources can be used at a time and it is selectable with two jumpers.

### 3.1.2 Serial interface

The communications between your application and the [Telit GM862 Family modules](#) must be done through a serial interface which can be a standard CMOS UART or a RS232 port.

All levels of the RS232 port are conform to RS232 and V.24 standard and a PC serial port can be directly connected to this connector.

Both these interfaces are supported.

### 3.1.3 Audio

The [Evaluation Kit board](#) provides two software/hardware selectable audio paths, the internal and the external one. All the handset, headset and hands free-car kit functions are supported.

Furthermore for each audio path two solution are presented: single ended and balanced.

### 3.1.4 GPIO and Leds

All the General Purpose Input Output ports of the [Telit GM862 Family modules](#) are supported in a dedicated connector and several leds are added as a debug aid.

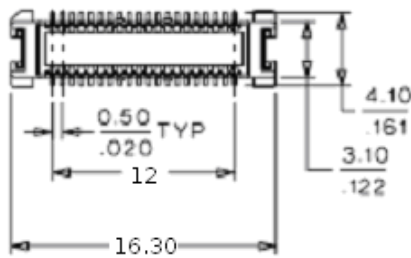
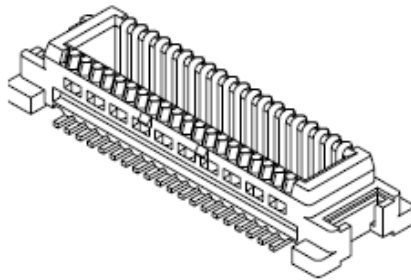
#### 3.1.4.1 Telit GM862 Family modules interface connector

The PL401 transceiver interface connector placed on the [Telit GM862 Evaluation Kit](#) is a female CSTP 2x25 pin vertical SMD SCH-SCH Molex 53748 - 0504 (low profile). See pin out on the SO301 connector on [Telit GM862 Family modules](#).

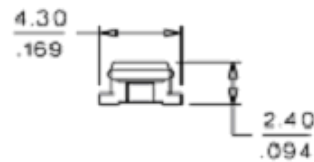




## Molex 53748-0504 (female, low profile) Connector LAY-OUT



PCB LAYOUT: COMPONENT SIDE



## 4 Service and firmware update

The **Telit GM862** modules firmware can be updated through the same serial interface, which is used normally for the AT commands. Since the software group is continuously working, in order to improve the overall performances and introduce new features on the product, we suggest, in order to keep updated the module's firmware, to foresee an external access to that interface with level converters to RS232, which allows connecting a Windows-based PC. It shall be possible to start the update procedure at POWER OFF condition of the module and then switch it ON to continue.

During the application development or evaluation phase of the **Telit GM862** module, the RS232 interface with the level converters or the USB port implemented on the **Telit Evaluation Kit EVK2** can be used to connect to a Windows-based PC on which the specific program for updating the Software (TFI) can be run.

### 4.1 Step-by-Step upgrade procedure

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

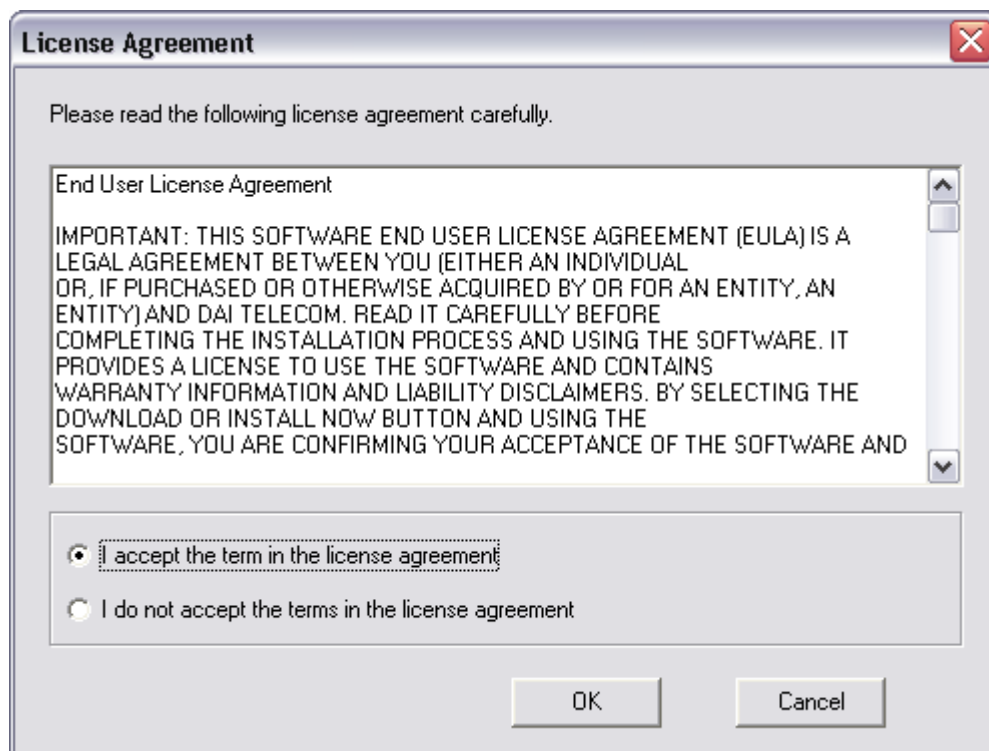
First the program will erase the content of flash memory, then the program will write on the flash memory. To update the firmware of the module, we suggest the following procedure:

1. 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.
2. Switch OFF the module.
3. Run the file *TFI\_xxxx.exe*. The following window should be displayed, Select the language preferred by pressing the correspondent button.

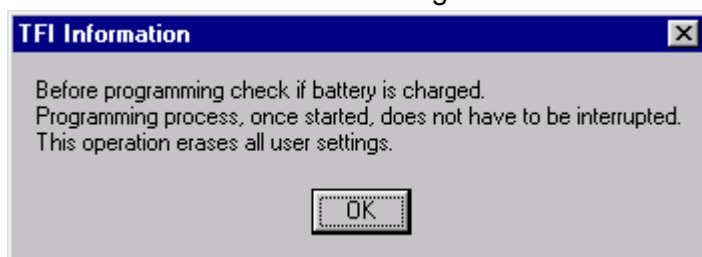


4. The End User License Agreement will appear. Please, read it and accept the terms if you are going to proceed.





5. Press OK to the initial message.



**NOTE:** In connection with the GM862 modules, charged battery has to be understood that the power supply must not be disconnected during the firmware update.

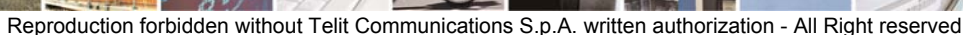


## 80272ST10019a Rev. 4 – 04/08/2006

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**NOTE:** the above pictures show how the application dialogs appear for the GM862-PCS product. The GM862-GPS, PY and QUAD TFI application will look similar.



## 5 Software Features

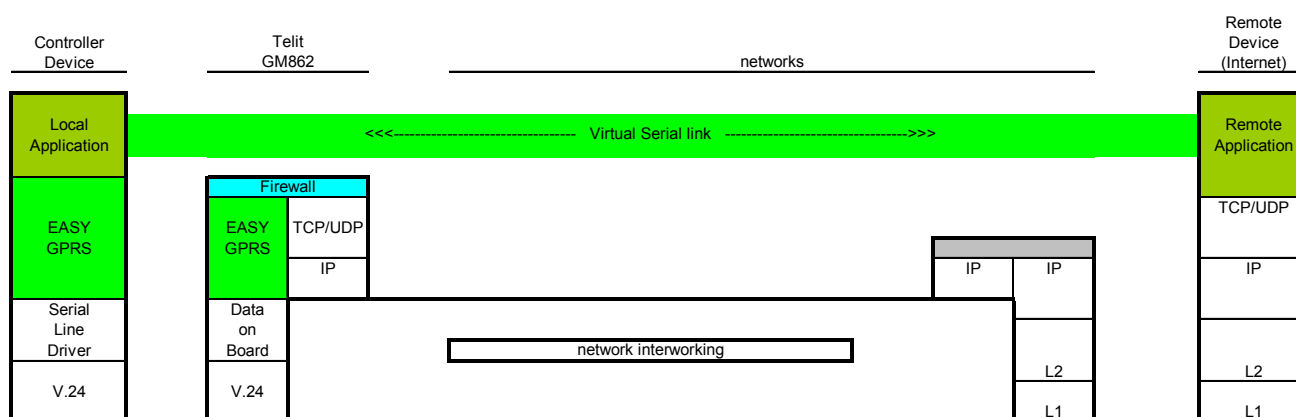
### 5.1 Enhanced Easy GPRS Extension

#### 5.1.1 Overview

The Easy GPRS feature allows the models [Telit GM862-QUAD,QUAD-PY](#) and [GPS](#) user to contact a device in 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 GM862](#) module, 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 GM862](#) module 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 new [Enhanced version](#) of the Easy GPRS overcomes some of the known limitations of the previous implementation and implements some new 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;
- A new internal firewall has been implemented in order to guarantee a certain level of security on internet applications.





## 5.1.2 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.

### 5.1.2.1 Configuring the GPRS access

The GPRS access configuration is done by setting the following:

- the GPRS context number 1 parameters (see +CGDCONT command)
- the Authentication parameters: User Name and Password (see commands #USERID, #PASSW)

### 5.1.2.2 Configuring the embedded TCP/IP stack

The TCP/IP stack behaviour must be configured by setting:

- the packet default size (see command #PKTSZ)
- the data sending timeout (see command #DSTO)
- the socket inactivity timeout (see command #SKTTO)

### 5.1.2.3 Defining the Internet peer to be contacted

As last setting definition, the host to be contacted and on which port/protocol must be set the socket definition (see command #SKTSET).

This command permits also to specify the host name instead of its IP address, if a host name is given to the set command, then the module stores it as a host nick name. It is care of the module user to guarantee that the host nick name provided corresponds to an existing internet peer.



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

If an host nick name has been given then, while opening the connection in response to the AT#SKTOP command, the module will autonomously activate a GPRS connection and query its DNS to obtain the IP address relative to the host nick name provided. This process of context activation and DNS query may require a bit more time and requires that the GPRS network coverage is good enough to permit data transfers.

### 5.1.2.4 Open the connection with the internet host

With the AT#SKTOP all the process required to connect with the internet host starts:

- GM862 activates the first context
- GM862 proceeds to the authentication with the parameters specified
- Eventually does the DNS query to resolve the IP address of the host name internet peer
- GM862 establishes a TCP/UDP (depending on the parameter request) connection with the given internet host
- Once the connection is up the module reports the code: CONNECT

From this moment the data incoming in the serial port is packet and sent to the Internet host, while the data received from the host is serialised and flushed to the Terminal Equipment.

### 5.1.2.5 Close the Socket and deactivate the context

The connection can be closed because of:

- remote host TCP connection close
- socket inactivity timeout
- Terminal Equipment by issuing the escape sequence "+++"
- Network deactivation

**NOTE:** if in the raw data to be sent there's an escape sequence, then the TE must work it out and sent it in a different fashion to guarantee that the connection is not closed.

The pause time is defined in the parameter S12.

On the reception of an escape sequence the GM862 closes the connection, deactivates the GPRS context returning to command mode and issuing the NO CARRIER code.

## 5.1.3 Enhanced Easy GPRS Outgoing connection

The New Enhanced Easy GPRS feature provides a way to place outgoing TCP/UDP connections and keep the same IP address after a connection, leaving the GPRS context active.

The steps that will be required open a socket and close it without closing the GRPS context are:

- configuring the GPRS Access
- configuring the embedded TCP/IP stack behaviour
- defining the Internet Peer to be contacted
- request the GPRS context to be activated
- request the socket connection to be opened
- exchange data



- close the TCP connection while keeping the GPRS active

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.

### 5.1.3.1 Configuring the GPRS access

The GPRS access configuration is done by setting:

- the GPRS context number 1 parameters (see +CGDCONT command)
- the Authentication parameters: User Name and Password (see commands #USERID, #PASSW)

### 5.1.3.2 Configuring the embedded TCP/IP stack

The TCP/IP stack behaviour must be configured by setting:

- the packet default size (see command #PKTSZ)
- the data sending timeout (see command #DSTO)
- the socket inactivity timeout (see command #SKTTO)

### 5.1.3.3 Defining the Internet peer to be contacted

As last setting definition, the host to be contacted and on which port/protocol must be set the socket definition (see command #SKTSET).

This command permits also to specify the host name instead of its IP address, if a host name is given to the set command, then the module stores it as a host nick name. It is care of the module user to guarantee that the host nick name provided corresponds to an existing internet peer.

If an host nick name has been given then, while opening the connection in response to the AT#SKTOP command, the module will autonomously activate a GPRS connection and query its DNS to obtain the IP address relative to the host nick name provided. This process of context activation and DNS query may require a bit more time and requires that the GPRS network coverage is good enough to permit data transfers.

Note that this setting command is not needed if the new #SKTD command is used.

### 5.1.3.4 Request the GPRS context to be activated

With the new command #GPRS you can activate or deactivate a GPRS context INDEPENDENTLY from the TCP socket opening:



AT#GPRS=1 activates the context,  
AT#GPRS=0 deactivates the context

Therefore with the AT#GPRS=1 command the module:

- GM862 activates the context previously defined with AT+CGDCONT
- GM862 proceeds to the authentication with the parameters specified

Note that activating a context implies getting an IP address from the network and this will be maintained throughout the session.

The response code to the AT#GPRS=1 command reports the IP address obtained from the network, allowing the user to report it to his server or application.

Deactivating the context implies freeing the network resources previously allocated to the device.

### 5.1.3.5 Open the connection with the internet host

With the new command #SKTD (socket Dial) the TCP/UDP request to connect with the internet host starts:

- Eventually does the DNS query to resolve the IP address of the host name internet peer
- GM862 establishes a TCP/UDP (depending on the parameter request) connection with the given internet host
- Once the connection is up the module reports the code: CONNECT

Note that the peer specifications of this socket Dial are within the command and not the one stored with #SKTSET command.

From this moment the data incoming in the serial port is packet and sent to the Internet host, while the data received from the host is serialised and flushed to the Terminal Equipment.

**NOTE:** this command differently from the AT#SKTOP DOES NOT automate all the process of activating the GPRS, if no GPRS is active the command reports ERROR; therefore before issuing this command the GPRS shall be activated with AT#GPRS=1 command.

In the same manner, when disconnecting the #SKTD command does not close the GPRS context, leaving it active for next connections until an AT#GPRS=0 command is issued or the network requests a context closing.

### 5.1.3.6 Close the Socket without deactivating the context

The connection can be closed because of:

- remote host TCP connection close
- socket inactivity timeout
- Terminal Equipment by issuing the escape sequence "+++"
- Network deactivation





**GM862 Product Description**

80272ST10019a Rev. 4 – 04/08/2006

**NOTE:** if in the raw data to be sent there's an escape sequence, then the TE must work it out and sent it in a different fashion to guarantee that the connection is not closed.

The pause time is defined in the parameter S12.

On the reception of an escape sequence if the socket was opened with the AT#SKTD command, the GM862 closes the connection, does not deactivate the GPRS context and returns to command mode issuing the NO CARRIER code.

## 5.1.4 Enhanced Easy GPRS Incoming Connection

The New Enhanced Easy GPRS feature provides a way to accept incoming TCP/UDP connections and keep the same IP address after a connection, leaving the GPRS context active.

The steps that will be required to open a socket in listen, waiting for connection requests from remote hosts and accept these request connections only from a selected set of hosts, then close it without closing the GPRS context are:

- configuring the GPRS Access
- configuring the embedded TCP/IP stack behaviour (see par. 5.1.3.2)
- defining the Internet Peer that can contact this device (firewall settings) (see par. 5.1.4.1)
- request the GPRS context to be activated (see par. 5.1.3.4)
- request the socket connection to be opened in listen (see par. 5.1.4.2)
- receive connection requests (see par. 5.1.4.3)
- exchange data
- close the TCP connection while keeping the GPRS active (see par. 5.1.3.6)

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.

### 5.1.4.1 Defining the Internet Peer that can contact this device (firewall settings)

The GM862 has an internal Firewall that controls the behaviour of the incoming connections to the module.

The firewall applies for INCOMING (listening) connections, OUTGOING connections will be always done regardless of the firewall settings.

Firewall General policy is DROP, therefore all packets that are not included into an ACCEPT chain rule will be silently discarded.

When a packet incomes from the IP address <incoming IP>, the firewall chain rules will be scanned for matching with the following criteria:





<incoming IP> & <net mask> = <ip\_address> ?

if the result is yes, then the packet is accepted and the rule scan is finished, otherwise the next chain is taken into account until the end of the rules when the packet is silently dropped if no matching was found.

For example, let assume we want to accept connections only from our devices which are on the IP addresses ranging from 197.158.1.1 to 197.158.255.255

We need to add the following chain to the firewall:  
AT#FRWL=1,"197.158.1.1","255.255.0.0"

#### 5.1.4.2 Request the socket connection to be opened in listen

With the new command #SKTL (socket Listen) the TCP request to start listening for connection requests is executed. The GM862 opens a listening socket on the port specified, waiting for incoming TCP connections (depending on the parameter request) with the internet hosts

The parameters that shall be specified are the local port where packets shall be received, the type of socket and the closing behaviour.

#### 5.1.4.3 Receiving connection requests

Once the connection request is received, the module reports an indication of connection with an unsolicited code

+CONN FROM: <remote address>

- then connection is accepted and once it is up the module reports the code:  
CONNECT

From this moment the data incoming in the serial port is packet and sent to the Internet host, while the data received from the host is serialised and flushed to the Terminal Equipment.

Note that the connections request are FIRST screened in the firewall, then if they are accepted they pass to the listening socket; therefore only hosts that are in the ACCEPT chain rules of the firewall can induce a connection request, the other host requests will be silently discarded without any indication to the remote host (for security reasons).

Once the connection is received and closed, the socket is not anymore in listen. If the application needs again to be in listen, then it shall send again the socket listen #SKTL command.

**NOTE:** this command differently from the AT#SKTOP DOES NOT automate all the process of activating the GPRS, if no GPRS is active the command reports ERROR; therefore before issuing this command the GPRS shall be activated with AT#GPRS=1 command.

In the same manner, when disconnecting the #SKTL command does not close the GPRS context, leaving it active for next connections until an AT#GPRS=0 command is issued or the network requests a context closing.



## 5.1.5 FTP Client

On top of the embedded TCP/IP stack, an FTP client is available. Such FTP is a versatile protocol suite, designed to be powerful, compact and simple to use for file transfer over the TCP/IP and therefore over the GPRS network.

As far as the AT commands list is concerned, the customer shall refer to the AT Commands chapter.

## 5.1.6 Known limitations

The implementation of the EASY GPRS feature has the following known limitations:

- Only one socket can be opened at a time, no multiple socket connections can be made;
- Only one connection request can be accepted at a time, subsequent requests will be silently discarded.
- Only the first GPRS context is associated with this feature;

It is taken for granted that external processor will be able to handle at least a limited v.24 implementation: RTS, CTS and, highly recommended, DCD lines; this because software flow control is not applicable to the feature;

Due to the particularity of this feature, the flow control of both the directions uplink and downlink is interlocked.



## 5.2 Jammed Detect & Report Extension

### 5.2.1 Overview

The Jammed Detect & Report feature allows a [Telit GM862-QUAD,QUAD-PY](#) and [GPS modules](#) 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 a 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 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.



## 5.3 Easy Script Extension - Python interpreter

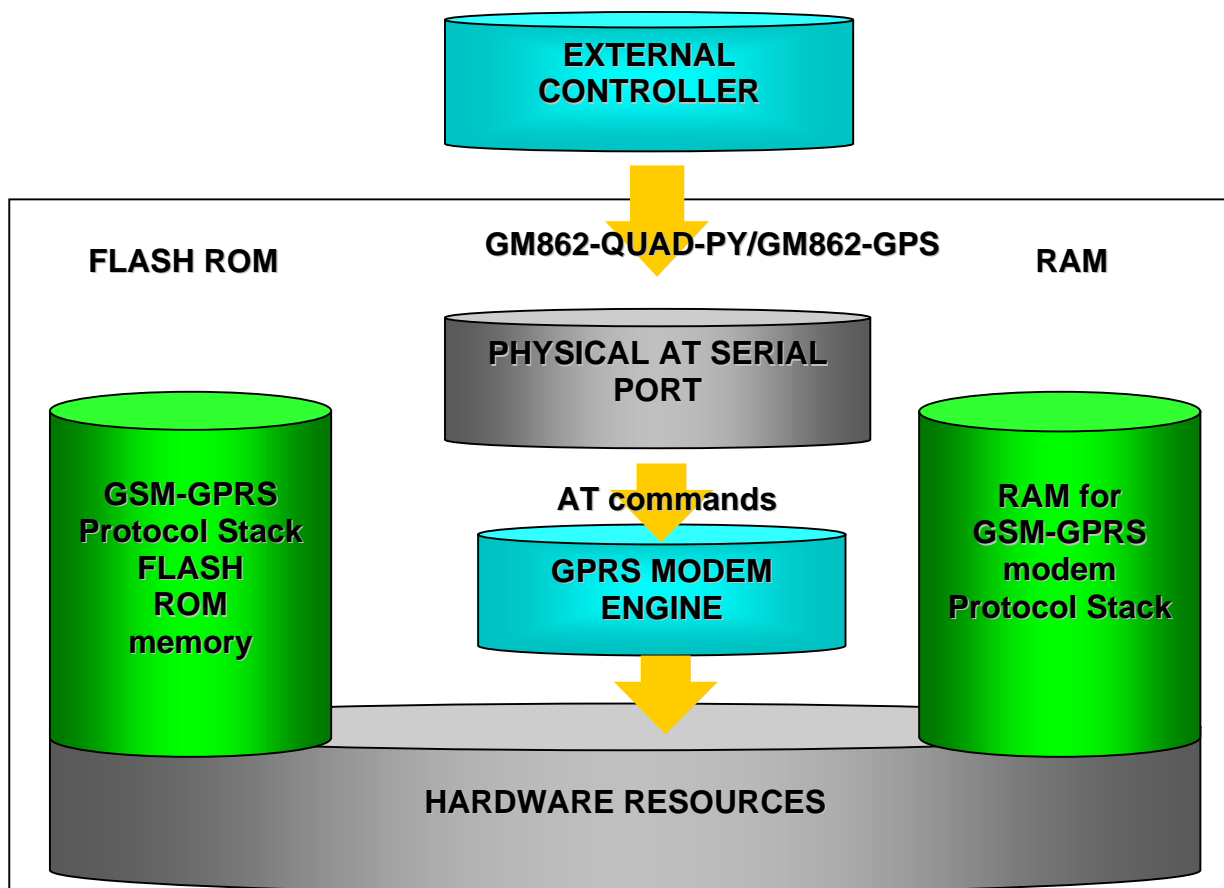
### 5.3.1 Overview

**NOTE:** This feature is available only on models **GM862-QUAD-PY** and **GM862-GPS**.

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 GM862-QUAD-PY and GM862-GPS through the AT command interface.

A schematic of such a configuration can be:

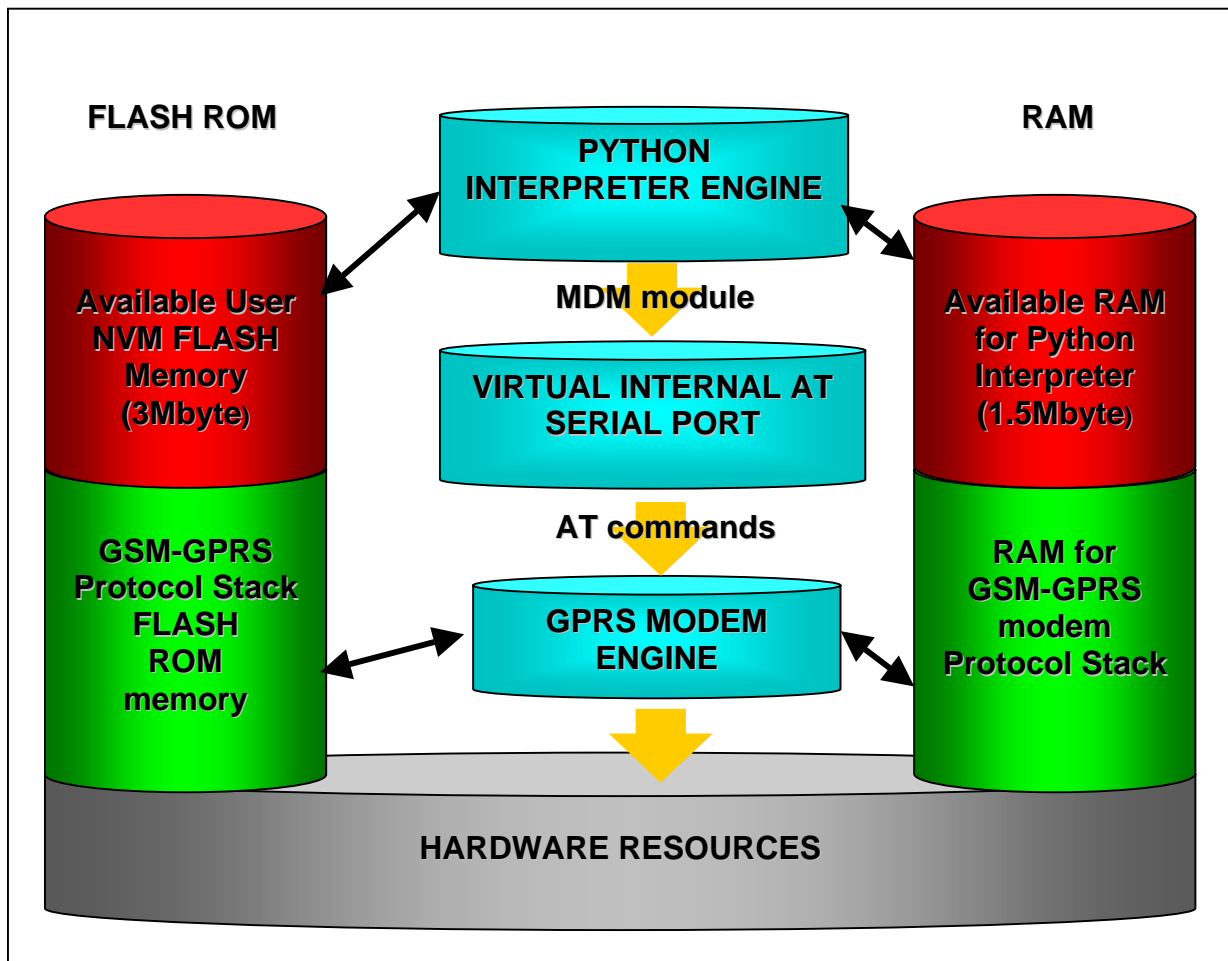
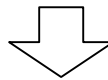


**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006

In order to eliminate this external controller, and further simplify the programming of the sequence of operations, inside the GM862-QUAD-PY / GM862-GPS it is included:

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

A schematic of this approach is:





### 5.3.2 Python 1.5.2+ Copyright Notice

The Python code implemented into the **Telit module** is copyrighted by Stichting Mathematisch Centrum, this is the license:

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All Rights Reserved

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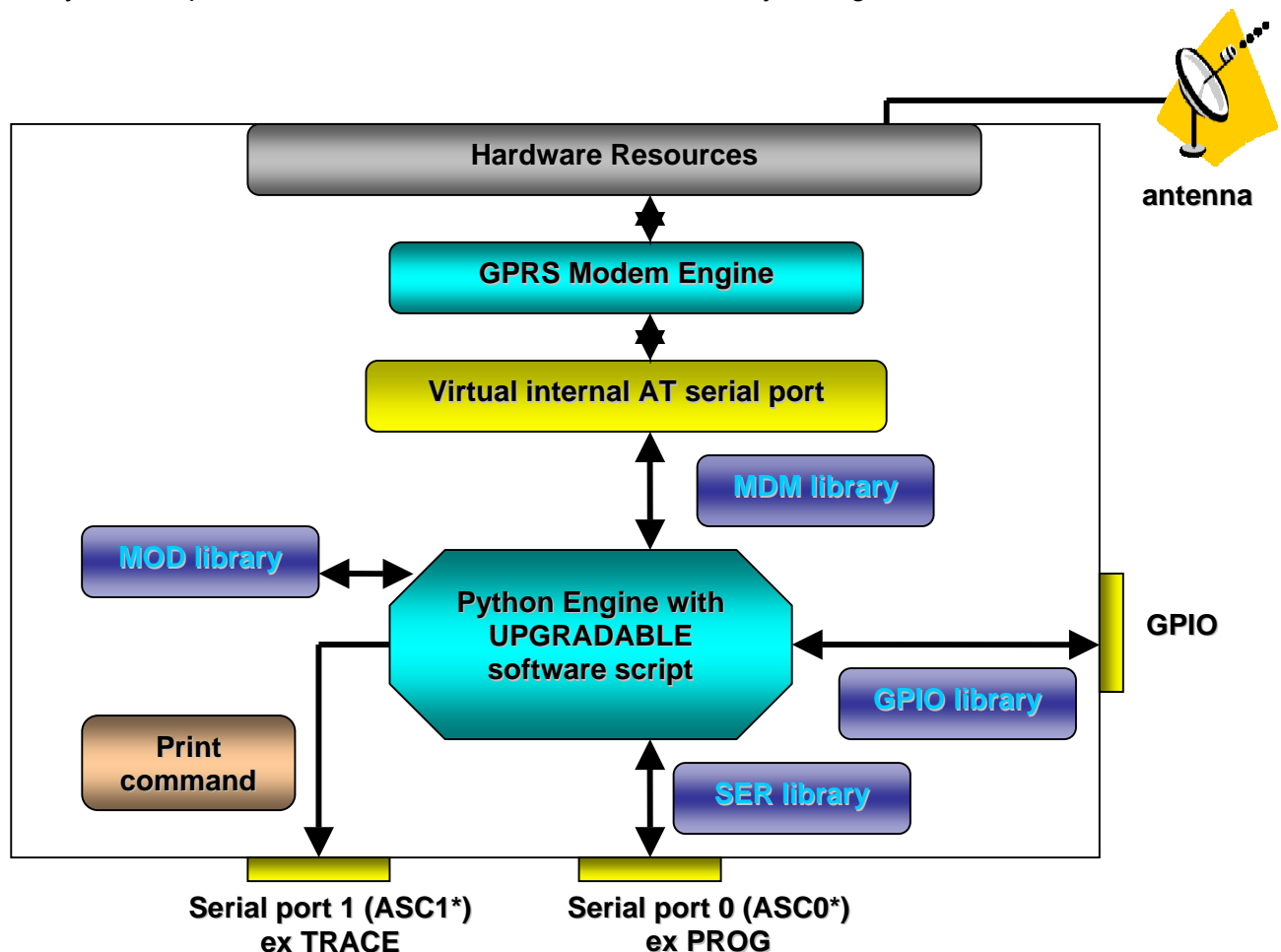
### 5.3.3 Python implementation description

Python scripts are text files stored in NVM inside the **Telit GM862-QUAD-PY** and **GM862-GPS**. 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 port but just an internal



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

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 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 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.

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

### 5.3.4 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 <b>not</b> supported	Available modules (all <b>others</b> are <b>not</b> supported)
complex	marshal
float	imp
long	_main_
docstring	_builtin_
	sys
	md5



### 5.3.5 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:

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

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



## 5.4 CMUX

**NOTE:** Available only for the products with the following part numbers:

Model	P/N
GM862-QUAD-PY	3990250658
GM862-QUAD	3990250659
GM862-GPS	3990250657

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

### 5.4.1.1 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.

### 5.4.1.2 Implementation feature and limitation

- 7.10 CMUX Basic Option used
- CMUX implementation support four full DLCI (Serial Port)
- CMUX can operate only at Fixed rate, if AT+CMUX is sent with IPR=0 an Error is returned, with a maximum rate of 115200
- Every 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 Instance has its own independent flow control

**NOTE:** More details about the Multiplexer mode are available in the Cmux Product Specification





## 5.5 SAP:SIM Access Profile

**NOTE:** Available only for the products with the following part numbers:

Model	P/N
GM862-QUAD-PY	3990250658
GM862-QUAD	3990250659
GM862-GPS	3990250657

### 5.5.1 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.

### 5.5.2 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.

### 5.5.3 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 Product Specification



## 6 AT Commands

The **GM862** module can be driven via the serial interface using the standard AT commands<sup>4</sup>. The **GM862** module are 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 **GM862** supports also Telit proprietary AT commands for special purposes.

The following table lists all supported AT commands and related brief description.

For a detailed description of GM862 modules AT Commands refer to document AT Commands Reference Guide, code 80000ST10025a.

For a detailed description of GM862GPS modules, refer to the AT Command Description document, code 80268ST10015a.

Hayes Compliant AT Commands		GM862 module Command availability				
Backward Compatibility		QUAD 3990250655	QUAD-PY 3990250656	GPS 3990250657	QUAD-PY 3990250658	QUAD 3990250659
#SELINT	Select Interface Style	•	•	•	•	•
Repeating a Command Line		QUAD 3990250655	QUAD-PY 3990250656	GPS 3990250657	QUAD-PY 3990250658	QUAD 3990250659
A/	Last command automatic repetition	•	•	•	•	•
Hayes AT Commands - Generic Modem Control		QUAD 3990250655	QUAD-PY 3990250656	GPS 3990250657	QUAD-PY 3990250658	QUAD 3990250659
&F	Reset base section factory profile configuration	•	•	•	•	•
Z	Soft reset	•	•	•	•	•
+FCLASS	Select active service class	•	•	•	•	•
&Y	Designate a default reset basic profile	•	•	•	•	•
&P	Designate a default reset full profile	•	•	•	•	•
&W	Store current configuration	•	•	•	•	•
&Z	Store telephone number in the internal phonebook	•	•	•	•	•
&N	Display internal phonebook stored numbers	•	•	•	•	•
+GMI	Request manufacturer identification	•	•	•	•	•
+GMM	Request model identification	•	•	•	•	•
+GMR	Request revision identification	•	•	•	•	•
+GCAP	Request capabilities list	•	•	•	•	•
+GSN	Request serial number	•	•	•	•	•

<sup>4</sup> 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.



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

&V	Display current configuration & profile	•	•	•	•	•
&V0	Display current configuration & profile	•	•	•	•	•
&V1	Display S registers values	•	•	•	•	•
&V2	Display last connection statistics	•	•	•	•	•
&V3	Display S registers values	•	•	•	•	•
\V	Single line connect message	•	•	•	•	•
%L	Report line signal level	•	•	•	•	•
%Q	Report line quality	•	•	•	•	•
+GCI	Select the country of installation	•	•	•	•	•
L	Monitor speaker loudness	•	•	•	•	•
M	Monitor speaker mode	•	•	•	•	•
<b>Hayes AT Commands - DTE-Modem Interface Control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
E	Command echo	•	•	•	•	•
Q	Quiet resut codes	•	•	•	•	•
V	Response Format	•	•	•	•	•
X	Extended result codes	•	•	•	•	•
I	Request identifier and software checksum	•	•	•	•	•
&C	Data carrier detect (DCD) control	•	•	•	•	•
&D	Data terminal ready (DTR) control	•	•	•	•	•
&K	Flow control	•	•	•	•	•
\Q	Standard Flow Control	•	•	•	•	•
&S	Data set ready (DSR) control	•	•	•	•	•
\R	Ring (RI) control	•	•	•	•	•
+IPR	Fixed DTE interface rate	•	•	•	•	•
+IFC	DTE - DTA flow control	•	•	•	•	•
+ILRR	DTE - modem rate reporting	•	•	•	•	•
+ICF	DTE - modem character format	•	•	•	•	•
<b>Hayes AT Commands - Call Control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
D	Dial	•	•	•	•	•
T	Set tone dial	•	•	•	•	•
P	Set pulse dial	•	•	•	•	•
A	Answer	•	•	•	•	•
H	Disconnect	•	•	•	•	•
O	Return to On Line Mode	•	•	•	•	•
&G	Guard tone	•	•	•	•	•
&Q	Sync/async mode	•	•	•	•	•
<b>Hayes AT Commands - Modulation Control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+MS	Modulation control	•	•	•	•	•
%E	Enable/disable line quality monitor and auto retrain or fallback / fallforward	•	•	•	•	•
<b>Hayes AT Commands - Compression Control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+DS	Set data compression	•	•	•	•	•
+DR	Data compression reporting	•	•	•	•	•
<b>Hayes AT Commands - Break Control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
\B	Transmit break to remote	•	•	•	•	•
\K	Break handling	•	•	•	•	•
\N	Operating mode	•	•	•	•	•



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

Hayes AT Commands - S Parameters		QUAD 3990250655	QUAD-PY 3990250656	GPS 3990250657	QUAD-PY 3990250658	QUAD 3990250659
S0	Number of rings to auto answer	.	.	.	.	.
S1	Ring counter	.	.	.	.	.
S2	Escape character	.	.	.	.	.
S3	Carriage return character	.	.	.	.	.
S4	Line feed character	.	.	.	.	.
S5	Backspace character	.	.	.	.	.
S7	Wait time for carrier, silence or dial tone	.	.	.	.	.
S12	Escape prompt delay	.	.	.	.	.
S25	Delay to DTR off	.	.	.	.	.
S30	Disconnect inactivity timer	.	.	.	.	.
S38	Delay before forced hang up	.	.	.	.	.
ETSI GSM 07.07 - General		QUAD 3990250655	QUAD-PY 3990250656	GPS 3990250657	QUAD-PY 3990250658	QUAD 3990250659
+CGMI	Request manufacturer identification	.	.	.	.	.
+CGMM	Request model identification	.	.	.	.	.
+CGMR	Request revision identification	.	.	.	.	.
+CGSN	Request product serial number identification	.	.	.	.	.
+CSCS	Select TE character set	.	.	.	.	.
+CIMI	Request international mobile subscriber identity (IMSI)	.	.	.	.	.
+CMUX	Multiplexing Mode	.	.	.	.	.
ETSI GSM 07.07 - Call Control		QUAD 3990250655	QUAD-PY 3990250656	GPS 3990250657	QUAD-PY 3990250658	QUAD 3990250659
+CHUP	Hang Up Call	.	.	.	.	.
+CBST	Select bearer service type	.	.	.	.	.
+CRLP	Radio link protocol	.	.	.	.	.
+CR	Service reporting control	.	.	.	.	.
+CEER	Extended error report	.	.	.	.	.
+CRC	Cellular result codes	.	.	.	.	.
+CSNS	Single numbering scheme	.	.	.	.	.
+CVHU	Voice Hang Up Control	.	.	.	.	.
ETSI GSM 07.07 - Network Service Handling		QUAD 3990250655	QUAD-PY 3990250656	GPS 3990250657	QUAD-PY 3990250658	QUAD 3990250659
+CNUM	Subscriber number	.	.	.	.	.
+COPN	Read operator names	.	.	.	.	.
+CREG	Network registration report	.	.	.	.	.
+COPS	Operator selection	.	.	.	.	.
+CLCK	Facility lock/ unlock	.	.	.	.	.
@CLCK	Facility lock/ unlock (improved)	.	.	.	.	.
+CPWD	Change facility password	.	.	.	.	.
+CLIP	Calling line identification presentation	.	.	.	.	.
+CLIR	Calling line identification restriction	.	.	.	.	.
+CCFC	Call forwarding number and conditions	.	.	.	.	.
+CCWA	Call waiting	.	.	.	.	.
+CHLD	Call holding services	.	.	.	.	.
+CUSD	Unstructured supplementary service data	.	.	.	.	.
+CAOC	Advice of charge	.	.	.	.	.
+CLCC	List current calls	.	.	.	.	.
+CSSN	SS Notification	.	.	.	.	.





## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

+CCUG	Closed User Group supplementary service control	•	•	•	•	•
<b>ETSI GSM 07.07 - Mobile Equipment Control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+CPAS	Phone activity status	•	•	•	•	•
+CFUN	Set phone functionality (Power Saving Management)	•	•	•	•	•
+CPIN	Enter PIN	•	•	•	•	•
+CSQ	Signal quality	•	•	•	•	•
+CIND	Indicator Control			•	•	•
+CMER	Mobile Equipment Event Reporting			•	•	•
+CPBS	Select phonebook memory storage	•	•	•	•	•
+CPBR	Read phonebook entries	•	•	•	•	•
+CPBF	Find phonebook entries	•	•	•	•	•
+CPBW	Write phonebook entry	•	•	•	•	•
+CCLK	Clock Management	•	•	•	•	•
+CALA	Alarm Management	•	•	•	•	•
+CRSM	Restricted SIM Access	•	•	•	•	•
+CALM	Alert sound mode	•	•	•	•	•
+CRSL	Ringer sound level	•	•	•	•	•
+CLVL	Loudspeaker volume level	•	•	•	•	•
+CMUT	Microphone mute control	•	•	•	•	•
+CACM	Accumulated call meter	•	•	•	•	•
+CMM	Accumulated call meter maximum	•	•	•	•	•
+CPUC	Price per unit and currency table	•	•	•	•	•
+CCID	Read ICCID (Integrated Circuit Card Id.)	•	•	•	•	•
+CLAC	Available AT Commands			•	•	•
<b>ETSI GSM 07.07 - Mobile Equipment Errors</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+CMEE	Report mobile equipment error	•	•	•	•	•
<b>ETSI GSM 07.07 - Voice Control (TIA IS-101)</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+VTS	DTMF tones transmission	•	•	•	•	•
+VTD	Tone Duration	•	•	•	•	•
<b>ETSI GSM 07.07 - Commands For GPRS</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+CGACT	PDP context activate or deactivate	•	•	•	•	•
+CGATT	GPRS attach or detach	•	•	•	•	•
+CGDATA	Enter data state	•	•	•	•	•
+CGDCONT	Define PDP context	•	•	•	•	•
+CGPADDR	Show PDP address	•	•	•	•	•
+CGCLASS	GPRS Mobile Station Class	•	•	•	•	•
+CGREG	GPRS network registration status	•	•	•	•	•
+CGQMIN	Quality of service profile (minimum acceptable)	•	•	•	•	•
+CGQREQ	Quality of service profile (requested)	•	•	•	•	•
<b>ETSI GSM 07.07 - Commands For Battery Charger</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+CBC	Battery Charge	•	•	•	•	•
<b>ETSI GSM 07.05 - General Configuration</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+CSMS	Select message service	•	•	•	•	•
+CPMS	Preferred message storage	•	•	•	•	•
+CMGF	Message format	•	•	•	•	•
<b>ETSI GSM 07.05 - Message configuration</b>		<b>QUAD</b>	<b>QUAD-PY</b>	<b>GPS</b>	<b>QUAD-PY</b>	<b>QUAD</b>



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

		3990250655	3990250656	3990250657	3990250658	3990250659
+CSMP	Set parameters in text mode	.	.	.	.	.
+CSDH	Show parameters in text mode	.	.	.	.	.
+CSAS	Save setting text mode	.	.	.	.	.
+CRES	Restore text mode settings	.	.	.	.	.
+CSCB	Select Cell Broadcast Message types	.	.	.	.	.
+CSCA	Service center address	.	.	.	.	.
<b>ETSI GSM 07.05 - Message Receiving and Reading</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+CNMI	New message indications to Terminal Equipment	.	.	.	.	.
+CMGL	List messages	.	.	.	.	.
@CMGL	List Message	.	.	.	.	.
+CMGR	Read message	.	.	.	.	.
@CMGR	Read Message	.	.	.	.	.
<b>ETSI GSM 07.05 - Message Sending and Writing</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+CMGS	Send message	.	.	.	.	.
+CMSS	Send message from storage	.	.	.	.	.
+CMGW	Write message to memory	.	.	.	.	.
+CMGD	Delete message	.	.	.	.	.
<b>FAX AT Commands – General Configuration</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+FMI	Report manufacturer ID	.	.	.	.	.
+FMM	Report model ID	.	.	.	.	.
+FMR	Report revision ID	.	.	.	.	.
<b>FAX AT Commands - Transmission/Reception control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+FTS	Stop Transmission and pause	.	.	.	.	.
+FRS	Wait for receive silence	.	.	.	.	.
+FTM	Transmit data modulation	.	.	.	.	.
+FRM	Receive data modulation	.	.	.	.	.
+FTH	Transmit data with HDLC framing	.	.	.	.	.
+FRH	Receive data with HDLC framing	.	.	.	.	.
<b>FAX AT Commands - Serial Port Control</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
+FLO	Select flow control specified by type	.	.	.	.	.
+FPR	Select serial port rate	.	.	.	.	.
+FDD	Double escape character replacement control	.	.	.	.	.
<b>Custom AT Commands – General Configuration</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#CGMI	Request manufacturer identification	.	.	.	.	.
#CGMM	Request model identification	.	.	.	.	.
#CGMR	Request revision identification	.	.	.	.	.
#CGSN	Request product serial number identification	.	.	.	.	.
#CIMI	Request international mobile subscriber identity (IMSI)	.	.	.	.	.
#CCID	Read ICCID (Integrated Circuit Card Id.)	.	.	.	.	.
#CAP	Change Audio Path	.	.	.	.	.
#SRS	Select ringer sound	.	.	.	.	.
#SRP	Select Ringer Path	.	.	.	.	.
#STM	Signaling Tones Mode	.	.	.	.	.
#PCT	Display PIN Counter	.	.	.	.	.



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

#SHDN	Software Shut Down	•	•	•	•	•
#WAKE	Wake from Alarm mode	•	•	•	•	•
#QTEMP	Query Temperature overflow	•	•	•	•	•
#SGPO	Set General Purpose Output	•	•	•		
#GGPI	Read General Purpose Input	•	•	•		
#GPIO	General Purpose Input/Output pin control	•	•	•	•	•
#E2SMSRI	SMS Ring Indicator			•	•	•
#ADC	Read Analog/Digital Converter input	•	•	•	•	•
#CBC	Battery And Charger Status			•	•	•
#AUTOATT	Enables / Disable GPRS Auto Attach	•	•	•	•	•
#MSCCLASS	Multislot Class Control	•	•	•	•	•
#MONI	Monitor Cells	•	•	•	•	•
#SERVINFO	Serving Call Information			•	•	•
#COPSMODE	+COPS Mode	•	•	•	•	•
#QSS	Query SIM Status	•	•	•	•	•
#DIALMODE	ATD Dialing Mode	•	•	•	•	•
#ACAL	Set Automatic Call	•	•	•	•	•
#ECAM	Extended Call Monitoring	•	•	•	•	•
#SMOV	SMS Overflow	•	•	•	•	•
#CODEC	Audio Codec	•	•	•	•	•
#SHFEC	Set Handsfree echo canceller	•	•	•	•	•
#HFMICG	Handsfree Microphone Gain	•	•	•	•	•
#HSMICG	Handset Microphone Gain	•	•	•	•	•
#SHFSD	Set Handsfree side tone	•	•	•	•	•
#/	Repeat last command	•	•	•	•	•
#BND	Select Band	•	•	•	•	•
#NITZ	Network Timezone	•	•	•	•	•
#SKIPESC	Skip escape sequence	•	•	•	•	•
#AUTOBND	Automatic Band Selection	•	•	•	•	•
#E2ESC	Escape Sequence Guard Time	•	•	•	•	•
#GAUTH	PPP-GPRS Connection Authentication	•	•	•	•	•
#RTCSTAT	RTC Status	•	•	•	•	•
<b>Custom AT Commands</b>	<b>Commands – FTP CLIENT AT</b>	<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#FTPTO	FTP Time-Out	•	•	•	•	•
#FTPOPEN	FTP Open command	•	•	•	•	•
#FTPCLOSE	FTP Close command	•	•	•	•	•
#FTPPUT	FTP Put command	•	•	•	•	•
#FTPPUTPH	FTP Put Photo	•	•	•	•	•
#FTPGET	FTP Get command	•	•	•	•	•
#FTPTYPE	FTP Type command	•	•	•	•	•
#FTPMSG	FTP read message command	•	•	•	•	•
#TFPDELE	FTP Delete command	•	•	•	•	•
#FTPPWD	FTP print working directory command	•	•	•	•	•
#FTPCWD	FTP change working directory command	•	•	•	•	•
#FTPLIST	FTP List command	•	•	•	•	•
<b>Custom AT Commands</b>	<b>Commands – Enhanced Easy GPRS® Extension</b>	<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#USERID	Authentication User ID control	•	•	•	•	•
#PASSW	Authentication Password control	•	•	•	•	•



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

#PKTSZ	Packet Size control					
#DSTO	Data Sending TimeOut control					
#SKTTO	Socket inactivity timeout control					
#SKTSET	Socket definition control					
#SKTOP	Socket Open command					
#QDNS	Query DNS					
#SKTCT	Socket TCP Connection Timeout					
#SKTSAV	Socket Parameters Save Command					
#SKTRST	Socket Parameters Reset Command					
#GPRS	GPRS context activation control					
#SKTD	Socket Dial					
#SKTL	Socket Listen					
@SKTL	Socket Listen (improved)					
#E2SLRI	Socket Listen Ring Indicator					
#FRWL	Firewall setup					
<b>Custom AT Management</b>	<b>Commands – Easy Camera®</b>	<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#CAMON	Camera ON					
#CAMOFF	Camera OFF					
#TPHOTO	Camera Take Photo					
#RPHOTO	Camera Read Photo					
#OBJL	Object List					
#OBJR	Object Read					
#CAMQUA	Camera Select Quality of Photo					
#CMODE	Camera Select Operating MODE					
#SELCAM	Camera Model selection					
#CAMEN	Camera ON/OFF					
#CAMRES	Camera resolution					
#CAMCOL	Camera colour mode selection					
#CAMZOOM	Camera zoom setting					
#CAMTXT	Camera Time/Date overprint					
<b>Custom AT Commands – E-mail Management</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#ESMTP	Email SMTP server					
#EADDR	Email sender address					
#EUSER	Email authentication USER NAME					
#EPASSW	Email authentication PASSWORD					
#SEMAIL	Email Sending With GPRS Context Activation					
#EMAILACT	E-mail context activation control					
#EMAILD	E-mail socket dial					
#ESAV	Email Parameters Save Command					
#ERST	Email Parameters Reset Command					
#EMAILMSG	SMTP Read Message					
<b>Custom AT Commands – Easy Scan® Extension</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#CSURV	Network Survey of the complete 900/1800/1900 Network					
#CSURVC	Network Survey in computer friendly format					
#CSURVU	Network Survey of user defined 900/1800/1900 channels					
#CSURVB	BCCH Network Survey					
#CSURVUC	Network Survey in computer friendly format					



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

#CSURVF	Network Survey Format	•	•	•	•	•
#CSURVNLF	<CR><LF> Removing On Easy Scan® Commands Family	•	•	•	•	•
#CSURVEXT	Extended Network Survey	•	•	•	•	•
<b>Jammed Detect &amp; Report AT commands</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#JDR	Jammed Detect & Report	•	•	•	•	•
<b>Custom AT Commands - Easy Script® Extension - Python Interpreter<sup>5</sup></b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#WSCRIPT	Write script command		•	•	•	
#ESCRIP	Select Active script command		•	•	•	
#RSCRIPT	Read script command		•	•	•	
#LSCRIPT	List script names command		•	•	•	
#DSCRIPT	Delete script command		•	•	•	
#REBOOT	Reboot command		•	•	•	
#CMUXSCR	CMUX Script Enable			•	•	
<b>GPS commands</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
\$GPSP	GPS Controller Power Management			•		
\$GPSRST	GPS Reset			•		
\$GPSD	GPS Device Type Set			•		
\$GPSSW	GPS Software Version			•		
\$GPSAT	GPS Antenna Type Definition			•		
\$GPSAV	GPS Antenna Supply Voltage Readout			•		
\$GPSAI	GPS Antenna Current Readout			•		
\$GPSAP	GPS Antenna Protection			•		
\$GPSNMUN	Unsolicited NMEA Data Configuration			•		
\$GPSACP	Get Acquired Position			•		
\$GPSSAV	Save GPS parameters configuration			•		
\$GPSRST	Restore to Default GPS Parameters			•		
<b>Custom AT Commands – SAP (SIM Access Profile)</b>		<b>QUAD 3990250655</b>	<b>QUAD-PY 3990250656</b>	<b>GPS 3990250657</b>	<b>QUAD-PY 3990250658</b>	<b>QUAD 3990250659</b>
#RSEN	Remote SIM Enable			•	•	•
#RSM:	Remote SIM Message (Unsolicited)			•	•	•
#RSM	Remote SIM Message Command			•	•	•
#RSS	Remote SIM Status Command			•	•	•

<sup>5</sup> Python is a registered trademark of the Python Software Foundation.





## 7 Conformity Assessments

The **Telit GM862 modules** are assessed to be conform to the R&TTE Directive as stand-alone products, so If the module is installed **in conformance with Telit Communications installation instructions** require no further evaluation under Article 3.2 of the R&TTE Directive and do not require further involvement of a R&TTE Directive Notified Body for the final product. In all other cases, or if the manufacturer of the final product is in doubt then the equipment integrating the radio module must be assessed against Article 3.2 of the R&TTE Directive. In all cases assessment of the final product must be made against the Essential requirements of the R&TTE Directive Articles 3.1(a) and (b), safety and EMC respectively, and any relevant Article 3.3 requirements. The **Telit GM862 modules** are 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 GM862PCS module is compliant with the following standards:

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

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

Furthermore the **Telit GM862-QUAD, GM862-QUAD-PY and GM862-GPS modules** is FCC Approved as module to be installed in other devices. If the final product after integration is intended for portable use, a new application and FCC is required.

The **Telit GM862-QUAD, GM862-QUAD-PY and GM862-GPS modules** are conform with the following US Directives:

- Use of RF Spectrum. Standards: FCC 47 Part 24 (GSM 1900)
- EMC (Electromagnetic Compatibility). Standards: FCC47 Part 15

To meet the FCC's RF exposure rules and regulations:

- The system antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all the persons and must not be co-located or operating in conjunction with any other antenna or transmitter.
- The system antenna(s) used for this module must not exceed 3 dBi for mobile and fixed or mobile operating configurations.



## GM862 Product Description

80272ST10019a Rev. 4 – 04/08/2006

- Users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.
- Manufacturers of mobile, fixed or portable devices incorporating this module are advised to clarify any regulatory questions and to have their complete product tested and approved for FCC compliance.



## 7.1 GM862-QUAD(P/N:3990250655): Conformity Assessment

**DECLARATION OF CONFORMITY**

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

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

declare under our sole responsibility that the product

**GM862-QUAD**

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

We hereby also declare that all essential test suites have been carried out and that the above named product is in conformity to all the essential requirements of Directive 1999/5/EC.

The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed with the involvement of the following Notified Body:

**BABT, Claremont House, 34 Molesey Road, Walton-on-Thames, KT12 4RQ, UK**

Identification mark: **0168**

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

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

Trieste, **16 November 2005**

  
Ing. Guido Walcher  
Quality Assurance Director

MOD.003 11/05 REV.7





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## Certificate

This certificate is issued to

**Telit Communications S.p.A**

of

Viale Stazione di Prosecco 5/B  
34010 Sgonico  
Trieste  
Italy

to certify that the Equipment known as

**GM862-QUAD**

as described in the Annex to this certificate  
conforms to the essential requirements of Directive 1999/5/EC  
of the European Parliament and European Council on the basis  
of Technical Construction File number SC\_0134-0018-002\_TCF  
in relation to the essential requirements of  
Articles 3.1(a), 3.1(b) & 3.2 of the Directive.

Signed:   
On Behalf of BABT

Issue Date: 16 November 2005

Number: NC/12603 Issue: 01

This certificate is issued by BABT and represents a formal Notified Body opinion under Annex IV of Directive 1999/5/EC  
permitting the use of the BABT CE0168 mark on the equipment described above  
subject to the equipment meeting the compliance requirements of all applicable EU directives.  
This certificate is not transferable and remains the property of BABT.

British Approvals Board for Telecommunications • TÜV SÜD Group •  
Balfour House • Churchfield Road • Walton-on-Thames • Surrey • KT12 2TD • United Kingdom







Annex to

## CERTIFICATE

### Description of Equipment

Quad band GSM850, GSM900, DCS1800, PCS1900 GPRS Cellular Mobile Radio module.

### Standards

Compliance has been demonstrated with:

EN 60950-1:2001  
EN 301 489-7: v1.2.1 / EN 301 489-1: v1.4.1  
EN 301 511 V.9.0.2

### Network Interface compatibility

Antenna	The Global System Mobile (GSM) 900 Network
	The DCS 1800 Personal Communications Network (PCN)

### Relevant Technical Documentation

*Supplier's Declaration(s) of Conformity:* dated 16/11/2005

*User Guides:* Technical Manual Quad Band GPRS Data Terminal Module  
Telit GM862-Quad, 1vv0300679 Rev 0, 10/08/05  
Telit GM862-Quad Hardware User Guide  
1vv0300692, Rev ISSUE#0, 4/10/2005

*Test report number:* 18899TDR.001  
18899RTC.001  
SC\_0134-0018-002  
SC\_0134-0018-003  
SC\_0134-0018-004  
SC\_0134-0018-005  
SC\_0134-0018-006  
SCM/171/05/627





**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006



Approved Software for GM862-QUAD		
Title	Identifier	Revision Level
GM862-QUAD	N/a	5.02.203/6.03.200-GM862-QUAD

Approved Hardware for GM862-QUAD Hardware version 0		
Printed circuit board	Schematic	Bill of materials
CS1180a	30280SE11180a	2000100754

and all subsequent issues of the above relevant technical documentation, hardware and software which have been formally accepted by BABT in accordance with the Certification Regulations of BABT.

Signed: <u>L Rowland</u> on behalf of BABT	Date: <u>16th November 2005</u>
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## 7.2 GM862-QUAD-PY(P/N:3990250656): Conformity Assessment



### DECLARATION OF CONFORMITY

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

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

declare under our sole responsibility that the product  
**GM862-QUAD-PY**

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

We hereby also declare that all essential test suites have been carried out and that the above named product is in conformity to all the essential requirements of Directive 1999/5/EC.

The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed with the involvement of the following Notified Body:

**BABT, Claremont House, 34 Molesey Road, Walton-on-Thames, KT12 4RQ, UK**

Identification mark: **0168**

The technical documentation relevant to the above equipment will be held at:  
**Telit Communications S.p.A  
V.le Stazione di Prosecco, 5/b  
34010 Sgonico (TRIESTE)  
ITALY**

Trieste, **13 December 2005**

  
**Ing. Guido Walcher**  
 Quality Assurance Director

65DXX01 MOD.003 11/05 REV.7





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## Certificate

This certificate is issued to

**TELIT Communications S.p.A.**

of

Viale Stazione di Prosecco 5/B  
34010 Sgonico  
Trieste  
Italy

to certify that the Equipment known as

**GM862-QUAD-PY**

as described in the Annex to this certificate  
conforms to the essential requirements of Directive 1999/5/EC  
of the European Parliament and European Council on the basis  
of Technical Construction File number SC\_0179-0018-001\_tcf  
in relation to the essential requirements of  
Articles 3.1(a), 3.1(b) & 3.2 of the Directive.

Signed:

On Behalf of BABT

Issue Date: 16 December 2005

Number: NC/12629 Issue: 01

This certificate is issued by BABT and represents a formal Notified Body opinion under Annex IV of Directive 1999/5/EC  
permitting the use of the BABT (€0168) mark on the equipment described above  
subject to the equipment meeting the compliance requirements of all applicable EU directives.  
This certificate is not transferable and remains the property of BABT.

British Approvals Board for Telecommunications • TÜV SÜD Group •  
Balfour House • Churchfield Road • Walton-on-Thames • Surrey • KT12 2TD • United Kingdom





Annex to

## CERTIFICATE

### Description of Equipment

Quad band GSM850, GSM900, DCS1800, PCS1900 GPRS Cellular Mobile Radio module.

### Standards

Compliance has been demonstrated with:

EN 60950-1:2001  
EN 301 489-7: v1.2.1 / EN 301 489-1: v1.4.1  
EN 301 511 V.9.0.2

### Network Interface compatibility

Antenna	The Global System Mobile (GSM) 900 Network
	The DCS 1800 Personal Communications Network (PCN)

### Relevant Technical Documentation

*Supplier's Declaration(s) of Conformity:* dated 13/12/2005

*User Guides:* Technical Manual Quad Band GPRS Data Terminal Module  
Telit GM862-Quad-PY, 1vv0300699 Rev 0, Dec 6, 2005  
Telit GM862-Quad/Quad-PY Hardware User Guide  
1vv0300692, Rev ISSUE#0, 4/10/2005

*Test report number:* 18899TDR.001  
18899RTC.001  
SC\_0134-0018-002  
SC\_0134-0018-003  
SC\_0134-0018-004  
SC\_0134-0018-005  
SC\_0134-0018-006  
SCM/171/05/627



**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006



Approved Software for GM862-QUAD-PY		
Title	Identifier	Revision Level
GM862-QUAD-PY	N/A	5.02.203/6.03.600-GM862 QUAD PY

Approved Hardware for GM862-QUAD-PY		Hardware version 0
Printed circuit board	Schematic	Bill of materials
CS1180a-A	30280SE11180a-A	2000100764

and all subsequent issues of the above relevant technical documentation, hardware and software which have been formally accepted by BABT in accordance with the Certification Regulations of BABT.

Signed: Alan Brito Date: 16<sup>th</sup> December 2005  
on behalf of BABT





## 7.3 GM862-QUAD : RoHS certificate



### DECLARATION OF EU RoHS Compliance

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

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

declare under our sole responsibility that the product

**GM862-QUAD** (commercial name)

**3990250655** (internal code)

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

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

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

Trieste, **01 December 2005**



**Dott. Carlo Soravia**  
Production & subcontractors relations  
Manager


The information contained in this document have been verified as complete and accurate



**Ing. Guido Walcher**  
Quality Assurance Director



## 7.4 GM862-QUAD-PY : RoHS certificate



### DECLARATION OF EU RoHS Compliance

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

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

declare under our sole responsibility that the product

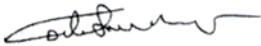
**GM862-QUAD-PY (commercial name)**  
**3990250656 (internal code)**

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

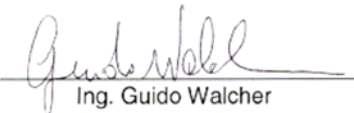
The technical documentation or other information showing that electrical and electronic equipment which has put on the market, complies the requirements of regulation, will be held at:

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

Trieste, **01 December 2005**

  
**Dott. Carlo Soravia**  
 Production & subcontractors relations  
 Manager

The information contained in this document have been verified as complete and accurate

  
**Ing. Guido Walcher**  
 Quality Assurance Director



## 7.5 GE862-GPS : RoHS certificate

Under approval.



## 7.6 GM862-QUAD FCC Equipment Authorization

Under approval.



## 7.7 GM862-QUAD-PY: Conformity Assessment

Under approval.




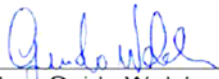


## 7.8 GM862-QUAD-PY FCC Equipment Authorization

Under approval.



## 7.9 GM862-GPS: Conformity Assessment

		<h3>DECLARATION OF CONFORMITY</h3>	
<p>We, <b>Telit Communications S.p.A</b></p>			
<p>Of: <b>Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY</b></p>			
<p>declare under our sole responsibility that the product</p> <p style="text-align: center;"><b>GM862-GPS</b></p>			
<p>to which this declaration relates is in conformity with all the essential requirements of Directive 1999/05/EC</p>			
<p>The conformity with the essential requirements of the European Directive 1999/05/EC has been verified against the following harmonized standards:</p> <ul style="list-style-type: none"> <li>• ETSI EN 301 511 v.9.0.2;</li> <li>• CENELEC EN 60950:2001;</li> <li>• ETSI EN 301 489-1: v.1.4.1;</li> <li>• ETSI EN 301 489-7: v.1.2.1.</li> </ul>			
<p>The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/5/EC has been followed with the involvement of the following Notified Body:</p> <p><b>BABT, Balfour House, Churchfield Road, Walton-on-Thames, Surrey, KT12 2TD, United Kingdom</b></p>			
<p>Identification mark:</p>		<p style="text-align: center;"><b>0168</b></p>	
<p>The technical documentation relevant to the above equipment will be held at:</p> <p><b>Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY</b></p>			
<p>Trieste, <b>04 August 2006</b></p>		<p style="text-align: center;">   <b>Ing. Guido Walcher</b>  <b>Quality Assurance Director</b> </p>	
<p>06DOC12 MOD.003 02/06 REV.9</p>			





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## Certificate

This certificate is issued to

**TELIT Communications S.p.A.**

of

Via Stazione di Prosecco 5/B  
34010 Sgonico  
Trieste  
Italy

to certify that the Equipment known as

**GM862-GPS**

as described in the Annex to this certificate  
conforms to the essential requirements of Directive 1999/5/EC  
of the European Parliament and European Council on the basis  
of Technical Construction File number 24435\_GM862-GPS\_rev1  
in relation to the essential requirements of  
Articles 3.1(a), 3.1(b) & 3.2 of the Directive.

Signed:

On Behalf of BABT

Issue Date: 03 August 2006

Number: NC/12874 Issue: 01

This certificate is issued by BABT and represents a formal Notified Body opinion under Annex IV of Directive 1999/5/EC  
permitting the use of the BABT CE0168 mark on the equipment described above  
subject to the equipment meeting the compliance requirements of all applicable EU directives.  
This certificate is not transferable and remains the property of BABT.

British Approvals Board for Telecommunications • TUV SUD Group •  
Ballour House • Churchfield Road • Walton-on-Thames • Surrey • KT12 2TD • United Kingdom





Annex to

## CERTIFICATE

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### Description of Equipment

Quad band GSM850, GSM900, DCS1800, PCS1900 GPRS radio module.

### Standards

Compliance has been demonstrated with:

EN 60950-1:2001  
EN 301 489-1: v1.5.1  
EN 301 489-7: v1.2.1  
EN 301 511: V.9.0.2

### Network Interface compatibility

Antenna	The Global System Mobile (GSM) 900 Network The DCS 1800 Personal Communications Network (PCN)
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### Relevant Technical Documentation

*Supplier's Declaration(s) of Conformity:* R&TTE draft 2006-07-31

*User Guides:* Telit GM862-GPS Hardware User Guide  
1vv0300728, Rev. 0, - 27/04/06

Technical Manual 1vv0300730 Rev.0



**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006



Test report number: RF Cetecom 22345RTC.001  
Cetecom 24435RTC.001  
Telit 31669  
Telit 31752  
EMC Cetecom 22345REM.001  
Cetecom 24435REM.001  
Safety Cetecom 24435RSE.001

**Approved Software for GM862-GPS**

Title	Identifier	Revision Level
GM862-GPS	N/a	PS:05.03.012 / AL:07.01.407-B001-GM862-GPS

**Approved Hardware for GM862-GPS** Hardware version 3.00

Printed circuit board	Schematic	Bill of materials
CS1187b	30272SE11187B	code: 2000100827

Signed: Alan Bails  
on behalf of BABT

Date: 3 August 2006





## 7.10GM862-GPS FCC Equipment Authorization

Under approval.



## 8 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.

Electronic equipment to be introduced in the market has to be conforming to the related Directives of the European Community. All the relevant information is available on the European Community's website, especially:

- The Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment ...:  
<http://europa.eu.int/comm/enterprise/rte/dir99-5.htm>



**GM862 Product Description**

80272ST10019a Rev. 4 – 04/08/2006

- The Low Voltage Directive (LVD) 73/23/EEC and The Council Directive 89/336/EEC of 3 May 1989 on ... electromagnetic compatibility (EMC Directive) are available at:  
[http://europa.eu.int/comm/enterprise/electr\\_equipment/index\\_en.htm](http://europa.eu.int/comm/enterprise/electr_equipment/index_en.htm)
- The DIRECTIVE 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 27 January 2003 on waste electrical and electronic equipment (WEEE) and the DIRECTIVE 2002/95/EC 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") are available at:  
<http://europa.eu.int/scadplus/leg/en/lvb/l21210.htm>



## 9 GM862 Family Technical Support

Telit's technical support to **GM862** wireless modem customers consists in:

- Technical documentation: available for download on the Website [www.telit.com](http://www.telit.com) >Products >Modules > selected model.
- Engineering support: accessible via E-Mail service with 48 hr replies assured under normal conditions.



## 10 Acronyms

<b>ACM</b>	Accumulated Call Meter
<b>ASCII</b>	American Standard Code for Information Interchange
<b>AT</b>	Attention commands
<b>BGA</b>	Ball Grid Array (of solder balls on surface mount devices)
<b>CB</b>	Cell Broadcast
<b>CBS</b>	Cell Broadcasting Service
<b>CCM</b>	Call Control Meter
<b>CLIP</b>	Calling Line Identification Presentation
<b>CLIR</b>	Calling Line Identification Restriction
<b>CMOS</b>	Complementary Metal-Oxide Semiconductor
<b>CR</b>	Carriage Return
<b>CSD</b>	Circuit Switched Data
<b>CTS</b>	Clear To Send
<b>DAI</b>	Digital Audio Interface
<b>DCD</b>	Data Carrier Detected
<b>DCE</b>	Data Communications Equipment
<b>DRX</b>	Data Receive
<b>DSR</b>	Data Set Ready
<b>DTA</b>	Data Terminal Adaptor
<b>DTE</b>	Data Terminal Equipment
<b>DTMF</b>	Dual Tone Multi Frequency
<b>DTR</b>	Data Terminal Ready
<b>EMC</b>	Electromagnetic Compatibility
<b>ETSI</b>	European Telecommunications Equipment Institute
<b>FTA</b>	Full Type Approval (ETSI)
<b>FTP</b>	File Transfer Protocol
<b>GGA</b>	Global Positioning System Fix Data
<b>GLL</b>	Geographic Posotion – Latitude/Longitude
<b>GPS</b>	Global Positioning System, based on reception of signals from orbiting satellites
<b>GPRS</b>	General Radio Packet Service
<b>GSA</b>	GPS receiver operating mode, SVs used for navigation, and DOP values.
<b>GSM</b>	Global System for Mobile communication
<b>GSV</b>	Number of SVs in view, PRN numbers, elevation, azimuth & SNR values.
<b>HF</b>	Hands Free
<b>IMEI</b>	International Mobile Equipment Identity
<b>IMSI</b>	International Mobile Subscriber Identity
<b>IRA</b>	International Reference Alphabet
<b>ITU</b>	International Telecommunications Union
<b>IWF</b>	Inter-Working Function





**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006

<b>LCD</b>	Liquid Crystal Display
<b>LED</b>	Light Emitting Diode
<b>LF</b>	Linefeed
<b>ME</b>	Mobile Equipment
<b>MMI</b>	Man Machine Interface
<b>MO</b>	Mobile Originated
<b>MS</b>	Mobile Station
<b>MT</b>	Mobile Terminated
<b>NMEA</b>	National Marine Electronics Association
<b>OEM</b>	Other Equipment Manufacturer
<b>PB</b>	Phone Book
<b>PDU</b>	Protocol Data Unit
<b>PH</b>	Packet Handler
<b>PIN</b>	Personal Identity Number
<b>PLMN</b>	Public Land Mobile Network
<b>PUCT</b>	Price per Unit Currency Table
<b>PUK</b>	PIN Unblocking Code
<b>RACH</b>	Random Access Channel
<b>RLP</b>	Radio Link Protocol
<b>RMC</b>	Recommended Minimum Specific GPS/TRANSIT Data
<b>RMS</b>	Root Mean Square
<b>RoHS</b>	Reduction of Hazardous Substances
<b>RTS</b>	Ready To Send
<b>RI</b>	Ring Indicator
<b>SCA</b>	Service Center Address
<b>SIM</b>	Subscriber Identity Module
<b>SMD</b>	Surface Mounted Device
<b>SMS</b>	Short Message Service
<b>SMSC</b>	Short Message Service Center
<b>SS</b>	Supplementary Service
<b>TIA</b>	Telecommunications Industry Association
<b>TTFF</b>	Time To First Fix
<b>UDUB</b>	User Determined User Busy
<b>USSD</b>	Unstructured Supplementary Service Data
<b>VTG</b>	Actual track made good and speed over ground



# 11 Document Change Log

Revision	Date	Changes
ISSUE#0	10/04/05	initial release.
ISSUE#1	27/10/05	Paragraphs reviewed: 1 Overview 2.1 Dimensions (GPS antenna position frozen) 2.3.1 Temperature range 2.6 Reference sensitivity 2.7.1 GSM Antenna 2.8 GPS Module features 2.8.1.1 GPS Sensitivity 2.8.1.2 GPS Consumption 2.12.9 Character management 2.12.12 Indication of network service availability 2.17 ADC Converter (GM862-GPS only) 4 AT Commands (Camera cmds, FTP cmds, GPS cmds, #NITZ, #SKIPESC, etc) 5.1.5 FTP Client
ISSUE#2	24/01/06	Added products order codes table on page 2
ISSUE#3	04/05/06	7.2 GM863-QUAD: RoHS certificate 7.3 GM862-QUAD-PY: RoHS certificate 2.14.1 Reset signal: unconditional reboot page 24
ISSUE#4	04/08/06	2.7.2 GPS antenna power supply changed 2.12.16 DTMF Tones: changed minimum duration of DTMF tone 2.14 Logical level specification: voltage on buffered pins 2.14.1 Reset signal: unconditional shut down for GM862-GPS 2.15 Audio level specification 2.18 Interface connectors on GM862 modules: Added size for the Molex male connector (page 30); Added NOTE after pin table (page 33); changed value of the maximum capacitor allowed for SIMVCC line 3.1.4.1 Telit GM862 Family modules interface connector: Added size for the Molex female connector (page 40) 5.4 CMUX: new paragraph dedicated to the products with the following P/N: 3990250657, 3990250658 and 3990250659 5.4 SAP: new paragraph dedicated to the products with the following P/N: 3990250657, 3990250658 and 3990250659 6 AT Commands: updated AT command list (CMUX, SAP, GPS and others: see rows in yellow) and added columns for the new products 7.1 GM862-QUAD(P/N:3990250655): Conformity Assessment



**GM862 Product Description**  
80272ST10019a Rev. 4 – 04/08/2006

	7.2	GM862-QUAD(P/N:3990250656): Conformity Assessment
	7.9	GM862-GPS: Conformity Assessment

