GL865-QUAD/DUAL Product Description

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APPLICABLE PRODUCTS

The information contained in this document is referred to the following products:

PRODUCT
GL865-DUAL
GL865-QUAD

Contents

1. Introduction

1.1. Scope

Scope of this document is giving an overview of the Telit GL865-DUAL/QUAD module, which is a very small GSM/GPRS module with data and voice capabilities.

1.2. Audience

This document is intended for customers who are evaluating the GL865-DUAL/QUAD.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit's Technical Support Center (TTSC) at:

TS-EMEA@telit.com
TS-NORTHAMERICA@telit.com
TS-LATINAMERICA@telit.com
TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/en/products/technical-support-center/contact.php

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

To register for product news and announcements or for product questions contact Telit's Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Document Organization

This document contains the following chapters:

"Chapter 1: "Introduction" provides a scope for this document, target audience, contact and support information, and text conventions.

"Chapter 2: "The GL865-DUAL/QUAD" gives an overview of the features of the product.

"Chapter 3: "Product Description" describes in details the characteristics of the product.

"Chapter 4: "Evaluation Kit" provides some basic information about the Evaluation Kit.

"Chapter 5: "Software Features" provides an overview of the software features of the products.

"Chapter 6: "Conformity Assessment Issues" provides some fundamental hints about the conformity assessment that the final application might need.

"Chapter 7: "Safety Recommendation" provides some safety recommendations that must be follow by the customer in the design of the application that makes use of the GL865.

"Chapter 8: "List of acronyms"

"Chapter 9: "Document history"

1.5. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.6. Related Documents

- Hardware User Guide
- Software User Guide
- AT Command User Guide
- CMUX User Guide
- SAP User Guide
- Easy Script User Guide
- Audio Settings User Guide
- IP Easy User Guide

2. The GL865-DUAL/QUAD

2.1. Product Overview

The new GL865-DUAL/QUAD product introduces the smallest GSM/GPRS Leadless-Chip-Carrier (LCC) module in the market.

The GL865-DUAL/QUAD incorporating a single-chip solution built on SMD technology into a 24,4 x 24,4 x 2,7 mm block.

The low profile and small size of the unique LCC package for the GL865-DUAL/QUAD enable the design of extremely compact applications. Since connectors are eliminated, the solution cost is significantly reduced compared to conventional mounting.

With its ultra-compact design and extended temperature range, the Telit GL865-DUAL/QUAD product is the perfect platform for high-volume m2m applications and mobile data devices. Additional features such as integrated TCP/IP protocol stack and serial multiplexer extend functionality of the application at no additional cost.

The Telit GL865-DUAL is dual band GSM/GPRS module in 900 and 1800 MHz.

The Telit GL865-QUAD is Quad band GSM/GPRS module in 850/900/1800/1900 MHz.

Moreover, the Telit GL865-QUAD is compliance with eCall European directive.

The GL865-DUAL/QUAD makes it possible to run the customer's application inside the module using Python Script Interpreter, thus making it the smallest, complete platform for m2m solutions.

The GL865-DUAL/QUAD module, support Over-the-Air firmware update by means Premium FOTA Management. By embedding the RedBend's vCurrent Mobile® agent, a proven and battle-tested technology powering hundreds of millions of cellular handsets world-wide, Telit is able to update its products by transmitting only a delta file, which represents the difference between one firmware version and another.

2.2. Target Market

The GL865-DUAL/QUAD is designed and developed for the usage in applications such as:

- Telemetry
- Telematics
- Security alarms
- Automated Meter Reading (AMR)
- POS terminals
- PDAs and Mobile Computing
- Automotive and Fleet Management applications

2.3. Product Features

- GL865-DUAL: Dual-band EGSM 900 / 1800 MHz
- GL865-QUAD: Quad-band EGSM 850 / 900 / 1800 / 1900 MHz
- GSM/GPRS protocol stack 3GPP Release 4 compliant
- Output power

  - Class 4 (2W) @ 850/900 MHz

  - Class 1 (1W) @ 1800/1900 MHz
- Control via AT commands according to 3GPP 27.005, 27.007 and Telit custom AT commands
- Control via Remote AT commands
- Power consumption (typical values)

  - Power off: ‹ 62 uA

  - Idle (registered, power saving): 1.6 mA @ DRX=9
- Serial port multiplexer 3GPP 27.010
- SIM Application Toolkit 3GPP TS 51.014
- SIM Access Profile
- eCall Compliant (only GL865-QUAD)
- Extended Supply voltage range: 3.22 – 4.5 V DC (3.8 V DC nominal)
- TCP/IP stack access via AT commands
- Sensitivity:

  ≤- 108 dBm (typ.) @ 850/900 MHz

  ≤- 107 dBm (typ.) @ 1800/1900 MHz
- DARP/SAIC support
- Enhanced Measurement Report support
- Dimensions: 24,4 x 24,4 x 2,7 mm
- Weight: 3.5 grams
- Extended temperature range

  -40°C to +85°C (operational)

  -40°C to +85°C (storage temperature)
- RoHS compliant

Interfaces

- 8 I/O ports maximum

- Analog audio (balanced)
- Digital Voice Interface
- 2 A/D plus 1 D/A converters
- Buzzer output
- ITU-T V.24 serial link through CMOS UART:

  - Baud rate from 300 to 115.200 bps

  - Autobauding up to 115.200 bps

Audio

- Telephony, emergency call
- Half rate, full rate, enhanced full rate and adaptive multi rate voice codecs (HR, FR, EFR, AMR)
- Superior echo cancellation & noise reduction
- Multiple audio profiles pre-programmed and fully configurable
- DTMF

Approvals

- Fully type approved conforming with R&TTE directive
- CE, GCF

SMS

- Point-to-point mobile originated and mobile terminated SMS
- Concatenated SMS supported
- SMS cell broadcast
- Text and PDU mode
- SMS over GPRS

Circuit switched data transmission

- Asynchronous non-transparent CSD up to 9.6 kbps
- V.110

GPRS data

- GPRS class 10

- Mobile station class B
- Coding scheme 1 to 4
- PBCCH support
- GERAN Feature Package 1 support (NACC, Extended TBF)

GSM Supplementary Services

- Call forwarding
- Call barring
- Call waiting & call hold
- Advice of charge
- Calling line identification presentation (CLIP)
- Calling line identification restriction (CLIR)
- Unstructured supplementary services mobile originated data (USSD)
- Closed user group

Additional features

- SIM phonebook
- Fixed dialling number (FDN)
- Real Time Clock
- Alarm management
- Network LED support
- IRA, GSM, 8859-1 and UCS2 character sets
- Jamming detection
- Embedded TCP/IP stack, including TCP, IP, UDP, SMTP, ICMP and FTP protocols
- EASY SCAN ® automatic scan over GSM frequencies (also without SIM card)

Python* application resources

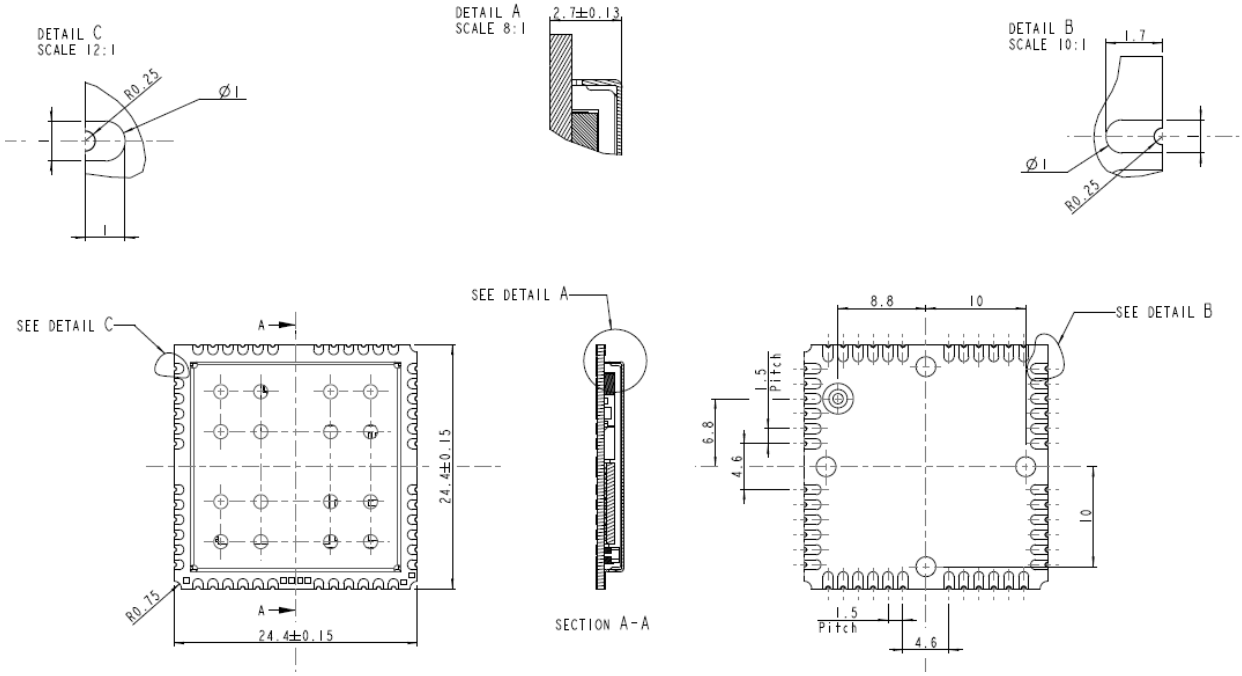
- Python* script interpreter (module takes the application code directly in the Python* language)
- Memory: 1.9 MB of NV memory for the user scripts and 1 MB RAM for the Python* engine usage
- Over-the-air application SW update

3. Product Description

3.1. Size and 2D mechanical drawing

The Telit GL865-DUAL/QUAD module overall dimensions are:

- Length: 24,4 mm
- Width: 24,4 mm
- Thickness: 2,7 mm



3.2. Weight

The weight of the GL865-DUAL/QUAD is 3.5 grams.

3.3. Environmental requirements

3.3.1. Temperature range

		Note
Operating Temperature Range	–20°C ÷ +55°C	The module is fully functional(*) in all the temperature range, and it fully meets the 3GPP specifications.
	–40°C ÷ +85°C	The module is fully functional (*) in all the temperature range.
Storage and non operating Temperature Range	–40°C ÷ +85°C	

(*)Functional: the module is able to make and receive voice calls, data calls, SMS and make GPRS traffic.

3.3.2. RoHS compliance

As a part of Telit's corporate policy of environmental protection, the GL865-DUAL/QUAD product comply to the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2002/95/EG).

3.4. 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
GSM 850	824.2-848.8	869.2-893.8	124 ÷ 251	45 MHz
EGSM 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
DCS-1800	1710.2 - 1784.8	1805.2 - 1879.8	512 ÷ 885	95 MHz
PCS1900	1850.2-1909.8	1930.2-1989.8	512 ÷ 810	80 MHz

3.5. Transmitter output power

The GL865-DUAL/QUAD transceiver modules in GSM–850 / EGSM-900 operating mode is class 4 in accordance with the specifications which determine the nominal 2W peak RF power (+33dBm) on 50 Ohm. In the DCS–1800 / PCS-1900, the operating mode is class 1 in accordance with the specifications which determine the nominal 1W peak RF power (+30dBm) on 50 Ohm.

3.6. Receiver sensitivity

Sensitivity of the module in GSM 850/900 band is better than –108 dBm (2.4% BER Class II - static channel) in normal operating conditions.

Sensitivity of the module in GSM 1800/1900 band is better than –107 dBm (2.4% BER Class II - static channel) in normal operating conditions.

The GL865-DUAL/QUAD supports also the Downlink Advance Receiver Performance (DARP) feature for single antenna interference cancellation (SAIC).

3.7. Antenna

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

Frequency range	Depending by frequency band(s) provided by the network operator, the customer shall use the most suitable antenna for that/those band(s).
Bandwidth	70 MHz in GSM 850, 80 MHz in EGSM 900, 170 MHz in DCS and 140 MHz in PCS band

For further information please refer to the GL865-DUAL Hardware User Guide.

3.8. Supply voltage

The external power supply must be connected to VBATT signal and must fulfill the following requirements:

Nominal Supply Voltage	3.8 V
Normal Operating Voltage Range	3.4 V – 4.2 V
Extended Operating Voltage Range (*)	3.22 V – 4.5 V

(*) Please refer to the GL865-DUAL/QUAD Hardware User Guide for using the product with the extended operating voltage range.

3.9. Power consumption

The current consumptions of the Telit GL865-DUAL/QUAD in power-off and idle are:

Power off current typical (RTC running)	< 5 µA;
Idle registered, power saving	1.5 mA @ DRX=9 (AT+CFUN=5)

Please check the HW User Guide for further details about all other power consumption figures.

3.10. The user interface

The user interface is managed by AT commands according to ITU-T V.250, 3GPP 27.007 and 27.005 specifications. Moreover, custom AT commands are also available. Please refer to the AT Command User Guide for details.

3.11. Speech CODEC

The GL865-DUAL/QUAD supports the following voice codec:

- HR - Half Rate
- FR - Full Rate
- EFR - Enhanced Full Rate
- AMR-HR, AMR Half Rate
- AMR-FR, AMR Full Rate

3.12. SIM Reader

The GL865-DUAL/QUAD supports phase 2 SIM at 1.8V and 3V ONLY with an external SIM connector. For 5V SIM, an external level translator can be added.

3.13. SMS

The GL865-DUAL/QUAD supports the following SMS types:

- Mobile Terminated (MT) class 0 – 3 with signaling of new incoming SMS, SIM full, SMS read
- Mobile Originated class 0 – 3 with writing, saving in SIM and sending
- Cell broadcast compatible with CB DRX with signaling of new incoming SMS.

The GL865-DUAL/QUAD also supports SMS over GPRS

3.14. Real Time Clock and Alarm

The GL865-DUAL/QUAD supports the Real Time Clock and Alarm functions through AT commands. An alarm output pin can be configured to indicate the alarm with a hardware line output.

Furthermore the Voltage Output of the RTC power supply is provided so that a backup capacitor can be added externally to increase the RTC autonomy.

3.15. Enhanced Measurement Report

The GL865-DUAL/QUAD supports the Enhanced Measurement Report on SACCH channel according to 3GPP TS 44.018 version 4.22.0 Release 4 (par. 3.4.1.2, 9.1.54, 9.1.55) and 3GPP TS 45.008 version 4.17.0 Release 4 (par. 8.4.8).

3.16. Data transmission capabilities

The Telit GL865-DUAL/QUAD is a mobile station class B supporting GPRS Class 10, coding schemes 1 to 4 and PBCCH. Moreover, it supports GERAN feature package 1, which consist in supporting the Extended Uplink TBF and Network Assisted Cell Change (NACC).

As for circuit switched data, the GL865-DUAL/QUAD supports asynchronous non-transparent data up to 9.6 Kbps. Moreover, it supports the V.110.

3.17. Local security management

The local security management can be done with the lock of Subscriber Identity module (SIM). The security code will be requested at power–up.

3.18. Call control

The call cost control function is supported.

3.19. Phonebook

This function allows the storing of the telephone numbers in SIM memory. The capability depends on SIM version and its embedded memory.

3.20. Characters management

The GL865-DUAL/QUAD supports the IRA, GSM, 8859-1 and UCS2 characters sets, in TEXT and PDU mode.

3.21. SIM related functions

Fixed Dialing Numbers (FDN), Abbreviated Dialing Number (ADN) and PIN insertion are supported

Extension at the PIN2 for the PUK2 insertion capability for lock condition is supported too.

3.22. Call status indication

The call status indication is supported.

3.23. Automatic answer (Voice, Data)

The automatic answer is supported. The user/application can specify the number of rings after which the module will automatically answer.

The user/application can set the number of rings by means of the command ATS0=<n>.

3.24. Supplementary services (SS)

The following supplementary services are supported:

- 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)

3.25. Acoustic signaling

The acoustic signaling of the GL865-DUAL/QUAD 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.

3.26. Buzzer output

A general purpose I/O pin can be configured to output the BUZZER output signal. With an external MOSFET or transistor and a diode, a buzzer can be directly driven.

The ringing tone and the other signaling tones can be redirected to this buzzer output with a specific AT command.

3.27. RF Transmission Monitor (RFTXMON)

As alternate function of the GPIO5, the GL865-DUAL/QUAD can 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.

3.28. RF Transmission Control

As alternate function of the GPIO4 pin, when configured as RF Transmission Control Input, it allows to disable the Transmitter when the GPIO is set to Low by the application.

3.29. TTY (Telephone Text)

The TTY feature is supported. Please refer to 3GPP TS 26.226 and 3GPP TS 26.231 for details.

3.30. Logic level specifications

Where not specifically stated, all the interface circuits work at 2.8V CMOS logic levels. To get more detailed information about the logic level specifications used in the GL865-DUAL/QUAD, please check with the Hardware User Guide.

3.31. Audio

3.31.1. Analog

The GL865-DUAL/QUAD offers one audio line balanced. The GL865-DUAL/QUAD has a built-in echo canceller and a noise suppressor. For more details, please refer to the GL865-DUAL/QUAD Hardware User Guide.

3.31.2. Digital

The GL865-DUAL/QUAD offers the digital voice interface. For more details, please refer to the Digital Voice Interface Application Note.

3.32. Serial Ports

Two serial ports are available on the module:

- Main serial port (full RS232), auto-bauding up to 115,200 bps
- AUX serial port (RX & TX only), 115,200 bps

3.33. Converters

3.33.1. ADC Converter

The GL865-DUAL/QUAD has two on board ADC, which 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, store and convert it into 11 bit word.

3.33.2. DAC Converter

The GL865-DUAL/QUAD has one on board DAC, which is a 10 bit converter, able to generate an analogue value based a specific input in the range from 0 up to 1023. However, an external low-pass filter is necessary. See the HW User Guide for the details.

3.34. Mounting the GL865-DUAL/QUAD on your Board

The Telit GL865-DUAL/QUAD module has been designed in order to be compliant with a standard lead-free SMT process. For detailed information about PCB pad design and conditions to use in SMT process please check with the GL865-DUAL/QUAD Hardware User Guide.

3.35. Packing system

The Telit GL865-DUAL/QUAD is supplied on trays of 100 pieces each or, in Tape&Reel of 200 pcs a reel

4. Evaluation Kit

In order to assist the customer in the development of the application, Telit offers the EVK2 Evaluation Kit that can be ordered separately. The EVK2 has a SIM card holder, the RS 232 serial port level translator, a direct UART connection, audio and antenna connector.

The EVK2 provides a fully functional solution for a complete data or phone application. The standard serial RS232 9 pin connector placed on the Evaluation Kit allows the connection of the EVK2 system with a PC or other DTE.

The development of the applications utilizing the Telit GL865-DUAL/QUAD module 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 EVK2 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.

For a detailed description of the Telit Evaluation Kit, please refer to the documentation provided with the Telit GL865-DUAL/QUAD Hardware User Guide and EVK2 User Manual.

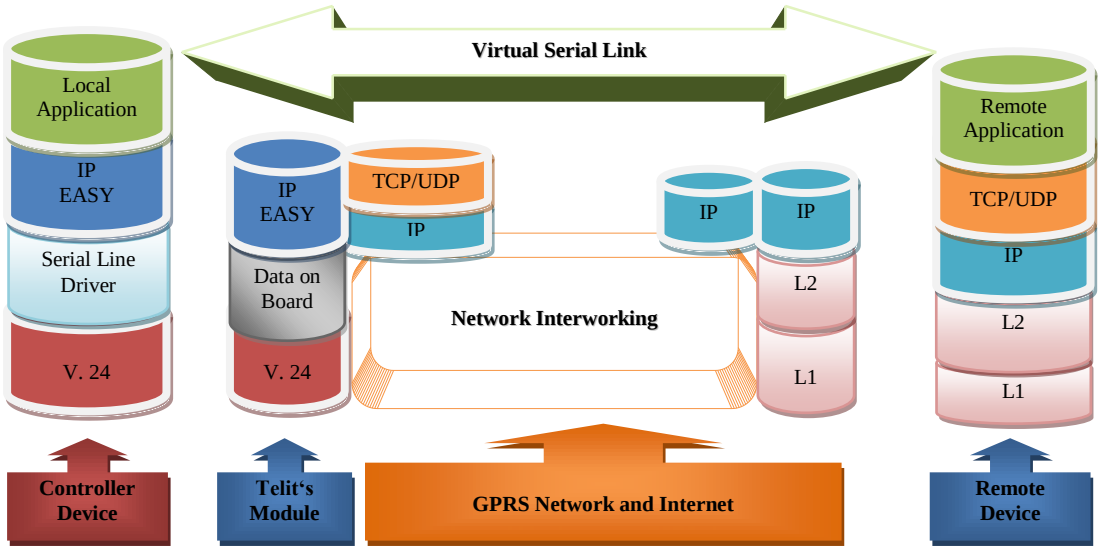
5. Software Features

5.1. IP Easy Extension

5.1.1. Overview

The IP Easy feature allows the Telit GL865-DUAL/QUAD 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 GL865-DUAL/QUAD module, regardless of all the software stacks underlying.



This particular implementation allows to the devices interfacing to the Telit GL865-DUAL/QUAD 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 in the module.

For more detailed information regarding the use of the IP Easy feature, please consult IP Easy User Guide and AT Commands Reference Guide.

5.2. Multisocket

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

For more detailed information please consult the IP Easy User Guide.

5.3. Jamming Detection

5.3.1. Overview

The Jammed Detect feature allows the GL865-DUAL/QUAD to detect the presence of a disturbing device such as a Communication Jammer and give indication to the user.

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 to the local system for countermeasure actions.

5.4. CMUX

CMUX (Converter-Multiplexer) is a multiplexing protocol implemented in the GL865-DUAL/QUAD that can be used to send any data, SMS, or TCP data.

5.4.1. 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 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.

5.4.2. Features

- 3GPP 27.010 CMUX Basic Option used
- CMUX implementation support four full DLCI (Serial Port)
- Every CMUX instance has its own user profile storage in NVM
- Independent setting of unsolicited message.
- Every CMUX instance has its own independent flow control

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

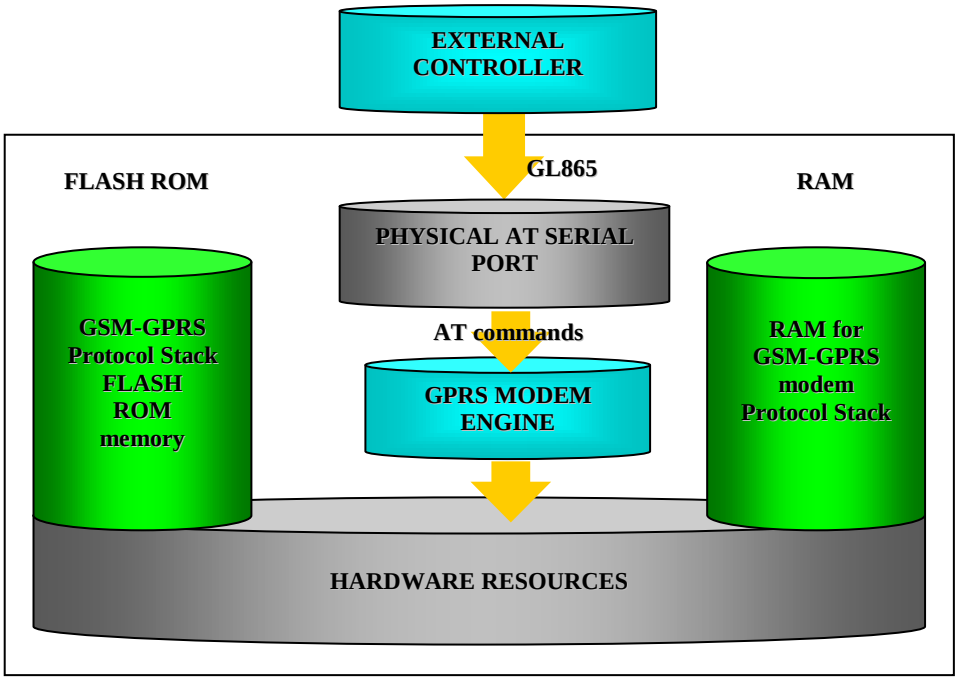
5.5. Easy Script Extension - Python interpreter

5.5.1. Overview

The Easy Script Extension is a feature that allows driving the modem "internally", writing the controlling application directly in a nice high level language: Python.

The Easy Script Extension is aimed at low complexity applications where the application was usually done by a small microcontroller that managed some I/O pins and the GL865-DUAL/QUAD through the AT command interface.

A schematic of such a configuration can be:



In order to not use any external controller, and further simplify the programming of the sequence of operations, the customer can benefit of these feature already embedded in the GL865:

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

5.5.2. 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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NOTE: More details about the Python modules are available in the Easy Script in Python User Guide.

5.6. SAP: SIM Access Profile

5.6.1. Architecture

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

5.6.2. Implementation features

- SAP is based on 3GPP 27.010 CMUX Basic Option used
- Only SAP Client features
- Logic HW flow control is recommended on the Virtual instance selected for the SAP command.

5.6.3. Remote SIM Message Command Description

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

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

The module fulfill the following feature requirements:

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

Every feature needs some procedures support:

Feature	Procedure
Connection Management	Connect
	Report Status
	Transfer ATR
	Disconnection Initiated by the Client
	Disconnection Initiated by the Server
Transfer APDU	Transfer APDU
Transfer ATR	Transfer ATR
Power SIM on	Power SIM on
	Transfer ATR
Report Status	Report Status
Error Handling	Error Response

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

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

5.7. Premium FOTA Management (PFM) Service

The premium FOTA Management Service provides a cost-effective, fast, secure and reliable way for wirelessly reflashing the firmware on mobile devices, ensuring that embedded software is up-to-date with the latest enhancements and features.

Customers, who want to benefit from this service, must pass through the Telit certification program, where Telit will assist the customer in validating the correct implementation of FOTA.

5.7.1. FOTA (Firmware Over The Air)

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

See “PFM Application Note” for details in www.telit.com > Product > GSM/GPRS > Product Family > Application Notes.

5.8. eCall Compliance (GL865-QUAD only)

eCall is a project of the European Commission intended to bring rapid assistance to motorists involved in a collision anywhere in the European Union. The projects aims to employ a hardware black box installed in vehicles that will wirelessly send vehicle location information, time stamp, number of passengers, Vehicle Identification Number (VIN), and other relevant

accident information to local emergency agencies eCall builds on emergency voice call (E112).

The main actors are the IVS (In-Vehicle System) and the PSAP (Public Safety Answering Point). When a collision happens the IVS sends to PSAP the MSD (Minimum Set of Data) via the speech channel of cellular and PSTN networks.

eCall provides reliable full-duplex data communications between IVS and PSAP in addition to emergency voice call, and can be initiated either automatically or manually. The eCall In-band Modem uses the same voice channel as used for the emergency voice call. eCall allows reliable transmission of MSD alternating with a speech conversation through the existing voice communication paths in cellular mobile phone systems.

Telit, understanding the importance of the eCall standard, developed its own eCall in band modem solution. The GL865-QUAD is able to act as IVS in-band modem.

IVS in-band modem functionality is completely transparent because user has only to enable it and manage unsolicited messages coming for AT commands interface.

For a complete description of Telit's eCall solution, please refer to TELIT Solution for eCall Testing Application Note, 80000NT10046a.

5.9. AT Commands

The Telit GL865-DUAL/QUAD module can be driven via the serial interface using the standard AT commands .

The Telit GL865-DUAL/QUAD module is compliant with:

1. Hayes standard AT command set, in order to maintain the compatibility with existing SW programs.
2. 3GPP 27.007 specific AT command and GPRS specific commands.
3. 3GPP 27.005 specific AT commands for SMS (Short Message Service) and CBS (Cell Broadcast Service)

Moreover the GL865-DUAL/QUAD module supports also Telit proprietary AT commands for special purposes.

For a more information about AT commands supported by the GL865-DUAL/QUAD module please refer to document AT Commands Reference Guide.

6. Conformity Assessment Issues

6.1. GE865-DUAL CE Conformity Assessment

Telit Communications S.p.A.

EC DECLARATION OF CONFORMITY

1. GL865-DUAL (product name)
2. Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico –TRIESTE- ITALY (manufacturer)
3. This declaration of conformity is issued under the sole responsibility of the manufacturer
4. Dual Band EGSM900/DCS1800 GPRS Module

5. The object of the declaration described above is in conformity with the relevant Community harmonisation: European Directive 1999/05/EC (R&TTE)
6. The conformity with the essential requirements of the 1999/05/EC has been demonstrated against the following harmonized standard:

EN 301 511 V9.0.2	For article 3.2 : Effective use of spectrum allocated

The product has also been verified against the following harmonized standards:

EN 60950-1:2006	For article 3.1 (a): Health and Safety of the User
EN 301 489-1 V1.8.1 EN 301 489-7 V1.3.1	For article 3.1 (b): Electromagnetic Compatibility

7. The conformity assessment procedure referred to in Article 10 and detailed in Annex IV of Directive 1999/05/EC has been followed with the involvement of the following Notified Body for article 3.2:
RFI Global Services Ltd Pavilion A, Ashwood Park, Ashwood Way RG23 8BG BASINGSTOKE United Kingdom
Notified Body Number 0889

Thus, CE 0889 is placed on the product.

8. The Technical Construction File (TCF) relevant to the product described above and which support this Declaration of Conformity, is held at: Telit Communications S.p.A Via Stazione di Prosecco, 5/b 34010 Sgonico (TRIESTE) ITALY.

Signed for and on behalf of Telit Communications S.p.A.

Trieste, ***2010-11-18***

EMEA Quality Director
Guido Walcher

Notified body opinion number:	RFI-NOTA1.SC79130JD06 2010-11-18
Technical Construction File :	79130JD05 2010-11-17

Mod 0211 2010-11 Rev.1 (768/2008/EC)

NOTIFIED BODY OPINION

RFI Global

NOTIFIED BODY STATEMENT OF OPINION

(For Council Directive 1999/5/EC)

This opinion is issued to

Telit Communications S.p.A
Via Stazione di Prosecco 5/B
34010 Sgonico (TS)
Italy

to state that the equipment known as

GL865-DUAL

in our opinion, conforms (following an evaluation of its associated Technical Construction File and subject to any restrictions stated in the attached Annex) with the essential requirements of Annex IV of Council Directive 1999/5/EC on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity, in relation to the essential requirements of :

Article 3.2 Radio Spectrum.

Details of the scope of this opinion, standards used, RF parameters of this equipment and other information necessary for the correct interpretation and application, including any remarks, restrictions or observations that are detailed in the attached Annex.

Signed:

John Bellairs on behalf of RFI Global Services Ltd.

Issue Date: 18 November 2010

Notified Body Opinion No: RFI-NOTA1-SC79130JD06

UKAS 0644

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NB nr.0889

7. SAFETY RECOMMENDATIONS

READ CAREFULLY

Be sure the use of this product is allowed in the country and in the environment required. The use of this product may be dangerous and has to be avoided in the following areas:

- Where it can interfere with other electronic devices in environments such as hospitals, airports, aircrafts, etc
- Where there is risk of explosion such as gasoline stations, oil refineries, etc

It is responsibility of the user to enforce the country regulation and the specific environment regulation.

Do not disassemble the product; any mark of tampering will compromise the warranty validity.

We recommend following the instructions of the hardware user guides for a correct wiring of the product. The product has to be supplied with a stabilized voltage source and the wiring has to be conforming to the security and fire prevention regulations.

The product has to be handled with care, avoiding any contact with the pins because electrostatic discharges may damage the product itself. Same cautions have to be taken for the SIM, checking carefully the instruction for its use. Do not insert or remove the SIM when the product is in power saving mode.

The system integrator is responsible of the functioning of the final product; therefore, care has to be taken to the external components of the module, as well as of any project or installation issue, because the risk of disturbing the GSM network or external devices or having impact on the security. Should there be any doubt, please refer to the technical documentation and the regulations in force.

Every module has to be equipped with a proper antenna with specific characteristics. The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from the body (20 cm). In case of this requirement cannot be satisfied, the system integrator has to assess the final product against the SAR regulation.

The European Community provides some Directives for the electronic equipments introduced on the market. All the relevant information's are available on the European Community website:

http://ec.europa.eu/enterprise/rtte/dir99-5.htm

The text of the Directive 99/05 regarding telecommunication equipments is available, while the applicable Directives (Low Voltage and EMC) are available at:

http://ec.europa.eu/enterprise/electr_equipment/index_en.htm

8. List of acronyms

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

PDU	Protocol Data Unit
PH	Packet Handler
PIN	Personal Identity Number
PLMN	Public Land Mobile Network
PUCT	Price per Unit Currency Table
PUK	PIN Unblocking Code
RACH	Random Access Channel
RLP	Radio Link Protocol
RMS	Root Mean Square
RTS	Ready To Send
RI	Ring Indicator
SCA	Service Center Address
SIM	Subscriber Identity Module
SMD	Surface Mounted Device
SMS	Short Message Service
SMSC	Short Message Service Center
SS	Supplementary Service
TIA	Telecommunications Industry Association
UDUB	User Determined User Busy
USSD	Unstructured Supplementary Service Data

9. Document History

Revision	Date	Changes	Location
0	2010-09-02	First issue	Trieste
1	2010-05-06	Consolidated version with GL865-QUAD	Trieste
2	2010-07-13	Applied new template Added 5.8 “eCall Compliance”	Trieste