GT863-3EU Product Description

Making machines talk.

APPLICABILITY TABLE

PRODUCT
GT863-3EU

SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE

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Contents

1.   Introduction

1.1.   Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit 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 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.

1.2.   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.

1.3.　　Related Documents

- HE910 AT Commands Reference Guide, 80378ST10091A
- Telit Modules Software User Guide, 1vv0300784
- Telit HE910 Family Ports Arrangements, 1vv0300971

2.   Overview

The GT863 3EU is a complete Cellular Terminal solution for cellular applications based on GSM and HSPA cellular technology.

The GT863-3EU unit includes Telit cellular GSM/UMTS engine, an advanced HW watchdog and is encased in an aluminum box with USB-B connector, SMA RF connector and power plug.

The GT863-3EU is based on HE910-EUx Family, with HSUPA up to 5.76 Mbps in uplink and HSDPA up to 7.2 Mbps on 850, 900 and 2100 MHz.
Moreover, the GT863-3EU guarantees a complete backward compatibility with 2G network through a quad band GSM\GPRS\EDGE receiver in 850/900/1800 and 1900 MHz.

The GT863-3EU is provided with a Python script interpreter able to run python scripts making the GT863-3EU a completely self-contained and autonomous terminal running the customer applications. This feature allows customers to save total cost of complete ownership, not external host is required.

2.1.   Features

- Advanced E-GPRS/WCDMA/HSDPA/HSUPA Software protocol stack (Layer 1 to 3) – Version: 3GPP Release 7
- GSM Quad band (850, 900, 1800, 1900)
- WCDMA Multi-band (850, 900 and 2100 MHz)
- DTM (Dual Transfer Mode)

- CPC (DRX/DTX) (Continuous Packet Connectivity)

- DARP

- Control via AT commands according to 3GPP TS27.005, 27.007 and Telit customized AT commands

- Serial port multiplexer 3GPP TS27.010

- SIM application Tool Kit 3GPP TS 51.014

- Power consumption (typical values)

  - Input current in idle mode: 20mA @ 12V

  - Input average current in communication mode: 100mA @ 12V

- RF Output power

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

  - Class 1 (1W) @ 1800 / 1900 MHz, GSM

  - Class E2 (0.5W) @ 850/900 MHz, EDGE

  - Class E2 (0.4W) @ 1800/1900 MHz, EDGE

  - Class 3 (0.25W) @ 850/900/2100 MHz, WCDMA

- RF Sensitivity:

  - -109 dBm (typ.) @ 850 / 900 MHz (GSM)

  - -110 dBm (typ.) @ 1800 / 1900 MHz (GSM)

  - -111 dBm (typ.) @ 850/900/ 2100 MHz (WCDMA)

Interfaces

- USB 2.0 HS

- 1.8V/3V SIM interface

- SMA RF interface

- RS232

- AUX (GPIOs)

SMS

- Point to point mobile originated and mobile terminated SMS

- Concatenated SMS supported

- SMS cell broadcast

- Text and PDU mode

- SMS over GPRS

Data transmission

- HSPA: category 8 in downlink e category 6 in uplink

    - DL up to 7.2Mbps

    - UL up to 5.76Mbps

- WCDMA: up to 384kbps downlink/uplink

- EDGE: DL up to 296kbps, UL up to 236.8kbps

- GPRS: DL up to 107kbps, UL up to 85.6kbps

- Asynchronous non-transparent CSD up to 9.6kbps

- Coding scheme 1 to 4 (GPRS) & Modulation Coding scheme 1 to 9 (EDGE)

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)

- Call control & status indication

- SIM phonebook

- Character management (IRA, UCS2, GSM)

- USIM 3GPP Rel.7

- Real Time Clock

- Automatic answer

- Alarm management

- Embedded TCP/IP stack, including TCP, IP, UDP, and FTP protocols

- CSD for Video Telephony support

2.2.   Operating Frequency

The operating frequencies in GSM850, EGSM900, DCS1800, PCS1900, WCDMA modes are compliant to the 3GPP and WCDMA specifications.

Mode	Freq. TX (MHz)	Freq. RX (MHz)	Channels	TX - RX offset
GSM850	824 ~ 849	869 ~ 894	128 ~ 251	45 MHz
EGSM900	890 ~ 915	935 ~ 960	0 ~ 124	45 MHz
	880 ~ 890	925 ~ 935	975 ~ 1023	45 MHz
DCS1800	1710 ~ 1785	1805 ~ 1880	512 ~ 885	95MHz
PCS1900	1850 ~ 1910	1930 ~ 1990	512 ~ 810	80MHz
WCDMA850 (band V)	824 ~ 849	869 ~ 894	Tx: 4132 ~ 4233 additional 782, 787, 807, 812, 837, 862 Rx: 4357 ~ 4458 additional 1007, 1012, 1032, 1037, 1062, 1087	45MHz
WCDMA900 (band VIII)	880 ~ 915	925 ~ 960	Tx: 2712 ~ 2863 Rx: 2937 ~ 3088	45MHz
WCDMA2100 (Band I)	1920 ~ 1980	2110 ~ 2170	Tx: 9612 ~ 9888 Rx: 10562 ~ 10838	190MHz

3. Hardware Interface Description

3.1. Main features of the GT863 3EU

Feature	Implementation
Telit HE910 module core based	The Telit module handles all GSM processing with PYTHON scripting capabilities
PIC16F1824 Microcontroller	The Microcontroller use for Modem ON/OFF and Modem watchdog
Frequency bands	GSM 850/900/1800/1900 HSPA: 850/ 900/2100MHz
Power supply	Single supply voltage 6V to 55V
Communication	Modem USB, Connector USB B High retention
Antenna	GSM/HSPA via SMA connector

3.2.   Hardware block diagram
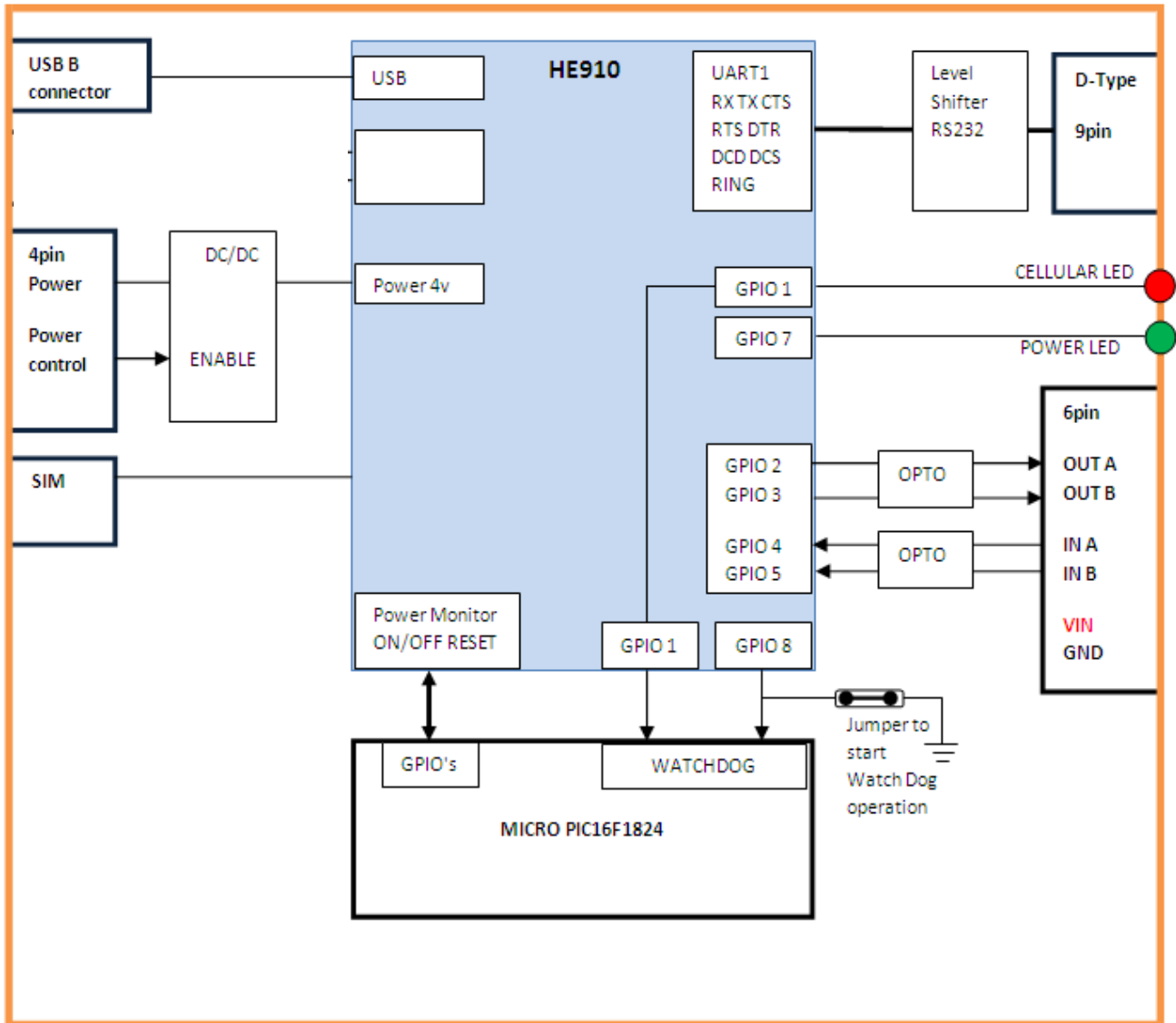
4. Interfaces

4.1. Power Supply interface

The power supply of the GT863-3EU Terminal requires a single voltage source of power 6V-55V capable of providing a peak during an active transmission. The GT863-3EU Terminal is protected from supply voltage reversal. An internal fuse 1.1A ensures an electrical safety according to EN60950-1. This fuse is not removable. A fast blow fuse of 0.8A is necessary for 24V power supply system (for vehicles).

Pin	Signal name	Use
1	POWER	Input Power supply range 6-55V
2	Power Enable	Control pin to turn off modem power When putting this pin to voltage >6V the unit will be turn OFF
3	GND	Ground
4	---	---

Pin assignment of the plug for power supply and Power Enable

Male 4-pole plug for power supply
To use with MOLEX MICRO FIT 3mm
PART NUMBER 43025-0400

Pin assignment
1 – Power
2 – Power Enable
3 – GND
4 – NC
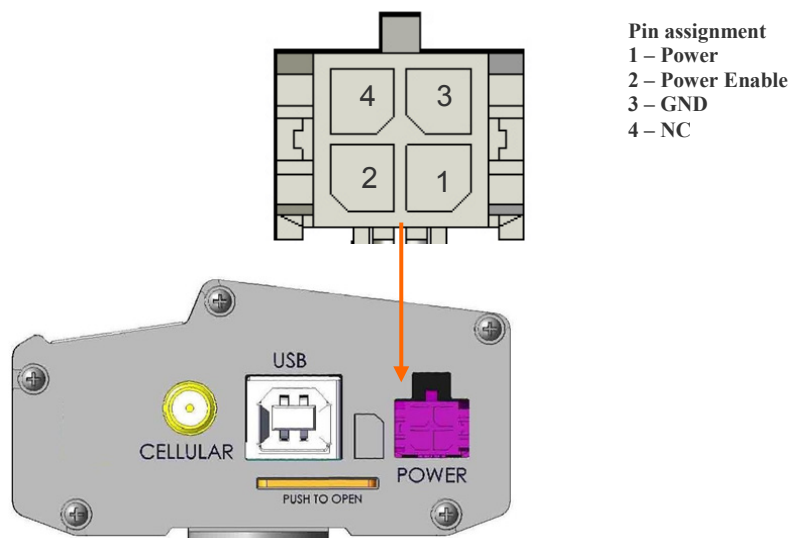
4.1.1. Supply voltage

4.1.1.1. Power supply requirements

The recommended power supply is any safety approved power supply certified IEC 60950-1 or EN 60950-1 or UL 60950-1 with limited output current up to 2A and voltage range specified in the present document. The type of the receptacle assembled on the GT863 3EU Terminal is 4 pin Micro Mate-N-LOK 3mm from MOLEX.
Telit can provide also a 230Vac Power Supply as accessory. Telit PN: 4990250198

The DC power supply must be connected to the POWER input:
- Input voltage range 6 - 55V DC
- Nominal Voltage 12V DC
- Power Supply current rating: max. 2A @12V
- Power Supply ripple: max. 120mV

4.1.1.2. Power consumption

- Input current in idle mode: 20mA @ 12V
- Input average current in communication mode: 100mA @ 12V

4.2.   USB Interface

The USB connector of the GT863 3EU Terminal has to be a USB B TYPE, The USB B connector on the GT863 3EU is **High retention**; the connector will need 15 Newton to disconnect the USB connector.

The USB interface of the GT863 3EU is intended for the communication between the UMTS module and the host application. This USB interface is a data and control interface.

For the SW interfacing please refer to the following documents
- 1vv0300784 - Telit Modules Software User Guide
- 80378ST10091A - Telit HE910 AT Commands Reference Guide
- 1vv0300971 - Telit HE910 Family Ports Arrangements
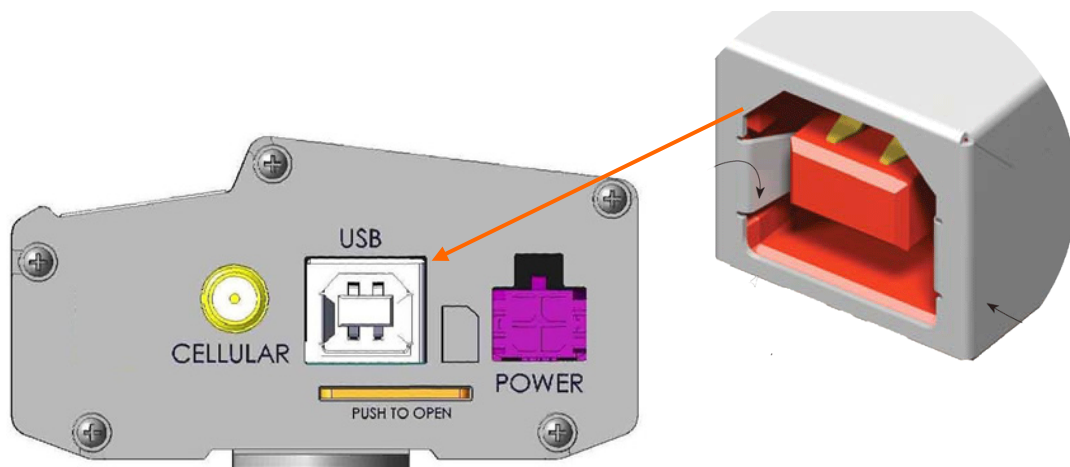
4.3. Antenna connector

The GT863 3EU Terminal is provided with a RF SMA connector for cellular antenna
.
For cellular, a 5 band (850/900/1800/1900/2100) antenna with 2.5 gain is required.
Telit can provide also a Cellular Antenna as accessory: Telit P\N: 1RR0100056TLB

Antenna Connector
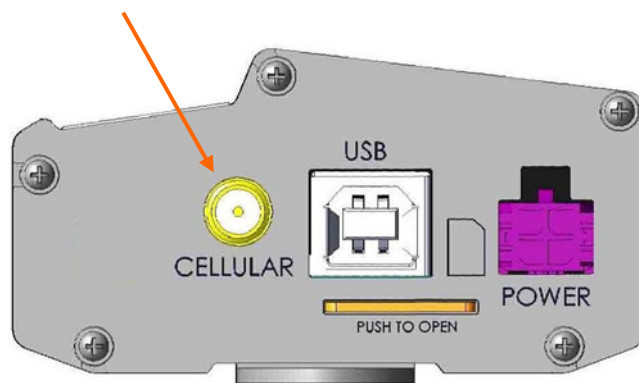
The antenna that the customer chooses should fulfill the following requirements:

| ANTENNA 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 (GSM/EDGE)	70 MHz in GSM850, 80 MHz in GSM900, 170 MHz in DCS & 140 MHz PCS band
Bandwidth (WCDMA)	70 MHz in WCDMA Band V (850MHz) 80 MHz in WCDMA Band VIII (900MHz) 250 MHz in WCDMA Band I (2100MHz)
Impedance	50 ohm
Input power	> 33dBm(2 W) peak power in GSM > 24dBm Average power in WCDMA
VSWR absolute max	$\leq$ 5:1 (limit to avoid permanent damage)
VSWR recommended	$\leq$ 2:1 (limit to fulfil all regulatory requirements)

4.3.1. Transmitter output power

The GT863-3EU family transceiver output of GSM/GPRS mode in 850/900MHz bands are class 4 in accordance with the specifications which determine the nominal 2W peak RF power (+33dBm) on 50ohm. In the 1800/1900MHz bands are class 1 in accordance with the specification which determines the nominal 1W peak RF power (+30dBm) on 50ohm.

The GT863-3EU family transceiver output of EDGE mode in 850/900MHz bands are class E2 in accordance with the specifications which determine the nominal 0.5W peak RF power (+27dBm) on 50ohm. In the 1800/1900MHz bands are class E2 in accordance with the specification which determine the nominal 0.4W peak RF power (+26dBm) on 50ohm.

The GT863-3EU family transceiver output of WCDMA mode in 850/900/2100MHz bands is class 3 in accordance with the specifications which determine the nominal 0.25W peak RF power (+24dBm) on 50ohm.

4.4. USIM connector

The USIM DRAWER is push-push FULL size SIM; SIM must be inserted following direction in the picture.
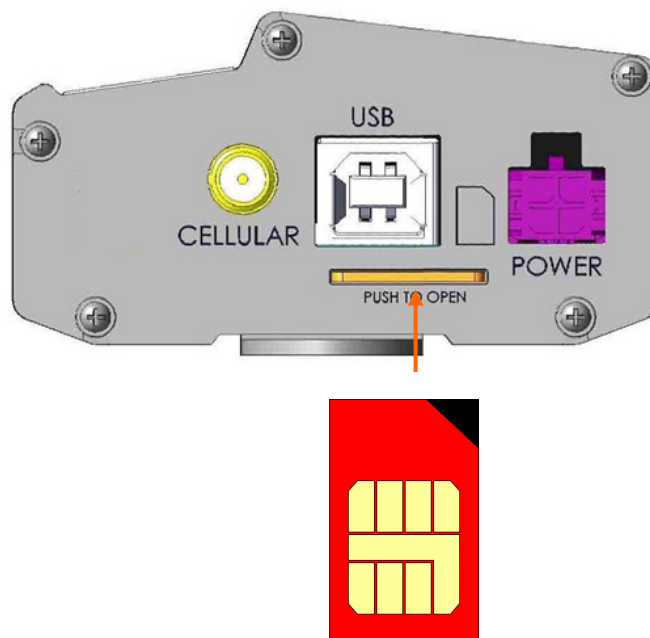
4.5.   RS232 Interface

The serial interface of the GT863-3EU is intended for the communication between the GSM/UMTS module and the host application. This RS-232 interface is a data and control interface for transmitting data. It accepts, AT commands and provides multiplexed channels. EMC immunity complies with the vehicular environment requirements according to EN 301 489-7.

The user interface of the GT863-3EU is accessible from a Data Terminal Equipment DTE connected to the RS232 interface and it is managed by AT commands according to the GSM/UMTS specification. The supported commands are listed in the AT Commands Reference Guide.
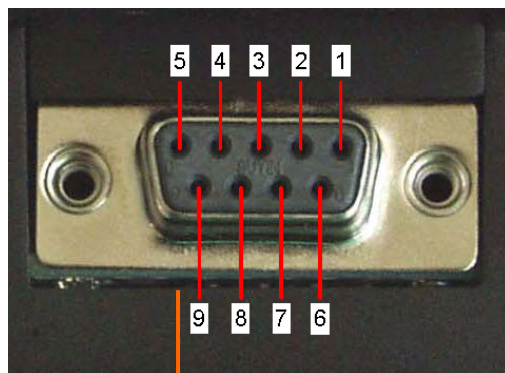
Pin no.	Signal name	I/O	Function of application
1	DCD	O	Data Carrier Detected
2	RXD	O	Receive Data
3	TXD	I	Transmit Data
4	DTR	I	Data Terminal Ready
5	GND	-	Ground
6	DSR	O	Data Set Ready
7	RTS	I	Request To Send
8	CTS	O	Clear To Send
9	RING	O	Ring Indication

Pin assignment RS-232   D-Type 9 pin female RS232
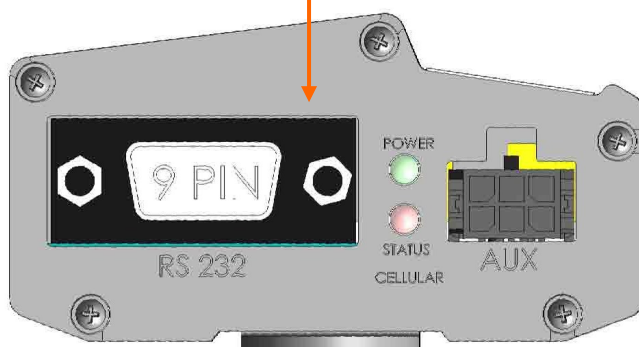
Connector type on the terminal is:

- RS-232 through D-Type 9-pin female
- Baud rate from 300 to 230,400 bit/s
- Short circuit (to Ground) protection on all outputs.
- Input voltage range: -12V to +12V

4.6.   AUX Interface

The AUX interface provides via Male 6-pole plug connector, the following options:

- 2 digital inputs optocouplers, input 0-55vdc.
- 2 outputs optocouplers, drive up to 100ma, external diode needed when driving a relay.
- 1 ADC (10 bit) input 0-55v.
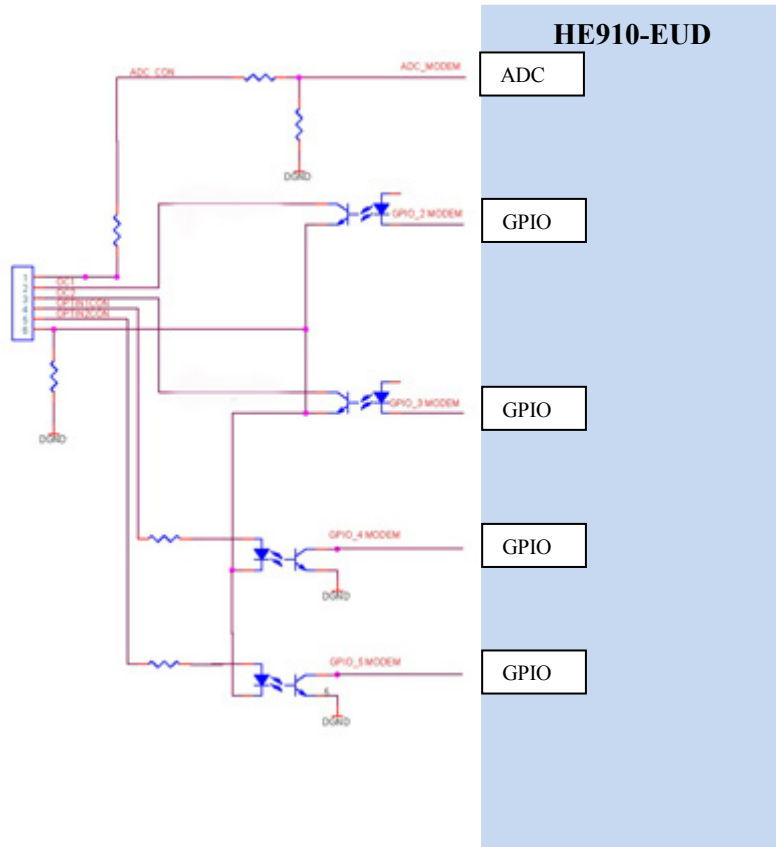- 1 Ground pin.

Pin assignment:

1. **ADC**
2. **GPIO 2 -- OUTPUT**
3. **GPIO 3 -- OUTPUT**
4. **GPIO 4 -- INPUT**
5. **GPIO 5 -- INPUT**
6. **GND**
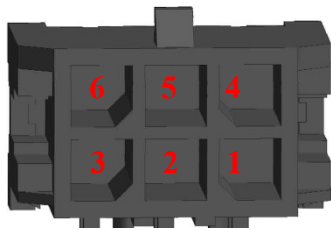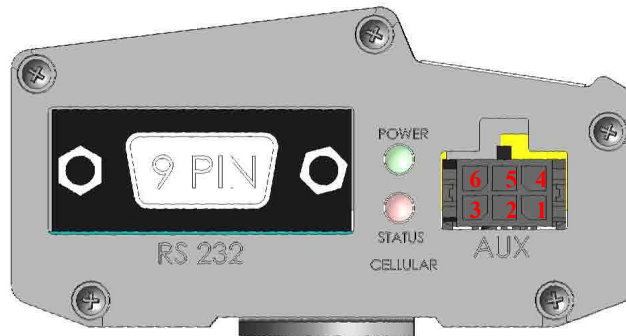
Male 6-pole plug.
To use with MOLEX MICRO FIT
PART NUMBER 43025-0600.

HE910-EUD

Pin #	Color
1	Red
2	White
3	Green
4	Blue
5	Yellow
6	Black

Mod. 0808 2011-07 Rev.2

4.7. Status LED

4.7.1. Red Led

The Red LED is connected to GPIO1, OFF by default.

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

The LED can use for Network status or controlled by the user.

To activate GSM status **Red LED "AT#GPIO=1,0,2;#SLED=2,1,1"**

Red LED ON: "AT#GPIO=1,1,1"

Red LED OFF: "AT#GPIO=1,0,1"

4.7.2. Green Led

The Green LED is connected to GPIO7, ON by default (at power up).

Green LED status	Device Status
permanently ON	Device active
permanently OFF	device off

Green LED control:

Green LED ON: "AT#GPIO=7,1,1" (Default)

Green LED OFF: "AT#GPIO=7,0,1"

5.   Software characteristics

See HE910 SW User Guide.

5.1.   OPTION: Watchdog operation

The GT863-3EU has internal Watchdog option. If the modem was turns OFF, the watchdog will start the modem each 30 min.

PYTHON script Watchdog:

1. New terminal will be shipped with the Watchdog disable. Watchdog starts working, only when the Modem`s GPIO8 changes first time to HIGH and then LOW. Each time terminal will turn OFF and ON, Watchdog will be disable.

2. Standard operation of the PYTHON script, each 2min the script will change GPIO8 HIGH for 1 second or more and then back to LOW.

3. If the PYTHON script is not changing the GPIO8 every 2min, the Watchdog will restart the internal power supply, which will reboot the terminal.

4. To start the Watchdog operation: **"AT#GPIO=8,0,1;#GPIO=8,1,1"**

USB

POWE
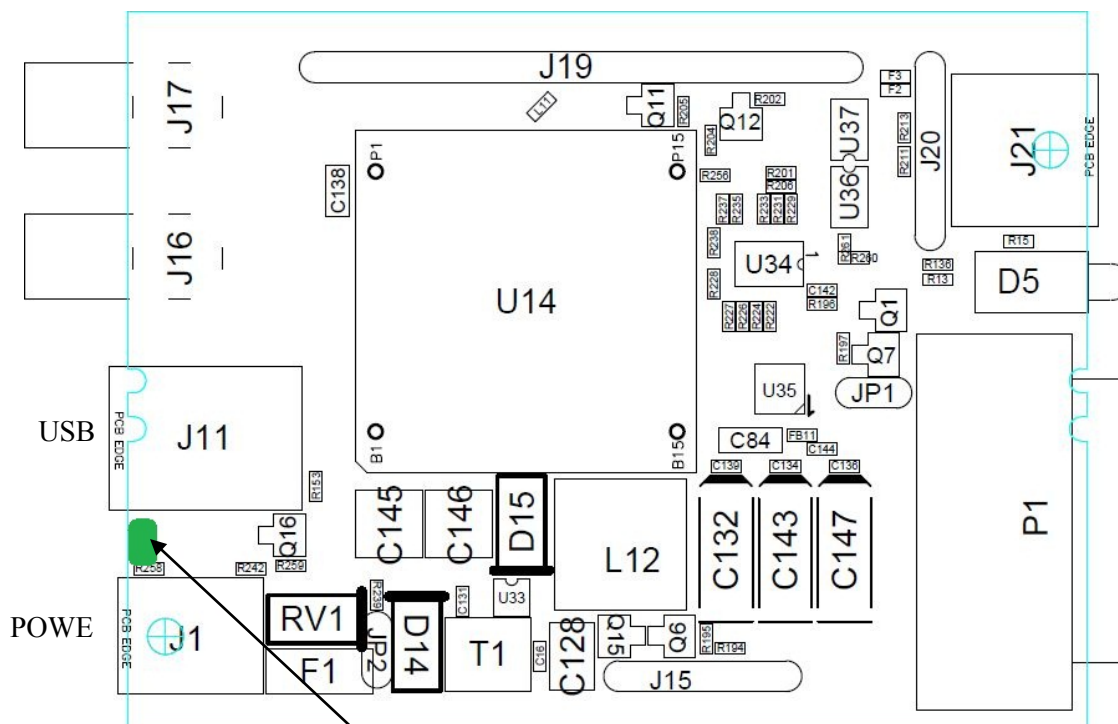
Green Led for Watchdog indication Led blinking for 2 seconds each time Watchdog command will appear

6.   Mechanical Characteristics

Weight	180g
Dimensions (max) L x W x H	83m x 64 x 34mm
Air humidity	5% - 85%
Casing material	Aluminum
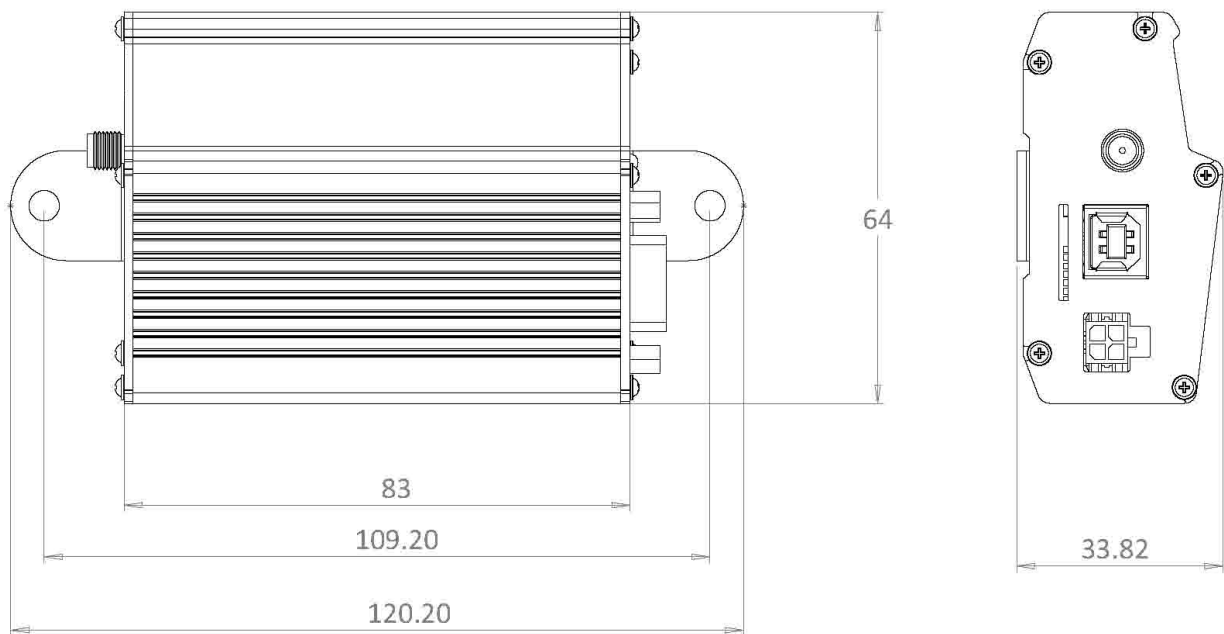
7. Environmental requirements

		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.
	–30°C ÷ +70°C	The module is fully functional (*) in all the temperature range.
Storage and non-operating Temperature Range	–40°C ÷ +85°C	
Humidity	5 – 85%	

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

7.1. Protection class

IP40 Avoid exposing the Terminal to liquid or moisture.

7.2. RoHS compliance

As a part of Telit corporate policy of environmental protection, the modules comply to the RoHS (Restriction of Hazardous Substances) directive of the European Union (EU Directive 2011/65/EU).

8.   GT863-3EU variants

GT863-3EU can be provided in the Minimum Assembly configuration (GT863-3EU MA), dedicated to data transmission with USB only.

	GT863-3EU	GT863-3EU MA
Power Supply Conn.	Present	Present
USB connector	Present	Present
Cellular Antenna	Present	Present
USIM Connector	Present	Present
RS-232 Connector	Present	**Not available**
AUX interface	Present	**Not available**
Status LEDs	Present	Present
P/N	**4990250172**	**4990150162**

GT863-3EU MA panels (Minimum Assembly)

9. 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/sectors/rtte/documents/

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/sectors/electrical/

10. Document History

Revision	Date	Changes
0	2012-07-11	First Preliminary issue
1	2012-09-18	USB connector description AUX interface update MA description
2	2013-08-28	Added additional feature, new description for power supply Added current consumption data Updated picture Updated P/Ns
3	2016-12-28	Update §4.1, table "PIN assignment": pin2 "Power Enable". Removed "When this pin on GROUND the unit will be turn OFF" and added "When putting this pin to voltage >6V the unit will be turn OFF"

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