GSM-ELS61-T2M

1. Introduction

LTE modem in an industrial metal aluminum case which is suitable for installation into a control cabinet. Modem has two serial ports (RS232 and USB) with adjustable watchdog. The modem is equipped with a GSM module Gemalto (Cinterion) ELS61. Thanks to standard RS232 and USB interface, the modem is suitable for fast implementation in devices that require remote communication. It also includes the monitoring of communication with the master device (watchdog), both via RS232 serial port as well as the USB (for USB watchdog see the chapter 9. Watchdog Setting).

The modem has JAVA OPEN PLATFORM in which you can write your own program, for example a program for downloading and sending data from connected technology.

For RS232 and USB parameter setting see the chapter 7.4.

Modem can be powered directly from the USB connector, even using RS232.

2. Package Content

1pc GSM modem
1pc 2-pin connector 3,5mm

3. Recommended Accessories

3.1 Antenna

GSM-ANT51SL   9dB, magnetic, cable 3m

3.2 Power Supply

GSM-PWR12   Power supply adapter into socket 230V$_{AC}$ / 12V$_{DC}$, 1A
GSM-PWR1   DIN rail mounted supply module 230VAC / 12VDC, 1.25A
Note: for DIN rail mounting inside of a cabinet suitable:
GSM-75-DIN   Plastic DIN rail holder   or
GSM-ZIP50   Industrial 3M Dual-Lock ZIP 25x50mm for wall mounting

3.3 Cables

HW-11.99.6218   CANON MD9-FD9 (connected as an extension), length 1.8 m
HW-11.99.8752   USB 2.0 AB (micro USB to a modem), length 1.8m

4. Technical Specification

Parametr		Symbol	MIN.	TYP.	MAX.	Unit
Power Supply (PWR)	Voltage DC		7 V$_{DC}$	8 až 30	33 V	V$_{DC}$
	Voltage AC		10 V$_{AC}$	12	27 V$_{AC}$	V$_{AC}$
	Standby power. consumption	connected to GSM network (call o GPRS)	0,36 (30mA for 12 V$_{DC}$)			W
	Max. power. consumption		1.2			W
POWER supply conn.		2-pin removable screw terminal block, pitch 3.5 mm (PWR), or micro USB connector				
Power supply via USB	Voltage			5		V
	Current			140	250	mA
Ingress Protection	IP			40		
Temperature	Storage	tSTG	-40		+85	°C
	Operating	tA	-30		+65	°C
Humidity	Operating				95	% R.V.
Dimensions	Width	W		54		mm
	Height	H		24		mm
	Length	L		82		mm
Weight				0.103		kg

Note: If the power supply and USB connectors are connected at the same time, current goes only from power supply connector.

5. Modem Parameters

Parameter	Description
GSM , GPRS 12	900/1800 MHz (GPRS 86 kbps DL, 86 kbps UL)
LTE	800/900/1800/2100 MHz (10,2 Mbps DL, 5,2 Mbps UL)
Antenna connector	Device – 2x SMA (F), 50 Ohm
Internet services	TCP/UDP server/client, DNS, Ping, FTP client, HTTP client
JAVA	18 MB RAM and 30 MB Flash File System
USB 2.0	Micro USB; USB2.0
RS232	CANON 9F; 300 to 921600 bps fix bit rate. Autobauding is available. Factory setting is 115200 baud, 8 data bits, no parity, 1 stop bit
HW watchdog	HW Watchdog is available for both RS232 and USB. Note: Watchdog setting is available only via RS232.

6. Documentation

USB driver (driver for RS232 port is not needed), a list of **AT commands** and other information, visit the www.seapraha.cz , type "GSM-ELS61-T2M" into the search box. In the Name field, enter the text **sea**. In the Password box, type **siemens**.

If you are using WIN10 and you will use only control via AT commands, do not download the driver, WIN10 will install its own driver automatically.

7. Hardware

7.1 Power supply and it's indication

Supply voltage is connected to terminals PWR and must be in the range of 7-33 V$_{DC}$ or 10-27 V$_{AC}$. The polarity is therefore irrelevant. The device is protected against overvoltage and has a built-in refundable SMD fuse. If the external fuse is needed, use 1.25 A fuse at V$_{CC}$ line. The modem can be powered directly from the USB connector, even using RS232.

LED	COLOR	MEANING
Located next to the connector PWR	green	*dark* … device is not supplied, or internal power convertor is out of order *light* … device in operation state

7.2 SIM card reader and GSM state indication

Insert the SIM card into the holder (cut corner first, contacts down - towards the inscription SIM). The correct insertion is indicated by mechanical click noise. Push gently and release to remove the SIM card.

Above the SIM card holder is located the LED which indicates status of GSM.

LED	COLOR	MEANING
Located above SIM card holder SIM	blue	Device state indication. *Dark* … device failure; Device was switched of using AT command *blinking 1:1* … device starting up *1 short blink per 3 seconds* … device operational

7.3 Antennas

The antennas (GSM and DIVERSITY GSM) are connected via SMA connector. The device is fitted with SMA female. The connected antenna must have SMA male. The impedance is 50 Ω.

7.4 Communication ports (RS232 and micro-USB)

To communicate with the modem is designed interface RS232 and USB. The device includes a female connector RS232 and micro-USB. The modem can be controlled using both interfaces, for setting up of the watchdog function is possible to use only RS232 interface.

Factory default baud rate for communication with the modem for RS232 is **15200bps**, **8 data bits**, **no parity**, **1 stop bit**. Baud rate for USB is not needed to set.

You will see several COM ports in WIN Control panel (for BGS5 two and for EHS5 six). For sending AT commands you must use the port, which you find in Device Manager „Modems" (Parameters/Modem). Other ports are determined for JAVA application´s development.

7.5 DIN rail mounting

If you need to place the device into the switchboard on DIN rail, screw the plastic holder GSM-75-DIN drilled hole in the side of the modem.

8. Warranty

General warranty period is 24 months after purchase, when eventual malfunction device will be repaired free of charge in SEA spol. s r.o. while shipping to SEA is paid by customer and SEA pays for shipping back to customer.

The warranty does not cover any damage caused by wrong use which does not comply the technical specifications and user instructions and any accidental damage (e.g. by water, lightening etc.).

SEA spol. s r.o. has NO RESPONSIBILITY for any damage, lost, costs and any other problems direct or inducted, caused by device malfunction from any reason.

In case of incompleteness or any damage in the packaging it is necessary to inform SEA spol. s r.o. immediately (within five days).

9. Watchdog setting

The device contains a built-in watchdog which checks whether the modem (line RXD on RS232 or USB). If it is no change on the line for specified time period, the modem is considered broken and is cut off from the power supply for 15 seconds. After that the modem and monitoring process starts again.
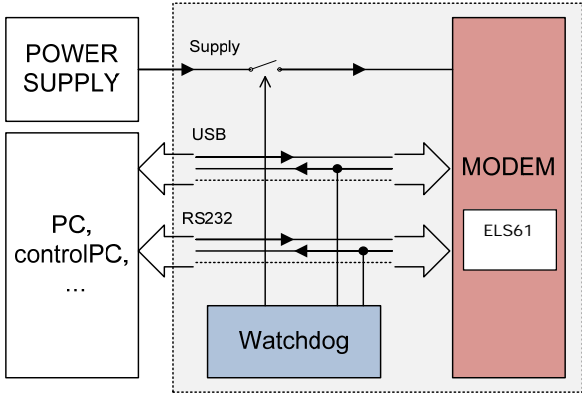
Time, which is still not considered an error of modem is configured using commands via serial interface RS232. USB port is not possible to use for Watchdog setting!

9.1 List of Commands

Notes
- Before each command must be a time of 1 second when there are no characters sent!
- Characters '-' and '+' in the following examples are sent. '-' … mean Data are sent to the device, '+' means data are sent by the device.
- '<# 0D>' is a placeholder for ENTER (13D, 0x0D).
- RS232 interface must be set to: 115200 baud, 8 data bits, no parity, 1 stop bit.

Command ECHO

Display current Watchdog setting

- GSMWDG<#0D>
+ WDG: OK 123456 D2251D v1.0

or

- GSMWDG?<#0D>
+ WDG: OK 123456 D2251D v1.0

Part	Description
WDG:	Watchdog respond identification
OK	Command accepted OK
123456	Actual Watchdog setting value in seconds (HEX code): 123456 HEX = 1 193 046 seconds ~ 13,8 day 000000 HEX = Watchdog function disabled (default setting) 00003C HEX = 60 seconds ~ 1 minute 000E10 HEX = 3 600 seconds ~ 1 hour 008CA0 HEX = 36 000 seconds ~ 10 hours 015180 HEX = 86 400 seconds ~ 1 day
D2251D	Device Identification
v1.0	Device version

Command SET

Watchdog setting

- GSMWDG 112233<#0D>
+ WDG: OK 112233 D2251D v1.0

The parameter '112233' means seconds (coded in HEX). See the table for command ECHO. Exactly 6 HEX numbers has to be entered, including leading zeroes.

Value '000000' disables Watchdog function = modem is never restarted by Watchdog.

Example: Disable Watchdog
- GSMWDG 000000<#0D>
+ WDG: OK 000000 D2251D v1.0

Example: set Watchdog for 1 hour
- GSMWDG 000E10<#0D>
+ WDG: OK 000E10 D2251D v1.0

Example: set Watchdog for 10 hours
- GSMWDG 008CA0<#0D>
+ WDG: OK 008CA0 D2251D v1.0

Example: set Watchdog for 1 day
- GSMWDG 015180<#0D>
+ WDG: OK 015180 D2251D v1.0

Command RESET

Immediate modem reset

- GSMWDG RESET<#0D>
+ WDG: OK RESET D2251D v1.0

9.2 USB Watchdog

The modem cannot watch the state of USB port. If you need it, you must install additional JAVA program into the modem. Following instructions download appendix from the manufacturer´s web page:

    at^sjnet="gprs","internet","","","8.8.8.8",60
    at^sjam=0,"http://update.seapraha.cz/bgs5watch/bgs5watch.jad",""

There must be an answer OK for both instructions (second instruction can take up to 60 seconds). The modem must have an inserted SIM card with GPRS connection to internet and must be registered into GSM net.

Complete instalation must be as follows :
- at^sjnet="gprs","internet","","","8.8.8.8",60
+ at^sjnet="gprs","internet","","","8.8.8.8",60
+ OK
- at^sjam=0,"http://update.seapraha.cz/bgs5watch/bgs5watch.jad",""
+ at^sjam=0,"http://update.seapraha.cz/bgs5watch/bgs5watch.jad",""
+ OK

Verification of complete instalation:
- at^sjam=4<#0D>
+ at^sjam=4
+ ^SJAM: "http://update.seapraha.cz/bgs5watch/bgs5watch.jad", "BGS5WATCH","SEA spol. s r.o.","1.0","1"
+ ^SJAM: "a:/JRC-1.50.4.jad","Java Remote Control MIDlet Suite","Cinterion","1.50.4","1"
+ OK
Warning: This function is available only for modems which were manufactured after 1st November 2017 and SW version v1.18 (instruction GSMWDG).

10. Frequently Asked Question

10.1 Command for Watchdog setting does not respond

- GSMWDG 52<#0D>
+ <nothing>

The problem is in the assignment of the time "52". It is required to enter the exactly 6-HEX digits. The correct command is this:

- GSMWDG 000052<#0D>
+ WDG: OK 000052 D2251D v1.0