

## MOD-GSM development board User's manual



All boards produced by Olimex are ROHS compliant

Rev. E, February 2013

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## INTRODUCTION

MOD-GSM is excellent board for adding remote monitoring and control with the use of the GSM cellular network. With this module you can use all of the the features of each one of Olimex's boards with on-board UEXT connector by GSM network. Also the board can work in stand alone mode, but only when the SIM card is without PIN code. In stand alone mode MOD-GSM don't offer much opportunities. It can receive information by GSM network, but if you want to operate with this information, you will need appropriate board with UEXT connected to MOD-GSM. Choose the other board depending on the application you want to have. MOD-GSM contains quad-band GSM GPRS module 850/900/1800/1900Mhz inside which covers most used GSM networks around the world. The GSM antenna is build in the board so no need for external expensive GSM antennas.

## BOARD FEATURES

- GSM/GPRS quad-band MODULE 850/900/1800/1900Mhz with build on-board GSM cellular antenna
- Li-ion backup battery 3.7 V 1200 mAh for up to 200 hours of GSM module stand-by
- SIM-card holder
- Status LED
- On-GSM module temperature sensor
- UEXT
- PWR\_EXT
- PWRKEY
- On-board DC-DC converter for stand alone mode and battery recharge
- PCB: FR-4, 1 mm (0,039"), solder mask, silkscreen component print
- Dimensions: 79.2x57.6 mm (3.1182x2.268")

## ELECTROSTATIC WARNING

The MOD-GSM board is shipped in protective anti-static packaging. The board must not be subject to high electrostatic potentials. General practice for working with static sensitive devices should be applied when working with this board.

## BOARD USE REQUIREMENTS

**Hardware:** 12V, 800mA at least Adapter, if you want to recharge the battery. Some of Olimex boards with UEXT on it.

**Important:** If your board does not work, first try to charge the battery as you power supply the board for few hours. Note that the baud rate it is set on hardware level to 115200. Consider using 115200 when connected to the terminal or host board.

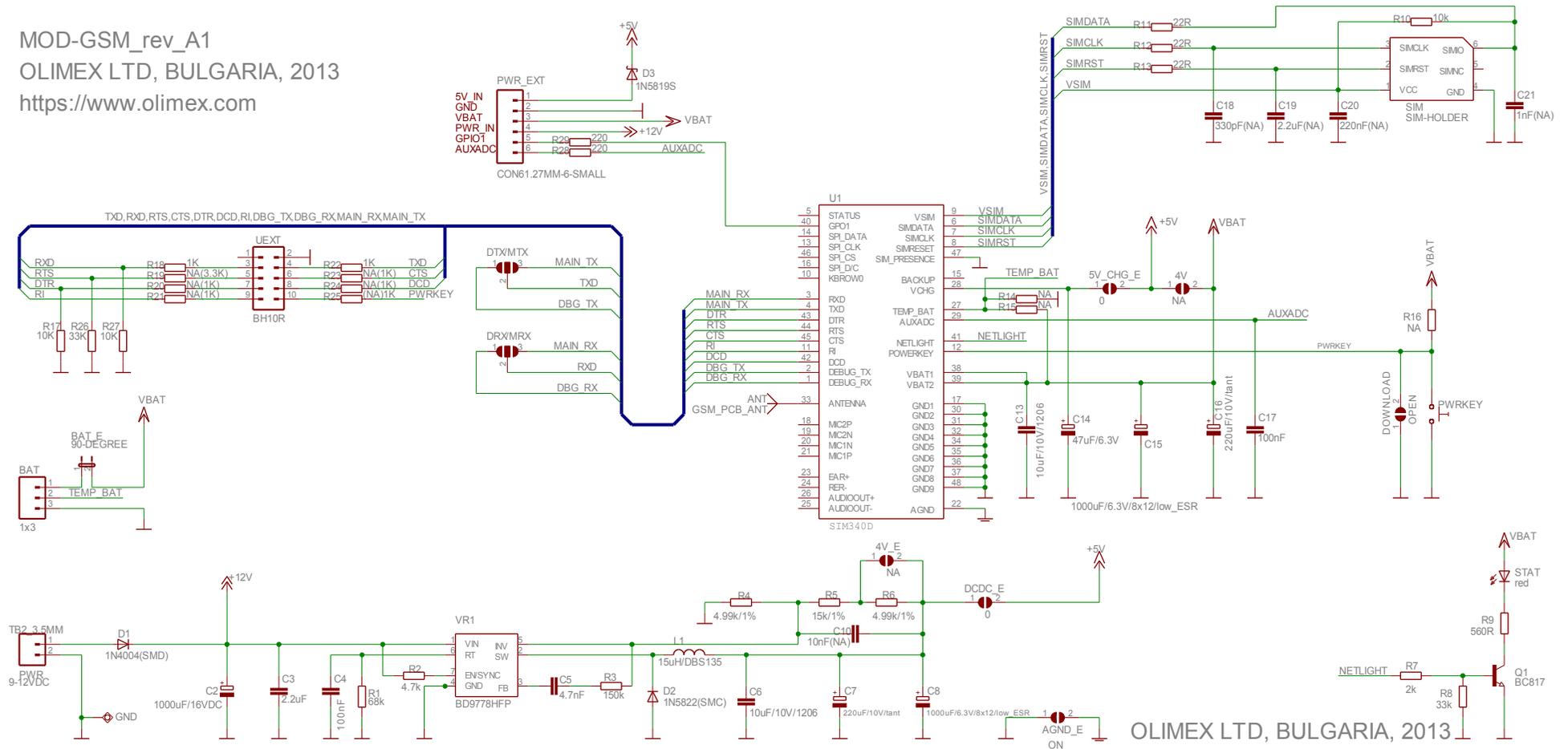
## MODULE FEATURES

- Power Supply - single supply voltage 3.4V - 4.5V
- Power saving - typical power consumption in SLEEP mode to 2.5mA (BS-PA-MFRMS=5)
- Charging - Supports charging control for Li-Ion battery
- Frequency bands:
  - SIM340DZ Quad-band: GSM 850, EGSM 900, DCS 1800, PCS 1900. The SIM340DZ can search the 4 frequency bands automatically. The frequency bands also can be set by AT command.
  - Compliant to GSM Phase 2/2+
- GSM class - Small MS
- Transmit Power
  - Class 4 (2W) at EGSM 900
  - Class 1 (1W) at DCS1800 and PCS 1900
- GPRS connectivity
  - GPRS multi-slot class 8 (optional)
  - GPRS multi-slot class 10 ( default)
  - GPRS mobile station class B
- Temperature range
  - Normal operation: -20°C to +55°C
  - Restricted operation: -30°C to -20°C and +55°C to +80°C
  - Storage temperature -40°C to +80°C
- DATA GPRS:
  - GPRS data downlink transfer: max. 85.6 kbps
  - GPRS data uplink transfer: max. 42.8 kbps
  - Coding scheme: CS-1, CS-2, CS-3 and CS-4
  - SIM340DZ supports the protocols PAP (Password Authentication Protocol) usually used for PPP connections
  - The SIM340DZ integrates the TCP/IP protocol
  - Support Packet Switched Broadcast Control Channel (PBCCH)
  - CSD transmission rates: 2.4, 4.8, 9.6, 14.4 kbps, non-transparent
  - Unstructured Supplementary Services Data (USSD) support
- SMS
  - MT, MO, CB, Text and PDU mode
  - SMS storage: SIM card
- FAX - Group 3 Class 1
- SIM interface - Support SIM card: 1.8V ,3V
- External antenna - Connected via 50 Ohm antenna connector or antenna pad

- Audio features - Speech codec modes:
  - Half Rate (ETS 06.20)
  - Full Rate (ETS 06.10)
  - Enhanced Full Rate (ETS 06.50/06.60/06.80)
  - Echo suppression
- Serial interface and Debug interface
  - Serial Port: Seven lines on Serial Port Interface
  - Serial Port can be used for CSD FAX, GPRS service and sending AT command of controlling module.
  - Auto bauding supports baud rates from 1200 bps to 115200bps.
  - Debug port: provide two lines on Serial Port Interface /TXD and /RXD
  - Debug port is only used for debugging
- Phonebook management - Support phonebook types: SM, FD, LD, MC, RC, ON, ME, BN, VM, LA, DC, SD
- SIM Application Toolkit - Support SAT class 3, GSM 11.14 Release 99
- Real time clock - Implemented
- Timer function - Programmable via AT command
- Physical characteristics
  - Size: 33±0.15 x 33±0.15 x 3±0.3 mm
  - Weight: 7.8g
- Firmware upgrade - over serial interface

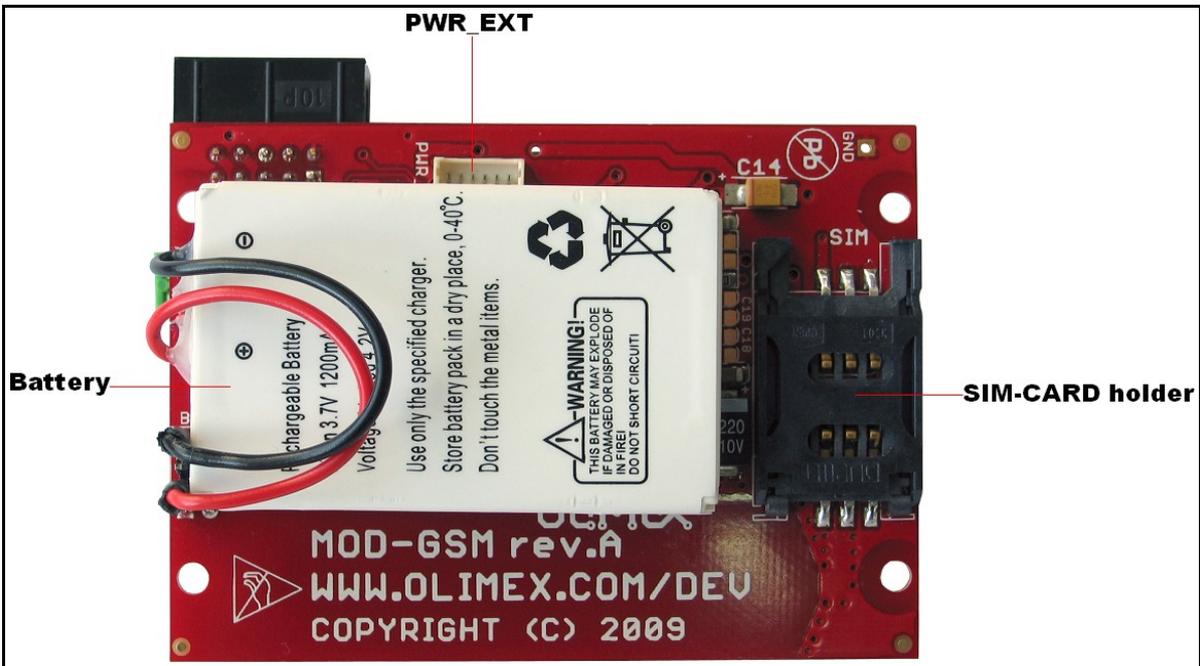
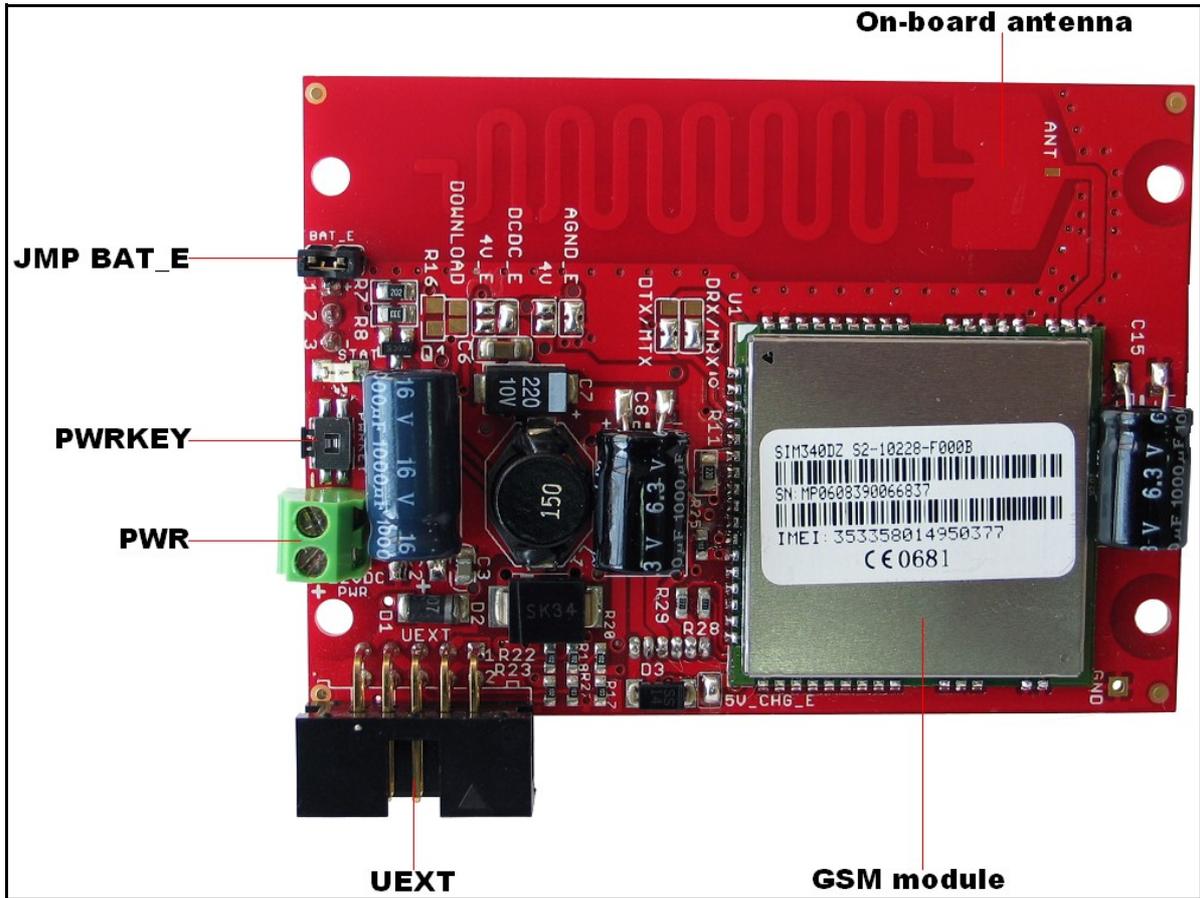
# SCHEMATIC

MOD-GSM\_rev\_A1  
 OLIMEX LTD, BULGARIA, 2013  
<https://www.olimex.com>



OLIMEX LTD, BULGARIA, 2013

# BOARD LAYOUT



## POWER SUPPLY CIRCUIT

The power supply of MOD-GSM may be done in two ways:

1. Power from +9 - 12VDC without using the external backup battery.  
In this case the external power supply is used for supplying of 4V to GSM module and thus the module can be powered only from external power supply and the battery must not be connected.

In this case the jumpers have to be configured as follows:

- jumper BAT\_E must be open
  - jumper 4V\_E must be closed
  - jumper 4V must be closed
  - jumper 5V\_CHG\_E must be open.
  - DCDC\_E must be closed
- Power consumption in this mode is:
- near to 70mA when have a conversation.
  - around 20mA in normal mode (without conversation).

**Important:** 4V\_E, 4V and 5V\_CHG\_E jumpers have to be moved together.

2. Power from +12VDC with external 4.2V Li backup battery. The GSM module is powered always via the battery voltage and the external power supply is used only for charging the battery if it is discharged, i.e. if you have plugged external power supply the battery will be charged and if the board is not powered from external power supply the board will work until the battery dies.

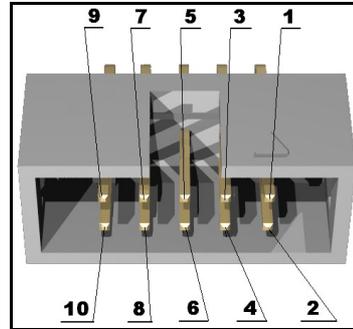
In this case the jumpers have to be configured as follows:

- jumper BAT\_E must be closed
  - jumper 4V\_E must be open
  - jumper 4V must be open
  - jumper 5V\_CHG\_E must be closed
  - DCDC\_E must be closed
- Power consumption in this mode:
- Depends on live of the battery and vary from 260mA to 330mA (fully discharged battery). If we supply the module only via battery, without external power supply, the current through the battery is between 15mA and 30mA if there is no conversation, and between 180mA - 240mA when there is conversation.

## CONNECTOR DESCRIPTIONS

### JTAG

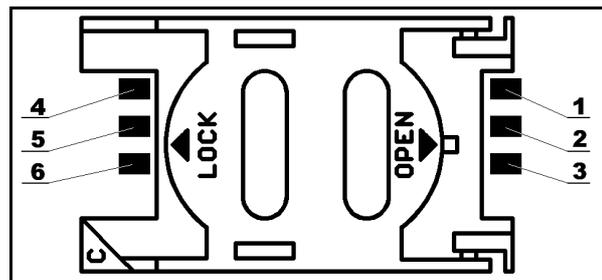
Pin #	Signal Name
1	NC
2	GND
3	RXD
4	TXD
5	RTS
6	CTS
7	DTR
8	DCD
9	RI
10	PWRKEY



This connector allows connecting to other Olimex boards with UEXT connector.

### SIM-CARD

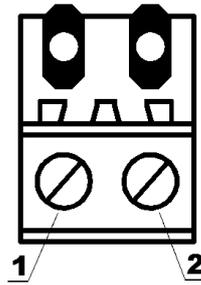
Pin #	Signal Name
1	VSIM
2	SIMRST
3	SIMCLK
4	GND
5	NC
6	SIMDATA



This is standard SIM card connector, to operate MOD-GSM should have inserted valid SIM card for your operator network.

## PWR-CON

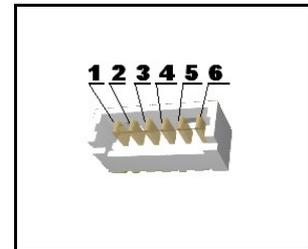
Pin #	Signal Name
1	+12V
2	GND



This connector is used to power the MOD-GSM. External (+9-12VDC) power source have to be applied to this pins.

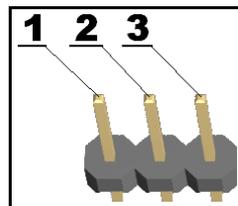
## PWR\_EXT

Pin #	Signal Name	Description
1	5V_IN	5V input for battery recharge
2	GND	Ground
3	VBAT	Output - for power supplying other devices from the GSM battery
4	PWR_IN	Optional input for external power supply
5	GPIO1	Doesn't work
6	AUXADC	Input for analog signal



## BAT

Pin #	Signal Name
1	VBAT
2	TEMP_BAT
3	GND



Note: The battery doesn't support TEMP\_BAT.

## JUMPER DESCRIPTION

### BAT\_E



Connects 3.7V Li-ion battery to the GSM module. Default state is to be open to not drain the battery during stocking the modules.

Default state - open

### 4V\_E



This jumper is used when power the module without battery. When connected enable 4V to the DCDC output.

Default state - open.

### 4V



This jumper is used when power the module without battery. When connected the jumper enable 4V to VBAT power pins of SIM340D module.

Default state - open.

### 5V\_CHG\_E



This jumper is used when the battery is present and allows battery charging. Connects the DCDC converter output (5V or 4V according 4V\_E jumper state) to VCHG power pin of SIM340D module.

Default state closed

**Important: 4V\_E, 4V and 5V\_CHG\_E jumpers have to be moved together.**

**Do not plug in external +12V if BAT\_E jumper is open!**

### DCDC\_E



Enable DCDC. Connect DCDC output ((5V or 4V according 4V\_E jumper state) to the module.

Default state closed

### Download



When the jumper is closed allow SIM340D firmware upgrade.

Default state is open

### DTX/MTX



The DebugTX/MainTX defines whether Debug TX terminal or Main TX terminal of SIM340D module is connected to FT232RL virtual com port driver.

Default state is DTX

## **DRX/MRX**



The DebugRX/MainRX define whether Debug RX terminal or Main RX terminal of SIM340D module is connected to FT232RL virtual com port driver.

Default state is DRX

## **AGND\_E**



Enable board analog ground.

Default state is closed

## **INPUT/OUTPUT**

**PWRKEY** button – turns on the MOD-GSM module. You can turn on the SIM340D by driving the PWRKEY to a low level voltage for period time from 500mS to 1S

**Status LED ( red)** with name **STAT** – indicates the state of SIM340D module.

**STAT** is off state - SIM340D is not running

64ms On/ 800ms Off - SIM340D does not find the network

64ms On/ 3000ms Off - SIM340D find the network

64ms On/ 300ms Off - GPRS communication

## **IMPORTANT NOTE ABOUT THE UEXT**

The information below is for older revisions of the board. If your board doesn't have the serial resistors mentioned below then there is no need to perform the actions mentioned below!

If MOD-GSM doesn't transmit properly data on the UEXT of another Olimex board, it might be because some other boards can interfere with MOD-GSM's signals. If the host board has any signal on the I2C and/or the SPI on the UEXT there is very high chance of erroneous behavior.

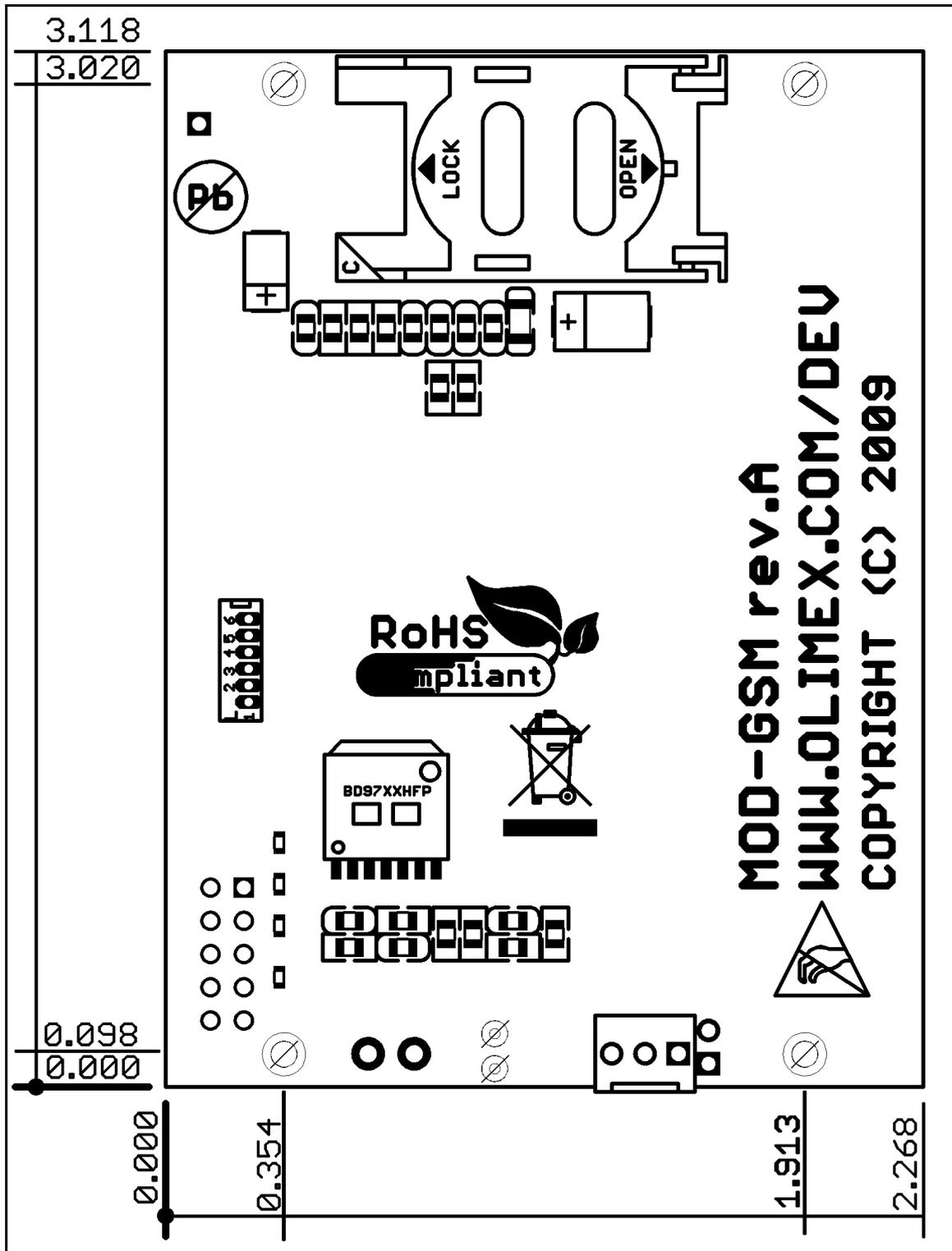
There are two workarounds:

1. Cut the UEXT cable wires 5,6,7,8,9,10. Only wires 1,2,3,4 (NC, GND, RXD, TXD) should remain.

OR

2. Remove resistors R19, R20, R21, R23, R24, R25

**MECHANICAL DIMENSIONS**



All measures are in inches.

## **AVAILABLE DEMO SOFTWARE**

- Please check the MOD-GSM web pages (standard edition and battery edition):  
<https://www.olimex.com/Products/Modules/RF/MOD-GSM/>  
<https://www.olimex.com/Products/Modules/RF/MOD-GSM-B/>

## **ORDER CODE**

**MOD-GSM** assembled and tested.

How to order?

You can order directly from our web shop or from any of our distributors.

Check our web site <https://www.olimex.com/> for more info. List of distributors:  
<https://www.olimex.com/Distributors/>

## **Board revision history**

Rev. A	- initial release
Rev. A1	- removed resistors R19, R20, R21, R23, R24, R25

## **Document revision history**

Rev. B	- edited October 2011 – changes in POWER SUPPLY CIRCUIT – more detailed
Rev. C	- added note about the recommended baud rate on page 2
Rev. D	- added important note about UEXT line; various formatting changes
Rev. E	- updated schematic and disclaimer

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It is possible that the pictures in this manual differ from the latest revision of the board.

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