

## USB Powered Evaluation Board for the GM862 Cellular Module



**GM862 USB Eval v2**  
2/2/2006

### 1 Overview

The GM862 wireless module is a tremendously powerful Machine-to-Machine device that allows data movement across the cellular network. The GM862 PCS and Python versions have tri-band frequencies to allow operation across the globe, wherever cellular towers are installed.

While this module is very lucrative for the embedded engineer, development can be impeded because of tight footprint tolerances and variable voltage requirements. The module interfaces to a 50 pin Molex connector, requires 3.8V @ 2A peak to operate, and communicates at 3.3V serial TTL. These interface specifications must be overcome just to be able to ‘talk’ to the device.

### 1.1 Functional Description

The GM862 USB Evaluation board allows a user to plug in the module, plug the board onto a USB port, and immediately start communicating with the device.

All power is drawn from the USB port and is regulated to the required 3.8V via the Linear Devices LT1528 LDO. This regulator has extremely low 400uA of quiescent current and can source up to 3A.

The USB interface is based on the Silicon Laboratories CP2102 USB to UART chip. Drivers are available for Windows, Linux, Mac OS 9, and Mac OS X. The chip is powered from the 5V USB power and communicates at 3.3V and is 5V tolerant. The CP2102 utilizes the v2.0 USB spec and auto-baud rates up to 115200bps.

A momentary On/Off button is provided as well.

Two solder jumpers allow the user to disconnect the TX and RX lines to the USB chip. An additional solder jumper allows the user to add an external power supply if needed.

Two LEDs provide Power and Status indicators.

### 2 Setting up the GM862 Eval Board

#### 2.1 Parts List (provided with kit)

- GM862 Module
- USB Eval Board (EVK)

# GM862 USB Evaluation Board v2

- MMCX to SMA Cable
- Tri-band GPRS Antenna
- 6' A to B USB Cable

## 2.2 Putting your Eval board Together

The first step to putting the kit together is to connect the MMCX to SMA Cable to the GM862 Module. This is simply done by placing the connector head straight and level over the connector port on the module and pressing down firmly until it snaps into place.



The next step is installing the module onto the EVK. On the bottom of the GM862 module there are 8 bendable legs that have to be placed into the holes on the EVK. Make sure that the module is oriented correctly with the board.



After you have aligned the legs press down on the module until it is flush with the board. The next step is installing the appropriate drivers.



### 3 Installing the USB Drivers

This is a standard Windows Driver installation that accompanies almost all Plug and Play devices. The SFE USB Eval boards use drivers for the CP210x USB to Serial IC. The drivers are available for download at

<http://www.sparkfun.com>

Additional documentation and support can also be found on the website. Click the “USB Driver Installation Information” link on the GM862 Eval board page.

### 4 Starting the GM862 module

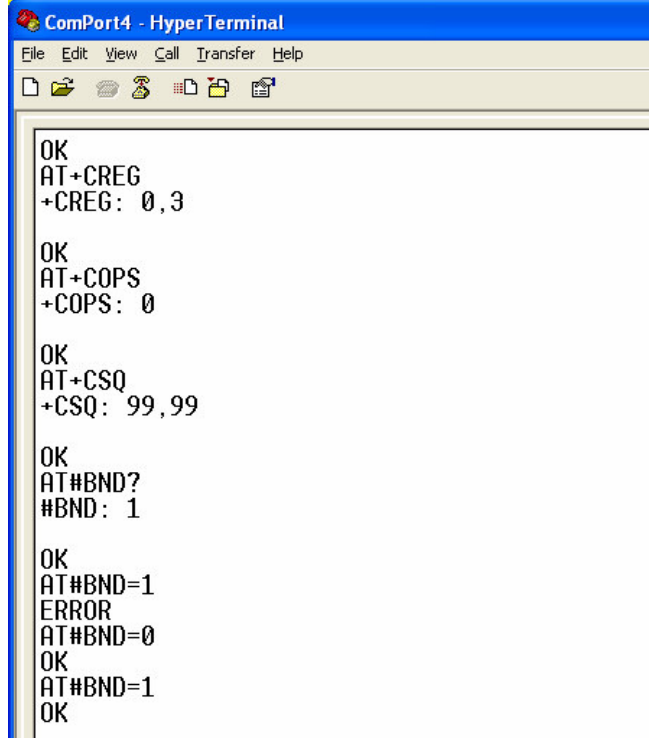
Be sure you have the USB drivers installed and the EVK board is appearing as a standard com port. Be sure you have the antenna attached, and a valid SIM card inserted into the module. These items are *not* required to talk to the module, but if you plan on attaching to the cell network and placing a call, you’ll most likely need all of them.

Once you have the module installed, attach the GM862 EVK to the USB port. The Power LED should come on. The board is now powered.

Open HyperTerminal or your favorite terminal interface and open the com port that the SFE Serial Interface Device is located on. Set the port to 9600bps 8-N-1. Turn Flow Control to None. Now open the serial port. The computer is now ready to start communicating with the GM862.

Once the GM862 board is powered, you must turn the module on by holding the On/Off button down for 1-2 seconds. If this sounds repetitive, just imagine turning on your cell phone by holding the ‘On’ button for a second. Now give the module a few seconds to kick on - imagine your cell phone screen turning and displaying ‘Connecting...’. The status LED will begin to blink indicating the module is running.

In HyperTerminal type ‘AT’ and press enter. You should see the letters you typed as well as an ‘OK’ response from the module. You are now ready to start sending AT commands to the GM862 module.



```

ComPort4 - Hyper Terminal
File Edit View Call Transfer Help
OK
AT+CREG
+CREG: 0,3

OK
AT+COPS
+COPS: 0

OK
AT+CSQ
+CSQ: 99,99

OK
AT#BND?
#BND: 1

OK
AT#BND=1
ERROR
AT#BND=0
OK
AT#BND=1
OK

```

### 5 Setting the GM862 module to work in North America

After two days of painful debugging and getting no signal on our unit, my friend decided to check the GM862 support forum (<http://www.modem-gsm.de/forum/>) only to discover that the GM862 ships with the European cellular bands as default.

By sending the command:

```
AT#BND=1<cr>
```

GM862 module will use the 1900MHz PCS frequencies in the United States and Canada. Read the *Product Description* datasheet for more details. Section 6.7.1.21 currently covers band selection but it will most likely change with future datasheet revisions.

### 6 Solder Jumpers

Two solder jumpers are provided on the board, labeled “RX” and “TX”. These solder

# GM862 USB Evaluation Board v2

jumpers are set during manufacturing. These jumpers can easily be removed with any soldering iron. Once removed, the CP2102 USB IC is isolated from the GM862. If the USB connection needs to be connected and removed multiple times, the solder jumpers need to be removed and 2-pin headers can be installed next to TX/RX. Larger plastic jumpers can then be used to quickly switch between USB control and external control (by a microcontroller for example). Please refer to the GM862 USB Eval schematic.



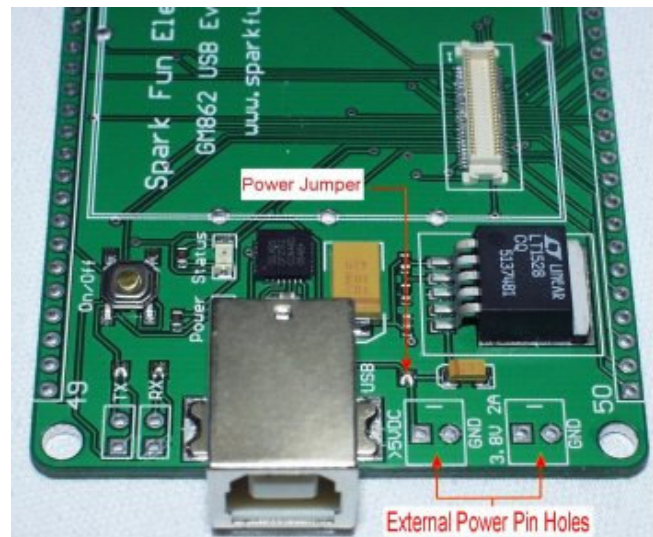
## 7 External Power Connections

The GM862 consumes an average of 220mA when communicating with the network. On some computers, the USB port cannot source enough current when the GM862 module initiates onto the cellular network. If the power fluctuation is too great, the GM862 module will shut down automatically. If this occurs, try a different computer - preferably one with USB v2.0 ports. If the problem persists, external power can be applied to the Eval board.

There is a small solder jumper shown in the picture just to the right of the USB Connector. This jumper connects the USB 5V power line to

the input of the 3.8V regulator. By removing this jumper, you will isolate the power system of the GM862 allowing external power to be applied.

Two dual-pin polarized header footprints are provided for external power. A simple two-pin header may be soldered in, however a polarized header Digikey part #: **A1921-ND** is recommended to prevent reverse polarization of the board. The connector nearest the USB connector requires a >5VDC input, unregulated. This input will use the onboard LT1528 regulator to power the GM862. The second connector, labeled 3.8V 2A, will power the GM862 directly. This input requires a regulated 3.8V input that can sustain 2A peaks. Do NOT attach to more than one input.



The board can also be used to provide a regulated 3.8V power source from the polarized connector shown next to the LT1528. Up to 3A can be consumed but current draws over 1A continuous may require additional heat sinking.

Please refer to the GM862 USB Eval schematic as well for specific connection information.