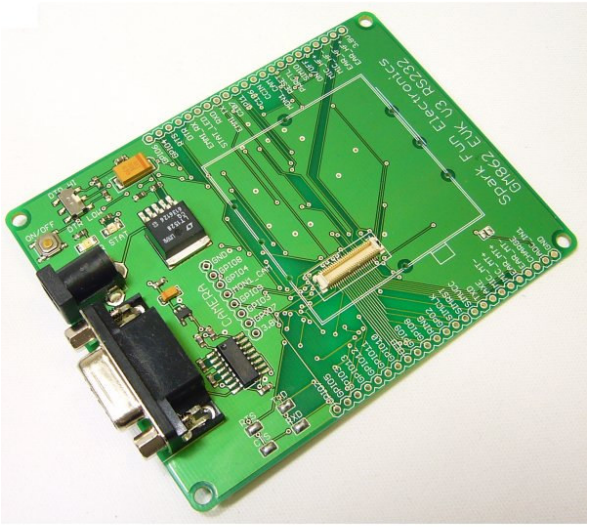


RS-232/USB Evaluation Boards for the GM862 Wireless Module

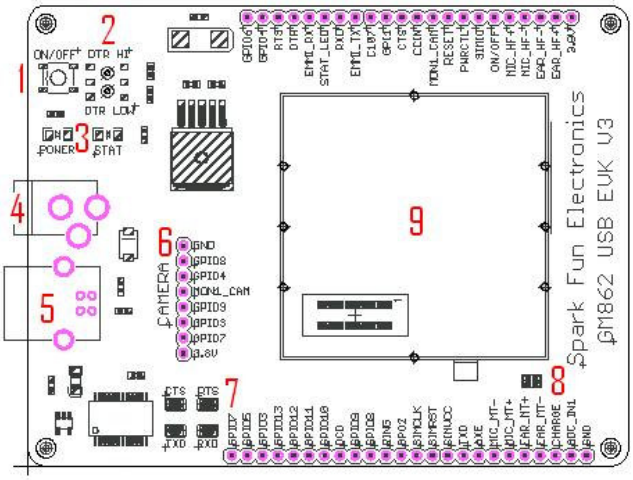
GM862 EVK v3
11/3/2006

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 version has tri-band frequencies to allow operation across the globe, wherever cellular towers are installed. Recent additions to the GM862 line of modules include the Quad-band, Quad-GPS and Quad-Python, all of whose functionality can be fully realized on the newly revised V3 Evaluation boards.

While the GM862 modules can be 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 and Layout



Pictured above is the USB version of the EVK V3 as an example for the hardware layout. There are just a few things you should familiarize yourself with:

1) Momentary on/off pushbutton for the GM862
2) DTR high/low switch
3) Status LEDs
4) Barrel jack (external power input, 5 to 12V)
5) USB connector (or DB9 for the RS-232 version)
6) Camera port
7) Serial communication solder jumpers (closed for com through USB or RS-232)
8) ADC/GND solder jumper (GPS version only)
9) GM862 footprint

Both RS-232 and USB versions of the V3 board offer a full breakout of all of the pins on the GM862 modules. Additionally, both boards provide the user with a preconfigured port for the Transchip TC5747 camera module, hardware flow control for uploading python scripts and a hardwired switch to the GM862's DTR line for executing python scripts.

Other commonalities between the RS232 and USB versions include a momentary On/Off button and a pair of LED's, one as a power indicator and one as a status indicator for the GM862 module.

The USB version allows a user to plug in the module, plug the board onto a USB port, and immediately start communicating with the device. Or optionally the user may power the board from an onboard barrel jack and communicate with the module via 2.8V logic through the provided 0.1"-spaced headers. (**Note:** care should be taken to open the solder jumpers TX, RX, RTS and CTS to isolate the module from the USB chip. A protection diode is in place to prevent reverse current through the USB circuit when using the barrel jack for power).

The USB interface is based on the FTDI FT232RL USB to UART chip, drivers for which are available for Windows, Linux and Mac from http://www.ftdichip.com/FTDrivers.htm.

2 Starting the GM862 module

If you're using the USB version, be sure you have the USB drivers installed and the EVK board is appearing as a standard com port in the device manager. Unplug the board from the USB port and install the GM862 module.

If you're using the RS-232 version, simply plug in your GM862 module.

At this time you can also attach the MMCX to SMA connector, antenna, and insert a SIMM card 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 for the USB version. For the RS-232 version, plug into a serial cable and plug in a suitable wall-wart power supply to the provided barrel jack. In both cases 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 hardware. 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.

3 Setting the GM862 module to work in North America

The first critical hurdle in establishing communications with a GM862 module is to set the band(s) on which it works. Setting the band is covered in section 2.9.1.31 of the Telit AT command description data sheet (the exact file name is 80260st10018a_AT_Descr_GM862PCS_QUAD_TZ_GE863_r0.pdf, thought this may change with future revisions from Telit). Quoting that section,

0 - GSM 900MHz + DCS 1800MHz

1 - GSM 900MHz + PCS 1900MHz

2 - GMS 850MHz + PCS 1800MHz (available only on quadri-band modules)

3 - GMS 850MHz + PCS 1900MHz (available only on quadri-band modules)

By sending the command:

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

GM862 module will use the 900 and 1900MHz GSM frequencies in the United States and Canada.

4 Camera Interface

The GM862 modules have a built-in interface to the Transchip TC5747 CMOS color camera. This camera can be controlled via the GM862 AT command set to take pictures, download them locally, or send them via email attachment to any receipient in the world.

Spark Fun has taken the liberty to create a special breakout board for the TC5747 camera to work with the EVK V3 boards. The user may either install headers on each board, or wire up a cable for pseudo-remote application. The connection is "straight-through", so provided that the user aligns the 3.8V and GND positions (they're on opposite sides of the ports) the rest of the connections will be straight across.

Once the camera is connected, power the board and turn on the GM862 module. The following commands will get you up and running:

```
AT#CAMON<cr>
OK
AT#TPHOTO<cr>
OK
AT#RPHOTO<cr>
...
OK
```

The GM862 downloads the jpeg data at 115200bps with hardware flow control. You must be connected at this speed or else the data will be corrupt. The trailing 'OK' is sent at completion of transmission and will need to be excluded from the jpeg file.

For a full description of camera operations, please refer to section 2.9.4 of the previously mentioned AT command description data sheet.

5 Solder Jumpers

As described in the hardware layout section, there are 5 solder jumpers on the EVK V3 boards. Four of them are for serial communication (either USB or RS-232): TX, RX, CTS and RTS. For embedded applications the user should open these solder jumpers to isolate the GM862 module from either the USB or RS232 circuitry. The fifth jumper is for an ADC input line that is available on the GPS version of the GM862 module. If you do not have the GPS version, this jumper should be closed.

6 Python Scripts

Here are a couple of hints regarding running python scripts on the GM862 modules:

1) Scripts are loaded to the modules at 115200 baud using hardware flow control.
2) Execution of a python script happens at power up of the module when the DTR switch is set to HIGH. We mention this here as a reminder that RS232 logic is inverted. When the manual says to set DTR low, they mean the voltage level is high.
3) Remember that you python script must be enabled ("AT#ESCRIPT='<script name>'") before it will execute.

For a full description of python procedures, please refer to the "Easy Script in Python" document from Telit, available from their web site.