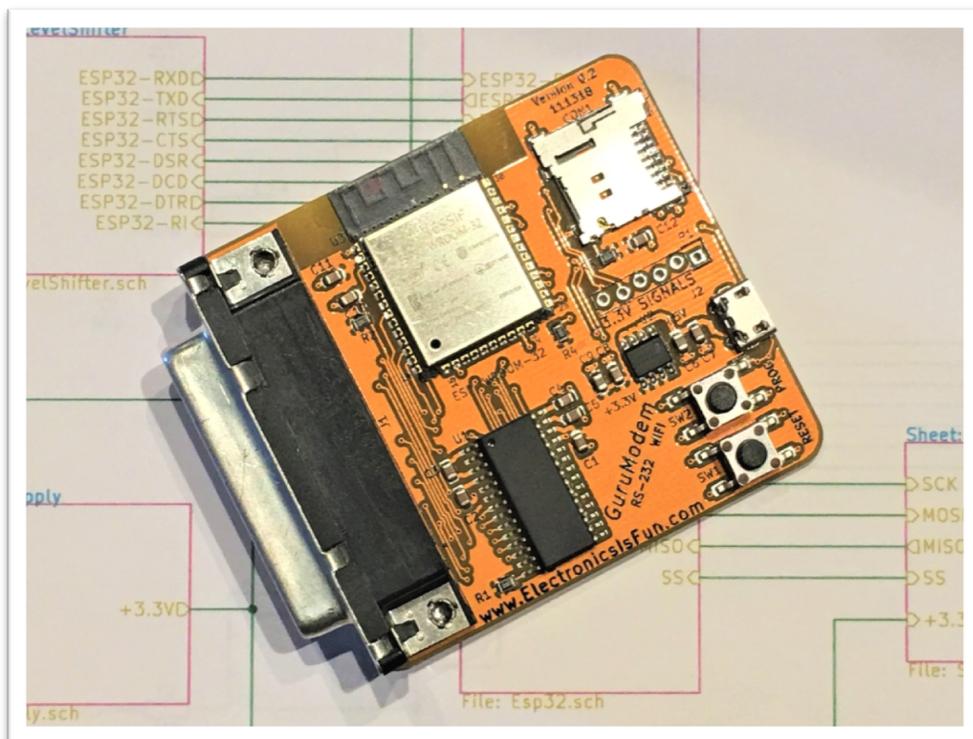


GURUMODEM

RS-232 Wifi Modem

“The Gold Standard in RS-232 WiFi Communications”



From Electronics Is Fun

www.ElectronicsIsFun.com

February 23, 2019

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GURUMODEM INTRODUCTION

The GuruModem adds wireless RS-232 modem communications capability to any microcomputer with a 9 or 25 pin RS-232 compatible serial port. It provides wireless connectivity to any 802.11g network. Unlike other RS-232 WiFi modems, the GuruModem provides full modem control without the need for jumpers or switches. Users can connect to the internet using standard communications software or custom built serial communications software. Additionally, the user can also connect to other computers and BBSs over the Internet or directly to other computers using TelNet. The GuruModem can be programmed using AT commands that are similar to the Hayes modem command set used with phone line modems.

The GuruModem also provides on-board storage via a micro SDCARD. The onboard firmware provides advanced commands for configuration, data storage and retrieval along with a comprehensive shell. The shell includes commands for file manipulation, FTP, Xmodem, Zmodem communications.



The GuruModem connects easily to the computer's serial port either directly or over a serial cable. Power must be supplied to the board from a +5V power adapter with a micro USB connector (similar to the power adapters used for the Raspberry Pi). The computer can communicate with the GuruModem over a standard RS-232 serial interface at speeds up to 230.4K baud* with the appropriate software and cable. The maximum speed is dependent on the computer hardware and software.

Some computers may use a different connector such as a DB-9 or a female DB-25 connector. In these cases, an adapter and/or a gender changer will be required.

FEATURES

- *Full standard RS-232 interface with Modem Control*
- *Integrated WiFi and Bluetooth ESP32 module*
- *Onboard mini-SD-CARD interface*
- *On-board low dropout regulator*
- *Over The Air firmware updating*
- *Debug interface (3.3V TTL signaling)*
- *Built shell (with DOS/Linux type commands)*
- *Support for multiple protocols*
- *Support for Xmodem and Zmodem transfers.*
- *Serial port speeds up to 230.4K baud*

This manual provides information on how to install and use the GuruModem.

It can be downloaded from:

<http://ElectronicsIsFun.com>

The GETTING STARTED SECTION provides details on how to connect the GuruModem to your computer. This section assumes that the user will provide a serial cable and/or adapter and a suitable power supply.

System Requirements

1. *A microcomputer with an available RS-232 serial port*
2. *Serial communications software (User supplied).*
3. *GuruModem card.*
4. *+5V power Adapter with micro-USB connector (User supplied).*
5. *Micro SD-CARD (User supplied).*
6. *Cable and/or adapter/gender changer. (as required)*

GETTING STARTED

Installing the GuruModem card simple and only takes a few minutes.

1. *Make sure the computer is off.*
2. *Find the RS-232 serial port on the rear of the computer.*
3. *If your computer has a male DB-25 serial connector, you may install the GuruModem directly. Otherwise, you may need to use a serial cable, adapter, etc.*
4. *Some computers require using the appropriate serial cable, adapters, etc, Connect one end of the cable to the serial port on the computer. (Note: On most computers a cable and/or adapters are not required.)*
5. *Connect the other end of the cable to the DB-25 connector on the GuruModem.*
6. *Install a FAT32 formatted mini-SDCARD.*
7. *Connect the +5V power adapter to the mini USB connector on the GuruModem.*
8. *Plug the power adapter to an AC power.*
9. *Turn the system power on.*

The GuruModem is now ready to use. It can be used with off the shelf software. Or, user provided communication software. The GuruModem defaults to 1200 baud. Configure your software appropriately. Using the “atb” command, the baud rate can be changed later.

NOTE: Additional information is required for configuration. For example, you will need to provide your network SSID (service set identifier) and password.

For initial configuration, the computer must be running serial communications software configured for serial settings of 1200 baud, 8, N,1.

To configure the Wifi, issue the following command and follow the onscreen instructions.

```
at+config
```

Look at the AT+CONFIG section of this document for more details.

Additional commands are available using the AT command set.

USING THE GURUMODEM CARD

Using a communications program in Terminal mode, you can issue commands to the GuruModem that allow you to change parameters and configuration options. The AT+CONFIG command provides a series of menus to configure the GuruModem quickly. In this section we describes some of the more common AT commands and how they can be used to get the most out of the GuruModem card. Additional commands can be found in the AT Command Reference

Set the baud rate

The default baud rate is set to 1200 baud. If you want to change this, you need to understand that once the baud rate is changed, characters will no longer be displayed properly. This can be corrected by changing the settings in your communications program after you have set a new baud rate. The baud rate can be set with the following command.

```
atb9600
```

This command will change the baud rate to 9600 baud. Other baud rates are available. Here is a list of the baud rates available:

```
1200, 2400, 4800, 9600, ..., 115200, 230400.
```

Configuring the SSID and password for your network

Start the communications program and issue the following command:

```
atw"your SSID, your password"
```

Saving your SSID and password

Since most users frequently connect to the same WiFi network, it is best to save the SSID and password that has been configured. Otherwise, the setting will be lost when you power down the system.

```
at&w
```

Once you issue this command, the GuruModem card will remember the SSID and password to your network.

PETSCII vs. ASCII

The GuruModem card can understand PETSCII (used by commodore computers) and ASCII. However, under certain situations sending PETSCII to the GuruModem can result in an error. This occurs because the GuruModem can only interpret commands in ASCII. For example, when setting the SSID and password, if the computer is in commodore graphics (PETSCII) mode an error will be generated. It is for this reason that the following command was created specifically for use with commodore computers.

```
atwp"your SSID, your password"
```

For non-commodore computers, the user should only use ASCII mode.

Getting help

After you configure the GuruModem, you can display help information by issuing the following command.

```
at&h
```

Note: this command will only work if you have configured your SSID and password. This is because the command will access the help information from the internet. After this help has been access once, it will remain resident. Issuing the command again will display a local copy.

Display available hotspots/networks

You can scan for available networks with the GuruModem card by issuing the following command.

```
atw
```

This will display the available hotspots along with their signal strength. This command is helpful when trying to connect to a different network.

Note: this command only works if you have already configured your SSID and password.

Reset to factory settings

You can reset the GuruModem card back to factory setting by issuing the following command.

```
at&f
```

This command will erase any settings that were configured by the user back to the default settings that were set at the factory.

BBS's

With the GuruModem card, you can access BBS's all over the world. Access is simple, just find your favorite BBS. Then use the ATD command to connect. The following pages are resources for BBS listings on the Internet.

```
http://www.bbscorner.com/usersinfo/bbslists.htm
```

```
https://www.telnetbbsguide.com/
```

The following site contains a list of BBS's dedicated to the commodore computers. To access a BBS, you need the name of the website and the port number.

```
http://cbbsoutpost.servebbs.com/
```

For example, for CottonWood BBS, the website is cottonwoodbbs.dyndns.org and the port number is 6502. So, to connect, you would issue the following command:

```
atd" cottonwoodbbs.dyndns.org:6502"
```

Most internet connected BBS's will provide a telnet address. Telnet addresses are in the form of:

```
Ipaddress:port
```

In some cases, the telnet address is the name/URL of the BBS. Also, some telnet address do not require a port number.

AT+CONFIG USAGE

The easiest way to configure the GuruModem is to issue the AT+CONFIG command. This command provides features to configure GuruModem using a clear and concise menu. Some of the menu options have submenus to make additional selections.

To use this menu, type the menu name (**[WIFI]**, **[FLOW]**, **[ECHO]**, **[BBS]**, **[PETSCII]**, **[ADD]**) and enter. You will be prompted for your desired setting.

Main Menu

[HOST] name:

[WIFI] connection: Not connected

[FLOW] control: DISABLED

[ECHO] keystrokes: ON

[BBS] host: OFF

[PETSCII] translation: OFF

[ADD] new phonebook entry

AT+CONFIG MENU OPTIONS

[HOST]

Set the host name of your machine.

[WIFI]

Set the wifi ssid and password.

[FLOW]

Setup flow control for XON/XOFF, RTS/CTS, and DISABLE.

[ECHO]

Set character echo keystrokes ON or OFF. Modem will echo characters if ON. Otherwise no characters will be echoed.

[BBS]

This option is used to configure the BBS Host mode. A BBS menu will be displayed to allow the user to configure host mode parameters. When the BBS option is issued a submenu will be displayed. Typing ENABLE will show the submenu to configure the BBS parameters

[HOST], **[PETSCII]**, **[TELNET]**, **[ECHO]**, **[FLOW]**, and **[DISABLE]**.

This menu allows the user to setup the modem to accept an internet connection. This is like a modem that is in auto-answer mode. When an attempt is made to connect to the GuruModem from the Internet on a specific port, the modem will accept the connection.

BBS SUB MENU OPTIONS

[HOST]

This option allows the listener port number to be entered for BBS listener mode..

[PETSCII]

Allows PETSCII translation to be turned ON or OFF for BBS listener mode.. This option is a toggle.

[TELNET]

Controls Telnet translation ON or OFF for BBS listener mode.. This option is a toggle.

[ECHO]

Controls local echo ON or OFF for BBS listener mode.. This option is a toggle.

[FLOW]

Controls flow control XON/XOFF, RTS/CTS and DISABLED for BBS listener mode. This option is a toggle.

[DISABLE]

Disables the BBS host listener mode.

[PETSCII]

This option controls the PETSCII character translation. When this option is ON, PETSCII characters will be translated from ASCII and displayed. It should only be ON for Commodore computers or Commodore emulators. It is seldom need because most computers use ASCII.

[ADD]

Add a new entry to the phonebook to allow quick connections over the internet to BBSes or Telnet servers. With the ADD option the user can enter a number and the ipaddress:port of a BBS or server to be accessed. This creates a quick dial number that can be used to quickly connect to other machines. Some older communications software require a number to be dialed instead of accepting the ipaddress:port. Once you enter a number, you will be prompted to enter the ipaddress:port to be saved. Then the user will be prompted with a submenu to setup the parameters for that connection including [PETSCII], [TELNET], [ECHO], and [FLOW].

AT+SHELL USAGE

The GuruModem provides local storage. The shell supports commands for manipulating files on the SDCARD. It also provided tools for performing file transfers over the internet

and to/from the local computer over the serial port. For a list of available commands, type “help” or “?”

COMMAND USAGE:

When issuing commands in the shell, some commands do not require parameters and others do. Parameters in square brackets “[]” are optional. The “|” shows mutually exclusive parameters. For example `[/][path][|][..]` either the “path” or “..” can be used with `cd`.

Commands:

`ls/dir/list/$ [-r] [/][path] - List files`

`cd [/][path][|][..] - Change to new directory`

`md/mkdir/makedir [/][path] - Create a new directory`

`rd/rmdir/deletedir [/][path] - Delete a directory`

`rm/del/delete [-r] [/][path]filename - Delete a file`

`cp/copy [-r] [-f] [/][path]filename [/][path]filename - Copy file(s)`

`ren/rename [/][path]filename [/][path]filename - Rename a file`

`mv/move [-f] [/][path]filename [/][path]filename - Move file(s)`

`cat/type [/][path]filename - View a file(s)`

`df/free/info - Show space remaining`

`xget/zget [/][path]filename - Download a file`

`xput/zput [/][path]filename - Upload a file`

`wget [http://url] [/][path] - Download url to file`

`fget ftp://user:password@url/[path]filename
[/][path]/filename - FTP get file`

fput [/][path]filename ftp://user:pass@url - FTP put file

fdir ftp://user:password@url[path] - ftp url dir

exit/quit/x/endshell - Quit to command mode

Examples of command usage:

Each of the commands available in the shell are similar to commands available in operating systems like DOS, Windows, and Unix/Linux. Some require parameters that include paths, filenames and switches like “-r” and -f.

Getting a file using fget, the user must specify the ipaddress or URL, file source address, and file destination. If the connection to the ftp server is not anonymous, the user name and password must also be specified.

The full path along with the filename must be specified as shown below.

```
ls -r
```

```
ls games/action/arcade
```

```
cd games
```

```
cd ..
```

```
mkdir games/strategy
```

```
deletedir games/text_adventure
```

```
rm -r homework
```

```
fget ftp://192.168.0.6/info.zip /info.zip
```

```
fput elfish.pdf ftp://192.168.0.6/elfish1.pdf
```

```
fdir ftp://192.168.0.11/DataDirectory
```

COMMUNICATIONS

The GuruModem is capable of communicating with other computers on a local network or across the Internet. The protocol available depend on the types of communications software provided by the user. Some popular protocols available include but are not limited to the following list.

XMODEM

YMODEM

ZMODEM

FTP

IRC

TelNet

Etc.

ADVANCED TOPICS

The GuruModem card is fully programmable. The tools used to create the firmware include the Arduino IDE and the ESP32 libraries. The card can be programmed (i.e. firmware downloaded) by using an FTDI cable or over the air using WiFi.

Developing new firmware or modifying the current firmware will be left as an exercise for the user. However, this section will provide details on what is required to configure the hardware and how to download a new version of the firmware.

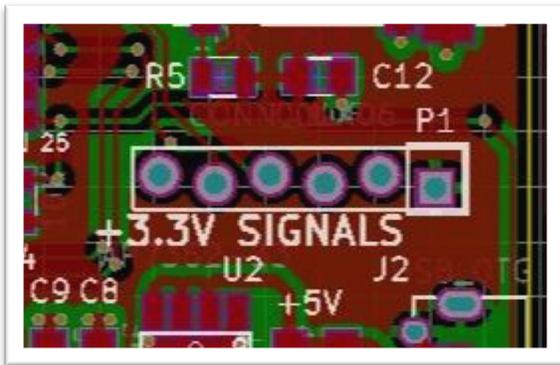
The README file on the github page provides details on how to configure the development environment to build the firmware.

The repository for the firmware source is available at:

<https://github.com/bozimmerman/Zimodem>

The GuruModem card is based on the ESP-WROOM-32 by Expressif. This is a feature rich WiFi module that contains 4MB of flash onboard. This flash can be updated using the Arduino IDE. It can also be updated over the air using an AT command. To perform the updates, the following instructions are provided.

FTDI Cable Download



You must install a 6 pin header in location P1 to connect the FTDI cable. Pin 1 of P1 is indicated by a square pad with a white box around it. Pin 1 of the FTDI cable will be the end with the black wire. **The FTDI cable must be of type TTL-234X-3V3. Using a different cable or installing the cable incorrectly, will damage the GuruModem.**

To perform the firmware update from a batch file. Create a batch file contains the following line: (NOTE: The Following is a single line)

```
C:\Users\Carlo\AppData\Local\Arduino15\packages\esp32\tools\esptool\2.3.1/esptool.exe --chip esp32 --port COM5 --baud 921600 --before default_reset --after hard_reset write_flash -z --flash_mode dio --flash_freq 80m --flash_size detect 0xe000 D:\Applications\Data\KiCAD\KiCadProjects\GuruModem\firmware\boot_app0.bin 0x1000 D:\Applications\Data\KiCAD\KiCadProjects\GuruModem\firmware\bootloader_qio_80m.bin 0x10000 D:\Applications\Data\KiCAD\KiCadProjects\GuruModem\firmware\zimodem.ino.bin 0x8000 D:\Applications\Data\KiCAD\KiCadProjects\GuruModem\firmware\zimodem.ino.partitions.bin
```

The paths will need to be changed on your system based on where your Arduino environment, and your firmware files are stored.

Three files are supplied with the Arduino IDE. `esptool.exe` `boot_app0.bin` `bootloader_qio_80m.bin`

Two files will be generated from your build of the firmware. `zimodem.ino.bin` `zimodem.ino.partitions.bin`

The FTDI model TTL-232R-3.3V cable is required.

Configuring the hardware for firmware downloading

The GuruModem card must be connected to the computer over an FTDI cable attached to P1. +5 V must be applied to the GuruModem before programming. **Attaching the FTDI cable to the card incorrectly may result in damage.**

1. *Build or acquire the firmware file you wish to download to the GuruModem card.*
2. *Attach the FTDI cable to P1 on the GuruModem card.*
3. *Connect the +5 V power to the micro USB connector J2.*
4. *Press and hold the PROG button (SW1).*
5. *Press and hold the RESET button(SW2).*
6. *Release the RESET button.*
7. *Release the PROG button.*
8. *Start the firmware download.*
9. *When the download is complete press the RESET button.*
10. *Disconnect the FTDI cable and power.*

Over the Air Download

To perform the over the air download, the GuruModem card must be connected to your computer, powered-up, and your communications program must be running. The default baud rate is 1200. If you have changes the baud rate of your modem, you must configure your software to run at the same baud rate.

Issuing the following command will perform the update from the default server.

AT&U6502	Will update the firmware from the home page on the web.
AT&U=x	Will update the firmware from the web to custom version x.

The over the air update restricts the size of the update to 512K bytes or less. If you are building a custom firmware that is larger, then the FTDI Cable download method must be used.

AT COMMAND REFERENCE

Command Set:

The command set is as follows (not case sensitive):

COMMAND	Description
ATZ	Closes all open socket connections (preserving the Access Point connection), stops all listeners, and resets the state of the Command processor to the saved configuration, preserving the current baud rate and Wi-Fi connection.
ATI	Shows the startup banner, including Wi-Fi connection information.
ATI0	same as ATI
ATI1	Shows the current common variable settings, common 'S' registers.
ATI2	Shows the modem's current IP address
ATI3	Shows the modem's current Wireless Router connection
ATI4	Shows only the firmware current version
ATI5	Shows all the current variable settings, all 'S' registers.
ATA	If a server listener has generated a RING, then ATA will switch the last rung connection to Stream mode (see ATD). ATA/ : Repeats the previous command (no idea why...)
ATAn	Causes the modem to create a server listening on port n. When a connection is received, the terminal will generate 1 or more RINGs according to the ATSO register, followed by a normal CONNECT response. At this point, all other commands related to connections may be used normally, unless ATS41 is > 0, in which case incoming connections are automatically sent to Stream mode as per ATD or ATA. Listeners are listed along with other connections using ATC0.
ATAPn" [HOSTNAME] : [PORT] "	Adding a P modifier causes all incoming connection input to be translated to PETSCII
ATATn" [HOSTNAME] : [PORT] "	Adding a T modifier causes connection streaming input to be translated per TELNET when the changed to Stream mode

COMMAND	Description
ATAEn " [HOSTNAME] : [PORT] "	Adding a E modifier causes connection terminal echo to be enabled when the changed to Stream mode
ATAXn " [HOSTNAME] : [PORT] "	Adding a X modifier causes connection XON/XOFF flow control to be enabled when the changed to Stream mode
ATN0	Shuts down all listeners, leaving client connections open ATNn : if n > 0 then same as ATAn
ATE0	Turns serial terminal echo off for command mode.
ATE1	Turns serial terminal echo on for command mode.
ATV0	Turns off verbose responses mode (Uses Terse Numeric response mode)
ATV1	Turns on verbose responses mode (Uses Word response mode)
ATX0	Turns off extended response codes (1/CONNECT instead of 5/CONNECT 2, etc..)
ATX1	Turns on extended response codes (5/CONNECT 2 instead of 1/CONNECT, etc..)
ATF0	Turns on rts/cts flow control.
ATF1	Turns on xon/xoff flow control.
ATF2	Turns on xon/xoff flow control, sets XON mode (if necessary), and, in command mode, will immediately go to XOFF when a single connection packet is received. This is very useful when the client wants to ensure it only receives one packet to process. You can think of this as an alternative way to use xon/xoff by having XOFF automatic between packets.
ATF3	Similar to ATF2 except that the default is XOFF, and, in command mode, a XON code from the user will immediately trigger either an empty packet response [0 0 0], or a real packet if one is available. After this, as in ATF2, XOFF is automatically set. ATF4 : Turns off flow control for command mode
ATQ0	Turns off quiet mode (Sends response codes)
ATQ1	Turns on quiet mode (Stops sending response codes)
ATRO	Suppresses linefeed (\n \$0a) in end of lines. Will only send carriage return (\r \$0d).

COMMAND	Description
ATR1	Sends \r\n (\$0d0a) as end of line string.
ATR2	Sends \n\r (\$0a0d) as end of line string.
ATR3	Suppresses carriage return (\r \$0d) in end of lines. Will only send linefeed (\n \$0a).
ATBn	Sets a new serial Baud Rate. Takes effect immediately.
ATB"n,xYz"	Sets baud rate n, bits x, parity (E,O,M, or N) for Y, and stop bits z.
ATW	List all wireless network access points scanned within range. The response for each entry is the SSID, following by the RSSI, followed by an * character is the connection is encrypted.
ATWn	Where n > 0, this lists up to n wireless network access points scanned within range. The response for each entry is the SSID, following by the RSSI, followed by an * character is the connection is encrypted.
ATW" [SSID] , [PASSWORD] "	Connects to the wireless access point with the given SSID, using the given password.
ATWP	Adding a P modifier is the same as all forms of ATW, with both arguments and results presented in PETSCII.
ATD	Start a streaming connection between the current opened connection. Use "+++" to exit back to Command mode.
ATDn	Where n > 0, this will start a streaming connection between the previously opened connection with an id the same as n. Use "+++" to exit back to Command mode.
ATD" [HOSTNAME] : [PORT] "	This opens a streaming connection between the terminal and the given host/port. Use "+++" to disconnect and exit back to command mode.
ATDP" [HOSTNAME] : [PORT] "	Adding a P modifier causes connection input to be translated to PETSCII during the streaming session.
ATDT" [HOSTNAME] : [PORT] "	Adding a T modifier causes connection input to be translated per TELNET during the streaming session.
ATDE" [HOSTNAME] : [PORT] "	Adding a E modifier causes terminal echo to be enabled that streaming session.
ATDX" [HOSTNAME] : [PORT] "	Adding a X modifier causes XON/XOFF flow control to be enabled that streaming session.
ATDnnnnnnn	Where n=0-9, if the digits exist in the phonebook (see ATP), it will try connect to that host, with those modifiers, from the phonebook.
ATC	Shows information about the current network connection in the following format "[CONNECTION STATE] [CONNECTION ID] [CONNECTED TO HOST]:[CONNECTED TO PORT]"

COMMAND	Description
ATC0	Lists information about all of the network connections in the following format "[CONNECTION STATE] [CONNECTION ID] [CONNECTED TO HOST]:[CONNECTED TO PORT]", including any Server (ATA) listeners.
ATCn	Where n > 0, this changes the Current connection to the one with the given ID. If no connection exists with the given id, ERROR is returned.
ATC" [HOSTNAME] : [PORT] "	Creates a new connection to the given host and port, assigning a new id if the connection is successful, and making this connection the new Current connection. The quotes and colon are required.
ATCP" [HOSTNAME] : [PORT] "	Adding a P modifier causes all connection input to be translated to PETSCII.
ATCT" [HOSTNAME] : [PORT] "	Adding a T modifier causes streaming input to be translated per TELNET when the changed to Stream mode.
ATCE" [HOSTNAME] : [PORT] "	Adding an E modifier causes terminal echo to be enabled when the changed to Stream mode.
ATCX" [HOSTNAME] : [PORT] "	Adding a X modifier causes XON/XOFF flow control to be enabled when the changed to Stream mode
ATH	Hangs up (disconnects and deletes) all open connections. Does not close Server listeners.
ATH0	Hangs up (disconnects and deletes) the current opened connection.
ATHn	Hangs up (disconnects and deletes) the open connection with the given id. Closing a Server (ATA) listener does not close any connections received from that listener.
ATO	Re-enters a Streaming session (see ATD) under the previous settings, with the current (previous) connection.
ATP	Lists all existing phonebook entries, with the format phone number followed by ATD modifiers, followed by the host and port.

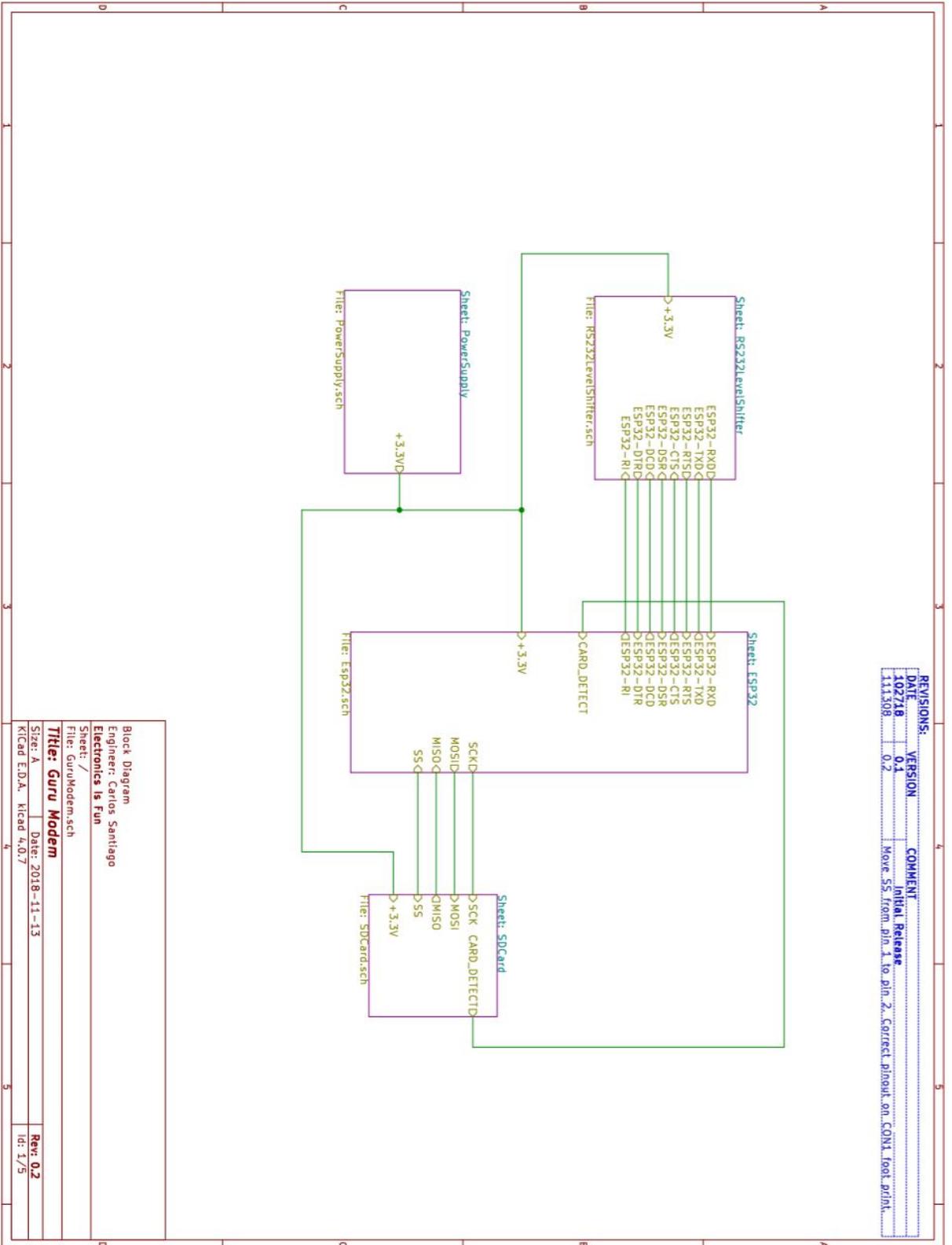
COMMAND	Description
ATP" [NUMBER]=[HOSTNAME] : [PORT] "	Adds or Modifies an entry to the phonebook with the given 7 digit number, host, and port. Use ATDnnnnn.. to connect.
ATPP" [NUMBER]=[HOSTNAME] : [PORT] "	Adding a P modifier causes connection input to be translated to PETSCII when connected to that entry.
ATPT" [NUMBER]=[HOSTNAME] : [PORT] "	Adding a T modifier causes connection input to be translated per TELNET when connected to that entry.
ATPE" [NUMBER]=[HOSTNAME] : [PORT] "	Adding a E modifier causes terminal echo to be enabled when connected to that entry.
ATPX" [NUMBER]=[HOSTNAME] : [PORT] "	Adding a X modifier causes XON/XOFF flow control to be enabled when connected to that entry.
ATP" [NUMBER]=DELETE"	Removes the phonebook entry with the given number.
ATS0=n	Changes the number of RING messages received before a CONNECT response is sent, on incoming Server listeners.
ATS1=n	Unimplemented, always returns OK
ATS2=n	Change the escape character (n = 0-255), Defaults to ASCII decimal 43 ("+")
ATS3=n	Change the Carriage Return Character (n = 0-127), Defaults to ASCII decimal 13 (Carriage Return)
ATS4=n	Change the Line Feed Character (0-127), Defaults ASCII decimal 10 (Line Feed)
ATS5=n	Change the Backspace Character (0-32), ASCII decimal 8 (Backspace)
ATS6 ... 39=n	Unimplemented, always returns OK
ATS40=n	Change the size of the connection packets (n > 0), Defaults to 127 bytes
ATS41=n	When n > 0, all incoming Server listener connections are immediately sent to Stream mode. If n=0, connections remain in normal command mode (default).
ATS42=n	Set the CRC8 for an expected incoming Transmit command. e.g. ATS42=123T"[MESSAGE]" returns error unless 123 is CRC8 of "[MESSAGE]".
ATS43=n	Sets a standby baud rate n for the next incoming or outgoing connection only. ATZ clears.

COMMAND	Description
ATS44=n	Sets an automatic delay of n milliseconds after most bytes written to the Serial port. This is for computers that support a baud rate, but can't really keep up, and you don't want to use flow control.
ATS45=n	Changes how packet and at&g data is delivered. 0 is normal binary with normal headers, 1 is 78 char HEX digit streams followed by EOLN with hex digit headers, 2 is decimal digits followed by EOLN, with decimal digit headers.
ATS46=n	Changes DCD status. n=0 is default DCD=HIGH=online. n=1 is DCD=LOW=online
ATS47=n	Changes CTS status. n=0 is default CTS=HIGH=active. n=1 is CTS=LOW=active
ATS48=n	Changes RTS status. n=0 is default RTS=HIGH=active. n=1 is RTS=LOW=active (N/A on ESP01)
ATS49=n	Changes DCD pin number, n=2 is default
ATS50=n	Changes CTS pin number, n=0 is default on ESP01, and default is 5 otherwise
ATS51=n	Changes RTS pin number, n=4 is default (N/A on ESP01) +++ : With a 1 second pause with no other characters afterwards, this will disconnect the current opened connection.
ATT" [MESSAGE] "	Transmit the given text string, with \r\n at the end, on the current connection.
ATTn	Where n > 0, Starts a transmission of exactly n bytes to the current connection. The \n from entering this command must be followed by the n bytes to transmit.
ATTP" [MESSAGE] "	Transmit the given text string, translating petscii to ascii, with \r\n at the end, on the current connection.
ATTPn	Where n > 0, this will start the transmission of exactly n bytes to the current connection, translating PETSCII to ASCII. The \n from entering this command must be followed by the n bytes to transmit.

COMMAND	Description
AT&L	Reloads the saved configuration.
AT&W	Saves the current configuration: WiFi settings(ATW), baud rate (ATB), end of line (ATR) settings, flow control (ATF), echo mode (ATE), extended responses (ATX), verbose responses (ATV), quiet responses (ATQ), PETSCII mode (AT&P1), DCD status (ATS46), CTS status (ATS47).
AT&F	Restores the modem to factory default settings.
AT&On	n is 1 to turn on internal serial-reception log, n is 0 to turn off or view a previously turned-on log.
AT&H	Shows a help file from the web, or brief help otherwise.
AT&U	Checks the firmware home page to see if a new version is available.
AT&U6502	Will update the firmware from the home page on the web.
(BETA) AT&U=x	Will update the firmware from the web to custom version x.
AT&Pn	Where n > 0, all command mode input and output will be translated to/from PETSCII before internal processing. This will not affect received packet data, or the stream mode.
AT&Nx	Shows the status of ESP32 I/O pin x
AT&Mn	Adds the byte denoted by n to a list of mask-out bytes. These are bytes that are not transmitted to the serial port in command mode incoming packets. If this command is followed by a C, N, or A command on the SAME LINE, then the setting will apply ONLY to that connection or listener.
AT&M	Resets the mask-out bytes list. No bytes will be masked-out. If this command is followed by a C, N, or A command on the SAME LINE, then the setting will apply ONLY to that connection or listener.

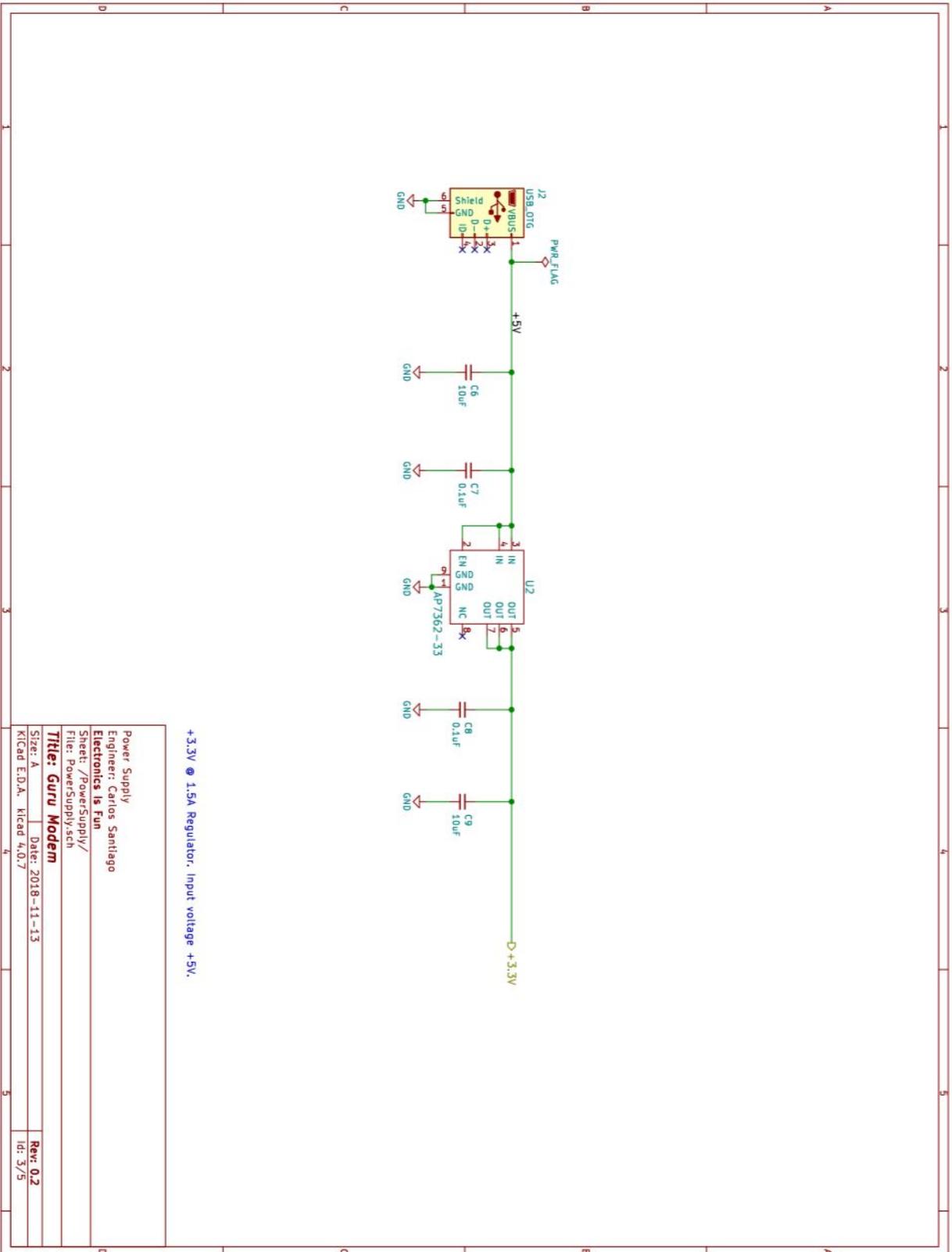
COMMAND	Description
AT&D	Resets the delimiter bytes list. No bytes will be delimited, and packets will contain as many bytes as are received and allowed by AT\$40. If this command is followed by a C, N, or A command on the SAME LINE, then the setting will apply ONLY to that connection or listener.
AT&G" [HOSTNAME] : [PORT] / [FILENAME] "	Streams a file from an HTTP source on the internet. The header contains channel 0, file length, and an 8-bit sum of all the bytes in the forthcoming file, followed by the bytes of the file, all formatted as a normal packet. An ASCII 3 (CNTRL-C) received during the transfer will abort. The S44 register can be used to create artificial delays in this output. XON/XOFF Flow control also remains in effect with, on a byte-by-byte basis for the auto and manual flow control systems.
AT+CONFIG	Displays the configuration menu. Follow the onscreen instructions.
AT+SHELL	Provides access to the command shell for accessing the SDCARD and file transfers to/from the internet and to/from the local computer. Type "help" or "?" for a list of commands.

SCHEMATICS



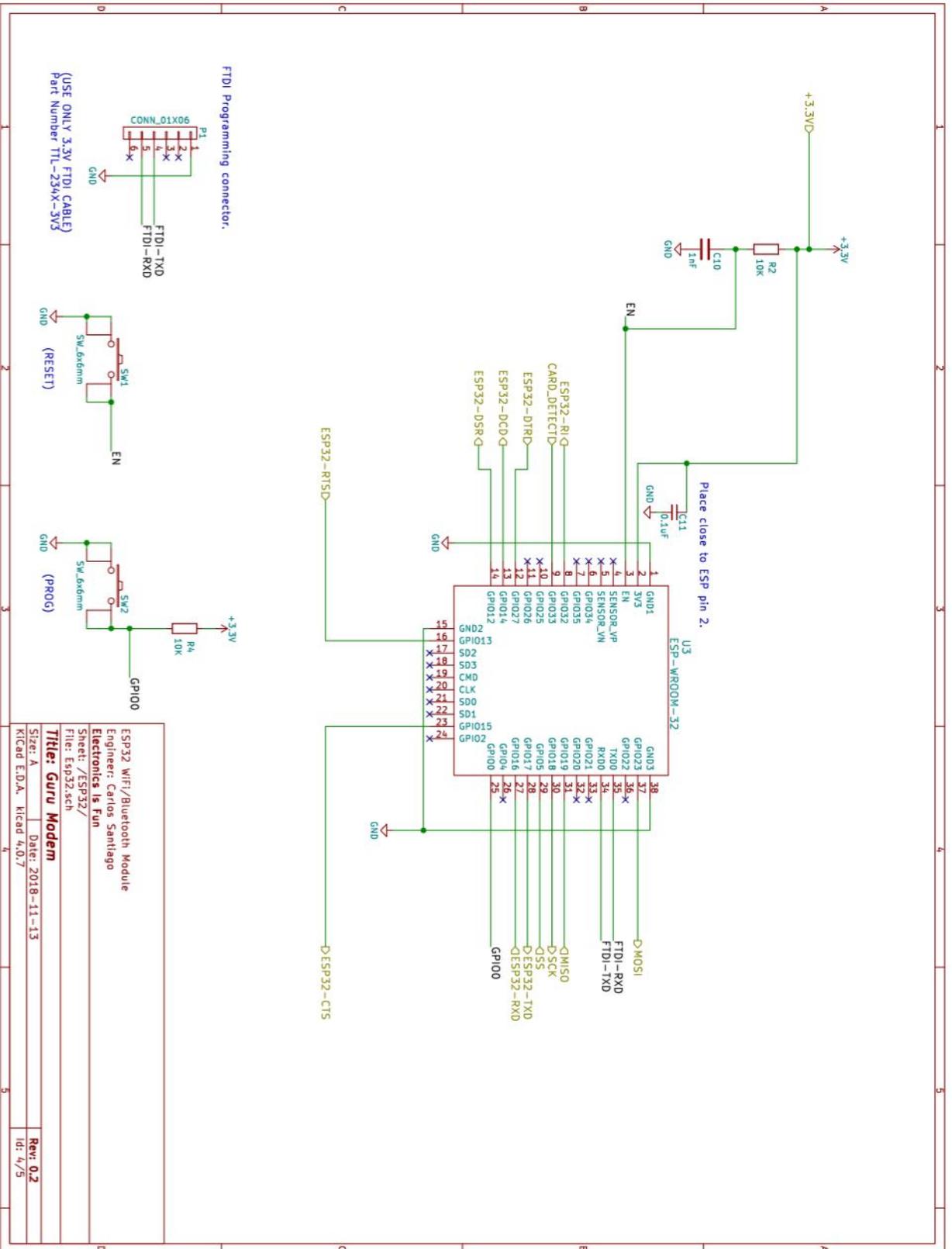
REVISIONS:		
DATE	VERSION	COMMENT
10/2/18	0.1	Initial Release
11/3/18	0.2	Move SS from pin 1 to pin 2. Correct pinout on CON1 board print.

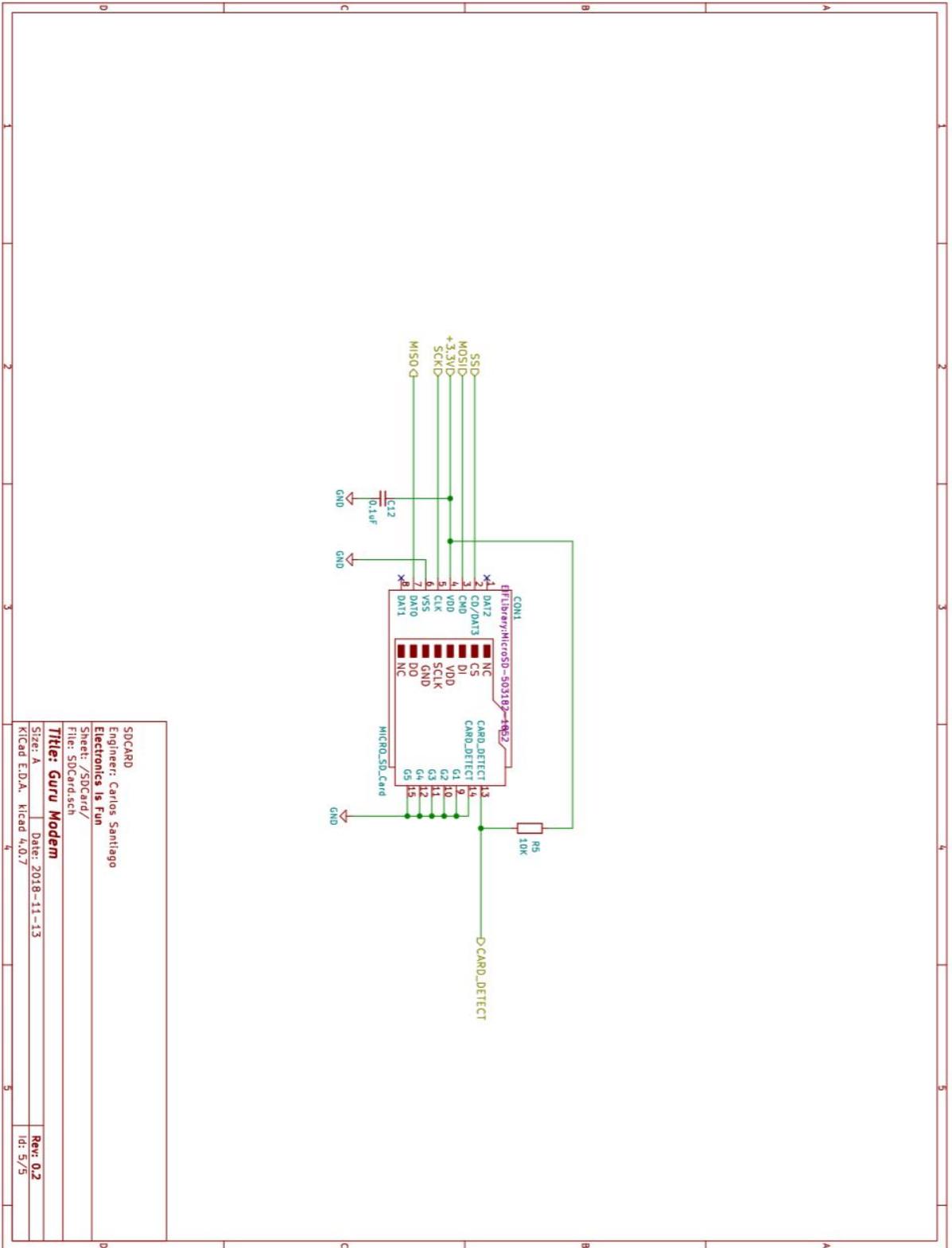
Block Diagram
 Engineer: Carlos Santiago
Electronics is Fun
 Sheet: /
 File: GuruModem.sch
Title: Guru Modem
 Size: A Date: 2018-11-13 Rev: 0.2
 KiCad E.D.A. - KiCad 4.0.7 Id: 1/5



+3.3V @ 1.5A Regulator. Input voltage +5V.

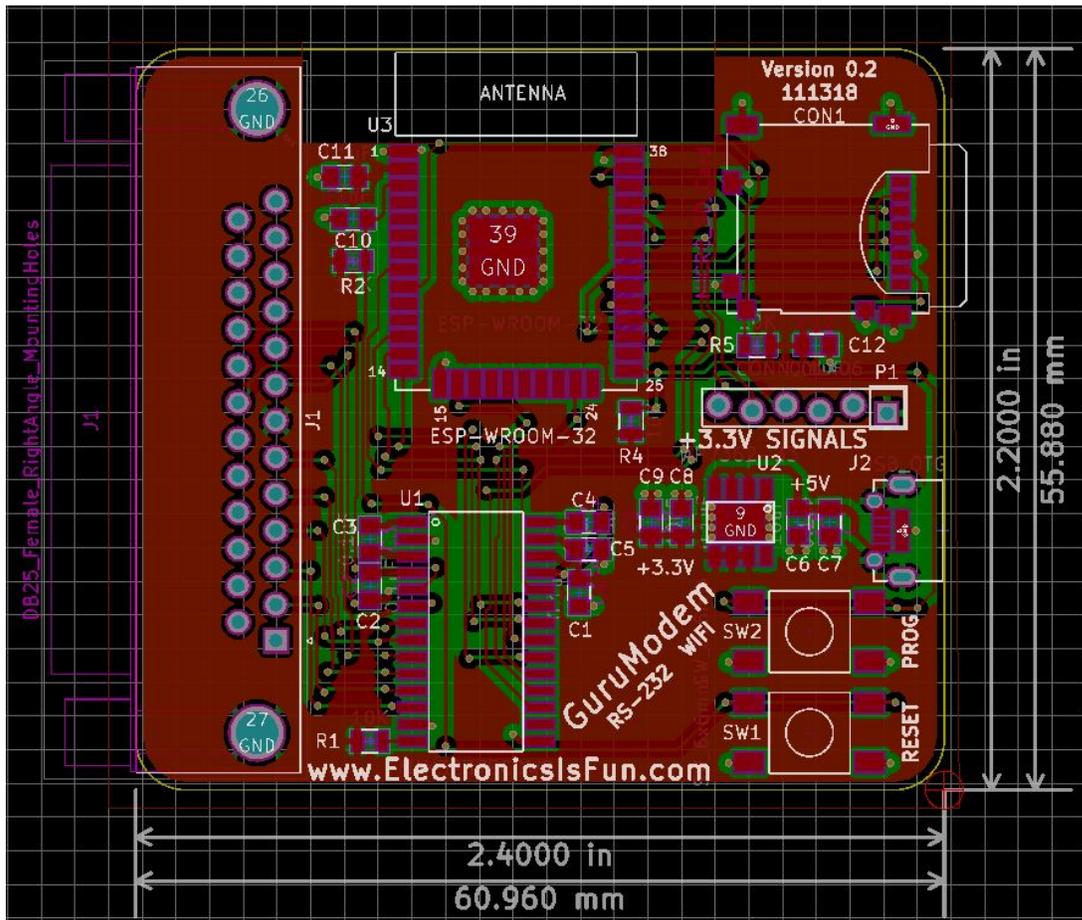
Power Supply	
Engineer: Carlos Santiago	
Electronics Is Fun	
Sheet: //PowerSupply//	
File: PowerSupply.sch	
Title: Guru Modem	
Size: A	Date: 2018-11-13
Kicad E.D.A. Kicad 4.0.7	Rev: 02
	Id: 3/5





SDCCARD
 Engineer: Carlos Santiago
 Electronics Is Fun
 Sheet: /SDCard/
 File: SDCard.sch
Title: Guru Modem
 Size: A Date: 2018-11-13
 Kicad E.D.A. Kicad 4.0.7
 Rev: 0.2
 Id: 5/5

BOARD LAYOUT



GLOSSARY

Term	Definition
SSID	SSID is the service set identifier. Also known as the network name. It is the name defined in your router.
IP Address	Internet Protocol Address. Every device on the internet is assigned a unique address that is usually (4) bytes long for example 192.168.1.100.
WiFi	The wireless standard defined as 802.11a, b, g, or n.
BBS	Bulletin Board System.
Bootstrap	A small program that starts the process of loading other larger programs, or an operating system.
FTP	File Transfer Protocol used to send and receive files over the Internet.
Telnet	A protocol used to connect to other machines or servers over the Internet.

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