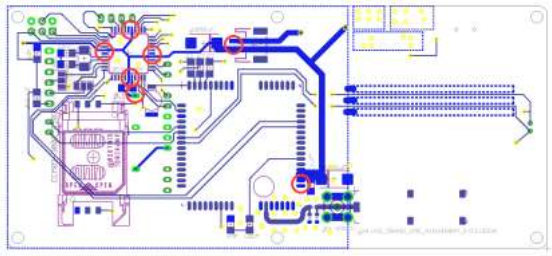
DIY Cellphone

Troubleshooting

There are a lot of pieces and, therefore, a lot of things that might not work. Here are some potential problems and some possible solutions.

Don't see the DIY Cellphone in the Tools > Board menu.

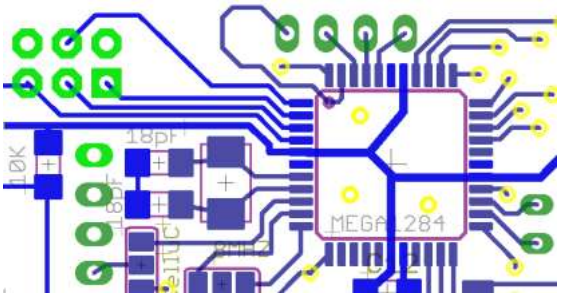
- Are you using Arduino 1.0.4 or 1.0.5? Arduino 1.5.x and 1.6.x require updates to the DIY cellphone board definition that I haven't made yet. Arduino 1.0.6 will show the DIY Cellphone in the Tools > Board menu but has a bug that will stop the cellphone's code from compiling (see below).
- Did you checkout the submodules of the cellphone2 repository? (They contain the required libraries and board definition.)
- Is the Arduino sketchbook folder set to the cellphone2 folder? Otherwise, the Arduino software won't be able to find the libraries and the board definition.



Places to check for potential short circuits between power and ground. (This diagram matches what you'd see when looking at the bottom of the cellphone circuit board, which is actually a mirror image of the top-view shown in Eagle.)

Can't burn the bootloader onto the microcontroller.

- Does the microcontroller have power? (Is the battery is plugged in and charged?) If you measure the voltage between power and ground with a multimeter, you should get at least 3.7V. If it's much below this, there's probably a short circuit between power and ground.
- Are the legs of the microcontroller soldered correctly (i.e. is each leg actually soldered to the corresponding pad and are the legs free of shorts / solder bridges)? In particular, check the legs connected to the ISP header (MISO, MOSI, SCK, and RESET), to VCC, and to ground. See diagram below.
- Are the pins in the header of the ISP being held firmly against the corresponding holes on the board? You might try soldering pins into the ISP header (on top of the board).
- Is the crystal soldered correctly? (If not, the first step of burning the bootloader might succeed but the second one might fail.)



The ATmega1284 connections required for successful boot-loading of the microcontroller using an in-system programmer (ISP) are highlighted in this diagram. They are VCC, GND (to power the microcontroller), MISO, MOSI, SCK, and RESET (for communication with the ISP). (This diagram matches

what you'd see when looking at the bottom of the cellphone circuit board, which is actually a mirror image of the top-view shown in Eagle.)

Can't compile the cellphone program.

- Are you using Arduino 1.0.4 or 1.0.5? The cellphone's code hasn't yet been ported to the Arduino 1.6.x line. Arduino 1.0.6 has a bug that breaks the GSM library used by the cellphone and will give an error like:
```
/Applications/Arduino 1.0.6.app/Contents/Resources/Java/libraries/GSM/GSM3ShieldV1ModemVerification.cpp: In member function 'Strin
/Applications/Arduino 1.0.6.app/Contents/Resources/Java/libraries/GSM/GSM3ShieldV1ModemVerification.cpp:72: error: conversion from
/Applications/Arduino 1.0.6.app/Contents/Resources/Java/hardware/arduino/cores/arduino/WString.h:61: note: candidates are: String:
/Applications/Arduino 1.0.6.app/Contents/Resources/Java/hardware/arduino/cores/arduino/WString.h:59: note:                 String:
```
- Did you checkout the submodules of the cellphone2 repository? (They contain the required libraries and board definition.) If not, won't see the DIY Cellphone in the Tools > Board menu and will likely get errors like:
```
Cellphone:59: error: 'LedDisplay' does not name a type
Cellphone.ino: In function 'void setup()':
Cellphone:207: error: 'screen' was not declared in this scope
Cellphone.ino: In function 'void loop()':
Cellphone:259: error: 'screen' was not declared in this scope
```
- Is the Arduino sketchbook folder set to the cellphone2 folder? Otherwise, the Arduino software won't be able to find the libraries and the board definition, giving an error like:
```
Cellphone:45: error: 'GSM3ClockService' does not name a type
Cellphone:46: error: 'GSM3VolumeService' does not name a type
Cellphone:47: error: 'GSM3DTMF' does not name a type
Cellphone:48: error: 'PhoneBook' does not name a type
Cellphone:59: error: 'LedDisplay' does not name a type
Cellphone:74: error: 'Keypad' does not name a type
Cellphone:86: error: 'DateTime' does not name a type
```
- Is "DIY Cellphone" selected from the Tools > Board menu?

Can't upload the cellphone program.

- Did the bootloader burn successfully? (If not, see that issue above.)
- Is the FTDI cable connected correctly (black wire to side labelled "B"; green wire to "G")?
- Did you select the right serial port from the Tools > Serial Port menu? (Try unplugging the FTDI cable and see which item disappears from the menu; that's the one corresponding to the cable.)
- Are the solder jumpers soldered correctly (central pad connected to the "uC" pad)?
- Is the board powered?
- Is the FTDI header soldered correctly? The 0.1 uF capacitors near it? The RX and TX legs of the microcontroller? See diagram below.
- Is the crystal still soldered correctly?

The connections required to upload code to the microcontroller using an FTDI cable are highlighted in this diagram. RX and TX go through the solder jumpers (whose center pads should be soldered to the pads labelled "uC"). DTR from the FTDI cable connects to the micro-controller's RESET line through the highlighted 0.1 uF capacitor. (This diagram matches what you'd see when looking at the bottom of the cellphone circuit board, which is actually a mirror image of the top-view shown in Eagle.)

Can't connect to the network.

- Is there a SIM card in the socket?
- Is the SIM socket soldered correctly? The 22 ohm resistors? The corresponding pads on the GSM module?
- Is the antenna soldered correctly? The corresponding pad on the GSM module?
- Is the 0 ohm resistor soldered correctly (to the trace connecting the M10 GSM module to the antenna)?
- Do you have reception?
- Is the SIM card locked to another phone?
- *AT&T (and possibly other carriers)*: have you activated your SIM card and phone on AT&T's website? You'll need the IMEI number printed on the M10 GSM module.

Another component doesn't work (e.g. display, speaker, microphone, buzzer).

- Is the component soldered correctly?
- Are the connected components (e.g. the corresponding legs of the microcontroller or GSM module) soldered correctly?

« Previous: Using the Phone **Next:** Serial Debugging »

7 Responses to "Troubleshooting"

---

1. *William* says:
August 27, 2015 at 5:06 am
I was able to burn the bootloader, compile the sketch and upload it to the phone, but it is stuck trying to connect. When I power up, the LCD displays "connecting" and just hangs there. The serial monitor output is:
AT%13%AT%13%
0 9>AT%13%%13%%10%OK%13%%10%
AT+CGREG?%13%
9 40>AT+CGREG?%13%%13%%10%+CGREG:
0,3%13%%10%%13%%10%OK%13%%10%
AT+CGREG?%13%

I used an Arduino UNO as an ISP which you mentioned somewhere would not work properly. Could that be causing problems with the uploaded program? During compiling I see several warning messages like: "GSM3VolumeService.cpp:76: warning: enumeration value 'MODEMCONFIG' not handled in switch" and "pins_arduino.h:53:1: warning: "TIMER5A" redefined"

I tried the serial debug program, the output for each query is:
AT+CREG?
+CREG: 0,1

AT+CPBS?
+CPBS: "SM",1,250

AT+CPBR=1
+CPBR: 1,"411", 129, "411 – Assistance"

Any help you can give is appreciated.

Reply

2. *Gustavo Arriaga* says:
January 22, 2016 at 7:12 pm
Can't burn the bootloader. Checked all connections. No shorts. Battery is charged. Using USB AVRISP MKII and getting the following error:

avrdude: Version 5.11, compiled on Sep 2 2011 at 18:52:52
Copyright (c) 2000-2005 Brian Dean, http://www.bdmicro.com/
Copyright (c) 2007-2009 Joerg Wunsch

System wide configuration file is
"/Users/mister_sausage/Downloads/Arduino.app/Contents/Resources/Java/hardware/tools/avr/etc/avrdude.conf"
User configuration file is "/Users/mister_sausage/.avrduderc"
User configuration file does not exist or is not a regular file, skipping

Using Port : usb
Using Programmer : stk500v2
avrdude: usbdev_open(): Found AVRISP mkII, serno: 0000B0026998
avrdude: usbdev_open(): using read endpoint 0x82
avrdude: Sent: . [01]
avrdude: Recv: . [01] . [00] . [0a] A [41] V [56] R [52] I [49] S [53] P [50] _
[5f] M [4d] K [4b] 2 [32]
avrdude: stk500v2_getsync(): found AVRISP mkII programmer
AVR Part : ATMEGA1284P
Chip Erase delay : 9000 us
PAGEL : PD7
BS2 : PA0
RESET disposition : dedicated
RETRY pulse : SCK
serial program mode : yes
parallel program mode : yes
Timeout : 200
StabDelay : 100
CmdexeDelay : 25
SyncLoops : 32

```
ByteDelay : 0
PollIndex : 3
PollValue : 0x53
Memory Detail :

Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
eeprom 65 10 128 0 no 4096 8 0 9000 9000 0xff 0xff
Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
flash 65 10 256 0 yes 131072 256 512 4500 4500 0xff 0xff
Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
lock 0 0 0 0 no 1 0 0 9000 9000 0x00 0x00
Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
lfuse 0 0 0 0 no 1 0 0 9000 9000 0x00 0x00
Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
hfuse 0 0 0 0 no 1 0 0 9000 9000 0x00 0x00
Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
efuse 0 0 0 0 no 1 0 0 9000 9000 0x00 0x00
Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
signature 0 0 0 0 no 3 0 0 0 0 0x00 0x00
Block Poll Page Polled
Memory Type Mode Delay Size Indx Paged Size Size #Pages MinW
MaxW ReadBack
---------- --- --- --- --- ---- ---- --- ---- --- --- ----
calibration 0 0 0 0 no 1 0 0 0 0 0x00 0x00

Programmer Type : STK500V2
Description : Atmel STK500 Version 2.x firmware
Programmer Model: AVRISP mkII
avrdude: Sent: . [03] . [90]
avrdude: Recv: . [03] . [00] . [01]
avrdude: Sent: . [03] . [91]
avrdude: Recv: . [03] . [00] . [01]
avrdude: Sent: . [03] . [92]
avrdude: Recv: . [03] . [00] . [0e]
Hardware Version: 1
Firmware Version Master : 1.14
avrdude: Sent: . [03] . [94]
avrdude: Recv: . [03] . [00] ( [28]
Vtarget : 4.0 V
avrdude: Sent: . [03] . [98]
avrdude: Recv: . [03] . [00] . [05]
SCK period : 4.00 us

avrdude: Sent: . [10] . [c8] d [64] . [19] [20] . [00] S [53] . [03] . [ac] S [53] .
[00] . [00]
avrdude: Recv: . [10] . [c0]
avrdude: stk500v2_command(): command failed
avrdude: Sent: . [03] . [a1]
avrdude: Recv: . [03] . [00] . [00]
avrdude: stk500v2_program_enable(): bad AVRISPmkII connection status:
Unknown status 0x00
avrdude: initialization failed, rc=-1
Double check connections and try again, or use -F to override
this check.

avrdude: Sent: . [11] . [01] . [01]
avrdude: Recv: . [11] . [00]

avrdude done. Thank you.
```

Reply

- *Gustavo Arriaga* says:
  January 22, 2016 at 7:40 pm
  Nevermind. Checked connections from ISP headers to IC and one pin wasn't soldered properly. Bootloader burned!

  Reply

  - *admin* says:
    January 22, 2016 at 9:22 pm
    Awesome, glad you got it working!

    Reply

3. *Gustavo Arriaga* says:
   February 4, 2016 at 12:41 am
   Communication with the M10 module doesn't seem to be working. Cellphone sketch hangs at "while (gsmAccess.begin(0, false) != GSM_READY)".

   SerialProxy sketch returns nothing on sending "AT".

   Any ideas? Do ALL pins on the module need to be soldered or only the ones connected to something on the PCB layout?

   Reply

   - *Gustavo Arriaga* says:
     February 4, 2016 at 8:25 pm
     Nevermind. Continuity issue again. This time the pad from M10 was not connected to pad from ATMEGA. All three of the PCBs ordered from OSHpark have had some quality issue (bad trace, through holes not milled, etc…). But after soldering a jumper wire to get around the bad trace IT WORKS!

     Reply

     - *admin* says:
       February 4, 2016 at 9:14 pm
       Huh, weird. I've generally heard good things about OSH Park. Glad you got it working!

       Reply

Leave a Reply

Name (required)

Mail (will not be published) (required)

Website

Submit Comment