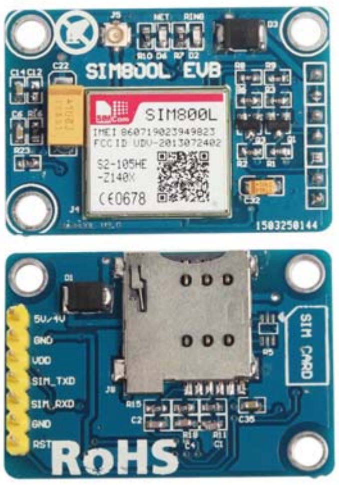
QUICKSTART SIM800 (SIM800L) WITH ARDUINO

SIM800 is one of the most commonly used GSM module among hobbyists and Arduino community. Even though AT command reference is available with a quick Googl
q=sim800+at+commands), it is not very easy for a beginner to properly understand and use Arduino with SIM800. Therefore, this post summarizes how a beginner coul
future posts we'll be going ahead with several other real life use cases discussing how SIM800 can be used with Arduino effectively.

Wiring

Caution! : SIM800 module itself uses input voltage of 3.7V – 4.2V. Therefore, if you directly connect the Vcc pin to Arduino 5V pin, it might damage the module as well. I
you have the SIM800 module itself, you will have to get the input voltage in range, maybe with a LM317 (and few calculations with a LM317 calculator (http://lm317 cal

Fortunately I am using below module with voltage regulators built in :



For above module Arduino to SIM800 connectivity was pretty straight forward .

- SIM800 5v/4v ↔ Arduino 5v
- SIM800 GND (either one) ↔ Arduino GND
- SIM800 SIM_TXD ↔ Arduino D8 (read through for the reason)
- SIM800 SIM_RXD ↔ Arduino D7 (read through for the reason)

Connect module with Arduino as mentioned above or with any changes depending on the module being used. Insert a valid SIM card and connect the Arduino with Ar

Simple Serial Communication

Below is the simplest program usable to interact with SIM800 :

```
#include <SoftwareSerial.h>

//SIM800 TX is connected to Arduino D8
#define SIM800_TX_PIN 8

//SIM800 RX is connected to Arduino D7
#define SIM800_RX_PIN 7

//Create software serial object to communicate with SIM800
SoftwareSerial serialSIM800(SIM800_TX_PIN,SIM800_RX_PIN);

void setup() {
  //Begin serial comunication with Arduino and Arduino IDE (Serial Monitor)
  Serial.begin(9600);
  while(!Serial);

  //Being serial communication witj Arduino and SIM800
  serialSIM800.begin(9600);
  delay(1000);

  Serial.println("Setup Complete!");
}

void loop() {
  //Read SIM800 output (if available) and print it in Arduino IDE Serial Monitor
  if(serialSIM800.available()){
    Serial.write(serialSIM800.read());
  }
  //Read Arduino IDE Serial Monitor inputs (if available) and send them to SIM800
  if(Serial.available()){
    serialSIM800.write(Serial.read());
  }
}
```

Upload above code to the Arduino (Code itself is self explanatory. Hence, will not repeat same). Once upload is complete start the Arduino Serial Monitor from Tools m
to boud rate selection set “Both NL and CR”.

Once done, you can freely send AT commands (https://www.google.com/search?q=sim800+at+commands) to SIM800 and see the output in real time. Few examples :

AT – is to check if interface is working fine.

AT+CFUN – is used to set phone functionality

AT+CFUN? – returns currently set value for AT+CFUN

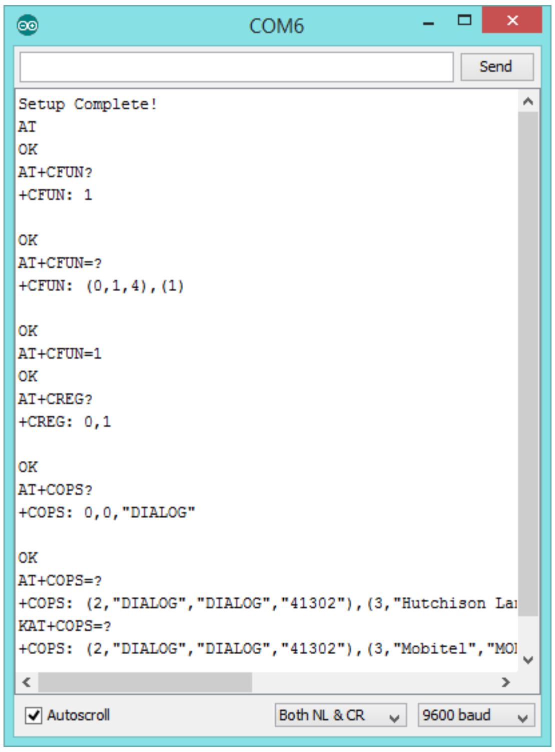
AT+CFUN=? – returns all possible values that can be set for AT+CFUN (similar to help)

AT+CFUN=1 – is to sent AT+CFUN to 1 (full functionality)

AT+CREG? – to get network registration information. stat=1 means you are registered with home network

AT+COPS? – returns currently registered operator details

AT+COPS=? – returns all the operators available



```
Setup Complete!
AT
OK
AT+CFUN?
+CFUN: 1

OK
AT+CFUN=?
+CFUN: (0,1,4),(1)

OK
AT+CFUN=1
OK
AT+CREG?
+CREG: 0,1

OK
AT+COPS?
+COPS: 0,0,"DIALOG"

OK
AT+COPS=?
+COPS: (2,"DIALOG","DIALOG","41302"),(3,"Hutchison La
KAT+COPS=?
+COPS: (2,"DIALOG","DIALOG","41302"),(3,"Mobitel","MO
```

Autoscroll ✓ | Both NL & CR | 9600 baud

Sending SMS with SoftwareSerial

In below code delay of 1 second is used after each command to give necessary time for SIM800 to respond to each command. With this approach it is not possible to cl
program will not ready the responses sent. Proper method of doing this is by checking each response against an expected value. This is already handled in most of the
we'll be using below. Hence, for this stage, 1 second delay is used for the sake of simplicity.

Note : Replace 07194XXXXX with mobile number SMS should be sent to.

```
#include <SoftwareSerial.h>

//SIM800 TX is connected to Arduino D8
#define SIM800_TX_PIN 8

//SIM800 RX is connected to Arduino D7
#define SIM800_RX_PIN 7

//Create software serial object to communicate with SIM800
SoftwareSerial serialSIM800(SIM800_TX_PIN,SIM800_RX_PIN);

void setup() {
  //Begin serial comunication with Arduino and Arduino IDE (Serial Monitor)
  Serial.begin(9600);
  while(!Serial);

  //Being serial communication witj Arduino and SIM800
  serialSIM800.begin(9600);
  delay(1000);

  Serial.println("Setup Complete!");
  Serial.println("Sending SMS...");

  //Set SMS format to ASCII
  serialSIM800.write("AT+CMGF=1\r\n");
  delay(1000);

  //Send new SMS command and message number
  serialSIM800.write("AT+CMGS=\"07194XXXXX\"\r\n");
  delay(1000);

  //Send SMS content
  serialSIM800.write("TEST");
  delay(1000);

  //Send Ctrl+Z / ESC to denote SMS message is complete
  serialSIM800.write((char)26);
  delay(1000);

  Serial.println("SMS Sent!");
}

void loop() {
}
```

SIM800 Libraries

With a quick Google search (https://www.google.com/search?q=SIM800+arduino+libraries) you will be able to find several SIM800 Arduino libraries. After going throug
was “Seeeduino_GPRS” library which provides basic SIM800 features as well as additional set of GPRS related features.

Sending SMS with Seeeduino Arduino library

Note : Seeeduino library assumes that TX connected to D8 and RX is connected to D7 on Arduino. This is the reason we used relevant pins at first place. If you need to c
will have to modify the library source (gprs.h) and add a new constructor. Library uses MIT license.

- Clear steps relevant to installing Arduino library is available at : https://www.arduino.cc/en/Guide/Libraries (https://www.arduino.cc/en/Guide/Libraries)
- Seeeduino_GPRS library is available for download at : https://github.com/Seeed-Studio/Seeeduino_GPRS (https://github.com/Seeed-Studio/Seeeduino_GPRS)

Once library is installed in Arduino IDE File menu, Examples section you will find “Seeeduino_GPRS” library and withing examples you will find “GPRS_SendSMS” exam

```
/*
Sketch: GPRS Connect TCP

Function: This sketch is used to test seeeduino GPRS's send SMS func.to make it work,
you should insert SIM card to Seeeduino GPRS and replace the phoneNumber,enjoy it!
*********************************************************************************
note: the following pins has been used and should not be used for other purposes.
  pin 8   // tx pin
  pin 7   // rx pin
  pin 9   // power key pin
  pin 12  // power status pin
*********************************************************************************
created on 2013/12/5, version: 0.1
by lawliet.zou(lawliet.zou@gmail.com)
*/
#include <gprs.h>;
#include <SoftwareSerial.h>;

GPRS gprs;

void setup() {
  Serial.begin(9600);
  while(!Serial);
  Serial.println("GPRS - Send SMS Test ...");
  gprs.preInit();
  delay(1000);
  while(0 != gprs.init()) {
      delay(1000);
      Serial.print("init error\r\n");
  }
  Serial.println("Init success, start to send SMS message...");
  gprs.sendSMS("07194XXXXX","hello,world"); //define phone number and text
}

void loop() {
  //nothing to do
}
```

If you go through Seeeduino library you will notice that it is possible to send commands directly for any advanced use cases. For examples there are library methods su

- sendCmdAndWaitForResp(const char* cmd, const char *expectedResp, unsigned timeout)
- sendCmd(const char* cmd)
- waitForResp(const char *resp, unsigned int timeout)

Hence, you could simply correctly rewrite the SMS sending application as below (reinvent the wheel) :

```
if(0 != gprs.sendCmdAndWaitForResp("AT+CMGF=1\r\n", "OK", DEFAULT_TIMEOUT)) { // Set message mode to ASCII
    ERROR("ERROR:CMGF");
    return;
}
delay(500);
if(0 != gprs.sendCmdAndWaitForResp("AT+CMGS=\"07194XXXXX\"\r\n","&gt;",DEFAULT_TIMEOUT)) {
    ERROR("ERROR:CMGS");
    return;
}
delay(1000);
gprs.serialSIM800.write(data);
delay(500);
gprs.serialSIM800.write((char)26);
return;
```

I hope we have covered enough details for a quick start. It will be helpful if you could further go tough Seeeduino library to understand how they have used different co