HTTP Client using SIM900A GPRS and PIC18F4550

Introduction to HTTP

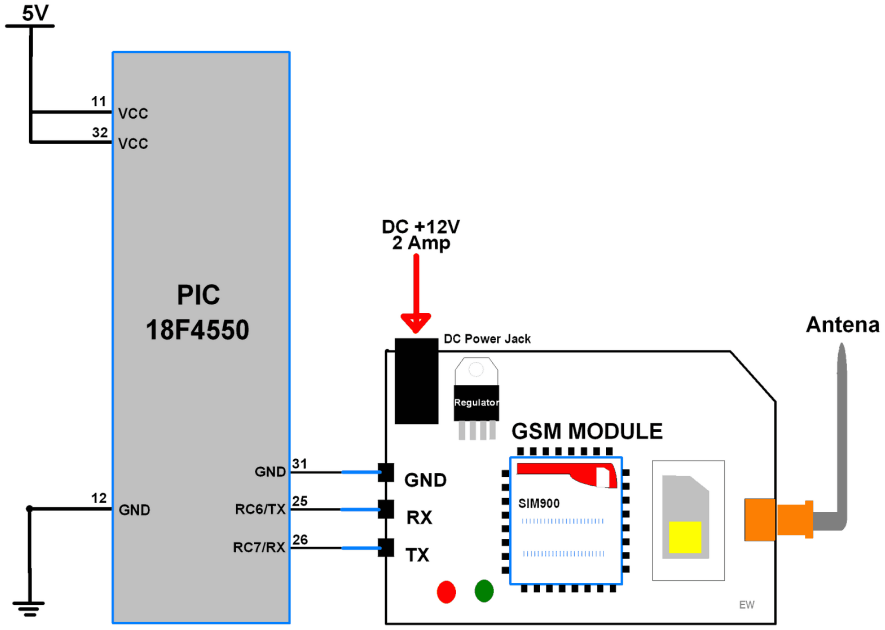
SIM900 enables GPRS for Embedded applications. We can implement HTTP (https://en.wikipedia.org/wiki/Hypertext_Transfer_Protocol) Client protocol using the SIM900 HTTP function AT Commands.

The Hypertext Transfer Protocol (HTTP) is a standard application layer protocol that functions as a request-response protocol between server and client.

It is widely used in IoT (Internet of Things) based embedded applications, where every sensor is connected to a server and we have access to control them over the internet.

To know aboutSIM900 GSM/GPRS Module refer to **SIM900** (http://electronicwings.com/sensors-modules/sim900a-gsmgprs-module)

Connection Diagram SIM900 GSM Module With PIC18F4550



PIC18F4550 Interface with SIM900

HTTP Client over GPRS

Let's program PIC18F4550 to configure SIM900A as HTTP Client and GET/POST data from/to Server using GPRS.

Here, we are using the Thingspeak server for HTTP Client demo purposes.
Thingspeak is an open IoT platform where anyone can visualize and analyze live data from their sensor devices. Also, we can perform data analysis on data posted by remote devices with MATLAB code in Thingspeak. To learn more about Thingspeak refer link

https://thingspeak.com/pages/learn_more
(https://thingspeak.com/pages/learn_more)

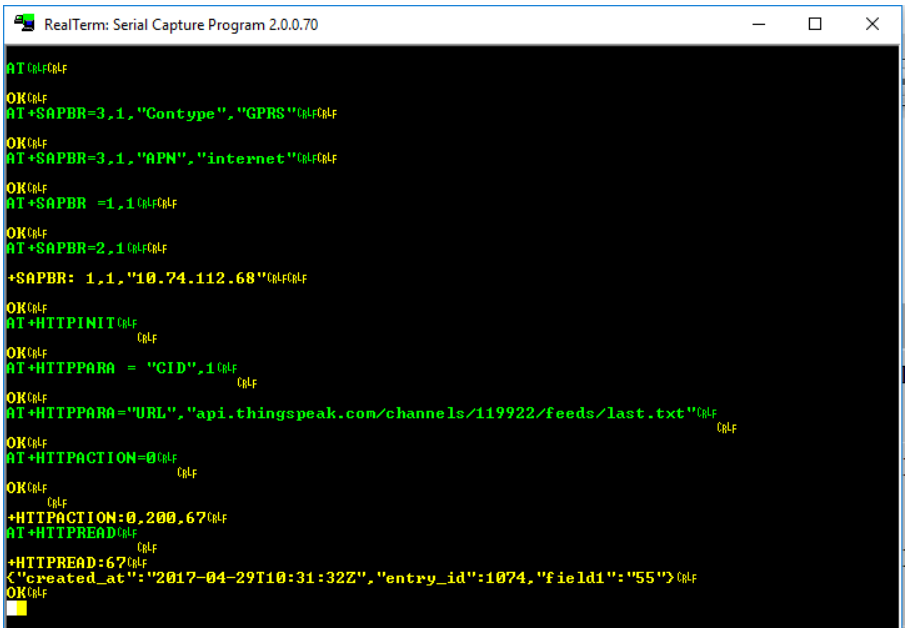
Just sign up and create a channel. We have below the channel and write key on Thingspeak for data send and receive.

- channel ID is = 119922
- Write Key is = C7JFHZY54GLCJY38

> **Note**: Do not forget to tick the **Make Public** field in the **channel setting** option on your Thingspeak channel. It makes the channel available to use as public. This allows any user to access channel data without any username & password.

For **HTTP GET** method, use below AT command steps shown in the screenshot of RealTermSerial Terminal.

The below screenshot consists of AT commands (Green) and Responses (Yellow).



For the **HTTP POST** method, use below AT command steps shown in the screenshot of the RealTerm Serial Terminal.

In the below program of HTTP Client, do the following

For HTTP Client GET method

```
#define GET_DEMO                    /* Define GET demo */
//#define POST_DEMO                     /* Define POST demo */
```

For HTTP Client POST method

```
//#define GET_DEMO                  /* Define GET demo */
#define POST_DEMO                   /* Define POST demo */
```

Edit Fields below with respective data

```
/* Define Required fields shown below */
#define URL             "api.thingspeak.com/update"
#define API_WRITE_KEY   "your write key"
#define CHANNEL_ID      "your channel ID"
#define APN             "APN of your service provider"
#define USERNAME        "Username if any or left blank"
#define PASSWORD        "Password or left blank"
```

In the below program, we are using response-based functions to get a better status if things deviate from normal.

Program for HTTP Client with Thingspeak

```
/*
 * HTTP Client using GPRS & PIC
 * http://www.electronicwings.com
 */

#include <string.h>
#include <stdio.h>
#include <stdint.h>
#include <stdlib.h>
#include <stdbool.h>
#include <pic18f4550.h>
#include "USART_Header_File.h"
#include "Configuration_header_file.h"

#define DEFAULT_BUFFER_SIZE     200     /* Define default buffer size */
#define DEFAULT_TIMEOUT         20000       /* Define default timeout */
#define DEFAULT_CRLF_COUNT      2       /* Define default CRLF count */

#define POST                1       /* Define method */
#define GET             0

#define GET_DEMO                    /* Define GET demo */
```

SIM900 Response

At the client end, we need to check SIM900 responses. We can check it on the serial terminal of the PC/Laptop. Connect SIM900 transmit pin (TX) to the receive pin (RX) of PIC18F4550 Microcontroller and to the receive pin (RX) of USB to serial converter as shown in the below figure. connect USB to serial converter to PC/Laptop. Open the serial terminal on the PC/Laptop to see the SIM900 responses for the AT command sent from PIC microcontroller.

PIC18F4550 Interface with SIM900 GSM along with PC

Now for **HTTP POST** commands (sent from PIC Microcontroller), we can see the below response from SIM900 on the serial terminal for the Thingspeak server.

In response to **HTTP POST,** we get the data entry no. as shown in the above figure i.e. 974, 975, and so on.

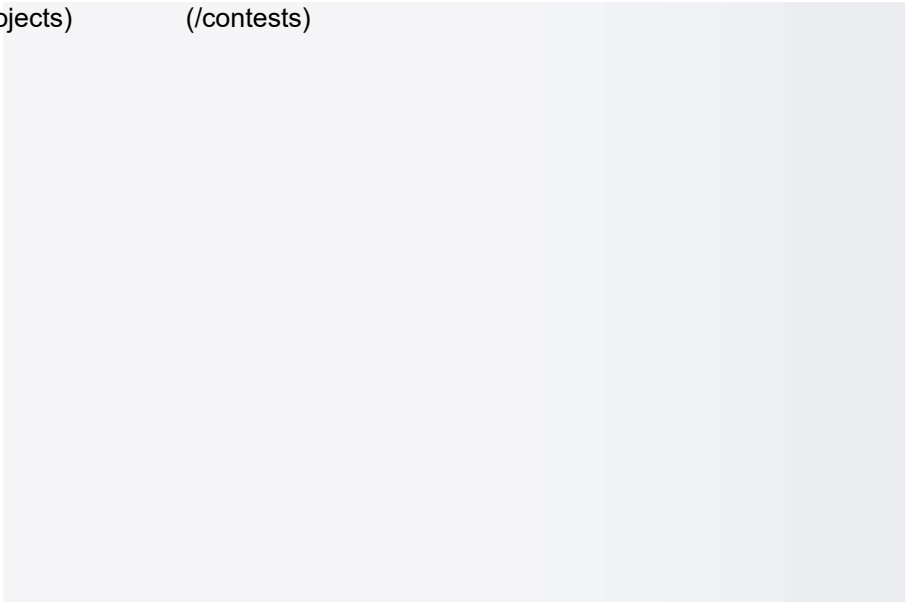
For **HTTP GET** commands (sent from PIC Microcontroller), we can see the below response from SIM900 on the serial terminal for the Thingspeak server.

In response to **HTTP GET**, we get the last entry data for field1 on Thingspeak as shown in the above figure.

> **Note:** here we are retrieving the last entry data on field1 of Thingspeak server hence we get the last updated data of field1 from the server as shown in the above figure i.e. “field1”:”2”. In the program, we used "api.thingspeak.com/channels/119922/feeds/last.txt" to receive the last updated data only.

Updates at Thingspeak server on HTTP POST

For HTTP POST, we can see the output at the server end. Here we are using the Thingspeak server and sending the incremented count at field1 on the server. We get incremented count at field1 of Thingspeak server as shown in the below figure.



Components Used

Powered By MOUSER ELECTRONICS (https://www.mouser.in?utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0)

SIM900A GSM GPRS Module SIM900A is dual band GSM/GPRS 900/1800MHz modul...	X 1	(https://www.mouser.com/ProductDetail/M5Stack/M031-D?qs=%2Fha2pyFadugEKx3cUjc5DGB4hxkc12iwAkV7YxEmv6c%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0) Datasheet (/components/sim900a-gsm-gprs-module/1/datasheet)

Components Used

PIC18f4550 PIC18f4550	X 1	(https://www.mouser.in/ProductDetail/Microchip-Technology/PIC18F4550-I-P?qs=oKK8NaWdAJs8nLDXBGwMXw%3D%3D&utm_source=electronicswings&utm_medium=display&utm_campaign=mouser-componentslisting&utm_content=0x0) Datasheet (/components/pic18f4550/1/datasheet)

Downloads

SIM900 AT Commands	Dow nloa d (/api/download/platform-attachment/515)
SIM900 Application Note	Dow nloa d (/api/download/platform-attachment/516)
PIC18F4550 GPRS HTTPClient Project file	Dow nloa d (/api/download/platform-attachment/517)

Comments

Comment

camilo19961211
(/users/camilo19961211/profile)
2019-02-01 04:17:53

Buenas tardes, estoy trabajando con CCS, y pues no tengo estas librerias, me podrian hacer el favor de facilitarlas Muchas gracias.

#include "USART_Header_File.h"
#include "Configuration_header_file.h"
Reply Like

authorized
(/users/authorized/profile)
2019-02-04 11:47:01

Hello camilo,

i hope you doing well, but can i know are you using mplabx ide ?
if yes then i think "Configuration_header_file.h" file can be created with mplabx ide with your custom configs.
and "USART_Header_File.h" is just library used for serial communication, you will get it in source code attachment.
Reply Like 1

camilo19961211
(/users/camilo19961211/profile)
2019-02-05 06:17:27 • Edited

Hola buenas tardes,
Gracias por responder.
No estoy utilizando mplabx ide, voy a instalarlo, y a reconocer como funciona porque no lo he utilizado, estaba utilizando CCS C Compiler, y pues la forma del codigo tiene cosas diferentes, podrias brindarme mas información sobre este tema al correo "lumonje12@gmail.com", este codigo esta escrito en que editor CCs, MikroC, XC8..?
Te agradezco por el tiempo prestado.
Reply Like

mayuresh4007
(/users/mayuresh4007/profile)
2019-02-05 11:23:02

This code is written in MPLABx IDE and compiled using XC8 compiler. You can refer this link "https://www.electronicwings.com/pic/getting-started-with-pic18f4550-and-mplabx-ide" to start with MPLABX IDE and XC8 compiler.
Reply Like 1

camilo19961211
(/users/camilo19961211/profile)
2019-02-06 01:45:12

hay un problema con la interrupcion externa
PIC_GPRS_HTTPClient.c:321:6: error: variable has incomplete type 'void'
void interrupt ISR()
Me paso tambien con otro proyecto, saben de alguna solución?
Reply Like

authorized
(/users/authorized/profile)
2019-02-06 12:05:23

i think you should refer example of "how to write interrupt routines in XC8"
Link ==> http://microchipdeveloper.com/faq:31
Reply Like

MintesnotMilkias
(/users/MintesnotMilkias/profile)
2020-10-29 23:46:25

void __interrupt () ISR (void)
it works for me
Reply Like

oladunk321
(/users/oladunk321/profile)
2019-06-02 05:28:16

Hi,
SIM900A module needs a SIM card to operate and dial a receiver.
I can't see any dial commands ? How does this work or am I missing something ?
I have used SIM800,808 and 900A to send and receive sensordata as SMS and this works
different.
Reply Like

lokeshc
(/users/lokeshc/profile)
2019-06-02 13:07:34

The above program is for Http protocol which is required for Internet communication.
For calling and sending sms you can visit below content,
https://www.electronicwings.com/pic/gsm-module-interfacing-with-pic18f4550
Reply Like

oladunk321
(/users/oladunk321/profile)
2019-06-10 23:50:37

Thanks. But were is the Internet connection taking place ? From my 900A module to internet via a channel ? How can you access the channel from your 900A to internet without any registration or dialup costs ?
Reply Like

lokeshc
(/users/lokeshc/profile)
2019-06-11 08:11:23 • Edited

Hi,
Sim900 needs sim card for mobile network. Then recharge that sim card with whatever internet pack.
Then via program you can connect to the Internet using access point setting. You can find this in the above program. Read the whole content carefully.
Also refer the following content to get more idea about SIM 900
http://electronicwings.com/sensors-modules/sim900a-gsmgprs-module
Reply Like

oladunk321
(/users/oladunk321/profile)
2019-06-12 01:50:32

Thanks for the answer. Now it's clear for me. I was not aware that you can get sim card for mobile network only. Here we have prepaid low cost sim cards for speech + SMS. For data network I'll need a subscription with for example 1G/month quota minimum and then we are talking high cost. Will try this for learning purposes. Very smart solution for remote access to green houses,agriculture monitoring etc.
Reply Like

danisondavid14
(/users/danisondavid14/profile)
2020-01-14 12:44:57