

Updating ThingSpeak Channels using SIM800L AT-Commands

In this example I use “AT” commands to control the SIM800L module by connecting my laptop to the module via a USB to Serial convertor, available at little cost from all the usual suspects. The “AT” commands are pretty standard so this should work with any similar module. I used “Terminal”, a free terminal program but any should work such as “PuTTY”. The default settings for my module are 115200-8-1-N.

Using a terminal program is very useful as it lets us control what is being sent to the module and see the response. This allows us to establish what Flowcode needs to do to automate the process.

I recommend you download a full copy of the AT Command set from the manufacturer’s website as it will fully document each and every AT command. In this example I only give a very brief description and it is not my intent to explain in any great detail the function.

When you initially power up the module the LED will flash every second until it establishes communications with the network, after which it will flash once every three seconds. When you establish a GPRS connection (CIICR command) the LED will flash twice per second until disconnection. These are useful visual indications.

The following are a list of AT commands that come in handy. Do note however that in my example I am only demonstrating the ability to update your ThingSpeak channel using AT commands and that your subsequent Flowcode program should incorporate various checks to ensure conditions are met before proceeding. It is very important that you wait until the documented reply is received before moving to the next step and this can be done using delays, but better to actually look for the reply perhaps by polling a Circular Buffer.

The replies in the table below assume the module is functioning correctly. If you get ERROR in any reply then something has gone wrong and you need to then establish the reason and resolve.

In the below table, anything in **blue** is user dependent and any reply in **red** is a non-fixed value. The commands should be typed exactly as shown then press Enter / Return. Depending on how your module is configured you may receive an “echo” of what you type / send. This echo is helpful when troubleshooting.

AT Command	Reply	Brief Description
AT	OK	Confirms communications with SIM800L module
AT+CREG?	+CREG 0,1 OK	Checks to see if registered on the network
AT+CGATT?	+CGATT: 1 OK	Checks to see if attached to GPRS Service
AT+CIPSHUT	SHUT OK	Deactivate GPRS PDP Context
AT+CIPSTATUS	OK STATE: IP Initial	Query current connection status
AT+CIPMUX=0	OK	Start up IP connection
AT+CSTT= apn	OK	Start task and set APN (apn = your network providers apn details)
AT+CIICR	OK	Bring up Wireless connection
AT+CIFSR	aaa.bbb.ccc.ddd	Get local IP address
AT+CIPSPRT=0	OK	Set “>” prompt when sending data
AT+CIPSTART="TCP","api.thingspeak.com",80	OK Connect OK	Starts connection
AT+CIPSEND= xx		Send Data where xx = number of bytes you are about to send
GET https://api.thingspeak.com/update?api_key= abc123 &field n=x	SEND OK ne Closed	GET statement to update ThingSpeak where abc123 = your unique key n = Field you wish to update x = your data ne = Number of ThingSpeak entries

The following is just an example which may not necessarily be the best solution for you, and sets various parameters. Whilst there is nothing wrong in repeating the entire procedure each time you wish to update, it may not be the most efficient way and certain steps could be omitted depending on circumstance. By using a terminal program you can establish for yourself the best procedure for your purpose and then incorporate into your Flowcode chart.

Commands sent from a Terminal program

The following commands are issued once the module has been powered and has network connectivity (LED flashing once every three seconds) and remember to wait for the reply before proceeding with the next command:-

AT

AT+CREG?

AT+CGATT?

AT+CIPSHUT

AT+CIPMUX=0

AT+CSTT=[apn](#)

AT+CIICR

AT+CIFSR

AT+CIPSPRT=0

AT+CIPSTART="TCP",["api.thingspeak.com"](#),80

AT+CIPSEND=[xx](#)

GET [https://api.thingspeak.com/update?api_key=abc123&fieldn=x](#)

AT+CIPSHUT

The above commands have been verified to work as described

The above should now have updated your ThingSpeak channel. A very important point to note is the AT+CIPSEND=[xx](#) command where [xx](#) is the number of bytes you are about to send. When using a terminal program you will need to first count the number of bytes in the following "GET" line including spaces and returns and insert that value. If your reply after sending "GET" contains ERROR 400 then it means the server didn't understand your request and is probably due to an incorrect CIPSEND value or a typo in your "GET" line.

Obviously the above is only updating the channel manually and you first need to establish whatever data value you are sending.

If you wish to update multiple channels then you can include the following at the end of the "GET" line (without any spaces) &fieldy=[z](#) etc, however remember to update the AT+CIPSEND=[xx](#) command too.

You can easily adapt the above to update other services such as PushingBox by modifying the CIPSTART / CIPSEND / GET parameters.

Once you can successfully update your channels you can incorporate your steps into Flowcode.