Skywire® LTE CAT4 Modem
Sending and Receiving Data Using Socket Dials

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1. Introduction

1.1 Applies to the Following Part Numbers

Orderable Device	Description	Manufacturer	Carrier	Network Type
NL-SW-LTE-S7588-V	4G LTE CAT4 with HSPA+ Fallback	Nimbelink	Verizon	LTE
NL-SW-LTE-S7588-T	4G LTE CAT4 with HSPA+ Fallback	Nimbelink	AT&T	LTE, GSM
NL-SWDK	Skywire Development Kit	Nimbelink		
TG.30.8113	Cellular Antenna	Taoglas		

1.2 Prerequisites

This document assumes you have completed the initial setup of your modem and development kit. If you have not completed those steps, refer to the Skywire® Development Kit User Manual and complete the modem setup before proceeding.

2. SOCKET DIAL

2.1 Overview

Socket dialing is useful for uploading or downloading information to or from a website or database via HTTP or other protocols. Below is an example for connecting to a server, uploading data, downloading data, and then disconnecting from the server using a socket dial and HTTP.

2.2 Enable Hardware Flow Control

It is recommended that you use hardware flow control on your Skywire for Socket Dials if you are using the UART connections. To enable it, enter the following command:

AT&K3

and the terminal should respond with:

OK

2.3 Setup the Session Connection

Next, configure the session information. Issue the following AT command:

AT+KCNXCFG=[PDP CONTEXT NUMBER],"GPRS","[YOUR APN]"

where **[PDP CONTEXT NUMBER]** is your PDP context and **[YOUR APN]** is your APN from above. For AT&T, the PDP context is **1**. For Verizon, the PDP context is **3**. The APN is specific to the data plan and SIM card. The APN can be obtained from the provider of the data plan.
The terminal should respond with:

OK

Example Session Connection setup for the NL-SW-LTE-S7588-T:

Issue the following AT Command:
    AT+KCNXCFG=1,"GPRS","c2.korem2m.com"
The terminal should respond with:
    OK

Example Session Connection setup for the NL-SW-LTE-S7588-V:

Issue the following AT Command:
    AT+KCNXCFG=3,"GPRS","nimbelink.gw12.vzwentp"
The terminal should respond with:
    OK

NOTE: Verizon devices should always use context 3 and GSM devices should use context 1 (or the context specified by their carrier).

2.4 Set HTTP Endpoint

Next, we will setup the server we are connecting to. Issue the following command:
    AT+KTCPCFG=[PDP CONTEXT NUMBER],0,"[SERVER]",[PORT]

where **[PDP CONTEXT NUMBER] is your PDP context from above, [SERVER] is your server's address, and [PORT] is your server port number.**

The terminal should respond with:
    +KTCPCFG: [x]

    OK

where **[x]** is the connection number. Note this connection number.

2.5 Start the Connection

Now, we can start the connection. To do this, enter the following command in the terminal program:
    AT+KTCPCNX=[x]

where **[x]** is the connection number for above.

You will receive unsolicited codes in the following format:

+KCNX_IND: a,b,c

+KCNX_IND: d,e,f

+KTCP_IND: [x],1

where **a**, **b**, **c**, **d**, **e**, and **f** are numbers indicating the connection status, and **[x]** is your connection number. Note: if you are having issues with this guide, consult the AT Command manual for this Skywire® modem for the meaning of these numbers.

You will need to calculate the length of the message you are going to send for the next command. For instance, for the command:

POST index.php HTTP/1.0

the length is 23, plus 4 for the necessary carriage return/line feed/carriage return/line feed combination for a total of 27 characters.

Issue the command:

AT+KTCPSND=1,[y]

where **[y]** is the length of your message. The terminal will respond with:

CONNECT

At this point, when you type in the terminal, it will not echo back. Therefore, it is recommended that you copy and paste your HTTP request type into the terminal program.

Enter your HTTP message, followed by carriage return/line feed/carriage return/line feed combination (on the keyboard, CTRL-M CTRL-J CTRL-M CTRL-J).

You will receive the following response from the terminal:

NO CARRIER

+KTCP_DATA: 1,[z]

where **[z]** is the length of the response from the server. Note this length.

2.6 Read Response from Server

To read the response from the server, issue the following command:

AT+KTCPRCV=[x],[z]

where **[x]** is the connection number, and **[z]** is the length of the response from above. The terminal will print the HTTP Response.

2.7 Close the Session and Delete the Session

To close the session, issue the following command:

AT+KTCPCLOSE=[x],1

where [x] is the connection number. The terminal should respond with:

OK

To delete the session, issue the following command:

AT+KTCPDEL=[x]

where **[x]** is the connection number.

3. WORKING EXAMPLE: SENDING TO DWEET.IO

3.1 Overview

This section covers a working example of sending information to the cloud data site www.dweet.io. This has been tested with the NimbeLink Verizon CAT4 LTE Skywire.

The APN used in this example is **nimblink.gw12.vzwentp**.

3.2 Get IMEI for the Thing Name

For dweet.io, it is recommended that you use a unique identifier for your endpoint (called a "thing"). One good option is the Skywire's IMEI, which is unique to each cellular device. To get the IMEI, issue the following command:

AT+GSN

and the terminal should respond with:

111222333444555

OK

where **111222333444555** is your unique IMEI. Note this number.

3.3 Enable Hardware Flow Control

It is recommended that you use hardware flow control on your Skywire for Socket Dials. To enable it, enter the following command:

AT&K3

and the terminal should respond with:

OK

3.4 Setup the Session Connection

Next, configure the session information. Issue the following AT command:

AT+KCNXCFG=3,"GPRS","nimblink.gw12.vzwentp"

the terminal should respond with:
OK

3.5 Set HTTP Endpoint

Next, we will setup the server we are connecting to. Issue the following command:
AT+KTCPCFG=3,0,"www.dweet.io",80

The terminal should respond with:
+KTCPCFG: 1

OK

3.6 Start the Connection

Now, we can start the connection. To do this, enter the following command in the terminal program:
AT+KTCPCNX=1

You will receive unsolicited codes in the following format:
+KCNX_IND: 3,4,1

+KCNX_IND: 3,4,0

+KTCP_IND: 1,1

You will need to calculate the length of the message you are going to send for the next command. Please see www.dweet.io for information and formatting. We will be using a HTTP POST to send data:
POST /dweet/for/111222333444555?hello=world HTTP/1.0

where **111222333444555** is your IMEI from Section 3.3. The total length of this message is:
52 characters long for the message above, and

4 for the carriage return/line feed/carriage return/line feed ending, for: 56 characters total.
Issue the command:

AT+KTCPSND=1,56

The terminal will respond with:

CONNECT

At this point, when you type in the terminal, it will not echo back. Therefore, it is recommended that you copy and paste your HTTP request type into the terminal program.

Copy your HTTP message from above into the terminal program, followed by:

CTRL-M CTRL-J CTRL-M CTRL-J

You will receive the following response from the terminal:

NO CARRIER

+KTCP_DATA: 1,363

Note this length of the response (**363**).

3.7 Read Response from Server

To read the response from the server, issue the following command:

AT+KTCPRCV=1,363

The terminal will print the HTTP Response:

CONNECT
HTTP/1.1 200 OK
Access-Control-Allow-Origin: *
Content-Type: application/json
Content-Length: 203
Date: Mon, 24 Oct 2016 20:20:27 GMT
Connection: close

{"this":"succeeded","by":"dweeting","the":"dweet","with":{"thing":"111222 333444555","created":"2016-10-24T20:20:27.618Z","content":{"hello":"worl

d"},"transaction":"131fb5df-f0d3-4ce7-a24c-df014c483d38"}}--EOF--Pattern-
-
OK

3.8 Close the Session and Delete the Session

To close the session, issue the following command:

AT+KTCPCLOSE=1,1

The terminal should respond with:

OK

To delete the session, issue the following command:

AT+KTCPDEL=1

The terminal should respond with:

OK

4. WORKING EXAMPLE: READING FROM DWEET.IO

4.1 Overview

This section covers a working example of reading information to the cloud data site www.dweet.io. This has been tested with the NimbeLink Verizon CAT4 LTE Skywire.

The APN used in this example is **vzwinternet**. This example is reading from the above example IMEI: **111222333444555**.

4.2 Enable Hardware Flow Control

It is recommended that you use hardware flow control on your Skywire for Socket Dials. To enable it, enter the following command:

AT&K3

and the terminal should respond with:

OK

4.3 Setup the Session Connection

Next, configure the session information. Issue the following AT command:

AT+KCNXCFG=3,"GPRS","vzwinternet"

the terminal should respond with:

OK

4.4 Set HTTP Endpoint

Next, we will setup the server we are connecting to. Issue the following command:

AT+KTCPCFG=3,0,"www.dweet.io",80

The terminal should respond with:

+KTCPCFG: 1

OK

4.5 Start the Connection

Now, we can start the connection. To do this, enter the following command in the terminal program:

AT+KTCPCNX=1

You will receive unsolicited codes in the following format:

+KCNX_IND: 3,4,1

+KCNX_IND: 3,4,0

+KTCP_IND: 1,1

You will need to calculate the length of the message you are going to send for the next command. Please see www.dweet.io for information and formatting. We will be using a HTTP POST to send data:

GET /get/latest/dweet/for/111222333444555 HTTP/1.0

where **111222333444555** is your IMEI from Section 3.3. The total length of this message is:

50 characters long for the message above, and
4 for the carriage return/line feed/carriage return/line feed ending, for:
54 characters total.

Issue the command:

AT+KTCPSND=1,54

The terminal will respond with:

CONNECT

At this point, when you type in the terminal, it will not echo back. Therefore, it is recommended that you copy and paste your HTTP request type into the terminal program.

Copy your HTTP message from above into the terminal program, followed by:

CTRL-M CTRL-J CTRL-M CTRL-J

You will receive the following response from the terminal:

NO CARRIER

+KTCP_DATA: 1,313

Note this length of the response (**313**).

4.6 Read Response from Server

To read the response from the server, issue the following command:
    AT+KTCPRCV=1,313

The terminal will print the HTTP Response:
CONNECT
HTTP/1.1 200 OK
Access-Control-Allow-Origin: *
Content-Type: application/json
Content-Length: 152
Date: Mon, 24 Oct 2016 20:31:00 GMT
Connection: close

**{"this":"succeeded","by":"getting","the":"dweets","with":[{"thing":"111222
333444555","created":"2016-10-24T20:20:27.618Z","content":{"hello":"worl
d"}}]}--EOF--Pattern--**
OK

4.7 Close the Session and Delete the Session

To close the session, issue the following command:
    AT+KTCPCLOSE=1,1

The terminal should respond with:
    OK

To delete the session, issue the following command:
    AT+KTCPDEL=1

The terminal should respond with:
    OK