Skywire® LTE NL-SW-LTE-S7xxx Modem Family

Sending and Receiving Data Using Socket Dials

NimbeLink Corp

Updated: March 2024

© NimbeLink Corp. 2024. All rights reserved.

NimbeLink Corp. provides this documentation in support of its products for the internal use of its current and prospective customers. The publication of this document does not create any other right or license in any party to use any content contained in or referred to in this document and any modification or redistribution of this document is not permitted.

While efforts are made to ensure accuracy, typographical and other errors may exist in this document. NimbeLink reserves the right to modify or discontinue its products and to modify this and any other product documentation at any time.

All NimbeLink products are sold subject to its published Terms and Conditions, subject to any separate terms agreed with its customers. No warranty of any type is extended by publication of this documentation, including, but not limited to, implied warranties of merchantability, fitness for a particular purpose and non-infringement.

NimbeLink and Skywire are registered trademarks of NimbeLink Corp. All trademarks, service marks and similar designations referenced in this document are the property of their respective owners.

Table of Contents

Table of Contents 2

1. Introduction 3

1.1 Applies to the Following Part Numbers 3

1.2 Prerequisites 4

2. SOCKET DIAL 5

2.1 Overview 5

2.2 Enable Hardware Flow Control 5

2.3 Verify CMUX Mode Setting (SRC7611-4 Only) 5

2.4 Setup the Session Connection 6

2.5 Set HTTP Endpoint 6

2.6 Start the Connection 7

2.7 Read Response from Server 8

2.8 Close the Session and Delete the Session 8

3. WORKING EXAMPLE: SENDING TO DWEET.IO 9

3.1 Overview 9

3.2 Get IMEI for the Thing Name 9

3.3 Enable Hardware Flow Control 9

3.4 Setup the Session Connection 9

3.5 Set HTTP Endpoint 10

3.6 Start the Connection 10

3.7 Read Response from Server 11

3.8 Close the Session and Delete the Session 12

4. WORKING EXAMPLE: READING FROM DWEET.IO 13

4.1 Overview 13

4.2 Enable Hardware Flow Control 13

4.3 Setup the Session Connection 13

4.4 Set HTTP Endpoint 13

4.5 Start the Connection 13

4.6 Read Response from Server 15

 © NimbeLink Corp. 2024. All rights reserved.

4.7 Close the Session and Delete the Session 15
5. Document Version Information 16

1. Introduction

1.1 Applies to the Following Part Numbers

Orderable Device	Description	Manufacturer	Carrier	Network Type
NL-SW-LTE-S7618RD	4G LTE CAT1	NimbeLink	Verizon	LTE
NL-SW-LTE-S7648	4G LTE CAT1	NimbeLink	AT&T/T-Mobile	LTE
NL-SW-LTE-S7588-V	4G LTE CAT4 with HSPA+ Fallback	NimbeLink	Verizon	LTE
NL-SW-LTE-S7588-V-B	4G LTE CAT4 with HSPA+ Fallback	NimbeLink	Verizon	LTE
NL-SW-UAV-S7588	4G LTE CAT4 with HSPA+ Fallback	NimbeLink	Verizon	LTE
NL-SW-LTE-S7588-T	4G LTE CAT4 with HSPA+ Fallback	NimbeLink	AT&T/T-Mobile	LTE, GSM
NL-SW-LTE-S7588-T-C	4G LTE CAT4 with HSPA+ Fallback	NimbeLink	AT&T/T-Mobile	LTE, GSM
NL-SW-LTE-SRC7611-4	4G LTE CAT4	NimbeLink	AT&T/Verizon	LTE
NL-SW-LTE-SRC7611-4NG-B	4G LTE CAT4	NimbeLink	AT&T/Verizon	LTE
NL-SIM-COM	3FF Commercial Temp Range SIM Card		Verizon	LTE
NL-SWDK	Skywire Development Kit	NimbeLink		
TG.30.8113	Cellular Antenna	Taoglas		

 © NimbeLink Corp. 2024. All rights reserved.

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.

 © NimbeLink Corp. 2024. All rights reserved.

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 Verify CMUX Mode Setting (SRC7611-4 Only)

The NL-SW-LTE-SRC7611-4 has CMUX functionality that is controlled by the **AT!MUXMODE** command:

AT!MUXMODE=<mode>

<mode> (CMUX feature state)

- 0—Disable
- 1—Enable CMUX over UART (Default)

If the **!MUXMODE: 0** setting is applied, the serial AT parser will become unresponsive when sending the TCP/IP commands for the socket dial.

If the modem's UART is being used for the socket dial, ensure that **AT!MUXMODE=1** is applied before continuing. The modem must be rebooted with **AT!RESET** before the setting is applied.

Please see the Sierra Wireless RC7611 AT command manual for detailed information on the **AT!MUXMODE** command.

 © NimbeLink Corp. 2024. All rights reserved.

2.4 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 fom the provider of the data plan.
The terminal should respond with:

OK

Example Session Connection setup for the NL-SW-LTE-S7588-T-x, NL-SW-LTE-S7648:

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-x, NL-SW-LTE-S7618RD:

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).

2.5 Set HTTP Endpoint

Next, we will set up 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]

 © NimbeLink Corp. 2024. All rights reserved.

OK

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

2.6 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.

 © NimbeLink Corp. 2024. All rights reserved.

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).

Finally, issue the end-of-file character sequence (EOF):

+++

The EOF file must be issued within one second, start-to-finish, with at least a one second delay before and after the **+++**.

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.

Note: depending on what you're sending, the socket may close without the EOF sequence being needed.

2.7 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.

2.8 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.

 © NimbeLink Corp. 2024. All rights reserved.

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

 © NimbeLink Corp. 2024. All rights reserved.

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

 © NimbeLink Corp. 2024. All rights reserved.

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

and finally the EOF sequence:

+++

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":"111222333444555","created":"2016-10-24T20:20:27.618Z","content":{"hello":"world"},"transaction":"131fb5df-f0d3-4ce7-a24c-df014c483d38"}}--EOF--Pattern--
OK

 © NimbeLink Corp. 2024. All rights reserved.

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

© NimbeLink Corp. 2024. All rights reserved.

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:

 © NimbeLink Corp. 2024. All rights reserved.

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

and finally the EOF sequence:

+++

You will receive the following response from the terminal:

NO CARRIER

 © NimbeLink Corp. 2024. All rights reserved.

+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":"111222333444555","created":"2016-10-24T20:20:27.618Z","content":{"hello":"world"}}]}--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

 © NimbeLink Corp. 2024. All rights reserved.

5. Document Version Information

Revision	Description	Date
11	-Updated to include SRC7611-4 -Fixed formatting Errors	10/21/22
12	Updated to include NL-SW-LTE-SRC7611-4NG-B	03/08/24

© NimbeLink Corp. 2024. All rights reserved.