

Firmware Upgrade Procedure for NL-SW-LTE-SVZM20

NimbeLink Corp

Updated: February 2018



© NimbeLink Corp. 2018. 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
Introduction	3
Overview	3
Applies to the Following Part Numbers	3
Prerequisites	3
Before You Begin	3
Downloading the Update Tools and Files	3
Hardware and Software	4
Setup	5
Verify Jumper Settings	5
Download the Firmware and Update Application	5
Firmware Update Procedure	6
Overview	6
Plug Modem into M1DK	6
Connect USB cable from M1DK to PC	6
Apply Power to the M1DK	6
Check Firmware Version Before Update	6
Disconnect USB and Reconnect to J20	8
Run Update Command	8
Firmware Update - 31022 and less than 32110	9
Firmware Update - 32110 or greater	9
Monitor Update Process	9
Check Firmware Version After Update	11

1. Introduction

1.1. Overview

This document outlines the steps for updating the firmware on the Skywire LTE CATM1 modem, the NL-SW-LTE-SVZM20, to firmware version 32902.

1.2. Applies to the Following Part Numbers

Orderable Device	Description	Carrier	Network Type
NL-SW-LTE-SVZM20	LTE CAT M1	Verizon	LTE
NL-M1DK	M1 Development Kit	n/a	n/a

1.3. Prerequisites



This document assumes you have completed the initial setup of your modem and development kit using the Skywire® M1 Development Kit User Manual up to Section 4:

<http://nimbelink.com/skywire-m1dk/user-manual/>

If you have not completed those steps, refer to the link above and complete the modem setup before proceeding.

1.4. Before You Begin

Before you begin, please read this entire document before attempting the firmware update. There is a chance that if these instructions are not followed exactly that the modem will be damaged and unrecoverable. **If your modem is rendered unusable because of an improper firmware update attempt, it is not covered under warranty.**

Please contact NimbeLink at product.support@nimbelink.com if you have any questions.

Note: Any settings you have made will be overwritten with this update. Please make note of the settings you have changed before updating the firmware.

1.5. Downloading the Update Tools and Files

Downloading the firmware files and tool requires having a non-disclosure agreement (NDA) in place. If you do not have one, please review and fill out this document:

http://nimbelink.com/Documentation/Skywire/1001463_Document-Guide.pdf

and send it to:

product.support@nimbelink.com

Once we have the document countersigned, we can share the files.

If you do have an NDA in place, please contact us at:

product.support@nimbelink.com

to get the files.

1.6. Hardware and Software

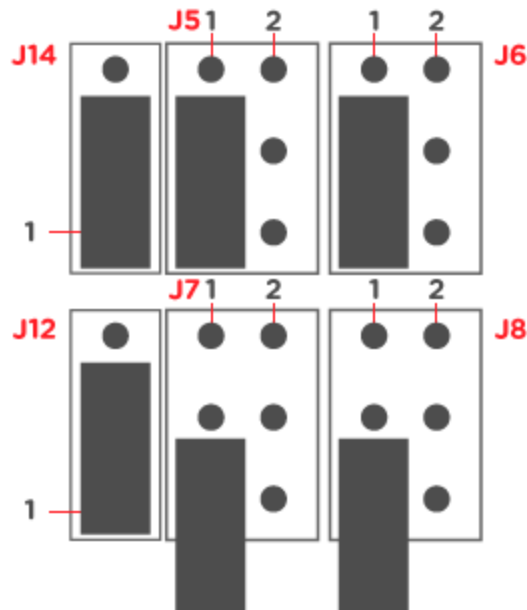
This procedure has been tested on:

- Windows 7 Pro x64
- Windows 8.1 Pro x64
- Windows 10 Pro x64

2. Setup

2.1. Verify Jumper Settings

In order to verify that the firmware update was successful, use the jumpers settings below at a minimum:



Please consult the NL-M1DK User Manual:

<http://nimbelink.com/skywire-m1dk/user-manual/>

and NL-M1DK Schematic:

http://nimbelink.com/Documentation/Development_Kits/NL-M1DK/20052_NL-M1DK_Schematic.PDF

for more information.

2.2. Download the Firmware and Update Application

Extract the files in the .ZIP package to a local directory on your PC, and note the location.

3. Firmware Update Procedure

3.1. Overview

As cellular carriers and chipset providers update the network and products that support it, new features get added that are desirable to enable in NimbeLink modems. This document provides instructions on how to update Skywire® modems with firmware versions that have been released by Sequans.

3.2. Plug Modem into M1DK

Please note the orientation of the Skywire based on the the NL-M1DK. The U.FL connectors should face toward the power jack.

3.3. Connect USB cable from M1DK to PC

To begin, we will connect to the AT command interface to check the firmware version on your Skywire currently. To do so, connect a USB cable from port J20 to your workstation. Connect the USB cable to that port and then to your Windows workstation.

3.4. Apply Power to the M1DK

Plug the supplied 5V power supply into connector/barrel jack J9. The modem will automatically power on upon application of power.

3.5. Check Firmware Version Before Update

The procedure to update your Skywire is different depending on the firmware you currently have. To check your firmware version, connect to your Skywire modem using

a terminal program such as TeraTerm or PuTTY (baudrate 921600, 8N1) to the first COM port, and issue:

```
° (ŁÖ
```

You'll receive a response similar to the following:

```
) | ÚÉÖÉÖÉÖÖ  
ž&ÚÉdEdEdd×Øeeee
```

```
#ž
```

Øeeee is a five-digit number indicating the firmware version. This is the number that will be referenced throughout this document.

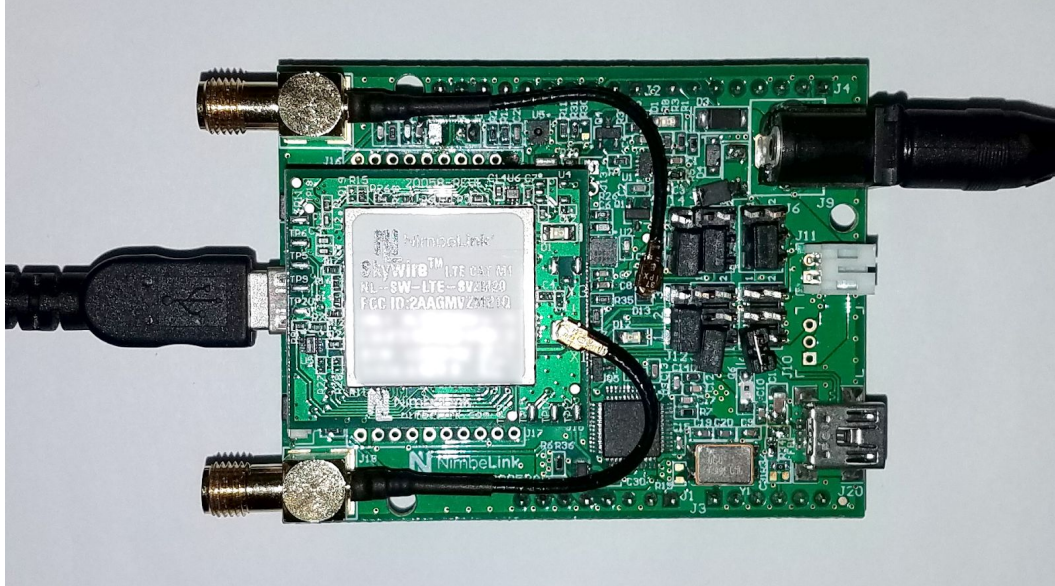
There are three procedures to follow, depending on your firmware version:

1. If your firmware version is less than 31022, you have an "Engineering Sample" Skywire (NL-SW-LTE-SVZM20-ES) and you are not able to update your Skywire to this version of firmware. Please contact NimbeLink at product.support@nimbelink.com for your options.
2. If your firmware version is 31022 or greater, but less than 32110, please follow the procedure in Section 3.8.
3. If your firmware version is 32110 or greater, please follow the procedure in Section 3.9.

If you have any questions about your firmware version, please contact us at product.support@nimbelink.com.

3.6. Disconnect USB and Reconnect to J20

The USB port to do the firmware upgrade is Port J22. Remove the USB cable from port J20 on your NL-M1DK, and move it to port J22. This is the USB port located underneath the Skywire, between the two user buttons.



3.7. Run Update Command

Open Windows Command Prompt (↑ ↵) as Administrator, and navigate to the extracted directory at the location you noted in the last step.

At this point, please follow the correct Section based on the firmware version you found in Section 3.5.

Note: It is recommended that you do not copy and paste the following commands, but type them to avoid unintended characters.

3.8. Firmware Update - 31022 and less than 32110

For firmware greater than or equal to 31022, but less than 32110:

Note: Before you begin, please make sure that you have write permissions for the SFU folder, as this will create a folder called NMD\.

The command to start the upgrade process has the following syntax:

```
bà | Áãáb\æãÁOŠRÀÀ{ ~ ↑G@Èãæ{ GÈæ{ ←ÈããáFÈããááĜÈb← ]NÎ€€€ĜFÈ↑ \~→bÈĜGİ€GÈæ→àÁ
ÛXRG€TÈPÓÜGÈÓÜPÈÑÑNFÈPÔNGÈUPWJÎ€€€ĜFŽÛÓPØXŠSÈSŠQŠRŽQPİÈFÈFÈÈ€ÈĜGİ€GÈ' b€È↔↑&Á
ÈÝáá'← | *ÁÈãÁİGFJW€€ÁÈ ~ ÁGÁÈÈ←ææ* È↔ãæ^ \↔\↔æbÁÈÈ←ææ* ÈãàÈ' ~^à↔&Á
```

where #! ÔÔ is the COM port that enumerates in Device Manager. This example is using COM37 (listed above):

```
bà | Áãáb\æãÁOŠRGÍÁ{ ~ ↑G@Èãæ{ GÈæ{ ←ÈããáFÈããááĜÈb← ]NÎ€€€ĜFÈ↑ \~→bÈĜGİ€GÈæ→àÁ
ÛXRG€TÈPÓÜGÈÓÜPÈÑÑNFÈPÔNGÈUPWJÎ€€€ĜFŽÛÓPØXŠSÈSŠQŠRŽQPİÈFÈFÈÈ€ÈĜGİ€GÈ' b€È↔↑&Á
ÈÝáá'← | *ÁÈãÁİGFJW€€ÁÈ ~ ÁGÁÈÈ←ææ* È↔ãæ^ \↔\↔æbÁÈÈ←ææ* ÈãàÈ' ~^à↔&Á
```

Note: If you are doing multiple firmware updates, it is recommended to change the .\backup folder to something unique for your particular Skywire (such as the IMEI). That way, you have a unique backup folder of each Skywire.

After issuing the command, please continue to Section 3.10.

3.9. Firmware Update - 32110 or greater

For firmware 32110 or greater:

The command to start the upgrade process has the following syntax:

```
bà | Á | * &ãããæÁOŠRÀÀ
ÛXRG€TÈPÓÜGÈÓÜPÈÑÑNFÈPÔNGÈUPWJÎ€€€ĜFŽÛÓPØXŠSÈSŠQŠRŽQPİÈFÈFÈÈ€ÈĜGİ€GÈà | *ÁÈãÁ
İGFJW€€ÁÈ ~ ÁGÁ
```

where #! ÔÔ is the COM port that enumerates in Device Manager. This example is using COM37 (listed above):

```
bà | Á | * &ãããæÁOŠRGÍÁ
ÛXRG€TÈPÓÜGÈÓÜPÈÑÑNFÈPÔNGÈUPWJÎ€€€ĜFŽÛÓPØXŠSÈSŠQŠRŽQPİÈFÈFÈÈ€ÈĜGİ€GÈà | *ÁÈãÁ
İGFJW€€ÁÈ ~ ÁGÁ
```

After issuing the command, please continue to Section 3.10.

3.10. Monitor Update Process

There are multiple steps that occur with this firmware update tool, and multiple reboots.

Note: There may be times where the firmware update appears stuck or isn't moving. This is normal. Please be patient and wait for the update to finish.

The firmware update process can take several minutes to complete. Below are example outputs:

```

=====
2017-03-21 14:00:20.113 - DCC/Itf - info - starting stp session
2017-03-21 14:00:20.113 - DCC/Itf - info - [0x00B38FC0] = MsDetected mac=N
/A; network adapter=COM37
2017-03-21 14:00:20.123 - DCC/Itf - info - [0x00B38FC0] =====
=====
2017-03-21 14:00:20.133 - sfu - info - found device "COM37"
2017-03-21 14:00:20.133 - sfu - info - device 00B38FC0 loading: 0%
2017-03-21 14:00:20.411 - sfu - info - device 00B38FC0 loading: 1%
2017-03-21 14:00:21.661 - sfu - info - device 00B38FC0 loading: 2%
2017-03-21 14:00:21.911 - sfu - info - device 00B38FC0 loading: 3%
2017-03-21 14:00:21.161 - sfu - info - device 00B38FC0 loading: 4%
2017-03-21 14:00:21.413 - sfu - info - device 00B38FC0 loading: 5%
2017-03-21 14:00:22.665 - sfu - info - device 00B38FC0 loading: 6%
2017-03-21 14:00:22.915 - sfu - info - device 00B38FC0 loading: 7%
2017-03-21 14:00:22.175 - sfu - info - device 00B38FC0 loading: 8%
2017-03-21 14:00:22.425 - sfu - info - device 00B38FC0 loading: 9%
2017-03-21 14:00:23.671 - sfu - info - device 00B38FC0 loading: 10%
2017-03-21 14:00:23.931 - sfu - info - device 00B38FC0 loading: 11%

```

Example Output 1: Loading Firmware

```

2017-03-21 14:01:47.540 - sfu - info - device 00B38FC0 upgrading: 60%
2017-03-21 14:01:48.946 - sfu - info - device 00B38FC0 upgrading: 61%
2017-03-21 14:01:49.525 - sfu - info - device 00B38FC0 upgrading: 62%
2017-03-21 14:01:49.107 - sfu - info - device 00B38FC0 upgrading: 63%
2017-03-21 14:01:50.637 - sfu - info - device 00B38FC0 upgrading: 64%
2017-03-21 14:01:51.504 - sfu - info - device 00B38FC0 upgrading: 65%
2017-03-21 14:01:51.940 - sfu - info - device 00B38FC0 upgrading: 66%
2017-03-21 14:01:52.684 - sfu - info - device 00B38FC0 upgrading: 67%
2017-03-21 14:01:52.194 - sfu - info - device 00B38FC0 upgrading: 68%
2017-03-21 14:01:53.740 - sfu - info - device 00B38FC0 upgrading: 69%
2017-03-21 14:01:54.654 - sfu - info - device 00B38FC0 upgrading: 70%
2017-03-21 14:01:54.236 - sfu - info - device 00B38FC0 upgrading: 71%
2017-03-21 14:01:55.540 - sfu - info - device 00B38FC0 upgrading: 72%
2017-03-21 14:01:56.634 - sfu - info - device 00B38FC0 upgrading: 73%
2017-03-21 14:01:56.216 - sfu - info - device 00B38FC0 upgrading: 74%
2017-03-21 14:01:57.818 - sfu - info - device 00B38FC0 upgrading: 75%
2017-03-21 14:01:58.701 - sfu - info - device 00B38FC0 upgrading: 76%
2017-03-21 14:01:58.213 - sfu - info - device 00B38FC0 upgrading: 77%
2017-03-21 14:01:59.806 - sfu - info - device 00B38FC0 upgrading: 78%
2017-03-21 14:02:00.678 - sfu - info - device 00B38FC0 upgrading: 79%
2017-03-21 14:02:00.248 - sfu - info - device 00B38FC0 upgrading: 80%
2017-03-21 14:02:01.783 - sfu - info - device 00B38FC0 upgrading: 81%
2017-03-21 14:02:01.366 - sfu - info - device 00B38FC0 upgrading: 82%
2017-03-21 14:02:02.234 - sfu - info - device 00B38FC0 upgrading: 83%
2017-03-21 14:02:03.822 - sfu - info - device 00B38FC0 upgrading: 84%
2017-03-21 14:02:03.344 - sfu - info - device 00B38FC0 upgrading: 85%
2017-03-21 14:02:04.244 - sfu - info - device 00B38FC0 upgrading: 86%

```

Example Output 2: Loading Firmware

```

=====
2017-10-17 16:01:58.839 - sfu - info - device 00228FD0 is ready
2017-10-17 16:01:58.839 - DCC/Itf - info - [UART COM132] AT command AT+SQM
SUPGRADENTIF="success"\r\n done with success; answer = \r\n
2017-10-17 16:01:58.850 - RCS/SPY - info - start cleanup modules (5)
2017-10-17 16:01:58.854 - RCS/SPY - info - 4 - 'ATD'
2017-10-17 16:01:58.857 - ATD/SPY - info - cleanup
2017-10-17 16:01:58.860 - RCS/SPY - info - 3 - 'CMD'
2017-10-17 16:01:58.863 - RCS/SPY - info - 2 - 'CUT'
2017-10-17 16:01:58.866 - RCS/SPY - info - 1 - 'DCC'
2017-10-17 16:01:58.869 - DCC/Itf - info - DCC cleanup
2017-10-17 16:01:58.872 - DCC/Evt - info - dccEvtManager::clean:...
2017-10-17 16:01:58.877 - DCC/Itf - info - [0x00228FD0] =====
=====
2017-10-17 16:01:58.884 - DCC/Itf - info - [0x00228FD0] = MsDetached
2017-10-17 16:01:58.888 - DCC/Itf - info - [0x00228FD0] =====
=====
2017-10-17 16:01:58.899 - sfu - info - device 00228FD0 has been lost
2017-10-17 16:01:58.980 - sfu - error - failed to connect to server
2017-10-17 16:01:58.989 - RCS/SPY - info - 0 - 'DCX'
Upgrade done with success

```

Example Output 3: "Upgrade done with success" Message

Note: you may receive a message similar to:

```
ÉRMUXQP` [ ` ^OMP` PM MR^[Y` aM` ç` [\Q^M U[Z` MN[ ^` QPÉ`
```

This is normal. If the upgrade was successful, you will receive the message:

```
É)\S^MPQ` P[ZQ` cU` T` _aOOQ__É`
```

If it fails, you will receive the message:

```
É)\S^MPQ` RMUXQPÉ`
```

If that happens, retry this step.

3.11. Check Firmware Version After Update

Now that the firmware update has completed, the next step is to verify the firmware. To do this, remove the USB cable from Port J22 and plug it into port J20.

Note: this is a different port than you used for the firmware update.

Open your terminal program of choice (921600 baud, 8N1) and issue the AT command:

```
^L
```

The modem should respond with your new firmware version:

```
AT+UIC
Z&UIC
```

```
#Z
```

By default, cellular functionality will be reset to off. To re-enable it, issue:

```
^E (% ) (# # " | ( í Ö
^E (% ) (# " ( | & " | ( í Ö
^E / ) " í Ö
```

The modem should respond with:

```
#Z
```

and then restart. You'll receive the unsolicited response code (URC):

```
E - ' ' fl " "
```

followed by:

```
E - ' ' ( ^ & (
```

indicating that the Skywire has restarted. You can then query cellular functionality with:

```
^E / ) " S
```

and it should return:

```
E / ) " C Ö
```

```
#Z
```

indicating that cellular functionality is enabled.