

Updating ULE Device Firmware via UART or SUOTA

Document Objective

This document describes alternative methods and tools for updating the ULE Device firmware (via the UART interface) residing on a DECT-ULE Device (eg DHAN-J or DHAN-S). There are 3 alternatives:

- 1) Using Software Upgrade Over-the-Air (SUOTA)
- 2) Using the FW upgrade tool over UART
- 3) Using Vega Memory Tool over JTAG

Methods 1 and 2 use the 500KByte ITCM_H image – it does NOT include the EEPROM portion of the SW image on the DHAN. Therefore, this method is relevant when upgrading the version within the same “branch” of SW, eg, 34.20 to 34.24. One cannot upgrade 32.28 to 34.24, for example, using this method. For such an upgrade, a JTAG to USB adaptor must be ordered from DSP Group (Part # is USB-UAJTI2C-CNV.BRD, contact your DSP Group Sales Rep) and the Vega Memory Tool application SW must be downloaded. This method is described in a separate document.

Note that FW upgrade over UART requires that the UART is active and presenting the CMND API. For applications running the Host on an external processor (Linux, Windows or otherwise), this is a given. For applications with the host running on the DECT-ULE Module processor, the application host must first transition the SW mode from “normal” to “production” mode. Once this is done, the UART I/F of the module can then be accessed via a Windows PC (for example) running the CMND API Simulator.

Change List

Version	Date	Changes
1.6	December 2019	Baseline
2.0	November 30, 2020	Modify upgrade over UART with newer “CMND+CMBS method”

Using SUOTA

SUOTA is the simplest method for upgrade as it requires only an over-the-air connection with the Hub. It presumes that the ULE Device is currently registered to a Hub, that the “ITCM_H” binary for the upgrade has been downloaded, and that the [DSPG Test Application](#) executable is available for the Hub. Proceed as follows:

- Note the com port associated with the ULE Device (in the example below, it is COM8)
- Open the [CMND Simulator app](#) and send the Get Version command (see Appendix for detail). This confirms that the CMND Interface is active and that the Device is NOT in hibernation (Note: the DHAN-J can be placed in this mode by applying power with the Product Button depressed)
- Open the CMND Simulator SUOTA Window and configure for automatic handle
- Open the HAN SUOTA Window on the Hub side, enter the Device ID
- Prepare SUOTA (See Appendix): Enter DECT, Select Upgrade binary that has been downloaded, Click Init Button, Click Tx Request (note the “Link Status” reports *Requested*)
- Send an Alert (Keep Alive or any other message) from the ULE Device – the Link Status should now report “In Link”
- Click the New Version Available Button and note the activity in the Log and finally the onset of packet transfer – see Appendix
- Should take about 2 minutes to download the upgrade via SUOTA. Upon completion the Progress bar in the Hub SUOTA window will indicate 100%. Log will also 100% completed
- Check the log on the CMND simulator side and confirm successful upgrade there as well!

Using the FW Upgrade via CMND

This method will be illustrated upgrading a DHAN-T Module running SW Version 37.14.1 (to 37.14.1S) and configured as a Smoke Alarm device with the CMND API interface active at the UART interface. The “Host” runs on a Windows PC and is comprised of two application entities: 1) [CMND API Simulator](#), 2) [cmbs_tcx_host](#) (can be downloaded from the links provided). Of course, this method can be used with any DCX or DHX-based module currently loaded with a ULE Device image. A Linux or other host application can be used to issue the CMND and CMBS mentioned in the description that follows below.

The upgrade image to be used is the ITCM_H binary. This image does not include the EEPROM. Thus, upon completion of the upgrade, the device retains its IPEI, RXTUN and its current registration status.

Step 1: Issue the FW_Update_REQ command found in the CMND API. If device is hibernating, you will need to awaken it prior to issuing this command.

4.19.2.30 CMND_MSG_PROD_FW_UPDATE_REQ

This message starts FW upgrade via UART port. The CMND will stop current activity and wait for CMBS FW upgrade API from uart.

IE	M/O	Comment
CMND_IE_U8	M	0x00 – Don’t erase factory image 0x01 – Erase factory image

If using the CMND_API simulator to issue this command, one must first exit the simulator prior to going to Step 2.

Step 2: Run the cmbs_tcx_host and select the following:

“F” for FW Upgrade

“1” for FW Upgrade

Enter File Name: ITCM_H

“4” for Packet Size

“no” for EEPROM update

At this point the upgrade should begin. Will take about 1 minute to complete

Step 3: Upon successful completion of the upgrade, the application host will receive the indication shown below

```

10:00:18.240 Host ->> CMBS  CMBS_EV_DSR_FW_UPD_END [0x15, 8 bytes, #0]:
10:00:18.441 Host <<- CMBS  CMBS_EV_DSR_FW_UPD_END_RES [0x16, 13 bytes, #0]: 16 00 01 00 00
<CMBS_IE_RESPONSE(22)>:
Response: OK

```

Step 4: Return to the CMND API Simulator Host and confirm that expected version has been loaded

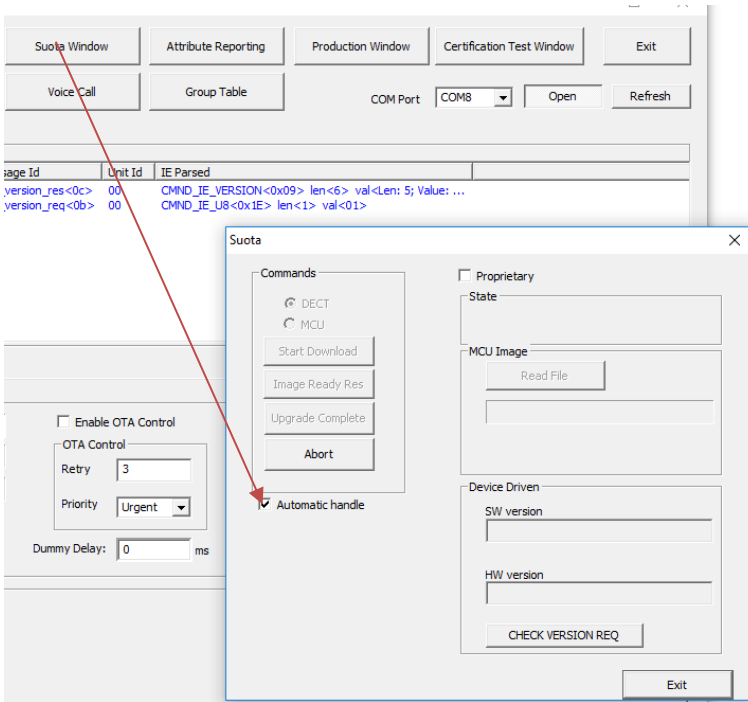
4.10.2.7 CMND_MSG_GENERAL_GET_VERSION_REQ

This message is a request to get CMND version. Version type is specified in message payload. The response is CMND_MSG_GENERAL_GET_VERSION_RES message with requested version. This message should be sent to Unit 0.

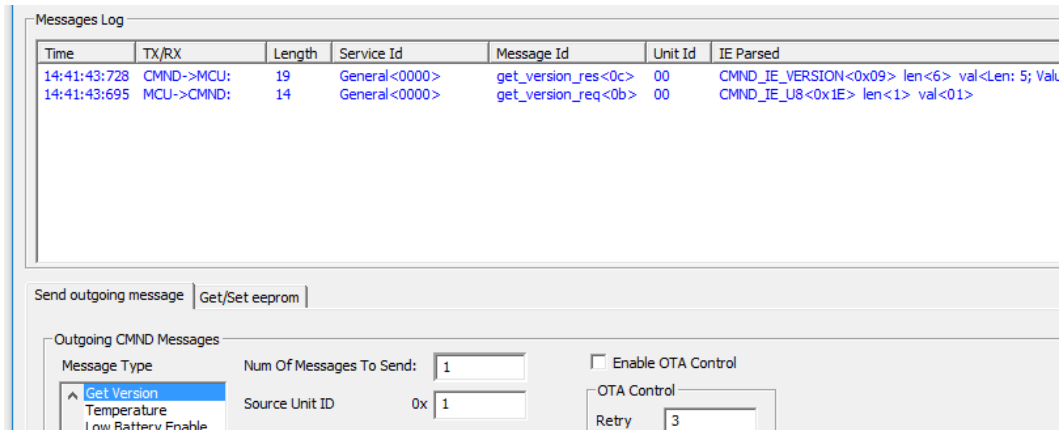
IE	M/O	Comment
CMND_IE_U8	M	Define in payload of this IE the version type 0x1 – Software version 0x2 – Hardware version 0x3 – EEPROM 0x4 – CMND API

SUOTA Appendix

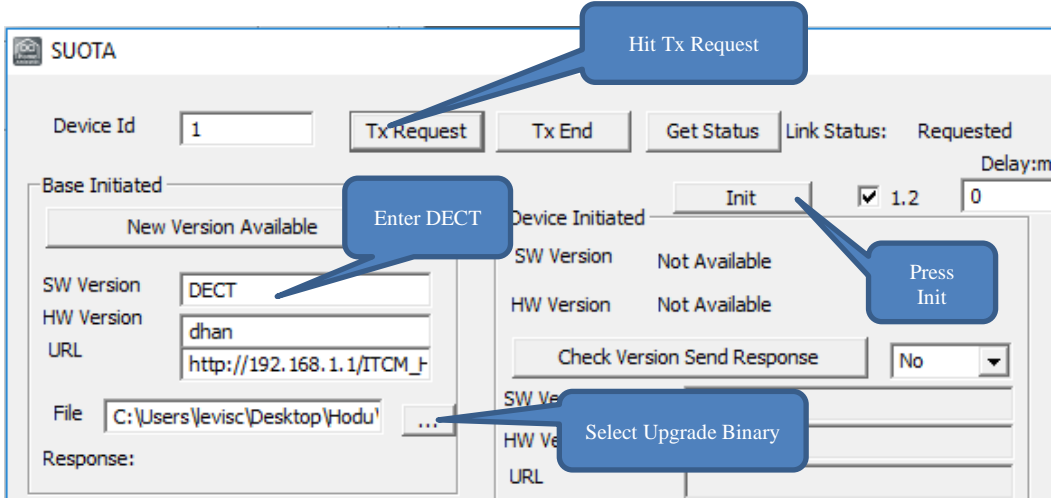
Automatic Handle



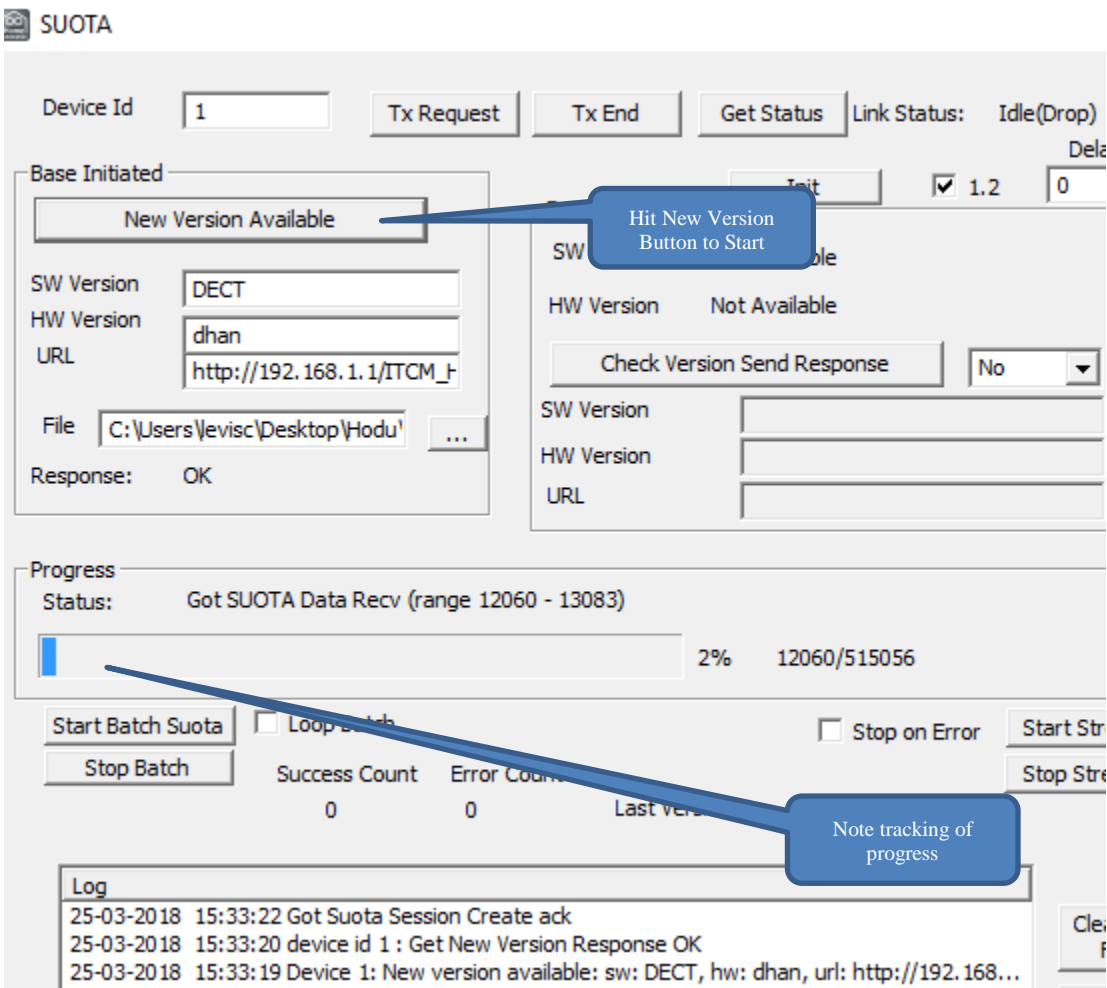
Get Version



Preparing SUOTA

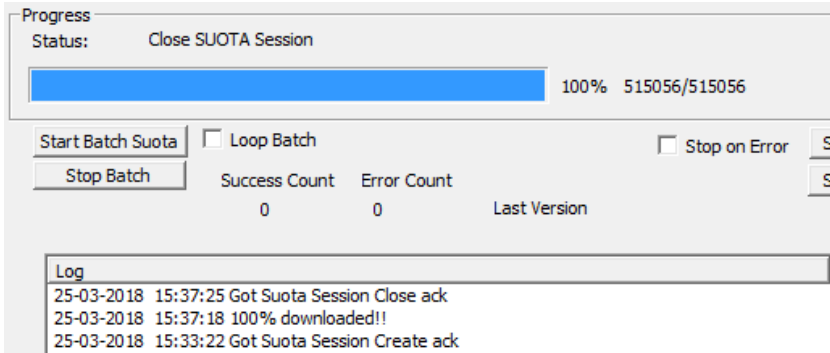


Running SUOTA

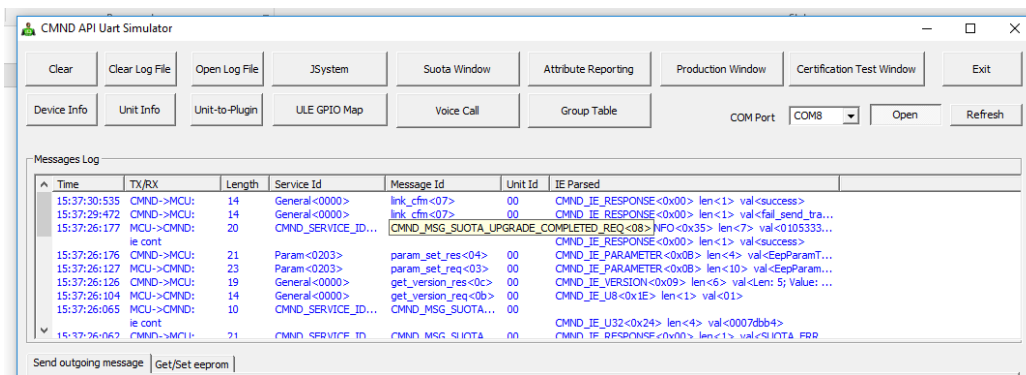


SUOTA Complete

As reported on the Hub side



As reported on the CMND side



FW Upgrade Appendix

Running the Batch File

```

C:\windows\system32\cmd.exe
Usage: flash_dhx_as_cmnd.bat com8

C:\Users\levis\Desktop\Hodu\FWUP_uart\FwupUart>var_tools.exe fwup --port com8 --file Itcm_h_cmnd_34_09 --erase 1 --preset 3
Version: 0.08 (build date: Oct 3 2017 19:51:57)
Commit date: 2017-10-03
Commit hash: ecffb3c2bae994015fae9ce87fcfc18b9f4901f3

Inputted arguments: fwup --port com8 --file Itcm_h_cmnd_34_09 --erase 1 --preset 3
MCU->CMND: GENERAL<0000> GET_VERSION_REQ<0b> [IE_RESPONSE [RawData[1]: 01]]
CMND->MCU: GENERAL<0000> GET_VERSION_RES<0c> [IE_RESPONSE [Version: 30.21]]
FWPATH: Itcm_h_cmnd_34_09
Found firmware image at <Itcm_h_cmnd_34_09>
Waiting for CMND_MSG_GENERAL_HELLO_IND from DECT module
**** RESET THE DEVICE NOW ****
FW UPDATER state <FW_UP_STATE_INITIAL> changed to <FW_UP_STATE_WAIT_HELLO1>, timeoutMs=2000
Timeout expired for state <FW_UP_STATE_WAIT_HELLO1>
MCU->CMND: GENERAL<0000> GET_STATUS_REQ<08> []
FW UPDATER state <FW_UP_STATE_WAIT_HELLO1> changed to <FW_UP_STATE_WAIT_POWERUP_MODE1>, timeoutMs=2000
CMND->MCU: GENERAL<0000> GET_STATUS_RES<09> [IE_RESPONSE [DeviceId: 32767, EepromStatus: 0, PowerupMode: 2, RegStatus: 1]]
Received CMND_MSG_GENERAL_GET_STATUS_RES
FW UPDATER state <FW_UP_STATE_WAIT_POWERUP_MODE1> changed to <FW_UP_STATE_WAITING_GET_VERSION_RES1>, timeoutMs=2000
MCU->CMND: GENERAL<0000> GET_VERSION_REQ<0b> [IE_RESPONSE [RawData[1]: 01]]
CMND->MCU: GENERAL<0000> GET_VERSION_RES<0c> [IE_RESPONSE [Version: 30.21]]
Starting parameters read
    
```

Success!

CMND API Uart Simulator

COM Port: COM8

Time	TX/RX	Length	Service Id	Message Id	Unit Id	IE Parsed
15:01:45:816	CMND->MCU:	19	General<0000>	get_version_req<0b>	00	CMND_IE_VERSION<0x09> len<6> val<Len: 5; Value: <34.09>>
15:01:45:757	MCU->CMND:	14	General<0000>	get_version_res<0c>	00	CMND_IE_U8<0x1E> len<1> val<01>

Send outgoing message | Get/Set eeprom

Outgoing CMND Messages

Message Type: Get Version

Num Of Messages To Send: 1

Source Unit ID: 0x1

Cookie: 0x68

Enable OTA Control:

OTA Control: Retry 3

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