App Note
Version 1.3

Customizing ULE Device and Hub FW Settings

Introduction

The FW image on the ULE Hub module (DHAN-M or ULE Dongle) and the FW image on the ULE Device module (DHAN-S, J or T) often must be customized per application by modifying module EEPROM settings. For example, the HAN Standard Unit ID (identifying the type of ULE Device on-board) of a DHAN-J or DHAN-S shipped out of the factory is 0x204 which identifies the Device as a Smoke Detector. The customer will want to modify the Unit ID setting either to adopt a different HAN-FUN Standard profile (See HF-Profile V1.4 at the ULE Website) or a proprietary profile (that should be registered with DSP Group!). EEPROM settings are also utilized to reconfigure the Hub or Device to operate in a region other than the EU – modules are shipped with EU settings as default.

This document will demonstrate several methods for overwriting EEPROM values. Several of the methods are convenient in the development phase (eg when working with the DECT-ULE Expansion Board or ULE Dongle), while others are more effective in production and "end-device" contexts (eg when working with DHAN-J/S/M embedded in the application).

Change List

Version	Date	Changes
1.0	January 2, 2019	Baseline
1.1	January 6, 2019	Detail modification of Device Unit_Info and Device_Info parameters (often requiring customization as a result of system operator standard practice)
1.2	July 8, 2019	Added Modifying Device EEPROM parameters over the air using DSPG proprietary FUN message (0x7F04)
1.3	September 22, 2019	update Regional setting for Japan DECT 6 CH's SD02_US_DECT=0x15

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EEPROM Basics

Both the ULE Hub (CMBS SDK) and ULE Device (CMND SDK) SW images store parameters that distinguish one module from the next. The "DECT-ULE Global ID" (RFPI in the Hub, IPEI in the Device), the calibration values for the 13M XTAL (RXTUN) and for the 2 bandgap regulators (AUXBGPROG, PORBGCFG) differ from module to module. These parameters are generated and entered in the DSP Group DHAN-J/M/S/T production line thus, the customer is typically not interested in accessing them. However, if they do (accidently) get overwritten, they can be recovered from a tabulation based on the module serial# (on the module label). This table should be requested from DSP Group.

Both Hub and Device EEPROMs store parameters that configure a unit for operation in a particular region. By default, modules ship pre-configured for operation in the EU. If a customer end-product is shipped to a different region, certain parameters must be modified in EEPROM. A listing of the relevant parameters, their "logical" names (in the case of CMBS) or "parameter" names (in the case of CMND) - locating them in EEPROM - and their requisite values can be found in the Appendix below.

In addition to the parameters described above, ULE Devices (CMND SDK) have a number of other parameters associated with the application type. These are listed in the han-ule-device-cmnd-api-spec, Section 6 (CMND API Parameters). Often, system operators have specific requirements for Unit Interfaces (other than the default settings shipped with DHAN-S/J modules) assigned to an application. An example is given in the appendix. However, a ULE Device manufacturer should check with the ULE system provider to verify the settings required.

With the exception of the JtagCmd Tool, all the methods below require access to the UART interface (or USB interface in case of the ULE Dongle). The UART interface is easily accessible with the DECT-ULE Expansion Board. It may be more difficult with a DHAN-J/M/S/T module embedded in an application PCB, having a UART connection to a Host Processor. In such a case, the JtagCmd Tool offers a JTAG alternative (at least for the ULE Device), often preferred in a production line setting

Both the JtagCmd and FWTool below require knowledge of parameter location (=offset) in the EEPROM – these tools do not provide access to these parameters via logical or parameter names. Email ule-support@dspg.com for an appropriate listing of these offsets.

Using the FWTool, ULE Hub or Device

This tool is included in the ULE Starter Kit SW Package. It is a command line tool, providing a simple script for updating the regional setting (no need to refer to the listing in the "Regional Setting" Appendix below) and application presets (see Appendix for description). It also provides a "generic" read/write of the EEPROM per offset. It assumes that the DUT is connected to the PC (Windows or Linux) via UART/USB and it can access multiple, parallel DUTs of both CMBS and CMND types.

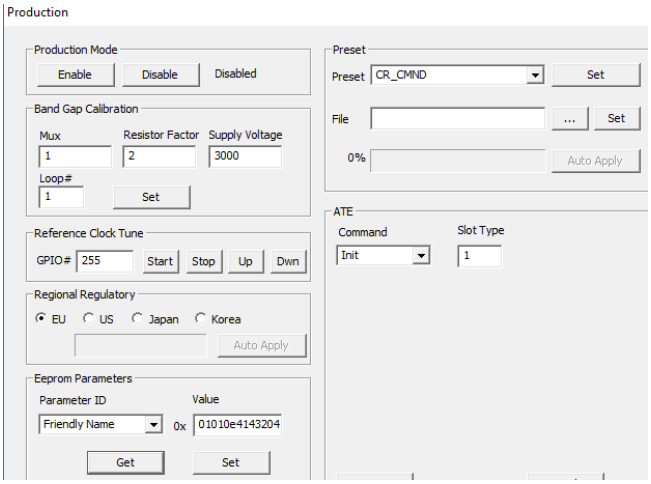
Using the CMND API Simulator, ULE Device

The CMND API Simulator can be downloaded from the DSP Group Developer Webpage. It is also bundled in the ULE Starter Kit SW Package where the "Getting Started" document provides basic instructions for using the simulator. Again, it presumes that the DUT is connected to the control PC via UART. The simulator provides several graphical menus to update region, application presets, Unit ID and Interfaces, other Device Info. In order to make entries into these menus, the Device must first be placed in Production Mode. This is accomplished as follows:

1) Enable (ie Send) Production Mode from the Main Menu and then Send the reset_req command
2) The DUT will wake up with "Hello" indicating its status as in Mode:Production

When update of parameters is complete, Production Mode should be disabled and Device should be reset to enforce the changes.

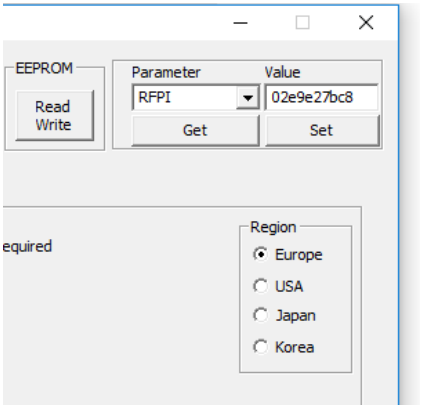
To access Regional Setting, other customization parameters (eg Manufacture Name, Friendly Name, Others) and Application Presets, enter the Production Window – as shown below:



See the Appendix for how to modify "Unit Interfaces" and "DEVICE_INFO" parameters. Note that the API simulator generates a short and long log of all the commands generated by the GUI interactions. These logs should be used as a reference for the Application Host SW embedding EEPROM customization in its initial power up of a DHAN module already embedded on the application board! An example of this log is given in the Appendix below

Using the DSPG Test Application Simulator, ULE Hub

The DSPG Test Application Simulator can be downloaded from the website Developer page. It is also included in the ULE Starter Kit SW Package where basic instructions for running this simulator are found. The Main Page of the simulator includes menu driven selection of the region. On the Hub side, this is typically the only adjustment to the EEPROM that is required.

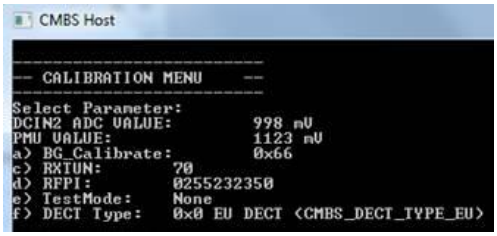


Using the cmbs_tcx.exe tool, ULE Hub

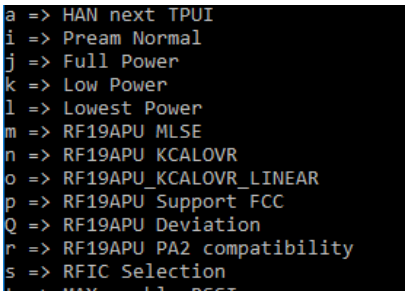
This tool is bundled in the ULE Starter Kit SW Package. Both are cmbs_tcx.exe and HAN_Client.exe are command line applications. Again, it assumes that the ULE Dongle or DHAN-M are accessible via a PC COM port.

To reconfigure the Regional settings using cmbs_tcx.exe, ater entering cmbs_tcx.exe on the command line:

Step 1: Enter “x” (for Calibration Menu, shown below) then “f” to enter appropriate frequency band (equivalent to SD02_US_DECT in appendix tabulation below)



Step 2: Back in main menu, enter “s” (for Service,System). Within the EEPROM Param Set menu (shown below), one can access and modify the parameters listed in the Appendix.



Using the HAN_Client.exe tool, ULE Hub

Similarly, one can access these parameters using the HAN_Client.exe. To run the HAN_Client, place both the cmbs_tcx.exe and HAN_Client.exe in the same directory (as below):

CMBS.bat	1/1/2019 4:56 PM	Windows Batch File	1 KB
cmbs_tcx.exe	3/8/2018 12:59 PM	Application	1,412 KB
HAN_Client.exe	8/8/2018 1:43 PM	Application	167 KB

1) Open 1st shell and run batch file: **cmbs_tcx.exe -com XX -han -log C:\Users\levisc\Desktop\temp1\han_log.txt**
2) Open a 2nd shell and run: **HAN_Client.exe 127.0.0.1**

In the HAN Client shell you will again select "s" from the Main Menu – for the Service Test Menu.

```
********** Service test menu **********
***********************************************
***
[1].........Get EEPROM parameter
[2].........Set EEPROM parameter
[3].........Get EEPROM Flex
[4].........Set EEPROM Flex
[5].........Get Production parameter
[6].........Set Production parameter
[7].........Get EEPROM size
[8].........Set RF State
[a].........Get Target HW Version
[b].........Get SW Version
[c].........Get number of registered devices
[d].........Get max number of Devices
[r].........Reset Target

[q].........quit

Production parameter name: DECT_TYPE
Production parameter value: 00
6

 please enter parameter id:
  0 => DECT_TYPE
>>0
Enter value(hex)
>>01
```

Step1: Select Option 6 – Set Production Parameter. When asked for DECT_TYPE, enter the SD02_US_DECT value from the appendix below. In the example above, the value 0x1 (for US DECT has been entered). You should get a "Set Successful…." response.

Step 2: Now Select Option 2 – Set EEPROM parameter. The other 4 parameters from the Appendix can be modified from this list.

```
please enter parameter id:
 0 => RFPI
 1 => RXTUN
 2 => RF_FULL_POWER
 3 => PREAM_NORM
 4 => RF19APU_SUPPORT_FCC
 5 => RF19APU_DEVIATION
 6 => RF19APU_PA2_COMP
```

This activity generates a log file called HAN_log_Host_log.txt which records the activity at the HAN Client-Server interface. Highlighted in orange are the actual commands entered/received at this interface:

SET_PRODUCTION_PARAM
NAME: DECT_TYPE
DATA: 01

SET_PRODUCTION_PARAM_RES
STATUS: SUCCEED
NAME: DECT_TYPE

SET_EEPROM_PARAM
NAME: RF19APU_DEVIATION
DATA: 23

SET_EEPROM_PARAM_RES
STATUS: SUCCEED
NAME: RF19APU_DEVIATION

Note that these "SET" commands correspond to the guidelines in the cmbs-han-server-protocol document – relevant Sections copied below!

4.3.9 Get Production Parameter

Syntax:
[SRV]
GET_PRODUCTION_PARAM
NAME: DECT_TYPE
Parameters:
NAME: Production parameter name from list g_ProdParamName described in appendix A.

4.3.10 Get Production Parameter Response

Syntax:
[SRV]
GET_ PRODUCTION _PARAM_RES
STATUS: SUCCEED / FAIL
NAME: DECT_TYPE
DATA: 00
Parameters:
STATUS: response status - SUCCEED / FAIL
NAME: Production parameter name from list g_ProdParamName described in appendix A.
DATA: Production parameter value read in case of success, received as list of bytes without delimiter.

4.3.7 Set EEPROM Parameter

Syntax:
[SRV]
SET_EEPROM_PARAM
NAME: RFPI
DATA: 00feb06920
Parameters:
NAME: EEPROM parameter name from list g_EepromParamName described in appendix A.
DATA: EEPROM parameter value to write, sent as list of bytes without delimiter.

4.3.8 Set EEPROM Parameter Response

Syntax:
[SRV]
SET_EEPROM_PARAM_RES
STATUS: SUCCEED / FAIL
NAME: RFPI
Parameters:
STATUS: response status - SUCCEED / FAIL
NAME: EEPROM parameter name from list g_EepromParamName described in appendix A.

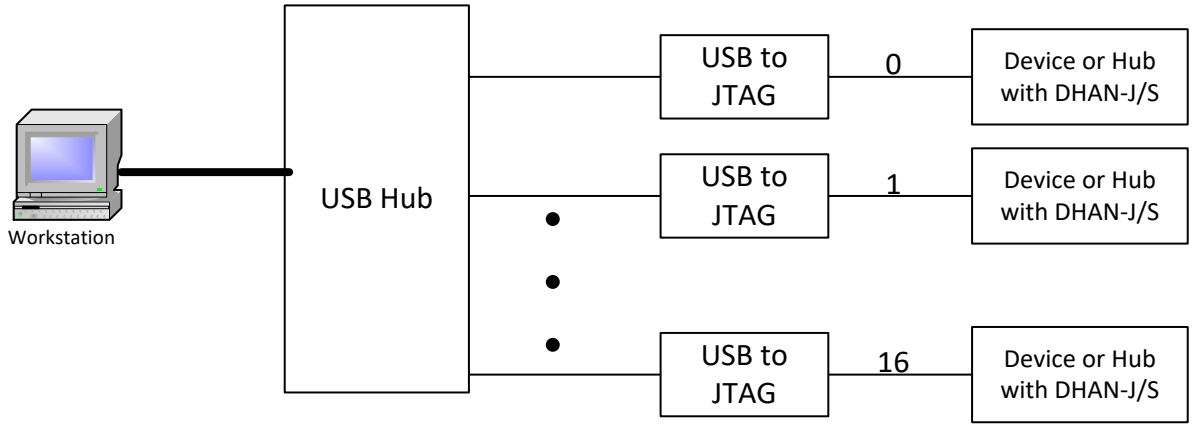
In the end-product, the ULE Hub application host can load the regional settings using the HAN Client-Server protocol using the commands depicted above. The Host must load in all the parameters listed in the Appendix below.

Using the JtagCmd Tool, ULE Device

The User Manual for this tool is included in the dect-ule-fw-update-via-jtag package downloadable from the DSP Group Developer webpage. While this package focuses on using the JtagCmd tool for upgrading the complete 2M SW image, it can also be used for modifying the regional and HAN application EEPROM settings. Use of this tool requires:

- USB to JTAG Adaptor Board(s): USB-UAJTI2C-CNV.BRD (can be ordered from DSP Group)
- Download and install the Vega Memory Tool on the PC

In the meantime, this tool is available only for upgrading the ULE CMND SDK on a DHAN-S/J. It can be used to program these modules in parallel as depicted in the diagram below.



As an example, to modify the regional setting in the ULE CMND Image to US of Device #2 (in the lineup above, for example), one would write:

1) Switch device to production mode:
```
JtagCmd.exe --Device 2 writeEeprom -b 909 --hex "01"
```

2) Write 1 byte to 516th byte of EEPROM (SD02_US_DECT):
```
JtagCmd.exe --Device 2 writeEeprom –b 516 –a “01”
```

3) Write 1 byte to 651th byte of EEPROM (SD02_RF19APU_SUPPORT_FCC):
```
JtagCmd.exe --Device 2 writeEeprom –b 651 –a “01”
```

4) Write 1 byte to 523th byte of EEPROM (SD02_Full_POWER):
```
JtagCmd.exe --Device 2 writeEeprom –b 523 –a “DE”
```

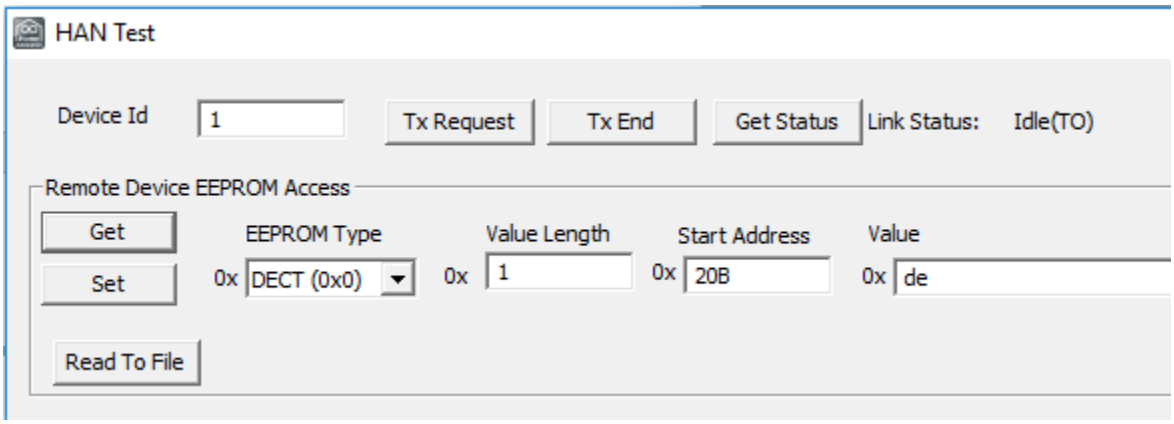
5) Write 1 byte to 657th byte of EEPROM (SD02_RF19APU_DEVIATION:
```
JtagCmd.exe --Device 2 writeEeprom –b 657 –a “23”
```

6) Write 1 byte to 661th byte of EEPROM (SD02_RF19APU_PA_COMP):
```
JtagCmd.exe Device 2 writeEeprom –b 661 –a “3C”
```

7) Switch device to normal mode (write "00" to EP_PRODUCTION_ENABLED):
```
JtagCmd.exe --Device 2 writeEeprom -b 909 --hex "00"
```

Modifying ULE Device EEPROM Settings Over the Air

EEPROM parameters on ULE Device can be modified **over-the-air** using a DSPG proprietary interface, 0x7f04. This interface is accessible via the DSPG Test Application GUI, in the menu called “HAN Test Window”.



An example is shown below where Offset 0x20B (controls Max DECT Tx Power) in the DECT EEPROM domain is modified to 0xde (see regional settings below – this is the US setting). The log shown below (from the DSPG Test Application Main Window) indicates the steps:

Time	Log
17:40:14:231	RX< D1:U0:D0:U2:T0:S3:M3:T1:I7f04:C1:L9:P00000000020b0001de
17:40:14:177	Message Send Response -OK!
17:40:14:177	Message Send Response(Response=OK)
17:40:13:978	TX> D0:U2:D1:U0:T0:S3:M2:T1:I7f04:C1:L7:P000000020b0001
17:40:13:978	Sending FUN message
17:40:12:825	RX< D1:U0:D0:U2:T0:S3:M3:T1:I7f04:C2:L8:P00000000020b0001
17:40:12:762	Message Send Response -OK!
17:40:12:762	Message Send Response(Response=OK)
17:40:12:499	TX> D0:U2:D1:U0:T0:S3:M2:T1:I7f04:C2:L8:P000000020b0001de
17:40:12:499	Sending FUN message

New Value is confirmed

CMBS Host sends FUN msg to “GET “ the new value

FUN msg received confirmed

CMBS Host sends FUN message to overwrite Offset 0x20b with 0xde

The ULE Device Host will receive a Link_cfm when there is an incoming message. The ULE Device Host is not required to respond to this update. The response is handled completely by the lower layers of SW in the ULE Device stack.

The full length “conversation” between the CMBS Host/HAN Client and the CMBS Target is listed below:

4-04-2019 17:40:12:499 (1555252812499)
Host ---> Target: 1B 00 02 00 01 00 00 30 19 00 00 00 02 01 00 00 00 00 00 03 02 01 04 7F 02 08 00 00 00 00 02 0B 00 01 DE 16 30 01 00 00
{CMBS_EV_DSR_HAN_MSG_SEND(12308)}
<CMBS_IE_REQUEST_ID(27)>:
Request Id = 1
<CMBS_IE_HAN_MSG(12288)>:
Src: (type = 0, dev_id = 0, un_id = 2)
Dst: (type = 0, dev_id = 1, un_id = 0)
Transport : 0
Msg Sequence : 3, Message Type : 2
IF Type : 1, IF Id : 0x7F04, IF Member : 2
Data Len: 8
0 0 0 2 11 0 1 222

CMBS Host sends FUN message to overwrite Offset 0x20b with 0xde

14-04-2019 17:40:12:821 (1555252812821)
Target ---> Host: 30 00 00 00 16 30 28 00 00 30 19 00 01 00 00 00 00 02 00 00 00 03 03 01 04 7F 02 08 00 00 00 00 00 02 0B 00 01 35 30 01 00 88 00 0F 02 00 CA 57
{CMBS_EV_DSR_HAN_MSG_RECV(12310)}
<CMBS_IE_HAN_MSG(12288)>:
Src: (type = 0, dev_id = 1, un_id = 0)
Dst: (type = 0, dev_id = 0, un_id = 2)
Transport : 0
Msg Sequence : 3, Message Type : 3
IF Type : 1, IF Id : 0x7F04, IF Member : 2
Data Len: 8
0 0 0 0 2 11 0 1

FUN msg received confirmed

14-04-2019 17:40:13:978 (1555252813978)
Host ---> Target: 1B 00 02 00 01 00 00 30 18 00 00 00 02 01 00 00 00 00 00 03 02 01 04 7F 01 07 00 00 00 00 02 0B 00 01 16 30 01 00 00
{CMBS_EV_DSR_HAN_MSG_SEND(12308)}
<CMBS_IE_REQUEST_ID(27)>:
Request Id = 1
<CMBS_IE_HAN_MSG(12288)>:
Src: (type = 0, dev_id = 0, un_id = 2)
Dst: (type = 0, dev_id = 1, un_id = 0)
Transport : 0
Msg Sequence : 3, Message Type : 2
IF Type : 1, IF Id : 0x7F04, IF Member : 1
Data Len: 7
0 0 0 2 11 0 1

CMBS Host sends FUN msg to “GET “ the new value

14-04-2019 17:40:14:225 (1555252814225)
Target ---> Host: 31 00 00 00 16 30 29 00 00 30 1A 00 01 00 00 00 00 02 00 00 00 03 03 01 04 7F 01 09 00 00 00 00 00 02 0B 00 01 DE 35 30 01 00 88 00 0F 02 00 A2 9F
{CMBS_EV_DSR_HAN_MSG_RECV(12310)}
<CMBS_IE_HAN_MSG(12288)>:
Src: (type = 0, dev_id = 1, un_id = 0)
Dst: (type = 0, dev_id = 0, un_id = 2)
Transport : 0
Msg Sequence : 3, Message Type : 3
IF Type : 1, IF Id : 0x7F04, IF Member : 1
Data Len: 9
0 0 0 0 2 11 0 1 222

New Value is confirmed

Via CMND Host Application Code

If customization in a production line context is not feasible, customization should be done by the Application Host. At power-up, the Application Host should transition to high the RSTN line and examine the "Hello" message coming down the UART API. If the DHAN-S/J is reporting that it is in Production Mode, this serves as an indication that it is "fresh" off the DSP Group module production line and requires customization. Upon completing overwrites, Production Mode should be disabled and the DUT reset once again.

❖ Updating Regional Settings

Below is a sample log of transitioning to US regional settings – per the tabulation in the Appendix below. See han-ule-device-cmnd-api-spec Section 6 for detail regarding the command templates shown below.

MCU->CMND:
Message Length: 10
Raw message: da da 00 06 00 00 02 0b 01 14
Service ID: Production<020b>
Message ID: prod_start<01>
Unit ID: 00
Cookie: 00

Device must be in Production Mode prior to overwriting EEPROM Settings. DHAN-J/S/T Modules are delivered in Production Mode so this step can be skipped

CMND->MCU:
Message Length: 14
Raw message: da da 00 0a 00 00 02 0b 03 1b 00 00 01 00
Service ID: Production<020b>
Message ID: prod_cfm<03>
Unit ID: 00
Cookie: 00
Raw IE: 00 00 01 00
Parsed IE: CMND_IE_RESPONSE<0x00> len<1> val<success>

MCU->CMND:
Message Length: 10
Raw message: da da 00 06 68 00 02 01 08 79
Service ID: System<0201>
Message ID: reset_req<08>
Unit ID: 00
Cookie: 68

CMND->MCU:
Message Length: 26
Raw message: da da 00 16 00 00 00 00 05 81 0d 00 05 02 01 00 7f ff 0
Service ID: General<0000>
Message ID: hello_ind<05>
Unit ID: 00
Cookie: 00
Raw IE: 0d 00 05 02 01 00 7f ff
Parsed IE: CMND_IE_GENERAL_STATUS<0x0D> len<5> val<Mode:Prod,Reg:False,Eeprom:OK,ID:0x7FFF>
Raw IE: 09 00 05 04 33 2e 30 30
Parsed IE: CMND_IE_VERSION<0x09> len<5> val<Len: 4; Value: <3.00>>

Upon reset, unit wakes up in Production Mode

MCU->CMND:
Message Length: 18
Raw message: da da 00 0e 00 00 02 03 03 2b 0b 00 05 00 03 00 01 01
Service ID: Param<0203>
Message ID: param_set_req<03>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 05 00 03 00 01 01
Parsed IE: CMND_IE_PARAMETER<0x0B> len<5>
val<EepParamType:0x00,EepParamId:0x03,ParamLen:1,Value:0x01>

Setting US_DECT to 0x1 (for US)

CMND->MCU:
Message Length: 21
Raw message: da da 00 11 00 00 02 03 04 2d 0b 00 04 00 03 00 00 00 00 01 00
Service ID: Param<0203>
Message ID: param_set_res<04>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 04 00 03 00 00
Parsed IE: CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x03,ParamLen:0>
Raw IE: 00 00 01 00
Parsed IE: CMND_IE_RESPONSE<0x00> len<1> val<success>

MCU->CMND:
Message Length: 18
Raw message: da da 00 0e 00 00 02 03 03 13 0b 00 05 00 0e 00 01 de
Service ID: Param<0203>
Message ID: param_set_req<03>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 05 00 0e 00 01 de
Parsed IE: CMND_IE_PARAMETER<0x0B> len<5>
val<EepParamType:0x00,EepParamId:0x0E,ParamLen:1,Value:0xde>

Setting Full_Power to 0xde (for US)

CMND->MCU:
Message Length: 21
Raw message: da da 00 11 00 00 02 03 04 38 0b 00 04 00 0e 00 00 00 00 01 00
Service ID: Param<0203>
Message ID: param_set_res<04>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 04 00 0e 00 00
Parsed IE: CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x0E,ParamLen:0>
Raw IE: 00 00 01 00
Parsed IE: CMND_IE_RESPONSE<0x00> len<1> val<success>

MCU->CMND:
Message Length: 18
Raw message: da da 00 0e 00 00 02 03 03 72 0b 00 05 00 0f 00 01 3c
Service ID: Param<0203>
Message ID: param_set_req<03>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 05 00 0f 00 01 3c
Parsed IE: CMND_IE_PARAMETER<0x0B> len<5>
val<EepParamType:0x00,EepParamId:0x0F,ParamLen:1,Value:0x3c>

Setting PA_COMP to 0x3c (for US)

CMND->MCU:
Message Length: 21
Raw message: da da 00 11 00 00 02 03 04 39 0b 00 04 00 0f 00 00 00 00 01 00
Service ID: Param<0203>
Message ID: param_set_res<04>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 04 00 0f 00 00
Parsed IE: CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x0F,ParamLen:0>
Raw IE: 00 00 01 00
Parsed IE: CMND_IE_RESPONSE<0x00> len<1> val<success>

MCU->CMND:
Message Length: 18
Raw message: da da 00 0e 00 00 02 03 03 38 0b 00 05 00 10 00 01 01
Service ID: Param<0203>
Message ID: param_set_req<03>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 05 00 10 00 01 01
Parsed IE: CMND_IE_PARAMETER<0x0B> len<5>
val<EepParamType:0x00,EepParamId:0x10,ParamLen:1,Value:0x01>

Setting Support_FCC to 0x01 (for US)

CMND->MCU:
Message Length: 21
Raw message: da da 00 11 00 00 02 03 04 3a 0b 00 04 00 10 00 00 00 00 01 00
Service ID: Param<0203>
Message ID: param_set_res<04>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 04 00 10 00 00
Parsed IE: CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x10,ParamLen:0>
Raw IE: 00 00 01 00
Parsed IE: CMND_IE_RESPONSE<0x00> len<1> val<success>

MCU->CMND:
Message Length: 18
Raw message: da da 00 0e 00 00 02 03 03 5b 0b 00 05 00 11 00 01 23
Service ID: Param<0203>
Message ID: param_set_req<03>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 05 00 11 00 01 23
Parsed IE: CMND_IE_PARAMETER<0x0B> len<5>
val<EepParamType:0x00,EepParamId:0x11,ParamLen:1,Value:0x23>

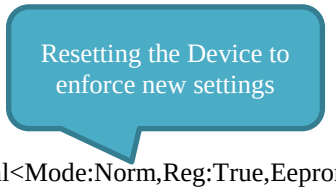
Setting Deviation to 0x23 (for US)

CMND->MCU:
Message Length: 21
Raw message: da da 00 11 00 00 02 03 04 3b 0b 00 04 00 11 00 00 00 00 01 00
Service ID: Param<0203>
Message ID: param_set_res<04>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 04 00 11 00 00
Parsed IE: CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x11,ParamLen:0>
Raw IE: 00 00 01 00
Parsed IE: CMND_IE_RESPONSE<0x00> len<1> val<success>

MCU->CMND:
Message Length: 10
Raw message: da da 00 06 00 00 02 0b 02 15
Service ID: Production<020b>
Message ID: prod_end<02>
Unit ID: 00
Cookie: 00

CMND->MCU:
Message Length: 14
Raw message: da da 00 0a 00 00 02 0b 03 1b 00 00 01 00
Service ID: Production<020b>
Message ID: prod_cfm<03>
Unit ID: 00
Cookie: 00
Raw IE: 00 00 01 00
Parsed IE: CMND_IE_RESPONSE<0x00> len<1> val<success>

CMND->MCU:
Message Length: 26
Raw message: da da 00 16 00 00 00 00 05 01 0d 00 05 00 00 00 00 01 09 00 05 04 33 2e 30 30
Service ID: General<0000>
Message ID: hello_ind<05>
Unit ID: 00
Cookie: 00
Raw IE: 0d 00 05 00 00 00 00 01
Parsed IE: CMND_IE_GENERAL_STATUS<0x0D> len<5> val<Mode:Norm,Reg:True,Eeprom:OK,ID:0x0001>
Raw IE: 09 00 05 04 33 2e 30 30
Parsed IE: CMND_IE_VERSION<0x09> len<5> val<Len: 4; Value: <3.00>>



❖ Updating Unit Info (Unit ID and Interface)

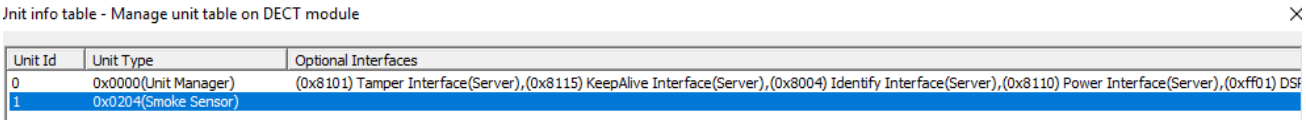
See han-ule-device-cmnd-api-spec Section 6 for details.

MCU->CMND:
Message Length: 177
Raw message: da da 00 ad 00 00 02 03 03 dd 0b 00 a4 00 0a 00 a0 etc….(160 Byte Unit ID)
ervice ID: Param<0203>
Message ID: param_set_req<03>
Unit ID: 00
Cookie: 00
Raw IE: 0b 00 a4 00 0a 00 a0 etc…….(160 Byte Unit ID)
Parsed IE: CMND_IE_PARAMETER<0x0B> len<164>
val<EepParamType:0x00,EepParamId:0x0A,ParamLen:160,Value: (160 Byte Unit ID)

Parameter 0xA is the Unit Info Parameter

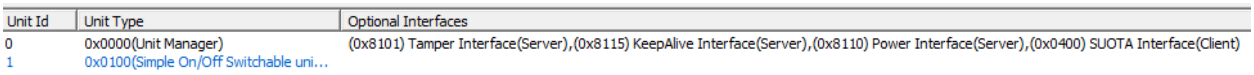
Appendix: Modifying Unit Info and Unit Interfaces

Using the CMND API Simulator, click on the Unit Info Button at the top left of the main menu. The submenu below will pop up:

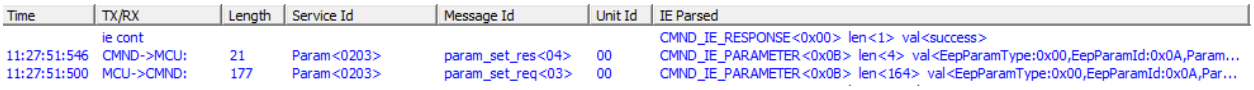


These are the default settings of the DHAN-S/J coming out of the DSP Group production line, ie Unit ID is Smoke.

Let's say the ULE Device manufacturer wants to modify the Unit Type (of Unit ID 1) to HAN Standard 0x100 – a "Simple On-Off Switchable unit or appliance". And, the customer wants to eliminate (from Unit ID 0) the Identity and DSPG Test Interfaces, and just leave the Tamper, Keep Alive, Power and SUOTA interfaces. After editing, the listing will appear as below:



The short form log indicates a single (very long) overwrite of logical parameter 0x0A.



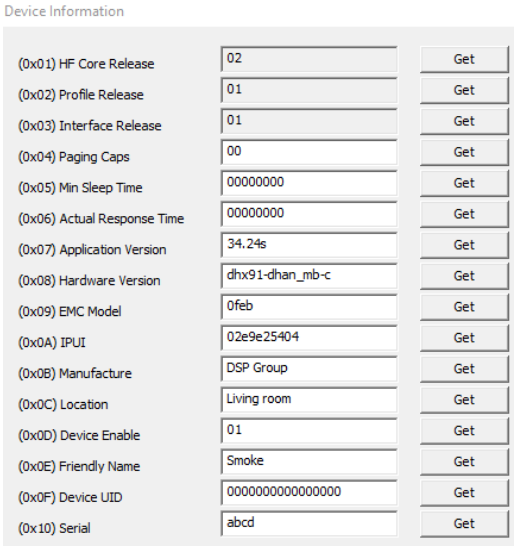
This corresponds to the Unit Info Table shown in the han-ule-device-cmnd-api-spec . Shown below.

0x0A	Unit info table	Struct	Defined units on the device, the type and which optional interfaces are supported on each unit. See [7] EP_UNIT_INFO_TABLE	Read/Write

The corresponding complete log file can be consulted as a reference for the Application Host if it is desired to embed this "Unit_Info" update in the host code for first time power up.

Appendix: Modifying Device_Info Parameters

Using the CMND API Simulator, click on the Device Info Button at the top left of the Main Menu. The menu below pops up and the values shown are the default settings for a DHAN-S/J.



Let's assume that the ULE Device Manufacturer wants to modify: HW Version (eg PCBzz), SW Version (eg34.24#2.3), Manufacturer (eg, IoT-Inc), Friendly Name (eg On-Off), Location (eg warehouse). Enter these values and hit SET for each one. The short log looks as below:

Time	TX/RX	Length	Service Id	Message Id	Unit Id	IE Parsed
	ie cont					CMND_IE_RESPONSE<0x00> len<1> val<success>
11:06:10:921	CMND->MCU:	21	Param<0203>	param_set_res<04>	00	CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x06,Param...
11:06:10:893	MCU->CMND:	26	Param<0203>	param_set_req<03>	00	CMND_IE_PARAMETER<0x0B> len<13> val<EepParamType:0x00,EepParamId:0x06,Para...
	ie cont					CMND_IE_RESPONSE<0x00> len<1> val<success>
11:06:09:403	CMND->MCU:	21	Param<0203>	param_set_res<04>	00	CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x17,Param...
11:06:09:381	MCU->CMND:	27	Param<0203>	param_set_req<03>	00	CMND_IE_PARAMETER<0x0B> len<14> val<EepParamType:0x00,EepParamId:0x17,Para...
	ie cont					CMND_IE_RESPONSE<0x00> len<1> val<success>
11:06:06:796	CMND->MCU:	21	Param<0203>	param_set_res<04>	00	CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x09,Param..
11:06:06:765	MCU->CMND:	24	Param<0203>	param_set_req<03>	00	CMND_IE_PARAMETER<0x0B> len<11> val<EepParamType:0x00,EepParamId:0x09,Para...
	ie cont					CMND_IE_RESPONSE<0x00> len<1> val<success>
11:06:03:272	CMND->MCU:	21	Param<0203>	param_set_res<04>	00	CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x08,Param..
11:06:03:213	MCU->CMND:	23	Param<0203>	param_set_req<03>	00	CMND_IE_PARAMETER<0x0B> len<10> val<EepParamType:0x00,EepParamId:0x08,Para...
	ie cont					CMND_IE_RESPONSE<0x00> len<1> val<success>
11:06:00:841	CMND->MCU:	21	Param<0203>	param_set_res<04>	00	CMND_IE_PARAMETER<0x0B> len<4> val<EepParamType:0x00,EepParamId:0x07,Param..
11:06:00:797	MCU->CMND:	27	Param<0203>	param_set_req<03>	00	CMND_IE_PARAMETER<0x0B> len<14> val<EepParamType:0x00,EepParamId:0x07,Para...
	ie cont					CMND_IE_RESPONSE<0x00> len<1> val<success>

Note that EEPROM IDs 6,7,8,9,17(hex) have been modified. That corresponds to the listing in the han-ule-device-cmnd-api-spec.

0x06	Device friendly name	Struct	Friendly name for the device. For example: "Smoke" Structure is different from other string parameters. See [7], EP_DEV_INFO_FRIENDLY_NAME	Read/Write
0x07	Software version	String	Specifies SW version. First byte is string length (u8) Next n bytes are ASCII in range 0x20-0x7F (maximum 32 characters)	Read/Write
0x08	Hardware version	String	Specifies HW version. First byte is string length (u8) Next n bytes are ASCII in range 0x20-0x7F (maximum 32 characters)	Read/Write
0x09	Manufacture name	String	Manufacture name. First byte is string length (u8) Next n bytes are ASCII in range 0x20-0x7F (maximum 32 characters)	Read/Write

0x17	Device location	String	Device information attribute: Location. For example: "Kitchen". First byte is string length (u8) Next n bytes are ASCII in range 0x20-0x7F (maximum 15 characters)

The corresponding complete log file can be consulted as a reference for the Application Host if it is desired to embed this "Device_Info" update in the host code for first time power up.

Appendix: Application Presets

As described in the han-ule-device-cmnd-api-spec, a variety of application profiles can be loaded in to the DHAN-J/S/T module via a "one-shot" preset. The relevant section of the API spec is copied below. Some of these presets run the application host on the module itself (without resorting to inputs from an external host), while others require an external host to run the application and access the communication services via CMND API. The default setting for DHAN-J/S coming out of the factory is Smoke CMND API (0x3), Production mode enforced. This preset is a good starting point for most applications running on an external application host. The DECT-ULE Expansion Board in the System Development Tool kit, is preset with the "Expansion Board" preset (0x15, not shown below). This preset is convenient for out-of-the-box experience and tutorial purposes.

4.19.2.18 CMND_MSG_PROD_SPECIFIC_PRESET_REQ

This message is used to set the EEPROM to automatic preset - a set of predefined values stored into the EEPROM when selected preset is applied.

IE	M/O	Comment
CMND_IE_U8	M	0x00 – CR GPIO preset 0x01 - CR CMND API preset 0x02 – AC GPIO on DHX91 board 0x03 – Smoke CMND API on DHX91 board 0x04 – Smoke ULE GPIO on DHX91 board 0x05 – ULE voice call standalone on dhx91 0x06 – ULE voice call with CMND API 0x07 – Vendor SPMKT 0x08 – AC Uart 0x09 – Simple Power Metering Uart DHX91 0x0A – Reserved 0x0B – Wakeup from UART on DHX91 board 0x0C – Simple Power Metering DHX91 board 0x0D – Vendor EU Thermostat 0x0E – Vendor EU WallSwitch 0x0F – Vendor EU Window 0x10 – Host Extension 0x11 – Smoke Pageable 0x12 – AC Broadcast 0x13 – AC Broadcast CMND 0x14 – Generic CMND

Appendix: Modifying Regional Settings

CMND Side (ULE Device)

Parameter Name	US Setting	EU setting	Japan Setting	Korea Setting	EEPROM Offset	Parameter ID	Explanation
SD02_US_DECT	0x1	0x0	0x15	0xB	0x204	0x3	Enforces 5 DECT6.0 RF Channels
SD02_RF19APU_SUPPORT_FCC	0x1	0x0	0x2	0x0	0x28B	0x10	Enforces Channel Access per Part 15.323c
SD02_FULL_POWER	0xDE	0x7F	0xDE	0x7F	0x20B	0x0E	Limits Tx Power to ~+21dBm
SD02_RF19APU_DEVIATION	0x23	0x13	0x00	0x13	0x291	0x11	Increase Deviation for US
SD02_RF19APU_PA2_COMP	0x3C	0x3C	0xAC	0x3C	0x295	0x0F	PA Bias

CMBS side (ULE Hub)

Parameter Name	US Setting	EU setting	Japan Setting	Korea Setting	Logical Name	Explanation
SD02_US_DECT	0x1	0x0	0x15	0xB	TBD	Enforces 5 DECT6.0 RF Channels
SD02_RF19APU_SUPPORT_FCC	0x1	0x0	0x2	0x0	RF19APU_SUPPORT_FCC	Enforces Channel Access per Part 15.323c
SD02_FULL_POWER	0xDE	0x7F	0xDE	0x7F	RF_FULL_POWER	Limits Tx Power to ~+21dBm
SD02_RF19APU_DEVIATION	0x23	0x13	0x00	0x13	RF19APU_DEVIATION	Increase Deviation for US
SD02_RF19APU_PA2_COMP	0x3C	0x3C	0xAC	0x3C	RF19APU_PA2_COMP	PA Bias

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