

mcsKNX

HomeSeer HS4 Plug-in
Version 4.1.1.x

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1 Introduction

mcsKNX provides bidirectional integration of HS4 with an IP-based KNX installation. It operates under Windows and Linux.

KNX communications are performed on Group Addresses in a broadcast or tunneling protocol. HS is able to listen to this communication and update HS Features based upon the content of the communication. HS is also able to initiate communication via the HS UI, Events or scripts on individual KNX Group Addresses. In essence HS becomes a set of virtual KNX devices.

There is a very wide range of KNX devices that serve many automation needs. Each device is characterized with communications that conforms to a specific Datapoint Type. mcsKNX, at the time of this writing, supports 182 different Datapoint types.

Each Group Address will be assigned communication using a specific Datapoint type. This relationship is normally done when the KNX installation is being configured. ETS5 is the software tool used to perform this setup. An output of ETS5 is an XML file that contains the Group Address information including the name and Datapoint type. mcsKNX uses this XML file as the basis to encode and decode the communications. The Group Address XML file exported from ETS5 is placed in the \Config subfolder of HS and renamed to "knx.xml".

2 Installation

Installation can be done using the facility provided by HS4 using the HS4 Updater or it can be done manually.

2.1 Updater4 Installation

mcsKNX is installed using the HS4 updater capability. Access is from the Pugins options of the main HS4 menu.

2.2 Manual Installation

2.2.1 Override JSON

An alternate install procedure that has been made available for plugin developers to pre-test their submittal is described below. This will supersede the normal Updater 4 procedure. In the HS4 folder create a file called updater_override.json or extract it from the zip. The contents of this file should be pasted from the indented lines below if not extracted from the zip. Change the red font to the version of mcsKNX that is being installed and match the name of the zip file `HSPI_mcsKNX_4_0_4_0.zip` that is normally available at <http://mcsSprinklers.com>. (i.e.

http://mcsSprinklers.com/HSPI_mcsKNX_4_0_4_0.zip). The zip file should also be deposited in the HS4 folder.

Start HS4, select the Plugins tab from the main menu, select Add. The only plugin available will be mcsKNX. Select it and install while responding to any prompts that may be given. Remove updater_override.txt when complete to restore normal Updater functionality.

```
{  
  "Version": "4.0.4.0",
```

```
"Packages":[
{
  "ProductID":"111",
  "PackageName":"mcsKNX",
  "EXEFile":"HSPI_mcsKNX.exe",
  "ID":"mcsKNX",
  "Version":"4.0.4.0",
  "UC":63,
  "ZipFile":"HSPI_mcsKNX_4_0_4_0.zip",
  "Author":"mcsSolutions",
  "Price":"Free",
  "IconFile":"knx.png",
  "StoreURL":"",
  "ReleaseNotesURL":"http://plugins.homeseer.com/releasenotes?productid=348",
  "Featured":"False",
  "ShortDescription":"Interface to KNX Installation",
  "SupportURL":"",
  "HelpFileURL":null,
  "Tags":[
    "Free",
    "KNX",
  ]
}
]
}
```

2.2.2 Manual from Manifest

The installer package zip file described in the prior section will contain all the files needed for the install. Extract each into the folders as described below.

Plugin executable into the HS4 folder:

HSPI_mcsKNX.exe
HSPI_mcsKNX.exe.config

Binary support files in the \Bin\mcsKNX subfolder:

Autofac.dll
Knx.Bus.Common.dll
Knx.Falcon.dll
Knx.Falcon.Sdk.dll
izKNX.dll
log4net.dll

Browser files in the \html\mcsKNX subfolder:

KNX.html
mcs.css
mcs.js
mcsKNX.pdf

Contained in the zip file is the following used by the installer to specify install locations and for manual override install. It does not need to be extracted from the zip:

install.txt
updater_override.json

2.3 Startup

One additional file will be needed to complete the installation. This is the Group Address export XML from KNX ETS5 configuration tool. The file should be placed in the HS4 \Config subfolder and renamed to "knx.xml". If this file is not available then one with the needed information can be manually created in a format similar to Table 1 but containing the specific Group Address, Name and Datapoint Types of the existing KNX installation. This file can also be added later and imported per Section 3.3. Since this file contains the knowledge of the installation that is being interface there is not much that can be done with mcsKNX until this file has been imported.

mcsKNX is started from the Plugins menu, Installed menu item. The toggle in the lower right of the tile is clicked to the right as shown in Figure 1. This will make available the mcsKNX pages from the "More" selector. They can also be accessed from the Plugins Menu as shown in Figure 2.

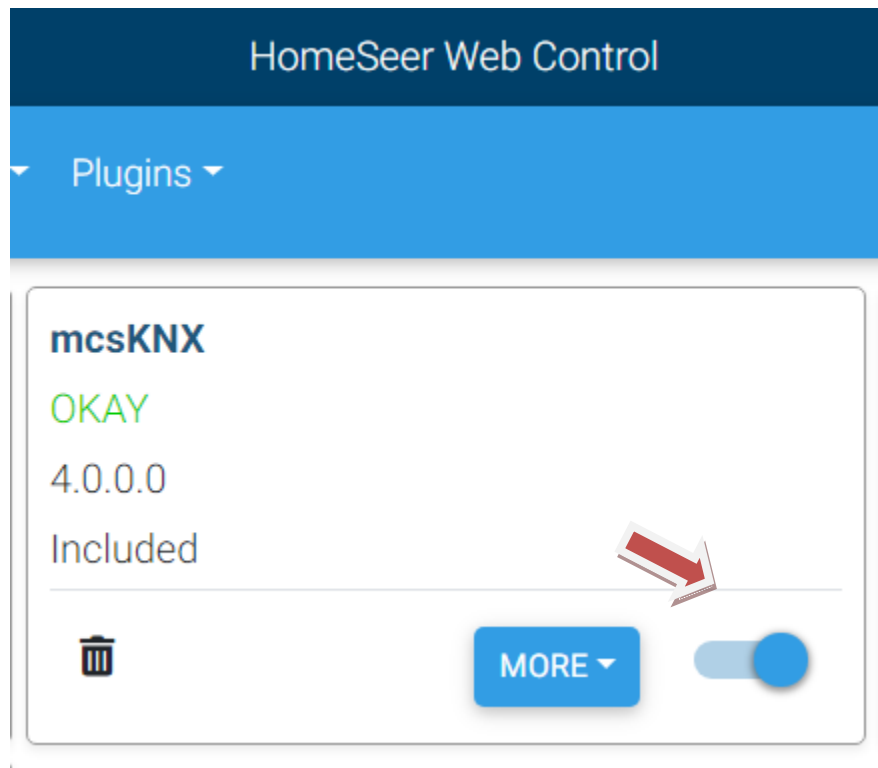


Figure 1 mcsKNX Enable Selection

After installation it will create a settings file mcsKNX.ini in the \Config subfolder.

Other information that persists between restarts is stored in the PED of HS Devices.

2.4 Migration from HS3 izKNX

mcsKNX is based upon the HS3 plugin izKNX so they share several aspects, but they are not interchangeable. The most significant difference is the Value Status Pair values are different between the two and mcsKNX gets its information from the ETS5 export for Group Address and Datapoint Type relationships. In addition HS3 allowed status and control devices while HS4 allows status and controls only on features and the device is only an organizational placeholder entity.

On startup of the plugin it will identify all devices created by izKNX and convert them to a format that is used by mcsKNX. The interface property will be changed from izKNZ to mcsKNX. The PED will be converted to HS4 format. The DeviceType property will be change for the purpose employed by mcsKNX. The VSP and corresponding controls and status will be recreated based upon the knx.xml definitions for the Group Addresses that had been setup by izKNX. Parent devices will be created when they do not exist.

It is important that a two step process be followed when trying to migrate HS3 izKNX setup to HS4 mcsKNX.

First is to make a backup of the HS folder so that one can always get back. Once mcsKNX makes the changes to the izKNX devices it cannot be undone.

Second is to review the Group Addresses setup in izKNX and assure that each is defined in \config\knx.xml. Any that are not defined will not be properly transitioned and orphans will exist that will need to be manually addressed.

Since mcsKNX takes ownership of the izKNX devices on initial detection these izKNX devices will no longer exist so a restart of mcsKNX will not discover and migrate additional devices. The only means to try again is to restore from backup.

3 Operation

3.1 Establish IP Connection to KNX Installation

Operation is initiated by describing the IP connection being used in the KNX installation. This is done from the Config page of mcsKNX. It is available from the HS Plugins menu shown in Figure 2.

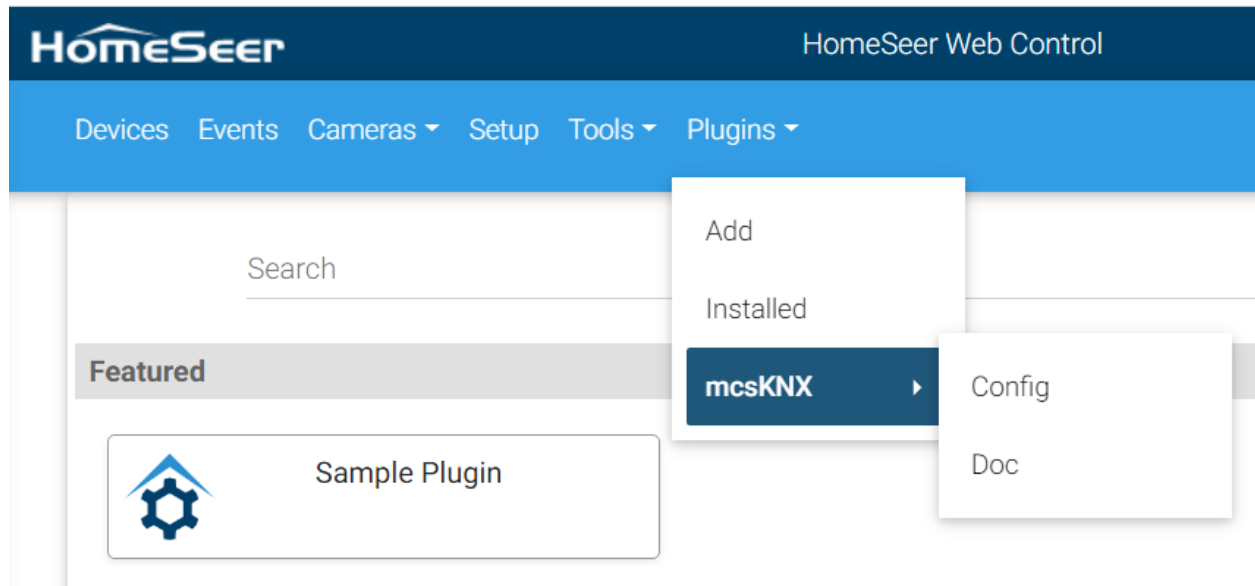



Figure 2 Config Page Access

The Doc page will show or download this document, depending upon the browser and its setup.

The Config page contains four tabs with the first being the Connection tab that is shown in Figure 3.



Connection		Device Creation	Group Addresses	Debug
KNX IP Bus Options:		Routing - Direct <input checked="" type="radio"/> Multicast <input type="radio"/> Tunnel - via KNX Interface <input type="radio"/>		
KNX Tunnelling Options:				
KNX Interface IP Address	192.168.0.204			
Port	3671			
Use NAT	<input type="checkbox"/>			
Keep KNX Bus Connection Alive	<input checked="" type="checkbox"/>			
Polling:				
Timer Based Polling	<input type="checkbox"/>			
Polling Frequency (Secs.)	61			

Figure 3 Config Page Tabs

KNX supports a multicast routing where every device has the ability to directly communicate with every other IP device on the network. It also supports a single-point tunnel to gain access to devices that may not be IP-connected. If the multicast option is selected then the Tunneling Options table does not need to be completed.

Also included on this tab is polling option. This option, when enabled, will cause mcsKNX to initiate a Read request on every Group Address that has been designated for polling. Polling setup will be discussed later.

3.2 Create HS Devices with Features

Two mechanisms exist to create HS Devices and Features. The first is to create a set of dummy devices and then later configure them with specific KNX Group Addresses. The second is to create HS Devices for everything that has been defined in the knx.xml export from ETS5. In the second case all Group Addresses will be mapped to a HS Device with a single Feature.

The size of the installation and then objectives of the creation will determine which approach should be used. One can always return to this Config tab and create more so best to start with just one or two for experimentation.

When devices are created they will all have the same Room and Floor location properties. The default locations are mcsKNX and mcsKNX. These can be changed from the Device Creation tab of the Config page as shown in Figure 4.

Connection

Device Creation

Group Addresses

Debug

Select default device Floor and Room

Floor	mcsKNX
Room	mcsKNX

Select count of each type of device to be created

One Feature Device	0
Two Feature Device	0
Three Feature Device	0
Four Feature Device	0
Create one multi-feature device with number of features specified	0
Create 191 Single-Feature Devices that have not yet been created from knx.xml	<input type="checkbox"/>

Create

Figure 4 HS Device Creation

All created devices are edited from the HS Devices menu as shown in Figure 6. This is the place where crafting is done to obtain the desired UI for the KNX functionality. In a simple case it may be a temperature sensor where one Group Address is used to show the current reading. In this case the HS Feature will have a single Group Action setup such as shown in HS Devices as Figure 5 and in the mcsKNX Feature configuration as Figure 6. Note in Figure 5, and subsequent figures that the name “Tasmota 222

Temperature” is the name of the Group Address that was obtained from the knx.xml file. The same convention will be true for all Feature names.

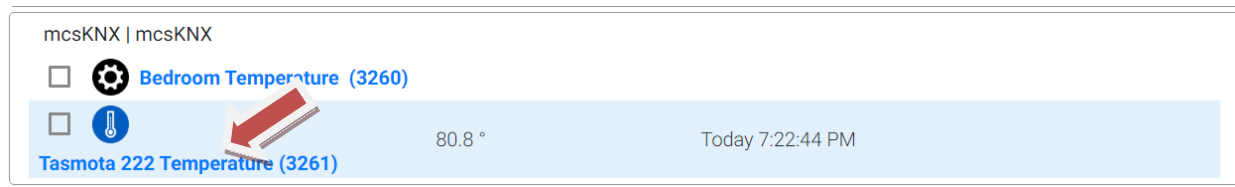


Figure 5 Single Group Address Feature UI

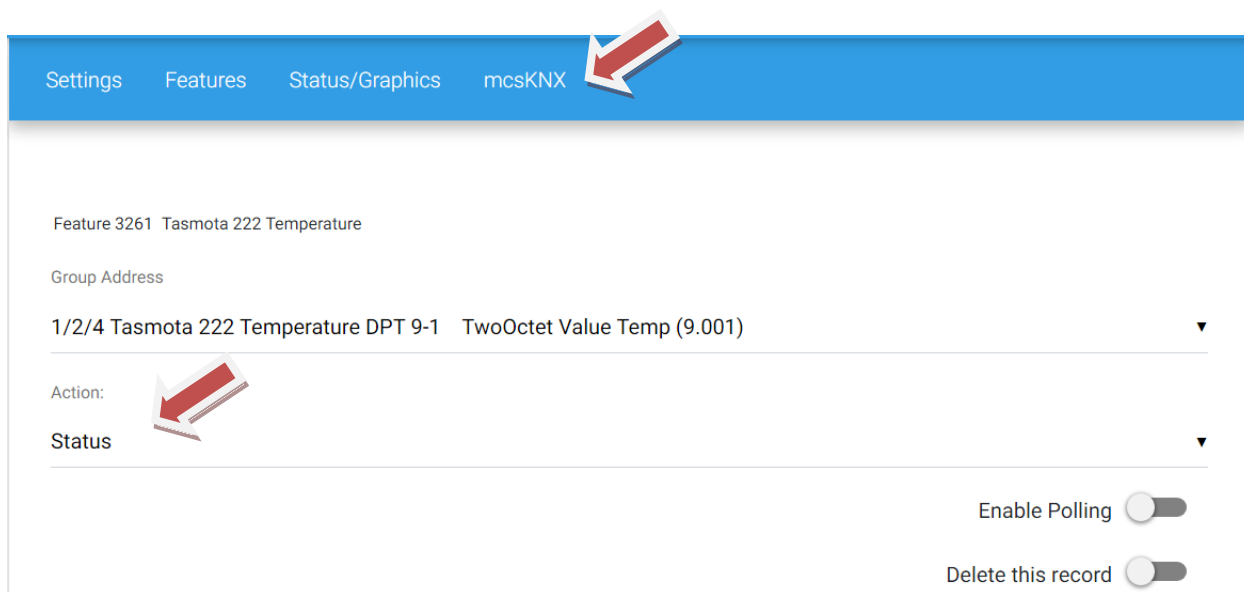


Figure 6 Single Group Address Feature Setup

Note that the Action on the setup is “Status”. This means that no control buttons will be setup for this Group Address on the Feature. When “Control” is selected then the appropriate buttons are included on the HS Devices page for the Feature based upon the Datapoint type. If it is a switch type then it will be an On-Off button pair. If it is a scene control then it will be an options selector. If a dimmer then a slider will be shown. etc.

The status and control ranges for HS devices are based upon the range defined in the specification for each Datapoint type. This range can be wider than is practical for its intended use. For example, a temperature setpoint will have a desired range of 10 C to 30 C while the Datapoint type could allow negative and large values. To override the default a minimum and maximum textbox is provided for the Datapoint types that use numeric range values. See Figure 7 for an example. These override text boxes are not shown for status only or Datapoint Types not in the 6.xxx to 15.xxx range.

Settings
Features
Status/Graphics
mcsKNX

Feature 3261 Tasmota 222 Temperature

Group Address

1/2/4 Tasmota 222 Temperature DPT 9-1 TwoOctet Value Temp (9.001)

Action:

Status

Enable Polling

Delete this record

Devices
Events
Cameras
Setup
Tools
Plugins

Feature
Status/Graphics
mcsKNX

Feature 4676 TwoOctet_Value_Temp

Group Address

9/0/1 TwoOctet_Value_Temp DPT 9-1 TwoOctet Value Temp (9.001)

Action:

Control

Enable Polling

Minimum Value
0

Maximum Value
30

Delete this record

Figure 7 Override of Feature Control Range

It may be appropriate to add a control to manually poll the temperature sensor. This is done with the Enable Polling checkbox. Note that this same checkbox is used to include the sensor in the periodically polling if it was enabled on the Config Connection tab.

When a poll (read) request is sent to a KNX it will either respond with its value or it will not respond. Typically, those KNX devices that are for control will not respond. Those that are designated for feedback will respond. This implies that the polling selection should only be made for the Group Addresses of KNX devices that are able to provide feedback.

Figure 8 Device Polling Selection

mcsKNX | mcsKNX

☐
☒

Bedroom Temperature (3260)

☐
☒

Tasmota 222 Temperature (3261)

Today 7:31:00 PM

POLL

Figure 9 HS Device with Feature Poll Button

A blank Group Address will be included as the last section of each Feature. This allows additional Group Addresses to be added to the Feature. If additional are needed then use the “Save” at the bottom of the page to rebuild the page with each additional.

If a Group Address was added by mistake or the configuration changed later to no longer use it, then it can be deleted with the “Delete this record” selector. As with all data entry it will only be acted upon following use of “Save” at the bottom of the page.

A more complex configuration is for something to achieve a functional dimming device. The HS UI for this example is shown in Figure 10 where in a single Feature controls exist to command one Group Address for On/Off, another Step selector with Stop, and a third Group Address with slider control. Note in this figure that the status icon is a question mark. In many Group Addresses where discrete control is setup the status will be reflected as “unknown” with the question mark until an actual update over the status Group Address is received.

Ref	Status	Category	Floor	Room	Name	Last Change	Control
<input type="checkbox"/> 3262				mcsKNX	mcsKNX	New One Feature Device	
<input type="checkbox"/> 3263	?			mcsKNX	mcsKNX	OneOctet_Unscaled	<div> <div>On</div> <div>Off</div> <div>Stop</div> <div> <div></div> <div></div> </div> <div>Step + 7 ▼</div> </div>

Figure 10 Dimming Device

Let us assume the case where the KNX actuators will accept On, Off, Dimming Step and Absolute Dim level controls. Each of these will be on different Group Addresses. Figure 11 shows the first two of these for the switch On-Off and Dimmer Step controls. The other Group Addresses are also included with one being selected for the feedback of the current dim level. This feedback device is selected as “Status” to designate it as the one that will be shown as the Features status. Any information received on the other Group Addresses mapped this feature will be ignored when multiple “Control” types are setup.

Feature 3263 Switch

Group Address

1/0/1 Switch DPT 1-1 Switch (1.001) ▼

Action:

Control ▼

Enable Polling ☐

Delete this record ☐

Feature 3263 Dimming_Step

Group Address

3/0/7 Dimming_Step DPT 3-7 Dimming Step (3.007) ▼

Action:

Control ▼

Enable Polling ☐

Delete this record ☐

Feature 3263 OneOctet_Scale100

Group Address

5/0/1 OneOctet_Scale100 DPT 5-1 OneOctet Scale100 (5.001) ▼

Action:

Control ▼

Enable Polling ☐

Delete this record ☐

Feature 3263 OneOctet_Unscaled

Group Address

5/0/10 OneOctet_Unscaled DPT 5-10 OneOctet Unscaled (5.010) ▼

Action:

Status ▼

Enable Polling ☐

Delete this record ☐

Figure 11 Multiple Group Addresses on Feature

If one wanted to have a Dimmer where both the On-Off status and the current Dim level is shown in the HS status then a Device with two features would be needed. Note that the Config page, Create Devices tab allows creation of Devices with One, Two, Three or Four Features. The Figure 12 illustration shows the dummy HS Device after one Two-Feature Device was created on the Config page.

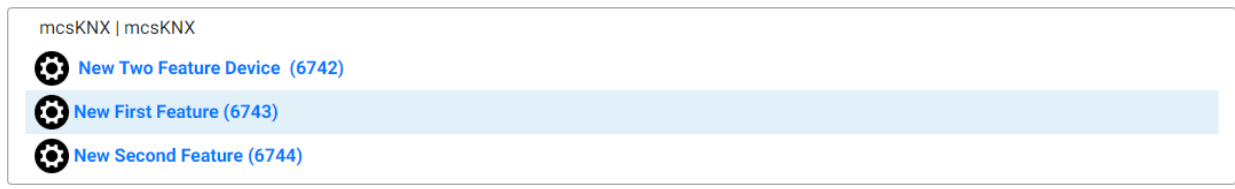


Figure 12 Two Feature Device Creation

Clicking on either the Device or one of its Features will bring up the edit capability provided by HS. Two tabs are of immediate interest. These are Settings and mcsKNX. On the Settings tab the Device should be given a reasonable name (e.g. Kitchen Dimmer). Its Floor and Room may also be changed from the default of the dummy Device. The default location was previously described as part of the Config page Device Creation tab. Note that the Device name is user defined while the Feature name is set based upon the content of the knx.xml file. Don't forget the "Save" at the bottom of the page when something is changed on the tab of the page.

A screenshot of the 'mcsKNX mcsKNX New Two Feature Device' edit page. The page has a blue header with navigation links: Devices, Events, Cameras, Setup, Tools, Plugins. Below the header is a tab bar with 'Settings', 'Features', 'Status/Graphics', and 'mcsKNX'. The 'Settings' tab is active. The form contains the following fields and options:

- Name:** 'New Two Feature Device' (with a red arrow pointing to it)
- ADD CATEGORY:** A blue button.
- Voice Command (Alexa/Google):**
 - ☐ Voice Command Enabled
 - ☐ Voice Command Confirm
- Floor:** 'mcsKNX' (with a red arrow pointing to it) and a 'SELECT FLOOR' button.
- Room:** 'mcsKNX' (with a red arrow pointing to it) and a 'SELECT ROOM' button.
- Options:**
 - ☐ Is Light
 - ☐ Hide from Mobile Views
 - ☐ Hide From All Views
 - ☐ Do Not Log
 - ☐ Include Power Fail Recovery

Figure 13 Device Edit Page

On the mcsKNX tab is where the Group Address is assigned. This is done on a Feature by Feature basis. The first is shown in Figure 14. While “Control” and “Status” actions can be explicitly entered, mcsKNX will make its assessment based upon the Datapoint Type to pre-populate the Action fields after the Save of the Group Address selection is done. It can always be changed later if necessary.

The screenshot displays the mcsKNX configuration interface with a blue header bar containing tabs: Settings, Features, Status/Graphics, and mcsKNX. The main content area shows two feature configurations for Feature 6743.

Feature 6743 New Feature

Group Address

1/0/1 Switch DPT 1-1 Switch (1.001) ▼

Action:

Control ▼

Enable Polling ☐

Delete this record ☐

Feature 6743 New Group Address

Group Address

1/0/11 State DPT 1-11 State (1.011) ▼

Action:

Status ▼

Enable Polling ☐

Delete this record ☐

Figure 14 Switch Control with Separate Feedback

The second Feature of the Device is then setup to be the Group Address 5/0/1 that is of Datapoint Type 5.001. See Figure 15. For this setup the assumption is that the same Group Address will contain the status of the Dim position so a second Group Address was not entered. With only one Control Group Address in this Feature the HS status will be updated based upon receipt of the same Group Address as the Control. While this may not be realistic for a dimmer the setup capability is provided for the general case.

Feature 6744 New Feature

Group Address

5/0/1 OneOctet_Scale100 DPT 5-1 OneOctet Scale100 (5.001) ▼

Action:

Control ▼

Enable Polling ☐

Delete this record ☐

Feature 6744 New Group Address

Group Address

Select an option ▼

Action:

Control ▼

Enable Polling ☐

Delete this record ☐

SAVE

Figure 15 Absolute Dim Control

The resultant HS UI for this Device with two Features is shown in Figure 16.

mcsKNX | mcsKNX

⚙️

Kitchen Dimmer (3378)

❓

State (3379)

Today 8:28:26 PM

ON

OFF

⚙️

OneOctet_Scale100 (3380)

Today 8:28:35 PM

Figure 16 Two Feature Dimmer HS UI

Similar Device/Feature crafting can be done for Thermostat, Blinds Control, Scene Control, etc. Another use case could be a bathroom with a humidity sensor, exhaust fan and wall switch. A bathroom moisture control device could be defined with three Features that would encapsulate all the related status and control information into this one device.

The option shown in Figure 4 at the bottom of the table is shown in red to highlight that this could be a significant action. In this example case 191 devices will be created. All Devices and its Feature will get its name from knx.xml. The Group Address, Datapoint Type, and suggested Status vs. Control set so the

devices will be ready to use with minimal additional setup. A snapshot immediately following use of this Device creation method is shown in Figure 17.

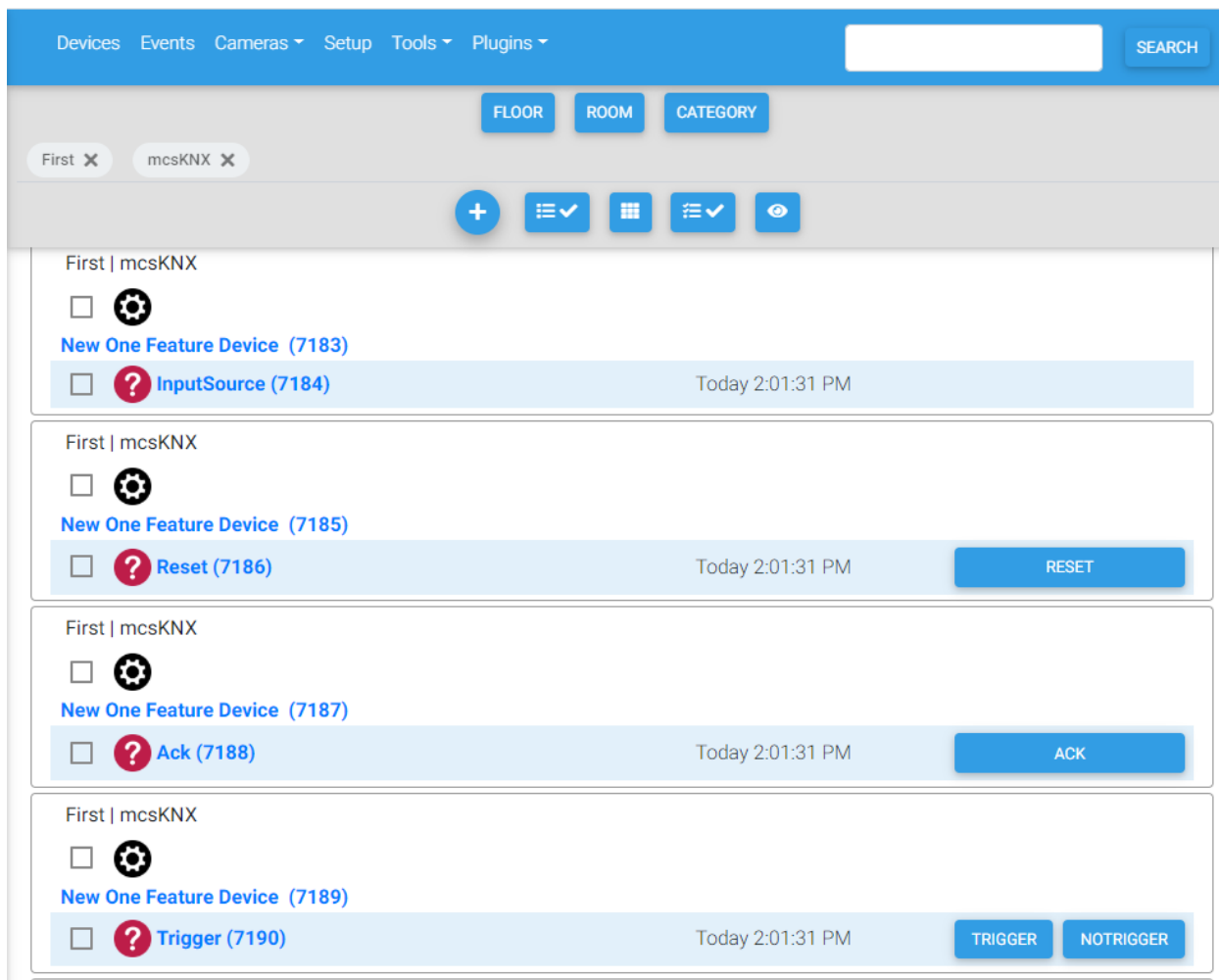


Figure 17 Auto Device Creation

As of version 4.0.2.0 the control of two-state devices will present a toggle option in the HS UI such as shown in Figure 18 Toggle Control on Binary Devices . When toggle is selected the last reported status from the KNX device will be inverted and used as the command.

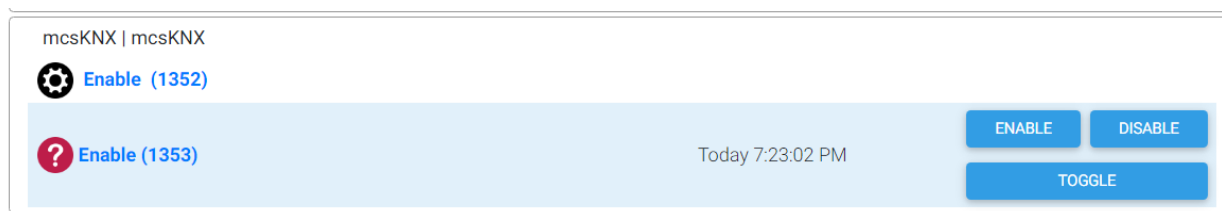


Figure 18 Toggle Control on Binary Devices

3.2.1 Date and Time formats

Datapoint type 10.001 contains data representing time in terms of Day, Hour, Minute, Second. When a message of this datapoint type is received it will be placed in both the HS DeviceValue and DeviceString. The DeviceValue will contain the total number of seconds in the received time. DeviceString will be formatted as DD HH:M:SS with DD only showing for non-zero day content. If the device is controllable then the HS interface will be the DeviceValue where the time, in number of seconds, is entered on the UI or commanded via script.

Datapoint type 11.001 contains data representing date in terms of a two digit Year, Month and Day. . When a message of this datapoint type is received it will be placed in both the HS DeviceValue and DeviceString. The DeviceValue will contain the total number of days in the received date. DeviceString will be formatted as a short date using local date representation. If the device is controllable then the HS interface will be the DeviceValue where the date, in number of days AD, is entered on the UI or commanded via script. Date value of zero represents January 1, 0000.

3.3 Group Address Import

The knowledgebase of Group Addresses in a KNX installation is contained in the file knx.xml what is located in the \Config folder of HS. This file is normally exported from ETS5, the KNX configuration utility. This file is read at mcsKNX startup. It can also be read on demand from the Group Addresses tab of the Config page as shown in Figure 19.

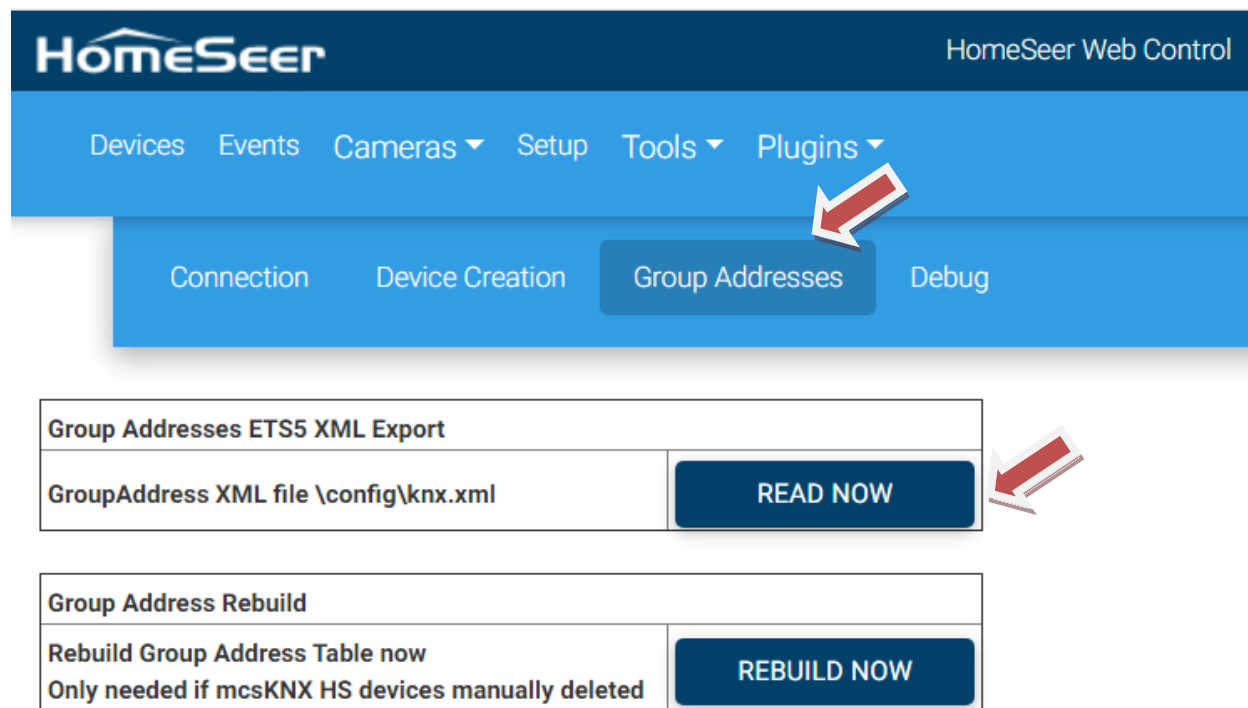


Figure 19 Group Address Import

In lieu of export of the file from ETS5 the file can be manually created with a text editor. This was the case for the test file produced when developing the plugin. This file can be used as a template to manually create the knowledgebase.

The contents of this file shown in Table 1 also shows the Datapoint types that have been incorporated in mcsKNX. If a need exists to create support for other types then the infrastructure is in place and the new type will usually be easy to add.

Note the test knx.xml file contains the name of the Datapoint type, a Group Address based upon the Datapoint number and the Datapoint number using x-y notation where y is a number in range 0 to 999. In a real installation there will not be any numerical relationship between the Group Address and the Datapoint number. Likewise, the name of the Group Address will not be the name of the Datapoint type, but represent something within the installation. The ETS5 export will also have additional XML-compliant structure and other information not used by mcsKNX. Table 1 only contains those lines that are used by mcsKNX. Other lines that do not comply to this structure will be ignored during import.

Two forms of DPTs encoding is accepted. These are DPST-x-y and DPT-x. The DPT-x format is assumed to be equivalent to DPST-x-1.

Table 1 Supported Datapoint Types and knx.xml Format

```
<GroupAddress Name="Switch" Address="1/0/1" DPTs="DPST-1-1" />
<GroupAddress Name="Boolean" Address="1/0/2" DPTs="DPST-1-2" />
<GroupAddress Name="Enable" Address="1/0/3" DPTs="DPST-1-3" />
<GroupAddress Name="Ramp" Address="1/0/4" DPTs="DPST-1-4" />
<GroupAddress Name="Alarm" Address="1/0/5" DPTs="DPST-1-5" />
<GroupAddress Name="Binary" Address="1/0/6" DPTs="DPST-1-6" />
<GroupAddress Name="Step" Address="1/0/7" DPTs="DPST-1-7" />
<GroupAddress Name="UpDown" Address="1/0/8" DPTs="DPST-1-8" />
<GroupAddress Name="OpenClose" Address="1/0/9" DPTs="DPST-1-9" />
<GroupAddress Name="Start" Address="1/0/10" DPTs="DPST-1-10" />
<GroupAddress Name="State" Address="1/0/11" DPTs="DPST-1-11" />
<GroupAddress Name="Invert" Address="1/0/12" DPTs="DPST-1-12" />
<GroupAddress Name="DimSendStyle" Address="1/0/13" DPTs="DPST-1-13" />
<GroupAddress Name="InputSource" Address="1/0/14" DPTs="DPST-1-14" />
<GroupAddress Name="Reset" Address="1/0/15" DPTs="DPST-1-15" />
<GroupAddress Name="Ack" Address="1/0/16" DPTs="DPST-1-16" />
<GroupAddress Name="Trigger" Address="1/0/17" DPTs="DPST-1-17" />
<GroupAddress Name="Occupancy" Address="1/0/18" DPTs="DPST-1-18" />
<GroupAddress Name="WindowDoor" Address="1/0/19" DPTs="DPST-1-19" />
<GroupAddress Name="LogicalFunction" Address="1/0/21" DPTs="DPST-1-21" />
<GroupAddress Name="SceneAB" Address="1/0/22" DPTs="DPST-1-22" />
<GroupAddress Name="ShutterBlinds" Address="1/0/23" DPTs="DPST-1-23" />
<GroupAddress Name="HeatCool" Address="1/0/100" DPTs="DPST-1-100" />
<GroupAddress Name="Switch_Control" Address="2/0/1" DPTs="DPST-2-1" />
<GroupAddress Name="Boolean_Control" Address="2/0/2" DPTs="DPST-2-2" />
<GroupAddress Name="Enable_Control" Address="2/0/3" DPTs="DPST-2-3" />
<GroupAddress Name="Ramp_Control" Address="2/0/4" DPTs="DPST-2-4" />
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```



```

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<GroupAddress Name="FourOctet_Float_Value_Amplitude" Address="14/0/5" DPTs="DPST-14-5" />
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```

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```

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<GroupAddress Name="FourOctet_Float_Value_Resistance" Address="14/0/60" DPTs="DPST-14-60"
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```

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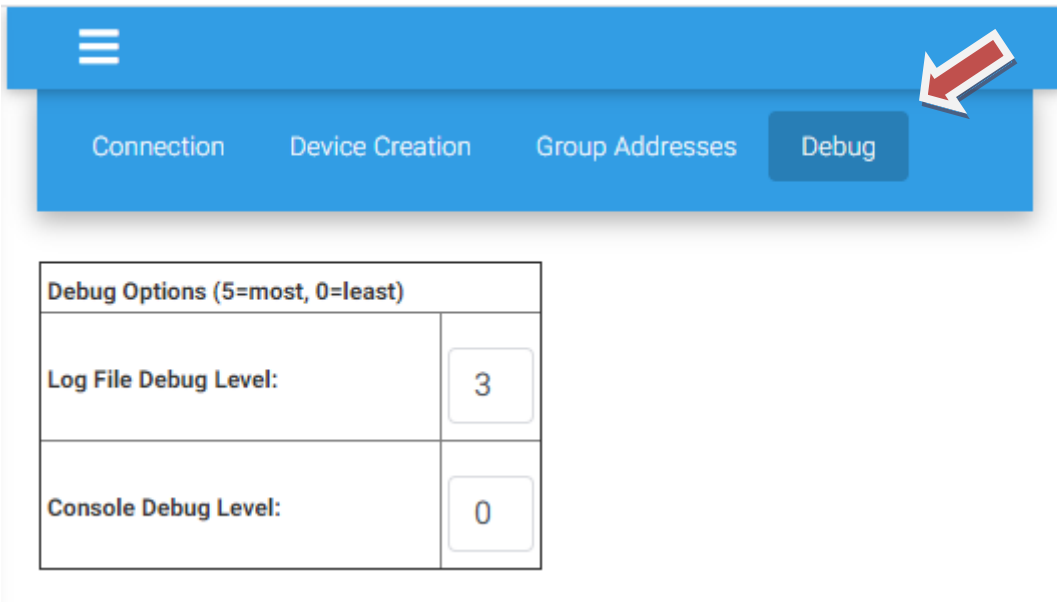
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```

The Group Address Table is a data structure in mcsKNX that manages the relationship between HS devices and KNX Group Addresses. This table is normally maintained as Group Address are mapped to HS devices. This relationship is compromised if a user deletes HS devices that had been created by mcsKNX. To restore the integrity of the relationship the “Rebuild Now” button is provided on the Config page, Group Addresses tab.

3.4 Logging Options

Logging is available to the Console and/or the HS log. Log messages are tagged with level of detail with 0 the most and 5 the least level of detail. These options are available from the Config page Debug tab as shown in Figure 20;



The screenshot shows the mcsKNX Config page with the 'Debug' tab selected. A red arrow points to the 'Debug' tab. Below the tabs, there is a table titled 'Debug Options (5=most, 0=least)'.

Debug Options (5=most, 0=least)	
Log File Debug Level:	3
Console Debug Level:	0

Figure 20 Debug Options

4 Non-Plugin Resources

The KNX Association provides broad support for KNX technology. A Google search will usually produce whatever information is of interest. Some specific links recommended by users Black Cat and Jonas Hellgren on the HS Message Board are

<https://www.peaknx.com/knx-visualisierung-mit-youvi>

<https://www.busbaer.de/en/eisbaer/scada>

<http://www.ilevia.com/>

<https://www.comfortclick.com/BOS/KnowledgeBase/KNX>

4.1 Source Libraries

The Association makes available .NET source code that implements the KNX protocol as part of the Falcon project. This .NET library is used by mcsKNX. This same set of files was used by izKNX plugin which is the one upon which mcsKNX was spawned. The izKNX source code was posted by user NicolaiL on the HS Message Board with link at : https://github.com/NicolaiL/HomeSeer_izKNX

4.2 KNX Virtual

KNX Virtual provides a virtual environment to setup and configure devices. The free version is limited to five devices so it useful for orientation and pointed testing. Annual subscriptions will remove the limitations. One can start at <https://www.knx.org/knx-en/for-professionals/get-started/knx-virtual/index.php>, register and download the simulator. Download of ETS5 is the companion. Several tutorials are available on ETS5 use with a wide range of experience levels being targeted.

4.3 KNXD

The knxd project <https://github.com/knxd/knxd> provides a very flexible tool for interfacing devices to the KNX network. It can be run in tunneling and multicast modes. It includes diagnostics and many command-line options to specify its configuration. My particular use was to configure it as a tunnel to test the tunneling configuration of mcsKNX.

4.4 KNX-MQTT_Bridge

Knx-mqtt-bridge is a node.js implementation of the KNX protocol that is available at <https://www.npmjs.com/package/knx-mqtt-bridge>. It provides the means to listen and send KNX IP protocol and convert it to MQTT protocol. This is an alternative to mcsKNX for those who have a strong MQTT environment. This was my first step into KNX before development of mcsKNX.

Node-Red KNX

Node-Red is a popular integration tool for a variety of automation protocols and devices. The KNX module is described at <https://flows.nodered.org/node/node-red-contrib-knx-ultimate>

4.5 Tasmota - KNX

Tasmota is open source firmware targeted to ESP8266 and emerging ESP32 microcontrollers. The firmware and setup documentation are available at:

<https://github.com/arendst/Tasmota/wiki/KNX-features>

<https://github.com/pauloromeira/Sonoff-Tasmota/wiki/KNX-Features>

The KNX provisions in the firmware allow the microcontroller to act as a KNX widget for basic functionality consisting of switches, relays/lights, temperature sensor and humidity sensor. The Tasmota device was the primary KNX node that I was using during mcsKNX development. Since it provides support for both KNX and MQTT protocols it was valuable in providing a complete environment for testing mcsKNX and the mcMQTT integration of knx-mqtt-bridge. The setup example is shown in Figure 21.

KNX

KNX Parameters

Physical Address

1

.

2

.

0

(Must be unique on the KNX network)

☒ Enable KNX ☒ Communication Enhancement

Data to Send to Group Addresses

Output 1 ▾

->

0

/

0

/

0

Add

Output 1 -> 1 / 2 / 2

Delete

Button 1 -> 1 / 2 / 3

Delete

Humidity -> 1 / 2 / 5

Delete

Temperature -> 1 / 2 / 4

Delete

Group Addresses to Receive Data from

0

/

0

/

0

->

Output 1 ▾

Add

1 / 3 / 2 -> Output 1

Delete

1 / 3 / 5 -> Reply Temperature

Delete

1 / 3 / 4 -> Reply Humidity

Delete

1 / 3 / 3 -> Output 1 Toggle

Delete

Save

Figure 21 Tasmota KNX Configuration

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