



HCA Tech Note 612

Samsung Smart Things Integration (updated 2-Jan-2020)

SmartThings is an integrator of various protocols that uses a hub that provides a protocol independent interface to devices of different types – a bit like HCA. The SmartThings app allows you to add, view, and modify devices and then to perform simple actions on them – programming and scheduling. The advantage of having HCA support SmartThings is that all the device types they support are then available to HCA.

For HCA support, a SmartThings hub must be installed which requires creating a Samsung account. Any devices that will be controlled by SmartThings must be added to your location so the hub can control and receive signals from them.

There are two parts to SmartThings integration with HCA: Inbound notification and outbound control.

We use the term “inbound” to mean signals generated by your SmartThings device and relayed to HCA for processing. The signals “inbound into” HCA from the SmartThings cloud.

“Outbound” is the term we use to describe HCA sending messages to the SmartThings cloud to control devices. These messages are “outbound from” HCA to the SmartThings cloud.

The process to integrate both inbound and outbound are different and are described below.

NOTE: You don't have to do both parts. If you only want to control devices, then you need only follow the outbound instructions. If you only want events, then you must do both inbound and outbound as the inbound messages contain device ids and you will not know what device reported unless HCA has discovered your devices.

NOTE: The response time for outbound control seems excellent (under 2 seconds) based upon testing.

Outbound Control

Step 1: Enable SmartThings into your Cloud Account

The first step is to enable HCA to access your devices through the SmartThings cloud. That authorization starts with your HCA cloud account. From the “HCA Cloud” ribbon category press the “My Services” button. Or go directly to a browser and enter the URL “cloud.hcatech.com”. Then login to your account and go to the “Services” section, if necessary, by picking that from the menu. Find SmartThings in the service list and click on the “+” to begin the process.

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SmartThings

BETA

After the "Please Wait" you will be at the Samsung account login.

 **SmartThings**

SIGN IN WITH SAMSUNG ACCOUNT

Sign in with your Samsung account. After logging in it will ask you to choose a location – you probably only have one.

Allow "Home Control Assistant" to access these things

Select a location for thing access

Select a location

Authorize

Deny

Once the location is selected, then it asks for device authorization.

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Allow "Home Control Assistant" to access these things

Select a location for thing access

My home

- Device(s)
 - Allow (execute, read) on all devices

- Location(s)
 - Allow (read) access for locations

Authorize Deny

Don't untick any of the options, just press "Authorize". Once that is complete, the browser redirects back to the HCA Cloud account and you can log out of your HCA Cloud account.

If you have your HCA Server running, the necessary info has already been passed from the HCA Cloud to your server. If you are using HCA stand-alone you must request that info. From the "HCA Cloud" ribbon category, press the "Outbound Control Manager" button and then press the "Sync Services with my account" button. Even if you are using client-server, you can do that to ensure that you have that service now authorized successfully. If it did then you should see this:

| Service name | Authorization acquired | Service description |
|--------------|------------------------|------------------------------|
| SmartThings | 8/14/2019 10:09 AM | Support SmartThings devices. |

Step 2: Adding the SmartThings Package

For HCA to discover and operate all the devices controlled by SmartThings you next add to your design a package from the online library. Open the library browser ("Design" ribbon category, "Library Browser/Import" button) and locate the SmartThings package and add that to your design.

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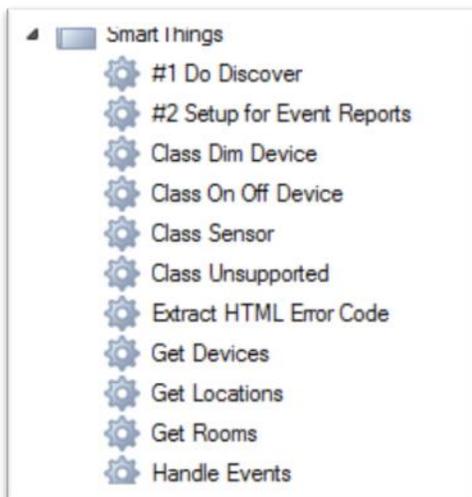
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| Name | Description | Version | Author | Added |
|---------------------------|--|----------|--------------|---------------------|
| Set Keypad LED Brightness | Set the brightness of keypad button LEDs based on... | 1 | Mark Stayton | 2018-10-17 23:16:06 |
| Smart Things | Support for SmartThings - a Samsung protocol integr... | 1 (BETA) | HCA Central | 2019-08-16 18:10:01 |
| Sonos | Programs for control of Sonos equipment | 1 | HCA Central | 2019-02-17 20:01:12 |
| Status Panel | Display to show interface, room, and alert status | 1 | HCA Central | 2019-02-24 13:27:33 |
| Thermostat Class Example | Example of thermostat class | 1 | HCA Central | 2018-10-17 21:59:48 |
| TPLink Module Class | Class for TPLink WiFi Modules | 1 | HCA Central | 2018-10-18 02:01:19 |
| TPLink Light Bulb Class | Class for TPLink WiFi Light Bulbs | 1 | HCA Central | 2018-10-18 02:02:21 |
| Venstar Thermostat Class | Supports the Venstar Thermostat | 1 | HCA Central | 2018-10-18 02:06:20 |

The import creates a “SmartThings” folder containing these programs.



NOTE: there may be more or fewer of these programs as the package evolves.



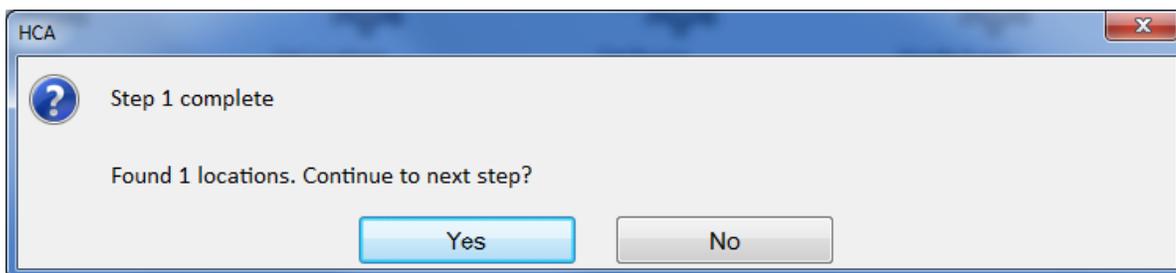
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Step 3: Adding the SmartThings managed devices to your design

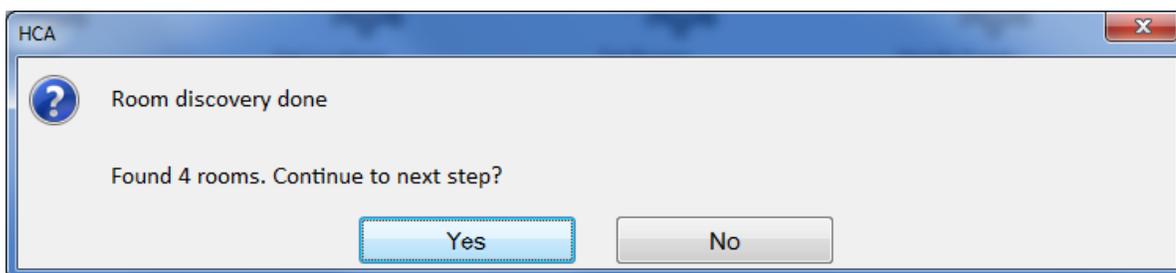
Start the program “SmartThings - #1 Do Discover” and it finds your locations, rooms, and devices.



Press Continue



Press Yes.



Press Yes.

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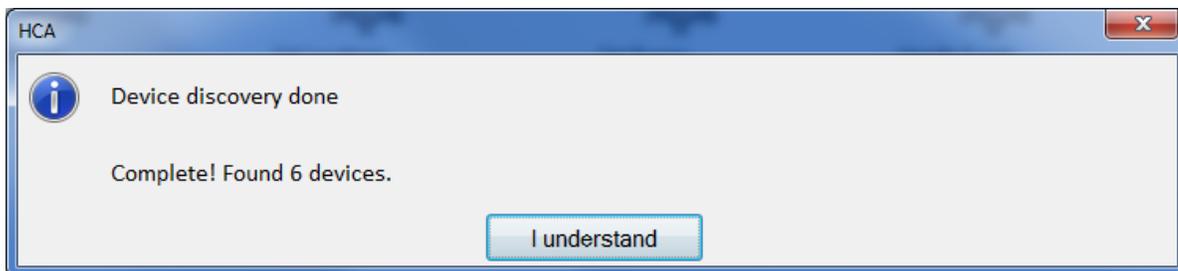


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This last popup is the most important as that shows the names and types of the devices found and added to your design. The part in brackets tells you what HCA can do with them. For example, the “Living room – Outlet” is an ON/OFF device while the “Kids room – Lights” is a dimmable device.

A final popup then appears.



And that completes the operation.

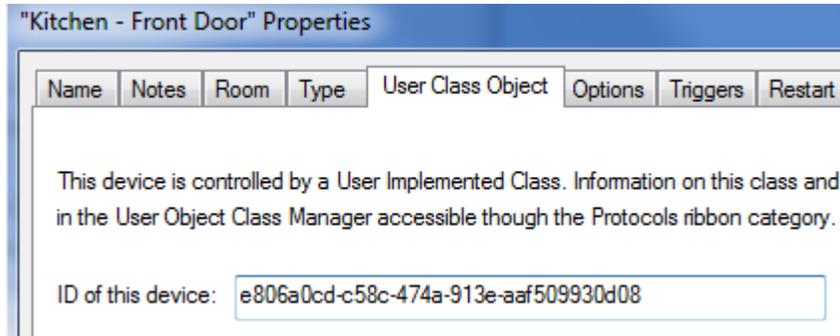
You can rename a device and move it from room to room. That’s ok. The key is what is shown on the “User Class Object” tab of the device’s properties.

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That ID is the way that HCA identifies each device when talking to the SmartThings Cloud. You can't change the ID.

Step 4: Using SmartThings devices

Once the devices are added you can control them like any other HCA device – ON, OFF, set to a percentage if dimmable, schedule it, use in programs, etc. Each action is handled by one of the class programs in the package.

For devices of the “Smart Things Sensor” class you can get their status.

Any devices assigned to the “Smart Things Unsupported” class will be non-functional as this class is a placeholder. See the next section.

NOTE: If a device goes offline – shows in the SmartThings app that it is no longer in contact with the hub, unfortunately HCA has no way of knowing this. When controlled or its state requested, the SmartThings Cloud returns no error.

SmartThings Device Types

The problem (and feature) of SmartThings is that they support so much. Each device is represented by info that the server provides showing the “components” and “capabilities” of a device. SmartThings doesn't provide a simple “type” – from some pre-determined list of available types – and isn't immediately obvious what you can do with a device unless the capability list is examined. The HCA program that discovers your SmartThings devices attempts to understand the capabilities of each device and assigns that device to a class that handles devices with those capabilities.

At this point these classes were created, and each SmartThings device is assigned to one of those classes. The classes are:

- Smart Things Dim Device

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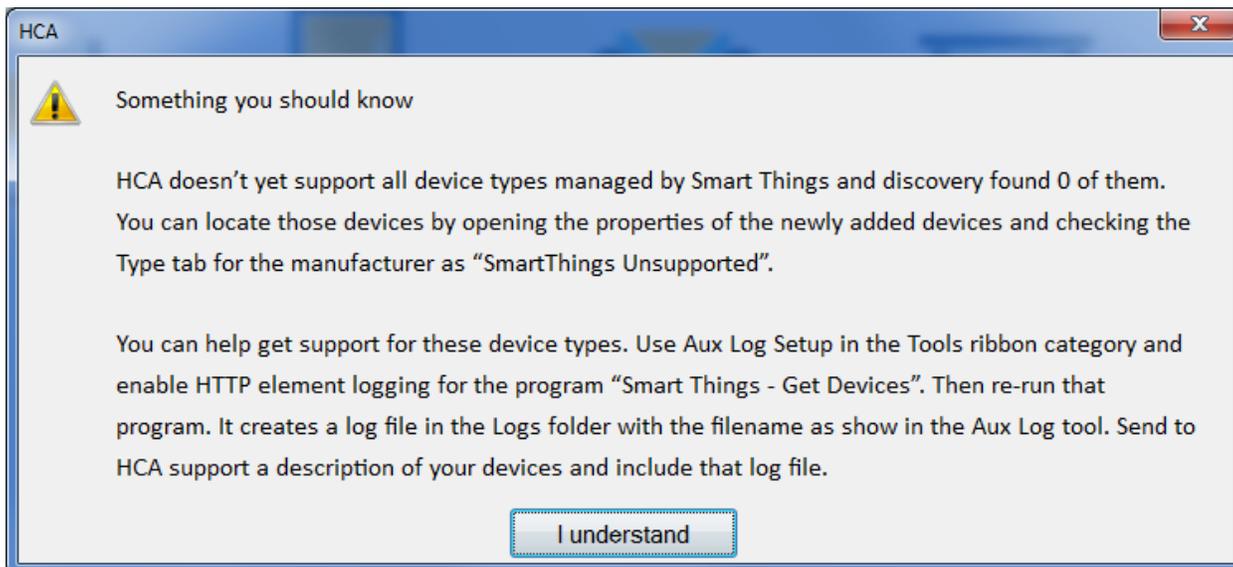


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- Smart Things On Off Device
- Smart Things Sensor
- Smart Things Unsupported

The first two are for dimmable and non-dimmable switches, modules, etc. The third class is for sensors that have some sort of state - contact, motion, button, or water sensor - and the final class is for everything else and is a placeholder so it doesn't allow any control or status reading.

If during the Discover program's execution any of the devices are managed by class "SmartThings Unsupported", a second popup suggests what you should do.



In the SmartThings package in the library is a program called "Check Batteries". When battery powered devices report their full status to the SmartThings hub, they also report other properties, one of which is the battery level. Some devices also report temperature. If the SmartThings programs see these kinds of settings it saves them as tags on the device. For example:

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| Tag Name | Current Value |
|----------------|-------------------------|
| ST_type | SmartSense Multi Sensor |
| ST_devType | Sensor |
| ST_devSubType | contact |
| ST_Temperature | 61 |
| ST_Battery | 90 |

These are shown on the “Tags” tab of a device properties. In this case the multi sensor is reporting a temperature of 61 (better put on a sweater!) and a battery level of 90 percent (good for now). You can schedule the “Check Batteries” program to run once a week or how often you want to, and it sends you email for any device with a battery level getting low. Of course for this to happen you will have to configure HCA to be able to send email. Feel free to modify the program to change how it reports, or the battery level you want to report about.

Because of these tags you can write your own programs to make decisions based upon their values – temperature for example – using the Tag functions in the Compute and Compute-Test programmer element expressions.

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Inbound Notification

For messages to be sent from the SmartThings Cloud to the HCA Cloud and then into your Server, the process is different.

BIG NOTE: Strange as it may sound, Samsung as of 1-Nov-2019 has no way for 3rd party developers to make their SmartApps available to the general public. This is a bit like Amazon providing developers with a way to create apps but provide no app store. This section will change once Samsung gets their act together.

Step 1: Gaining access to the HCA SmartApp

Because of limitations in how Samsung allows 3rd party integrations, for now it is first necessary to authorize you to gain access to our SmartApp.

First take note of the email address you used when you configured the SmartThings app. You can see it in the SmartThings App when you open the menu as it is right at the top.



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kharms1000@gmail.com



In a browser go here and login with your Samsung account – you must use the same email address as in the app.

<https://smarthings.developer.samsung.com/>

Then go here:

<https://smarthings.developer.samsung.com/partner/enroll>

On that page join an existing organization. Enter as the MNID 0AME (the first of the four letters is a zero)

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Join an Existing Organization

Received an invitation to join an existing organization? Enter your company's MNID (Manufacturer ID) and register as a developer.

MNID (Manufacturer ID):

[?](#)

[JOIN ORGANIZATION](#)

* Requires approval from your administrator to join.

Click the “Join Organization” button and then send an email to HCA Support saying that you did this. Then wait until HCA Support responds back saying that you can proceed.

Step 2: Enter Developer Mode

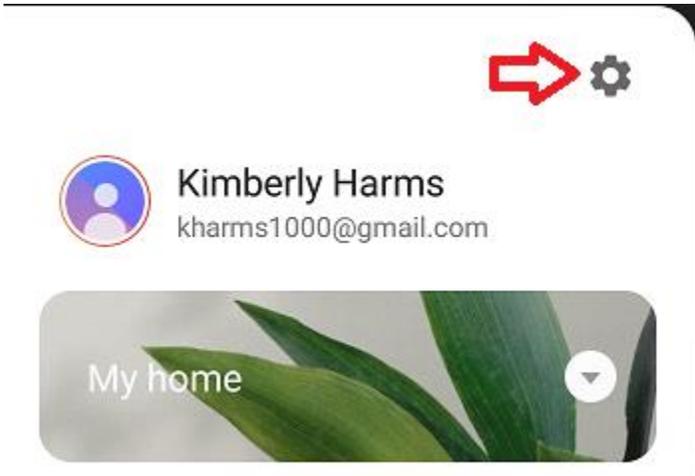
In the SmartThings App, open the menu and click on the gear icon at the top of the menu:

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Open the menu and then tap on the “Gear” icon.

Scroll down to the bottom of the settings page and then long press down on “About SmartThings” for 20 seconds. Nothing will happen until you release and then the “Developer Options” should appear. If it doesn’t then you didn’t wait long enough.

Then enable developer mode by sliding the option to the right.



The app will say it is going to shutdown. After it does, then start it again.

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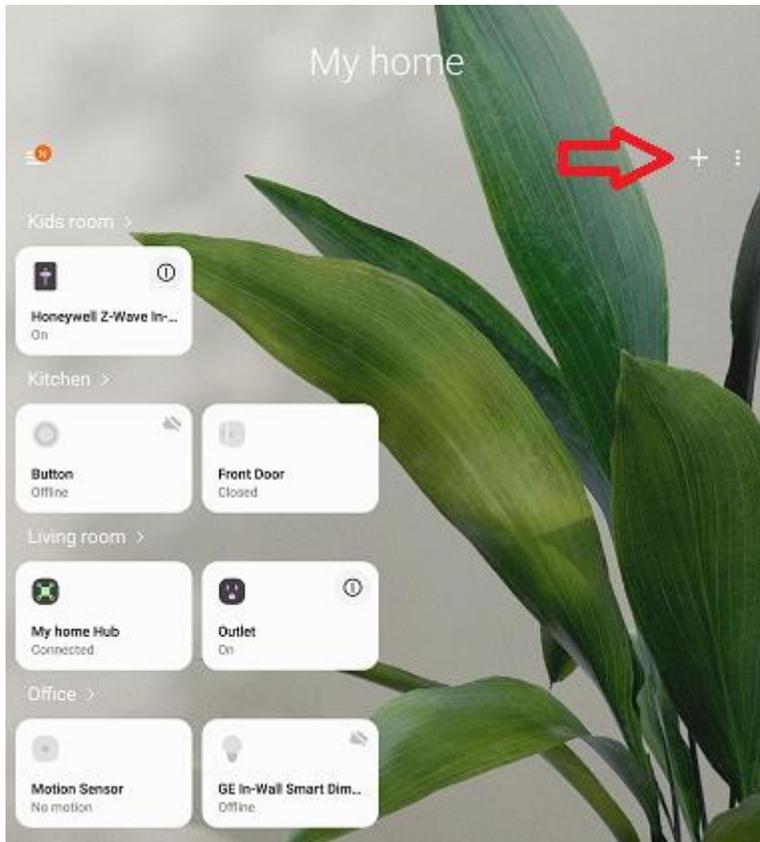
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Step 3: Add the HCA SmartApp

The next step adds the HCA SmartApp to your SmartThings account. This is necessary for HCA to relay events to the HCA Server. Start the SmartThings App on your mobile device.



Tap on the “+” sign

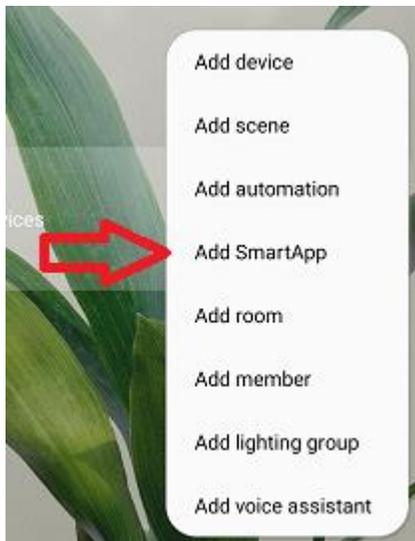
Then tap on “Add SmartApp” in the popup menu.

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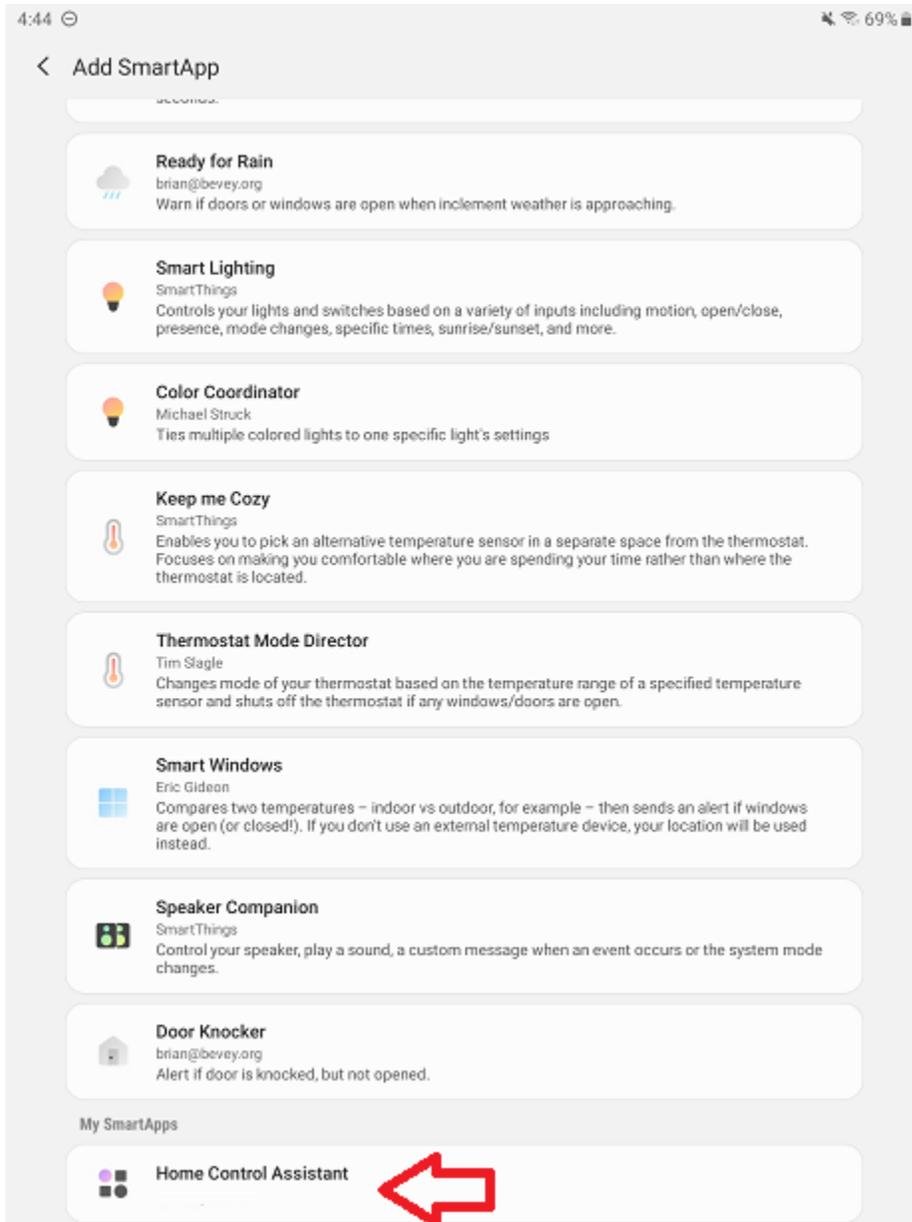


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Scroll down and find the Home Control Assistant SmartApp.

Note: The HCA SmartApp is only available after you have completed joining our organization and enabling developer mode as described above.

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If the HCA SmartApp doesn't appear, then check these things:

#1: The email address shown in the main page of the SmartThings app is the same email address that you were logged into when you did the "Join an Existing organization" and you heard back from support saying go ahead.

#2: You enabled developer mode as described above and you have restarted the SmartThings app.

#3: Go here: <https://smarthings.developer.samsung.com/workspace/> and log in with your Samsung account. At the top it should show this:



It could also say "Private workspace" and if it says that, open the dropdown and change the "Advanced Quonset Tech". If it already shows "Advanced Quonset Tech", change to "Private workspace" and then back to "Advanced Quonset Tech". Then logout of the workspace.

BIG NOTE: While in the workspace change nothing but this one dropdown. Don't change anything in the projects, please!

If you can't get the HCA SmartApp to appear after trying these three steps, send an HCA Support request.

Once you have the SmartApp showing in the SmartThings App, tap on it and the SmartApp configuration page displays and they key sections are at the bottom

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What is the Home Control Assistant?
The Home Control Assistant is a software package that acts as a super smart Hub to integrate devices from multiple platforms into one automation solution using schedules and event processing all under your total control. Take the next step in automation with HCA.

To learn more about HCA and what you can do with it please visit the website.
Home Control Assistant web site

Link to HCA Cloud Account
Before HCA can receive events from Smart Things, you must authorize the connection. Tap HERE and then log into your HCA Cloud account and allow access. When completed you will return here and then press "Done" below. **IMPORTANT: COMPLETE LINKING BEFORE PRESSING DONE.**

Cancel ~~Done~~

NOTE: It is very important that before tapping "Done" that you tap on the "Link to HCA Cloud Account" section!

After tapping on "Link to HCA Cloud Account", you are redirected to the HCA Cloud Login.

Already an HCA user? Login in here:

Username:

Password:

Sign in

Create Account

Forgot Password?

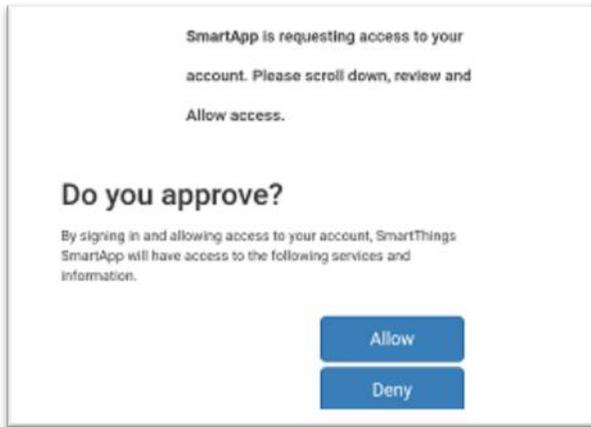
Login with your HCA Cloud name and password

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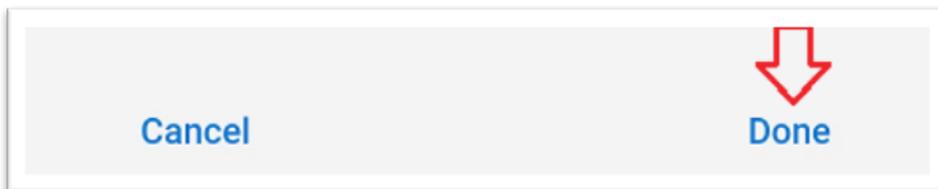


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On this page click "Allow"

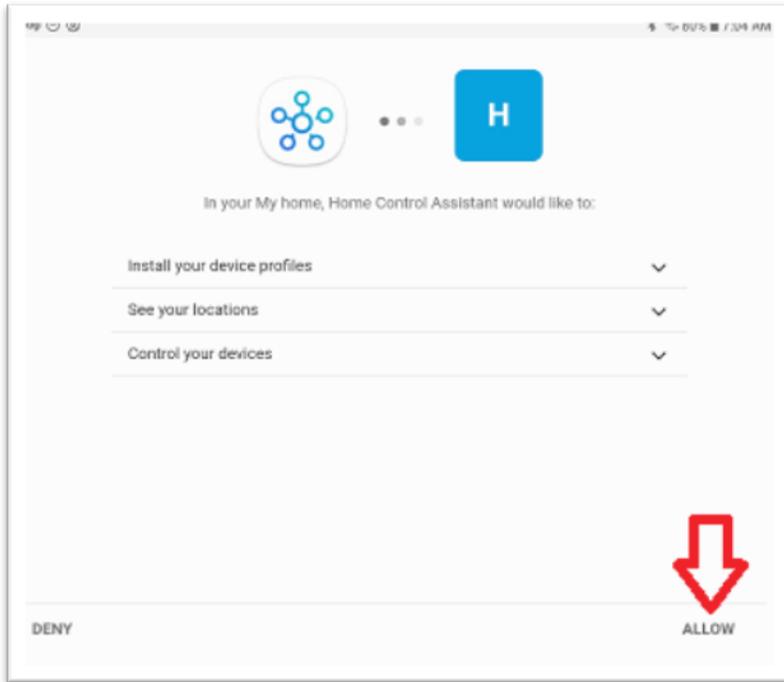
At this point you return to the SmartThings app and it is now OK to click "Done"



Then the next phase begins. SmartThings makes sure you understand that HCA will be able to access your devices. Tap on ALLOW.



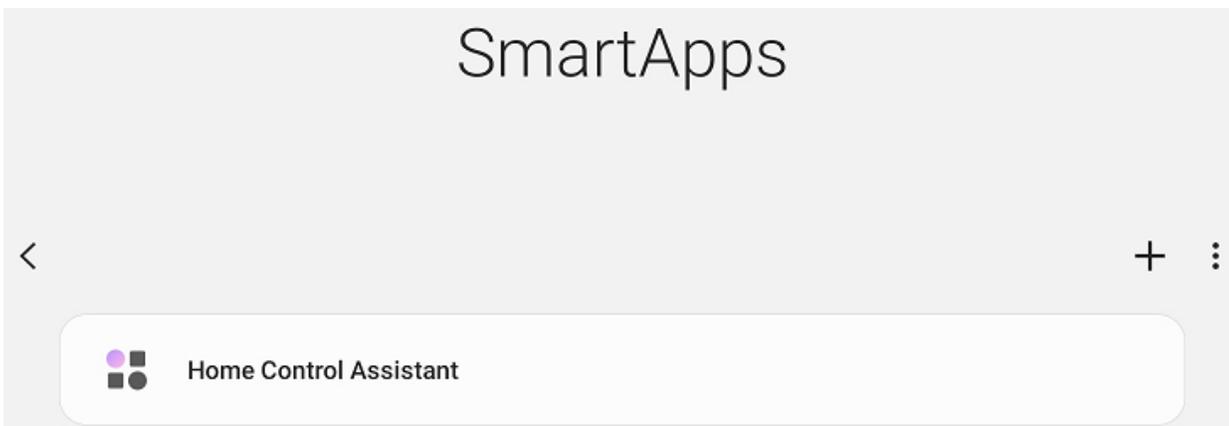
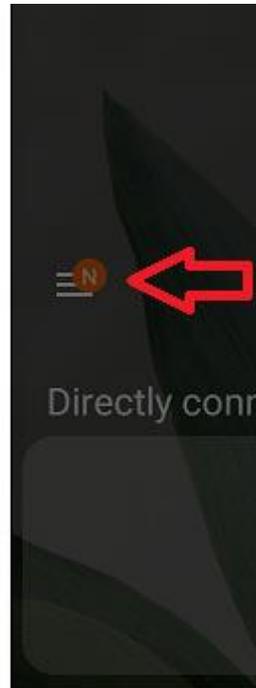
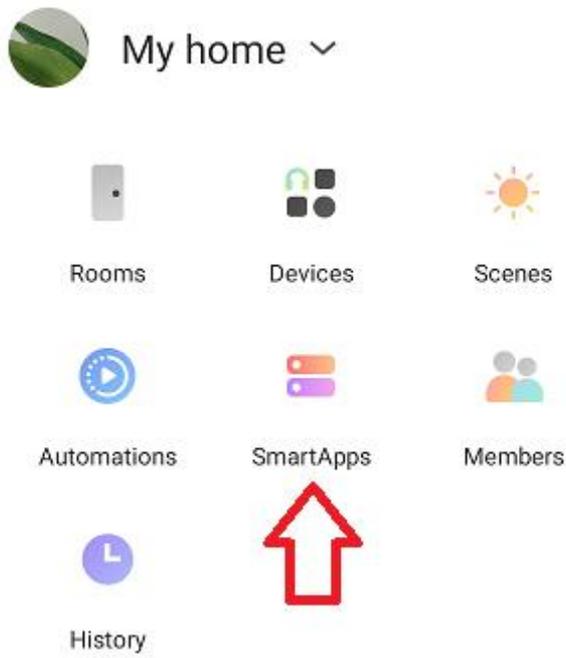
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This completes the process! To confirm that the SmartApp has been added, on the main app page open the menu (the three horizontal lines icon) and then on “SmartApp”



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If ever you should want to remove the HCA SmartApp, long tap on the SmartApp box and it selects, then press *Delete* at the bottom on the page.

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Processing Events

Now that you have added the HCA SmartApp to your account, each time a device managed by SmartThings changes its state, HCA is notified. HCA uses this to keep its state up to date, so it knows if a light is on or off, for example.

In the SmartThings package downloaded from the library is another program called “#2 Setup for event reports”. Run that program. That establishes what is called the “Package Handler”. What this means is that a program in the package (SmartThings – Handle Events) gets the first chance to process the event that comes in from the cloud.

When an event arrives from the SmartThings cloud, the “Package Handler” processes it to update HCA state. But you may want to process the event yourself. There are two ways to do that. Here are two examples.

Responding to a device that changes state based upon an event

When a motion sensor sees something move, it sends an event that is processed by the Package Handler program. That looks at the event data and sees that it applies to a motion sensor, so it changes the state HCA has for that sensor to be “ON”. You can create a program that triggers on a change of state for that device from OFF (inactive) to ON (active). Create a trigger on your program like this:

If you want to respond to the motion sensor going inactive, add a second “ON to OFF” trigger and then in the program, test for the trigger that stated the program.

In HCA everything is either ON or OFF. With sensors their state is ON/OFF but the meaning depends upon the sensor.

| Device Type | OFF means | ON means |
|-----------------|----------------------|------------------------|
| Motion Sensor | Inactive (no motion) | Active (Motion) |
| Contact Sensor | Close | Open |
| Water Sensor | Dry | Wet |
| Presence Sensor | Not present | Present |
| Button | (both) | Pushed / double / held |

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Responding to an event directly

When the state change trigger works fine for events that change the state of the device, some events don't do that, and you must process the event yourself. To create a handler program, from the "HCA Cloud" ribbon category, click on the "Inbound Notification Manager" button.

The Inbound Notifications Manager shows the services HCA is authorized to receive notifications from. In this way, when a notification is received, an event handler program starts supplied with the event details and you can process it in any way you choose.

Listed below are all the services that HCA can use and the event handler program for each if one exists.

There are two steps to configuring this. Typically, these services require that you authorize HCA to receive events. In the Cloud ribbon category use the "My Services" button to perform that authorization. In this manager dialog, select the service you want to create an event handler program and press the "Assign" button.

| Service name | User Handler Program | Package Handler Program | |
|------------------------------|----------------------|-----------------------------|--|
| SmartThings SmartApp Service | | SmartThings - Handle Events | |
| Ring Service | | | |
| Nest Service | | | |
| HCA Developer Service | | | |

Assign Notification Handler

SmartThings

This service accepts messages from the SmartThings Cloud when it reports an event.

Before this event handler can receive messages from the SmartThings Cloud, you first must add the HCA automation to your SmartThings account using the SmartThings App. Complete instructions on how this is done is on the HCA Support web site in the [SmartThings Notes](#). You should review this before going further.

The parameters to the handler program are:

1. Service name
2. JSON as supplied from SmartThings Cloud
3. Name of HCA device effected
4. Attribute
5. Value

The JSON contains lots of information and is best understood by consulting the SmartThings developer web site. The event handler in the SmartThings package processes the event first and then starts your handler program. While the complete JSON is provided as an argument to your program, the package event handler has pre-processed some of the JSON into a more manageable form and provides it as arguments to your program. The arguments contains the name of the effected HCA device, the event attribute, and the event value. For example tapping on a switch paddle provides the "switch" attribute and a value of "on" or "off". A contact sensor provides the ""contact" attribute and a value of "closed" or "open".

Close

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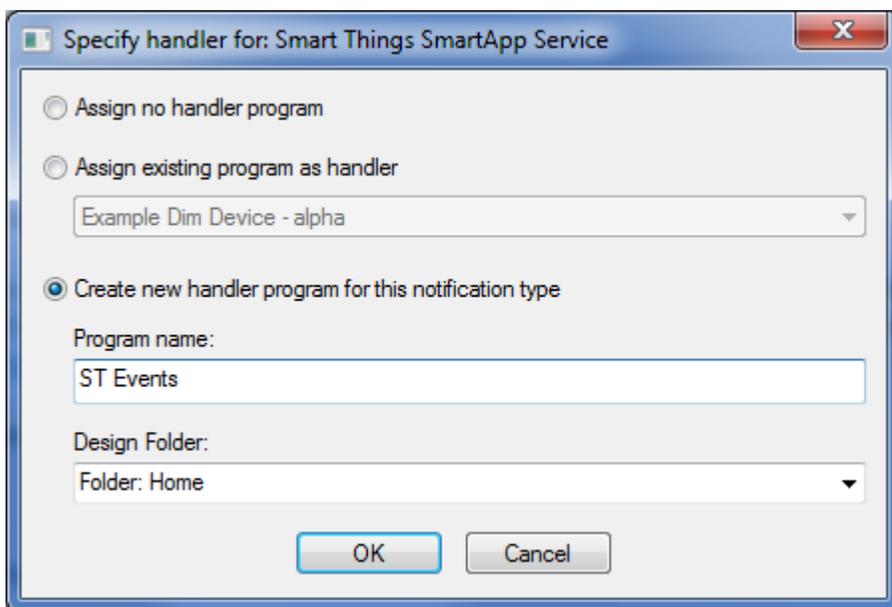
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Select the “Smart Things Smart App Service” and press the *Assign Notification Handler* button.

Name the new program by choosing a folder and entering a program name.



Press OK and the program is created. The display updates to show that your handler program is in place.

| Service name | User Handler Program | Package Handler Program |
|------------------------------|----------------------|-----------------------------|
| SmartThings SmartApp Service | Home - ST Events | SmartThings - Handle Events |
| Ring Service | | |
| Nest Service | | |
| HCA Developer Service | | |

The handler program created is very small as it is just to give you a starting point. You will have to buildout the program to do make it what you want. The program is started with these five parameters.



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Parameters

Count: 5

| | Name | Type |
|--------------|--|------------------------------------|
| Parameter 1: | <input type="text" value="serviceName"/> | <input type="text" value="Value"/> |
| Parameter 2: | <input type="text" value="json"/> | <input type="text" value="Value"/> |
| Parameter 3: | <input type="text" value="device"/> | <input type="text" value="Value"/> |
| Parameter 4: | <input type="text" value="attribute"/> | <input type="text" value="Value"/> |
| Parameter 5: | <input type="text" value="value"/> | <input type="text" value="Value"/> |

The JSON supplied is exactly what comes from the SmartThings cloud and contains lots of information most of which isn't useful. The SmartThings package event handler program has already processed it before passing it on to your handler. It has already found the device that is affected and information about what happened (the attribute and value).

Really, the only way to figure out what's what is to try some things and see what the values of those parameters are. You can also enable "inbound service message" logging in the "Tools" ribbon category, "Aux Log Setup" tool.

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Aux Log Setup

Unlike the main logs that show actions for devices and programs, there are auxiliary logs that are mainly used for determining if a specific HCA feature is working or a program interacting with an external service is functioning as you expect.

Logs for HCA features

| | | |
|------------------------|----------|---|
| Messaging send | Disabled | |
| Messaging receive | Disabled | |
| HUE devices | Disabled | |
| NEST devices | Disabled | |
| Network devices (ping) | Disabled | |
| Weather provider | Enabled | <Logs folder> Weather_mmdd.log |
| Inbound Service Msgs | Enabled | <Logs folder> Cloud Inbound <service name>_mmdd.log |

Logs for Program elements

| | |
|------------------|--------|
| Camera element | Select |
| HTTP element | Select |
| Port I/O element | Select |

Once logging is enabled, the event message containing the JSON is saved in a file in the “Logs” sub-folder of the HCA documents area on the computer that executes the HCA Server. You can cut and paste this into a JSON display program and determine what elements you want to access using the `_JSONOpen`, `_JSON` functions in your program.

One good JSON display tool (there are others):

<http://json.parser.online.fr/>

##end##

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