



# HCA Tech Note 102

## Checkbox Control

There is a lot you can do in HCA to achieve many functions within your home without any programs or schedules. These features are collectively called “Checkbox control” as many of the items are enabled or disabled by a checkbox tick or by a selection from a choice of options. This tech note discusses these items:

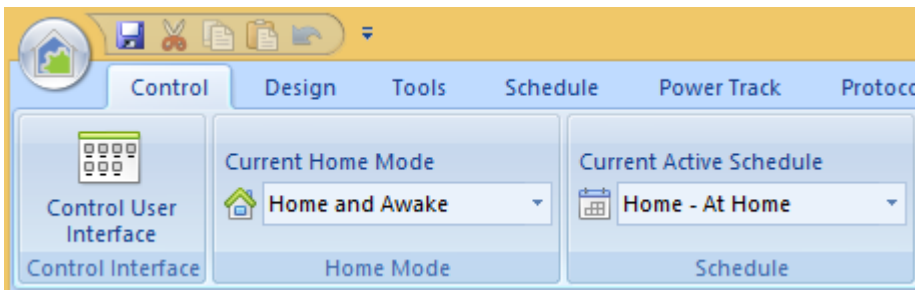
- Home Modes
- Device Auto Off
- Rooms & Room Auto Off

### Home Mode – aka “Green Mode”

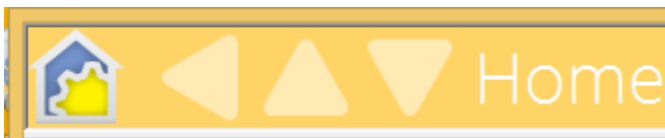
HCA has the concept of a mode that your home is in at any time. By default, HCA has three modes that are added to each new design: “Away”, “At Home and Asleep”, and “At Home and Awake”. These are hopefully consistent with how you occupy your home. HCA has up to 4 different modes and the 4<sup>th</sup> one isn’t defined automatically in new files.

While each new file gets these three modes with those names, you can change the names and usage of any of the four modes. Some users have found that using the 4<sup>th</sup> mode as a “Vacation” mode can be useful.

You can see the current home mode anytime by a dropdown in the development UI ribbon. It shows the current mode and you change it by making a new selection in the dropdown.



In the Control UI, the home mode is reflected by the icon at the right-end of the Window title bar,



The mode is “Home and Awake”.



The mode is “Home and Asleep”.



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The mode is "Away".

In the Control UI, you can change the home mode manually by tapping on the mode icon to open the Control Panel and in there are options for selecting the home mode to change to.

Any device can be configured to respond when a home mode is changed. There are different actions for when a new mode is entered and also what happens while in that mode. To configure these actions, open the device properties and look on the "Green" tab.

Green mode settings for this device.

Mode	Action when entering mode	Response while in mode
Home & Awake	Do nothing ▼	Behave normally ▼
Home & Asleep	Do nothing ▼	Behave normally ▼
Away	Go Off ▼	Suspend all actions ▼

Listed in this section of the tab are the home modes and what action to take when entering the mode and the response of the device while in that mode. The choices when entering the mode are:

- Do Nothing
- Go Off
- Go On

Without going any further, let's do an example to show how useful a feature this is. Imagine a "Go to bed" button you press on the way to bed. You want that button to turn off anything that you don't want left on all night. In the HCA Home Modes dialog, you can configure a trigger for a mode change and in this example you would use that keypad and button.

Then all you need do is to set the properties of each device to be turned off when you go to bed as:





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One device or 50 devices it's all the same. Just changing the home mode affects all the devices so configured.

Another example is that you might want some devices to come on when you arrive home (entering the "Home and Awake" mode) or when you get up in the morning. The settings for that are:

Home & Awake    Go On    Behave normally

The key point to take away is that each device says how it wants to respond. To change the action of the device vis-à-vis the home modes, all you need do is to change the configuration of the device.

The second column of this dialog section is "Response while in mode" has these options:

- Behave Normally
- Suspend all actions

The best way to explain this is by an example. Suppose that you have a light that you want to control to ON at dusk. This is an interior light so it doesn't make much sense for it to come on when you are not at home. While there are many ways to do this – different schedules, a program that tests conditions before controlling the light – but the simplest method is to schedule the light to come on at dusk every day. Then configure that device so that when in the "Away" mode the device suspends all actions. "All actions" in this case means that the device isn't controlled by a schedule or programs.

There is still a schedule. The schedule still has an entry for this device to turn on at dusk. It is just that at dusk when the schedule entry is executed nothing happens because the home is in "Away" mode. This is much simpler than creating a different schedule or a program that tests conditions before controlling the light.

## Taking advantage of this feature

To take advantage of this feature you should consider how HCA knows when to transition the home from one mode to another. There are many ways to do this:

- A keypad button that triggers a mode change by configuring the Home Mode triggers.
- Using the "Network Devices" tool that can keep track of mobile devices when they connect and disconnect from your home WiFi to figure out when anyone or no one is at home.
- If you use the iOS tablet or phone mobile applications you can configure Geo Fences that start programs that change the home mode.



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Then all you need do is to think about how you interact with your home and configure the devices as needed. When creating schedules with the home mode concept in mind, you may only need a single schedule rather than a different schedule for when you are home and another when away. The “Response when in mode” device settings takes care of suppressing schedule entries when their actions are not appropriate.

## Auto Off

The Auto Off feature is like having a timer built into each device so that it is controlled to a different level – probably to OFF - after “n” minutes of being controlled to ON. But the timer is very smart! The Auto Off settings for a device are also on the device properties dialog “Green” tab.

Auto Off

When Light	go to percent	0	10	minutes after ON
When Dark	go to percent	20	5	minutes after ON
Unused	go to percent	0	0	minutes after ON

0 minutes before going to its auto-off level dim to 50 percent

When receive ON/DIM from device during auto off countdown ...	When receive OFF from device during auto off countdown ...
<input type="radio"/> Does not effect auto off timer	<input type="radio"/> Does not effect auto off timer
<input checked="" type="radio"/> Restarts auto off timer	<input type="radio"/> Restarts auto off timer
<input type="radio"/> Cancels auto off timer	<input checked="" type="radio"/> Cancels auto off timer

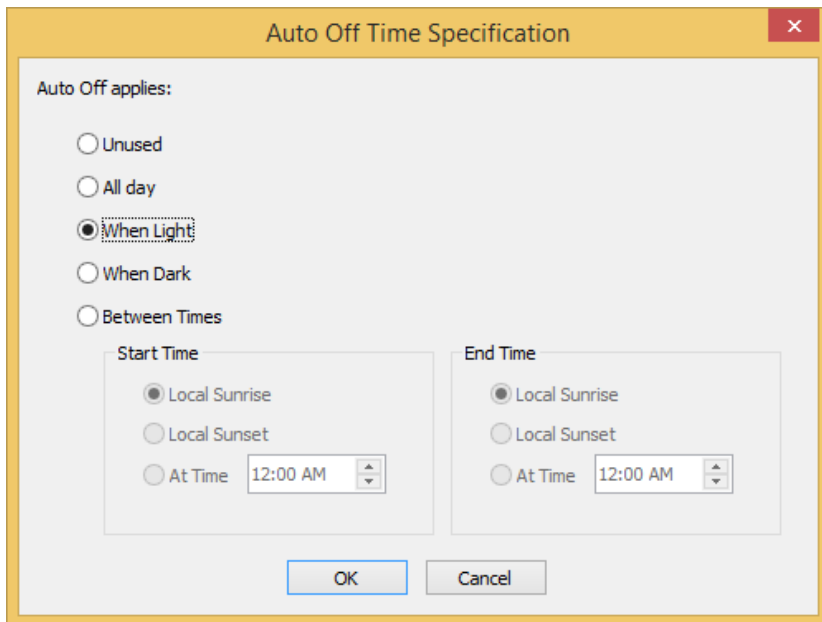
There are three parts to configuring an auto off specification to answer these questions:

- When does the auto off specification apply?
- What should the auto off do?
- How is the auto off countdown timer managed?

You can supply from one to three answers for the first two points. Each of the three buttons opens a dialog where you set when the auto off should happen.



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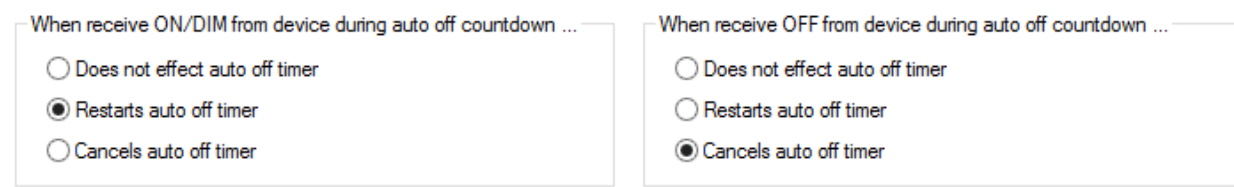
The condition for when an Auto off applies are set in this dialog. Choices are at any time, by light and dark, or by time. In this way, you can create a different auto off timer that happens during the day, and others at night or only at certain hours.

Once you have set the condition for when the auto off applies, next is to specify what happens. This is back in the “Green” tab where you set the number of minutes the countdown timer runs and the level to go to when it reaches zero.

**Note:** While this feature is called “Auto off” it really doesn’t have to be that. It could just as easily be an “Auto On”. You could configure it so that after 10 minutes, for example, that the light goes to 100%.

You may note at this point that you can create conflicting specifications. The first specification could be for “when light” and the second for “when dark” and the third for something else. Clearly the third case doesn’t matter as it is either light or dark so one of the first two always applies. HCA looks at the conditions top to bottom and the first one that is valid for the current conditions is used.

The final step is to decide how the countdown timer should be managed. This is in the bottom section of the dialog.





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This configuration section is only useful if the device reports when locally controlled to HCA. That is, when you tap on the switch paddle it sends a message out reporting what has happened. If this is the case, then you can use this configuration to make the timer behave differently.

An example is the best way to show the utility of this.

Suppose you have a switch in a room. Someone walks in and taps the switch to turn the light on. Since you have configured it to go off in 10 minutes it would be nice if you had a way to make that not happen. It is very annoying when a light goes out unexpectedly.

To continue this example, suppose that after a few minutes the person taps the paddle again. In that case you might want to cancel the auto off timer, or restart the timer to provide for a fresh 10 minutes. Both of those possibilities can be configured for. You can also specify different actions if an OFF or ON is received from the switch.

There is one more feature in this configuration. You can specify that ‘n’ minutes before the countdown timer expires that the device is controlled to a level. This is typically used to dim the device down one or two minutes before the timer expires to warn the person that the lights are about to go off.

## Taking Advantage of this feature

Auto off, like home mode control, is specified on a device by device basis. With the level of configuration for the auto off – when it happens, what happens, and how the countdown timer is controlled – you should be able to express the different scenarios needed for devices in your home.

If you have noticed the “Light” and “Dark” options and are wondering how HCA knows if it is light or dark, then you should look in the Home Properties dialog. Light and Dark can be determined in many ways using time, light sensors, and astronomical computations of sunrise and sunset based upon your location.

As a final note on auto off, and even though we are avoiding talking in this note about HCA programs and schedules, if a device auto off exists then regardless of how the device was turned on the auto off happens. The control of the device could have happened by a program, schedule, or even you interacting with the HCA UI or a mobile client application. It’s all the same. This can make setting up programs when you just need to control the device to ON and then exit the program. The auto off controls it OFF when needed.

## Rooms & Room Auto Off

Rooms are a concept HCA uses to both contain devices and to define how the room and the devices interact. Some of the devices in the room can be designated as contributing to determining the state of the room – is the room ON or is the room OFF? While other devices can be configured to “follow” the room – when the



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room becomes ON these devices are controlled to ON and when the room goes OFF, then these devices go OFF as well.

The configuration for how a device interacts with the room are made as part of the device's state on the Room tab.

Office - Lights Properties

Name Notes Room Type UPB Id Triggers Options Restart Icon Display Key Names Log Groups Schedule References Power Track Green

In HCA a room is more than a container for a set of devices, programs, and groups. A room can be controlled and in turn controls contained devices. Rooms can also have auto-off settings and the room auto-off can affect contained devices. On this tab are the settings that configure how the room and this device interact.

The state of this device participates in determining if the room is ON or OFF:

When LIGHT: This devices responds to a room ON by going to 0 percent

When DARK: This devices responds to a room ON by going to 0 percent

When LIGHT: This devices responds to a room OFF by going to 0 percent

When DARK: This devices responds to a room OFF by going to 0 percent

Transmissions from this device can trigger a room auto-off specification

When room is OFF ...

... and receive OFF from the device Ignore

... and receive ON/DIM from the device Ignore

When room is ON ...

... and Room Auto Off Timer IS NOT running ...

... and receive OFF from the device Ignore

... and receive ON/DIM from the device Ignore

... and Room Auto Off Timer IS running ...

... and receive OFF from the device Ignore

... and receive ON/DIM from the device Ignore

OK Cancel

The first checkbox of the first section of this dialog answers the “does this device help determine the state of the room” question. There may be more than one device in the room that participates in determining its state. If so then these rules apply:

- If any device that participates in determining the room state is ON, then the room is ON.
- If all devices that participates in determining the room state are OFF, then the room is OFF.

The other checkboxes in this section determines how the device responds to the change in state of the room. There are four states to configure:



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- When the room goes ON and it is light
- When the room goes OFF and it is light
- When the room goes ON and it is dark
- When the room goes OFF and it is dark.

At this point an example may help clarify things.

Suppose you have a room with a motion sensor and one or more lights. The motion sensor can determine the state of the room and the lights can follow the state of the room. In the simplest case, when the motion sensor sees motion, the lights come on. When the motion sensor stops seeing motion, the room goes off and the lights go off as well.

That sounds simple – and it is! And you could do this directly with device linking. But using this feature you can achieve different effects when light or dark. And even more importantly you can choose to only handle the ON from the motion sensor and not the OFF. You can't do any of that with direct linking.

The lower part of the dialog is all about room auto off specifications and can get complex so we will go slow with some examples.

The first point is to know that rooms like devices can have an auto off countdown timer. Like a device auto off timer, once the room countdown timer reaches zero, then the room is turned OFF and those devices that are configured to follow the room state are then controlled to OFF.

The room auto off is configured on the properties of a room on its “Green” tab.

Room Auto Off

Unused	control room to OFF	0	minutes after room ON
Unused	control room to OFF	0	minutes after room ON
Unused	control room to OFF	0	minutes after room ON

This is similar but a bit simpler than the device auto-off as the room auto-off is always a true auto-off as there is no selection of a level. Again, like a device there are three different configurations possible to answer the question of when does the auto off apply.

How is that auto off countdown timer managed? As we covered above, In the case of a device you can control the timer by the reception of a transmission from the device: If a message is received from the device when it is locally controlled, then the timer can be cancelled, restarted, or ignored.





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In a similar manner, the room countdown timer is managed by the transmission from devices in the room. If the device is one that can control the auto off timer you must enable that with the checkbox on the device's room tab.

Transmissions from this device can trigger a room auto-off specification

Once enabled then you can specify how the room countdown timer is controlled by this device. Each of the dropdowns offer three options: Ignore, Start/Restart the timer, Cancel the timer.

When room is OFF ...

... and receive OFF from the device

... and receive ON/DIM from the device

When room is ON ...

... and Room Auto Off Timer IS NOT running ...

... and receive OFF from the device

... and receive ON/DIM from the device

... and Room Auto Off Timer IS running ...

... and receive OFF from the device

... and receive ON/DIM from the device

Here are three examples that may help you see how all these configuration parameters interact.

## Example 1

Suppose a room contains a motion sensor and a switch. Here is what we want to have happen:

- You walk into the room. The motion sensor sees you. A light comes on and an auto-off timer starts.
- If you leave the room, then when the timer expires the light goes out.
- If you stay in the room, then each time the motion sensor sees you the timer is restarted.
- If you change the light level using the switch, the timer is canceled and not restarted until the room is off and the motion sensor again sees something.

Here is the room auto off specification for the room that contains the two devices we are working with.

Room Auto Off

All Day	control room to OFF	5	minutes after room ON
Unused	control room to OFF	10	minutes after room ON
Unused	control room to OFF	15	minutes after room ON



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Here is the configuration for the motion sensor and the switch:

## Motion sensor

The state of this device participates in determining if the room is ON or OFF

When LIGHT: This devices responds to a room ON by going to  percent

When DARK: This devices responds to a room ON by going to  percent

When LIGHT: This devices responds to a room OFF by going to  percent

When DARK: This devices responds to a room OFF by going to  percent

Transmissions from this device can trigger a room auto-off specification

When room is OFF ...

... and receive OFF from the device

... and receive ON/DIM from the device

When room is ON ...

... and Room Auto Off Timer IS NOT running ...

... and receive OFF from the device

... and receive ON/DIM from the device

... and Room Auto Off Timer IS running ...

... and receive OFF from the device

... and receive ON/DIM from the device

## Switch

The state of this device participates in determining if the room is ON or OFF

When LIGHT: This devices responds to a room ON by going to  percent

When DARK: This devices responds to a room ON by going to  percent

When LIGHT: This devices responds to a room OFF by going to  percent

When DARK: This devices responds to a room OFF by going to  percent

Transmissions from this device can trigger a room auto-off specification

When room is OFF ...

... and receive OFF from the device

... and receive ON/DIM from the device

When room is ON ...

... and Room Auto Off Timer IS NOT running ...

... and receive OFF from the device

... and receive ON/DIM from the device

... and Room Auto Off Timer IS running ...

... and receive OFF from the device

... and receive ON/DIM from the device



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Here is a timeline of what happens:

1. The room is off.
2. The motion sensor sees you and starts the timer. This is because the motion sensor has the setting enabled to trigger an auto-off specification and that specification says when the room is OFF and an ON command is received, the timer is started.
3. The motion sensor participates in determining if the room is ON so the room goes ON since the motion sensor is ON. When the room goes ON, the light in the room is sent a command to go ON. The light is marked as responding to the room going ON so it is sent a command to go ON.
4. Each time you move, the motion sensor restarts the timer. This is because the motion sensor options say that if the room is ON and a command is received when the auto off timer is running, then the auto off timer is restarted.

Before we continue, it is important to say something about the motion sensor when it sends an OFF. All that it does is to have the state of the motion sensor device be recognized by HCA as OFF. It doesn't control anything. That's because all its settings for receipt of an OFF say "ignore".

5. If you have not locally controlled the switch and you leave the room, then eventually the motion sensor state goes to OFF. Then the room auto off timer finally expires and then turns the room off.
6. If you stay in the room and you change the light level at the switch, the timer is canceled. This is because the switch is marked such that if the room is ON and the timer is running and a command is received from the switch then the timer is canceled.
7. Since the room remains on – the light is on and that participates in the room state - and the timer not running, the motion sensor now has no effect. The room is still ON since the light is ON. And when a command is received from the motion sensor it is ignored. You must turn the light off manually when you leave the room.

In this example the motion sensor controlled only a single light but it could just as easily control multiple lights.

## Example 2

In this second example, there are two lights in the room and no motion sensors. Here is what we want to happen:

- You walk in the room.
- You turn on one switch
- An auto off timer starts
- You turn on a second switch
- The timer should be canceled because by turning on a second light you are saying you want to stay in the room.



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And since you may turn on either light first, the settings of each light must be the same. Here are the settings for both devices:

The state of this device participates in determining if the room is ON or OFF

When LIGHT: This device responds to a room ON by going to  percent

When DARK: This device responds to a room ON by going to  percent

When LIGHT: This device responds to a room OFF by going to  percent

When DARK: This device responds to a room OFF by going to  percent

Transmissions from this device can trigger a room auto-off specification

When room is OFF ...

... and receive OFF from the device

... and receive ON/DIM from the device

When room is ON ...

... and Room Auto Off Timer IS NOT running ...	... and Room Auto Off Timer IS running ...
... and receive OFF from the device <input type="text" value="Ignore"/>	... and receive OFF from the device <input type="text" value="Ignore"/>
... and receive ON/DIM from the device <input type="text" value="Ignore"/>	... and receive ON/DIM from the device <input type="text" value="Cancel Timer"/>

Here is a timeline of what happens:

1. The room is off.
2. You enter the room and turn on a light. That starts the room auto off specification since it has the “transmission from this device can trigger a room auto off specification” enabled. Since the device participates in determining if the room is ON or OFF, the room is marked as ON. The other light doesn’t come on since it is marked as following the room.
3. You turn on a second light. Since the room is already ON and the room auto off timer is running, then the reception from this switch cancels the auto off timer.

If you didn’t control that second light, then the room auto off timer would eventually count down to zero and the light would go OFF.

If you had a third light in the room, since the room is ON and the timer is not running, controlling that light would have no effect.

## Example 3

This example is simpler than the first two. Here is what we want to happen.

- You walk into the room
- The motion sensor detects you so the lights come on and starts a room auto off timer.
- You change the light level at the switch. You want the auto off timer to restart but not to be cancelled.
- Each time the motion sensor sees you the timer should be restarted.



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- If you turn off the lights manually then the timer should be cancelled.

## Switch settings:

The state of this device participates in determining if the room is ON or OFF

When LIGHT: This devices responds to a room ON by going to  percent

When DARK: This devices responds to a room ON by going to  percent

When LIGHT: This devices responds to a room OFF by going to  percent

When DARK: This devices responds to a room OFF by going to  percent

Transmissions from this device can trigger a room auto-off specification

When room is OFF ...

... and receive OFF from the device

... and receive ON/DIM from the device

When room is ON ...

... and Room Auto Off Timer IS NOT running ...

... and receive OFF from the device

... and receive ON/DIM from the device

... and Room Auto Off Timer IS running ...

... and receive OFF from the device

... and receive ON/DIM from the device

## Motion sensor settings:

The state of this device participates in determining if the room is ON or OFF

When LIGHT: This devices responds to a room ON by going to  percent

When DARK: This devices responds to a room ON by going to  percent

When LIGHT: This devices responds to a room OFF by going to  percent

When DARK: This devices responds to a room OFF by going to  percent

Transmissions from this device can trigger a room auto-off specification

When room is OFF ...

... and receive OFF from the device

... and receive ON/DIM from the device

When room is ON ...

... and Room Auto Off Timer IS NOT running ...

... and receive OFF from the device

... and receive ON/DIM from the device

... and Room Auto Off Timer IS running ...

... and receive OFF from the device

... and receive ON/DIM from the device



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Timeline of what happens.

1. You walk into the room and the motion sensor sees you and sends an ON to HCA. Since the motion sensor participates in the room state, the room is now ON. When the room goes ON, the switch is sent a command to go ON.
2. As long as the motion sensor sees you the timer keeps getting reset.
3. You change the light level of the switch. The timer is restarted. When the motion sensor next sees you, the switch is not sent a command so the light doesn't change its level. Why? Because the switch is only sent a command when the room goes from OFF to ON and it is already ON.
4. You turn off the switch at the paddle. While the room may still be on – the motion sensor is the only determinate of that – the timer is cancelled.

The interaction of devices, rooms, and room auto-off can be complex but there is a lot of power in the concept. Hopefully the above examples will get you started.

Once nice feature of the HCA log is the ability to record when auto off timers are set, reset, and expire. On the Tools ribbon category, there is a button for Log Setup.

What to log

- Turn logging on
- Log commands sent
- Log commands received
- Log when programs start and stop
- Log executed program elements
- Log each time a variable value changes
- For protocols that separate addresses from commands, log received address separate from command
- Log room on/off and auto off timers for devices and rooms 

Enabling this option does generate extra log entries but it may help you configure the device and room auto off settings correctly.

##end##