

Chapter 20

Troubleshooter

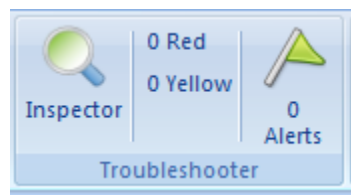
Once you have been using the Home Control Assistant for a while, you will probably want to look at the Troubleshooter. The Troubleshooter is a set of several tools you can use to make sure that your home design is working the way you want it to.

Overview of the Troubleshooter

The Troubleshooter consists of three tools:

- Inspector
- Alert Manager
- Log Viewer and Configuration

The composite of how things are working appears in the ribbon *Home* category *Troubleshooter* panel and tells you several things at a glance.



There are two parts to look at. The right and middle report what the Inspector has found and the left side reports what the Alert manager reports. To open the Inspector click on the left side. To open the Alert manager click on the right side.

Before getting into each of these tools it is important to first understand the differences between what the Inspector reports and what the Alert Manger reports.

The Inspector reports on potential problems that can determined from a static analysis of your design. The Alerts Manger looks for problems that occur over time while the system is running. It looks for dynamic problems.

The Inspector

The Inspector is a tool that locates and describes possible problems in your home design. It serves as a check on your design, and can point out potential difficulties before they create a problem in controlling your home.

As you work with objects in your home design, HCA observes errors or anomalies in many different places, and records them as they are encountered. The Inspector pulls all these error reports together into one place. Not everything it describes is necessarily a problem, but you should look into each item it notices.

Some of the problems (there are many more) the Inspector checks for are:

- Is there more than one device with the same primary address?
- Has a schedule been selected as the normal start schedule?

- Does any schedule contain schedule entries tied to specific calendar dates that are now gone by?
- Are all of the programs in the design ready to start?
- For any programs that reference external files, are the paths to the files correct and the files exist?
- Are there any devices, programs, or groups that have been suspended?
- Are there conflicting schedule entries for a group and any of its members?
- Are operations with devices consistent with their properties? For example if you are using a DIM operation does the device properties show it supports DIM?

If any of the conditions are found, then you have a possible problem in your design, and the Inspector notes it for you.

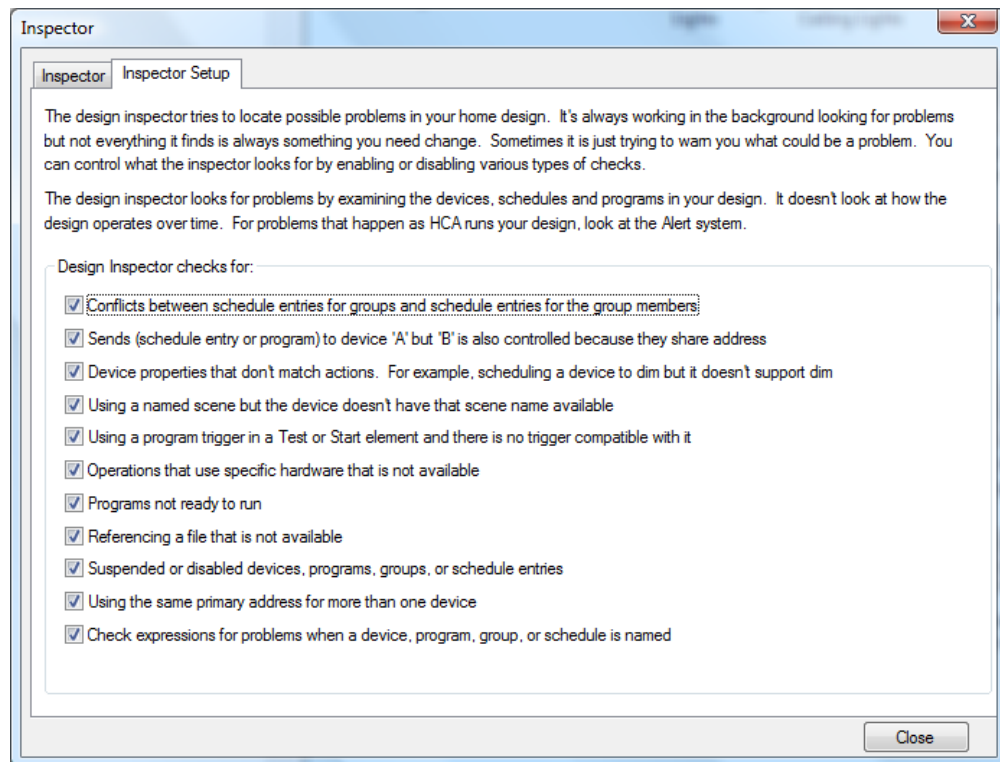
The Inspector periodically examines your home design. Each time you make a change to your design the Inspector checks for possible problems.

Depending upon the severity of the problems found, the inspector icon in the ribbon changes.

The Inspector classifies each issue found as a red or yellow issue. As you would expect, red issues are more serious. In the ribbon the current count of red and yellow issues are displayed.

Inspector Configuration

The inspector can check for many conditions. There are so many possible conditions that it may be useful for you to select only some of them. The Inspector Setup tab appears as:



After reading the text on this dialog, select the conditions you want the inspector to check for.

If you uncheck one or more of the options, those checks are not done so no messages for those kinds of checks appear on the Inspector tab. If you do check one of the options, messages may appear but you can *check them off* if they are not problems. This is described in the next section.

Inspector Checklist

The Inspector report is the 1st tab of the inspector.



Associated with each message in the checklist is a box that appears to the left of the message number. Some conditions the Inspector reports upon are problems and should be corrected, but others may not be. Only you know which are important and those that are not.

If a specific message reports on something that is not a problem in your design, use the left mouse button to click the checkbox associated with the message. In doing this, you are telling the Inspector that this message is something that truly is not a problem. For example, in the above screen image, issue number 8 reports that a program is suspended has been checked off, because I made a conscious decision to suspend that program—hence it is truly not a problem

If the Inspector has reported on a condition that is really a problem don't check it off - just close the Troubleshooter and resolve the problem. Once you have made the correction, the Inspector will no longer report the problem.

Hint: If the message displays in blue text you can click on it and the inspector closes and the appropriate dialog where you can make changes to resolve the issue opens.

The two options on the bottom of the Inspector tab are used to control what you see in the checklist. Conditions that you check off don't disappear; they are still reported each time the Inspector checks your design. To see just those messages that are not checked off, select the *Show only what's not checked off* option.

Once a message is checked off, the Inspector no longer uses that message in determining if the status bar lights should show a yellow or red condition. In this way, once you fix all problems or check off those messages that are OK, the status light will show green. If the Inspector finds anything new, the light will change to yellow or red.

Alert Manager

The Inspector as described above looks for problems in your design by analyzing your design at any minute in time. There are a second set of things that can go wrong as HCA operates your design. These are just a few examples:

- A device is polled for it's status but it doesn't reply
- An attempt is made to take a weather observation but it fails.
- One part of a UPB message being received is missing
- A message is received from a device that doesn't match anything in your design.

As you can see from this list, these items can't be checked for by the inspector as they only happen over time. What happens when these sorts of problems occur is what the Alert Manager is for.

Each of these conditions is called an Alert and each can be configured to how you want HCA to react.

The Alert Manager dialog is opened by clicking on the Alerts side of the troubleshooter panel in the ribbon. It consists of three tabs: Summary, Log, and Devices

Alert manager summary tab

The summary tab show each possible alert, if and when it occurred, and tools for configuring.

The Alert system reports on problems that are dynamic - events that occur as HCA runs your design. For example status requests not answered, devices that don't acknowledge control commands, etc. Each alert type can be configured on how it reports.

Alert	State	Count	Last Occurred	Clear	Configure
Unknown Reception	Disabled	0		Clear	Configure
Missing command receipt acknowledgement	Green	0		Clear	Configure
Confirm receipt needed retransmission	Green	0		Clear	Configure
Confirm receipt failure after all retransmissions	Yellow	1	7/3/2017 2:36 PM	Clear	Configure
Status request and no reply	Green	3	7/3/2017 2:38 PM	Clear	Configure
Missing sequence in UPB reception	Green	0		Clear	Configure
Program error	Green	0		Clear	Configure
Weather observation failed	Green	0		Clear	Configure
Interface reported error	Green	0		Clear	Configure
Interface disconnect	Green	0		Clear	Configure
Power out	Disabled	0		Clear	Configure
Power restored	Disabled	0		Clear	Configure
Client disconnect	Green	0		Clear	Configure
DDNS update failed	Green	0		Clear	Configure
Category 1 devices overdue	Green	0		Clear	Configure
Category 2 devices overdue	Green	0		Clear	Configure
Category 3 devices overdue	Green	0		Clear	Configure
Category 4 devices overdue	Green	0		Clear	Configure
User Alert 1	Green	0		Clear	Configure
User Alert 2	Green	0		Clear	Configure
User Alert 3	Green	0		Clear	Configure
User Alert 4	Green	0		Clear	Configure

Clear All

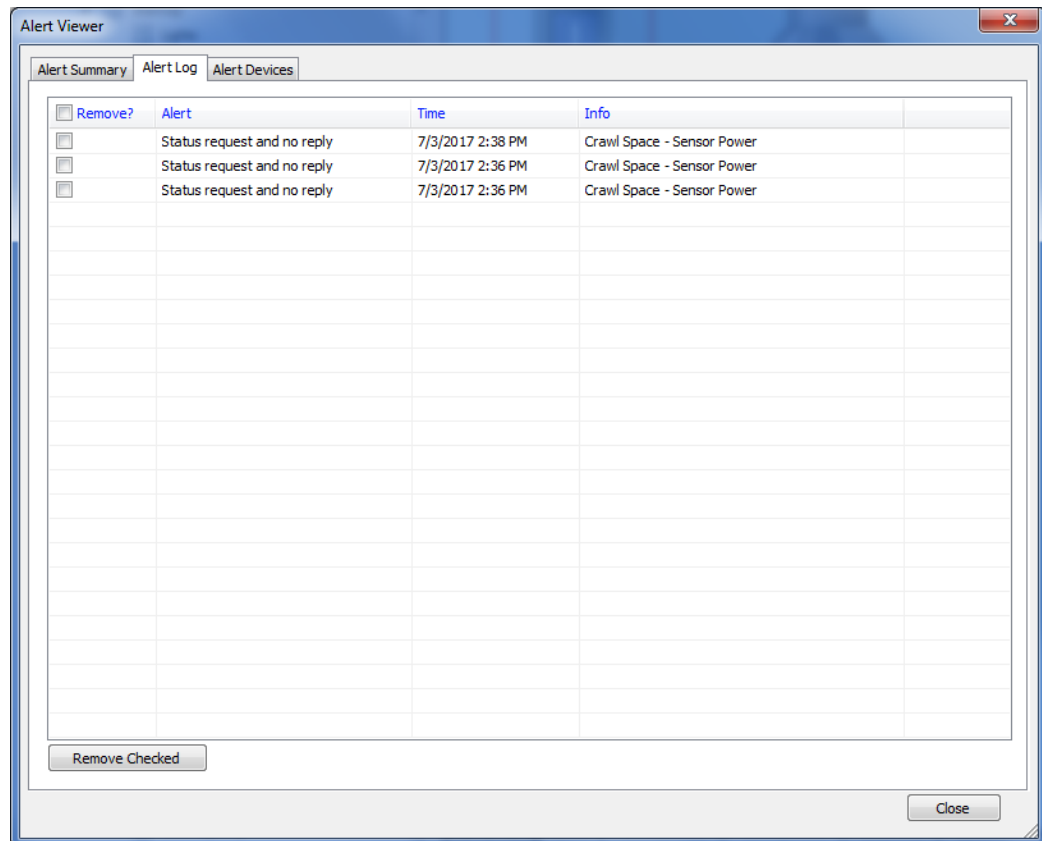
Close

The Summary tab lets you view and clear the count for each alert or clear them all using the "Clear All" button. It also shows the alert level – green, yellow or red - for each alert determined from its count. You can also re-configure the alert from this view. Press the “Configure” button or double click the line to open the alert configuration dialog.

All possible alerts are listed. If you want you can disable an alert. When an alert is disabled, if the condition that alert tests for happens, nothing is done – it doesn’t log, it doesn’t count. It is just like it never happened.

Alert manager Log tab

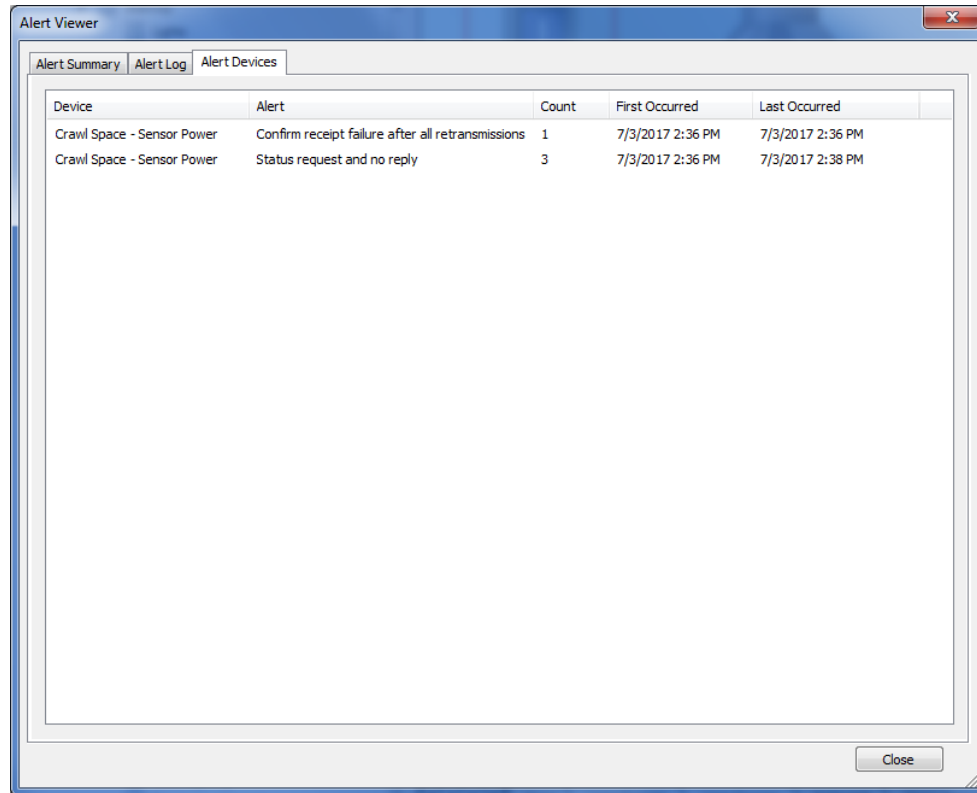
The log tab shows information about each alert that happened, when it happened, and any details about it. Don’t forget that you can configure an alert to only log once a day, each time, etc. So the count shown on the summary tab doesn’t necessarily mean that you will the same number of log entries as the count.



You can also re-configure the alert from this view. Double click the line to open the alert configuration dialog.

Alert manager Devices tab

The final tab shows an alternative view of the same information. This tab shows alerts organized by device and the time of the first alert and the time of the last. For each device, you may see more than one type of alert.



The screenshot shows a window titled "Alert Viewer" with three tabs: "Alert Summary", "Alert Log", and "Alert Devices". The "Alert Summary" tab is active, displaying a table with the following data:

Device	Alert	Count	First Occurred	Last Occurred
Crawl Space - Sensor Power	Confirm receipt failure after all retransmissions	1	7/3/2017 2:36 PM	7/3/2017 2:36 PM
Crawl Space - Sensor Power	Status request and no reply	3	7/3/2017 2:36 PM	7/3/2017 2:38 PM

A "Close" button is located at the bottom right of the window.

Configuring alerts

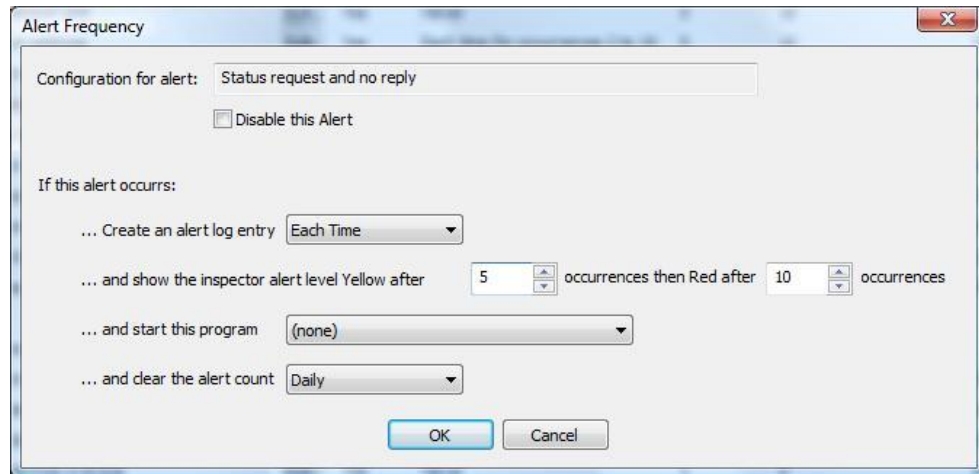
Each alert can be configured in several ways:

- How often it logs the alert in the alert details log. The possible choices are "never" , "each time" , "once a day" , "start after x and stop after y" a simpler "log after x" and "once"
- How its occurrence changes the green-yellow-red level shown in the HCA ribbon
- Does HCA start a program when it happens? This program could, for example, send a email or SMS message to you reporting what has happened.
- When to clear the alert count.

The next major change was to separate logging from counting. So now you can "never log" but still count occurrences. This can be useful for example if you really don't care about specific devices failures just how well the network is working in general

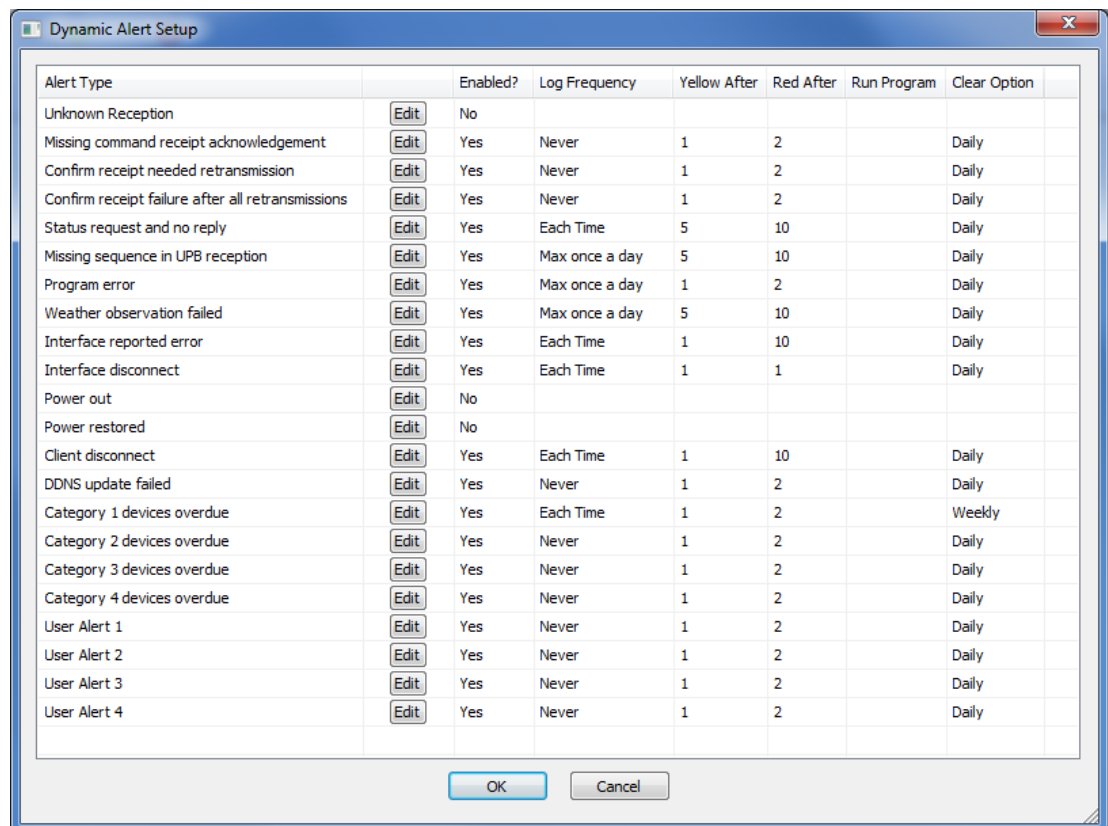
The alert setup has been changed to have daily, weekly, monthly clear options.

Added to the log options of "never" , "each time" , "once a day" , "start after x and stop after y" a simpler "log after x" and "once"



In addition to the alerts that the manager watches for HCA also has four "user" alerts that can be triggered by programs using "_AlertAdd" function in a Compute element.

From the viewer you can configure each alert. There is also an additional way to configure and view the configuration of all alerts at one time. Select from the ribbon *Tools* category *Alerts Setup* button.



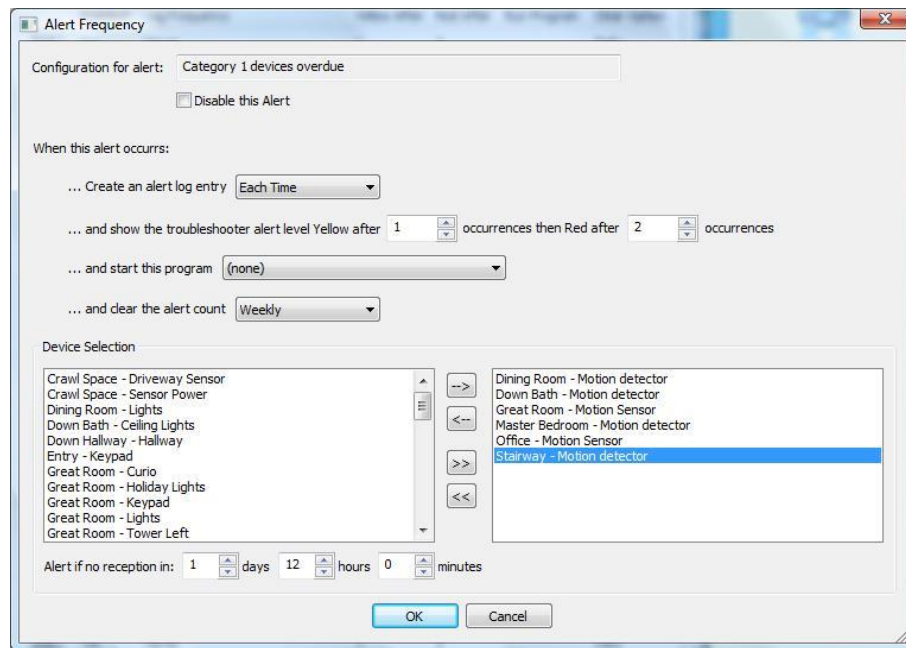
Like the Alert Viewer this shows all the alerts and information about their configuration. Press the *Edit* button to configure an alert.

Device Overdue alerts

One of the most useful alerts and one that takes some additional configuration is the Alert called “Category x devices overdue”. This alert lets you specify a set of devices and a time. The time specified is the duration since that last reception from the device where it will be considered “overdue”. That is, HCA should have seen a reception within that time.

This alert can be very useful when working with battery powered devices to make sure that they don't "go dark" and are not heard from.

There are 4 separate alerts that you can use. Why four? The idea is that some devices you expect to be heard from daily, others weekly, and still others are a different time schedule. By sorting your devices into these different categories and configuring separate alerts for each category you can express the different "check in " times.



If any device in the set doesn't have a reception within the specified time then the alert happens.

This alert is a bit different than the others. In that the alert can automatically clear when the device is heard from. Normally alerts only clear by user action. But in the overdue alerts, if a device is currently overdue and then is heard from, then any alert for it is cleared.

As with all alerts you can configure an action if the alert occurs to run a program. In the case of overdue alert the program is only run once even if the device continues to be overdue. The program doesn't get run again until after the device has checked in and then goes overdue again. For example suppose that device D is overdue if not heard from in 2 hours. Here is a timeline of what happens.

00:00: HCA Starts

00:50: Device D reception

02:50 Two hours since device D was heard from so the overdue action happens and that can include starting program P

05:00: Device D is still overdue but program P isn't started

05:04: Device D is received. This clears the overdue alert

07:04: Device D is again overdue. This time program P is run as part of raising the alert

The overdue mechanism only checks every 15 minutes for overdue devices so you can't rely on to-the-minute reporting.

Per device alerts

Alerts that apply to devices now keep track of the count per device. This means that you can say, for example, "log once" and that means log once per device. The alerts that this kind of counting applies to:

- UPB: Missing sequence in transmission
- UPB: Missing ACK
- Insteon: Message ACK
- Status request and no reply
- Confirm receipt needed retransmission
- Confirm receipt failure after all retransmissions
- Program error
- Overdue devices

While the logging for these alert conditions is driven by the alert setup and the per-device count, the red/yellow/green determination for the alert comes from the totals of all devices.

Suppose, for example if you have the "Program error" configured as "log once a day", yellow after 4, red after 8.

- If program P makes an error it will log since it is the 1st for "P" today.
- If program P makes another error it will not log since it is the 2nd today
- If program P1 makes an error it will log since it is the first for "P1" today

In this alert (program error) each program treats the log options based upon its own counts. To continue this example, at this point there have been 3 total program errors and that's still a green condition.

If program C now makes an error, it logs – first for "C" today - and since the total count is now 4 a yellow condition exists.

Alert colors

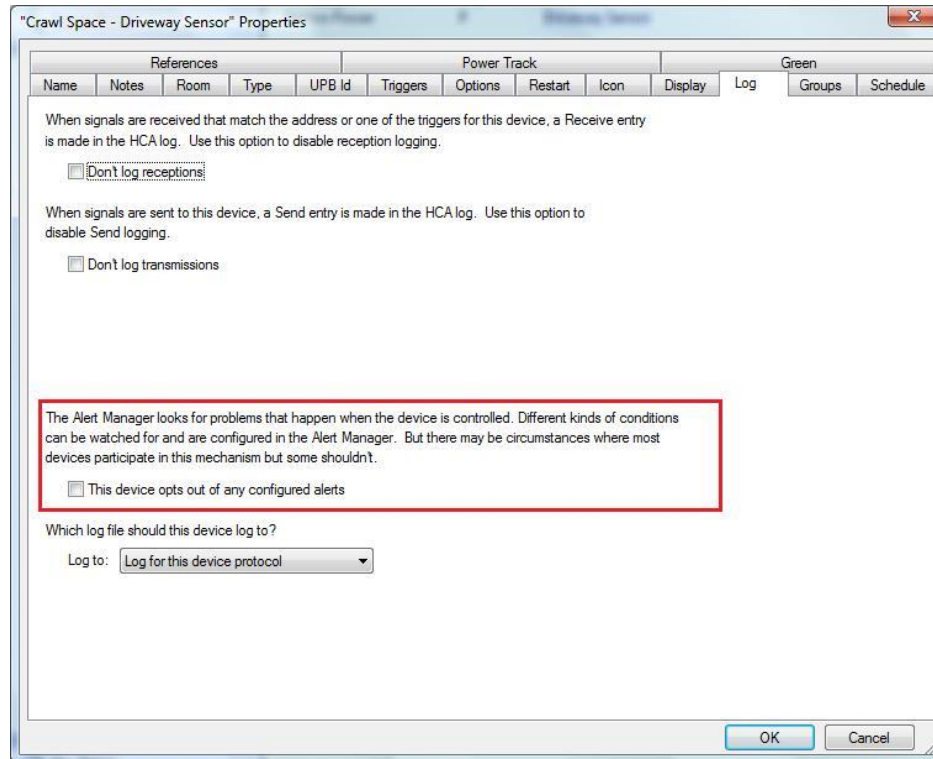
An alert that appears in the details log doesn't have - in itself - a red/yellow/green level. This is different than the static inspector which classifies all things it finds as red or yellow so each item listed in the inspector report does have a level for it.

The alert mechanism is different and looks at all alert counts and makes a determination if overall there is a green/yellow/red level for alerts. So the determination of the current level is the higher level of the static inspector level and the alerts level.

Alert manager final issues

There are two issues related to your automation interfaces. Interface capabilities problems are reported as an inspector issue – for example needing a UPB interface but not having once configured. Issues with interfaces configured but not connected are now reported to as an Alert issue.

There is a "disable" for devices to opt out of the alert general mechanism. Suppose for example you have a device that tends to have status request response problems and you have a program that polls it several times to get the result. You may want that device to opt out of the alert mechanism so it doesn't get reported upon.



The Log

Logging is a vitally important first step for troubleshooting because it helps you keep track of what's going on. You can also use the log to help diagnose odd behavior in your home.

The log keeps track of:

- when commands are sent and received
- which interface, if applicable, was associated with the message
- when errors are encountered
- start and stop times
- actions that programs take

As you can see, the log is a file that contains an entry for just about every action that HCA takes.

You can configure HCA to use a single log file, or you can configure up to three log files each assigned to log different actions.

There are two parts to each log. These are:

- The current log file. The contents of this file are stored in a proprietary format and its contents are viewed using the Log Viewer. HCA always has the current log file open.
- The historical log file is stored in a comma separated format and can be loaded into spreadsheet and/or database programs. HCA opens the historical log file only at midnight so you can almost always access it with other programs (for example, Microsoft Excel or Microsoft Access) in order to view its contents.

Log Setup

Before discussing how to view the contents of the log, the first steps are to establish where the log files reside, what information is placed in them, and how big the files can become.

In the *Tools* ribbon category, the *Log Setup* button opens the log configuration tool.

Log Usage Configuration

Log entries for these protocols are added to which log?

X10
 Log 1 Log sends Log receives

Phillips Hue
 Log 2 Log sends Log receives

UPB
 Log 1 Log sends Log receives

Log entries for these actions are added to which log?

Program Start / Stop Log 2

Program Elements Log 2

Variable Change Log 3

Room On / Off Log 3

Auto Off Log 3

Client Connect No Log

Client Disconnect No Log

Exceptions for log use for Devices, Programs, and Groups

Name	Action
Master Bedroom - Lights	Always uses log 1
Master Bath - Mirror Lights	Always uses log 2
Motion - Any Motion	Doesn't log elements
Motion - Battery Check	Doesn't log elements

Note: To change the log used for a particular device, program, or group, open its properties and select the Log tab.
 Unless changed in a device's properties, a device uses the log selected for its protocol.
 Unless changed in a program's properties, a program uses the log selected for program actions.

OK Cancel

The top left shows all the protocols in use by the design. In this example there are three: UPB, X10, and Phillips Hue. Other designs could show others. Associated with each protocol is the selection of which of the three logs – or no log – used for the actions of devices that communicate using that protocol. In this example actions of X10 and UPB devices go to log 1 and actions on Phillips Hue devices go to log 2.

In addition to specifying what log is used for which protocol, checkboxes are also available to control what is logged. The options are:

Log commands sent

Check this box, and every time an On, Off, or Dim command is sent for that protocol, an entry is made in the log.

Log commands received

Check this box, and every time a command is received from a device of that protocol, an entry is made in the log.

The top right section is for selection of those HCA actions that produce log entries, and which of the three logs – or no log – they are directed into. These are:

Log when programs start and stop

Check this box if you want to log whenever a program starts or stops. Unlike the "Log executed program elements" option, this option only adds log entries when a program starts running and when it stops. No other executed elements are logged.

Log executed program elements

Check this box if you want to log program elements. This means that for every program that is started, as each element of the program is executed, HCA makes an entry in the log. You may find this useful for verifying new or modified programs perform as you expect them to.

Log each time a variable changes value

Check this box if you want to log whenever one of your variables changes its value. Variables are described in the Programs chapter.

Log room on/off and auto off timers for devices and rooms

The log can show when rooms are determined to be on and off and the action of auto off configuration for devices.

Client Connect / Disconnect

When a client connects or disconnects from the server that action can also be logged.

While the protocol section controls where you will find log entries for a given protocol, each device, program, and group has a *Log* tab in its properties. That can be used to modify, on an object by object basis, which log is used for that specific device or program. Any devices or programs where you have used the log tab to make explicit log configuration are listed in the lower section of this dialog.

In the above image two devices – Master Bedroom-Lights and Master Bath-Mirror Lights – explicitly direct their actions to a specific log regardless of their protocol. And two programs – Motion-Any Motion and Motion-Battery Check – are configured to not log their actions at all.

Where to store the log

Once you've decided that you want to log HCA activities, you need to provide the path of where the log files are to be placed. This is done from the *Log Storage* tool opened from the *Tools* ribbon category.

Use the Browse button to locate and specify the directory to use and the file name for each file.

What to do with log entries

Associated with both log files are separate *retain* values. The operation of these two files and their *retain* values is as follows.

- At midnight of each day the number of entries contained in the current log file is compared to its retain setting. If there are fewer log entries than the setting, nothing more is done.
- If there are more entries than the retain setting, the oldest log entries are moved from the current log file to the end of the historical log file. The number of entries moved is the number necessary to bring the entry count of the current log file down to the retain setting. If there is no historical log file, the excess log entries are simply deleted.

Once the current log file has been pared down to its retain value, the same operation is performed on the historical log to reduce it, if necessary, to the number of entries in its retain value. Any excess entries removed are simply deleted.

HCA can operate without an historical log file. Without an historical log file, only those entries in the current log will be retained and only up to the limit specified in the “retain” value.

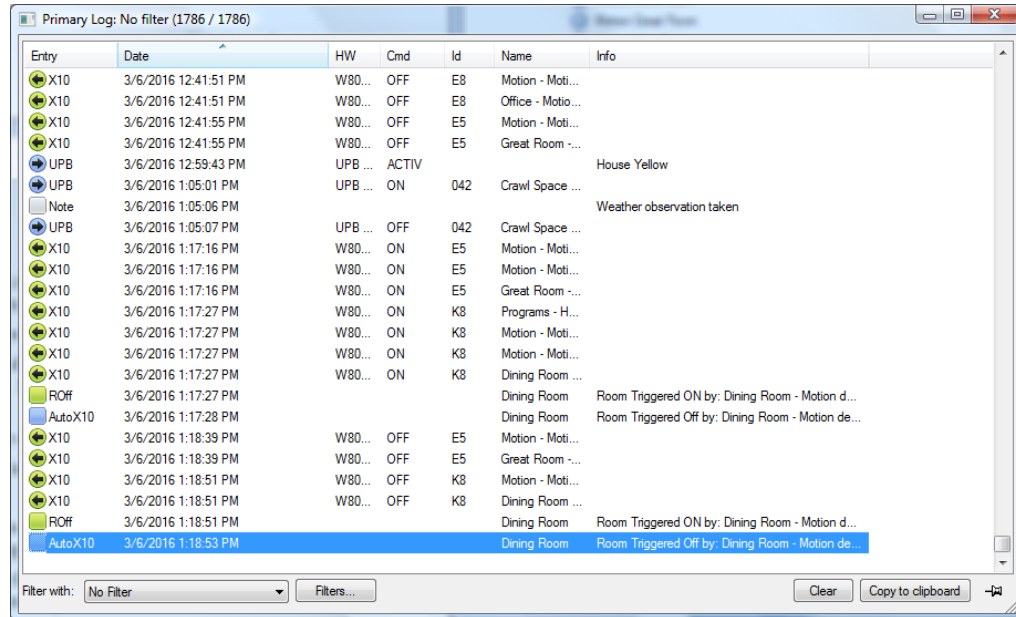
For example,

Using this, each interface can direct any log entries for it to a specific log.

In addition to this, any device or program can also direct log entries for it to their own log. This choice is made on the Log tab of a device, or program properties dialog.

Log Viewer

Each log has a viewer associated with it that can be opened from the log view buttons in the ribbon Control category.



At first glance, the Log Viewer appears very complex but don't panic! The log viewer contains these items:

- A large display area lists each log entry—one per line. Each entry contains these items:
 - The type of entry
 - The date and time it was added to the log
 - The automation interface used if there is one. For an interface connected to a serial port, the port numbers is enclosed in ()'s
 - For Send and Receive entries, the type of command sent or received
 - The address or id or the transmitter or receiver.
 - The name of the device, program, group, or controller for this entry.
 - Any additional information or notes
- Along the bottom, an area labeled *Filter* provides options you can use to see just certain kinds of entries that the log contains.
- A *Clear* button. Click it to move the contents of the current log to the historical log and totally clear the current log file.
- A *Copy to clipboard* button. Select a range of entries in the log then press the copy button. This places the log entries on the Windows clipboard. This is a very useful way to send sections of the log to Technical Support.
- A Push-pin that can stop or resume the log from updating while you have it open on the screen. When *pinned*, no new entries appear. When *un-pinned* any receptions, transmissions, programs, etc that are happening in the background log in real time as they occur. You may

want to pin the log while you are looking through it, sorting, filtering, etc. When *un-pinned*, the log viewer jumps to the top or the bottom - depending upon the sort – when something in the background adds an entry while the log viewer is open.

There are different types of log entries that you may see. They appear in the Entry column. There are these general types

Entry type	Used for
Note	For general messages.
Send	For commands sent. There are many different sub-types of Send for the various protocols: X10, UPB, Insteon, Zwave, etc.
Receive (Rcvc)	For commands received. These are for commands whose source or target matches a device, group, or program in your design. Like Send there are different sub-types of Receive for the different protocols.
Program (Pgm)	For programs when they start, stop, and for each element while a program executes. There is also a sub-type used to show program errors.
Error	For problems.

For send and receive log entries, each interface type – Insteon, UPB, IR – has a different color and you can use the colors to quickly see where the messages are coming from if your automation solution integrates different protocols.

There are several types of entries in the *Cmd* column. They show what type of command was sent or received. The Log Viewer shows these as:

Entry type	Used for
ON	On command
OFF	Off command
DIM	Dim command
BRT	Bright command
AUF	All Units Off command
ALO	All Lights On command
ALF	All Lights Off command
S-REQ	Status request
S-ON	Status On
S-OFF	Status Off
ADDR	Address
GOTO	UPB Goto command
FADE+	UPB Fade up command
FADE-	UPB Fade down command
FDST	UPB Fade stop command
ACTIV	UPB Activate command
DEACT	UPB Deactivate command
BLINK	UPB Blink command
IR	IR transmission

Using the Log Viewer

In working with the Log Viewer, there are a few things you can do to make it easier to see and use the entries:

- You can resize each column (with the mouse pointer) by dragging the breaks between the column headers in either direction, to make the columns larger or smaller.
- Click a column header to sort that column. The first time you click the column it sorts in ascending order. If you click it again, it re-sorts into descending order. The sort column is show with a gray background. The column header shows the sort direction with an upward pointing triangle (sort ascending) and a downward pointing triangle (sort descending).

Log Filters

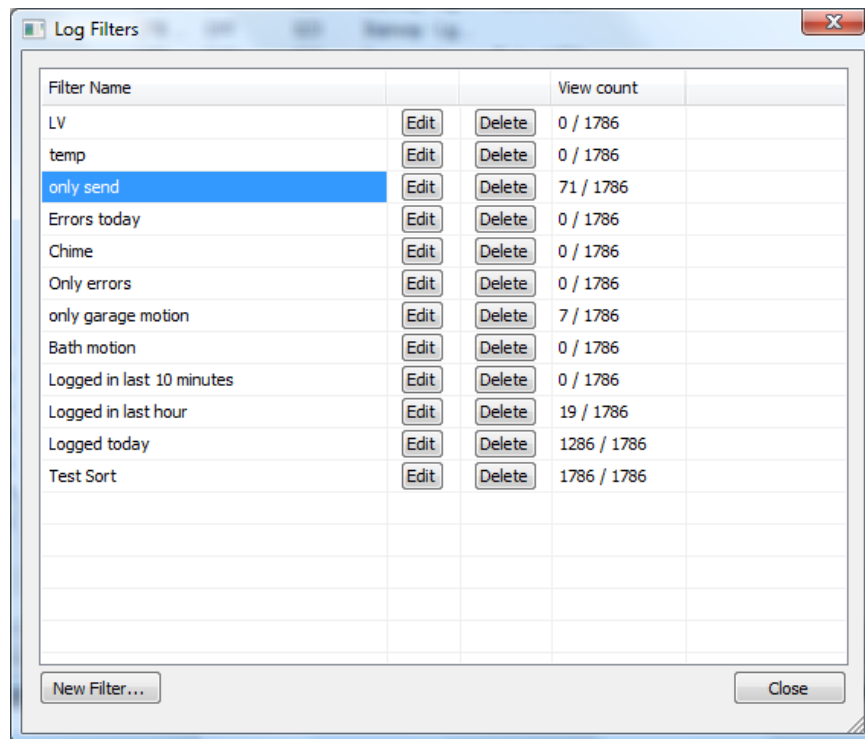
When viewing the log it is often difficult to focus on the specific data you want to see. The log filters allow you to select:

- Only a specific type of log entry such as Notes, Sends, Receives, etc.
- Only entries for selected devices, programs, groups, and controllers
- Only entries for a specific date, time, or range of dates and times.

In addition to selecting the type of entries to view, you can also specify the order these entries display in the log viewer.

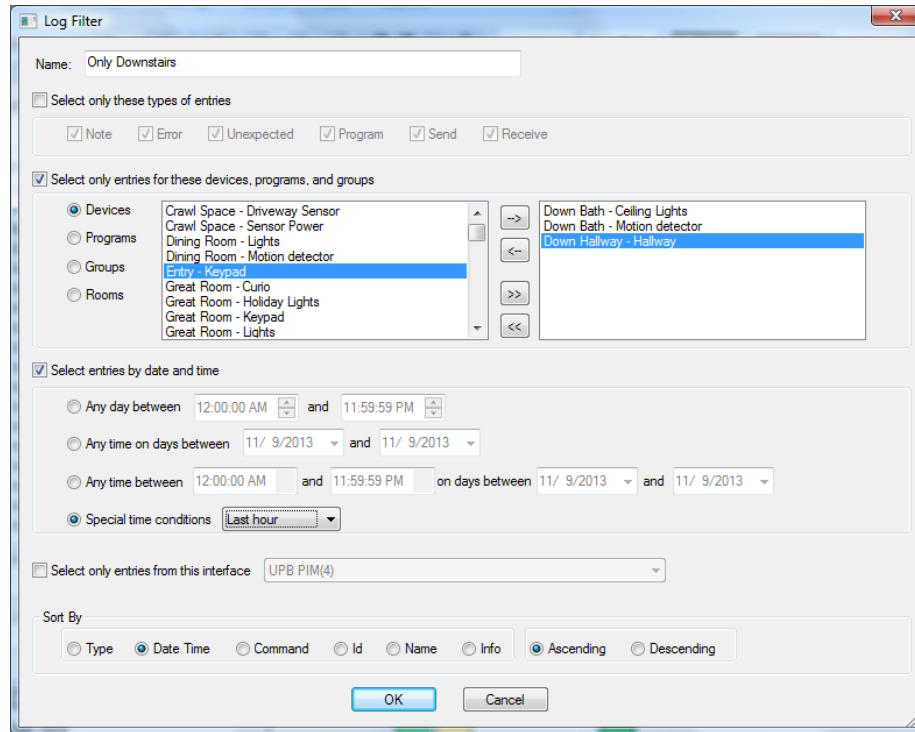
Each filter you create must be given a name. Once you have created a filter, it is saved with your design file.

To manage filters click on the Filters button at the bottom of the log viewer window. This opens the filter management window and in it list all the filters and their effects.



At a glance you can see which filters you have and how many entries would appear in the log viewer using each filter. From this dialog you can edit or delete the filter using those buttons. To edit a filter you can also double-click on the row for that filter.

To create a new filter, press the New Filter button. The filter creation dialog opens as:



The creation dialog for a filter is complex. It contains these sections.

Filter Name

Provide a descriptive name for the filter that you wish to create and save.

Select only these type of entries

If you want to limit the entries you see in the log display to only some kind of entries, check this option and then check the kind of entries you want to see.

Select entries for devices

If you want to limit the entries you see in the log display to only selected devices, programs, groups, and controllers, check this option. Then using the two lists move what you want to the right hand list. The option buttons on the left control what sort of things you see in the left hand list.

Select entries by date and time

To select entries created during a range of dates or times, check this option and then choose the selection type and the date/time range.

Select only entries from an interface

If you want to show only entries that are tagged with a specific interface.

Sort By

To control how the log entries are ordered in the log viewer when this filter is active, select the column to sort and in what direction.

In this example, a filter called *Downstairs only* is being created. Three devices are selected and only entries logged in the last hour are selected. When this filter is active the log viewer shows only entries for those three devices and only entries logged in the last hour.

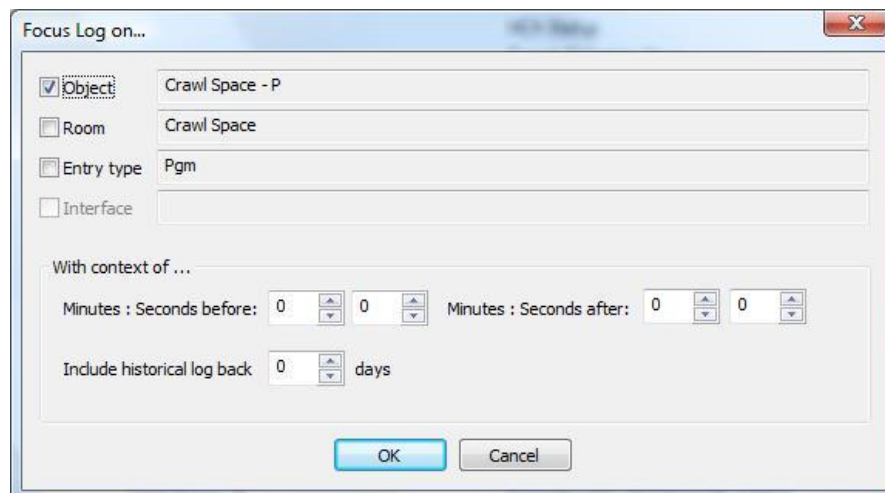
Note: For an entry to pass the filter **all** the criterion must be met. Each log entry is checked and it must pass each selected criterion. In this example an entry must be made for one of the three devices and must be made in the last hour. There is no way to create a filter that passes entries that meet one set of criterion or another set of criterion.

Show Log

Device, Programs, Groups, and Controllers have a right-click popup menu pick called ShowLog. What this does is to create a filter for showing just that object (or objects if there is a multiple selection) and opens the log viewer with that filter. This allows you to quickly focus in on one object and see what the log contains for it. These special ShowLog filters are temporary and are deleted when the log viewer is closed.

Log Focus

There is an additional tool in the log viewer to give you to method to locate useful information in tracking down problems. If you double-click on a line in the log viewer a “Focus” dialog opens.



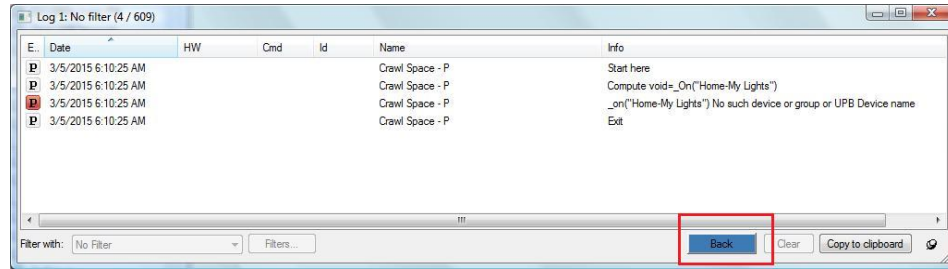
You can choose what you want to focus on. The log entry you double-clicked on pre-loads the details into this dialog and from the checkboxes you can specify what you want to focus on. Each box checked tells the focus to show only those log entries that have all of those properties.

But this is more than a simple filter. The “context” settings let you not only see the log entries that meet the filter requirements but also to show log entries before and/or after these to show the context of what you are looking at.

For example, suppose that you focus in on a program but that program is started by some reception. Using the context settings you can focus on the program and the action that started the program. In effect the settings in the top section of the dialog tell what you want to see and the settings in the bottom part of the dialog give you the log contents "around" what you want to see.

Once you close the focus dialog with OK then the log viewer shows the focused entries. At the bottom of the log viewer is a “Back” button to remove the focus.

You can create a new focus on a view that was itself created by a focus. The back button moves you back a focus level.



The log focus has one additional property. You can have the focus go back into the historical log – if you have created one – a number of days. This is the only time that HCA itself supports viewing of log entries in the historical log.

Why would you use this feature?

The log is a great debugging device but it can be difficult to find what you are looking for and more importantly the "context" of what you found. This feature lets you answer the questions like, why did this device go on at this time and discover from the context the other things happening around that time.