

DEVICE HISTORY PLUG-IN FOR HOMESEER

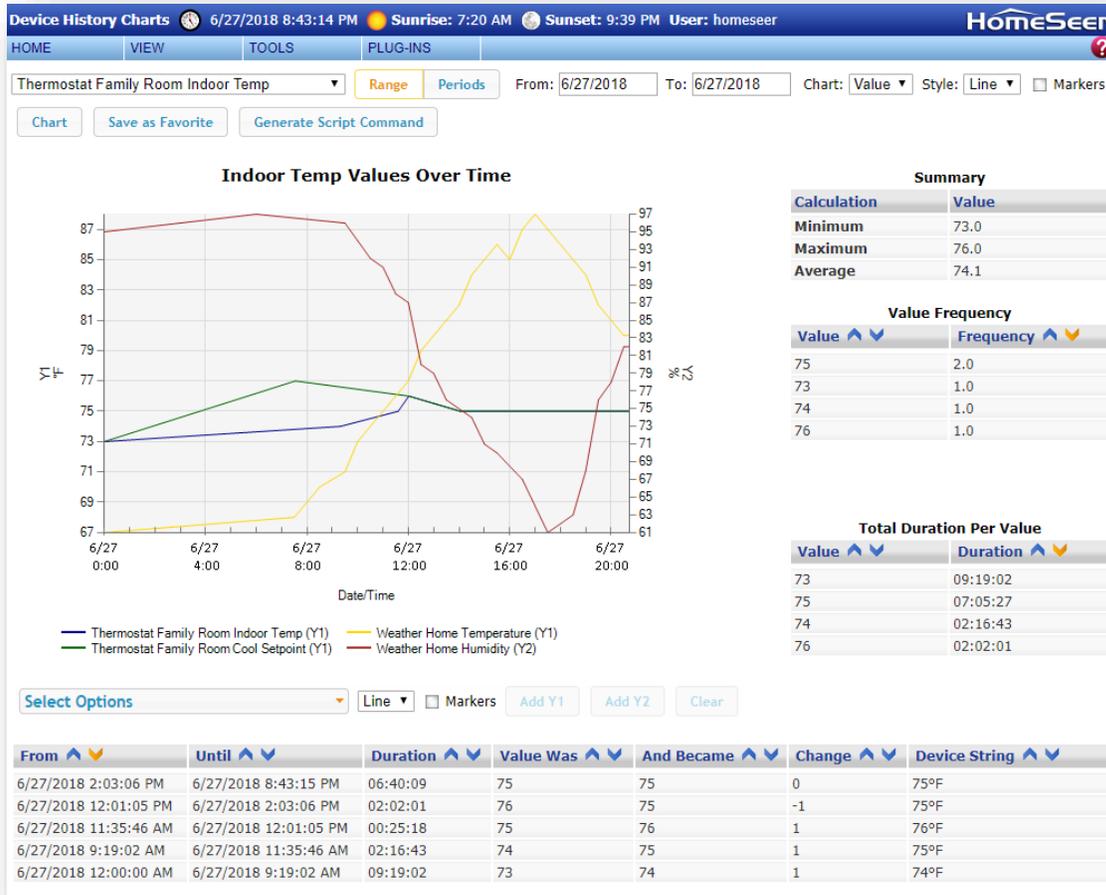
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CONTENTS

Overview.....	3
Installation.....	3
System Requirements.....	3
Options.....	4
Monitored Devices.....	6
Device History Charts.....	8
Device History Configuration.....	10
Device History Status.....	11
Device History Favorites.....	12
Conditions.....	12
Actions.....	13
Functions.....	14
Support.....	18
Known Issues.....	18
Appendix 1: Files.....	19
Appendix 2: Change History.....	20

OVERVIEW

The skWare Device History Plug-In for HomeSeer provides you with a way to track device value or string changes over time for any device and to analyze, chart and display that data for any date range you choose.



INSTALLATION

This Plug-In is installed using the built-in updater capability of HomeSeer. New installations include the database structure, binaries and supporting files needed to run the Plug-In, while updates will only replace the new binaries and supporting files without replacing your data.

In addition to the Plug-In, I highly recommend the [DB Browser for SQLite](#) if you would like to review and/or query your own history data.

SYSTEM REQUIREMENTS

The skWare Device History Plug-In for HomeSeer runs on both Windows and Linux installations of HS3, and has been tested with version 3.0.0.148+. Earlier versions of HS3 should work, but have not been specifically checked.



OPTIONS

The “Options” page provides the ability to purge old history and control over the charting and logging output.

The screenshot shows the 'Device History Configuration' window with a 'Database Options' section. It includes several configuration items with input fields and buttons:

- Manually purge device history older than:** 365 days **Purge Now**
- (Schedule a recurring event to automatically purge device history.)
- Keep** 3 **backup copies of the database (made on plugin startup)**
- Remove device history data for devices that are no longer being monitored:** **Clean Database**
- Rebuild Device History index:** **Rebuild Index**
- Compact Device History Database (could take several minutes, but changes will be queued and inserted once complete):** **Vacuum Database**
- Pausing the database closes the connection to allow for backup, but changes will be queued and inserted once complete:** **Pause** **Resume**

To manually clear history for all devices, provide the number of days to keep and click “Purge Now”. This setting will be kept for future use on this screen, and is the default for the “Purge Device History” event action, which can be scheduled to perform this task on a recurring basis.

The plugin has the ability to make backup copies of your database on startup. The number of copies to keep can be configured here; use “0” to disable this feature.

To delete history data for orphaned devices that are no longer being monitored, use the “Clean Database” button.

If your charts are slow to create, there are two utility functions you can try:

- “Rebuild Index” recreates the index on the table to make sure the queries are as efficient as possible.
- “Vacuum Database” will reorganize the data and remove unused space, making a smaller file. This could take several minutes, during which time the database will be automatically paused.
 - Do not manually pause the database first or Vacuuming will fail.

You can also Pause recording of history and later Resume it. This is useful if you need to perform backups of your Homeseer system, for example. Value changes are queued while recording is paused, but not persisted between restarts of the plugin/Homeseer, so leaving the plugin paused for an extended period of time is not recommended.

Two charts are generated each time you press “Chart”: One for display and one full size that can be accessed by clicking on the image on the Chart Page. You can set the dimensions for each of these two charts here, as well as determine whether the device name should be added to the chart as the title.

Chart Options & Defaults

Actual Chart Width: x Actual Chart Height:

Chart Display Width: x Chart Display Height:

Chart Title:

Default Style: Markers

Line Width:

Axis Font Size:

Default Duration Type:

Default Time Period/Type: (when "Last N Periods" selected)

Value History Table Height (0 = no limit): rows

Sort for Value History Table:

Show chart on Device Utility page automatically

The default style and choice to show markers can also be set. This will be used as the initial setting for devices that have not been previously used in an interactive chart.

The options also allow you to define the default duration type (Date Range or Last N Time Periods) for new devices (once you chart a device, it will remember your settings for the next time rather than using these defaults).

Additional appearance options include the line width and the minimum X & Y axis font size.

To force the Value History table on the chart page to a fixed height with a scrollbar, enter a value greater than 0 for the “Value Table Height” option.

The default sort order can be set by selecting the column and direction from the “Default sort for Value History Table” dropdown.

The “Show chart on Device Utility page” checkbox controls whether the plugin’s tab on the [Device Configuration](#) page generates the chart automatically or not. If this is turned off, a “Show Chart” button will appear instead.

Optional log data can be recorded in both the HomeSeer log and in a stand-alone Plug-In log (which can be found in the “Logs” directory of your HomeSeer installation).

Logging Options

HomeSeer Log message level:

- None
- Fatal
- Error
- Warn
- **Info**
- Debug

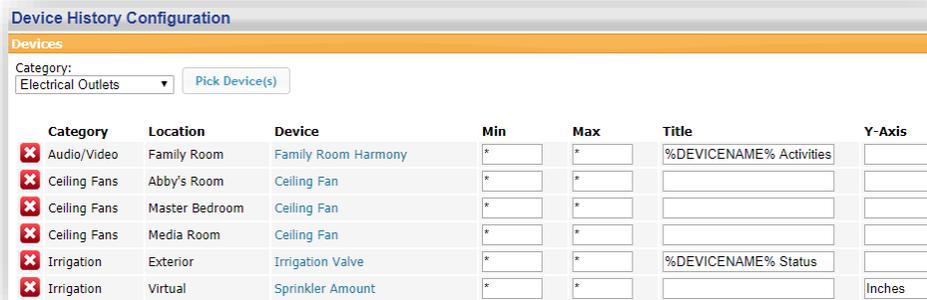
Plugin Log messages level:

- **None**
- Fatal
- Error
- Warn
- Info
- Debug

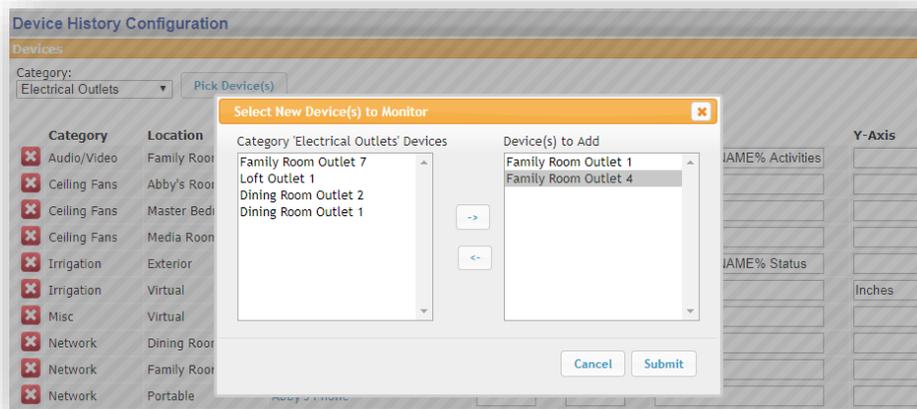
Please note that the “TRACE” message level should only be used when troubleshooting or sending in for support as it can have a significant impact on performance. (An additional logging option, TraceHTML, can be set in the INI file if requested for support by setting the LogLevelFile value to 7.)

MONITORED DEVICES

After installing the Plug-In, a new “Device History” menu item can be found under “Plug-Ins” in the HomeSeer browser interface. The “Monitored Devices” item will take you to the device configuration page, where you are able to select the devices for which you want to track value changes.



The available devices are filtered by the location setting configured in HomeSeer (if you use both location and location2, the setting “Display Location 1 First” is used to determine the primary filter). The “Pick Device(s)” button brings up a selection list of all remaining devices in the selected Location, where you can choose one or more devices to add to the list of monitored devices.



You can add and remove monitored devices at any time; removing them does not remove past history from the database, but it will remove the item from the list to be selected on the chart page and device value changes will no longer be recorded.

Each device can be edited to supply a minimum and/or maximum value. A value of “*” is the default for all devices and means there is no limit. These limits impact the range of values stored in the database.

Device-level properties are also here for the Title and Y-Axis label to use when the selected item is chosen as the primary device. (Y-Axis labels for Y2 are chosen based on the first secondary item selected.)

The chart Title supports the following tokens:

Token	Description
DEVICENAME	The device's name, no location information provided.
LOCATION1	The device's configured Location 1.
LOCATION2	The device's configured Location 2.
CURRENTDATE(<format>)	The current date. Supports custom date formatting .
CURRENTTIME(<format>)	The current time. Supports custom date formatting .
FROMDATE	The requested (or first available) start date. Supports custom date formatting .
FROMTIME	The requested (or first available) start time. Supports custom date formatting .
TODATE	The requested chart end date. Supports custom date formatting .
TOTIME	The requested chart end time. Supports custom date formatting .

DEVICE HISTORY CHARTS

Once your devices are being monitored, you can visit the “Device History Chart” page via the additional menu item under “Plug-Ins” → “Device History”. This page allows you to select a monitored device and a “From” and “To” date range or the Last N (Hours|Days|Weeks|Months|Years) for which to display the information available about your devices’ value change history. The duration type, period type, style (Step or Line) and “Markers” choices are saved on a device-by-device basis each time a chart is generated.

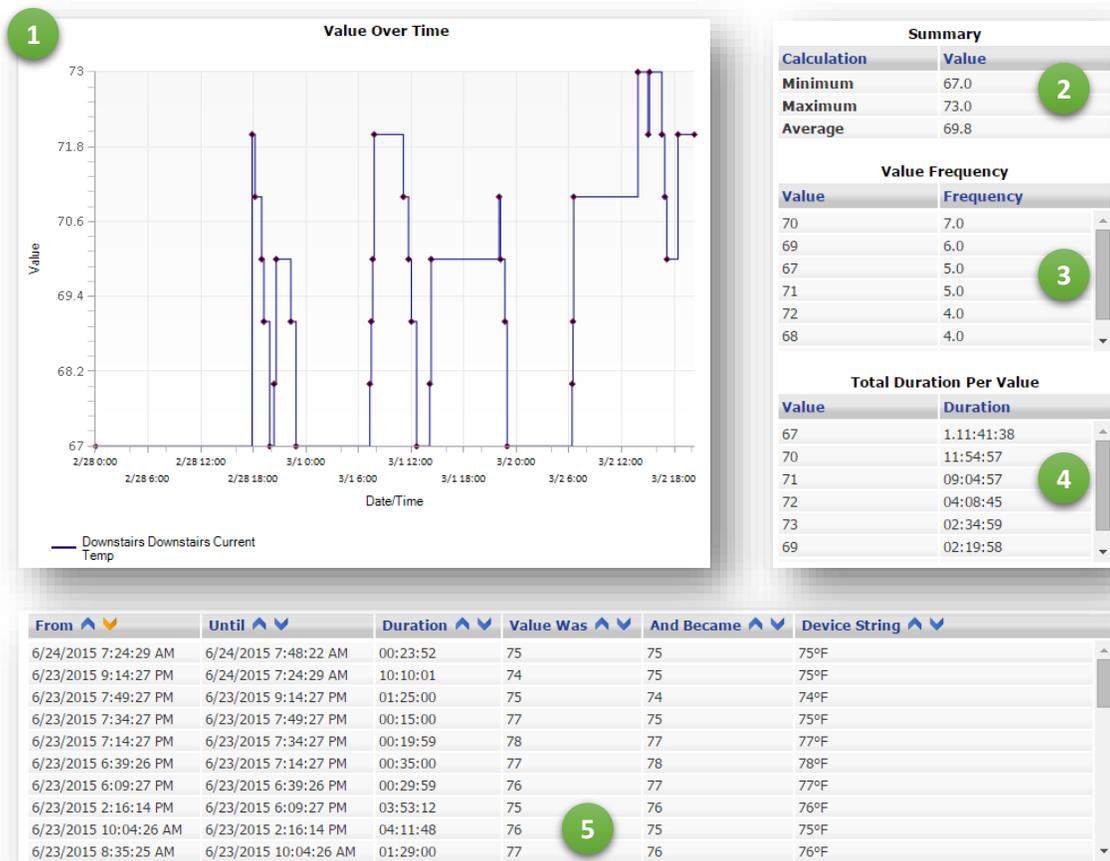
Thermostat Family Room Indoor Temp Range Periods From: 6/27/2018 To: 6/27/2018 Chart: Value Style: Line Markers

[Chart](#) [Save as Favorite](#) [Generate Script Command](#)

The resulting data will include:

- 1) A step or line chart showing value changes over the selected time period.
- 2) If Range Status Text is defined (or no status text exists), a summary for Min, Max and Average values. (Average values are over time and based on total seconds at each value.)
- 3) A Frequency Analysis of values during the selected time period.
- 4) Top duration values over the selected time period.
- 5) A detailed list of value changes and the preceding duration. (NOTE: If monitoring String changes, this is the only component displayed.)

The data used for these tables and charts includes assumed values for the beginning of the time period, and if the end date is today, it will include an extra row for “right now” at the end, in order to chart the duration so far today.



If a device is configured with Value Status Text pairs that have a range component (or that do not have any Value Status Text pairs defined), the device’s values will be displayed as-is, and the summary statistics will be calculated and shown on the Chart page.

For devices that do not have a range type Value Status Text pair (or that do not have any Value Status Text pairs defined), any discrete values that do have a Value Status Text defined will be shown as-is, and any values with a corresponding text value will be shown with the text value instead.

All columns in the Value History table can be sorted in both ascending and descending order. The orange chevron indicates the currently selected sort order. The default sort order can be set on the Config page.

Additional Devices

Once a chart has been generated, you may select additional devices to add to either the existing Y axis or a secondary Y axis. The secondary axis is meant for devices with different value ranges (or devices that have the same value but different status text). Adding devices with different value ranges or duplicate values with different labels may result in an undesired appearance or scaling of values.



To add more devices to the chart, use the multi-select control to mark the desired device(s), then choose either “Add Y1” or “Add Y2”. The chart will automatically refresh with the new values. The “Clear” button will remove all additional devices and return to the original chart. You can change the style settings and click “Chart” to re-draw the entire chart with the new style settings. You can also set the series style and indicate whether or not to use markers for data points; these settings are applied to the newly selected devices when you click “Add Y1/Y2”.

Additional devices added to the chart will not impact the summary or value history tables.

Save As Favorite

You can save the current combination of options and devices as a favorite, which will be accessible from the Plug-in’s “Favorites” page. It is recommended that you use Ranges instead of Dates for these favorites so they’re dynamic and show relative data based on when they’re created rather than the fixed dates selected.

Favorites are stored in the INI file for the plug-in and can be manually edited while the plug-in is disabled, allowing you to further customize the configuration of these stored chart options.

Generate Script Command

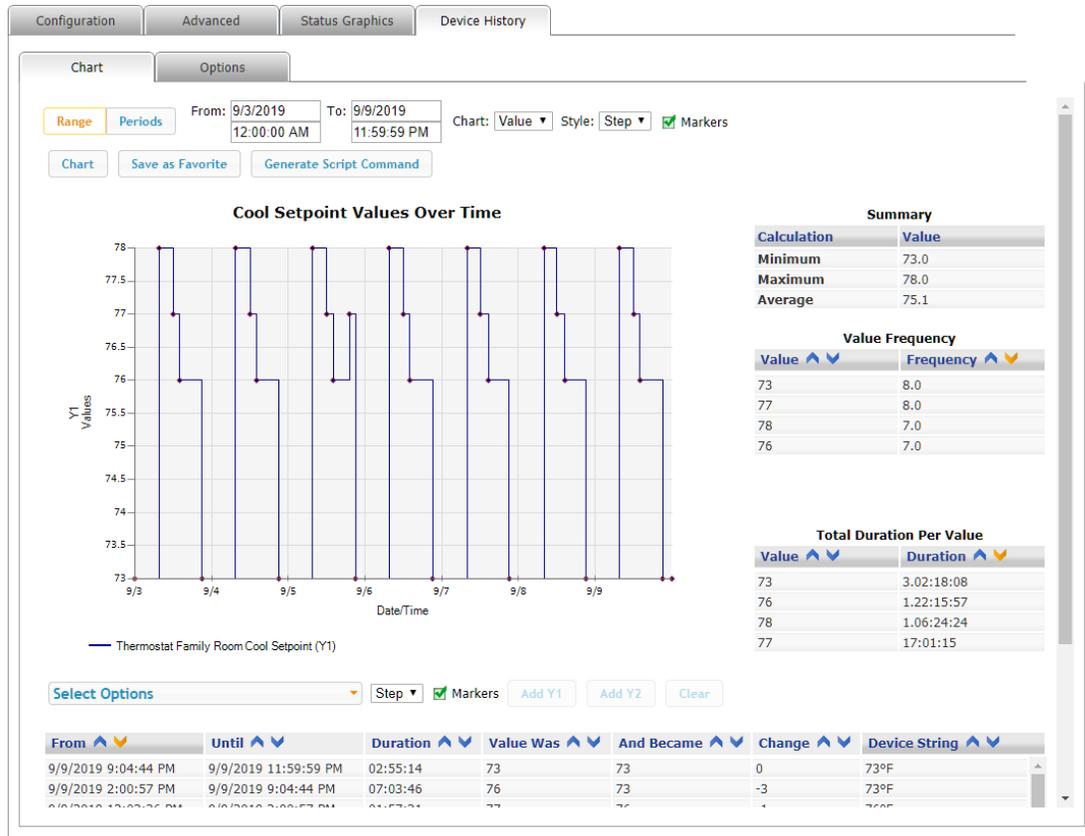
You can also have the current chart (and all the options used to create it) turned into a script command you can put in an Event or HSTouch element by copying the value provided by this button.

Query String Charts

The “Device_History_Chart” page can also be called with query string parameters by appending “?action=chart&primary=<device ref>”. You can specify more details using the “parameters” option to pass in a URL encoded JSON string using the same name/value pairs outlined in the CreateChartEx function below, and pipe-delimited lists for the “y1list” and “y2list” options. The “Generate Script Command” button above can be used to get a good starting point for this JSON string.

DEVICE HISTORY CONFIGURATION

For devices that have been configured to capture history, a Device History tab will be displayed when viewing the properties of that device. This screen has a tab that shows a chart for the device's history.



On the Options tab, there are database management functions that allows you to manually purge history for just this device for the specified number of days.

The Options also include the ability to set device-specific options, including the min/max, title and Y-axis label (same values as shown on the plug-in configuration page). Additional options on this page include the default period type, number of periods, style and checkbox to control whether markers are included by default when graphing this device.

The 'Options' tab is titled 'Thermostat Downstairs Cool Setpoint: History Options'. It is divided into two main sections:

- Manual Database Management:** Includes a 'Purge device history older than: 365 days' field and a 'Purge' button.
- Device Settings:** Includes fields for:
 - Ignore values outside this range: Min: * Max: * (* = no limit)
 - Title: %DEVICENAME% History (with a note: Leave blank to use default title format.)
 - Y-Axis Label: °F
 - Default Period Type: Days
 - Default Periods: 5
 - Default Style: Line
 - Default Use Markers: Markers

Buttons for 'Save', 'Clear', and 'Save & Close' are located at the bottom.

DEVICE HISTORY STATUS

You can view details about the database on the Device History Status page in the Plug-in Menu. This page shows information about the database overall (size, last vacuum date, and total record count) and provides a summary of the stats for the monitored devices (total records, first change, and last change).

Status

Device History Status

Database Health
 File Size: 9.7 MB
 Last Compacted: 1/1/0001 12:00 AM
 Monitored Devices: 46
 History records: 188,611

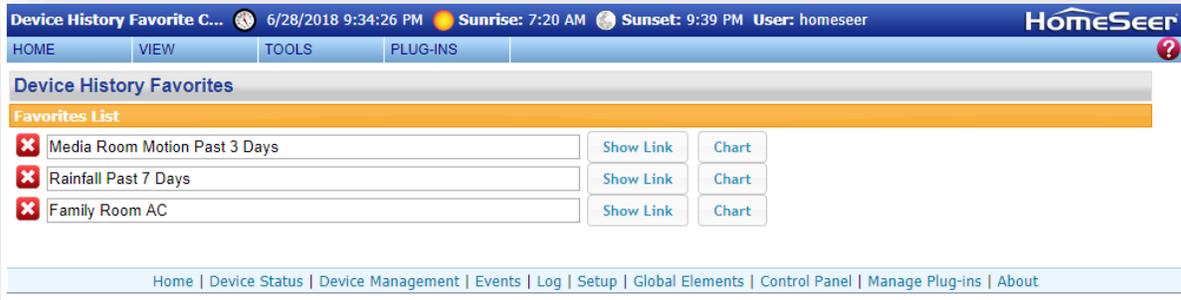
Device Stats				
	Device	Rows	First Change Date	Last Change Date
<input type="checkbox"/>	Application Monitoring SWG Dostan	725	3/3/2017 8:46 PM	8/12/2017 3:39 PM
<input type="checkbox"/>	Application Monitoring SWG Omega	1,428	3/3/2017 9:18 PM	8/12/2017 3:34 PM
<input type="checkbox"/>	Audio/Video Media Room Harmony Hub	1,003	7/9/2016 7:13 PM	8/12/2017 4:30 PM
<input type="checkbox"/>	Network Portable Abby's Phone	6,407	8/6/2016 6:12 PM	6/22/2017 7:54 PM
<input type="checkbox"/>	Network Portable Andy's Phone	732	8/7/2016 1:29 PM	8/13/2017 12:08 AM
<input type="checkbox"/>	Network Portable Kristie's Phone	2,208	8/6/2016 6:13 PM	6/22/2017 7:54 PM
<input type="checkbox"/>	Network Portable Steve's Phone	9,797	8/6/2016 6:12 PM	8/13/2017 12:22 AM
<input type="checkbox"/>	Security Downstairs Windows	6	9/10/2016 10:29 AM	2/25/2017 5:16 PM
<input type="checkbox"/>	Security Entry Doorbell	402	7/18/2016 8:13 PM	8/10/2017 9:08 AM
<input type="checkbox"/>	Security Entry Front Door	5,224	7/10/2016 6:49 PM	8/12/2017 7:56 PM
<input type="checkbox"/>	Security Entry Front Door Lock	2,975	9/4/2016 11:53 AM	8/12/2017 7:59 PM
<input type="checkbox"/>	Security Garage Back Door	22,805	7/9/2016 5:58 PM	8/12/2017 7:56 PM
<input type="checkbox"/>	Security Garage Left Garage Door Status	2,257	7/10/2016 1:16 PM	8/12/2017 7:56 PM
<input type="checkbox"/>	Security Garage Right Garage Door Status	4,033	7/9/2016 5:57 PM	8/12/2017 1:56 PM
<input type="checkbox"/>	Security House House	39,654	7/9/2016 5:58 PM	8/12/2017 11:02 PM
<input type="checkbox"/>	Security Kitchen Patio Door	9,534	7/9/2016 5:59 PM	8/12/2017 10:17 PM
<input type="checkbox"/>	Security Kitchen Patio Door Lock	5,828	9/4/2016 12:19 PM	8/12/2017 10:17 PM
<input type="checkbox"/>	Security Master Bedroom Windows	2	6/21/2017 10:55 AM	6/21/2017 4:06 PM
<input type="checkbox"/>	Security Upstairs Windows	2	6/21/2017 4:48 PM	6/21/2017 5:54 PM
<input type="checkbox"/>	Status Occupancy Abby	1,062	7/16/2016 1:41 PM	7/16/2017 10:23 PM
<input type="checkbox"/>	Status Occupancy Andy	472	7/23/2016 9:02 PM	7/25/2017 8:53 PM
<input type="checkbox"/>	Status Occupancy Kristie	1,511	7/16/2016 2:32 PM	8/12/2017 7:33 PM
<input type="checkbox"/>	Status Occupancy Steve	1,105	7/16/2016 4:41 PM	8/12/2017 8:11 PM
<input type="checkbox"/>	Status Virtual Awake	669	7/9/2016 11:00 PM	8/12/2017 11:00 PM
<input type="checkbox"/>	Status Virtual Occupancy	883	7/9/2016 5:58 PM	8/12/2017 7:32 PM
<input type="checkbox"/>	Thermostat Downstairs Cool Setpoint	1,339	9/17/2016 6:04 PM	8/12/2017 7:32 PM
<input type="checkbox"/>	Thermostat Downstairs Current Temp	3,304	7/9/2016 12:22 PM	8/12/2017 7:32 PM
<input type="checkbox"/>	Thermostat Downstairs Fan Mode	2	12/24/2016 1:40 PM	12/24/2016 1:47 PM
<input type="checkbox"/>	Thermostat Downstairs Fan Status	12,374	9/17/2016 4:09 PM	8/12/2017 4:57 PM
<input type="checkbox"/>	Thermostat Downstairs Heat Setpoint	996	9/17/2016 8:59 PM	8/12/2017 4:30 PM
<input type="checkbox"/>	Thermostat Downstairs Hold Type	914	7/9/2016 12:14 PM	8/12/2017 7:32 PM
<input type="checkbox"/>	Thermostat Downstairs Operating Status	13,956	9/17/2016 4:09 PM	8/12/2017 4:57 PM
<input type="checkbox"/>	Thermostat Downstairs Status	2,206	7/9/2016 9:53 PM	7/22/2017 10:43 AM
<input type="checkbox"/>	Thermostat Downstairs System Mode	966	7/9/2016 6:03 PM	7/21/2017 8:20 PM
<input type="checkbox"/>	Thermostat Upstairs Cool Setpoint	1,263	9/17/2016 6:04 PM	8/12/2017 8:45 PM
<input type="checkbox"/>	Thermostat Upstairs Current Temp	2,990	7/9/2016 2:05 PM	8/12/2017 8:49 PM
<input type="checkbox"/>	Thermostat Upstairs Fan Mode	6	7/29/2016 9:32 PM	5/3/2017 10:28 PM
<input type="checkbox"/>	Thermostat Upstairs Fan Status	11,073	9/17/2016 6:08 PM	8/13/2017 12:44 AM
<input type="checkbox"/>	Thermostat Upstairs Heat Setpoint	1,211	9/17/2016 8:43 PM	8/12/2017 8:45 PM
<input type="checkbox"/>	Thermostat Upstairs Hold Type	761	7/9/2016 7:16 PM	8/12/2017 7:32 PM
<input type="checkbox"/>	Thermostat Upstairs Operating Status	11,991	9/17/2016 6:08 PM	8/13/2017 12:44 AM
<input type="checkbox"/>	Thermostat Upstairs Status	1,743	7/9/2016 9:53 PM	8/12/2017 11:19 PM
<input type="checkbox"/>	Thermostat Upstairs System Mode	791	7/9/2016 7:16 PM	4/30/2017 12:30 AM
<input type="checkbox"/>	Unknown Unknown Device History Test	1	8/12/2017 11:47 PM	8/12/2017 11:47 PM

Purge Selected History

Each device has a checkbox for selecting it, and below the report a “select all”, “Purge Selected History” and “Stop Monitoring Selected Devices” buttons are present to allow you to manage the device history from this page.

DEVICE HISTORY FAVORITES

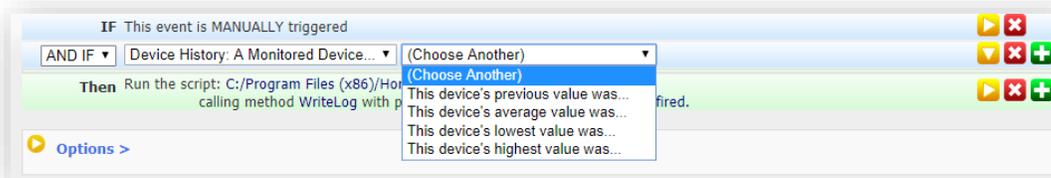
Charts you build on the Device History Charts page can be saved as a Favorite and accessed with a single click from the Device History Favorites Page. You can also remove previously saved Favorites and Rename existing entries.



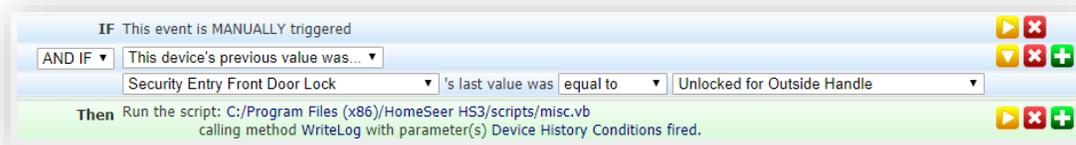
CONDITIONS

The Device History Plug-In for HomeSeer supports the addition of conditions to any event that already has a trigger defined. Attempting to add a Device History trigger as the first criteria of an event will not work.

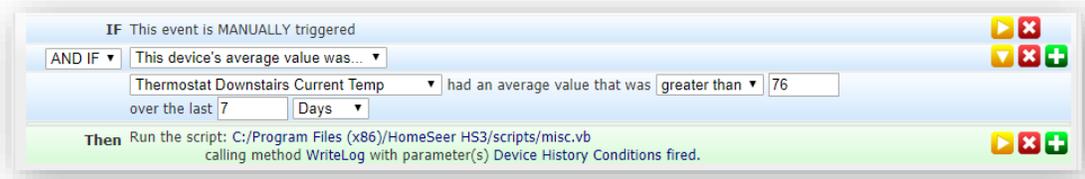
To configure a condition for an event, select the primary trigger and add the “Device History: A Monitored Device...” as an additional condition, then select one of the 4 available sub triggers:



- Previous Value** – this condition will look up the most recently recorded value prior to changing to the current value. You must select an operator (“equal to”, “greater than”, “less than”, or “not equal to”) and provide a value. For this condition type only, a dropdown of choices based on configured Value/Status Pairs will be provided if this is not a range-based device; in all other cases it will simply prompt you to enter a value.



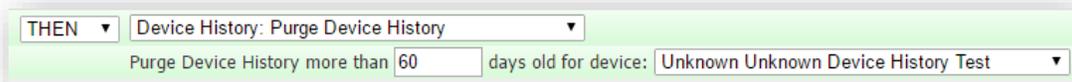
- **Average Value, Min Value, or Max Value** – In addition to selecting the device, operator and value (as with the Previous Value condition), you will also need to specify the time period over which to calculate the selected metric.



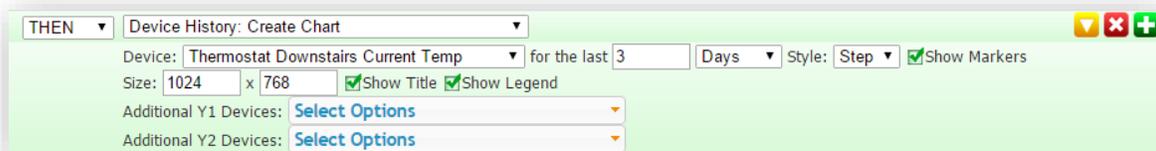
ACTIONS

The Device History Plug-In for HomeSeer currently supports the following actions:

- **Purge Device History** – this action will issue a delete statement in the Device History database to remove records more than the specified number of days old for the specified device. A choice for “All Devices” is also included, and is the default for any existing events using this action prior to version 1.0.10. Includes SQLite “VACUUM” command to reduce disk space and fragmentation.



- **Create Chart** – this action allows you to specify the device for which you would like a chart to be generated at the time the event is executed, along with specifying a number of hours, days, weeks, months, or years of history to render on the chart. Specify the style (Line or Step) and indicate whether or not to show markers on the lines.
 - Specify the size of the chart.
 - Indicate whether or not to include a title and/or a legend.
 - Optionally add additional devices to the Y1 or Y2 axis.
 - Files are saved under “\html\skWare\DeviceHistory\images\chart” using the device Location and Name, replacing any non-alpha-numeric characters with “_”.



- **Pause Recording** – this action will pauses database activity, but the plugin will continue to capture and queue value changes until resumed. Queued items are lost when the plugin/HomeSeer is restarted.
- **Resume Recording** – this action will resume database activity, reconnect to the database if necessary, and record any queued value changes.

FUNCTIONS

The Device History Plug-In for HomeSeer currently supports the following plugin Functions (available only through the .NET “&nhs” interface, not the traditional “&hs” object):

- **PauseRecording** – pauses database activity, but continues to capture and queue value changes until resumed. Queued items are lost when the plugin/Homeseer is restarted. No parameters required.
- **ResumeRecording** – resumes database activity, reconnects to the database if necessary, and writes any queued value changes from during the time recording was paused. No parameters required.
- **CreateChartByName** – creates a chart using just a favorite name as the only parameter.
 - &nhs.PluginFunction("Device History","", "CreateChartByName", New Object() {"My Favorite Name"})
- **CreateChartByDate** – creates a chart showing the data for the specified device(s) between the specified dates and returns the relative URL. Saved settings for the device from the last interactive chart are used when generating these charts.
 - Parameters = Device Ref, From Date, To Date, Y1 Refs (separated by |), Y2 Refs (separated by |), Style ("1"=Step, "2"=Line), Show Markers ("true" or "false") , Width (Integer), Height (Integer)
 - Returns String
- **CreateChartByDays** – creates a chart showing the data for the specified device(s) for the last N days and returns the relative URL. Saved settings for the device from the last interactive chart are used when generating these charts.
 - Parameters = Device Ref (Integer), Days (Integer), Y1 Refs (separated by |), Y2 Refs (separated by |), Style ("1"=Step, "2"=Line), Show Markers ("true" or "false") , Width (Integer), Height (Integer)
 - Returns String

Hint: Use these functions to show a 320x240 line chart for the last day of history for device 95 (along with 100 & 101 and 112) in HSTouch by adding a Text object with “isHTML=True”, and a “Text” value of:

```
<img src='http://myserver.com/[$SCRIPT=&nhs.PluginFunction("Device History","", "CreateChartByDays", New Object() {"95", "1", "", "100|101", "112", "2", "false", "320", "240"})]' />
```

- **CreateChartEx** – creates a chart showing the data for the specified device(s) using the parameters provided to customize the graphic.
 - Parameters = Device Ref (Integer), StyleParameters (JSON String), Y1 Refs (separated by |), Y2 Refs (separated by |)
 - Returns String

StyleParameters is a JSON string with the following possible attributes:

Attribute	Description	Default Value
NameSuffix	Text to add to the end of the filename to allow generating multiple charts with different parameters.	""
DurationType	Determines if the chart duration is based on a date range or a number of periods. 1 = Date Range 2 = Last N Periods	1

Attribute	Description	Default Value
PeriodType	Specifies the time period type if DurationType = 2. 1 = Hours 2 = Days 3 = Weeks 4 = Months 5 = Years	2
Periods	Number of time periods if DurationType = 2.	3
FromDate	Start Date if DurationType = 1. Must be written as "YYYY-MM-DD" or in ISO 8601 format with toString("o").	
ToDate	Ending Date if DurationType = 1. Must be written as "YYYY-MM-DD" or in ISO 8601 format with toString("o").	
Style	Controls how the line is drawn. 0 = Device Default 1 = Step 2 = Line	1*
Style2	Controls how the line is drawn for any secondary devices (applies to all secondary devices). 0 = Device Default 1 = Step 2 = Line	<same as Style>
UseMarkers	Indicates whether or not to include data point markers (true false).	true*
UseMarkers2	Indicates whether or not to include data point markers (true false) on secondary devices (applies to all)	<same as UseMarkers>
Width	Controls the width of the generated image.	640*
Height	Controls the height of the generated image.	480*
LineWidth	Controls the thickness of the lines for all series.	1*
Title	Specify the chart title.	"<Device Name> <Device Location> Values Over Time"
ShowTitle	Whether or not to show the chart title.	true*
Y1Label	Specifies the label for the left hand Y Axis.	"Y1 Values"
Y2Label	Specifies the label for the right hand Y Axis.	"Y2 Values"
XLabel	Specifies the label for the X Axis.	"Date/Time"
ShowY1Label	Indicates whether or not to show the Y1 Axis label.	true
ShowY2Label	Indicates whether or not to show the Y2 Axis label.	true
ShowXLabel	Indicates whether or not to show the X Axis label.	true
ShowLegend	Whether or not to include the legend (true false).	true
TransparentBG	Indicates whether or not the entire background should be transparent (true false). If true, no other color settings are honored.	false
ImageBGColor	Specifies the named color for the overall image background.	"White"
ChartBGColor	Specifies the named color for the graph background.	"WhiteSmoke"

Attribute	Description	Default Value
AxisLineColor	Specifies the named color for the axis lines.	"DimGray"
TickMarkColor	Specifies the named color for all tick marks.	"Gray"
GridLineColor	Specifies the named color for the grid lines.	"Gainsboro"
TextColor	Specifies the named color for all text.	"Black"
FontSize	Specifies the minimum font size for chart axis labels	10*
Y1AxisMin	Specifies the minimum value for the Y1 axis.	"Auto"
Y1AxisMax	Specifies the maximum value for the Y1 axis.	"Auto"
Y2AxisMin	Specifies the minimum value for the Y2 axis.	"Auto"
Y2AxisMax	Specifies the maximum value for the Y2 axis.	"Auto"
Y1Ticks	Show tick marks on the Y1 axis.	true
Y2Ticks	Show tick marks on the Y2 axis.	true
XTicks	Show tick marks on the X axis.	true
RotateDegrees	Number of degrees to rotate the image clockwise. Must be 0, 90, 180, or 270.	0
Colors	List of colors to use. Must have at least enough for total number of Y1 and Y2 devices charted. Color names can be found here .	['DarkBlue', 'DarkGreen', 'Gold', 'Brown', 'Magenta', 'LightBlue', 'LightGreen', 'PaleGoldenrod', 'Tan', 'DarkRed']
Markers	List of Marker Styles to use. Must have at least enough for total number of Y1 and Y2 devices charted with Use Markers. Integer values can be found here .	[1, 3, 2, 5, 4, 9, 6, 7, 8, 4]

* Default value comes from the Config page setting.

The StyleParameters object should be passed in as a string, using single quotes to delineate attribute names and string values. You may pass in one or more attribute using standard JSON notation in any order. Attributes and values are case insensitive.

Example request:

```
&nhs.PluginFunction("Device History", "", "CreateChartEx", New
Object(){"677","{'Title': 'Title For This Chart', 'Y1Label': 'Primary
Values', 'Y2Label': 'Secondary Values','XLabel': 'Date/Time',
'ShowLegend': true, 'DurationType': 1, 'FromDate': '2015-03-22',
'ToDate': '2015-03-29', 'Style': 1, 'UseMarkers': true, 'Width': 640,
'Height': 480, 'TransparentBG': false, 'ImageBGColor': 'White',
'AxisLineColor': 'DimGray', 'TickMarkColor': 'DimGray',
'GridCLineColor': 'gray', 'LineWidth': 5, 'Colors':['DarkRed',
'DarkBlue', 'DarkGreen', 'Gold', 'Brown', 'Magenta', 'LightBlue',
'LightGreen', 'PaleGoldenrod', 'Tan'], 'Markers':[1, 3, 2, 5, 4, 9, 6,
7, 8, 4]}", "680|682", "678"})
```

- **GetRangeStats** – Provides the min, max and average values (over time) for the given device and date range.
 - Parameters = Device Ref, From Date, To Date
 - Returns String (Delimited value of <min>|<max>|<avg>|<count>)
- **GetLastValue** – Provides the previous value for the given device
 - Parameters = Device Ref
 - Returns Double

Example script code:

```
Sub GetLastValue(strRef As String)
    Dim dblValue as Double
    dblValue = hs.PluginFunction("Device History", "", "GetLastValue", New Object(){strRef})
    hs.WriteLog("Device History", "Last value for " & strRef & ": " & dblValue)
End Sub
```

- **GetLastValues** – Provides the last N previous values for the given device
 - Parameters = Device Ref, Count
 - Returns String (Delimited list of values separated by | character)

Example script code:

```
Sub GetLastValue(strRef As String, intLimit As Integer)
    Dim strValues as String
    strValues = hs.PluginFunction("Device History", "", "GetLastValues", New Object(){strRef, intLimit})
    hs.WriteLog("Device History", "Last " & intLimit & " values for " & strRef & ": " & strValues)
End Sub
```

- **GetFreqs** – Provides the frequency table for the given device and date range
 - Parameters = Device Ref, From Date, To Date
 - Returns String (Delimited list of Value~Frequency pairs separated by | character)
- **GetDurations** – Provides the duration table for the given device and date range
 - Parameters = Device Ref, From Date, To Date
 - Returns String (Delimited list of Value~Duration pairs separated by | character)

Note: All parameters should be passed as strings to the above plugin functions.

SUPPORT

Support for the skWare Device History Plug-In for HomeSeer is provided through the standard HomeSeer channels. The primary mechanism is via the [Device History forum](#) on the HomeSeer message board. The author can be contacted directly at steve@skware.net.

KNOWN ISSUES

The following issues are currently known but unresolved in this version of the plug-in:

- In HS3, when using “Save as Favorite” on the “Charts” Page, the text entry box appears behind the overlay. This issue is with the jQuery controls provided by HomeSeer, and has been reported as a bug to HST.
 - To workaround this, drag the text entry box above, below, or to the side of the overlay.
 - On mobile/tablet devices, this may not be possible, so you may need to define your favorites on a PC/laptop.

APPENDIX 1: FILES

The following files are used by the Plug-In. Directories in bold are part of the standard HomeSeer installation. Files marked with * are created by the software during usage; all other files are included in the installation.

<HomeSeer Installation Directory>

```

HSPI_SKWARE_DEVICE_HISTORY.exe
HSPI_SKWARE_DEVICE_HISTORY.exe.config
\Bin
  \skWare
    \DeviceHistory
      System.Web.DataVisualization.dll
      Newtonsoft.Json.dll
\Config
  HSPI_SKWARE_DEVICE_HISTORY.ini*
\Data
  \skWare
    \DeviceHistory
      HSPI_SKWARE_DEVICE_HISTORY.db3
\Docs
  \skWare
    \DeviceHistory
      skWare Device History Plug-In User Guide.pdf
\html
  \skWare
    \DeviceHistory
      skWare Device History Plug-In User Guide.pdf
    \images
      asc.png
      desc.png
      asc-sel.png
      desc-sel.png
      \chart*
        _<GUID>.png*
        <device_location>_<device_name>.png*
\Logs
  HSPI_SKWARE_DEVICE_HISTORY.log*
  
```

“bin” on Linux, which is case sensitive.

This represents the “current” request’s chart. “_<GUID>”-named charts more than 1 minute old will be deleted when the next request is processed.

APPENDIX 2: CHANGE HISTORY

Version	Date	Notes
1.0.0	5/4/2015	Initial release.
1.0.1	5/24/2015	Fixed "LineWidth" parameter for CreateChartEx to take effect properly. Updated CreateChartEx example in documentation to use the correct name of "GridLineColor" instead of "BGLineColor". Updated graphic on title page of documentation to reflect store image.
1.0.2	6/25/2015	Fixed issue where labels aren't always shown with devices that have discrete values assigned. Fixed issue where dates used on graph X axis were not locale-sensitive (MM/DD vs. DD/MM). Added device string to the table of values. Added ability to set minimum axis font size in options and JSON (FontSize).
1.0.3	6/27/2015	Fixed issue where new device values were recorded as integers and lost decimal precision (issue introduced in 1.0.2). Fixed an issue where first-time installations would fail to start (issue introduced in 1.0.2).
1.0.4	7/14/2015	Added support for both Location and Location 2 (order based on HS settings). Added option to disable chart title via Device History Config page. Added new parameter for hiding the chart title via JSON. Changed the way monitored devices are selected, displayed and removed to avoid limitations and defects in the HomeSeer-provided controls.
1.0.5	8/29/2015	Fixed issue with a sporadic error on startup. Fixed issue with wrong device being charted when first loading the chart page. Added ability to specify min/max values for each device.
1.0.6	2/27/2016	Added "Show Title" option to Create Chart event action parameters. Added "Show Legend" option to Create Chart event action parameters. Added "Hours" option to Create Chart event action parameters. Changed the way values were graphed for non-range devices to produce a smooth scale. Changed the way the Y axis scale was created to use discrete values for major and minor tick marks and labels for devices with continuous values. Changed the way Step charts are created so duplicate markers are no longer added at the point of change and duplicate values were not loaded to the chart (wasn't visible, but more efficient now). Fixed an issue with charting Hours not working properly on the Chart page. Removed version number from User Guide file name.
1.0.6.1	3/1/2016	Fixed an issue with the Newtonsoft.Json.dll dependency.
1.0.7	3/4/2016	Fixed an issue with event-created charts losing the Device Name in the title. Fixed an issue with event-created charts losing the additional Y1 and Y2 devices. Fixed an issue with missing min/max values on the Device Config page.
1.0.8	3/4/2016	Fixed an issue with handling min/max values that caused multiple errors.
1.0.9	3/4/2016	Fixed issue with a sporadic error on startup. Fixed issue with wrong device being charted when first loading the chart page. Fixed an issue with not properly honoring min/max values when charting.

1.0.10	9/9/2016	<p>Added manual "Pause" and "Resume" option buttons. Changes are queued while paused, and recorded upon resume, maintaining their original timestamp. Unprocessed changes are lost if the plugin is shutdown.</p> <p>Added "Pause" and "Resume" event actions.</p> <p>Added "Pause" and "Resume" functions.</p> <p>Automatic Pause/Resume now occurs during "Purge" and "Clean".</p> <p>Added "Vacuum" functionality to "Purge" logic to reduce database size.</p> <p>Added device parameter to Purge event action. Defaults to "All devices" per current functionality.</p> <p>Add "Purge" button to device property pages for tracked devices.</p> <p>Fixed issue with Min/Max not restricting captured values.</p> <p>Fixed issue with last value shown being incorrect.</p>
1.1.0	10/9/2016	<p>Added new plugin setting for default Chart Title.</p> <p>Added support for dynamic tokens in Chart Title (see documentation for details).</p> <p>Added ability to set default chart title per device.</p> <p>Added support for specifying the Y axis label per device.</p> <p>Added per-device purge settings to the purge action in events (default is "All Devices").</p> <p>Added per-device customization on the device properties page (min, max, title, Y axis, purge days).</p> <p>Fixed issue with last value not containing decimal precision.</p> <p>Fixed an issue with the total time per status not calculating correctly in some cases.</p> <p>Fixed issue with Y-axis not working well with small value changes.</p> <p>Improved X-axis intervals & formatting.</p>
1.1.1	10/29/2016	<p>Fixed an issue when adding Y1 and Y2 devices.</p> <p>Added "Help" link and a copy of this document to the html directory for the plugin.</p>
1.1.2	12/31/2016	<p>Fixed an issue with graphing two devices of the same name in the same chart.</p>
1.2.0	8/13/2017	<p>Added the ability to choose whether to chart the actual values or the change amount (delta).</p> <p>Added the "Change" column to the value history table on the chart page.</p> <p>Added a "Device History Status" page to show database details.</p> <p>Added a "Device History Docs" page to provide easy access to documentation and the support forum.</p> <p>Added event conditions (cannot be the first trigger, must follow AND/OR) for a device's last value or a device's min/max/avg over a specified time period.</p> <p>Added "GetRangeStats" function to allow scripts to interrogate min/max/avg for a given device between two dates.</p> <p>Added "GetLastValue" function to allow scripts to request the previous value for a given device.</p> <p>Fixed an issue with calculating Min, Max and Average values in the Basic Summary table for devices with ranged values. Average is now based on total time spent at each value.</p>
1.2.1	11/25/2017	<p>Fixed an issue where having deleted devices in the "Monitored Devices" list would cause errors rendering Device History event triggers.</p>
1.2.2	12/3/2017	<p>Fixed an issue with the "GetRangeStats" plugin function where it failed to honor the "To" parameter.</p>

		Fixed an issue with the "GetRangeStats" plugin function that caused it to result in an error.
		Fixed an issue with the "Device History Status" page on Linux.
1.2.3	4/15/2018	Fixed an issue with CreateChartByDays, CreateChartByDate, and CreateChartEx where it failed if "optional" parameters weren't provided. (Turns out the way HS invokes plugin functions doesn't support optional parameters so made them all required.)
1.2.4	6/2/2018	Added new chart parameters to force Y-axis min and max values. Fixed an issue with X-axis labels if using a Date Range with <= 2 days difference - now includes hours in this case.
1.2.5	6/2/2018	Changed Y-axis min/max variables to be separated for Y1 and Y2.
1.3.0	6/30/2018	Added the ability to save a chart configuration as a favorite. Added a plugin web page to show the list of favorite charts. Added the ability to create a chart based on query string parameters on the plugin charting page using the same JSON as CreateChartEx. Added a UI Block to provide feedback while building or updating the chart, the Device Status list, and the Device Config list. Changed the Config Page to save changes on the fly (no more "Save" buttons). Registered the Config Page properly with HomeSeer so the plugin title is linked to it correctly. Improved page load speeds for some pages in the plugin. Fixed an issue with double footers on plugin-generated pages. Fixed an issue where date ranges outside of the current date/time would include the current value of a device as the last data point. Fixed the status page so it would refresh after purging or removing a device from the monitor list. Fixed the status page so it wouldn't throw an error if a device being purged no longer existed in HS.
1.3.1	7/4/2018	Improved plugin startup time. Improved error handling of web page activity. Added better Debug-level logging for web pages and reduced some Trace logging.
1.3.2	7/6/2018	Separated Monitored Device list from Plugin Options on different pages. Improved interface status reporting. Improved log writing performance. Moved log message returning HTML for web pages to a dedicated logging level (TraceHTML = 7) that can only be set from the config file if needed. Fixed an issue with the Monitored Devices list causing an error if no devices existed with a blank location. Fixed an issue that caused previously used chart settings to not be applied on a per-device level. Fixed an issue that caused some default chart settings to not be applied correctly to new devices that have not yet been charted.
1.3.3	7/18/2018	Fixed an issue with charts generated by action resulting in numeric overflow. Fixed (for real this time) an issue with double footers on plugin-generated pages. Documentation updates around CreateChartEx parameters and author's contact email address.
1.3.4	8/25/2018	Improved overall database query performance. Added option to choose whether or not to show the chart automatically on the HS Device Utility page. The default is "True".

Added a "Show Chart" button on the HS Device Utility page under the "Device History" tab if chart is not shown automatically.

Added the option to chart a time period of minutes.

Added time pickers to the date range controls.

Changed the default dates to be "from yesterday to today" instead of the previous default of "2 days ago to yesterday".

Changed the way the Monitored Devices page works so that you can add multiple devices from the same Location (whichever location is first in your configuration) at once.

Changed logging to better avoid expensive string manipulations when not needed.

Fixed an issue that would cause the Device History tab to not show up on the HS Device Utility page when no records existed yet for the device.

Fixed an issue that prevented devices from being removed from monitoring in some cases.

1.3.4.1	9/3/2018	Fixed an issue with GetRangeStats using midnight for "from" and "to" parameters, resulting in getting the same value for min/max. Now supports adding specific times, but uses "23:59:59" if only a date string is provided as the "to" parameter.
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1.3.4.2	9/3/2018	Fixed a similar issue with CreateChartByDate.
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1.3.4.3	10/16/2018	Fixed an issue when adding devices to be monitored that have ",", or " " in the name. These will be listed with "_" in place of those characters in the selection list from now on, but that will not affect HS or the functionality of this plugin.
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		Fixed an issue where newly created devices or locations would not show up without restarting the plugin.
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All future release updates will be via the HomeSeer plugin list's [Release Info](#) link.