

Installation and User Guide



Helvar

niagara⁴

HLC-N4Rx Installation and User Guide

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1. Revision History

Issue	Date	Change Descriptions	Author
Issue 01	29/07/2016	First Issue	Helvar Limited
Issue 02	04/04/2017	Section 2 edit	TO
Issue 03	10/12/2020	N4.7/N4.9 Release	AG

2. System Requirements

This driver has been tested with Niagara 4 platform and Tridium hardJACE model 8005. The driver requires the use of Helvar Lighting Router firmware version 5.4 or later.

Versions tested:

- 1) 4.4.94.14
- 2) 4.7.110.32
- 3) 4.9.0.198

Helvar recommends that, in a system design, each JACE should be associated with no more than 10 Lighting Routers. This assumes that:

- Each Lighting Router is fully loaded e.g. Helvar 910 Lighting Router is controlling 128 DALI devices.
- The strategy for the JACE is consuming all available points only once and maximum number of points is 6 per DALI device.
- The JACE is being used exclusively with Helvar Lighting Routers.

The driver can also be hosted on a PC based station (softJACE).

3. Disclaimer

Helvar Ltd. ("Helvar") has developed this graphical widget software for use with the Helvar IP driver operating with the Tridium, Inc. ("Tridium") 'Niagara 4 Framework®'. By installing this widget software, you accept the terms and conditions of this disclaimer. Furthermore, if you are using this software on behalf of, or for the benefit of, an end user, then you also represent that you are authorized by the end user to accept the terms and conditions of this disclaimer for the end user as the agent of the end user. If you do not agree to these terms, or if you are not authorized by the end user to accept the terms of this disclaimer for the end user, then this software should be removed immediately.

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Helvar standard terms and conditions apply.

4. Introduction

This document is the software manual for the Helvar IP driver developed for Niagara 4 Tridium JACE hardware and Supervisor using the Niagara 4 platform.

This document is intended for and to be used by system integrators (SI's) that belong to the Tridium partner network and have completed training on the use of the Niagara 4 Framework and Tridium hardware.

5. Installation

- Copy the “**helvarDriver.jar**” provided into the Niagara/modules folder.
- Restart the workbench and station if already running.
- Open the “**helvarDriver**” module in the palette of the workbench.
- Correct installation of the module will bring up a palette as in Figure 1.

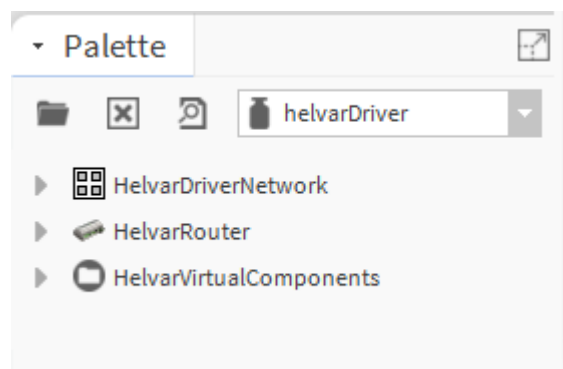


FIGURE 1 - HELVARDRIVER.JAR - PALETTE

6. Description

The Helvar Tridium driver provides a communication link from either an N4 Supervisor or JACE unit via the TCP/IP connection to the Helvar lighting router system. The message structure and functionality is derived from the HelvarNET protocol.

The driver allows the systems integrator to establish a connection to multiple Helvar lighting routers and to generate queries to devices within the system. By use of virtual components within the driver, it is also possible to initiate control functions within the Helvar lighting control system.

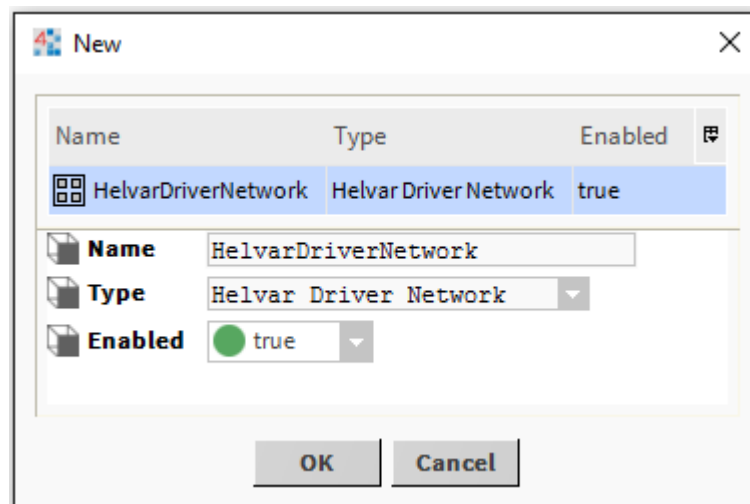
The driver supports an automatic discovery process that is executed as part of the Driver Manager Discovery wizard. The discovery process is able to determine all the devices

connected to a selected Helvar Lighting Router Workgroup, as well as retrieving information entered during commissioning of the lighting system, such as natural names given to devices and groups. In general no editing of discovered devices is necessary, but this is still possible. Alternatively, devices can be added manually, instead of or in addition to the automatic discovery process. The driver uses both UDP and TCP to communicate with the Helvar lighting router system. Therefore, it may be necessary to configure any active firewall to allow transmission and reception of packets on:

UDP: 50001, TCP: 50000

7. Adding a Helvar network

1. Double-click the station's Driver container to bring up the Driver Manager view.
2. Click the New button to bring up the new network dialog.
3. Select "Helvar Driver Network" from the drop down list, set number to add as 1 and click OK. This will open up another dialog window in which you can name the network.
Note: it is only possible to add one Helvar Network
4. Ensure Enabled property is "True" so that raw output can be later viewed in the application director view.

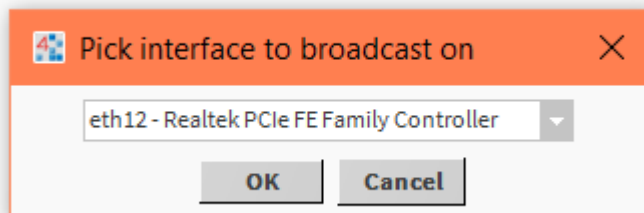


5. Click OK, to add the HelvarDriverNetwork. A folder named Groups will also be added at the same time immediately under the HelvarDriverNetwork.
Note: The Groups folder use will be explained in later sections.

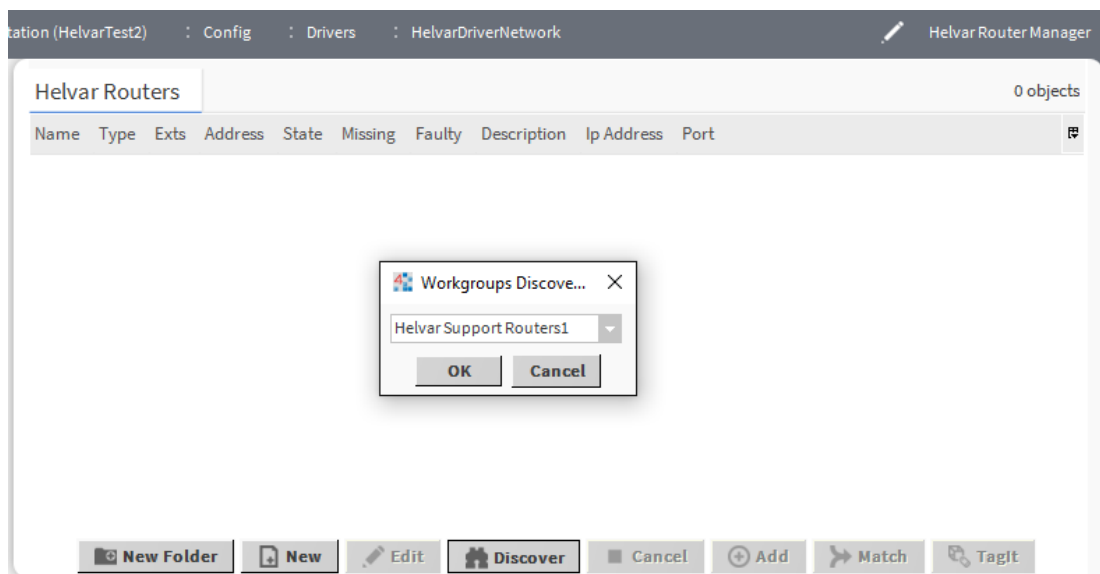
8. Performing an automatic discovery

1. In the Nav tree or in the Driver Manager view, double-click the HelvarDriverNetwork to bring into view the device manager view (Helvar Routers).
Note: this is actually the Helvar Router Manager; Niagara use the term Device.

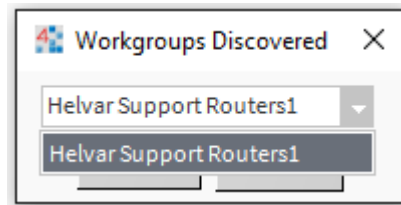
2. Click the Discover button to start the discovery process and display the network interface selection dialog.



Then select the workgroup to be discovered

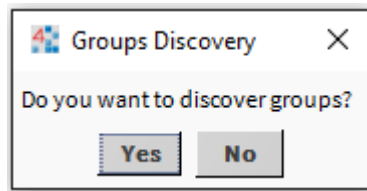


3. The drop down list in the dialog will display all the available Helvar Lighting Router Workgroups available on the JACE or PC's Ethernet adaptor's network. Choose a Workgroup from this list and click OK.

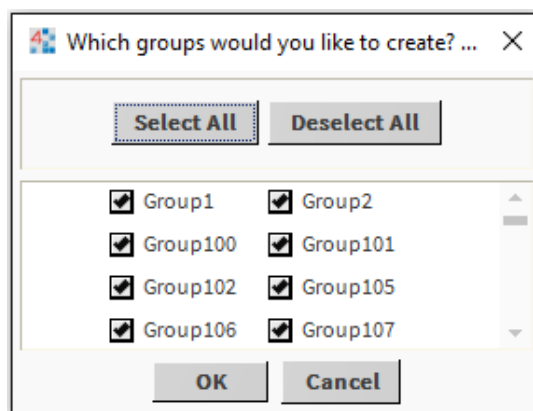


9. Discovering Groups in the Lighting Router System

1. The driver will check for the presence of any Groups in use on the Lighting Router System. If these are found the following dialog will appear to offer an automatic discovery. Click Yes to accept or No to skip this operation.

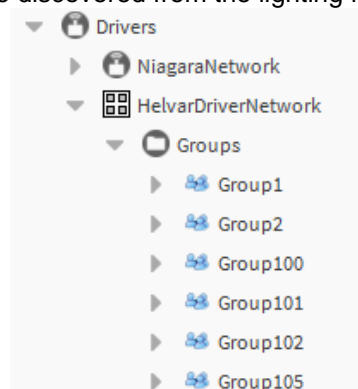


2. Selecting Yes will, after a short pause display all the available Groups. Use the check boxes to select the required Groups (all Groups are selected by default) and click on OK



3. A confirmation dialog is displayed and the Groups are added in the folder under the HelvarDriverNetwork.

Note: all group types will be discovered from the lighting router system.



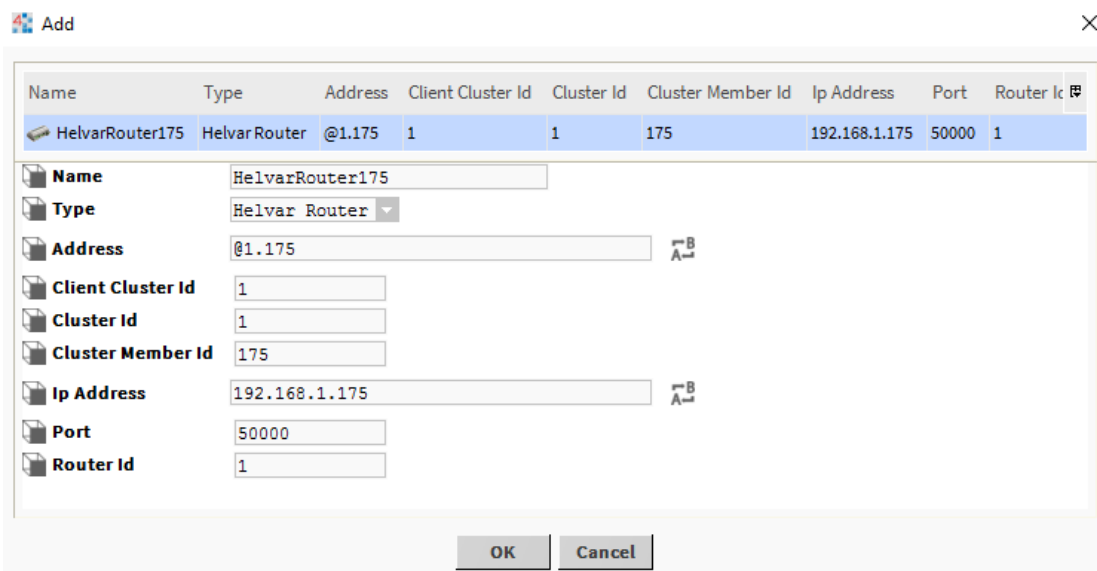
10. Discovering Router(s) in a Lighting System Workgroup

1. The initial discovery process completes by displaying a list of Discovered Routers that belong to the selected Workgroup



2. To commit one or more Lighting Routers to the database: multi-select and drag the devices to the database pane, or multi-select and click Add. The Add dialog will appear.

Note: the discovery process will use any natural names that were assigned to devices or groups during commissioning of the lighting router system. If these contain characters that are illegal in Niagara component names, they must be corrected (only alphanumeric and underscore characters are allowed).

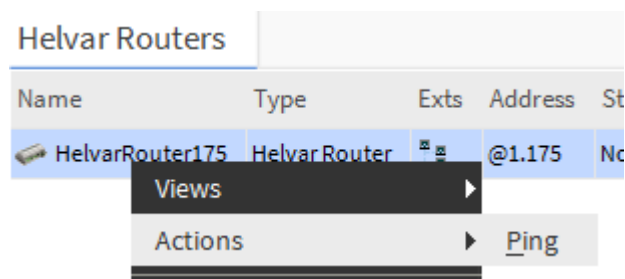


3. In general, it will not be necessary to make any changes and all the routers shown can be committed to the database by clicking OK. You should see the device(s) listed in the Helvar device manager view database, showing the State of "Normal".

Helvar Routers										1 objects
Name	Type	Exts	Address	State	Missing	Faulty	Description	Ip Address	Port	
HelvarRouter175	Helvar Router		@1.175	Normal	No	No		192.168.1.175	50000	

New Folder New Edit Discover Cancel Add Match TagIt

- If a router shows “Request Timeout” check the configuration of the network and/or the device addresses. You can double-click a router in the device manager to review settings in the edit dialog.
- After making any address changes, click save, then right-click the device and select Actions > Ping to test the connection.



11. Discovering Devices connected to a Router(s)

1. In the Helvar Router Manager view, in the Exts column, double-click the Devices icon on the router for which you wish to create input devices. This brings up the Helvar Device Manager view
2. In the Devices Manager, click the Discover button. This process may take several minutes to complete as it depends on the number of devices connected to the Lighting Router(s). A progress bar is shown at the top of the view.
3. All the discovered devices are shown at the end of this process.

Helvar Driver Device Discovery Success

Discovered 10 objects

Device Type	Address
HELVAR EL1x24si	@1.175.1.14
HELVAR EL1x24si_1	@1.175.1.10
Emergency Lighting	@1.175.1.37
Button 125	@1.175.1.56
Mini Input Unit 444	@1.175.1.60
HELVAR EL1x24si_2	@1.175.2.4
HELVAR EL1x24si_3	@1.175.2.10

4. To commit one or more Devices to the database: multi-select and drag the devices to the database pane, or multi-select and click Add.
5. The 'Add Discovered Device' dialog will appear. In general, it will not be necessary to make any changes and all the devices shown can be committed to the database by clicking OK. You should see the device(s) listed in the Helvar device manager view.
6. In the Helvar Device Manager, double click on the points Ext to view the devices points database. The example below shows an output device.

Note: when viewing the points for the device on screen, they will refresh immediately. The same applies when you have points on a graphical PX view. The polling for points is done sequentially via the devices parent router (one at a time). When the station is running, by default the points are re-read every 15 minutes. After first creating the device the point data is retrieved after an initial 15-minute period.

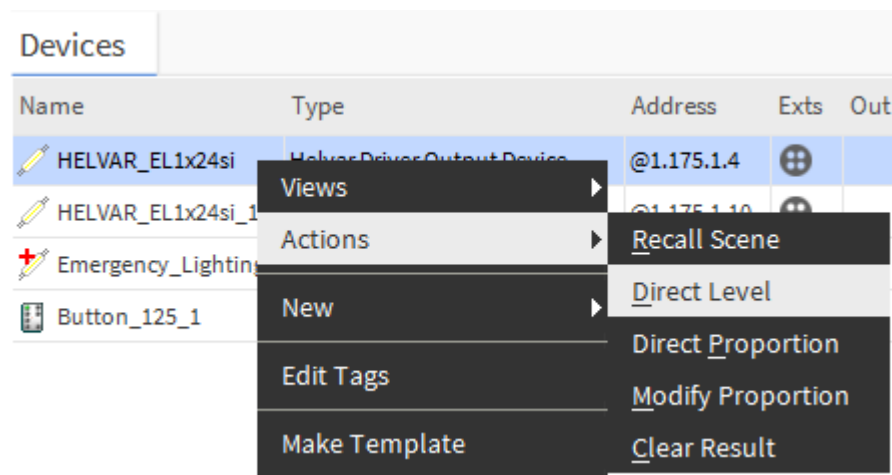
Database 6 objects

Name	Address	out
HELVAR_EL1x24si_DeviceState	@1.175.1.14	true [ok]
HELVAR_EL1x24si_LampFailure	@1.175.1.14	false [ok]
HELVAR_EL1x24si_Missing	@1.175.1.14	true [ok]
HELVAR_EL1x24si_Faulty	@1.175.1.14	false [ok]
HELVAR_EL1x24si_OutputLevel	@1.175.1.14	0.0 [ok]
HELVAR_EL1x24si_PowerConsumption	@1.175.1.14	0.0 [ok]

New Folder New Edit TagIt

12. Output Device Direct Actions

- For output devices a list of actions is also available to you. (If the device type selected in the drop down menu was “emergency” then the list of actions will differ from the standard ones available). To select an action, from the Helvar Device Manger right-click the device, select action and then the required function from the list.



- When selecting the action, an input box appears. You must specify the correct parameters for each action. The following outlines the format for the available actions.

Note: the result of the action appears in the “Out” column of the Helvar Device Manager. To clear the result, click on clear result. The Emergency test actions if applicable do not require input parameters to be set.

- Recall Scene: format 1,1,90 will recall Block 1, Scene 1, with a fade time of 90.
Note: blocks available are 1-8, scenes available are 1-16, giving 128 total scenes. Fade time units are displayed as 1/100th of a second. E.g. 90 = 0.9 seconds, 900 = 9 seconds & 9000 = 90 seconds.
- Direct Level: format 44,90 will send a direct output level of 44% with a fade time of 90.
Note: level should be 0-100.
- Direct Proportion: format 50,90 will increase the output level by a factor of 50% of the difference between the last recalled scene or direct level and 100%, with a fade time of 90.

Note: if current level is 44, then an increase of 50% will give a new level of 72 (100-44 = 56, 56x50% = 28, therefore 44+28 = 72). The range is -100 to 100.

- d. Direct Proportion: format -20,90 will decrease the output level by a factor of 20% of the difference between the last recalled scene or direct level and 0%, with a fade time of 90.

Note: if current level is 44, then a decrease of 20% will give a new level of 35 ($0-44 = -44$, $-44 \times 20\% = 9$, therefore $44-9 = 35$).

- e. Modify Proportion: format 5,90 will increase the output level by a factor of 5% of the difference between the last recalled proportional level and 100% with a fade time of 90.

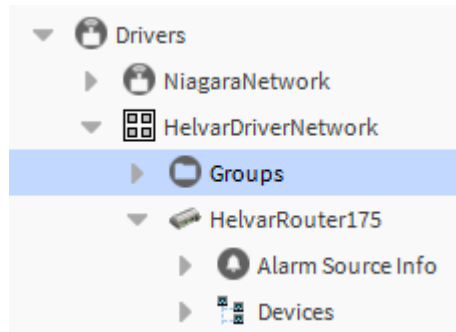
Note: if current level is 72, then a modification of 5 will give a new level of approx. 74 ($100-72 = 28$, $28 \times 5\% = 2$, therefore $72+2 = 74$).

- f. Modify Proportion: format -5,90 will decrease the output level by a factor of 5% of the difference between the last recalled proportional level and 100% with a fade time of 90.

Note: if current level is 72, then a modification of 5 will give a new level of approx. 68 ($0-72 = -72$, $-72 \times 5\% = -4$, therefore $72-4 = 68$).

13. Viewing Virtual Components

- As explained previously a folder named Groups is automatically created under the HelvarDriverNetwork and all discovered group components are stored in this folder. This ensures that the groups can locate routers and execute actions.
 Note: If a group component is added manually it MUST be stored in the Groups folder.



- Double-click on the Groups folder to open its wiresheet.
- The wiresheet will display a cascaded view of all discovered group components.
- The example below shows a typical Group component from the wiresheet.

Note: As soon as the Group is added to the wiresheet it will automatically retrieve the group properties (Group description, LSIG, LSIBlock 1, LSIBlock 2 and Power Consumption – described in the next section. The properties will automatically poll and update every 15 minutes. If a push message (described on page 15) is retrieved, the group immediately updates the LSIG property.

Group 1	
Group	
Group Id	1
Cluster Id	1
Group Description	
LSIG	13
LSI Block1	
LSI Block2	
Group Power Consumption	
Action Result	
Recall Scene	
Store Scene	
Direct Level	
Direct Proportion	
Modify Proportion	
Emergency Function Test	
Emergency Duration Test	
Stop Emergency Test	
Reset Emergency Battery Total Lamp Time	

- Group component properties are described below:
 - Group ID: This is the group number with which the virtual component controls and interacts.

- b. Cluster ID: This must be the same as the cluster as used in the address structure.
Note: Address scheme is described in full on page 20 of this document.
 - c. Description: This is the group description as obtained by the driver from the Helvar Router system.
 - d. LSIG: This is the last scene selected in the group.
Note: This property is updated in response to a push message received from the Helvar Lighting Router System.
 - e. LSIBlock 1: This is the last scene selected within the group for block 1.
Note: blocks available are 1-8.
 - f. LSIBlock 2: This is the last scene selected within the group for block 2.
Note: blocks available are 1-8.
 - g. Power Consumption: This is the total calculated power consumption for all devices in the same group.
Note: The value returned will depend on the total consumption at 100% as set in the Helvar lighting system for that device. The value is not measured but calculated based on the device type and internal dimming curve and output value.
6. A list of actions is also available to you from the Group component. To select an action, right-click the device, select action and then the required function from the list.
Note: the format of the actions is similar to device actions; they are however applied at the Group level. The Emergency test actions listed do not require input parameters to be set.
- a. Recall Scene: format 1,1,90,1 will recall Block 1, Scene 1, with a fade time of 90 and Constant Light (CL) active
Note: blocks available are 1-8, scenes available are 1-16, giving 128 total scenes. Fade time units are displayed as 1/100th of a second. E.g. 90 = 0.9 seconds, 900 = 9 seconds & 9000 = 90 seconds, Constant Light can be set to 1=active, 0=inactive or not set, in which case it would default to 0.
 - b. Store Scene: Format 1,1 will store the current output values into Block 1, Scene 1 immediately.
Note: blocks available are 1-8, scenes available are 1-16, giving 128 total scenes.
 - c. Direct Level: format 44,90 will send a direct output level of 44% with a fade time of 90.
Note: level should be 0-100.
 - d. Direct Proportion: format 50,90 will increase the output level by a factor of 50% of the difference between the last recalled level and 100%, with a fade time of 90.
Note: if current level is 44, then an increase of 50% will give a new level of 72 ($100-44 = 56$, $56 \times 50\% = 28$, therefore $44+28 = 72$). The range is -100 to 100.
 - e. Direct Proportion: format -20,90 will decrease the output level by a factor of 20% of the difference between the last recalled level and 0%, with a fade time of 90.

Note: if current level is 44, then a decrease of 20% will give a new level of 35 ($0-44 = -44$, $-44 \times 20\% = 9$, therefore $44-9 = 35$).

- f. Modify Proportion: format 5,90 will increase the output level by a factor of 5% of the difference between the last recalled level and 100% with a fade time of 90.
Note: if current level is 72, then a modification of 5 will give a new level of approx. 74 ($100-72 = 28$, $28 \times 5\% = 2$, therefore $72+2 = 74$).
- g. Modify Proportion: format -5,90 will decrease the output level by a factor of 5% of the difference between the last recalled level and 100% with a fade time of 90.
Note: if current level is 72, then a modification of 5 will give a new level of approx. 68 ($0-72 = -72$, $-72 \times 5\% = -4$, therefore $72-4 = 68$).
- h. EmergencyFunctionTest: Format not required and starts an emergency function test in the group.
- i. EmergencyDurationTest: Format not required and starts an emergency duration test in the group.
- j. StopEmergencyTest: Format not required and stops ALL emergency tests currently running in the group.
- k. ResetEmergencyBatteryTotalLampTime: Format not required and resets the total running time that the emergency batteries in the group have been used since the last reset.

l.

7. Push Messages. These messages are sent on to the TCP / IP bus when a local action occurs within the system such as a button push scene recall or PIR scene recall.

Note: Feature available from router firmware versions 4.2.14. By default, the push function is turned off within the Helvar Lighting Router System. Refer to Helvar Designer help for further information on enabling push messages.

14. Added Device Alarms

Device alarms may be added to the system by using the “Device Alarms Required” property found under on the Helvar Routers property sheet.

Property Sheet









HelvarRouter175 (Helvar Router)

Status	{ok}
Enabled	<input checked="" type="checkbox"/> true
Fault Cause	
Health	Ok [30-Jun-16 3:24 PM BST]
Alarm Source Info	Alarm Source Info
Ip Address	192.168.1.175
Port	50000
Router Id	1
Device Alarms Required	<input type="checkbox"/> false
Device Alarms Created	<input type="checkbox"/> false
Address	@1.175
State	Normal
Missing	No
Faulty	No
Description	
Client Cluster Id	1
Cluster Id	1
Cluster Member Id	175
Devices	Helvar Device Ext

1. Setting the “Device Alarms Required” to “True” will automatically generate and set the following;
 - a. Alarm Class Component named “HelvarAlarmClass” under the Stations AlarmService.
 - b. BooleanChangeOfStateAlarmExt Component under any Devices that have Missing, LampFailure and Faulty Points.
 - c. Set the BooleanChangeOfStateAlarmExt default alarm class under its properties to be “HelvarAlarmClass”
2. Setting the “Device Alarms Required” to “False” will automatically remove the above components and settings.

15. Input Device List

Shown below are the available input devices for the Helvar IP driver. Note: Each device must have a unique Address in the correct format, as this forms part of the communication messages for polling the points. Also note that when viewing the extensions, the address will have an additional sub-device reference number.

Devices				
Name	Type	Address	Exts	Out
 fred	Helvar Driver Input Device	@1.175.2.56		
 Button_125_1	Helvar Driver Input Device	@1.175.1.56		
 Mini_Input_Unit_444	Helvar Driver Input Device	@1.175.1.60		
 Mini_Input_Unit_444_1	Helvar Driver Input Device	@1.175.2.60		

Input devices points extensions vary depending on the device type selected but will consist off the following types.

1. Button: Format Boolean and display's true or false statement if the button of the Helvar control panel is selected (LED lit) or not selected (LED unlit).

Note: It is possible for one or more LED's to be lit depending on the Helvar Lighting System programming.

2. IR: Format Boolean and display's true or false statement dependent on the last selected IR of the Helvar control panel.

Note: It is possible for one or more IR's selections to be made depending on the Helvar Lighting System programming.

3. Slider: Format Numeric and will display a value representing the sliders position.

Note: The value returned will be in the range 0-51200 incremented in steps of 512.

4. PushOn_Off: Format Boolean and display's true or false statement dependent on the last action.

5. Input: Format Boolean and display's true or false statement dependent on the last action.

Note: On device type 942, the first four inputs can be either Boolean OR numeric not both. Unused points should be deleted.

6. Input_numeric: Format Numeric and will display a value representing the sliders position.













Note: The value returned will be in the range 0-51200 incremented in steps of 512. Further note Input_numeric are only available on device type 942, where the first four inputs can be either Boolean OR numeric not both. Unused points should be deleted.

7. PIR: Format Boolean and display's true or false statement dependent on the last action.
8. LightSensor: Format Numeric and will display a value representing the current light value detected.
9. Note: The value returned will be in the range 0-200. Further note the light sensor value is an internal system value and does not represent a LUX or any other internationally recognised measurement of light.
Note: Status shown is PIR active or not active state and does not account for PIR timeouts and therefore should not be used to validate if lighting levels are on or off.
10. LightSensor: Format Numeric and will display a value representing the current light value detected.
Note: The value returned will be in the range 0-200. Further note the light sensor value is an internal system value and does not represent a LUX or any other internationally recognised measurement of light.
11. Missing: Format Boolean and display's true or false statement if the device has gone missing from the Helvar lighting system.
12. Note: In the case of data cable being disconnected for example.

16. Output Device List

Shown below are the available output devices for the Helvar IP driver.

Note: Each device must have a unique Address in the correct format, as this forms part of the communication messages for polling the points.

Devices					
Name	Type	Address	Exts	Out	
 HELVAR_EL1x24si	Helvar Driver Output Device	@1.175.1.4			
 HELVAR_EL1x24si_1	Helvar Driver Output Device	@1.175.1.10			
 Emergency_Lighting	Helvar Driver Emergency Device	@1.175.1.37			
 HELVAR_EL1x24si_2	Helvar Driver Output Device	@1.175.2.4			
 HELVAR_EL1x24si_3	Helvar Driver Output Device	@1.175.2.10			
 Emergency_Lighting_1	Helvar Driver Emergency Device	@1.175.2.37			

Output devices point extensions are all the same except for the device “Emergency Lighting”, the points consist off the following types.

a. DeviceState: Format Boolean and display’s true or false statement depending on the state.

b. LampFailure: Format Boolean and display’s true or false statement depending on if there is or is not lamp failure detected.

Note: On some output devices (e.g. convertors) lamp failure can only be detected in the case of all lamps being faulty.

c. Missing: Format Boolean and display’s true or false statement if the device has gone missing from the Helvar lighting system.

Note: In the case of power failure to luminaire for example.

d. Faulty: Format Boolean and display’s true or false statement if the device is detected as faulty in the Helvar lighting system.

Note: In the case of an internal circuitry failure for example

e. OutputLevel: Format numeric and will display a value representing the current output of the device.

Note: The value returned will be in the range 0-100 representing 0-100% values commonly used in scene recall. The actual voltage output will vary dependent on the device, lamp controlled and internal dimming curve.

f. PowerConsumption: Format numeric and will display a value representing the power consumption of the device.

Note: The value returned will depend on the total consumption at 100% as set in the Helvar lighting system for that device. The value is not measured but calculated based on the device type and internal dimming curve and output value.

Device “Emergency Lighting” point extensions consist of the following types:

- a. EmergencyFunctionTestTime: Format String and display’s the time and date for the last test completed.

Note: If no test has been carried out this will return a null.

- b. EmergencyFunctionTestState: Format numeric and will display a value representing the current test status.

Note: Status values shown below and apply also to EmergencyDurationTestState.

- i. 0 = Pass
- ii. 1 = Lamp Failure
- iii. 2 = Battery Failure
- iv. 4 = Faulty
- v. 8 = Failure
- vi. 16 = Test Pending
- vii. 32 = Unknown

- b. EmergencyDurationTestTime: Format String and display’s the time and date for the last test completed.

Note: If no test has been carried out this will return a null.

- c. EmergencyDurationTestState: Format numeric and will display a value representing the current test status.

Note: See previous list for function test.

- d. EmergencyBatteryCharge: Format numeric and will display a value representing the current percentage of battery charge remaining.

- e. EmergencyBatteryTime: Format String and display’s the total running time that the emergency battery has been in use since the last reset.

- f. EmergencyTotalLampTime: Format numeric and display’s the total running time that the lamp has been in use from any power source since the last reset.

- g. Missing: Format Boolean and display’s true or false statement if the device has gone missing from the Helvar lighting system.

Note: In the case of data cable being disconnected for example.

17. Driver Tuning

Refresh Props After Action

Property Sheet	
Group1 (Group)	
Group Id	1
Cluster Id	1
Group Description	Group 1
L S I G	14
L S I Block1	
L S I Block2	
Group Power Consumption	15.75
Group Power Polling Minutes	15
Action Result	
Scene Table	Scene Table
Refresh Props After Action	<input type="radio"/> false

Property Sheet	
HelvarRouter251 (Helvar Router)	
Status	{ok}
Enabled	<input checked="" type="radio"/> true
Fault Cause	
Health	Ok [15-Feb-19 11:06 AM GMT]
Alarm Source Info	Alarm Source Info
Ip Address	192.168.1.251
Port	50000
Router Id	1
Device Alarms Required	<input type="radio"/> false
Device Alarms Created	<input type="radio"/> false
Address	01.251
State	Normal
Missing	No
Faulty	No
Description	
Client Cluster Id	1
Cluster Id	1
Cluster Member Id	251
Devices	Helvar Device Ext
Refresh Props After Action	<input checked="" type="radio"/> true

“Refresh Props After Action” is a property that resides on both the Router Device and the Group Component. If this is set to false, it will refresh properties in the background or if it is set to true it will refresh the properties after the action is complete.

18. Abbreviations

IP	Internet Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
DALI	Digital Addressable Lighting Interface
S-Dim	Serial Dimmer Communication
DMX	USITT DMX512