HLC-IPDRV Tridium – Helvar IP Driver

Helvar

Installation and User Guide

HLC-IPDRV Tridium - Helvar IP Driver

Table of Contents

1 Revision History

Issue	Date	Change Descriptions	Author
Issue 01	10/04/2012	First Issue	Helvar Limited
Issue 02	20/06/2012	Addition of automatic discovery	Helvar Limited
Issue 03	04/04/2013	Minor clarifications	Helvar Limited

2 Document Outline

This document is the software manual for the HLC-IPDRV Helvar IP driver developed for Tridium Jace hardware and Ax Supervisor using the Niagara AX platform.

3 Scope

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 AX Framework and Tridium hardware.

4 Safety Precautions

None.

5 General Description

The Helvar IP driver allows connection and communication to the Helvar lighting router system (product ref. 910 / 920) by use of the HelvarNET control protocol.

6 System Requirements

This driver has been tested with Niagara AX platform version 3.7.X and Tridium JACE model JCX 660. The driver requires the use of Helvar Lighting Router firmware version 4.2.16 or later.

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, without the use of a JACE, running under the Niagara AX platform.

7 Disclaimer

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Helvar standard terms and conditions apply.

8 Installation

The Helvar IP driver is installed in the modules directory of Niagara AX Workbench and can subsequently configured into a Tridium Station (JACE unit or AX Supervisor).

The use of the driver is licenced and the appropriate certificate will need to be activated and installed to the Host hardware. The Host ID of the JACE Hardware (or PC in case of supervisor) should be provided to the licence administration team at Helvar for activation, at the address provided below:

Tridium-Licensing@helvar.com

Once installed Workbench and stations should be re-started.
Note: Please see the release certificate for software compatibility level.

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:

Protocol	Port#
UDP	50001
TCP	50000

8.1 Operation

The Helvar Tridium driver provides a communication link from either an AX 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 (for full HelvarNET information see Helvar designer software help).

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.

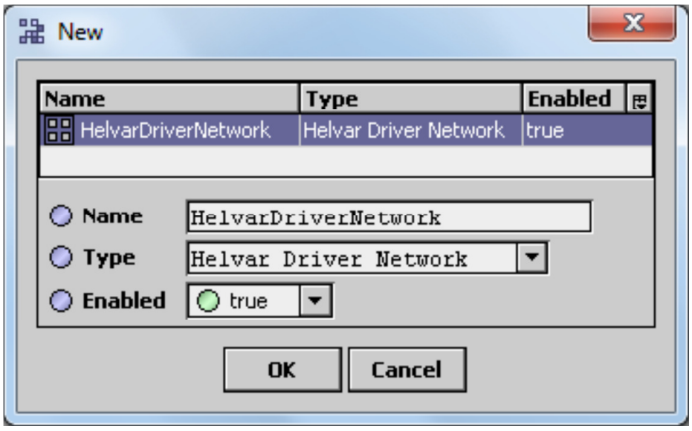
8.2 Adding a Helvar network

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.

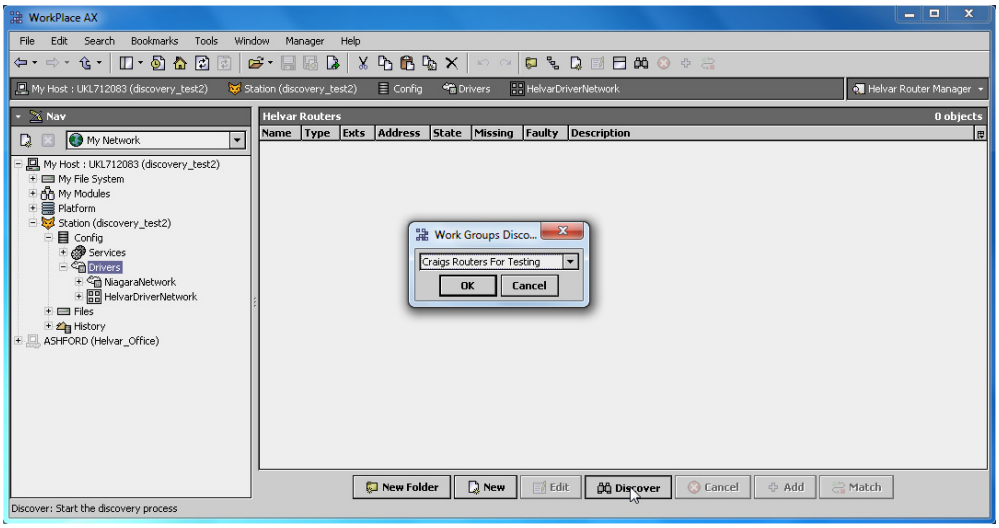


5 Click OK, to add the HelvarDriverNetwork. A folder named Groups will also be added at the same time immediately under the HelvarDriverNetwork.
Note: the Groups folder use will be explained later in section 8.4.

8.3 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.

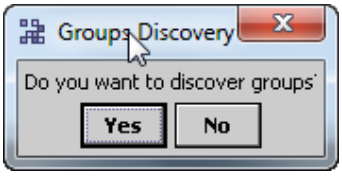
2 Click the Discover button to start the discovery process and display the Workgroup selection dialog.



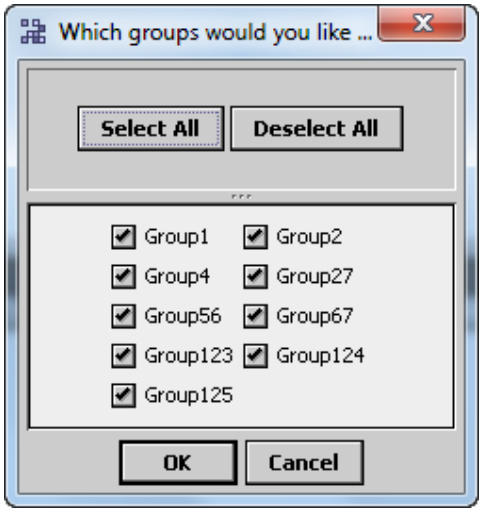
3 The drop down list in the dialog will display all the available Helvar Lighting Router Workgroups available on the Jace or PC's Ethernet adaptor's network. Choose a Workgroup from this list and click OK.

8.4 Discovering Groups in the Lighting Router System

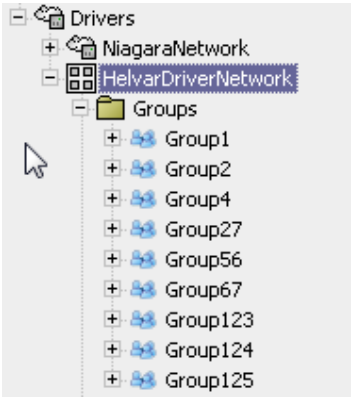
1 The driver will check for the presence of any Groups in use on the Lighting Router System. If these are found the following dialog will appear to offer an automatic discovery. Click Yes to accept or No to skip this operation.



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

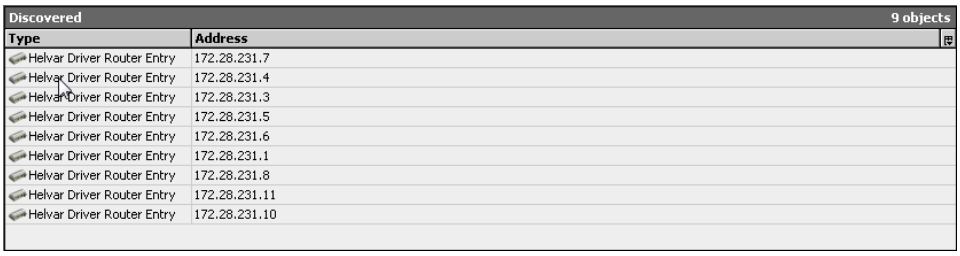


3 A confirmation dialog is displayed and the Groups are added in the folder under the HelvarDriverNetwork.
Note: all group types will be discovered from the lighting router system.

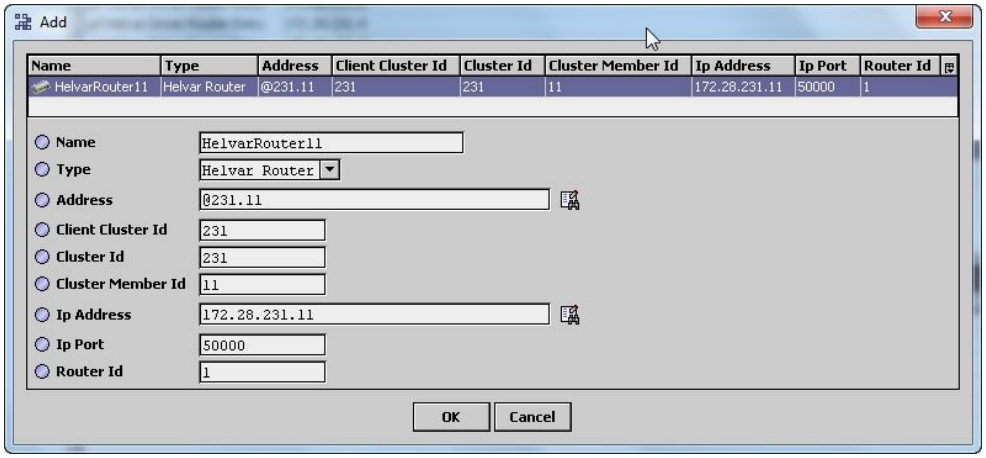


8.5 Discovering Router(s) in a Lighting System Workgroup

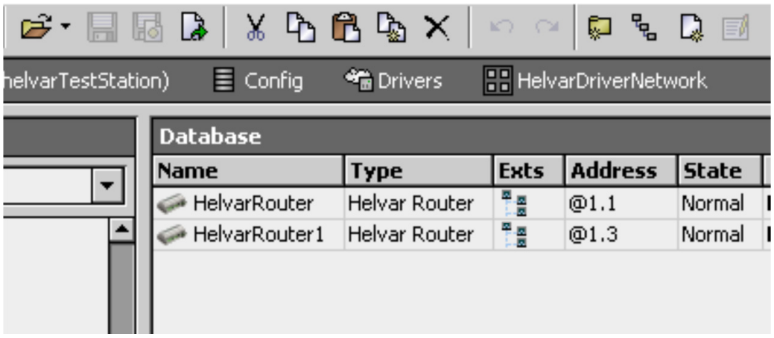
1 The initial discovery process completes by displaying a list of Discovered Routers that belong to the selected Workgroup



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).

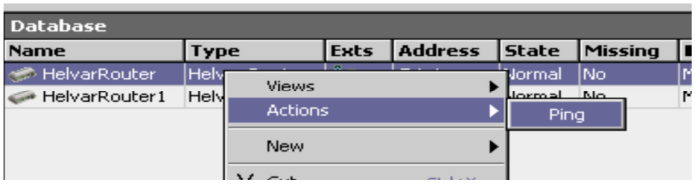


3 In general it will not be necessary to make any changes and all the routers shown can be committed to the database by clicking OK. You should see the device(s) listed in the Helvar device manager view database, showing the State of “Normal”.



4 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.

5 After making any address changes, click save, then right-click the device and select Actions > Ping to test the connection.

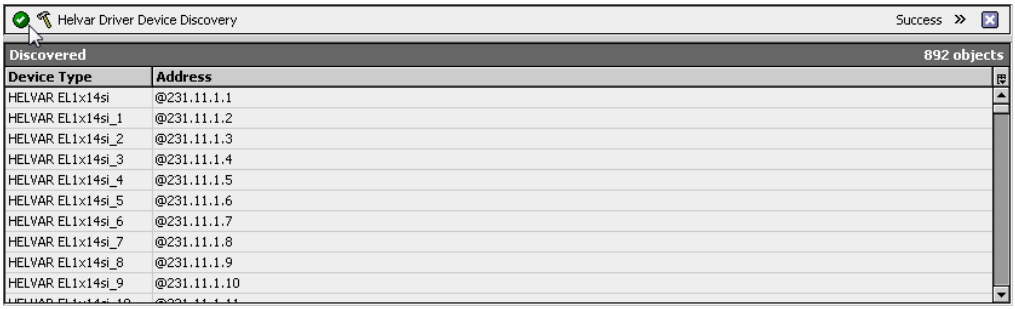


8.6 Discovering Devices connected to a Router(s)

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.

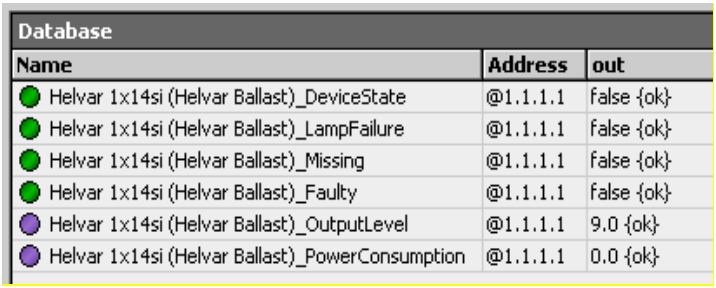
3 All the discovered devices are shown at the end of this process.



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.

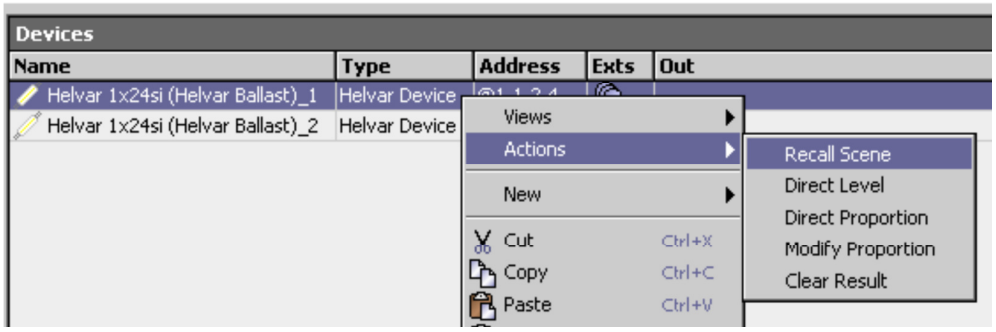
5 The 'Add Discovered Device' dialog will appear. In general it will not be necessary to make any changes and all the devices shown can be committed to the database by clicking OK. You should see the device(s) listed in the Helvar device manager view.

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.



8.7 Output Device Direct Actions

1 For output devices a list of actions are 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.



2 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.

a 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.

b 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.

c 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.

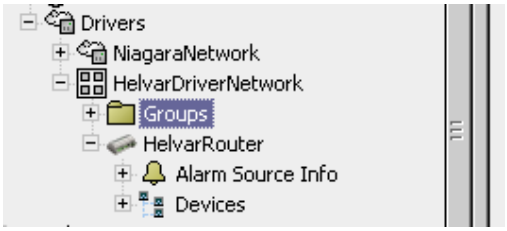
d Direct Proportion: format *-20,90* will decrease the output level by a factor of 20% of the difference between the last recalled scene or direct level and 0%, with a fade time of 90.
Note: if current level is 44, then a decrease of 20% will give a new level of 35 (0-44 = -44, -44x20% = 9, therefore 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, 28x5% = 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, -72x5% = -4, therefore 72-4 = 68).

8.8 Viewing Virtual Components

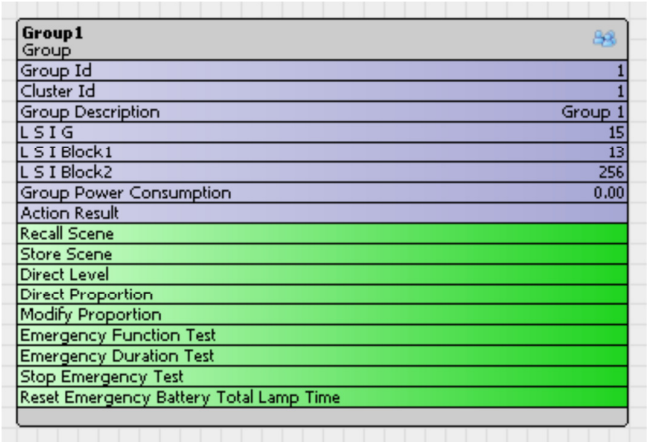
1 As explained previously a folder named Groups is automatically created under the HelvarDriverNetwork and all discovered group components are stored in this folder. This ensures that the groups can locate routers and execute actions.
*Note: If a group component is added manually it **MUST** be stored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



2 Double-click on the Groups folder to open its wiresheet.

3 The wiresheet will display a cascaded view of all discovered group components.

4 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.



5 Group component properties are described below:

a 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* 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.

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, 56x50% = 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, -44x20% = 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, 28x5% = 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, -72x5% = -4, therefore 72-4 = 68).

h EmergencyFunctionTest: Format *not required* and starts an emergency function test in the group.

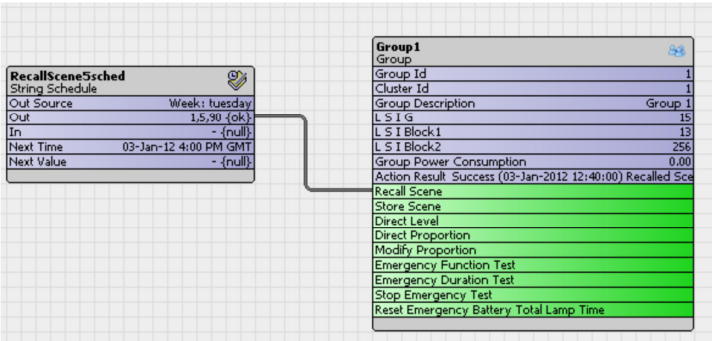
i EmergencyDurationTest: Format *not required* and starts an emergency duration test in the group.

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.

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.

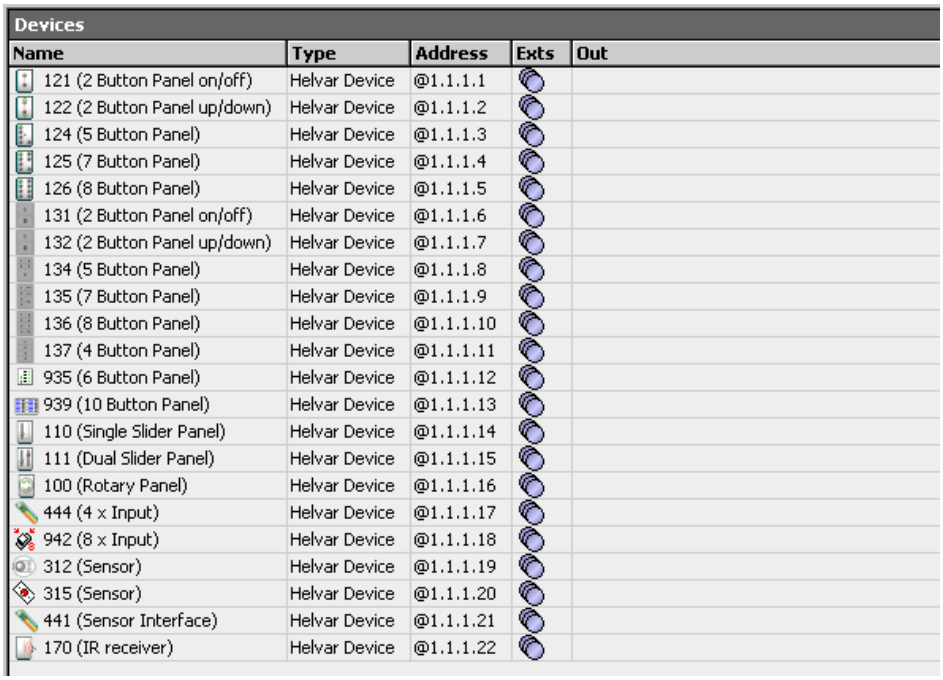
8 In order to recall a scene via a Schedule, from the schedule palette, drag a string schedule to the wiresheet and link from the out value slot to the Recall scene action slot on the group as follows:



9 Next, specify the parameters in the String Schedule object. This must follow the format as previously described for “recall scene” action. E.g. 1,5,90 would recall Block 1, Scene 5 with a fade time of 0.9 seconds.

9 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
121 (2 Button Panel on/off)	Helvar Device	@1.1.1.1		
122 (2 Button Panel up/down)	Helvar Device	@1.1.1.2		
124 (5 Button Panel)	Helvar Device	@1.1.1.3		
125 (7 Button Panel)	Helvar Device	@1.1.1.4		
126 (8 Button Panel)	Helvar Device	@1.1.1.5		
131 (2 Button Panel on/off)	Helvar Device	@1.1.1.6		
132 (2 Button Panel up/down)	Helvar Device	@1.1.1.7		
134 (5 Button Panel)	Helvar Device	@1.1.1.8		
135 (7 Button Panel)	Helvar Device	@1.1.1.9		
136 (8 Button Panel)	Helvar Device	@1.1.1.10		
137 (4 Button Panel)	Helvar Device	@1.1.1.11		
935 (6 Button Panel)	Helvar Device	@1.1.1.12		
939 (10 Button Panel)	Helvar Device	@1.1.1.13		
110 (Single Slider Panel)	Helvar Device	@1.1.1.14		
111 (Dual Slider Panel)	Helvar Device	@1.1.1.15		
100 (Rotary Panel)	Helvar Device	@1.1.1.16		
444 (4 x Input)	Helvar Device	@1.1.1.17		
942 (8 x Input)	Helvar Device	@1.1.1.18		
312 (Sensor)	Helvar Device	@1.1.1.19		
315 (Sensor)	Helvar Device	@1.1.1.20		
441 (Sensor Interface)	Helvar Device	@1.1.1.21		
170 (IR receiver)	Helvar Device	@1.1.1.22		

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

a. 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.

b. 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.

c. 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.

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

e. 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.

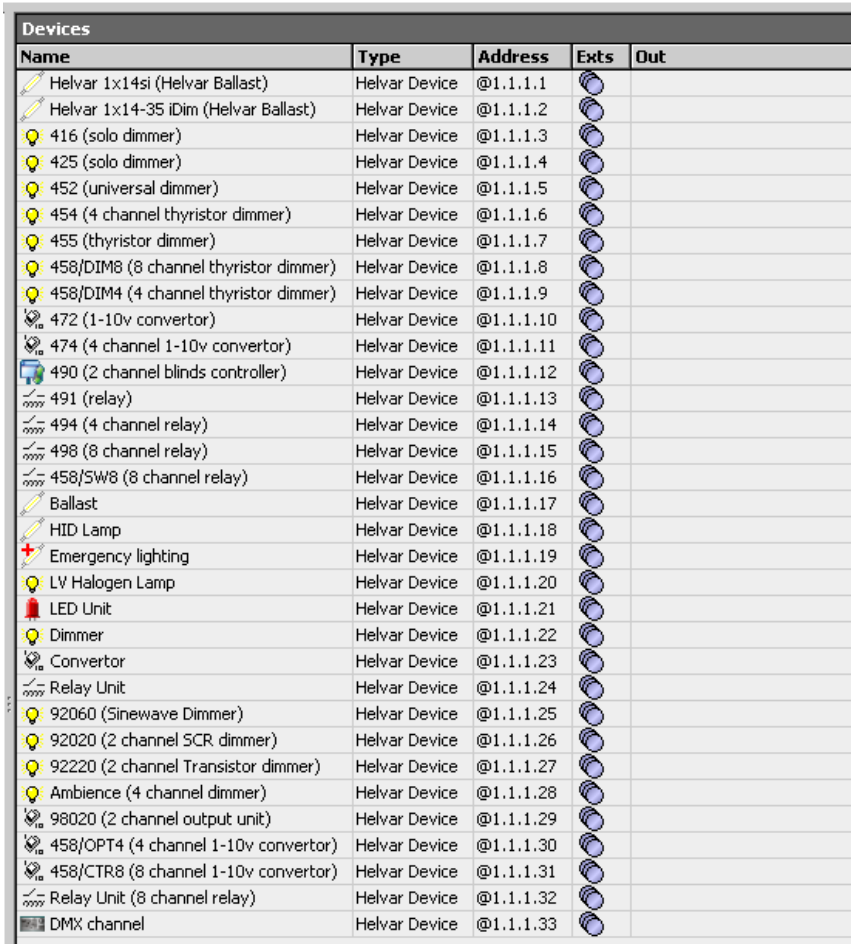
f. Input_numeric: Format *Numeric* and will display a value representing the sliders position.
Note: The value returned will be in the range 0-51200 incremented in steps of 512. Further note Input_numeric are only available on device type 942, where the first four inputs can be either Boolean OR numeric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

g. PIR: Format *Boolean* and display's true or false statement dependent on the last action.
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.

h. 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.

10 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. For clarity only 1 off each ballast type si and iDim are shown.



Devices

Name	Type	Address	Exts	Out
Helvar 1x14si (Helvar Ballast)	Helvar Device	@1.1.1.1		
Helvar 1x14-35 iDim (Helvar Ballast)	Helvar Device	@1.1.1.2		
416 (solo dimmer)	Helvar Device	@1.1.1.3		
425 (solo dimmer)	Helvar Device	@1.1.1.4		
452 (universal dimmer)	Helvar Device	@1.1.1.5		
454 (4 channel thyristor dimmer)	Helvar Device	@1.1.1.6		
455 (thyristor dimmer)	Helvar Device	@1.1.1.7		
458/DIM8 (8 channel thyristor dimmer)	Helvar Device	@1.1.1.8		
458/DIM4 (4 channel thyristor dimmer)	Helvar Device	@1.1.1.9		
472 (1-10v convertor)	Helvar Device	@1.1.1.10		
474 (4 channel 1-10v convertor)	Helvar Device	@1.1.1.11		
490 (2 channel blinds controller)	Helvar Device	@1.1.1.12		
491 (relay)	Helvar Device	@1.1.1.13		
494 (4 channel relay)	Helvar Device	@1.1.1.14		
498 (8 channel relay)	Helvar Device	@1.1.1.15		
458/SW8 (8 channel relay)	Helvar Device	@1.1.1.16		
Ballast	Helvar Device	@1.1.1.17		
HID Lamp	Helvar Device	@1.1.1.18		
Emergency lighting	Helvar Device	@1.1.1.19		
LV Halogen Lamp	Helvar Device	@1.1.1.20		
LED Unit	Helvar Device	@1.1.1.21		
Dimmer	Helvar Device	@1.1.1.22		
Convertor	Helvar Device	@1.1.1.23		
Relay Unit	Helvar Device	@1.1.1.24		
92060 (Sinewave Dimmer)	Helvar Device	@1.1.1.25		
92020 (2 channel SCR dimmer)	Helvar Device	@1.1.1.26		
92220 (2 channel Transistor dimmer)	Helvar Device	@1.1.1.27		
Ambience (4 channel dimmer)	Helvar Device	@1.1.1.28		
98020 (2 channel output unit)	Helvar Device	@1.1.1.29		
458/OPT4 (4 channel 1-10v convertor)	Helvar Device	@1.1.1.30		
458/CTR8 (8 channel 1-10v convertor)	Helvar Device	@1.1.1.31		
Relay Unit (8 channel relay)	Helvar Device	@1.1.1.32		
DMX channel	Helvar Device	@1.1.1.33		

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.

3. 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

c. 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.

d. EmergencyDurationTestState: Format *numeric* and will display a value representing the current test status.
Note: See previous list for function test.

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

f. EmergencyBatteryTime: Format *String* and display's the total running time that the emergency battery has been in use since the last reset.

g. 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.

11 Helvar system device addressing.

The Helvar lighting router system would consist of a number of routers (910 or 920) that enable connection to a variety of different inputs and outputs using a different data buses.

The backbone structure of the system uses Ethernet Cat 5 cabling & the TCP/IP protocol. As such each system (or workgroup) is a cluster of routers. The cluster (3rd Octet in IP addressing) forms the first part of the unique device address

Each router within the system will then have a unique IP address with the 4th octet providing the unique router number. This number forms the second digit of the unique device address.

The cluster.router is then followed by a subnet. The subnet refers to the data bus on which inputs or output devices are connected. Depending on the router type (910 or 920) there are 2 or 4 subnets available. In both case's subnet 1 & 2 use the DALI protocol. For the 920 you have additional subnets 3 (using S-Dim) and 4 (DMX).

Following cluster.router.subnet is then the device address. This number is limited by the type of subnet to which the device is connected and in the case of output devices completes the device address.

For input devices there is a further sub-device which will refer to a particular property of that input device for example a control panel (device) would have a number of buttons (sub-device).

So a full address would be written:-

cluster.router.subnet.address for output devices

cluster.router.subnet.address for input devices

cluster.router.subnet.address.sub-address for input sub-devices

Address structure – additional information for reference

Cluster = the 3rd octet of the IP address range used

Router = the 4th octet of the IP address of that particular router

Subnet = the data bus on which devices are connected (Dali 1 = 1, Dali 2 = 2, S-Dim = 3, DMX = 4)

Address = the device address, dependant on the data bus (Dali = 1-64, S-Dim = 1-252, DMX = 1-512)

Sub-address = the sub-device of the device (button, sensor, input etc.)

12 Abbreviations

IP	Internet Protocol
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
DALI	Digital Addressable Lighting Interface
S-Dim	Serial Dimmer Commmunication
DMX	Data Multiplex Unit