LONMARK
Functional Profile: Occupancy Controller
Overview

This document describes the profile for an occupancy controller. The controller input is the occupancy state and the output is the control value for the lamp actuator.

Example Usage

Typically the occupancy controller input is connected to the occupancy sensor and the output to the lamp as shown in Figure 2. A switch can be used to turn the occupancy controller into ON and OFF mode. An additional switch can override the controller and directly control the lamp.

Figure 2 Typical Usage of a LONMARK Occupancy Controller Object
The occupancy controller can also be driven by an occupancy sensor from a neighboring area, (secondary input) as shown in Figure 3. The occupancy controller can also operate on another controller (eg constant light controller) as shown in Figure 4.

Figure 3  Secondary Input to a LONMARK Occupancy Controller Object

Figure 4  Interaction between LONMARK Occupancy Controller Object and constant light controller
Timing Description

The following timing diagram defines the different timers used in the profile.

**Figure 5** Timing diagram

Detected

SENSOR

Occupancy

Sensor message

Controller message

(time)

(retriggered each time a new OCCupied value is received)
Object Details

Figure 6  Object Details

Table 1  SNVT Details

<table>
<thead>
<tr>
<th>NV # (M/O)*</th>
<th>Name</th>
<th>In/Out</th>
<th>SNVT Type (SNVT Index)</th>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (M)</td>
<td>nviOccupancy</td>
<td>In</td>
<td>SNVT_occupancy (109)</td>
<td>Class Description</td>
<td>Occupancy status input</td>
</tr>
<tr>
<td>2 (M)</td>
<td>nvoLampValue</td>
<td>Out</td>
<td>SNVT_switch (95)</td>
<td></td>
<td>Control output for lamp</td>
</tr>
<tr>
<td>3 (O)</td>
<td>nviSecondary</td>
<td>In</td>
<td>SNVT_occupancy (109)</td>
<td></td>
<td>Occupancy status input</td>
</tr>
<tr>
<td>4 (O)</td>
<td>nviSetting</td>
<td>In</td>
<td>SNVT_setting (new)</td>
<td></td>
<td>Auto/Off mode selection</td>
</tr>
<tr>
<td>5 (O)</td>
<td>nviManOverride</td>
<td>In</td>
<td>SNVT_switch (95)</td>
<td></td>
<td>Manual override</td>
</tr>
<tr>
<td>6 (O)</td>
<td>nvoSetting</td>
<td>Out</td>
<td>SNVT_setting (new)</td>
<td></td>
<td>Operations with other controllers</td>
</tr>
</tbody>
</table>
### Table 2 SCPT Details

<table>
<thead>
<tr>
<th>SCPT index (M/O)*</th>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>17 (O)</td>
<td>SCPT_location</td>
<td>Location label</td>
</tr>
<tr>
<td>91 (O)</td>
<td>SCPTHoldTime</td>
<td>Hold time for occupied state after there is no occupancy detected. The HoldTime timer is retriggered each time an OCCUPIED value is received from the sensor.</td>
</tr>
<tr>
<td>155 (O)</td>
<td>SCPTPrimeVal</td>
<td>Default lamp value sent when the area is occupied.</td>
</tr>
<tr>
<td>156 (O)</td>
<td>SCPTSecondVal</td>
<td>Default lamp value sent when the neighboring area is occupied.</td>
</tr>
</tbody>
</table>

- M = mandatory, O = optional

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**Mandatory Network Variables**

**Occupancy Status Input Value**

```plaintext
network input SNVT_occupancy nviOccupancy;
```

This input network variable provides the occupancy status.

**Valid Range**

The range of `SNVT_occupancy`:

- \( 0 : \text{OC_OCCUPIED} \) (Area is occupied)
- \( 1 : \text{OC_UNOCCUPIED} \) (Area is unoccupied)
- \( 0xFF : \text{OC_NUL} \)

For all other enumerations of `SNVT_occupancy`, no action is taken by the occupancy controller.

**Lamp Value Output**

```plaintext
network output SNVT_switch nvoLampValue;
```

This output network variable provides the state for the lamp actuator (ON or OFF) and the percentage level of intensity.

**Valid Range**

The valid range of the state is as defined for `SNVT_switch` where 0 means OFF and 1 means ON. The 8-bit intensity value contains a value from 0 to 200, representing minimum to maximum (0%-100% in steps of 0.5%) intensity. A state value of 0xFF indicates the switch value is undefined.

**When Transmitted**

Whenever the state or intensity of the lamp actuator is required to change.

**Default Value**

None.
Optional Network Variables

Secondary Occupancy Status Input Value

network input SNVT_occupancy nviSecondary;

This input network variable provides the occupancy status of a neighboring area in order to provide low level lighting around an occupied area (security feeling).

Valid Range

The range of SNVT_occupancy:

<table>
<thead>
<tr>
<th>Value</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>OC_OCCUPIED</td>
</tr>
<tr>
<td>1</td>
<td>OC_UNOCCUPIED</td>
</tr>
<tr>
<td>0xFF</td>
<td>OC_NUL</td>
</tr>
</tbody>
</table>

For all other enumerations of SNVT_occupancy, no action is taken by the occupancy controller.

Setting Input

network input SNVT_setting nviSetting;

This input network variable selects the operating mode for the controller.

The mode can be either ON or OFF. The ON mode turns on the controller (automatic mode) which then controls the lamp value output. The OFF mode turns off the controller and the lamp value output.

Valid Range

The variable nviSetting uses SNVT_setting enumerations ON and OFF. The other fields of the structure are not used.

Default Value

ON.

Manual Override Input

network input SNVT_switch nviManOverride;

This input network variable provides the possibility to control locally and manually the lamp value output. When nviManOverride receives a state OFF the occupancy controller turns off the lamp. When nviManOverride receives a state ON and a value, the occupancy controller turns on the lamp with the specified level. This new value overrides the nciPrimeVal.

The controller is turned back to automatic mode when the information UNOCCUPIED is received on nvioccupancy. Then the light is turn off.

Valid Range

The valid range of the state is as defined for SNVT_switch where 0 means OFF and 1 means ON. The 8-bit intensity value contains a value from 0 to 200, representing minimum to maximum (0%-100% in steps of 0.5%) intensity. A state value of 0xFF indicates the switch value is undefined.
### Setting Output

network output SNVT_setting nvoSetting;

This output network variable selects the operating mode for another controller. (e.g. constant light controller)

The ON mode turns on the controller which then starts to control the lamp value output.

The OFF mode turns off the controller and the lamp value output.

The UP, DOWN and STOP modes are used to set the controller lamp value output to a relative level.

**Valid Range**

The variable nviControl uses SNVT_control enumerations ON, OFF, UP, DOWN and STOP. With UP and DOWN functions a percentile value (0%-100% in 0.5% steps) is used to define the relative size of an increment/decrement.

**Default Value**

None.

### Mandatory Configuration Properties

#### Location Label

network input config SNVT_str_asc nciLocation;

This configuration property is optionally used to provide more descriptive physical location information than can be provided by the Neuron Chip’s 6 byte location string. The location relates to the object and not the node.

**Valid Range**

Any NULL terminated ASCII string of 31 bytes total length.

**Default Value**

An ASCII string containing all zeros.

**SCPT Reference**

SCPT_location (17)

### Optional Configuration Properties

#### Hold time value

network input config SNVT_time_sec nciHoldTime;

This configuration network variable is used to set the hold time value before switching off the lamp when the area is unoccupied. If the neighbouring area is occupied the lamp is not switched off, but switched to the value specified by nciSecondVal.

When the hold time is elapsed, if the controller has been overridden before, it is automatically set back to the normal operating mode.

**Valid Range**

Valid range is 0.0 - 6553.4 by steps of 0.1s.
Default Value
Default value is 10 minutes.

SCPT Reference
SCPTholdTime (91)

Primary Default Value

network input config SNVT_switch nciPrimeVal;

This configuration property is used to set the default value sent to the lamp when the area is occupied.

Valid Range
The valid range of the state is as defined for SNVT_switch where 0 means OFF and 1 means ON. The 8-bit intensity value contains a value from 0 to 200, representing minimum to maximum (0%-100% in steps of 0.5%) intensity.

Default Value
Default value is ON-100%

SCPT Reference
SCPTPrimeVal (155)

Secondary Default Value

network input config SNVT_switch nciSecondVal;

This configuration property is used to set the default value sent to the lamp when the neighboring area is occupied.

Valid Range
The valid range of the state is as defined for SNVT_switch where 0 means OFF and 1 means ON. The 8-bit intensity value contains a value from 0 to 200, representing minimum to maximum (0%-100% in steps of 0.5%) intensity.

Default Value
Default value is OFF-0%

SCPT Reference
SCPTSecondVal (156)

Data Transfer
None specified.

Power-up State
None specified.

Boundary and Error Conditions
None specified.
Additional Considerations

None specified.