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.
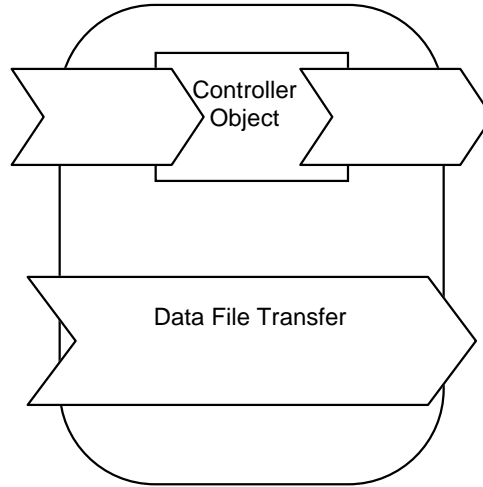

Figure 1 Functional Profile

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
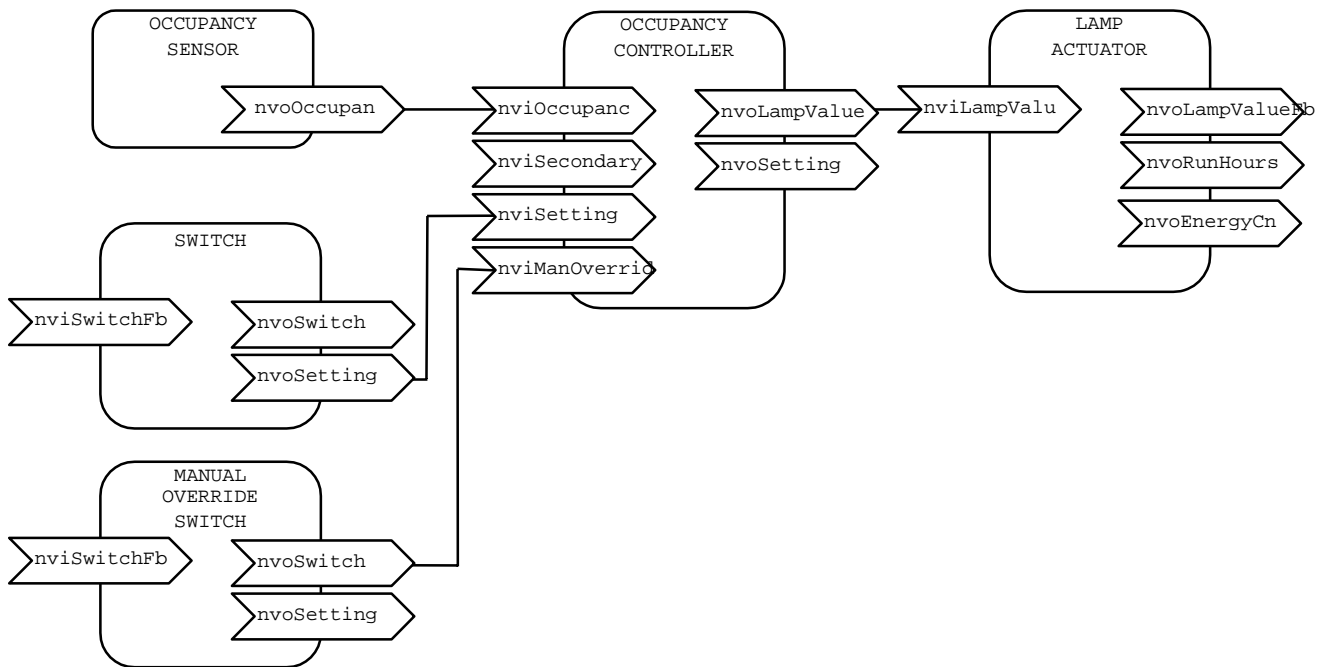
The occupancy controller can also be driven by an occupancy sensor from a neighboring area , (secondary input) as shown in Figure 3. The occupancy controller can also operate on another controller (eg constant light controller) as shown in Figure 4
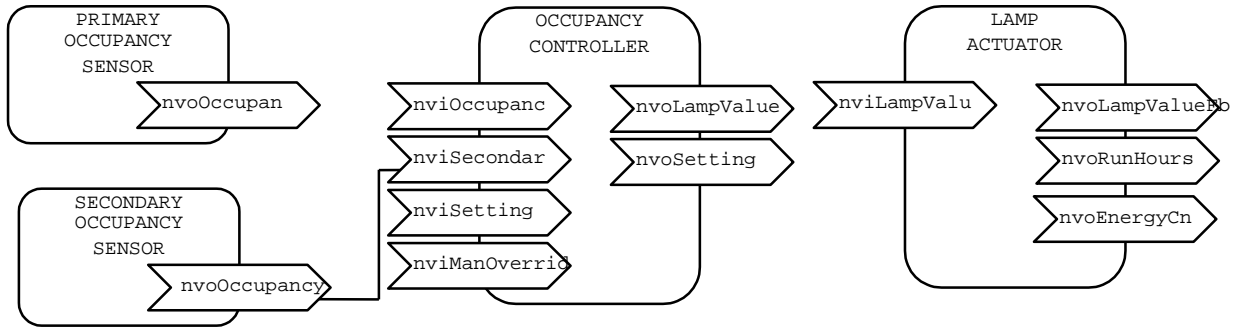
```
┌─────────────┐        ┌─────────────┐              ┌─────────────┐
│  PRIMARY    │        │ OCCUPANCY   │              │    LAMP     │
│ OCCUPANCY   │        │ CONTROLLER  │              │  ACTUATOR   │
│  SENSOR     │        │             │              │             │
│   nvoOccupan│──►nviOccupanc    nvoLampValue──►nviLampValu   nvoLampValueFb│
│             │    nviSecondar      nvoSetting                  nvoRunHours │
│ SECONDARY   │    nviSetting                                   nvoEnergyCn │
│ OCCUPANCY   │    nviManOverrid                                            │
│  SENSOR     │                                                            │
│  nvoOccupancy│                                                           │
└─────────────┘        └─────────────┘              └─────────────┘
```

Figure 3 Secondary Input to a LONMARK Occupancy Controller Object

```
┌─────────────┐        ┌─────────────┐
│ OCCUPANCY   │        │ OCCUPANCY   │
│  SENSOR     │        │ CONTROLLER  │
│  nvoOccupancy│──►nviOccupanc    nvoLampValue│
│             │    nviSecondar      nvoSetting│──┐
│             │    nviSetting                    │
│             │    nviManOverrid                 │
└─────────────┘        └─────────────┘           │
                                                 │
┌─────────────┐        ┌─────────────┐        ┌─────────────┐
│   LIGHT     │        │  CONSTANT   │        │    LAMP     │
│  SENSOR     │        │   LIGHT     │        │  ACTUATOR   │
│             │        │ CONTROLLER  │        │             │
│             │──►nviSetting    nvoLampValue──►nviLampValu  nvoLampValueFb│
│   nvoLuxLe  │──►nviLuxLevel                  nvoRunHours │
│             │    nviManOverrid               nvoEnergyCn │
└─────────────┘        └─────────────┘        └─────────────┘

┌─────────────┐
│  MANUAL     │
│ OVERRIDE    │
│  SWITCH     │
│nviSwitchFb  nvoSwitch│
│             nvoSetting│
└─────────────┘
```
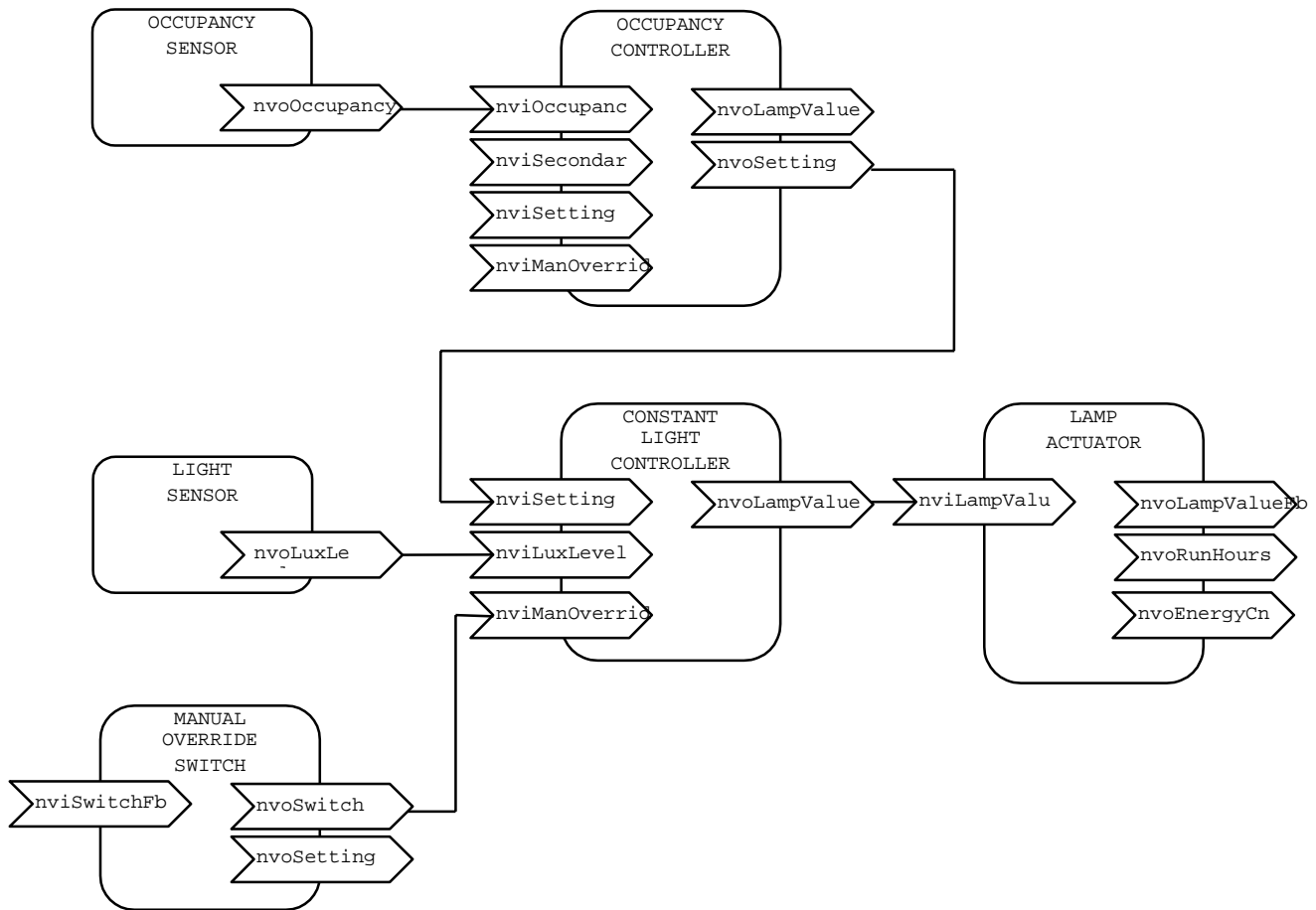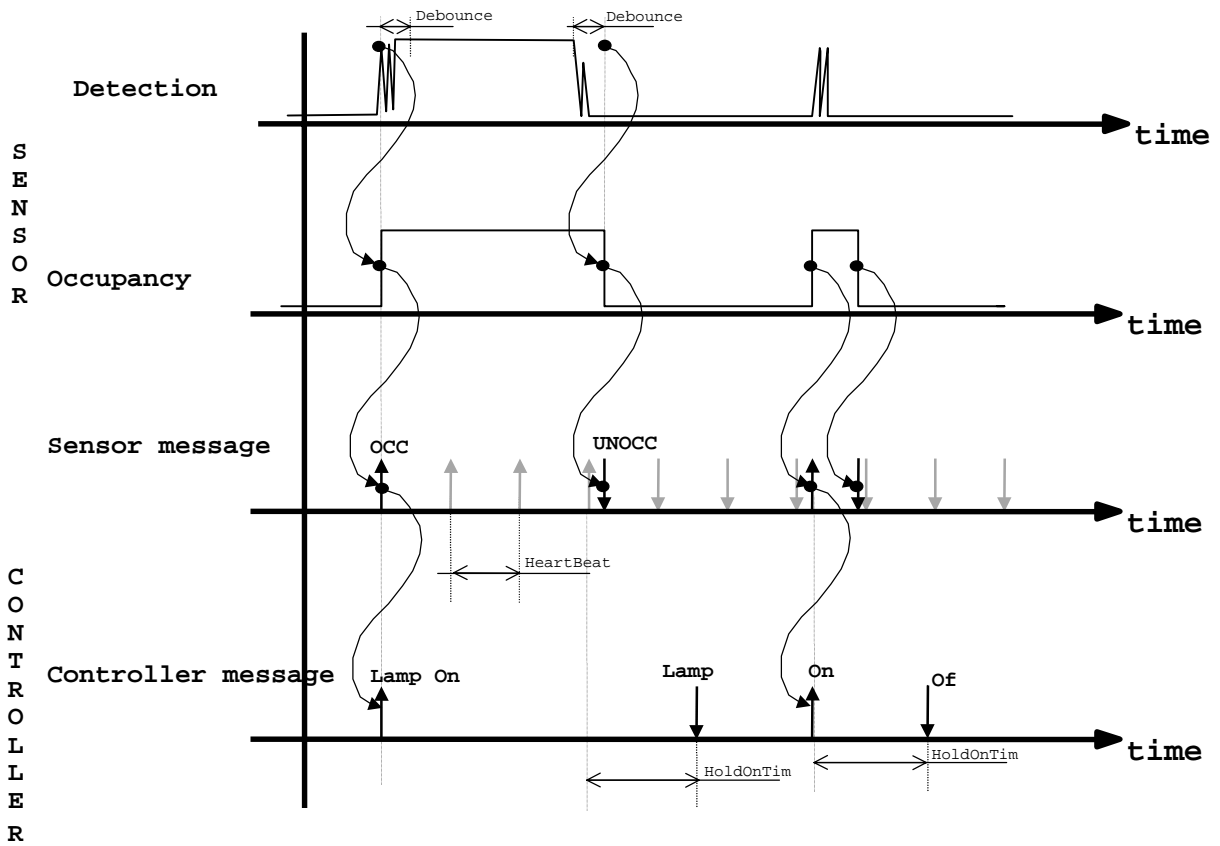
Figure 4 Interaction between LONMARK Occupancy Controller Object and constant light controller

Timing Description

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

Figure 5 Timing diagram

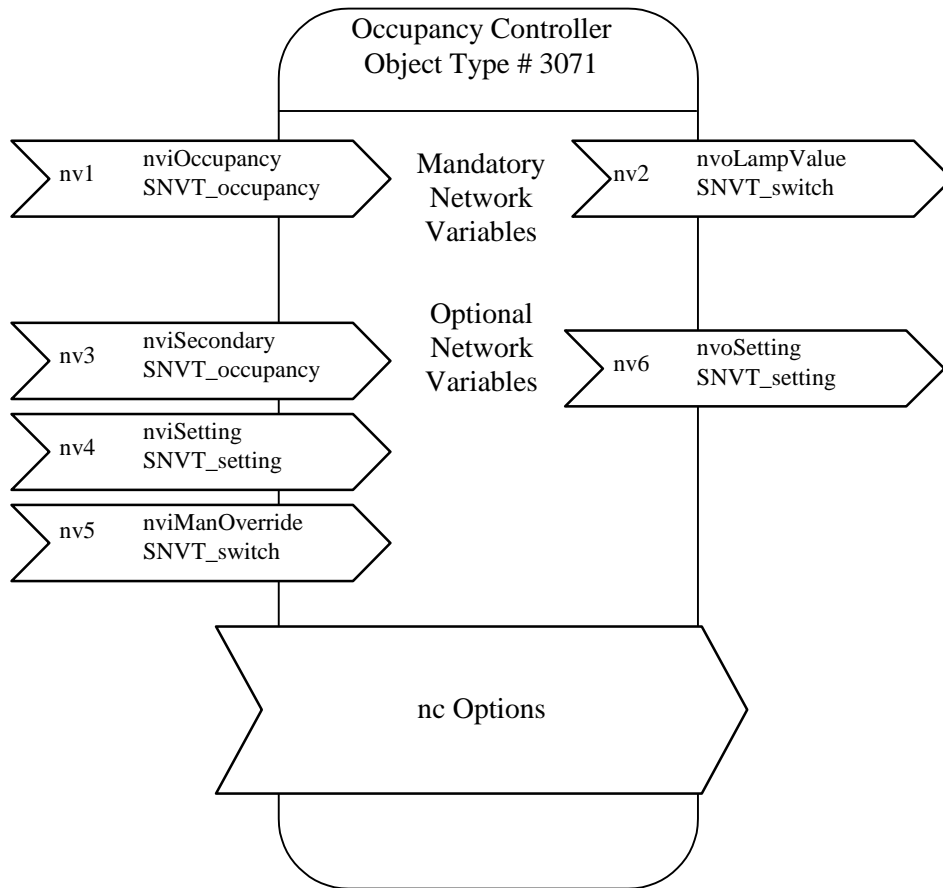(retriggered each time a new OCCupied value is received)

Object Details

Figure 6 Object Details

Table 1 SNVT Details

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

Table 2 SCPT Details

SCPT index (M/O)*	Name	Description
17 (O)	SCPT_location	Location label
91 (O)	SCPTholdTime	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.
155 (O)	SCPTPrimeVal	Default lamp value sent when the area is occupied.
156 (O)	SCPTSecondVal	Default lamp value sent when the neighboring area is occupied.

- M = mandatory, O = optional

Mandatory Network Variables

Occupancy Status Input Value

`network input SNVT_occupancy nviOccupancy;`

This input network variable provides the occupancy status.

Valid Range

The range of `SNVT_occupancy` :

```
0      : OC_OCCUPIED      (Area is occupied)
1      : OC_UNOCCUPIED    (Area is unoccupied)
0xFF   : OC_NUL
```

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

Lamp Value Output

`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 :

       0   : OC_OCCUPIED   (Area is occupied)
       1   : OC_UNOCCUPIED   (Area is unoccupied)
       0xFF : OC_NUL

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

Setting Intput

`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.

Additional Considerations