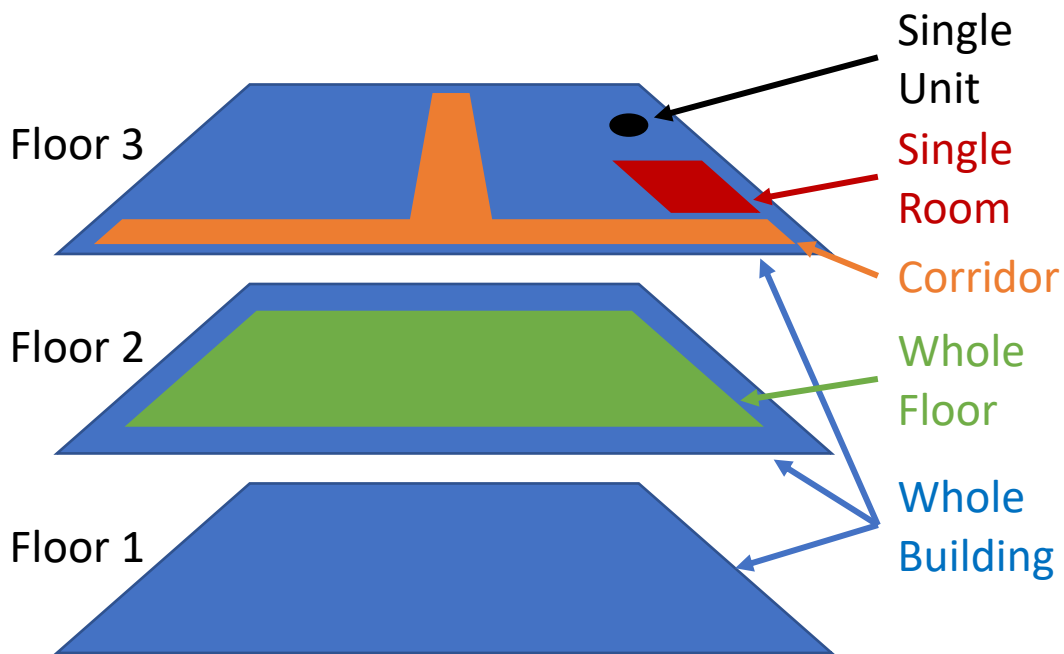


Introduction

This document describes the use of light level sensors with zones within the RAPIX Lighting Control System.

Zones

A RAPIX zone is an area of lighting that is controlled or monitored by the RAPIX system. A zone can range in scale from a single device or room, through larger areas including corridors or floors of a building, up to an entire building or site.



RAPIX Zones

A RAPIX zone can contain any combination of zone “members”:

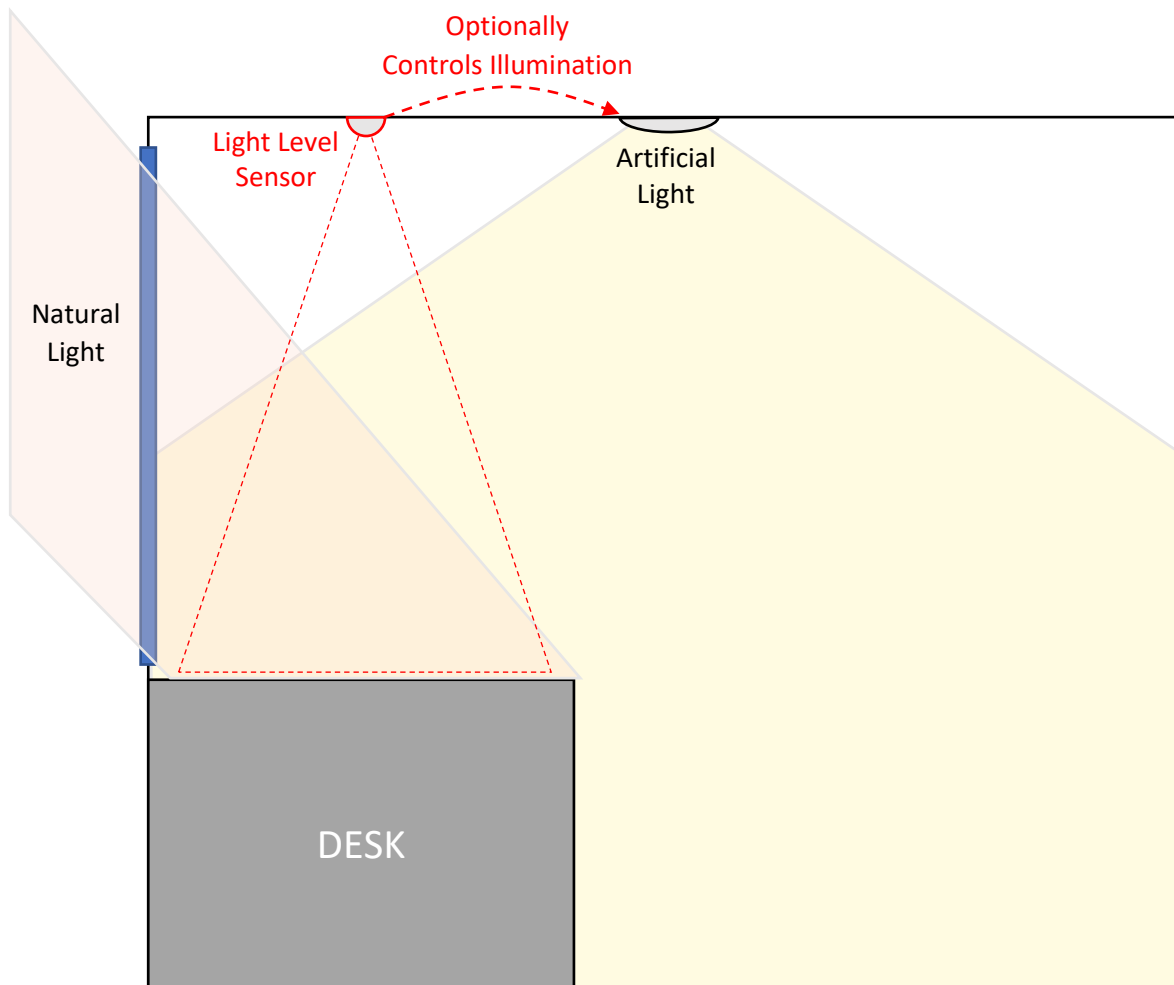
- DALI Units (“control gear”)
- DALI Groups
- DALI Lines (DALI “broadcast”)
- Other Zones

All control and monitoring of the RAPIX system is performed using zones.

Light Level Measurement

Light level sensors are typically used to monitor the light level (measured in Lux) on a working surface, such as a desk. The measured light level may also be used in a control-loop for maintaining a specified lighting level by controlling the illumination.

All light level sensors measure only the light falling on the sensor, which comprises the light directly acting on the sensor, and the light reflected from nearby surfaces to the sensor.



If a zone has more than one light level sensor in it, the RAPIX system allows the minimum, maximum and average Lux levels to be read.

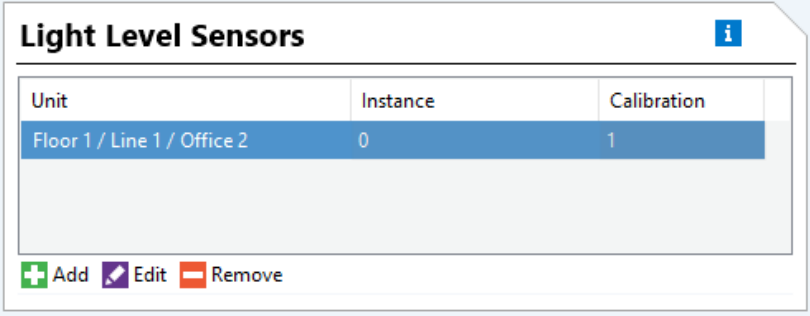
How Light Level works in DALI

DALI-2 standards define that the measurements made by a light level sensor and transmitted over DALI have no units. That is – the transmitted measurements are not required to be in Lux (or candela, or any other units). Transmitting the measurement in Lux is permitted, but not required.

This means that conversion to useful units may be required, depending on the selected light level sensor.

Light Level Sensors

One or more DALI-2 Light Level sensors can be associated with a Zone for the purposes of monitoring the Zone's Lux level. They are added in the RAPIX Integrator Zone tab, as shown below.



Unit	Instance	Calibration
Floor 1 / Line 1 / Office 2	0	1

The Zone Light Level Sensors panel

DALI-2 Light Level sensors need to be configured as follows:

- Event Messages: Enabled
- Event Addressing Scheme: Device
- Event Filter: IL
- Deadtime Timer: 2 seconds or more
- Report Timer: 1 minute or more
- Hysteresis Min: 10
- Hysteresis (%): 5% or more
- Calibration Factor: *See below*

Minimum values are recommended for some settings to prevent excessive DALI messages.

Note that the Event Addressing Scheme is not the same as is required for use with Zone Controller Templates, and therefore a light level sensor cannot be used for both purposes at the same time.

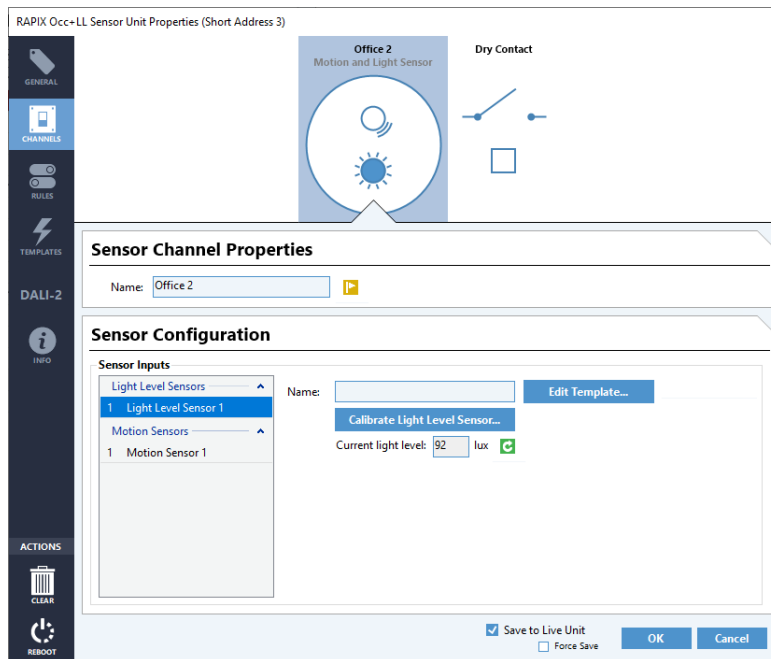
Light level sensors should be associated with the smallest applicable Zone. For example, if the light level sensor is in an office, and the office is part of a Zone for the whole floor, then the light level sensor should be associated with the office.

Calibration

Light level sensors measure the reflected light from the surface below them which will have varying properties. Light Level sensor should be calibrated so that they provide useful measurements.

RAPIX Light Level Sensors can be calibrated as follows:

1. Place a light level meter on the surface that the sensor is measuring.
2. Set the zone lighting brightness to a level that is typical for its intended use.
3. Open the light level sensor properties form.
4. Select the **Channels** tab.
5. Click the **Calibrate Light Level Sensor** button.
6. Enter the measured Lux.
7. Click the **Calibrate** button.
8. Close the properties form.



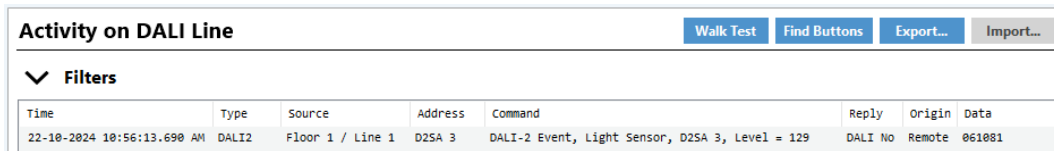
Light Level Sensor properties form

Once calibrated, a RAPIX Light Level Sensor will send DALI-2 event messages with the apparent light level in Lux as on the surface used during calibration.

Non-RAPIX light level sensors may have a manufacturer method for calibration, and if supported, this process should be followed.

For sensors that cannot be calibrated, the measured light level in the DALI-2 event messages will not be in Lux. In this case, it is necessary to enter a calibration factor that will convert the reported level into Lux. This conversion will be done in the RAPIX Zone Controller instead of in the Light Level sensor. The process for this is:

1. Place a light level meter on the surface that the sensor is measuring.
2. Set the zone lighting brightness to a level that is typical for its intended use.
3. Open the DALI logger and select the DALI line that has the sensor. Start the log running.
4. Wait for a DALI-2 light level event from the sensor.




Activity on DALI Line								
Filters								
Time	Type	Source	Address	Command	Reply	Origin	Data	
22-10-2024 10:56:13.690 AM	DALI2	Floor 1 / Line 1	D2SA 3	DALI-2 Event, Light Sensor, D2SA 3, Level = 129	DALI No	Remote	061081	

The DALI Logger, showing a DALI-2 light level event from the sensor

5. Read the measured light level on the meter.
6. The calibration factor will be found from:

$$\text{Calibration Factor} = \frac{\text{Measured Lux}}{\text{Level in DALI-2 event message}}$$

7. Enter the calibration factor into the sensor DALI-2 properties.



DALI-2 Settings	
Name	Value
Report Timer	1 min 0 s
Hysteresis Min (lux)	10
Hysteresis (%)	5
Calibration Factor	1

The sensor DALI-2 properties, showing the calibration factor

Use with RAPIX API

The RAPIX API allows the Zone measured Lux levels to be read using the Zone status messages. The extended zone status format needs to be set to level 2. Refer to the RAPIX API documentation for details.

Use with BACnet

The BACnet Zone object includes properties for the Minimum, Maximum and Average Lux levels. Refer to the "Using RAPIX with BACnet" Application Note for details.

Use with Logic

The Zone objects have three properties for use with the measured light levels:

- Zone.MinLuxLevel
- Zone.MaxLuxLevel
- Zone.AveLuxLevel

Change History

Rev	Date	Updated By	Comment
1	22 Oct 2024	DS	First Release

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