Introduction - RAPIX Xi

RAPIX provides features required for building automation that are no considered by DALI standards.

RAPIX is supported by proprietary DALI frames. These frames:

- Automatically work across DALI Lines when used with the RAPIX Zone Controller; and
- Are safely ignored by DALI-compliant non-RAPIX devices; and
- Allow RAPIX to do what other systems cannot do.

All RAPIX devices support the RAPIX eXtended intelligence (Xi) messages.

The RAPIX Xi Logo

This application note discusses the uses of two RAPIX Xi concepts:

1. Operating Properties; and
2. Flags

Operating Properties

An Operating Property is used to represent an aspect of the state of the Lighting Control System.

A site can have up to 65534 Operating Properties. In turn, each Operating Property has a "value" in the range 0 to 255.

Operating Properties:

- Have a unique ID (this is not normally of relevance).
- Have a name (so that you don't need to remember the ID).
- Have a "value" (0 – 255). The values have names (so that you don't need to remember the numbers).

Examples of Operating Properties:

- "Building Occupancy" Operating Property, with values:
  - o 0: "Work Hours"
  - o 1: "After-Hours"
  - o 2: "Cleaning"
  - o 3: "Emergency"
- "Season" Operating Property, with values:
  - o 0: "Summer"
  - o 1: "Winter"
  - o 2: "Spring/Autumn"

Operating Properties are normally used to modify system behaviour. Many aspects of the Lighting Control System can change when the Operating Property changes, such as:

- Timer durations;
- Lighting levels;
- Sensor behaviour;
- Wall switch behaviour;
- Schedules.

The value of Operating Properties can be set using:

- Buttons
  - Example: "Zone and Xi Timer" template.
- Dry Contacts
  - Example: "Set Operating Property" template.
- Schedules
- On power-up
  - Example: Using the "Power-up Action" template.

Flags

A Flag is used to represent an aspect of the state of the Lighting Control System.

A site can have up to 65280 Flags. These are arranged into at most 254 groups.

Each Flag Group has:

- an id (0 – 254): this is not normally of relevance;
- a name;
- one or more Flags inside the Group, each with:
  - An id (0 – 254): this is not normally of relevance;
  - a name;
  - a state, or value:
    - Set or
    - Clear

Flags are generally used to enable or disable a system function, for example:

- "Sensor Enable" Flag Group, with Flags:
  - "Meeting Room 1A Sensors"
  - "Meeting Room 1B Sensors"
- "Wall Switch Disable" Flag Group, with Flags:
  - "Meeting Room 1A Wall Switches"
  - "Meeting Room 1B Wall Switches"

Flags are normally used to modify system behaviour.

Many aspects of the system can change when the Flag state changes, such as:

- Sensor behaviour (enabled/disabled);
- Wall switch behaviour (enabled/disabled);
- Schedules (enabled/disabled).

The state of Flags can be set using:

- Buttons
    - Example: "Toggle Flag" template
- Dry Contacts
    - Example: "Set Flag" template
- Schedules
- On power-up
    - Example: using the "Power-up Action" template.
- Logic

Terms used

"RAPIX Properties" or "Xi Properties" is a term used to refer to both Operating Properties, and Flags.
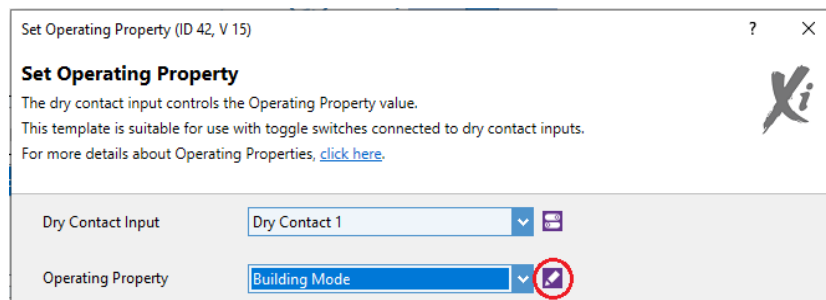
Creating Operating Properties

Operating Properties are created using the Xi tab in RAPIX Integrator:
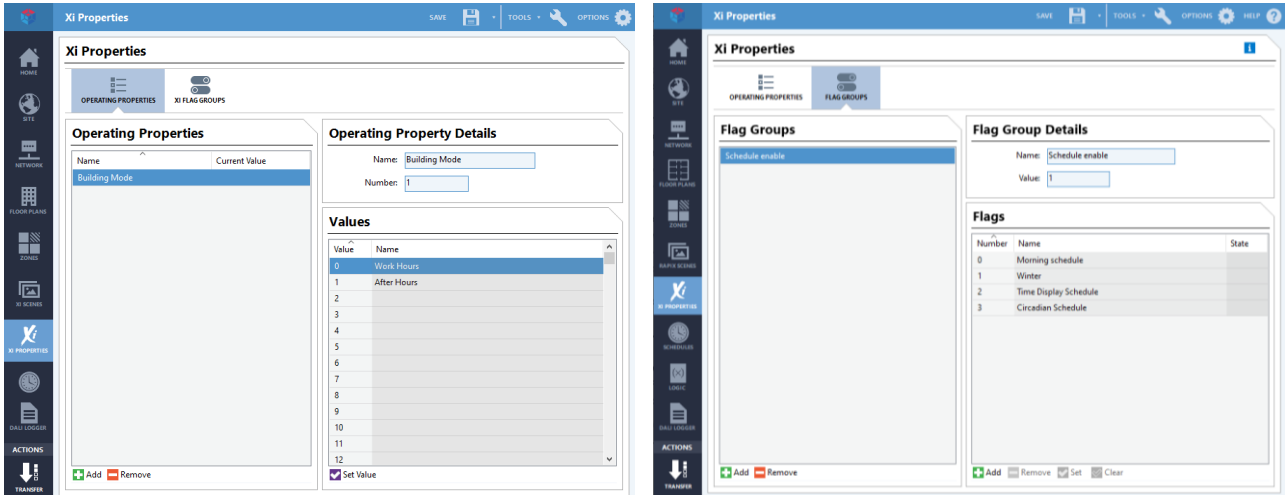
The Xi Properties tab, showing Operating Properties (left) and Flags (right)

The **Add** buttons can be used to add new Operating Properties, Flag Groups or Flags. They do not have to be given names, but it is highly recommended as it makes their use much easier.

In RAPIX Integrator and RAPIX Addressing, there are buttons near where Operating Properties are used. The button allows the Operating Property to be edited.

Button for editing Operating Properties in the template editor

Controlling Xi Properties

Operating Properties and Flags can be set from buttons, dry contact inputs or on start-up using templates.

Button template setting a Flag
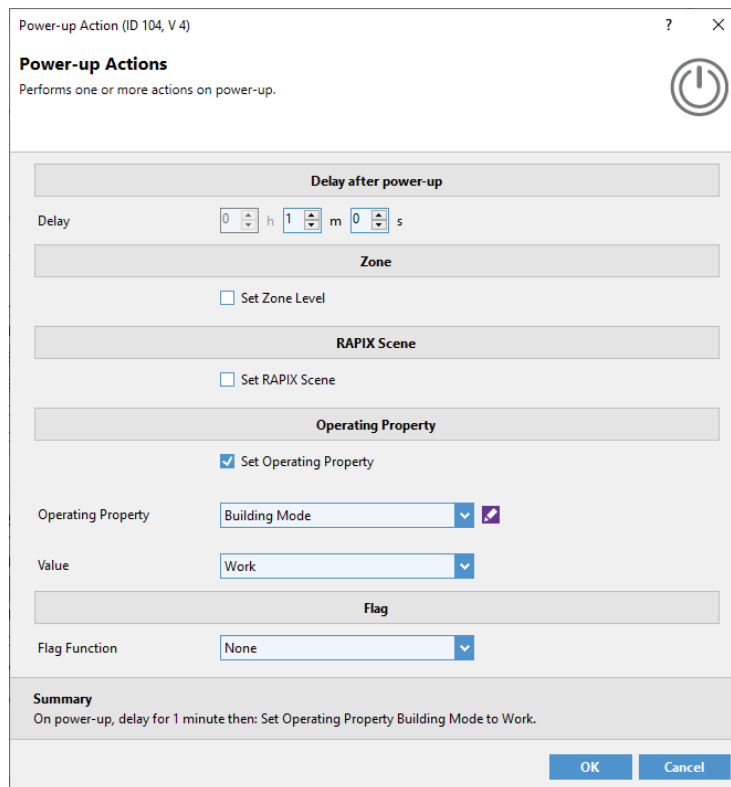
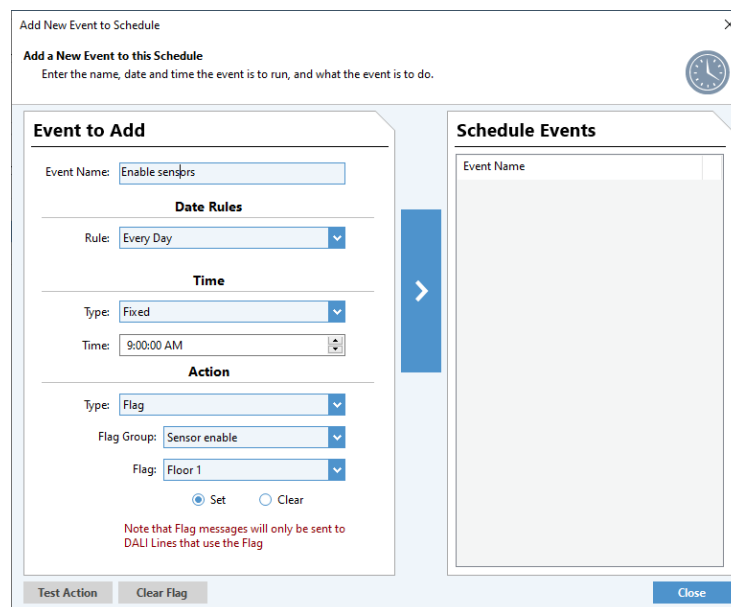*Dry contact template setting an Operating Property*

Start-up event template setting an Operating Property

Operating Properties and Flags can also be controlled from schedules:


Schedule controlling a Flag

Using Xi Properties

Enabling buttons and sensors

RAPIX devices allow external inputs, buttons or sensors to be disabled using rules. These are all called inputs to a device, and depending on the RAPIX device, those inputs may be built into the device or may be connected by terminals.
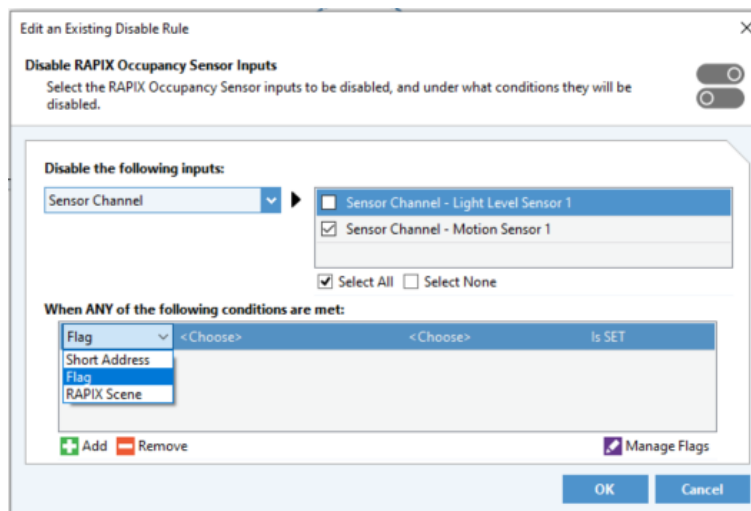
An input can be disabled based on one or more of:

- Short Address is on / off;
- Scene is set / not set;
- Flag is set / clear.

The rules can be viewed in the RAPIX Device editor:
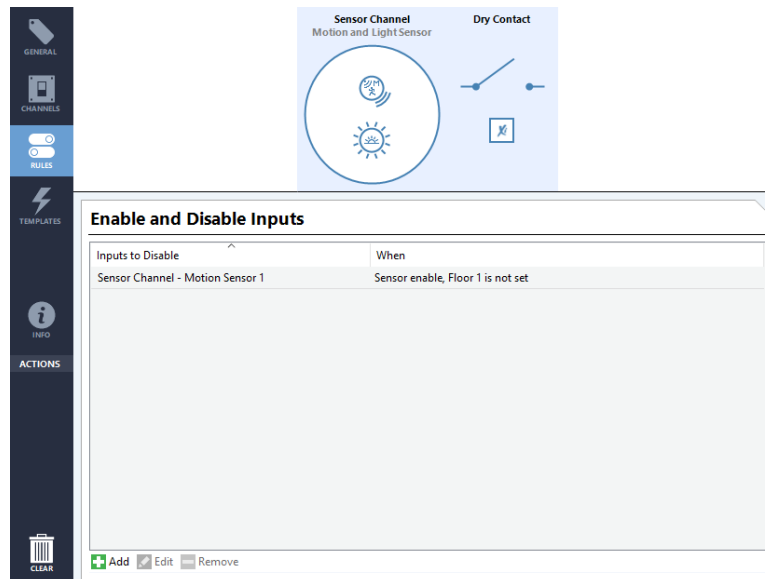
The RAPIX Device Editor "rules" tab

To add a new rule, click on the **Add** button and select the details in the form.

The RAPIX Device disable rules form, creating a Flag disable rule

When more than one rule is used, there is an OR relationship between rules. This means the input is disabled if <u>any</u> of the rules apply.

Disabling Schedules

The schedules tab has a list of rules for disabling the schedule:

The schedules tab disable rules list

Click on the **Add** button to open the schedule disable rule editor and define a disable rule.

The schedule disable rule form, showing an Operating Property rule

When more than one rule is used, there is an OR relationship between rules. This means the input is disabled if <u>any</u> of the rules apply.

Changing template behaviour

Many templates allow the properties to be changed based on the value of an Operating Property. This allows system behaviour to change dynamically.

The most common usage of this is for the operation of a building to change between work hours and non-work hours. Typically, an Operating Property will be created for the building "mode", with two values: "work hours" and "after-hours". When editing a template, clicking on the large green **Add Mode** button allows selection of the building "mode" and the properties for each mode.

In the example shown below, the sensor time-out is 10 minutes during work hours, and 5 minutes at other times.
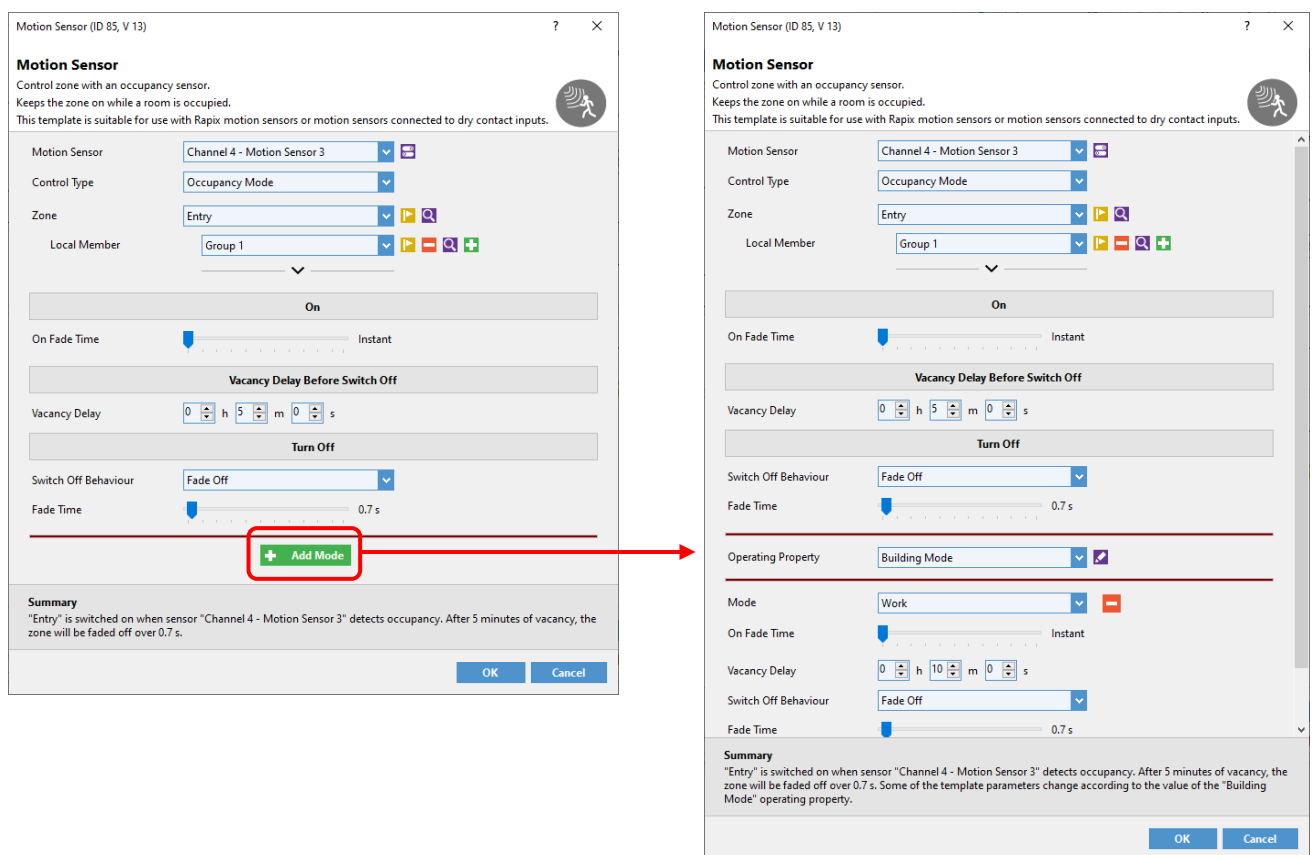
Clicking the Add Mode button on a template allows selection of property values for each mode.

Power Failure Recovery

Following a power failure (i.e. on system start-up), all Xi properties are set to their default settings:

- Flags: Clear
- Operating Property: value = 0

When designing the use of Xi Properties, use these default settings for the fail-safe condition.

For example, if a Flag is used to enable/disable some motion sensors, it is generally preferred that the default condition is for the sensors to be enabled. In this case, the Flag should be used to disable the sensor when set, which is the same as the sensor being enabled when the Flag is clear. After a power failure, the Flag will be cleared and the sensors will be enabled.

If a Flag or Operating Property needs to be set to a specific setting after a power failure, the Power-up Actions template can be added to a RAPIX Device Internal Events:

The Internal Events on the Templates tab

The Power-up Action template

Change History

Rev	Date	Updated By	Comment
1	1 June 2020	D. S.	First Release
2	14 June 2022	D. S.	General update

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APN-RAPIX-012-2 June 2022