

RAPIX INTRODUCTION

18 MAY 2022



COURSE PURPOSE

Introduction to RAPIX.

This will help you to understand:

- Limitations of DALI & how RAPIX overcomes those limitations;
- RAPIX Zones;
- RAPIX Scenes;
- RAPIX Operating Properties and Flags;
- RAPIX Hardware; and
- RAPIX Software.

COURSE PURPOSE

Pre-requisites.

It is recommended that you have already completed:

- DALI basics

DALI LIMITATIONS

WHY RAPIX IS NEEDED



DALI CHALLENGES

- DALI Line limitations:
 - Length: 300m
 - Devices: 64
 - Groups: 16
 - Scenes: 16
- Fading/ramping rates are limited:
 - Instant
 - 0.7 sec – 90.5 sec (15 choices)

DALI CHALLENGES

- No standard for joining DALI Lines into a single system.
- DALI messages are not acknowledged.
- Knowing the state of a DALI device requires polling.
- Low communication rate (20 – 30 commands per second).
- Incompatibility between manufacturers:
 - Not following the IEC-62386 standards;
 - Original DALI standards are incomplete, forcing proprietary extensions.
- DALI 2 is not universally supported yet.

RAPIX ZONES

HOW RAPIX OVERCOMES THE LIMITATIONS OF DALI



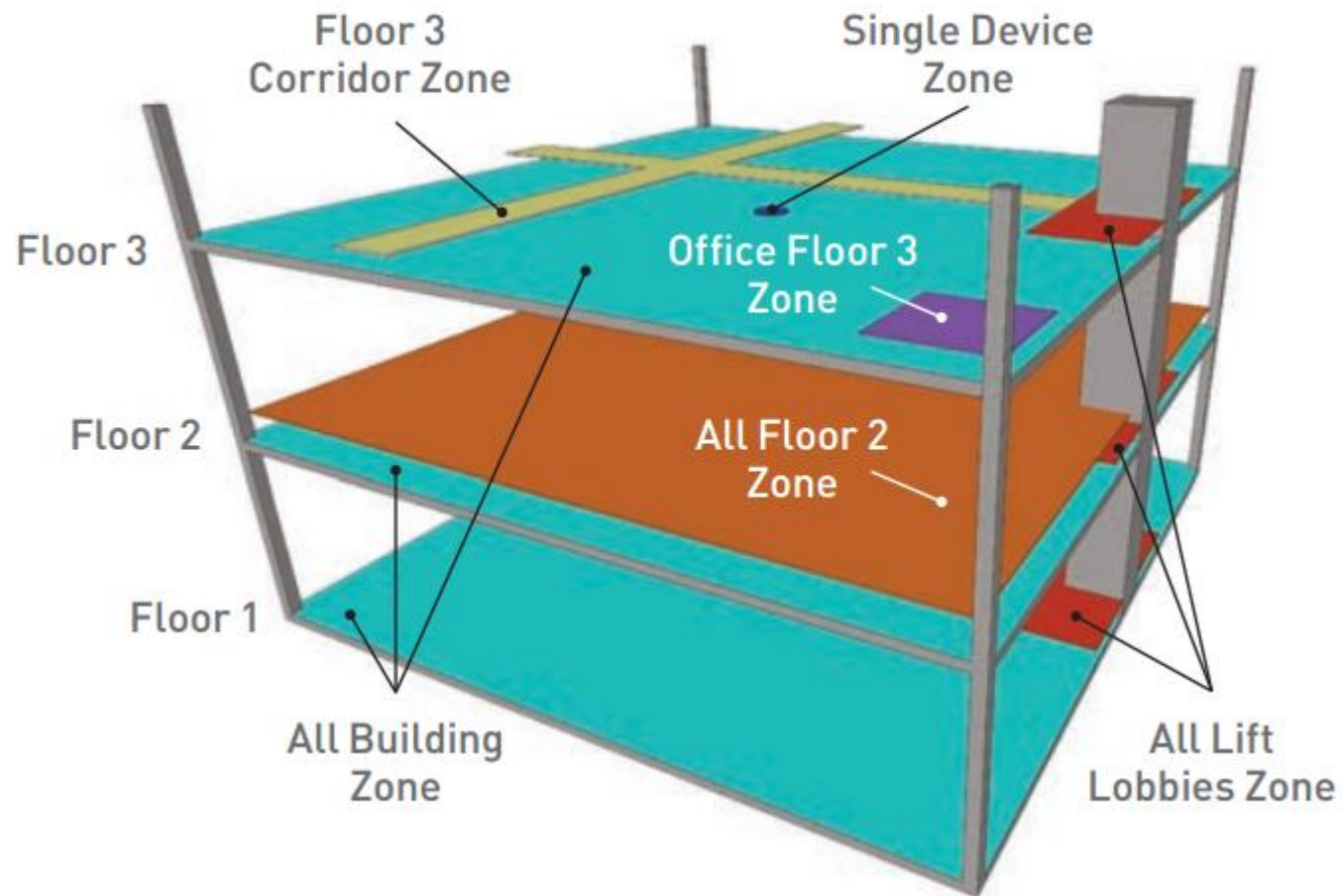
RAPIX ZONES

The solution to the limitations of DALI is RAPIX “Zones”

- Any number of RAPIX Zones in a system.
- Any number of devices in a RAPIX Zone.
 - Can span multiple DALI Lines.
- Once a Zone has been created:
 - The user doesn't need to know what is in the Zone;
 - The user doesn't need to understand how DALI works;
 - The user doesn't need to worry about the limitations of DALI.

RPIX ZONES

A Zone can span any area



RAPIX ZONES

Zones can overlap or contain other zones.

A site will typically have:

- One or more zones per room;
- A zone for each corridor or common area;
- A zone for each floor (containing all room/corridor zones);
- A zone for the whole building (containing all floor zones).

A meeting room or board room would normally contain several sub-zones.

RAPIX ZONES

RAPIX Zone can contain any combination of:

- Short Addresses (individual devices);
- DALI Groups;
- Entire DALI Lines;
- Other RAPIX Zones (i.e. nested Zones).

RAPIX Zones can span multiple DALI Lines.

RAPIX ZONES

RAPIX Zones:

- Have a unique id (the user rarely needs to know this)
- Have a name (so that you don't need to remember the id)
- Can be controlled:
 - On, Off;
 - Set to Level;
 - Fade to Level;
 - Step Up, Step Down.
- Can be monitored:
 - Level;
 - Error conditions;
 - No polling of DALI required;
 - Uses model of DALI devices.

RAPIX ZONES

To use a RAPIX Zone:

- No knowledge of DALI is required.
- No knowledge of the system configuration is required.

A Zone behaves like a virtual lighting circuit.

RAPIX ZONES

Zones have features not supported by DALI:

- Knowing state without polling;
- Long fade times;
- Flexible grouping of devices:
 - Including across DALI Lines.
- Aggregated information:
 - Number of devices;
 - Average, minimum and maximum level;
 - Error conditions.

RAPIX ZONES

Useful information obtainable from the Zone min/max:

Minimum Level	Maximum Level	Inferred information about Zone
0	0	All devices are off
> 0	> 0	All devices are on
0	Any	Some (maybe all) devices are off
Any	> 0	Some (maybe all) devices are on
0	> 0	Some devices are on and some are off
Same level		All devices are at the same level

RAPIX SCENES

OVERCOMING THE LIMITATIONS OF DALI SCENES



RAPIX SCENES

A “Scene” is defined as pre-defined lighting levels for a group of devices:

- Different devices may have different levels.

For example, a meeting room may have:

- “Meeting” scene;
- “Presentation” scene; and
- “Video Presentation” scene.

“Setting” a Scene involves setting the group of devices to their pre-defined levels

- The level may optionally fade to the new level over time.

RAPIX SCENES

DALI Scenes have limitations:

- Limited to a single DALI Line;
- Number of scenes per Line: 16
- Fade time is the same for all devices in a Scene;
- Fade times are limited:
 - Instant;
 - 0.7 sec – 90.5 sec (15 choices).
- There is no way to know if a scene is “set”.

RAPIX SCENES

RAPIX Scenes can set many Zones at once:

- Can be different levels.
- Can be different fade times.
- Can span different DALI Lines.

RAPIX Scenes have the same advantages as RAPIX Zones:

- Can have much longer fade times.
- Can be monitored without polling.

RAPIX SCENES

RAPIX Scenes:

- Have a unique id (the user rarely needs to know this).
- Have a name (so that you don't need to remember the id).
- Have a list of DALI Addresses or RAPIX Zones, each with:
 - Level or DALI Scene number;
 - Fade Time.
- State can be monitored:
 - Allows scene state (set/not set) to be displayed on an indicator.



RAPIX XI


GOING BEYOND DALI



RAPIX XI



RAPIX Xi

- Provides features required for building automation that are missing from the DALI Standard:
 - e**X**tended intelligence 
- Supported by a series of custom messages:
 - Automatically work across DALI Lines; and
 - Will be safely ignored by non-RAPIX devices.
- Allows RAPIX to do what other systems can not do.

RAPIX XI



Operating Properties

- An Operating Property is used to represent an aspect of the state of the system;
- The system can have up to 65534 Operating Properties;
- Each Operating Property has a “value” (0 – 255).

RAPIX XI



Operating property examples.

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

RAPIX XI



Operating Properties:

- Have a unique id (the user rarely needs to know this).
- 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)

RAPIX XI



Operating Properties

- Used to modify system behavior.
- Many aspects of the system can change when the Operating Property changes, such as:
 - Timer durations;
 - Lighting levels;
 - Sensor behaviour;
 - Wall switch behaviour.

RAPIX XI



Operating Properties

- Can be set in a variety of ways:
 - From a sensor;
 - From a wall switch;
 - From a dry-contact input;
 - From a Schedule;
 - On power-up.

RAPIX XI



Flag

- A Flag is used to represent an aspect of the state of the system.
- The system can have up to 65280 Flags arranged into groups.
- Each Flag has a “value”:
 - Set; or
 - Clear.
- Flags are generally used to enable or disable a system function.

RAPIX XI



Flag Examples

- “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”

RAPIX XI



Flag Groups

- Have a unique id (the user rarely needs to know this).
- Have a name (so that you don't need to remember the id).
- Contain one or more Flags, which:
 - Have a unique id;
 - Have a name;
 - Have a state:
 - Set; or
 - Clear

RAPIX XI



Flags

- Used to modify system behavior.
- Many aspects of the system can change when the Flag changes, such as:
 - Sensor behavior (enabled/disabled);
 - Wall switch behavior (enabled/disabled).

RAPIX XI



Flags

- Can be set in a variety of ways:
 - From a sensor;
 - From a wall switch;
 - From a dry-contact input;
 - From a Schedule;
 - On power-up.

RAPIX HARDWARE

THE PARTS THAT MAKE UP THE SYSTEM



RAPIX HARDWARE

RAPIX Zone Controller

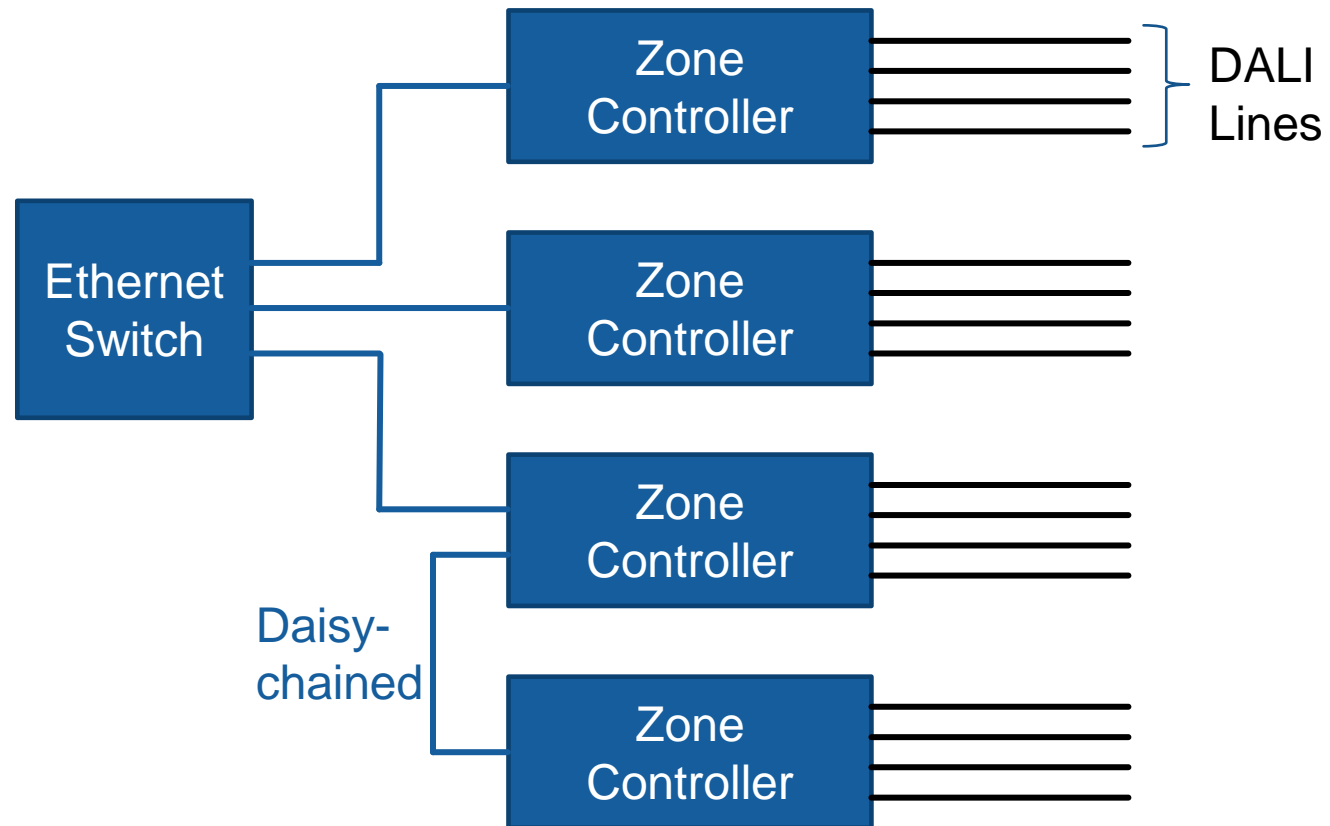


RAPIX HARDWARE

RAPIX Zone Controller:

- Connects to 4 DALI lines;
- Allows Zones and Scenes to span DALI Lines;
- Communicate with each other via a mesh
 - Fast, efficient & reliable;
 - All Ethernet communication uses encryption.
- Scans the DALI Line on start-up so it can model real-time behaviour of devices;
- Runs Schedules and Logic;
- Distributes Xi messages throughout the system;
- Acts as an interface to DALI for RAPIX Software and other systems.

RAPIX HARDWARE



RAPIX HARDWARE

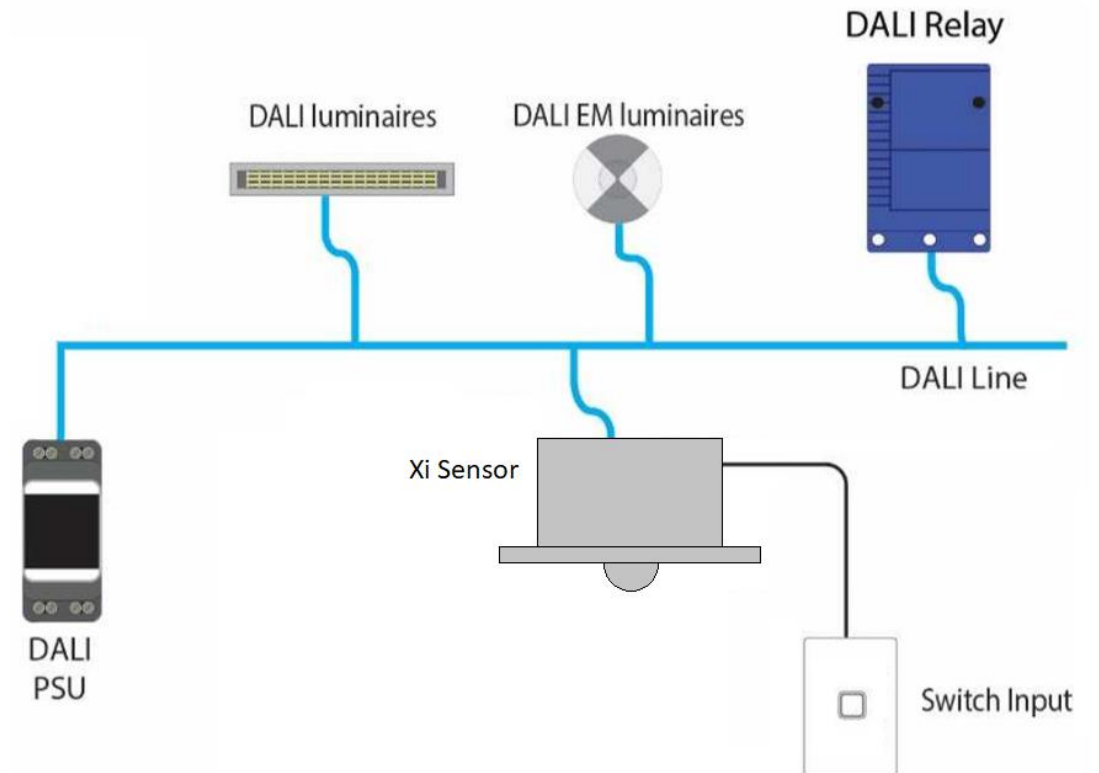
RAPIX Sensor



RAPIX HARDWARE

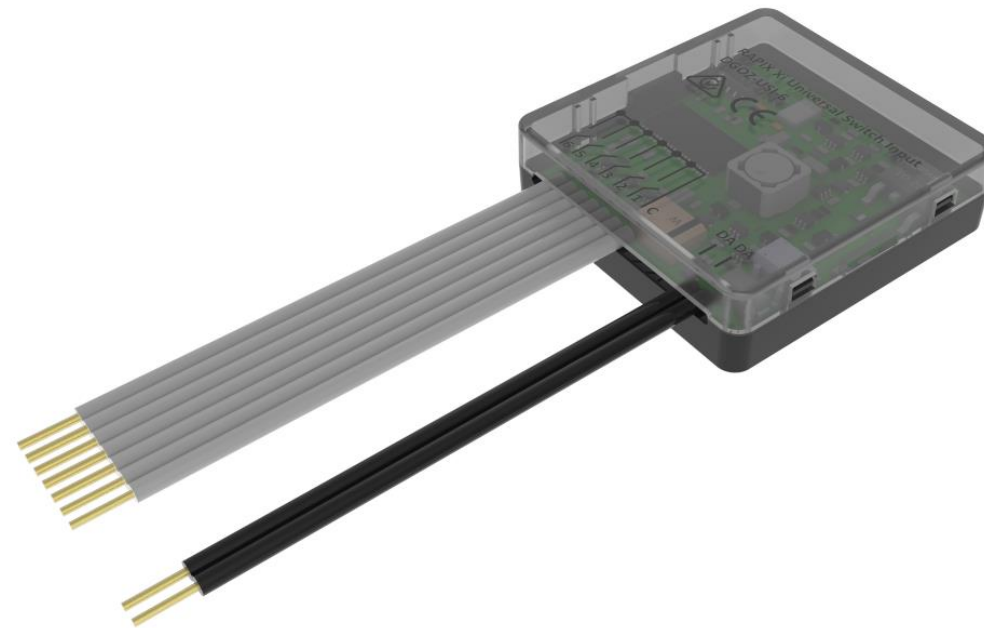
RAPIX Sensor:

- Motion (PIR) sensor
- Light Level sensor
- Dry Contact input - allows connection to
 - Momentary push button wall switch
 - Third-party motion sensor
 - Outputs from other systems



RAPIX HARDWARE

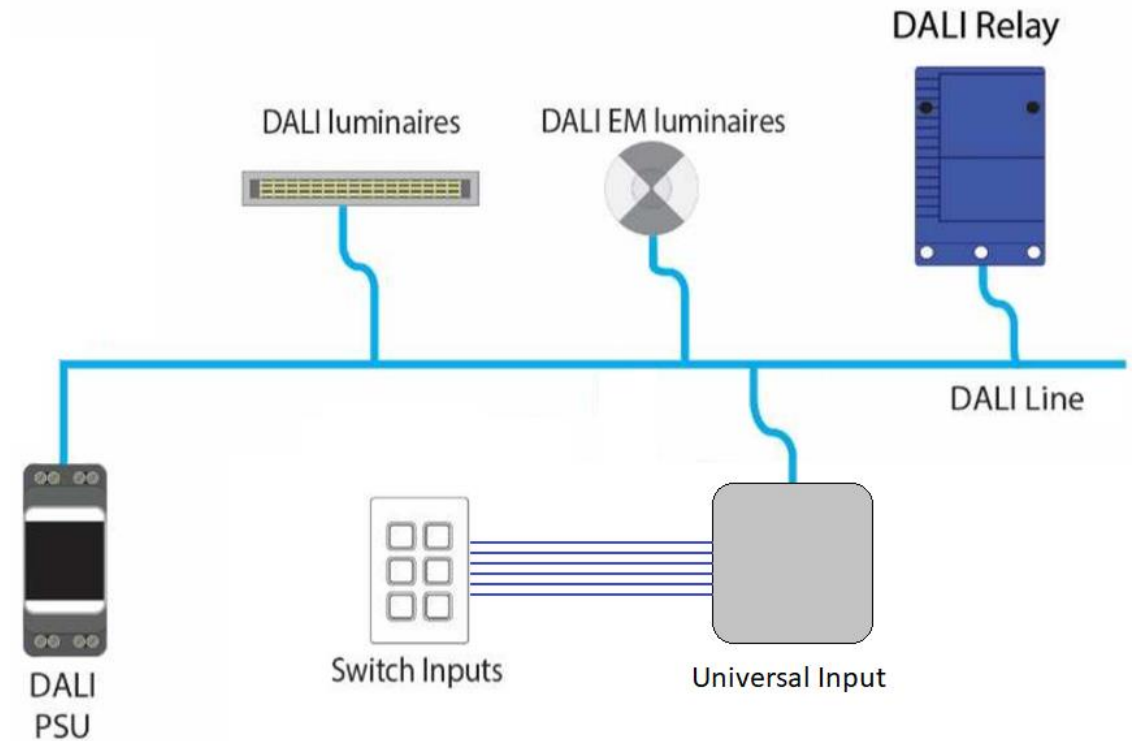
RAPIX Universal Input



RAPIX HARDWARE

RAPIX Universal Input:

- 6 x Dry Contact input - allows connection to
 - Momentary push button wall switch
 - Third-party motion sensor
 - Outputs from other systems



RAPIX HARDWARE

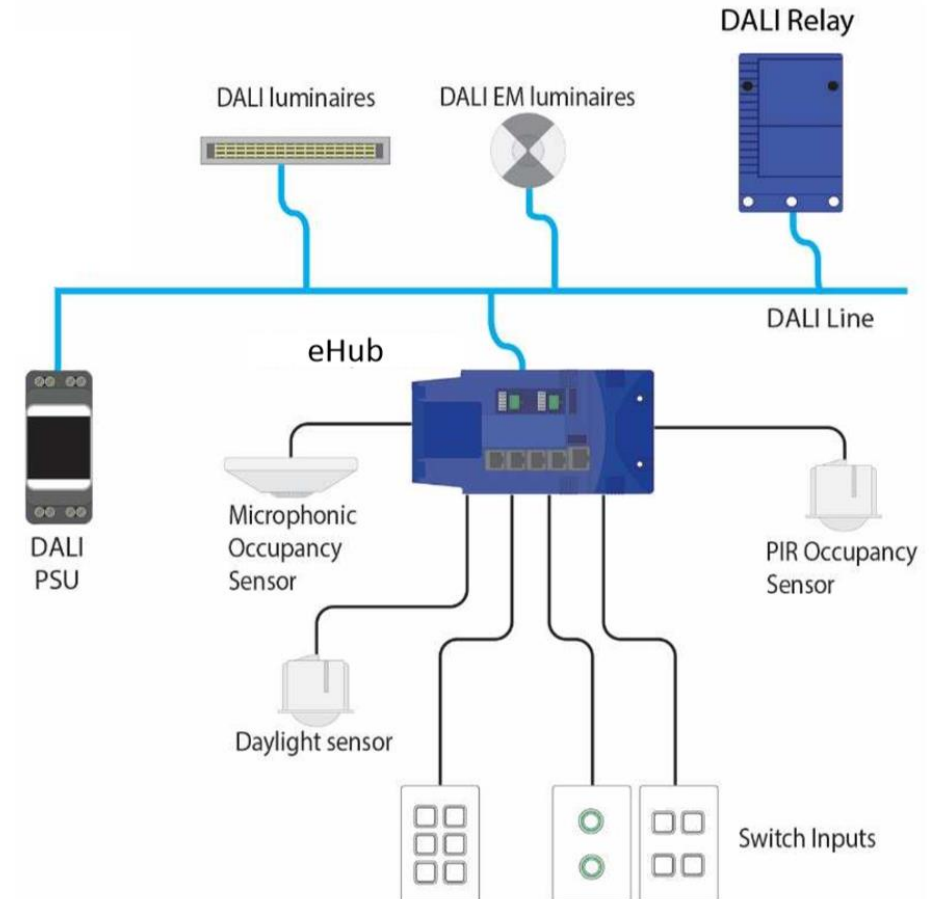
RAPIX eHub



RAPIX HARDWARE

eHub:

- Provides a connection to system inputs:
 - 4 “smart” channels, each with:
 - Sensors -
 - Motion; or
 - Light level.
 - Wall switches -
 - Push button; or
 - Rotary dial.
 - 2 Dry-contact inputs.
 - Ethernet (see separate training course).



RAPIX HARDWARE

eHub Switches

- Multiplexer connects to eHub channel
 - Pushbutton can have up to 5 “slave” switches;
 - Dial can have 1 “slave” dial.



RAPIX HARDWARE

eHub Sensors

- Multiplexer connects to eHub channel
 - Contains Motion sensor OR light level sensor;
 - Can have up to 2 “slave” Motion sensors.



RAPIX HARDWARE

RAPIX Sensor, Universal Input & eHub

- Provides much of the system intelligence;
 - Models the DALI Line in the same way as the Zone Controller.
- Uses “templates” of functionality for speed, flexibility and simplicity;
- Can work independently of the Zone Controllers.

RAPIX HARDWARE

Interface
Devices



Power
Supplies



Relays



Dimmers

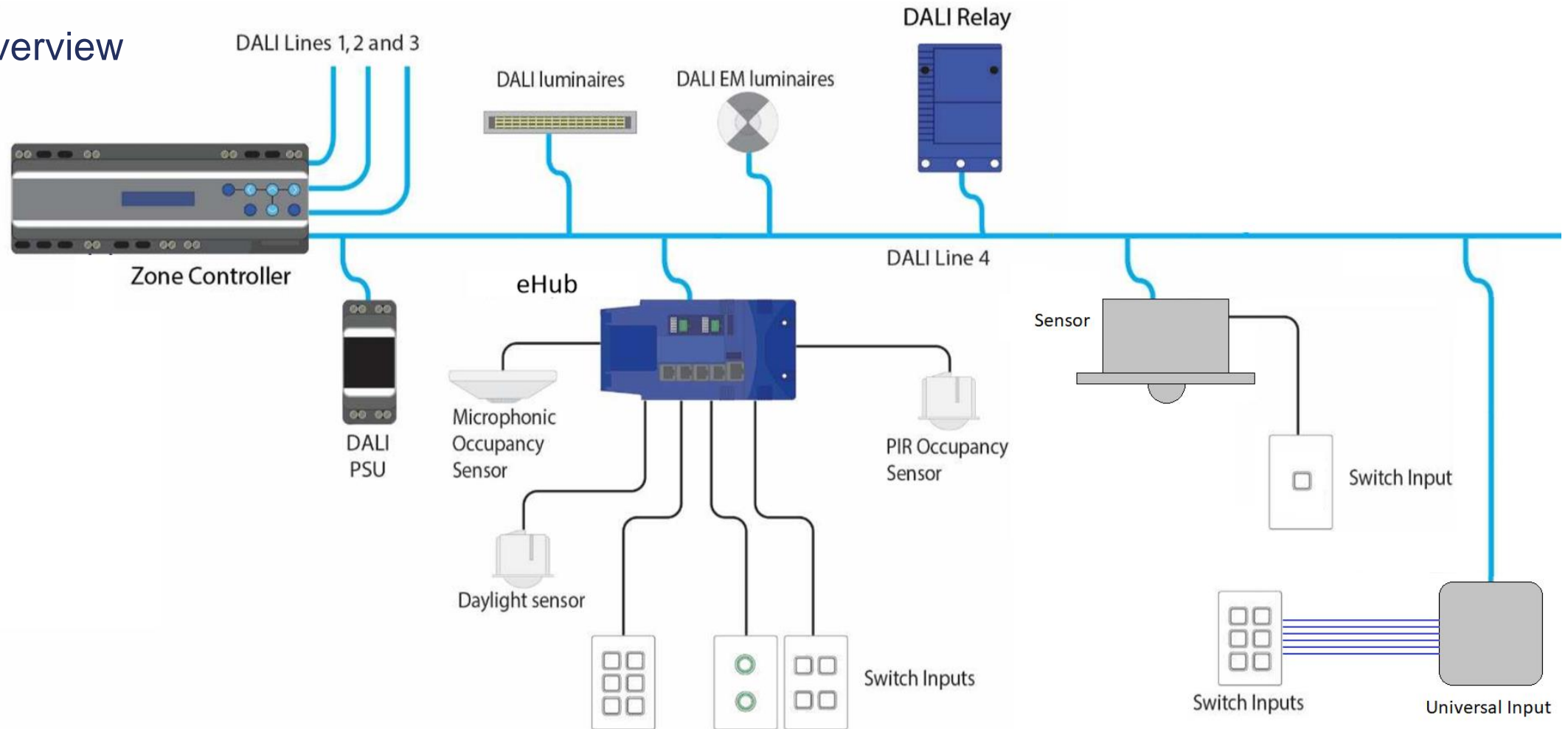


Emergency
Drivers



RAPIX HARDWARE

Overview





RAPIX SOFTWARE

HOW TO CONFIGURE THE RAPIX SYSTEM

RAPIX SOFTWARE

RAPIX Addressing Software

- Used to configure DALI Control Gear
 - From any manufacturer;
 - Allocate device Short Addresses:
 - Very fast, award-winning, patented technology
 - Configure standard DALI settings, such as:
 - Min Level, Max level;
 - Power-up level;
 - DALI Groups;
 - DALI Scenes.

RAPIX SOFTWARE

RAPIX Addressing Software

- Connects to a single DALI Line using a USB interface
- Used to configure RAPIX Sensors, Universal Inputs and eHubs
 - Uses “templates” of functionality for speed, flexibility and simplicity;
 - Transfers configuration data to device;
- Database stores details of devices, including names
 - Supports off-line commissioning;
- DALI Debugging:
 - Control devices, groups, Lines or Scenes
 - Logging of DALI events;
- See separate training course for details.

RAPIX SOFTWARE

RAPIX Integrator software

- Extends RAPIX Addressing Software
 - Contains all features of RAPIX Addressing;
 - In addition:
 - Define Zones;
 - Define Scenes;
 - Define Operating properties and Flags;
 - Define Schedules.

RAPIX SOFTWARE

RAPIX Integrator software

- Connects to multiple DALI Lines via Zone Controllers;
- Used to configure RAPIX Zone Controllers:
 - Discovers and communicates with Zone Controllers;
 - Transfers configuration data to Zone Controllers.
- Floor Plan view to speed up commissioning;
- See separate training course for details.

RAPIX SOFTWARE

RAPIX Emergency software

- Used to find DALI Emergency Devices and add them to a “Test Plan”
 - Devices from any manufacturer.
- Automatically tests DALI Emergency Devices
 - “One-click” patented technology;
 - Tests are scheduled to comply with local regulations.
- Automatically generates test reports:
 - Sends to building administrator.
- See separate training course for details.