



ZAURMAG1A1A
ZAURSTG1A1A
ZAURCTG1A00

ZAURA™ RF Wireless Lighting Control

Installation Guide

UM022903-0311



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Revision History

Each instance of revision history reflects a change to this document from its previously published version. For more details, refer to the corresponding pages or appropriate links listed in Table 1.

Table 1. History of this Document

Date	Revision Level	Description	Page No.
Mar 2011	03	Expanded for clarity, comprehensiveness, FAQs	All
Dec 2010	02	Updated Configuration Tool sections; replaced images	All
Oct 2010	01	Original issue	N/A

Safeguards

The following precautions must be observed when working with the devices described in this document:



Caution: When replacing a ZAURA™ Starter, it is necessary to turn off the main power to the luminaries.

- Be sure to match starter wattage with lamp wattage.
 - Install and use the devices described herein in accordance with applicable electrical codes and regulations.
 - Risk of damage can occur if the battery is replaced by an incorrect battery type.
 - Removal of the lens can cause irreversible damage to the sensor and void the warranty of the ZAURA Detector.
-

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General Description

Zilog's ZAURA RF Wireless Communications Technology for Fluorescent Lighting is an occupancy detector energy management system designed to save energy in starter-based lighting. Upon easy plug-and-play installation, the system will detect occupancy in a room and switch the starter-based lighting on and off without the use of control wiring.

The ZAURA RF Wireless Lighting Control System can detect occupancy in rooms of approximately 100 square meters in size. Larger rooms can be controlled through the use of additional occupancy detectors.

System Overview

The ZAURA system provides power savings in conventional fluorescent lamp installations by turning off lamps when the room is unoccupied or when sufficient natural light is available. ZAURA consists of three unit types: Masters, Starters and an optional ZAURA Configuration Tool.

Masters are battery-powered, perform occupancy and natural light detection, and command ZAURA starters via wireless communication. A Master can be configured as a Standard Master which controls the ZAURA starters, or as a Range Extender which provides additional occupancy detection information to a Standard Master so that the occupancy detection range of the Standard Master is extended.

Starters control fluorescent lamps in standard ballast systems (L, C) based on wireless commands from the Master. A ZAURA Starter can be configured as one of two types: as a ZAURA Starter or as a ZAURA Virtual Dimming Starter. The latter is intended to be installed near windows and is commanded to extinguish lamps if sufficient natural light exists. ZAURA Starters are typically associated wirelessly to their Master.

► **Note:** Non-ZAURA (original) starters can also be used, for example, to allow selected lamps to remain on 100% of the time for safety reasons.

The ZAURA Configuration Tool is typically used to change existing ZAURA Starter associations, though it can also be used to place the ZAURA Starter into **Associate** mode for an initial association, e.g., if difficulties are encountered with wireless association.

Applications

The ZAURA RF Wireless Lighting Control System is designed for use in schools, offices, industrial buildings and similar applications. It is optimized for ceiling heights from 2.5 to

3.5 meters. The product is designed for installation within minutes without drilling or wiring. One ZAURA Master can control up to 128 lights with superior low power, long range and radio frequency communication.

Figure 1 shows an out-of-the-box version of the ZAURA Detector including the Master/Range Extender, the Starter and the ZAURA Configuration Tool; Figure 2 offers a glimpse into the components of the ZAURA Detector.

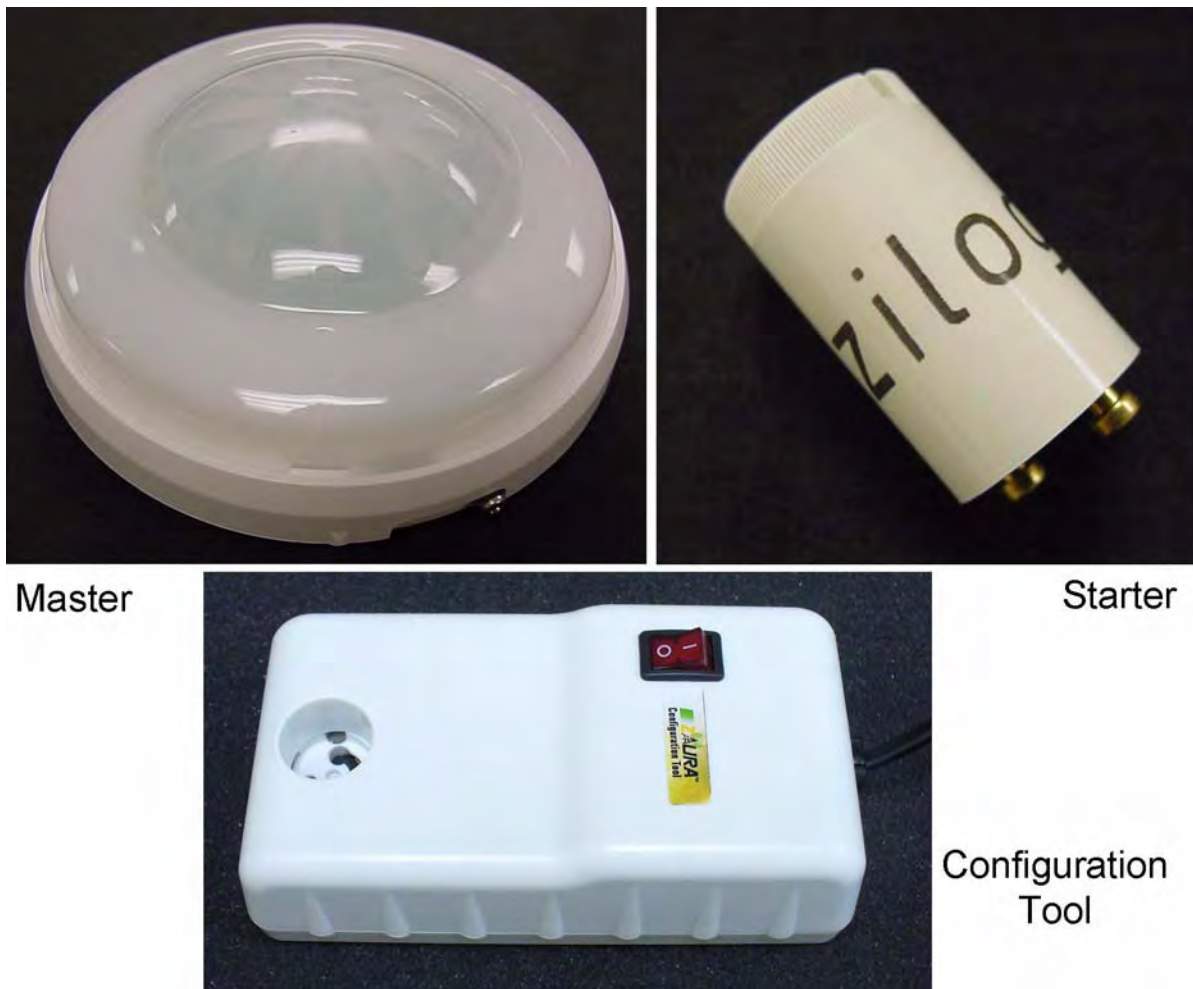


Figure 1. The ZAURA Master Unit/Range Extender and the ZAURA Starter

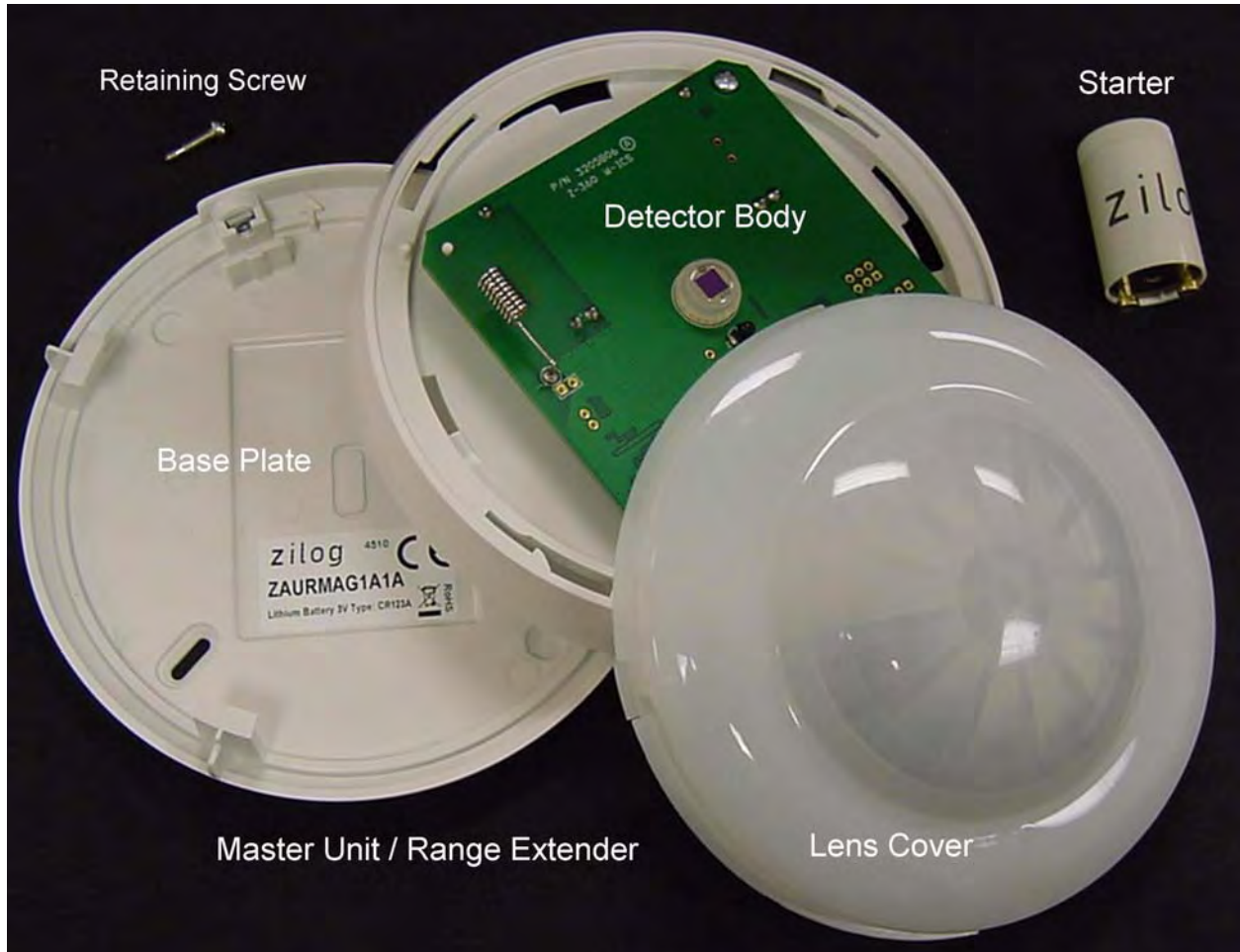


Figure 2. A Components Breakout of the ZAURA System

Physical Dimensions

The dimensions of the three ZAURA system components are discussed in this section.

ZAURA Master Unit

The images in Figure 3 show the height and width of the ZAURA Master Unit.

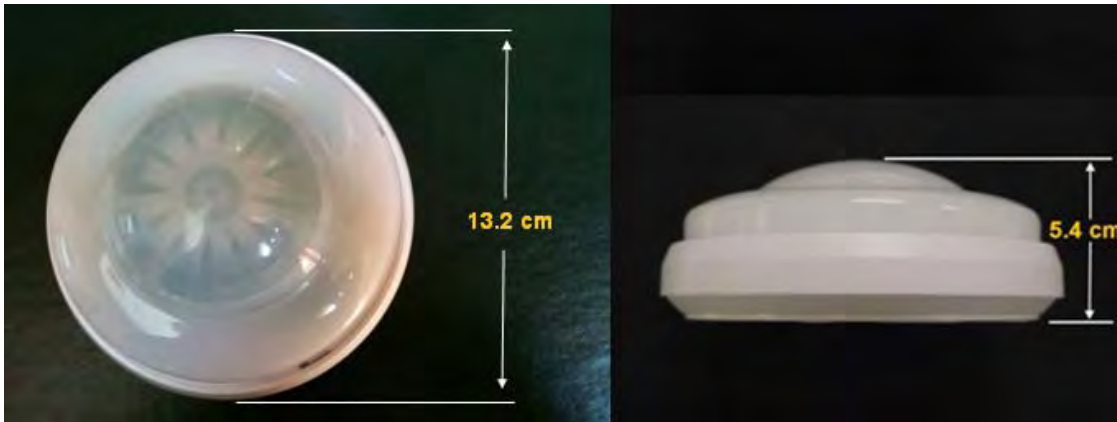
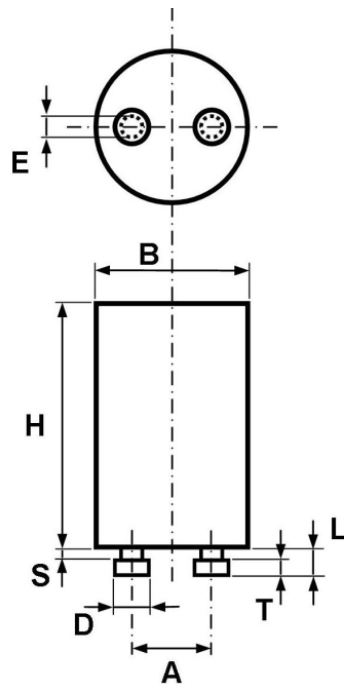


Figure 3. ZAURA Master Unit Dimensions

ZAURA Starter Unit

Figure 4 shows the dimensions of the ZAURA Starter Unit.



	Dimensions (mm)	
	Minimum	Maximum
A	12.5	12.9
B	-	21.5
D	4.7	5.0
E	2.8	3.2
H	33.0	36.0
L	-	4.3
S	1.7	-
T	1.9	2.2

Figure 4. Starter Component Dimensions

ZAURA Configuration Tool

Figure 5 shows the dimensions of the ZAURA Configuration Tool.

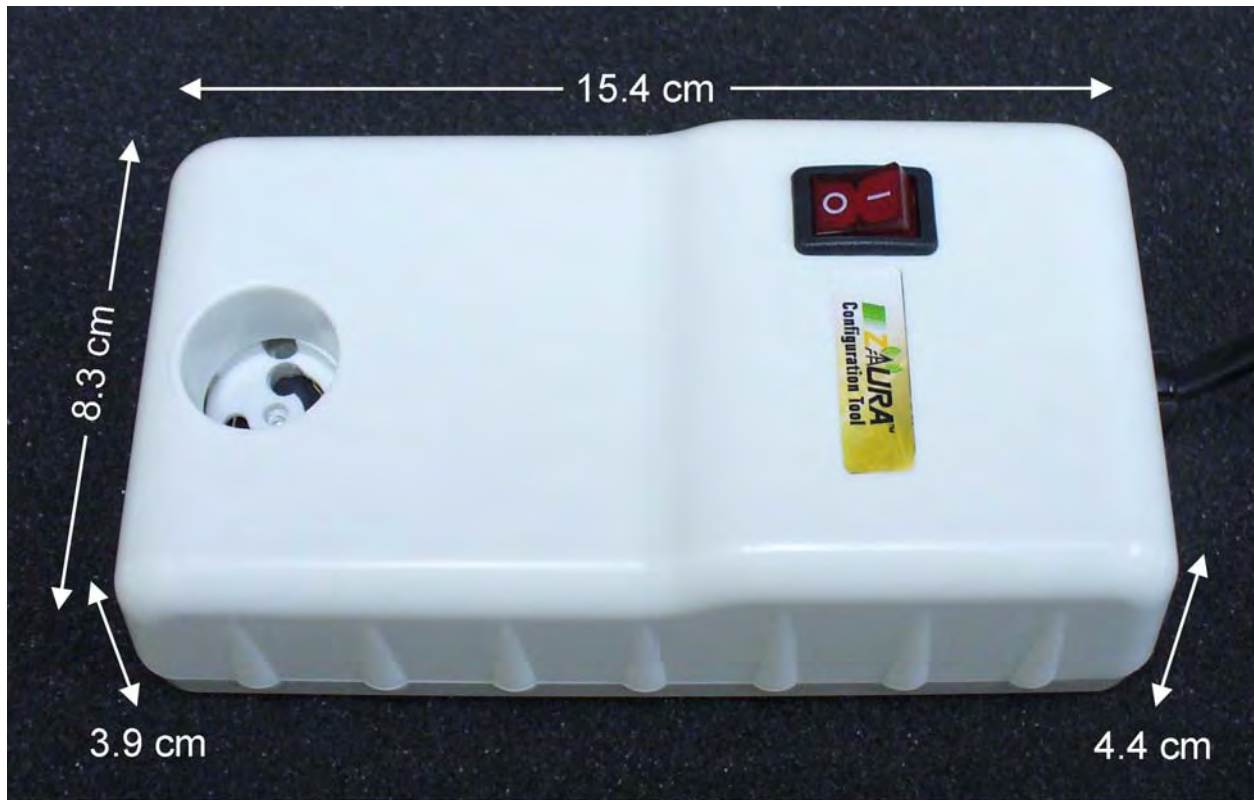


Figure 5. ZAURA Configuration Tool Dimensions

ZAURA System Operation

System communication is performed wirelessly. In order for a Master and its Starters and Range Extenders to communicate with each other, they must be associated (bound) to each other. (To learn more about master/starter association, refer to the [Associating a ZAURA Starter with a Master](#) section on page 30.) If any device in the system loses power, then after power is restored, there can be a delay of up to several minutes before its communication is restored.

This chapter also describes the operation of the ZAURA Configuration Tool.

ZAURA Master/Range Extender Operation

This section describes the operation of the Motion and Light Sensor features of the ZAURA Master/Range Extender.

Motion Sensor for Occupancy Detection

The Master/Range Extender utilizes Zilog's high-performance Z8 Encore! XP® Micro-controller combined with a lens and Passive Infrared (PIR) sensor that have been optimized to detect occupancy. If occupancy has not been detected based on a user-configurable time delay setting, the lights in the room are turned off to conserve power.

Light Sensor for Daylight Harvesting

For many installations, natural light is available during daytime and adequate lighting can be provided even when certain lamps are turned off. The daylight harvesting feature of this system saves power by automatically turning off luminaries connected to *Virtual Dimming Starters* when a predetermined brightness level (virtual dimming threshold) of natural light is exceeded. Luminaries connected to ZAURA starters remain on.

ZAURA Virtual Dimming Starters should be installed to control luminaries in areas that receive relatively strong natural light. A certain amount of hysteresis can exist such that the starting of dimming and stopping of dimming occur at different natural light levels in order to avoid on/off oscillation.

Natural light levels are also evaluated before lamp ignition. For example, when all luminaries are initially off and motion is detected, the Virtual Dimming luminaries are not ignited if the natural light in the room exceeds the dimming threshold. All luminaries can be turned off if the measured light level is 3 times greater than the virtual dimming threshold, as shown in Figure 6. This feature can optionally be disabled using a DIP Switch inside the Master Unit.

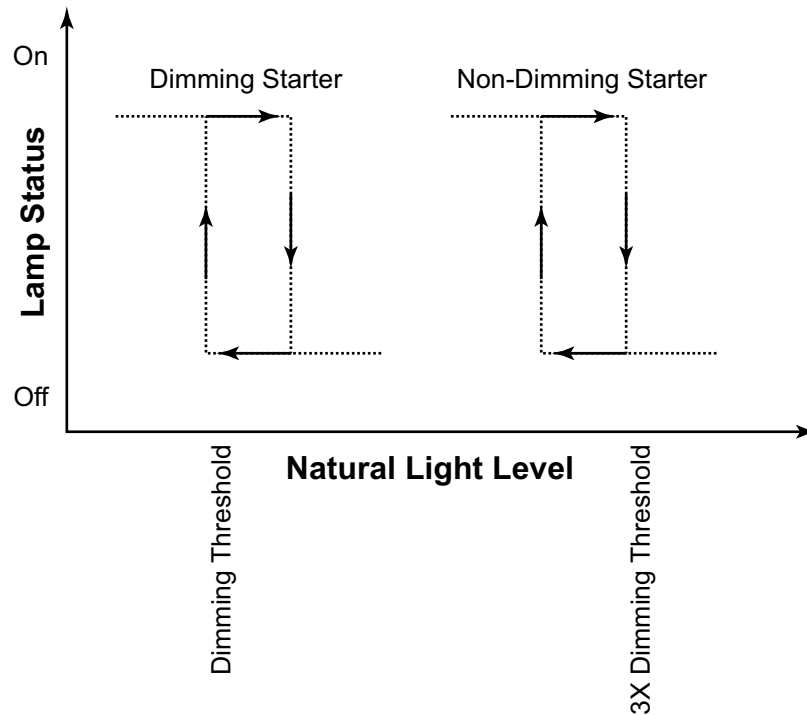


Figure 6. Daylight Harvesting

ZAURA Starter Operation

When the Master is operating, ZAURA Starters respond to commands from the Master. If the room's light switch is set to the OFF position, all lamps will be turned OFF irrespective of Master commands. When the light switch is set to the ON position, all lamps will initially be turned ON. After communication is reestablished between the Master and its associated ZAURA Starters, Master control of the ZAURA Starters resumes.

In the absence of a Master, or when the Master contains either no battery or a low battery, the ZAURA starters perform traditional ON/OFF behavior based on the position of the light switch.

When commanded by its Master to ignite or extinguish a lamp, the ZAURA Starter will perform a limited number of attempts. This behavior prevents excessive ignite and extinguish strikes on lamps near the end of their life cycles. The ZAURA Starter will again attempt to ignite and extinguish a lamp if the lamps are cycled by either the Master using ON/OFF commands or by manual power cycling the lamps OFF for one minute, then ON using the light switch.

► **Note:** For safety reasons, non-ZAURA (original) starters can be used to allow selected lamps to remain ON whenever the switch is ON.

Configuration Tool Operation

The ZAURA Configuration Tool, though its use can be relatively infrequent, can be employed for the following reasons:

- A Starter is required to be associated to a different Master
- A Starter is required to be changed from non-dimming to dimming, or vice versa
- A Starter is required to be associated outside of a luminary

Typically, one or two configuration tools are sufficient for a facility. The ZAURA Configuration Tool can be used with any ZAURA Starter, but is not required to be associated with a Master. Refer to the [Configuration Tool Method](#) section on page 36 for more details.

ZAURA System Installation and Configuration

This chapter describes room requirements assessment, battery installation, starter installation and association, and how to configure and mount your ZAURA masters and range extenders. The chapter begins with an Installation Summary section, which provides a blueprint suitable for installers who have previously performed a ZAURA installation.

Installation Summary

The steps in this section summarize the sequence of a typical ZAURA System installation. Links to additional sections of this document have been added to provide more detailed assistance.

1. Determine the location of Standard Masters (and Range Extenders, if required). For additional assistance with this step, see the the [Determine Master and Range Extender Locations](#) section on page 11.
2. Determine luminary configuration. For additional assistance with this step, see the the [Determine Luminary Configuration](#) section on page 13. Items to consider when configuring your luminaries are:
 - Which luminaries, if any, will be using their original starters (consider safety concerns)
 - Which luminaries will contain ZAURA Starters
 - Which luminaries will contain ZAURA Virtual Dimming Starters (typically for placement near windows)
3. Inventory your parts (Masters/Range Extenders, Starters, etc.) and tools to ensure that you have sufficient quantities for the required installation. For additional assistance with this step, see the the [Inventory Parts and Tools](#) section on page 15.
4. Mount base plate(s) to the ceiling in the location(s) you determined in Step 1 using the screws or the double-sided tape provided.¹ For additional assistance with this step, see the the [Mount Base Plates](#) section on page 15.
5. Configure the ZAURA Masters. For additional assistance with this step, see the the [Configuring ZAURA Masters](#) section on page 18.

1. Zilog recommends using the screws provided with the ZAURA System when mounting the Master base plate; however, double-sided tape is provided with the installation hardware. Simply press the double-sided tape to the base plate, then mount the base plate securely to the mounting surface to ensure good adherence. Depending on the mounting surface, however, caution should be used when removing the base plate when it has been affixed with the double-sided tape, because damage to the Master housing and/or to the mounting surface could occur.

- a. Set the Master type switch to the Standard (OFF, OFF) position.
 - b. Make sure the mode is set to Normal Operation (i.e., DIP switches 1, 2 and 3 are in the OFF position).
 - c. Set the turn-off delay to the required value (the recommended setting is 5 minutes).
 - d. Adjust light and movement sensitivity, if required. For additional assistance with this step, see the [Occupancy Detection Adjustment](#) section on page 22 and the [Light Detection Adjustment](#) section on page 23.
 - e. Install one battery. For additional assistance with this step, see the [Install Batteries](#) section on page 24.
6. Configure the Range Extenders (if required). For additional assistance with this step, see the [Configuring ZAURA Range Extenders](#) section on page 33.
- a. Set the Master type switch to Range Extender (OFF, ON) position.
 - b. Set DIP switches 1 through 8 to match the Master.
 - c. Adjust the Occupancy sensitivity POT, if required.
 - d. Install the batteries.
 - e. Associate the Range Extender(s) to the appropriate Master.
7. Set the Virtual Dimming Luminaries (if no Virtual Dimming luminaries are required, skip to Step 8). For additional assistance with this step, see the [Set Up and Install ZAURA Virtual Dimming Luminaries](#) section on page 26.
- a. Replace the original starters with ZAURA Starters.
 - b. Associate the ZAURA Virtual Dimming Starters to the Master.
 - c. Verify the association of all ZAURA Virtual Dimming Starters.
8. Set the Standard Luminaries to be controlled by the Master. For additional assistance with this step, see the [Set Up and Install ZAURA Standard Luminaries](#) section on page 29.
- a. Replace the original starters with ZAURA Starters in the remaining luminaries to be controlled by the Master.
 - b. Associate ZAURA Starters to the Master. For additional assistance with this step, see the [Associating a ZAURA Starter with a Master](#) section on page 30.
 - c. Verify association of all ZAURA Starters.
9. Mount the Master to the previously installed base plate closest to the center of the room. Mount the Range Extenders (if any) to their designated base plates. For additional assistance with this step, see the [Mount Master/Range Extenders](#) section on page 31.
10. The room is complete.

-
- **Notes:** ZAURA Starters and Virtual Dimming Starters are physically identical; however, they behave differently depending upon how they are associated. Zilog highly recommends installing the ZAURA RF Wireless Lighting Control System one room at a time to avoid possible communication issues during the association process.
-

Assessing Room Requirements

Before installing and configuring your ZAURA System, you'll first want to establish where you will install your ZAURA detectors based on the lighting needs of the room.

Determine Master and Range Extender Locations

Typically, the ZAURA Master is located in the center of a room; however, differing levels of expected activity in a room should be considered when determining the Master's eventual mounting placement.

For example, a university lecture hall full of students will pose different lighting requirements than that same lecture hall when only the professor is occupying the room, grading papers; i.e., the general seating area will not require lighting but the area surrounding the professor's lectern must continue to remain illuminated. By placing the Master closer to the professor's lectern, you can ensure maximum sensitivity to the professor's movement and reduce the chance that the lights turn off while the professor is alone in the room.

Figures 7 and 8 can help to determine whether installation is sufficiently covered by the occupancy detection range of a single Master unit. If the situation requires, add Range Extenders to achieve coverage. When placing multiple Range Extenders, locate the Master toward the center of the grouping.

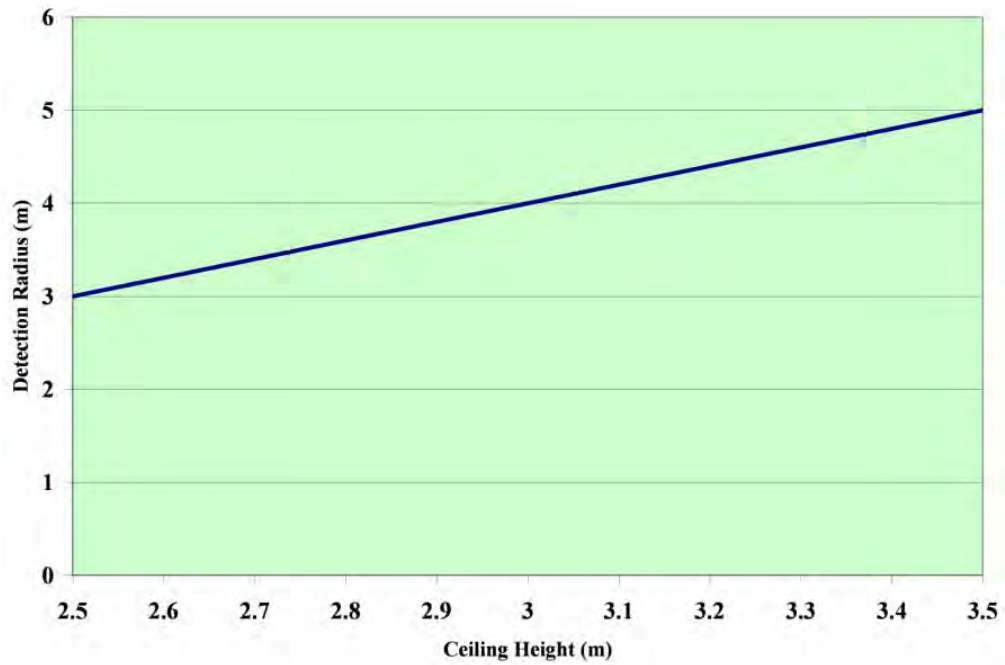


Figure 7. Master Detection Radius vs. Ceiling Height

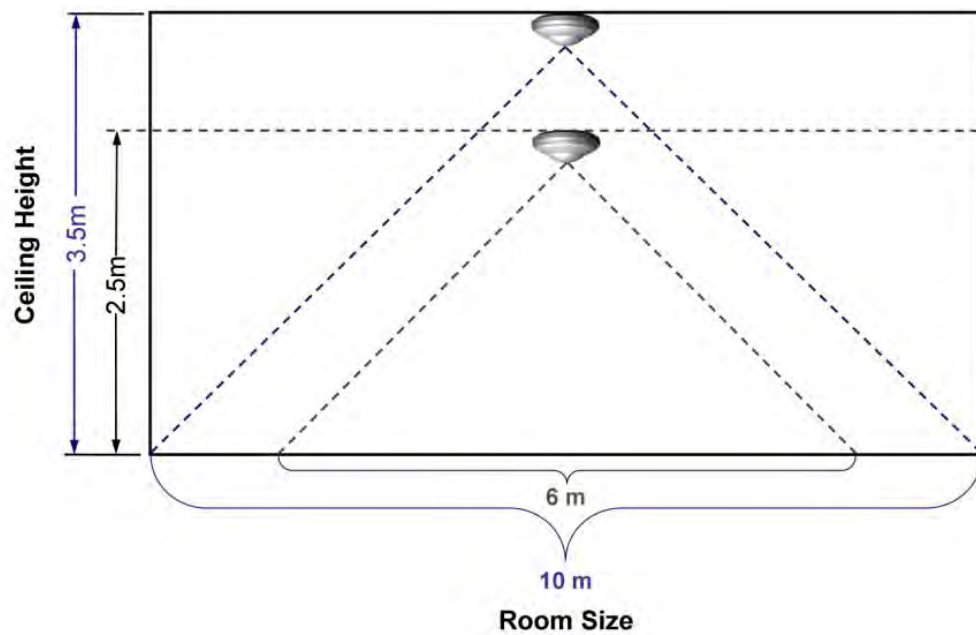


Figure 8. Detector Coverage Area

Items to consider when locating Masters/Range Extenders:

- There can only be one Master per control group
- Coverage area, as shown in Figures 7 and 8
- Clear line of sight from Master/Range Extender location to all main room entrances, exits and areas where occupancy detection is required
- Room obstructions such as pillars, walls, lockers, piping, etc.
- Proper clearance around the mounting location
- The ZAURA Master should be the only unit to determine light levels in the room and to turn off the Virtual Dimming Luminaries
- To better detect room light levels, the Master can be located closer to a natural light source
- A Range Extender does not evaluate the natural light levels in an area
- Mounting material (wood vs. concrete vs. brick vs. porous ceiling panels)
- Relatively dry area
- Is there a requirement to have motion detection in every part of the room?

Determine Luminary Configuration

The ZAURA system for fluorescent lighting is very flexible to meet the lighting and energy savings requirements for different situations. Figure 9 (also see [Appendix A](#) on page 44) illustrates how rooms can be configured. In the figure, the term *ZAURA* represents ZAURA Starters in the luminaries.

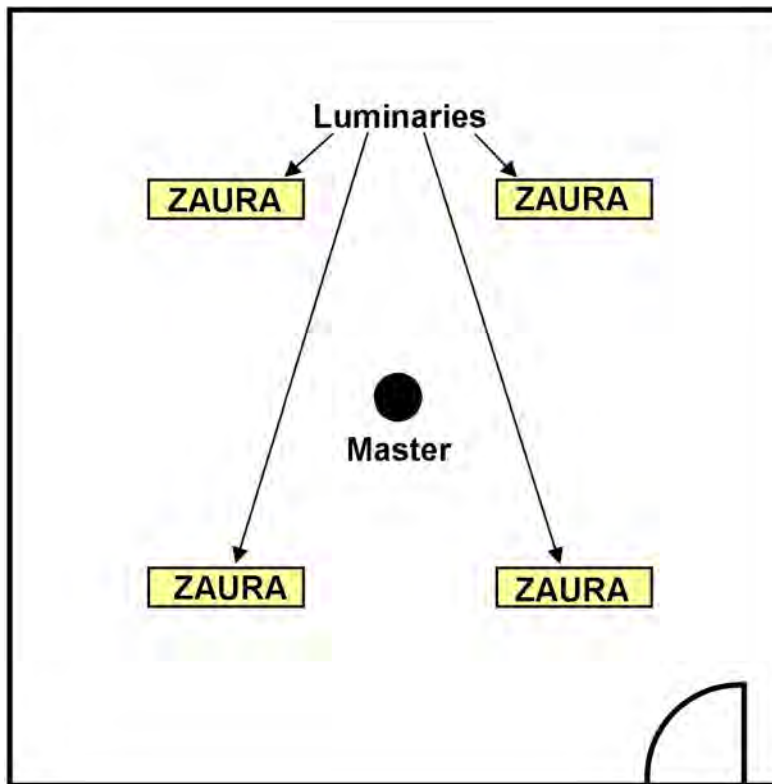


Figure 9. Example Room Configuration

There are 3 basic types of luminaries:

- Luminary using the original starter (no change)
- ZAURA Standard Luminary
- ZAURA Virtual Dimming Luminary

Items to consider when determining luminary configuration:

- You may find it necessary to keep one or more luminaries configured with original unit starters due to safety reasons. If no movement is detected and the room lights turn off, there will remain enough light from these luminaries to navigate the area.
- Room dimensions or environmental conditions could make it more practical to leave one or two luminaries with the original starters rather than placing additional Range Extenders to detect movement in every part of the room.
- The more luminaries that are configured with ZAURA Starters, the greater the energy savings.

- Virtual Dimming Luminaries will turn off when the Master detects a natural light level above a certain threshold set by the light sensitivity adjustment on the Master unit. These virtual dimming luminaries should be located near the source of the natural light. It may take some adjustments over time to determine exactly which luminaries should be configured for virtual dimming.

Inventory Parts and Tools

Before starting the installation process, Zilog recommends that you review the configuration for each room so that the number of ZAURA Masters/Range Extenders and ZAURA Starters match or exceed your requirements.

A typical installation can require the following items:

- ZAURA Master Unit, which includes:
 - Base Plate
 - Detector Body (includes circuit board)
 - Lens Cover
 - Retaining Screw
 - CR123A Lithium Battery
 - Mounting Screws
- ZAURA Starter
- ZAURA Configuration Tool (if necessary)

Required and Recommended Tools

- Phillips screwdriver (required)
- Ladder
- Pen, Pencil or Marker
- Standard electric drill and bits (for concrete, an impact drill)
- Small slot screwdriver (for changing Master DIP Switch positions)
- Tape measure
- Appropriate tools to access starter(s) in luminaries

Mount Base Plates

Before configuring the ZAURA Masters, observe the following two sections, which describe the process for preparing Master base plate installation.

Opening the Master Unit

1. Loosen the retaining screw from the side of the Detector body, as shown in Figure 10, until you can turn the base plate.
2. Turn the base plate until the arrows on the Detector body and the base plate align, as shown in Figure 10.
3. Remove the Detector body and lens cover from the base.



Figure 10. Opening the Master Unit

Mounting the Base Plate

1. Place the base plate on the ceiling in the location(s) that you identified in the [Determine Master and Range Extender Locations](#) section on page 11. If preferred, use the double-sided tape provided in the kit to tentatively place the base plate.¹ It may be necessary to rotate the base plate to allow easier access to the retaining screw.
2. Mark and drill holes (if required) into the ceiling, as shown in Figure 11.
3. Mount the base plate to the ceiling, as shown in Figure 12.

1. Zilog recommends using the screws provided with the ZAURA System when mounting the Master base plate; however, double-sided tape is provided with the installation hardware. Simply press the double-sided tape to the base plate, then mount the base plate securely to the mounting surface to ensure good adherence. Depending on the mounting surface, however, caution should be used when removing the base plate when it has been affixed with the double-sided tape, because damage to the Master housing and/or to the mounting surface could occur.



Figure 11. The ZAURA Master's Base Plate, Showing Mounting Holes

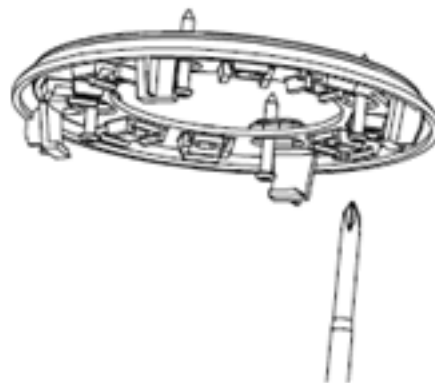


Figure 12. Mounting the Master Unit Base Plate

Configuring ZAURA Masters

The configuration settings built into the ZAURA Detector's Master unit allow for performance adjustments of the Master to satisfy user preferences and environmental conditions. Adjustments can be made using the DIP switches and POTs to:

- Toggle lamps
- Test occupancy detection
- Adjust light and occupancy sensitivity

How to perform each of these adjustments is described in this section.

Figure 13 shows the location of each configuration interface on the ZAURA Detector.



Caution: To always start from a known state, and to therefore prevent unintended association between the Master and its starters, ensure that the Master does not contain a battery before configuring the Master.

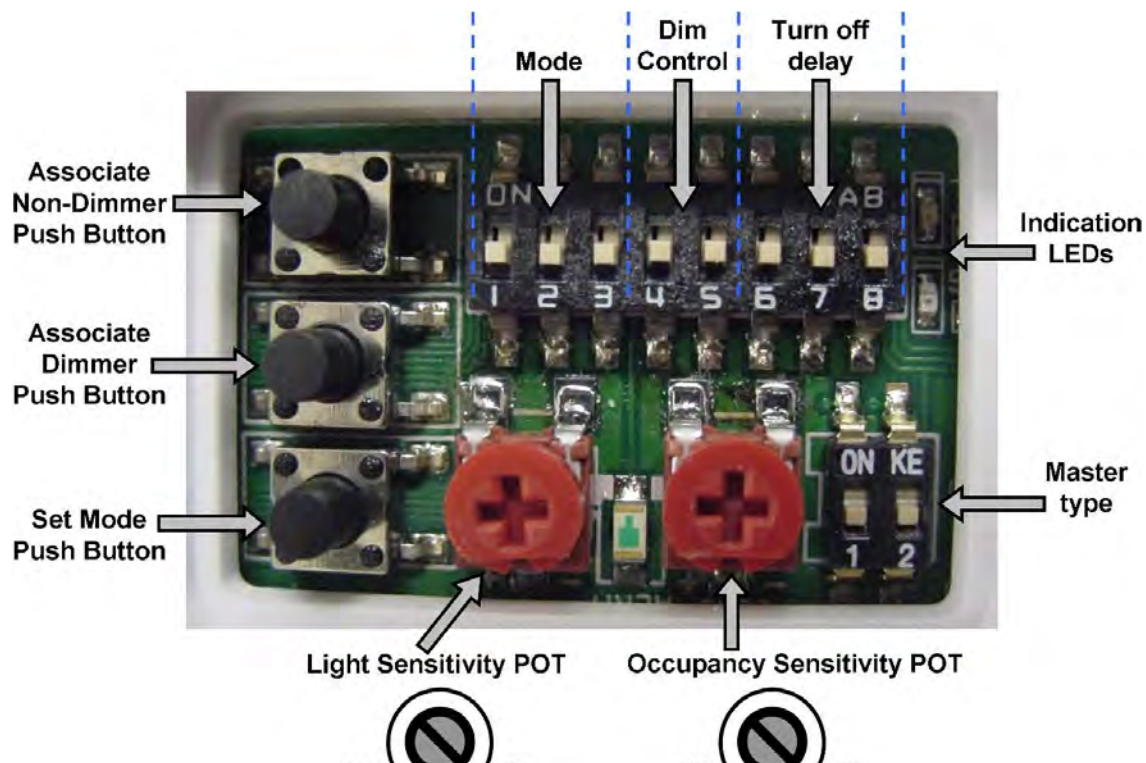


Figure 13. Location of Master Configuration Settings

Set the Master Type DIP Switch

Begin configuring your ZAURA Master by first setting the Master Type DIP Switch to the Standard (OFF, OFF) position, as illustrated in Figure 14.

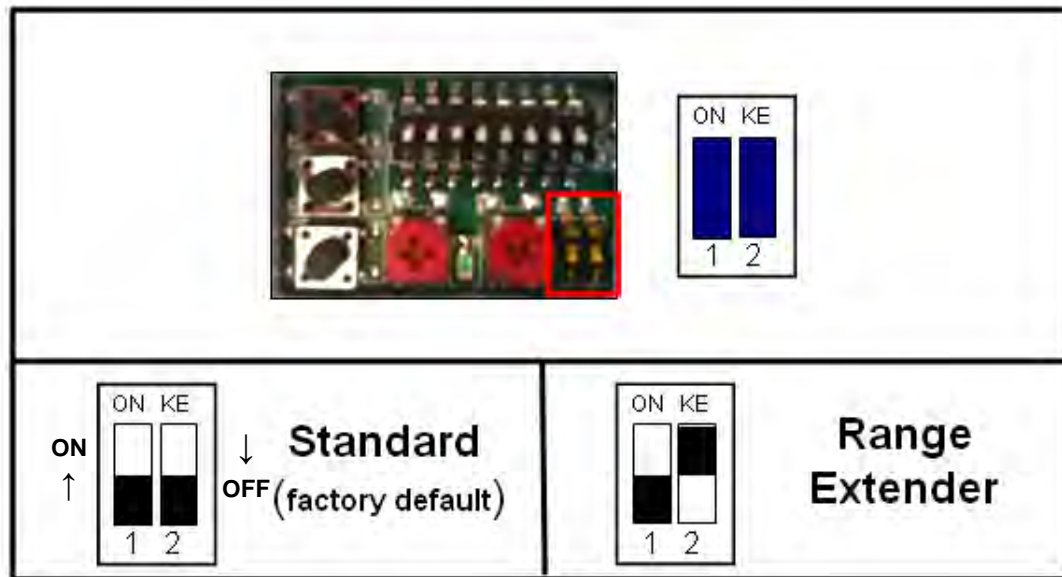


Figure 14. Setting Master Type DIP Switches

Special Modes Setting

A Special Modes setting can provide assistance during installation or system testing. Special Modes are activated by first setting the required mode via the DIP switches, as shown in Figure 15, then depressing the **Set Mode** button until the green LED blinks one time. The following paragraphs describe these special modes.

Normal Operation. Normal operation is enabled; it is the factory default setting.

Toggle All Lamps. When activated (i.e., the SET MODE pushbutton is pressed), the state of all ZAURA Starters is changed to the opposite state. For example, if the luminaries are currently turned on, then **Toggle All Lamps** will turn off all luminaries, including all Virtual Dimming luminaries. The new state is retained for the lesser of one minute (after which normal operation returns) or until a new press of the **Set Mode** button. This mode can be used after the association of ZAURA Starters to validate that the Starters associated properly.

Toggle Dimming Lamps. When activated, the state of the ZAURA Virtual Dimming Starters is changed to the opposite state. For example, if the luminaries are currently turned on, then toggling the dimming state will turn off the Virtual Dimming luminaries. The new state is retained for the lesser of approximately one minute (after which normal

operation returns) or until a new press of the **Set Mode** button. This mode can be used after the association of the ZAURA Virtual Dimming Starters to validate that the starters associated properly.

PIR Test. This mode displays PIR detection status by turning on the blue LED whenever occupancy is detected. The PIR Test will continue for the lesser of five minutes (after which normal operation returns) or until a new press of the **Set Mode** button.

► **Note:** After you are finished using one of the above special modes, it is good practice to return the DIP switches to the Normal Operation position.

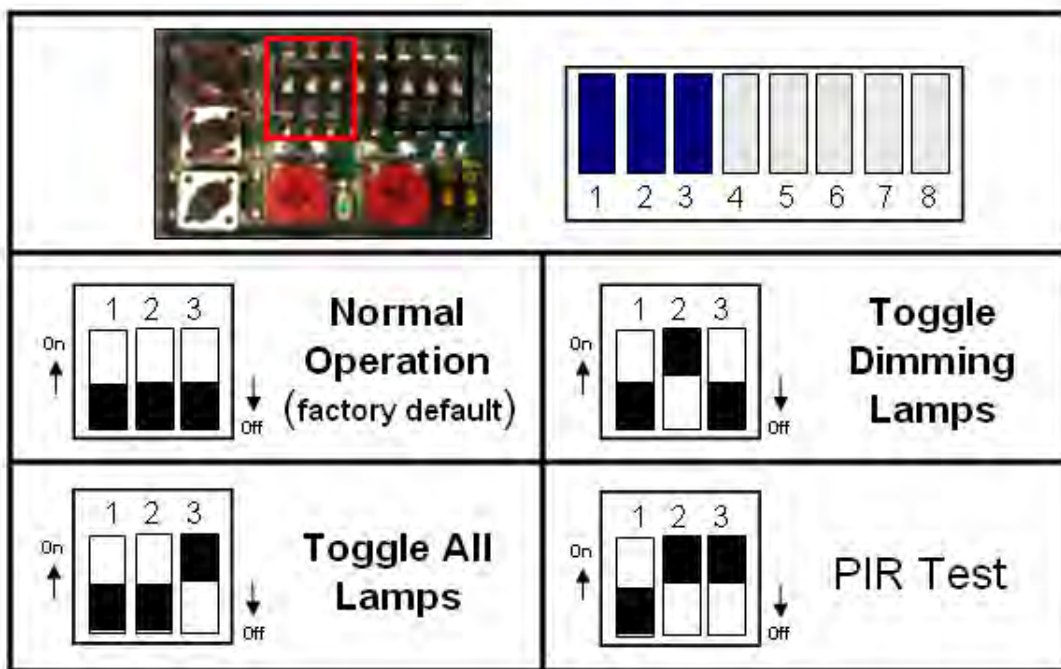


Figure 15. Setting Special Mode DIP Switches

Dim Control Setting

The Dim Control DIP switches are used to determine how the system reacts to the amount of natural light in the room, as shown in Figure 16.

Normal Operation. All Virtual Dimming luminaries are turned off if the natural light level is greater than the dimming threshold, as set by the Light Sensitivity POT. If the nat-

atural light level is three times greater than the dimming threshold, all luminaries are turned off regardless of occupancy detection.

Disable Dim All. If the natural light level is three times greater than the dimming threshold, the ZAURA standard luminaries will remain on if occupancy is detected.

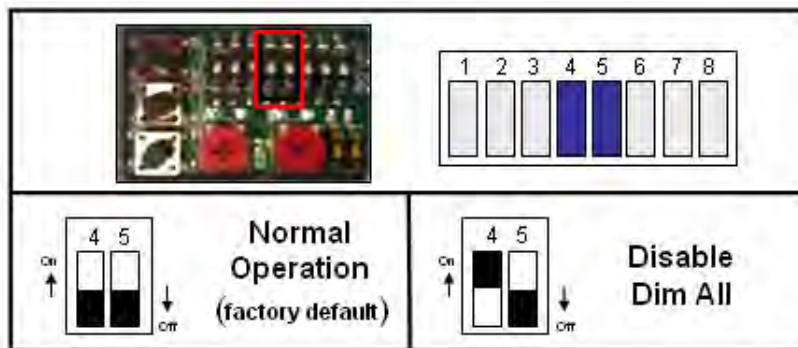


Figure 16. Dim Control DIP Switch Setting

Turn-Off Delay Setting

A turn-off delay feature in the ZAURA Detector allows you to adjust the time period between when the last person leaves the room (i.e., occupancy is no longer detected) to the moment the lights turn off. Longer delays reduce the likelihood that lamps turn off even though the room is occupied.

The duration of delay can be set by adjusting the turn-off delay DIP switches. For proper system operation, the Turn-Off Delay (DIP switch) settings of the Range Extender must match the settings of the Master to which it is associated, as shown in Figure 17.

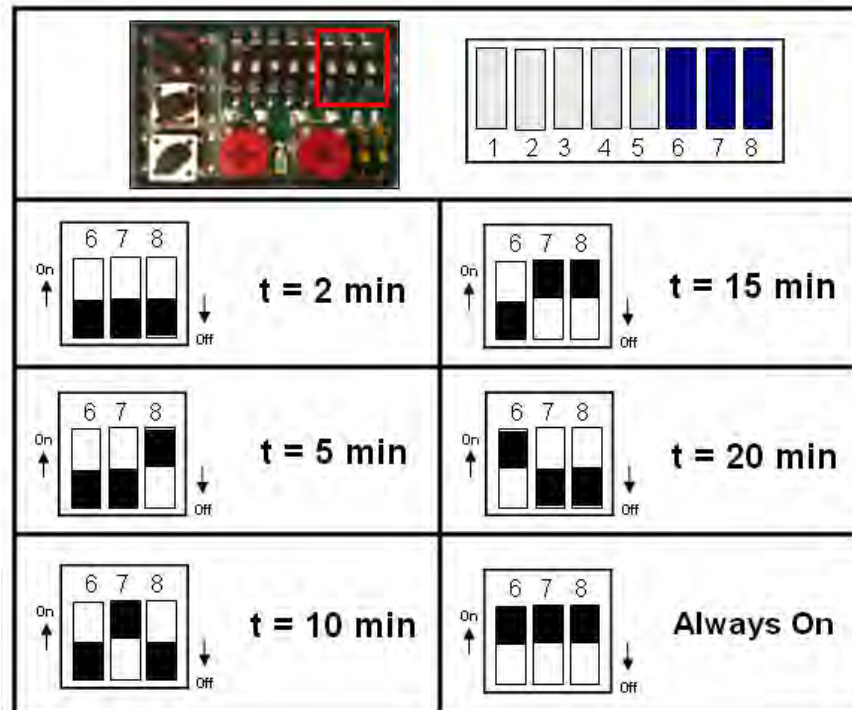


Figure 17. Setting Turn-Off Delay DIP Switches

Occupancy Detection Adjustment

The Master is preset to an occupancy sensitivity level that is appropriate for typical installations. Due to variations in room characteristics, adjustments can be required to optimize detection. The Occupancy Sensitivity POT (see Figure 18) is provided to adjust detector sensitivity to motion in the room. To access the Occupancy Sensitivity POT, the Master body must be removed from its base (as described in the [Opening the Master Unit](#) section on page 16). Rotating the Occupancy Sensitivity POT counterclockwise (to the left) will make the Master more sensitive to movement within the room.

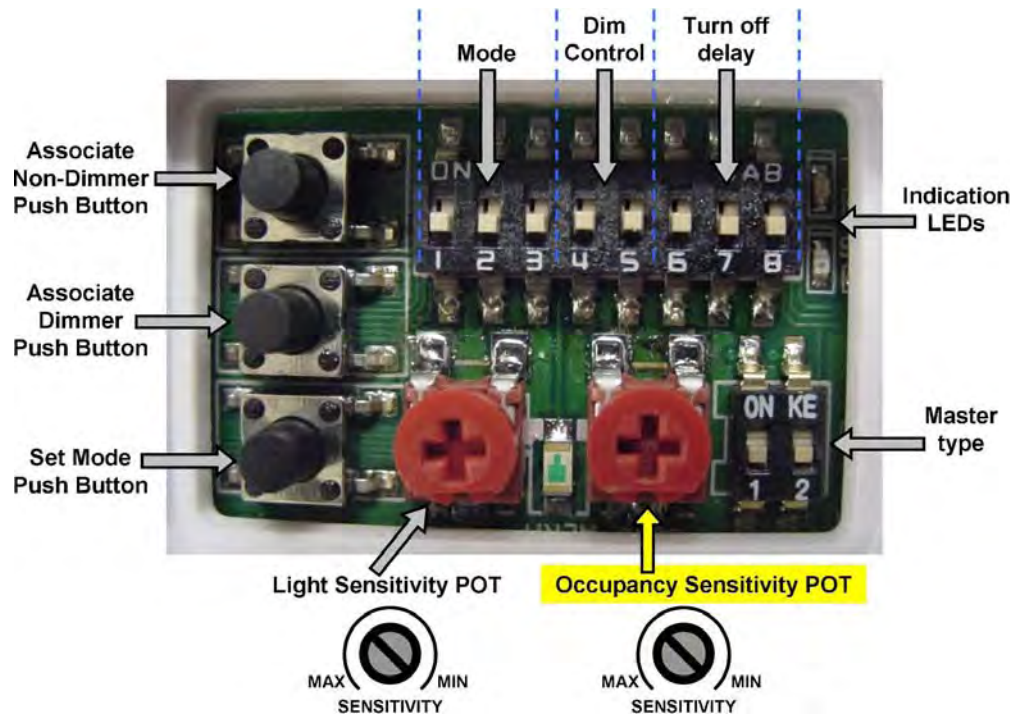


Figure 18. Adjusting the Occupancy Sensitivity POT

Light Detection Adjustment

The Master is preset to a dimming threshold that is appropriate for typical installations. Due to variations in room characteristics, adjustments can be required to optimize dimming performance. A Light Sensitivity POT is provided for adjusting the dimming threshold. To access this sensitivity POT, the Master body must be removed from its base (as described in the [Opening the Master Unit](#) section on page 16). Rotating the Light Sensitivity POT counterclockwise will increase the natural light level at which dimming occurs, as shown in Figure 19.

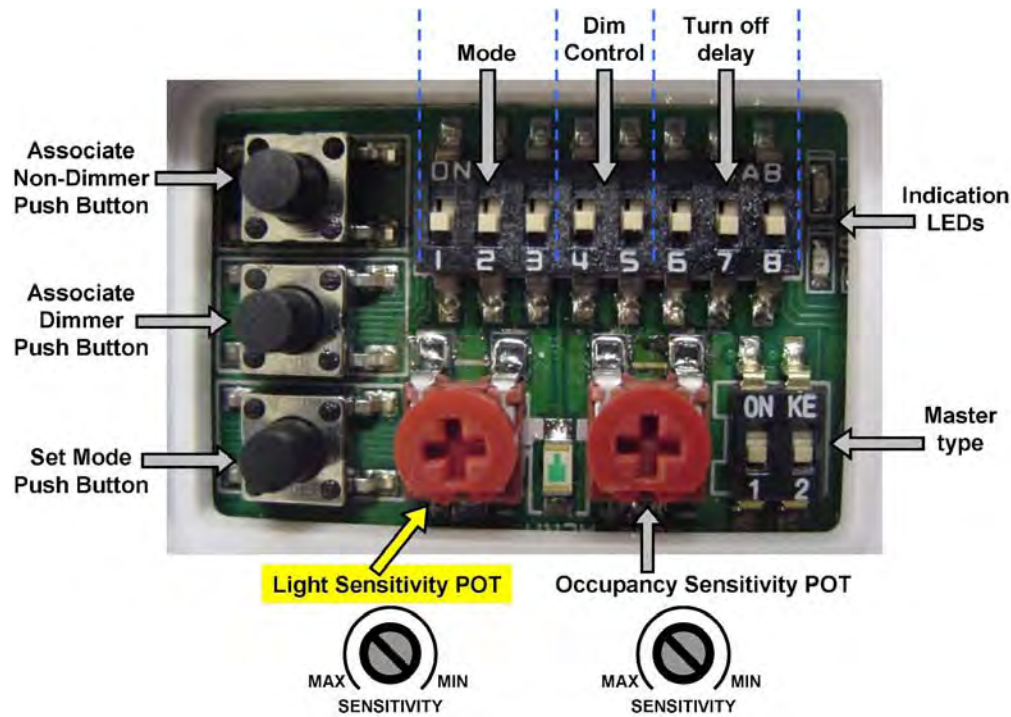


Figure 19. Adjusting the Light Sensitivity POT

-
- **Note:** Handling the Master to adjust the Light Sensitivity POT can temporarily change the measured natural light level and affect the dimming control of the Starters. After adjusting the Light Sensitivity POT and reinstalling the Master, please wait two minutes before evaluating the effect of the change to the dimming threshold.
-

Install Batteries

Observe the following steps when installing fresh batteries in your ZAURA Master detector unit(s).

1. Refer to the [Technical Specifications](#) section on page 40 for the proper battery type to be used in the ZAURA Master.

-
- Caution:** There is a risk of damage to the detector if the battery is replaced by an incorrect type of battery.
-

2. Insert the battery (ies) into the battery holders, as shown in Figure 20.

► **Note:** A single battery is sufficient for Masters that are not associated to Range Extenders. Two batteries are recommended for Masters that are associated to Range Extenders.

3. The first time that a battery is installed, the Master will perform automatic radio sensing and will not perform any other function. The blue LED will blink at a rate of once per second during this sensing period, which lasts approximately 45 seconds. Please wait for this period to complete before attempting other tasks with the Master. This step should be performed with the Master closest to its intended mounting position.



Figure 20. Master Unit Battery Installation

-
- **Note:** If the battery becomes too weak for the Master to continue operating, the Master will no longer control the lamps; however, the lamps can be controlled in the traditional way using the light switch. After you install a fresh battery, the Master will resume control of the lamps.
-

Set Up and Install ZAURA Virtual Dimming Luminaries

Virtual dimming is triggered in the ZAURA Detector when natural light exceeds a pre-determined level that can be adjusted by the Light Sensitivity POT. If natural light is not a factor in your room installation, or if no Virtual Dimming Luminaries are to be used, skip this section and proceed to the [Set Up and Install ZAURA Standard Luminaries](#) section on page 29. For a more thorough description of virtual dimming, see the [Light Sensor for Daylight Harvesting](#) section on page 6.



Caution: The following precautions must be observed when working with the devices described in this section.

- When replacing Starters, it is necessary to turn off the main power to the luminaries
- Be sure to match starter wattage with lamp wattage
- Install and use in accordance with applicable electronic codes and regulations

To install the ZAURA Starters in the Virtual Dimming Luminaries, observe the following steps.

1. Turn off line power to the luminaries.
2. Remove the fixture cover and lamp(s), if necessary.
3. Remove the old starter by gently pushing it in and turning it counterclockwise.
4. Insert a ZAURA Starter by gently pushing it and turning it clockwise. Refer to Figure 21 for starter installation examples.



Figure 21. Inserting ZAURA Starters


5. Replace the lamp(s) and fixture cover.
6. Repeat your installation of ZAURA Starters in all luminaries (which you identified in the [Determine Luminary Configuration](#) section on page 13) to be configured as ZAURA Virtual Dimming Luminaries.

-
- **Note:** If your installation will include both ZAURA Standard and Virtual Dimming Starters, Zilog recommends that the installer mark at least one of these two types of starters for tracking purposes. You may find a permanent marking pen to be suitable for this purpose.
-

Associating a ZAURA Virtual Dimming Starter with a Master

Before the ZAURA RF Wireless Lighting Control System can become operational, ZAURA Starters are required to associate (i.e., be bound) to their Master. Both the Starter and the Master must be triggered for association to occur. After they are associated, these devices retain their associations even if power (line or battery) is removed.

Apply line power to the luminaries to trigger all unassociated Starters to seek a Master until association completes or until line power is removed.

-
-  **Caution:** Do not apply power to unassociated ZAURA Starters in multiple rooms simultaneously during association. Master communication range can be such that a Master in one room can associate unintentionally with unassociated ZAURA Starters in another room. For this reason, Zilog recommends performing complete installations and associations in one room or area before moving on to the next room.
-

-
-  **Caution:** Do not trigger two Masters to associate simultaneously.
-

Observe the following steps to trigger *only one master* to associate.

1. Insert a battery into the Master battery receptacle, as shown in [Figure 20](#) on page 25.
2. Depress the **Associate Dimmer** button on the Master until the green LED blinks one time. Refer to [Figure 13](#) on page 18 for button location.
3. The Master will attempt association for a period of 30 seconds. If the **Associate Dimmer** button is depressed again during this 30-second period, a new 30-second period of association is initiated. All powered and unassociated starters within range will associate.

-
- **Note:** Each time a Starter becomes associated with the Master, the green LED on the Master will blink.
-

Verify Association of ZAURA Virtual Dimming Starters

1. On the back of the Master, change the mode to **Toggle Dimming Lamps** by sliding DIP Switch 2 to the ON position. Refer to [Figure 13](#) on page 18 for a description of the different modes and the location of the DIP switches.
2. Press the **Set Mode** button. All luminaries that are associated as Virtual Dimming should turn off.
3. Press the **Set Mode** button again. The same luminaries should turn back on.
4. Slide DIP Switch 2 to the OFF position to return the master to Normal Operating Mode.

Set Up and Install ZAURA Standard Luminaries



Caution: The following precautions must be observed when working with the devices described in this section.

- When replacing Starters, it is necessary to turn off the main power to the luminaries
- Be sure to match starter wattage with lamp wattage
- Install and use in accordance with applicable electronic codes and regulations

Upon satisfactory setup, install the ZAURA Starters in the Standard Luminaries that you set up in the previous section, as follows.


1. Turn off line power to the luminaries.
2. Remove the fixture cover and lamp(s), if necessary.
3. Remove the old starter by gently pushing it in and turning it counterclockwise.
4. Insert a ZAURA Starter by gently pushing it and turning it clockwise. Refer to [Figure 21](#) on page 27 for starter installation examples.
5. Replace the lamp(s) and fixture cover.
6. Repeat your installation of ZAURA Starters in all luminaries (which you identified in the [Determine Luminary Configuration](#) section on page 13) to be configured as ZAURA Standard Luminaries.

-
- **Note:** If your installation will include both ZAURA Standard and Virtual Dimming Starters, Zilog recommends that the installer mark at least one of these two types of starters for tracking purposes. You may find a permanent marking pen to be suitable for this purpose.
-

Associating a ZAURA Starter with a Master

Before the ZAURA RF Wireless Lighting Control System can become operational, ZAURA Starters are required to associate (i.e., be bound) to their Master. Both the Starter and the Master must be triggered for association to occur. After they are associated, these devices retain their associations even if power (line or battery) is removed.

Apply line power to the luminaries to trigger all unassociated Starters to seek a Master until association completes or until line power is removed.

-
-  **Caution:** Do not apply power to unassociated ZAURA Starters in multiple rooms simultaneously during association. Master communication range can be such that a Master in one room can associate unintentionally with unassociated ZAURA Starters in another room. For this reason, Zilog recommends performing complete installations and associations in one room or area before moving on to the next room.
-

-
-  **Caution:** Do not trigger two Masters to associate simultaneously.
-

Observe the steps below to trigger *only one master* to associate.

1. Insert a battery into the Master battery receptacle, as shown in [Figure 20](#) on page 25.
2. Depress the **Associate Non-Dimmer** button on the Master until the green LED blinks one time. Refer to [Figure 13](#) on page 18 for button location.
3. The Master will attempt association for a period of 30 seconds. If the **Associate Non-Dimmer** button is depressed again during this 30-second period, a new 30-second period of association is initiated. All powered and unassociated starters within range will associate.

-
- **Note:** Each time a Starter becomes associated with the Master, the green LED on the Master will blink.
-

Verify Association of ZAURA Non-Dimming Starters

1. On the back of the Master, change the mode to **Toggle All Lamps** by sliding DIP Switch 3 to the ON position. Refer to [Figure 13](#) on page 18 for a description of the different modes and the location of the DIP switches.
2. Press the **Set Mode** button. All of the luminaries, including the Virtual Dimming luminaries installed in the previous step, should turn off.
3. Press the **Set Mode** button again. The same luminaries should turn back on.
4. Slide DIP Switch 3 to the OFF position to return the master to the Normal Operating Mode.

► **Note:** If any luminaries still have the original starters installed due to safety concerns, these luminaries should stay on during this verification test.

Issues with Association

- If the LED blinks green during association but not all devices are under Master control (as can be tested by using the Toggle modes), perform the association procedure again.
- If no associations occur during an association period, the Master will cause the red LED to blink three times. If this situation occurs, identify any Starters that are not under Master Control (for example, by using the Toggle modes) and associate them using the [Configuration Tool Method](#) (see page 36).
- If a Master is requested to associate with more than the maximum number of allowed devices, the red LED responds immediately by blinking five times and aborting association.

► **Note:** A Master remembers all devices that it has been associated with, even if they are removed from the system. The remedy for this instance is to first erase the Master and deassociate all devices previously associated to the Master, then associate each device as required. For further details, see the [Deassociating a Starter](#) section on page 35 and the [Deassociating a Range Extender](#) section on page 36.

Mount Master/Range Extenders

After configuration is complete, covering the Master unit is a simple process, as follows.

1. If the lens cover has been removed, place the four tabs of the lens cover into the matching notches of the Detector body (see [Figure 22](#)) and turn the lens cover clockwise until it is secure.

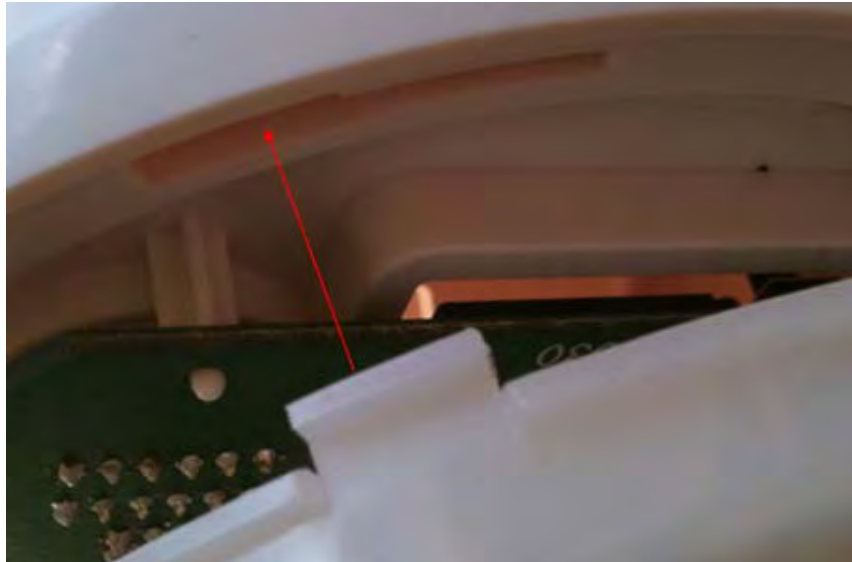


Figure 22. Lens Cover Assembly Notch

2. Place the Detector body into the base plate so that the arrows on each are aligned.
3. Turn the unit clockwise to latch it closed; the arrows will offset each other, as shown in Figure 23.

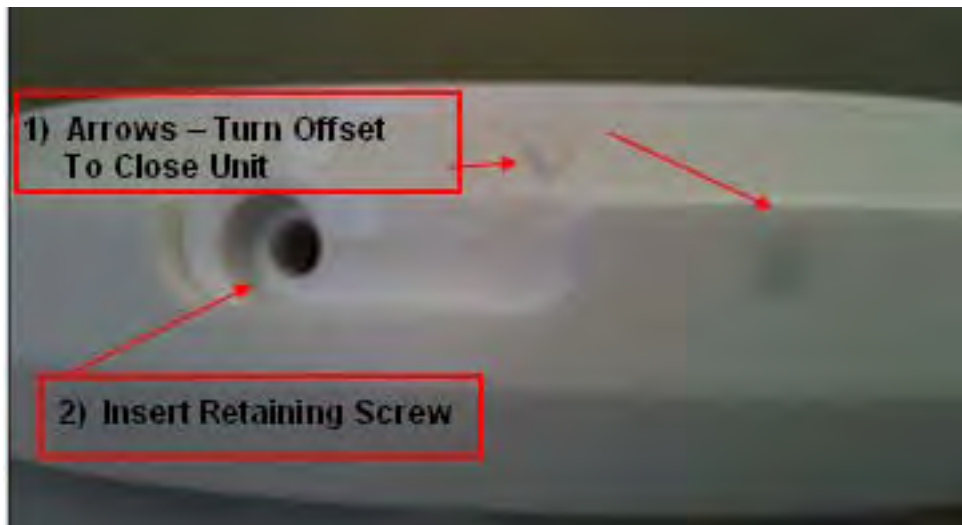


Figure 23. Closing the Master Unit

4. Insert and fasten the retaining screw.
5. Your work is complete!

Configuring ZAURA Range Extenders

If your application requires that you configure your occupancy detector for an extended range, consider the following settings.

Master Type Setting

Range Extenders can provide additional occupancy detection information to a Standard Master to allow the occupancy detection range of the Standard Master to be extended. When configuring a Range Extender, observe the following points:

- The Master type DIP switches must be set to the Range Extender (OFF, ON) position as shown in [Figure 14](#) on page 19.
- DIP switches 1 through 8 must be set to match the Master, as shown in [Figure 13](#) on page 18.
- The Occupancy Sensitivity POT may require adjustment; see [Figure 19](#) on page 24.

Associating a Range Extender with a Master

Before inserting a battery, designate the Range Extender unit(s) by observing the following steps.

1. If you haven't already configured the Master type DIP Switch (as noted above), set it to the Range Extender position, as shown in [Figure 14](#) on page 19.
2. Insert a battery into the Range Extender. The blue LED will blink during this sensing period, which lasts approximately 45 seconds.
3. Upon receiving power, the Range Extender seeks a Master until the association completes or until the battery is removed. While the Range Extender is seeking a Master, the blue LED illuminates briefly, every 1 to 2 seconds. After the Range Extender has associated, the blue LED stops blinking.
4. On the Master unit, depress either **Associate** button (dimming or non-dimming).
5. The Master unit attempts association for a period of 30 seconds. If either **Associate** button is pressed during this 30-second period, a new 30-second period of association is initiated.

► **Note:** Each time a Range Extender becomes associated with the Master, the green LED located on the Master blinks.

Reconfiguration of Masters and Starters

While installation and configuration of the ZAURA system can be a relatively simple and straightforward process, it's possible that situations can arise in which further understanding is required. This section describes what to do when you must reconfigure a room or are not achieving the results you're seeking.

Changing the Master Type

Should it become necessary to change the operating mode of a Master Unit (Master to Range Extender, Range Extender to Master or moving a Master to a new location), it is first necessary to deassociate all bound Starters (in the case of a Master) or deassociate the Range Extender from its Master.

Changing a Master to Range Extender Mode

To change a Master's operating mode to Range Extender mode, observe the following steps.

1. Ensure that the wall switch has been in the ON position for at least 1 minute to allow synchronization of all starters and range extenders associated to the Master that you are reconfiguring. **Toggle All** mode can be used to verify synchronization.
2. Depress both **Associate** buttons on the Master for at least six seconds, or until the blue LED illuminates.
3. Wait until the blue LED turns off before proceeding to the next step.
4. Change the Master Type switch to the Range Extender position. All three LEDs will illuminate for several seconds to indicate that a mode switch is about to occur.
5. The unit now operates as an associated Range Extender and can be moved to another location to be associated with a Master. See the [Configuring ZAURA Range Extenders](#) section on page 33 for a procedure that associates the Range Extender to the Master.

Changing a Range Extender to Master Mode

1. See the [Deassociating a Range Extender](#) section on page 36 for a procedure that explains how to deassociate the Range Extender before proceeding to Step 2.
2. Change the Master Type switch to the Master position. All three LEDs will illuminate for several seconds to indicate a mode switch is about to occur.

3. The unit now operates as an unconfigured Master and can be moved to a new location. Follow the steps in the [Configuring ZAURA Masters](#) section on page 18 for instructions about completing the setup.

► **Note:** All starters that were previously associated to the Master are no longer associated and will no longer respond to the Master that was reconfigured.

Moving a Master to a New Location

1. Ensure that the wall switch has been in the ON position for at least three minutes to allow synchronization of all Starters and Range Extenders associated to the Master that you are reconfiguring. **Toggle All** mode can be used to verify synchronization.
2. Depress both **Associate** buttons on the Master for at least six seconds until the blue LED illuminates. Wait until the blue LED turns off before proceeding to the next step.
3. Change the Master Type switch to the Range Extender position. All three LEDs will illuminate for several seconds to indicate that a mode switch is about to occur. This step is necessary to erase the radio-sensing information that the Master configured in its previous location – information that might not be suitable in the new location. Additionally, the Master must erase the binding information it previously created. If this step is not performed, all Starters that were previously associated to the Master will no longer be associated and will no longer respond to the relocated Master.
4. The unit now operates as an unassociated Range Extender and can be moved to its new location.
5. Change the Master Type switch to the Master position. All three LEDs will illuminate for several seconds indicating a mode switch is about to occur. See the [Configuring ZAURA Masters](#) section on page 18 for a procedure to associate the Range Extender to the Master. After the mode switch completes, the Master performs radio sensing in its new location.

Deassociating a Starter

Should it become necessary to change the type or association of a Starter, the Starter can be recommissioned by first deassociating it from the Master, then associating it as required. To deassociate a Starter, two methods exist: the Luminary Method and the Configuration Tool Method.

Luminary Method

This method will deassociate all powered Starters and Range Extenders associated to the Master. It is important to power on all associated devices that are to be deassociated.

1. Turn off line power to the luminaries.
2. Place Starters in the luminaries.
3. Provide line power to the luminaries. Wait a minimum of three minutes for the starters to resynchronize to the Master. Using the special **Toggle All** mode on the Master (see the [Toggle All Lamps](#) section on page 19) can help determine when all of the starters are synchronized to the Master.
4. Apply power to all Range Extenders, if any.
5. Depress both **Associate** buttons on the Master simultaneously for at least six seconds until the blue LED illuminates.
6. Wait until the blue LED turns off before taking any other action with the system.

Configuration Tool Method

Using the Configuration Tool decommissions only one Starter at a time; however, it does not reduce the number of Starters counted by the Master.

1. Plug in the Configuration tool.
2. Check that the Configuration Tool power switch is in the OFF position.
3. Place the ZAURA Starter into the Configuration Tool.
4. Place the Configuration Tool power switch in the ON position.
5. Wait four seconds. If a Master is triggered to associate while the Starter is in the Configuration Tool, the Starter will associate to the Master.
6. Turn OFF the Configuration Tool power switch.

Deassociating a Range Extender

Should it become necessary to change the type or association of a Range Extender, the Range Extender can be recommissioned by first deassociating it, then reassociating it as required. Two methods exist to deassociate a Range Extender, the Master Method and the Range Extender Method.

Master Method

The Master method deassociates all powered Starters and Range Extenders associated to the Master. It is important to first provide power to all associated devices.

1. Ensure that all associated Range Extenders are powered on.
2. Depress both **Associate** buttons on the Master simultaneously for at least six seconds until the blue LED illuminates.
3. Wait until the blue LED turns off before taking any other action with the system.

Range Extender Method

The Range Extender method requires only one simple step to decommission the Range Extender; however, it does not reduce the number of Range Extenders counted by the Master.

- To decommission the Range Extender, depress both **Associate** buttons on the Range Extender for at least six seconds.

Frequently Asked Questions

Q. Will the Master unit operate properly if only one battery is installed?

A. Yes; however, battery life can be diminished relatively quickly, especially in Masters that are associated to Range Extenders. The batteries operate in parallel and the reason to use two batteries is merely to prolong the operating period before it becomes evident that a change of batteries is required.

Q. If the room light levels are high enough for the Virtual Dimming luminaries to be turned off and the **Toggle All Lamps** mode is started, what will happen?

A. The ZAURA standard luminaries will turn off and the ZAURA Virtual Dimming luminaries will turn on. If the mode button is pressed again, the luminaries will toggle back to the state they were in before the test was started. Also, if the Mode button is not pressed for approximately one minute, the system will reset to **Normal** operating mode.

Q. Upon initial installation of the battery into the Master unit, why does nothing seem to happen?

A. This occurrence is normal. The Master is busy going through many initial setup functions which include scanning the local radio traffic on or near the frequency band that is being used. If there is traffic on or near the frequency band being used, the Master unit will adjust the radio frequency slightly to avoid possible interference. This adjustment period will last for approximately 45 seconds and the blue LED should be blinking while this automatic radio sensing process is being performed. This occurrence will only take place the first time the Master Unit is powered.

Q. Will the unit still operate if the Master is removed from the base plate mounted on the ceiling?

A. Yes, although the motion and light-sensing functions can be changed depending on the location and orientation of the Master unit in the room.

Q. Are ZAURA Starters and ZAURA Virtual Dimming Starters identical?

A. Yes – except for how they operate after the association process.

Q. Can I install ZAURA in multiple rooms at one time?

A. Zilog highly recommends installing ZAURA systems one room at a time to avoid possible communication issues during the association process.

Q. What is the best way to track which of my luminaries are dimmers and which are non-dimmers?

A. It is conceivable that any given starter could be configured as a dimmer or a non-dimmer multiple times over its lifetime. Something as simple as a dot from a permanent marking pen on the end of a Starter could indicate a dimming starter. Labels, however, could pose a problem, because starters have a tendency to get warm and the labels could peel off or, if made of improper material, become a fire hazard.

Q. Does a reset deassociate to only one Master, or to all masters?

A. The Deassociating procedure depends on the method used. If the Luminary method is used, all starters that are powered up and previously associated with the Master (when both buttons are pressed) will be deassociated.

If the Configuration Tool Method is used, only the starter in the Configuration tool will be deassociated (when the tool is powered up).

When Deassociating a Range Extender and using the Master method, all starters and range extenders that are powered up will be deassociated when the two buttons are pressed & held.

Technical Specifications

Table 1 lists a number of operating specifications for both the ZAURA Master and ZAURA Starter.

Table 1. Technical Specifications for the ZAURA Master & Starter

ZAURA Master/Range Extender		ZAURA Starter	
Environmental Conditions		Environmental Conditions	
Storage Conditions		Storage Conditions	
Temperature	-20°C to +55°C	Temperature	-15°C to +85°C
Relative Humidity	5%–90%; no condensation	Relative Humidity	5%–95%; no condensation
Operating Conditions		Operating Conditions	
Temperature	+5°C to +55°C	Temperature	+5°C to +85°C
Relative Humidity	5%–90%; no condensation	Relative Humidity	5%–90%; no condensation
Power		Mains Connection	
Battery	Lithium, 3V Type CR123	Voltage	220V–240V _{RMS} , 50Hz
Battery life			
Without Range Extenders	>3 years (1 battery)		
With Range Extenders	>3 years (2 batteries)		
As Range Extender	>3 years (1 battery)		
Current Consumption		Power Consumption	0.1 W typical
Stand-by	~15µA		
Transmission	~26mA		
RF		RF	
Frequency	865.6MHz to 867.4MHz	Frequency	865.6MHz to 867.4MHz
Modulation Type	FSK	Modulation Type	FSK
Radiated Power	~0.01 W	Radiated Power	~0.01 W
Range in Open Space	30m	Range in Open Space	30m
Receiver Class	3	Receiver Class	3
Duty Cycle	0.72 s/3600 s = 0.02%		

Table 1. Technical Specifications for the ZAURA Master & Starter (Continued)

ZAURA Master/Range Extender		ZAURA Starter	
LED Indicators			
Red	Failure		
Green	Success		
Blue	Wait/Alarm		
System Parameters		System Parameters	
# of Starters Controlled	128 max	Lamps Supported	1
# Range Extenders	7 max	Lamp Type	Tube
Switch Off Delay	2, 5, 10, 15, 20 min	Lamp Wattage	51W–58W
Light Level	0–2000 Lux natural light		
Detection Range	5m radius (3.5m installation height)		
Compliance		Compliance	
Safety	EN 60950	Class	
Classification	Class III	Safety	EN 61347-2-1
Pollution	Degree II	Performance	EN 60927
Flammability	UL94-HB	Housing/connection related	EN 60155
EMC		EMC	
Radio	EN 300 220-1	Radio	EN 300 200-1
EMC (radio)	EN 301 489-3/1	EMC (radio)	EN 301 489-3/1
RF & EMC	R&TTE	RF & EMC	R&TTE
		EMC (harmonic current emissions)	61000-3-2
		EMC (limitation of voltage changes)	61000-3-3
Weight		Weight	
	150 g (1 Batteries)		9 g
	164 g (2 Batteries)		

Table 2 lists the technical specifications for the ZAURA Configuration Tool.

Table 2. ZAURA Configuration Tool Technical Specifications

Environmental Conditions	
Storage Conditions	
Temperature	–20°C to +85°C
Relative Humidity	5%–90%; no condensation
Operating Conditions	
Temperature	+5°C to +55°C
Relative Humidity	5%–90%; no condensation
Main Connection	
Voltage 220V–240V _{RMS}	50Hz
Power Consumption w/ Starter inserted	3.5W typical
Compliance	
Safety	EN60950
Classification	Class II
Pollution	Degree II
Flammability	UL94-V1
EMC	
RF & EMC	R&TTE
EMC (Emission)	55015
EMC (Immunity)	61547
EMC (harmonic current emissions)	61000-3-2
EMC (limitation of voltage changes)	61000-3-3
Weight	440g

Ordering Information

Each ZAURA RF Wireless Lighting Control kit contains the elements listed in Table 3. To order the ZAURA Lighting Control System, simply provide the part numbers listed in the table. Visit our [Zilog Sales page](#), where an interactive map will guide you to your regional Zilog sales office.

Table 3. Packaging Data

Part Number	Type	Box Dimensions	Qty	Material
ZAURSTG1A1A	Starter Box	105mm x 100mm x 51mm	16	cardboard
	Starter Outer Box	260mm x 213mm x 61mm	64 (4 ea. starter boxes)	cardboard
ZAURMAG1A1A	Master Box	132mm x 132mm x 54mm	1	cardboard
ZAURCTG1A00	Configuration Tool	222mm x 135mm x 81mm	1	cardboard

Appendix A. Room Configuration Examples

Figures 24 through 31 offer possible room configurations that include starters, masters, extenders and luminaries; Figure 24 provides a key to the symbols used in the figures that follow.







ZAURA Master	 Master
ZAURA Range Extender	 Range Extender
Luminary with ZAURA Starter	
Luminary with ZAURA Virtual Dimming Starter	
Luminary with Original Starter	
Door	

Figure 24. Symbol Key

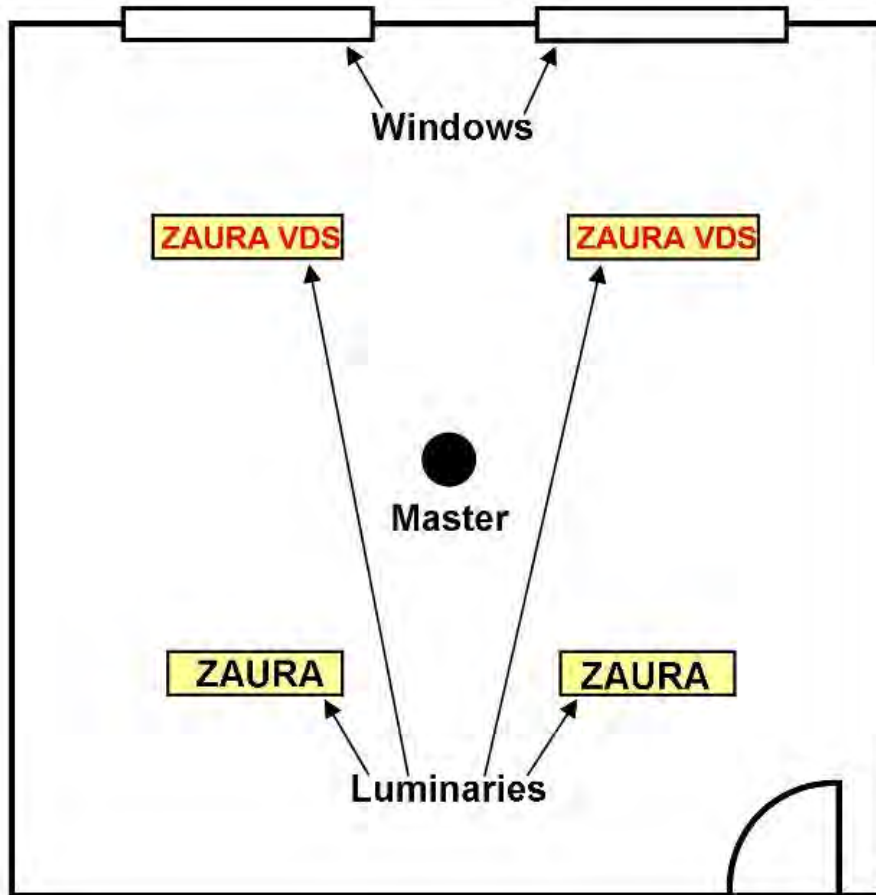


Figure 25. Configuration 1

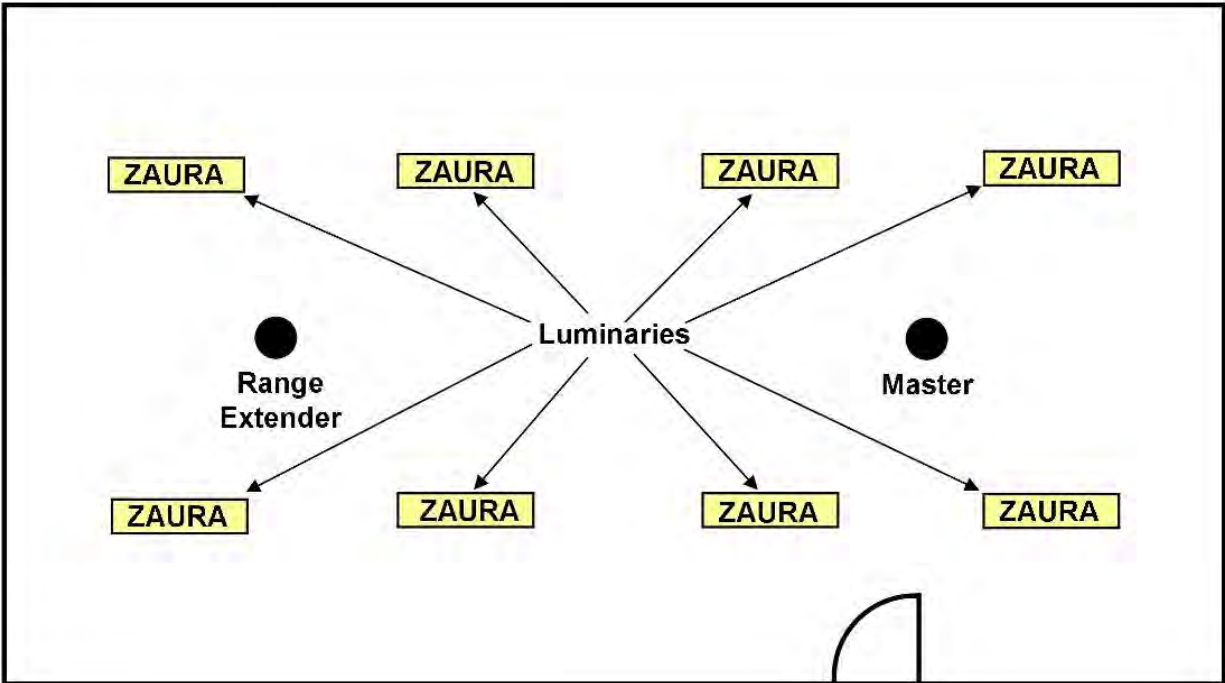


Figure 26. Configuration 2

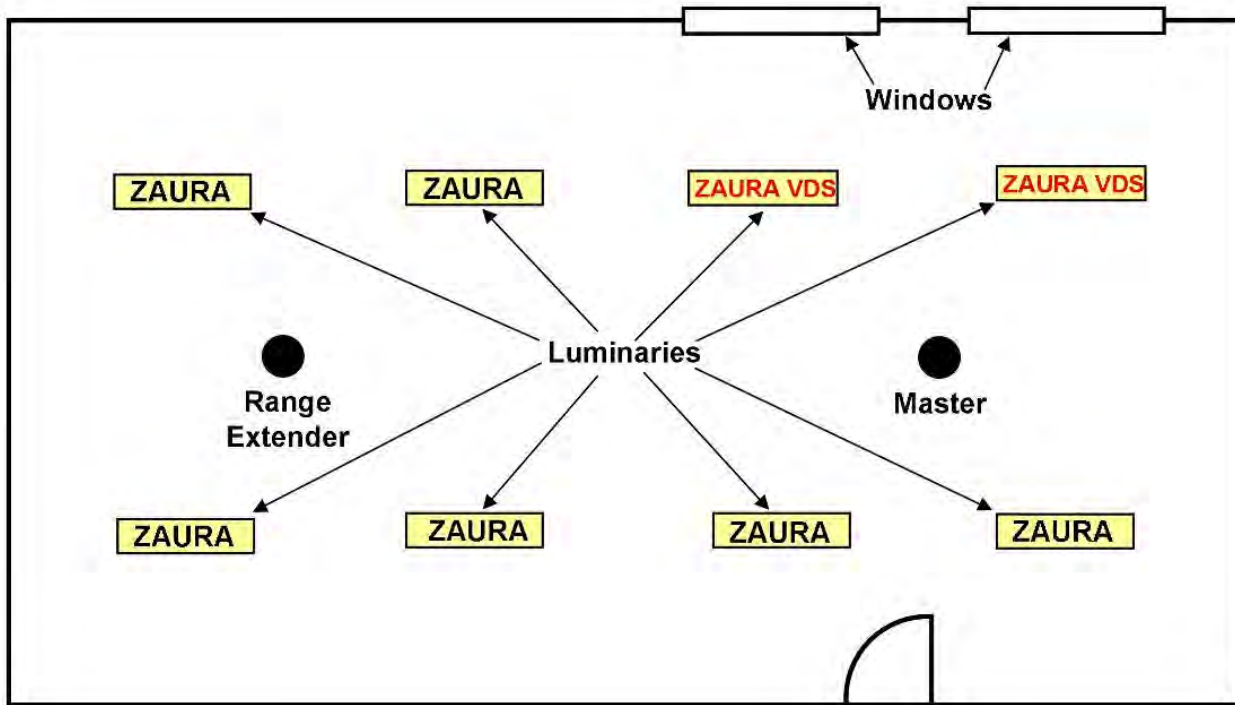


Figure 27. Configuration 3

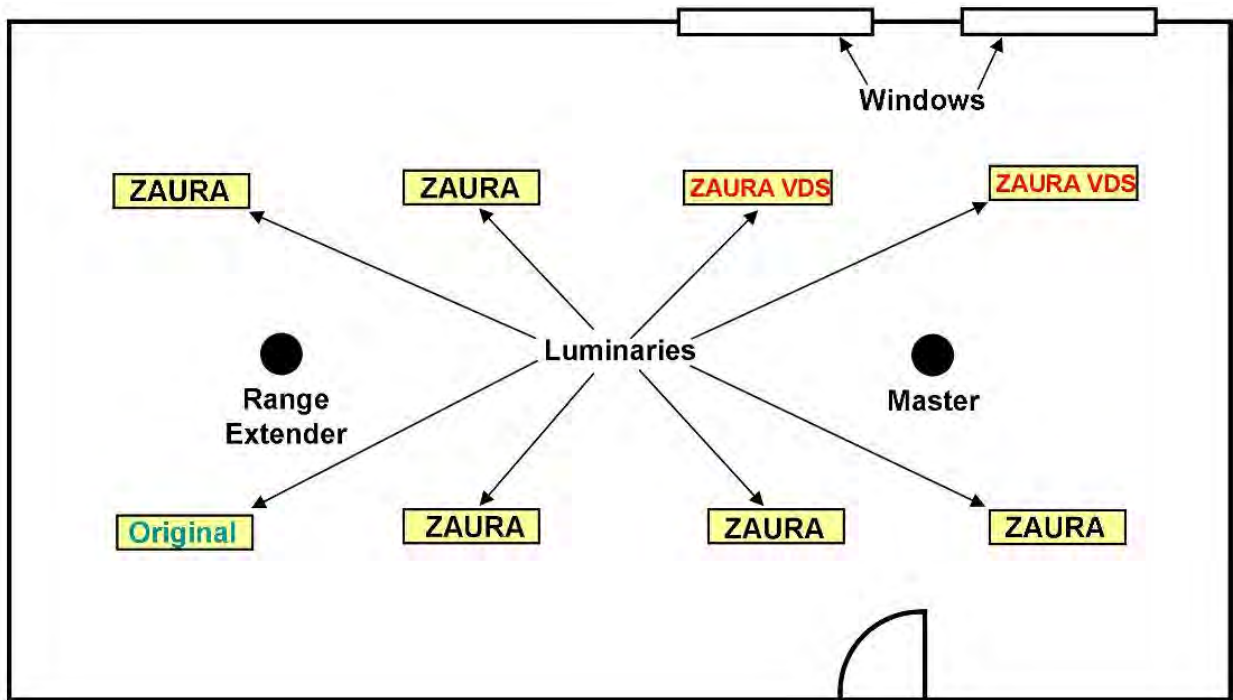


Figure 28. Configuration 4

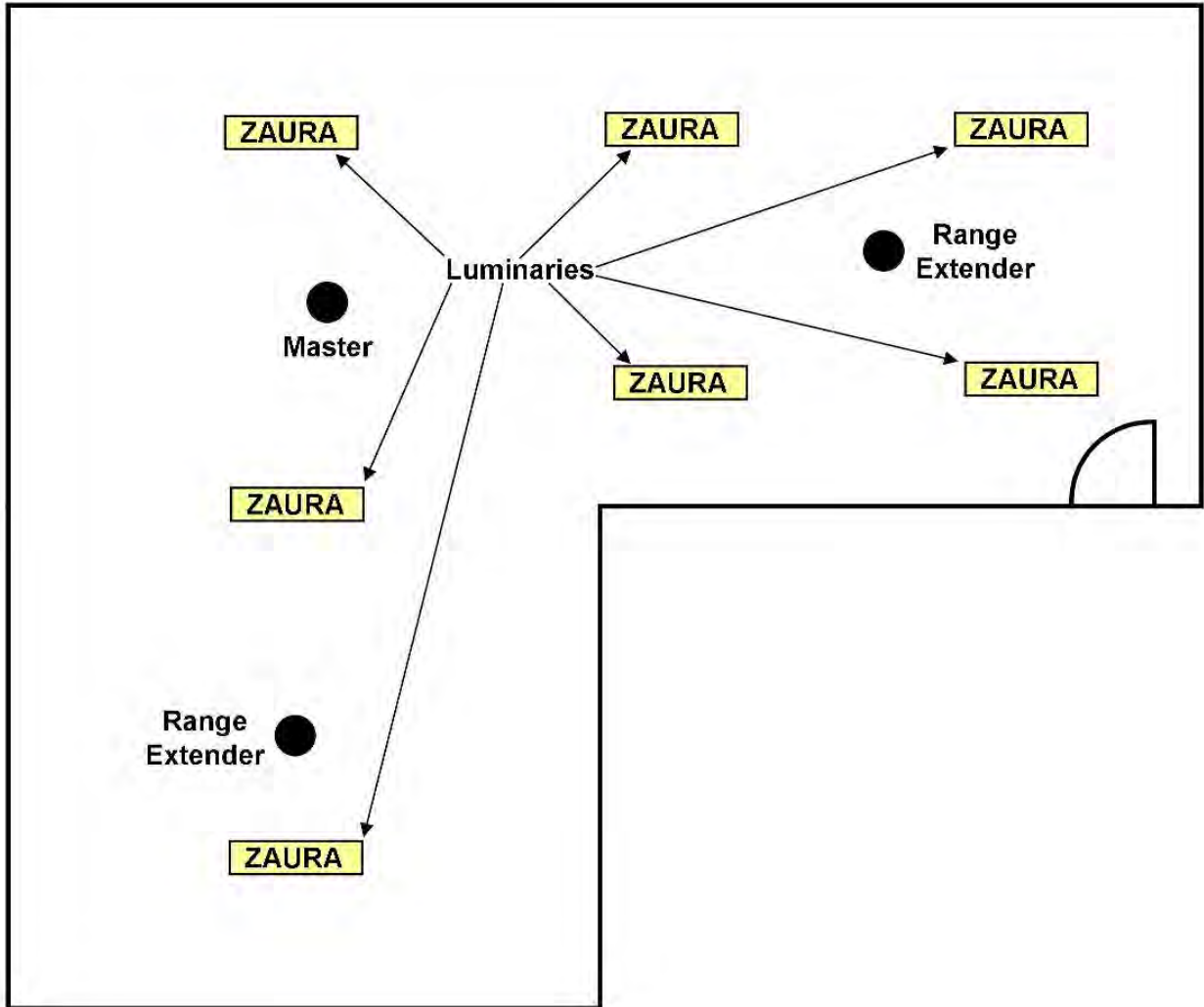


Figure 29. Configuration 5

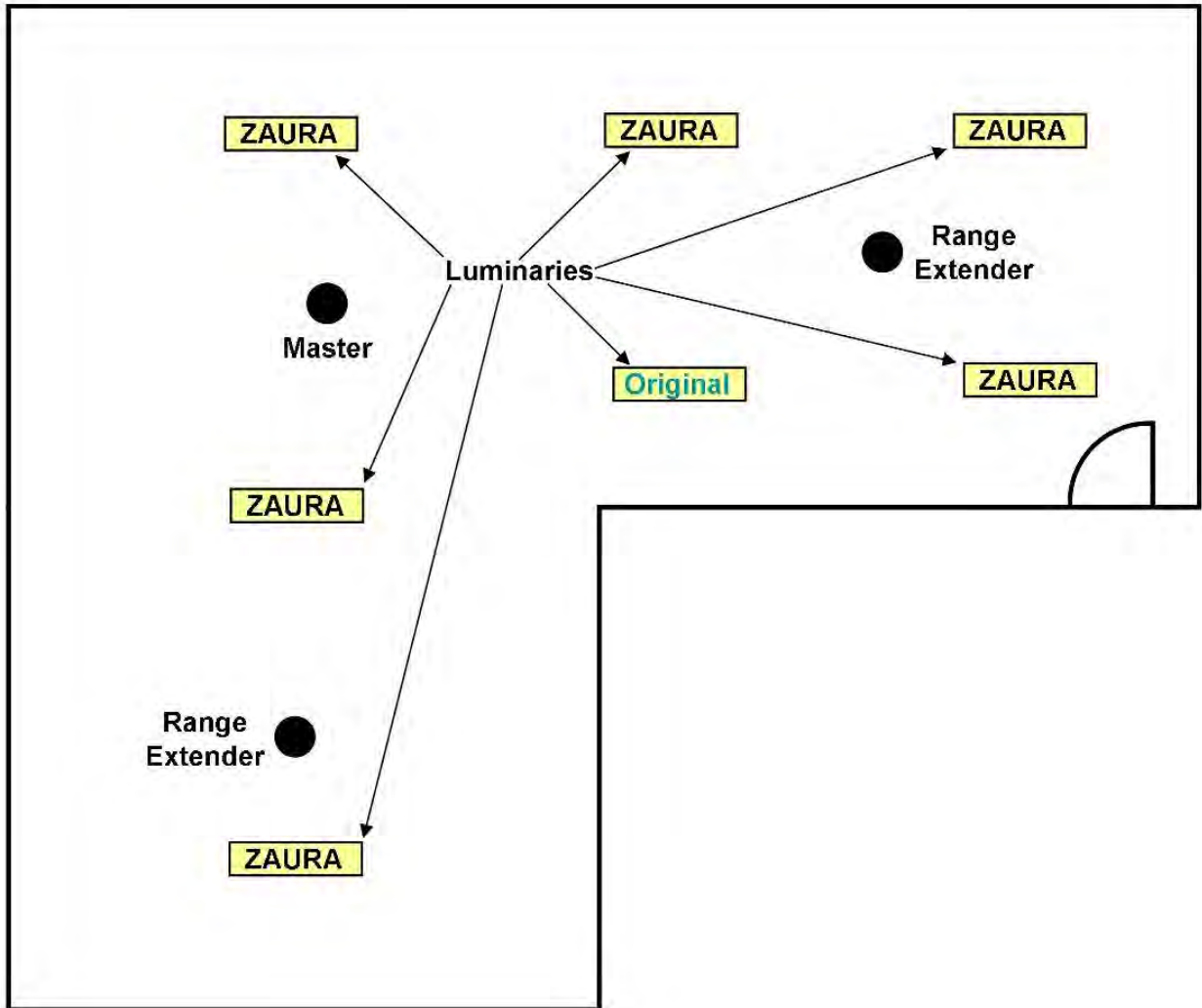


Figure 30. Configuration 6

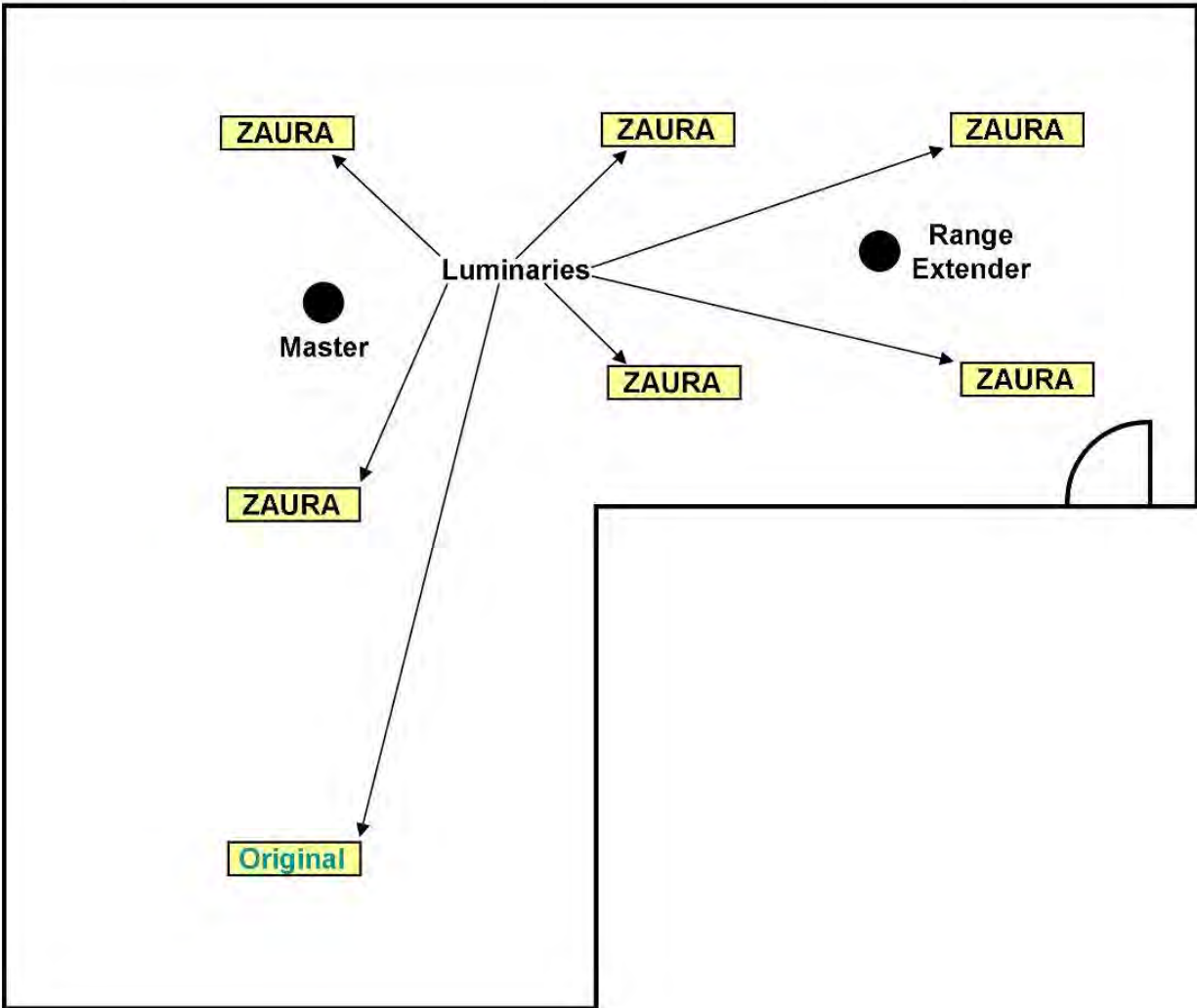


Figure 31. Configuration 7

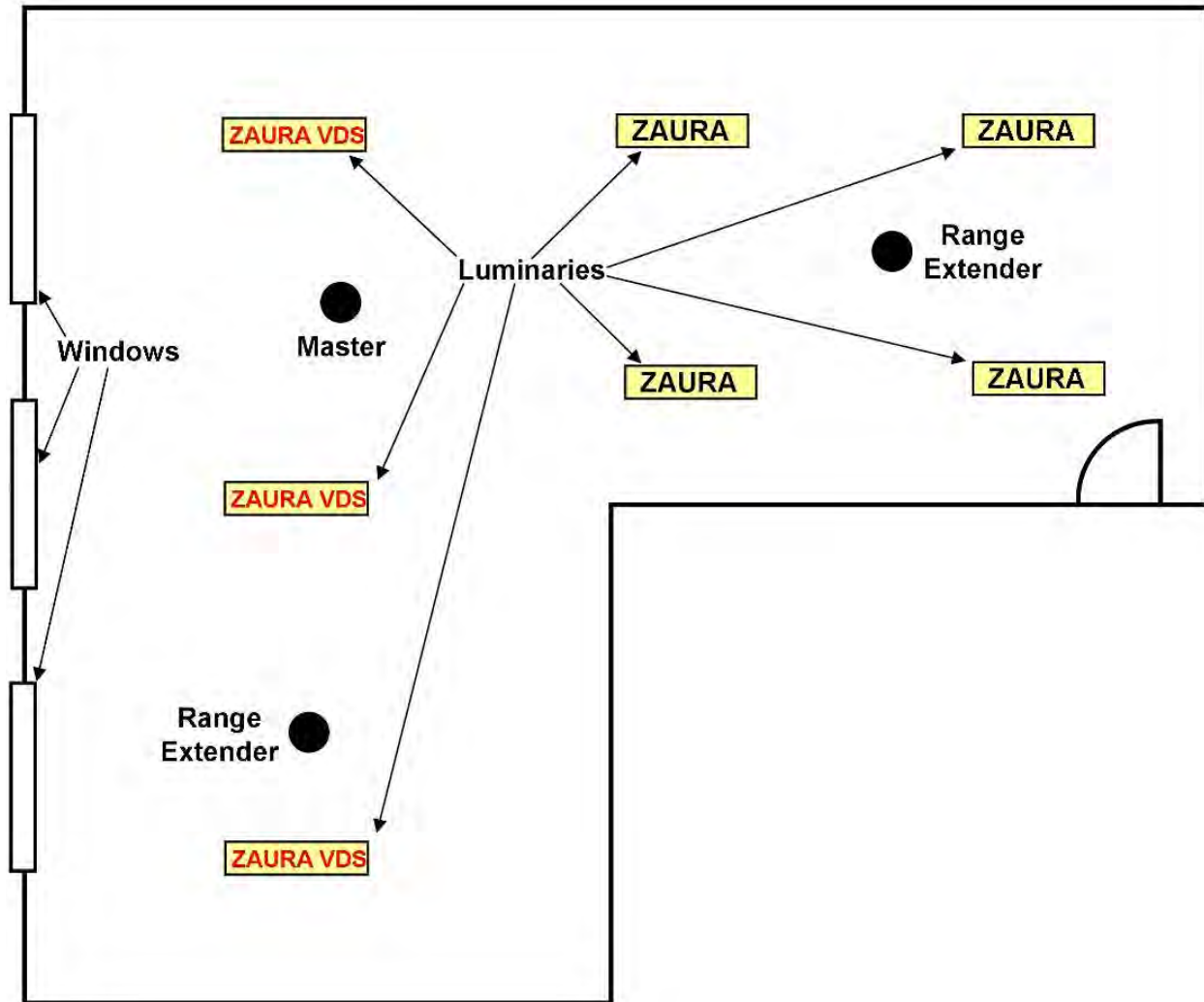


Figure 32. Configuration 8

Customer Support

To share comments, get your technical questions answered, or report issues you may be experiencing with our products, please visit Zilog's Technical Support page at <http://support.zilog.com>.

To learn more about this product, find additional documentation, or to discover other facets about Zilog product offerings, please visit the Zilog Knowledge Base at <http://zilog.com/kb> or consider participating in the Zilog Forum at <http://zilog.com/forum>.

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