echoflex
an ETC Company

Tunable White Dimming Controller
Models: ELED2 and ELED2H

Configuration Guide

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Blink Indications

Introduction

The Tunable White Dimming Controller is a wireless lighting controller designed for spaces/areas where intensity and correlated color temperature (CCT) control are required. The ELED2 controller creates a range of desired lighting effects based on occupancy state, manual switch action, ambient light levels, and timeclock or gateway commands for a single LED fixture or entire zone.

The ELED2(H) is available in two voltages: 120–277 V and 240–347 V. Its integral relay and two robust 0–10 V outputs allow the ELED2(H) to control dimmable light and tunable color temperature levels. Outputs are for connecting zones or fixtures to provide the intensity and CCT control. Output 1 is identified by the violet/red stripe wire, and output 2 is identified by the violet/green stripe wire.

ELED2H-AU model shown

Three linking channels are for assigning remote devices to affect the controller's operation. The first linking channel is for devices affecting intensity, and the second channel is for devices affecting the CCT. The third channel is for assigning Open Loop CCT set points. The channels are identified by different LED colors that display when the controller is in link mode, see *Blink Indications on page 19*.

For scenarios where only occupancy sensors are linked to the controller, built-in control begins by automating lights ON and OFF using occupancy detection. Daylighting control of the fixture intensity can be quickly set up in either an open or closed loop scenario. The factory defaults defined for the ELED2(H) are energy code compliant, including occupancy Partial-ON and Partial-OFF requirements.

Echoflex ELED products include preset functionality that allows spaces to be lit with lighting scenes. Presets can be activated from scene stations, wireless timeclocks, or gateways and include values for intensity and color temperature. The lockout feature allows timeclocks to schedule a controller's response to specific sensors or stations.
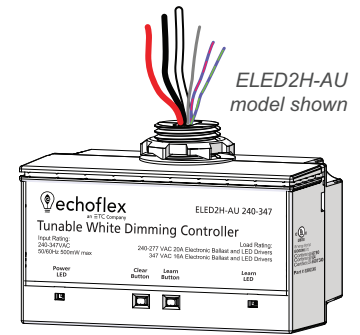
> **Note:** *For lighting controls specific to horticultural applications, Echoflex also has a Bicolor Luminaire Controller, model ELED2-BCL. This controller uses the same method to modulate light intensity and blend warm and cool LEDs to provide desired CCT output. Learn more about the ELED2-BCL at rayngrowingsystems.com.*

> **Note:** *Echoflex recommends using Garibaldi Pro software to manage wireless projects and configurable settings. Garibaldi Pro is available for download at echoflexsolutions.com.*

Document Conventions

Echoflex's user documentation is designed for print or electronic use. Cross-references highlighted in this document are links to the referenced section of the guide.

This document uses the following conventions to draw your attention to important information.

Configuration parameters are emphasized in *italics*. Switch actions (ON/OFF) and dimmer events (lights ON/OFF) are emphasized in ALL CAPS. Buttons are emphasized in **[Bold Bracket]**.

All Echoflex documents are available for free download from our website: echoflexsolutions.com.

Please email comments about this manual to: TechComm@etcconnect.com.

Help from Technical Services

If you are having difficulties that are not addressed by this document, contact Echoflex support at service@echoflexsolutions.com or the main website at echoflexsolutions.com. If none of these resources are sufficient, contact Technical Services directly at the office identified below.

When calling for help, take these steps first:

- Prepare a detailed description of the problem
- Go near the equipment for troubleshooting
- Find your notification number if you have called in previously

Technical Services

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service@echoflexsolutions.com

Control Features

Dim-to-Warm

Dim-to-Warm operates if at least one switch station is linked to the intensity channel and nothing is linked to the color temperature channel. Color temperature moves according to the change in light intensity. An increase in intensity also moves color temperature to cooler. A decrease in intensity moves color temperature to warmer. Dim-to-warm mode operates with occupancy sensors, daylight sensors, regular switches, and gateways linked to the intensity channel.

Explicit Color Control

With a switch station linked to the color temperature channel, Explicit Color Control provides manual control over a fixture's color temperature. By pressing the paddle on the station, you can set a color level and modulate output as required. Press and hold ON increases color temperature to cooler; Press and hold OFF decreases color temperature to warmer. A quick tap on the button bumps color temperature up or down incrementally. A gateway command can also be linked to the color temperature channel allowing other devices to control the fixture's color temperature.

Automated Color Tuning

Automated Color Tuning requires a color temperature sensor like the Echoflex TAP-41 photo sensor linked to the color temperature channel. The ELED2(H) compares its CCT set point to the value from the space provided by the sensor and increases the fixture's color temperature to the set point.

Example: *The CCT set point is 3500 K and the sensor reports a value of 3200 K. The controller will adjust the CCT output driving the fixture's output towards the desired set point.*

Automated Color Tuning can also use a dynamic CCT set point input linked to a gateway command or outdoor color temperature sensor like the Echoflex FLS-41 sensor to set the desired color temperature within the space and track outdoor color temperature values.

Characterized Color Tuning

Characterized Color Tuning modulates the color temperature channel based on the set point value. As in the Automated Tuning Operation, a gateway command or outdoor color temperature sensor can be linked to the CCT set point channel and the output will adjust to this value based on the fixture's defined specifications. This operation does require the fixture's characterized specifications for the 0–10 V channel be defined with the controller's configuration.

Example: *A fixture is used that maps a range of 3200–6000 K across the 1–10 V range. These values are pre-commissioned with the ELED2-BU or ELED2H-AU at the factory. The color tunable output modulates based on the value provided by a linked FLS-41 sensor on the set point value.*

Configuration Options

The ELED2(H) is a complete stand-alone lighting controller, requiring only remote linked devices to provide input on light level, color temperature, occupancy state and switch operation. In addition to the tunable white color operations, the controller will perform the following common lighting control applications:

- 0–10 V dimming of LED fixtures
- Vacancy Sensor Mode: partial OFF or fully OFF
- Occupancy Sensor Mode: partial ON or fully ON
- Wall Switch Station: ON/OFF, manual adjustment of dim level and timed switch
- Daylight Harvesting: open loop or closed loop
- Demand Response: sets a temporary hard limit to the maximum dimming output
- Scheduling via interfaces, timeclocks, or gateways
- Building Systems support with gateway commands

This document describes the controller's features and explains how to use and configure them with Simple Tap. Some features can only be configured using Garibaldi Pro software.

> **Note:** *For information about Garibaldi Pro software or pre-commissioning services that provide complete system solutions, contact Echoflex. Garibaldi Pro software is available for download from the Echoflex website at* *echoflexsolutions.com*.

Simple Tap Instructions

Simple Tap is a manual method of changing individual settings one at a time. There are no tools required—simply use your finger to activate a sensor, standard switch, or station that is linked to the controller. The tap in Simple Tap means a quick press on a sensor's [Teach] button or a switch or station's ON/OFF.

If the sensor is linked to multiple controllers and you do not want to make changes to all, turn off the controllers' lights/loads to ignore the Simple Tap changes.

Radio Communications

The ELED2(H) controller is equipped with a 902 MHz radio capable of transmitting and receiving wireless messages. The controller supports single-hop and dual-hop message repeating and controller status broadcast.

Repeater Function

The repeater function repeats received messages if:

- The message has not been repeated previously
- In the case of dual-hop repeating, the messages have been repeated previously only once

If single-hop or dual-hop repeating is needed, the repeater function can be enabled/disabled using Simple Tap instructions.

1. Press and hold the [Clear] button on the controller.
2. Tap the [Learn] button:
   - Once to **disable** repeating
   - Twice to **enable** single-hop repeating
   - Three times to **enable** dual-hop repeating
3. Release the [Clear] button. The Power and Learn LEDs blink the corresponding number of [Learn] button presses.

Status Message

The controller can broadcast a message per EEP: A5-11-01 Status Feedback Message. A message broadcasts every 100 seconds. The status message can be enabled/disabled using Simple Tap instructions.

1. Press and hold the **[Learn]** button on the controller.
2. Tap the **[Clear]** button once to **disable**, or twice to **enable**.
3. Release the **[Learn]** button. The Power and Learn LEDs blink the corresponding number of **[Clear]** button presses.

Radio Range Confirmation

Echoflex sensors that are equipped with patented Range Confirmation technology work with ELED2(H) controllers to facilitate optimal sensor placement. The Range Confirmation test is invoked at the sensor. It must be linked to the controller and during the test, any repeaters in the controller's vicinity must be disabled. The controller receives a unique message from the sensor, evaluates the signal strength and sends back a unique message containing the strongest signal value received. The sensor displays this value using color LEDs.

See the related device documentation to verify support for radio Range Confirmation testing and for test details.

Dimming Intensity

The controller's dimming output provides linear, proportional dimming control of a dimming driver or ballast.

- *Output maximum level* - the high level trim of the dimming output, set to 100% by default
- *Output minimum level* - the low level trim of the dimming output, set to 10% by default

Garibaldi Pro software is required to configure the maximum and minimum levels and to disable dimming output for immediate control.

Tunable White Control

The controller provides linear, proportional control of a fixture's tunable white output. The maximum and minimum CCT level of the fixture can be saved in the controller's configuration settings. The maximum and minimum levels of the output can be configured using Garibaldi Pro software.

Near-Cross Technology

The controller monitors the AC voltage waveform to prevent carbon build-up on contacts and ensure long relay life. The relay will open or close only when the waveform is close to zero.

Switch Operation

The controller operates with single, dual-paddle wall, wave, and hand-held Echoflex switches as well as button station transmitters including the Multi-Button Interface Switch Station (MBI). Garibaldi Pro software is required to configure all fade control settings.

- Press **[ON]** to fade the lights to the last manually set dimming level.
- Double-press **[ON]** to quickly fade the lights to the *output maximum level*.
- Press **[OFF]** to fade the lights to the *output minimum level* and then turn lights off.
- Double-press **[OFF]** to quickly fade and turn the lights off.

Echoflex switches can also be used as dimmers when *dimming output* is enabled.

- Press and hold **[ON]** to fade to the maximum dimming level.
- Press and hold **[OFF]** to fade to the minimum dimming level.

If a photo sensor is linked to the dimming channel it will have control priority over manually dimming the output towards the maximum output value.

Multi-Scene Station Buttons

The layout of buttons for the Multi-Scene Station (MSS) differs according to the MSS model. Buttons have the following effects when they are included in a model's layout and supported by the controller.

- **[On]** – turns lights on and fades to the last manually set dimming level.
- **[Off]** – fades lights to the minimum dimming level and then turns them off.
- **[Cool Light]** – adjusts light temperature to cooler level.
- **[Warm Light]** – adjusts light temperature to warmer level.
- **[Up Arrow]** – fades lights to maximum dimming level.
- **[Down Arrow]** – fades lights to minimum dimming level. Does not turn the lights off, even if the minimum dimming level is 0%.
- **[Scene X]** – recalls a configured scene setting.

Color Tuning Functions

If no switch station or color temperature sensor is linked to the color temperature channel, the dimming switch will also modulate the fixture's tunable white output. See *Dim-to-Warm on page 1*.

Linking a switch to the color temperature channel will provide manual control over the fixture's tunable white output. Pressing ON or OFF will fade the tunable white temperature up or down. A quick press will bump the output value a small amount. See *Explicit Color Control on page 1*. When the tunable white output has been manually adjusted using a linked switch, this value will be recalled upon a ON event.

Timed Switches

The controller can be configured to make any linked wall switch station into a timed switch. Switching the lights ON starts the countdown timer for the configured period. One minute before the timer expires and the lights turn off, the lights blink once as a warning (flickwarn). Switching the lights ON at anytime resets the timer. Switching the lights OFF clears the timer. Garibaldi Pro software is required to configure the period for a timed switch. Each channel can be configured with it's own timer period.

Occupancy-Based Lighting Applications

When occupancy sensors that are linked to the controller do not detect motion, they send a vacancy message to the controller. After the *occupancy Auto-OFF timer* expires, the controller turns the lights OFF or fades to a preset level. For information about coordinated control of a space, see *Open-Plan Shared Occupancy on page 9*.

Occupancy Sensor Auto-OFF Timer

The *occupancy Auto-OFF timer* is set to 15 minutes by default. The value can be changed using Simple Tap. Dual Tech sensors also have a built-in independent *occupancy timer Auto-OFF*. To use the occupancy timer on the sensor, not the controller, set the controller's occupancy timer to zero seconds.

> **Note:** *When Dual Technology sensors are linked, audio detection will maintain the occupied state and reset the enabled occupancy timer. If the timers have expired, audio will not trigger occupancy.*

To set the controller's *occupancy Auto-OFF timer* value:

1. Turn the light ON.
2. Tap the **[Teach]** button on the sensor three times to edit the timer period, or to set it to zero seconds. The light ramps up to full ON and then dims to OFF to acknowledge the input.

Taps	Occupancy Sensor Timer	Light Response
3 taps	0 seconds	1 blink

3. Continue to step 4 below to set minutes for the timer.
4. Tap the **[Teach]** button the number of times indicated in the table below to set the timer period. The light responds a number of times to confirm the change and then returns to normal operation.

Additional Taps	Occupancy Sensor Timer	Light Response
1 tap	5 minutes	2 blinks
2 taps	10 minutes	3 blinks
3 taps	15 minutes	4 blinks
4 taps	20 minutes	5 blinks
5 taps	25 minutes	6 blinks

Save State

The controller saves its current operating state every ten minutes so when power is cycled, it returns to the last saved values. The *save state* function can be overridden with a value used to recall a particular dimming output value after a power cycle (BU and AU models only). Garibaldi Pro software is required to configure overrides.

Grace Timer

The occupancy sensor *grace timer* is a short period of time during which the controller returns the lights to the previous if triggered by motion, or audio in the case of Dual Tech sensors. The *grace timer* starts counting down after the *occupancy Auto-OFF timer* has expired, providing a time period for an undetected occupant to signal that the space is occupied. Garibaldi Pro software is required to configure the *grace timer*. The default is 30 seconds.

Dual Technology Occupancy Sensors

Dual Tech sensors have built-in occupancy timers that manage the transition from occupied to vacant state. To allow the Dual Tech sensor to control the vacancy action, the controller's *occupancy sensor Auto-OFF timer* parameter should be set to zero (0) seconds. See *Occupancy Sensor Auto-OFF Timer on the previous page*.

Occupancy Sensors and Partial-ON

If only occupancy sensors are linked to the controller, the sensors automate the lights both ON and OFF. The dimming output for ON adjusts to the *occupancy Partial-ON value*. The default value is 100%. It can be changed using Simple Tap.

To set the *Partial-ON value* and enable/disable *automatic Partial-ON*:

1. Use a linked switch or station to set the light ON and dim to the target Partial-ON value.
2. Press the **[Teach]** button on the sensor, and then use a linked switch or station to do one of the following:
   - Press ON four times to **enable** Partial-ON.
   - Press ON three times followed by one OFF to **disable** Partial-ON.

Occupancy Sensors and Partial-OFF

If the application requires the lights to remain ON during vacant periods but at a dimmed level, set the *vacancy Partial-OFF value* using Simple Tap. The default value is 20%.

To set the *Partial-OFF value* and enable/disable *automatic Partial-OFF*:

1. Use a linked switch or station to set the light ON and dim to the target Partial-OFF value.
2. Press the **[Teach]** button on the sensor, and then use a linked switch or station to do one of the following:
   - Press OFF three times followed by one ON to **enable** Partial-OFF.
   - Press OFF four times to **disable** Partial-OFF.

Occupancy Sensors with Switches

If switches and sensors are linked to the controller, Vacancy Sensor Mode (Manual-ON, Auto-OFF) is active. The controller can be configured to turn the lights ON immediately when a sensor detects motion (Partial-ON). When a switch is pressed ON or OFF, the occupancy sensor's Auto-OFF timer resets the state to occupied, which allows the lights to stay OFF when they are switched OFF (for example, a slide show presentation). See *Occupancy Sensors and Partial-ON above*.

Open-Plan Shared Occupancy

The open-plan shared occupancy feature provides energy saving control over large open spaces that have been segmented into zones to comply with local energy code requirements. It allows connected lighting controllers to share the occupancy state of the zone they control. Only after all the controllers in the space report a vacant state are the lights turned off at the same time.

All Echoflex controllers support open-plan shared occupancy functionality to comply with current energy savings codes.

There is no limit to the number of controllers that are connected to a shared occupancy, but each controller must be within radio range of at least one other controller to be able to send and respond to occupancy state messages.

A shared occupancy timer starts when a controller transitions from an occupied to a vacant state. Controllers with the same shared occupancy ID that remain occupied will reset the shared occupancy timer of any controller reporting vacancy within the ID group. The vacant controllers will remain at the Partial-OFF value until all controllers in the group report vacancy.

> **Example:** *When one controller reports a vacant state, the lighting transitions to Partial-OFF and stays at that value until all the controllers are also vacant. After the shared occupancy timer expires, the lighting for the whole space will turn off at the same time. The shared occupancy timer default is 60 seconds.*

Create a Shared Occupancy Space

A shared occupancy space is easy to create before the controllers are installed, during pre-commissioning, or manually on-site if you have access to one of the controllers and the ability to activate Link mode on each of the other zone controllers in the space.

Controllers in a shared occupancy space have the same shared occupancy ID. Pressing a button sequence on one controller generates and sends a unique shared occupancy ID message that controllers in Link mode record to join and recognize the shared occupancy feature.

Connect Controllers

You can select any controller to send a shared occupancy ID and connect other controllers. If the selected controller does not have a shared occupancy ID (default), it will generate one to send. If the controller has a shared occupancy ID, it will send the shared occupancy ID it has recorded.

> **Note:** *To reset a controller's shared occupancy ID to the default, zero (0), you can delete the shared occupancy ID field in Garibaldi Pro. To restore the default manually, you must reset the controller. See Clear Button on page 18.*

1. Identify one controller to send the shared occupancy ID.
2. Activate Link mode on the controllers you want to connect, using Garibaldi Pro or manually press each of the **[Learn]** buttons. Link mode times out after 60 seconds of inactivity.
3. Press and hold the **[Clear]** button and then press the **[Learn]** button four times on the sending controller. The controller sends a shared occupancy ID for controllers in Link mode to receive and record.

   Alternatively, if the project is set up in Garibaldi Pro, you can copy the sending controller's shared occupancy ID field to each of the controllers in the space.
4. Ensure an occupancy sensor is linked to each zone controller.

Configure Controller Settings

1. Set the *vacancy Partial-OFF value*, if other than the default 20% is required.
2. Set the *shared occupancy timer*, if other than the default 60 seconds is required.
3. Set the *vacancy Fade-OFF rate*, if other than the default two seconds is required.

Night Light Level

Night light level is a control feature that maintains a minimum dimming level to conform to city ordinances, if required.

When enabled, the ELED2(H) can provide the normal range of lighting control and also maintain a minimum night lighting level that does not turn off. The feature ensures that the selected minimum dimming level cannot be turned off by any linked device, gateway, or structured command (MSC).

A night light level has useful applications in commercial office spaces, either open concept or enclosed offices. Typically, these spaces have controlled zones that include emergency lights (single fixtures that behave normally except during a power loss or emergency) and night lights (single fixtures that behave normally but never go off completely).

Garibaldi Pro software is required to set a value for the night light level. The default is disabled or zero (0).

Behavior Relative to Minimum Dimming Level

When the night light value is lower than the minimum dimming output level:

- A switch or station will fade the output only to the minimum dimming level.
- An OFF event will drive the output to the night light level.

If the night light value is higher than the minimum dimming output level:

- A switch or station will fade the output to the night light level.
- An OFF event will also drive the output to the night light level—the output never goes to the minimum dimming output level.

Hospitality Applications

Hospitality is a specific kind of occupancy-based control. When the controller is used in a hotel or dormitory setting, it is typically linked to a keycard switch station or to both an entry door sensor and an occupancy sensor.

Example: *When an occupant enters a room and inserts a keycard into the keycard switch station an occupancy message is sent to its linked controllers to power the room. Lights can be turned ON to a level (occupancy Partial-ON), creating a welcoming environment.*

For hospitality applications that do not use keycards for room access, an entry door sensor and occupancy sensor combination can be linked to the controller to confirm occupancy and therefore proper control. The occupancy sensor is used to monitor occupancy, not to turn lights OFF. Each time the door is opened and closed and the sensor detects motion, the room locks into an occupied state. If the door opens and closes, but no motion is detected before the *occupancy Auto-OFF timer* expires, the room resumes an unoccupied (vacancy) state. If an occupancy message is sent when the room is in an unoccupied state, the room will lock into an occupied state until the entry door opens and releases the lock on the state.

Note: *If using the manual method to link a Magnetic Contact Sensor (MC-31) as a entry door sensor, link the sensor to the controller with the magnet placed next to the sensor (closed door position). If the magnet is not beside the sensor (open position), the MC-31 is linked as a window sensor.*

Garibaldi Pro software is required to configure all fade control settings.

Daylight Harvesting Applications

When a photo sensor is linked to the dimming channel, the controller modulates light intensity from a dimming fixture based on the ambient light level in a space. When daylighting is active, a switch, gateway command, or occupancy sensor cannot force the light level higher. However, they can be used to override the light OFF or to dim to a level below the daylighting control value.

> **Note:** *The controller supports only one linked photo sensor. If using a type of multisensor, Echoflex recommends that only one be linked to the controller.*

Daylight harvesting does not affect the operation of wall switches or occupancy sensors when the light is ON. If the light is ON, either a switch or occupancy sensor can override with an OFF or dim to below the daylighting control value.

If a system only has a rocker switch and photo sensor linked, the lights will go OFF when the light level rises above the OFF set point. This behavior can be temporarily overridden with the settings described in *Daylighting Control Override below*.

Daylighting Control Override

The daylighting features can be temporarily overridden by enabling the *daylighting manual override* parameter. This override is governed by a timer that, upon expiration, relinquishes control, allowing the daylighting functions to resume automatically, default five minutes.

If the override is enabled on the controller, a manually controlled switch can turn lights ON and manually set the dimming level.

Garibaldi Pro software is required to configure both the *daylighting manual override timer* and *daylighting manual override enable* parameters.

Closed Loop Control

In closed loop daylighting, the sensor indirectly monitors the controlled light output from the fixtures plus some of the natural light contribution.

> **Note:** *For closed loop control to function properly, the sensor must be installed in a location where it is significantly affected by light level changes. If that condition is not available, consider using Open Loop Control on page 14.*

When the lights are on, closed loop daylighting tries to maintain a given set point level within the space. This level is specified in the *closed loop daylighting set point* parameter. The controller only adjusts the dimming output on received photo sensor messages and only when the light is ON. If the light is OFF, closed loop daylighting is ignored.

> **Note:** *This process is best performed when there is little or no natural light; either close the blinds or complete this step at night. A photo sensor and a switch must be linked to the controller.*

To set the closed loop set point:

1. Turn the light ON.
2. Use a handheld photometer to measure the light on the task plane.
3. Use a linked switch to adjust the fixture's light level until it matches the target light level and give the sensor a moment to register the level.
4. Tap the [Teach] button on the mounted sensor three times to set the daylight harvesting parameters to closed loop function. The light level ramps up to full ON and then dims to OFF to acknowledge the change.
5. Move away from the sensor so your shadow does not affect the light level recording.

After the controller receives the next message from the photo sensor, the light responds again and then returns to normal operation. It may take up to 150 seconds to calculate and send the second message.

To maintain the set point, the dimming output level changes an incremental amount of the output's full range with every message received from the photo sensor. The default *daylighting maximum change* is 10%, which provides a slow adjustment that does not exceed the set point.

Note: *Ensure the wireless photo sensor has an update rate that is appropriate to indoor closed loop lighting applications. The period between consecutive messages should not exceed 200 seconds.*

The output dimming level does not change when the photo sensor level is within the *closed loop deadband* value of the *closed loop daylighting set point*.

Example: *If the controller has a set point of 500 lux and deadband of 5% (default), then the deadband would be + or - 25 lux. The controller would not change the existing light level if the sensor transmitted a measurement between 450 lux and 550 lux. This variable is used to prevent feedback loops in closed loop control.*

Garibaldi Pro software is required to configure both the amount of change per message and the deadband value parameters.

Open Loop Control

A sensor's default setting (open loop or closed loop) depends on what it is linked to and the controller's daylighting operating mode setting: Automatic, Open Loop, or Closed Loop. In open loop daylighting, the sensor monitors the natural light contribution. The sensor must be mounted so it is not affected by the controlled fixture's light output.

When the light level monitored by the photo sensor is below the *open loop maximum output set point*, dimming output is at the *maximum output level*. When the light level is above the *open loop minimum output set point*, dimming output is at the *minimum output level*.

> **Note:** *Set points are calculated as percentages of the photo sensor's full scale range.*

In the diagram that follows, the solid line (blue) indicates dimming output. It begins lowering as the natural light level increases, as shown by the dashed line (green). When the monitored light level is between the set points it modulates dimming output proportionally.

Photo Sensor Range

- - - Photo Sensor Value   —— Dimming Output Value
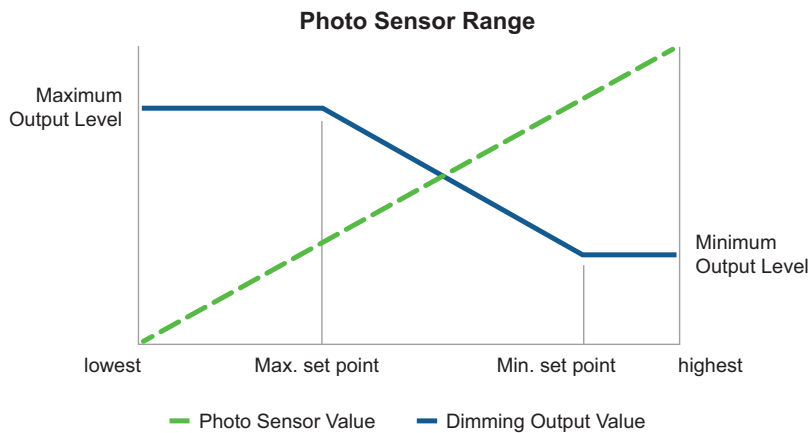
Sensor Ranges and Associated EEPs

To set the open loop maximum and minimum output set points using Simple Tap, a photo sensor must be linked to the controller. Photo sensors are designed to operate within one of three lux ranges determined by the sensor's EEP setting: Low, Mid, and High.

> **Note:** *If a photo sensor supports different EEPs, the selection can be set during pre-commissioning or directly on the sensor. You cannot set it with Garibaldi Pro. Refer to the sensor's installation guide for more information.*

Low Range: generally up to 2,500 lux
- A5-06-02 (0 to 1,020 lux range)
- A5-06-03 (0 to 1,000 lux range)
- A5-07-03 (0 to 1,000 lux range, Occupancy with Photo Sensor)

Mid Range: generally up to 100,000 lux
- A5-06-01 (300 to 60,000 lux range)
- A5-06-04 (0 to 65,535 lux, Curtain Wall Brightness Sensor)
- A5-06-05 (0 to 10,200 lux range)
- D2-14-25 (0 to 100,000 lux range)

High Range: generally greenhouse and industrial sensors

- D2-14-56 (Light Intensity, CCT and PPFD Sensor)
- D2-14-5E (Greenhouse Sensor)

Note: *Low Range is the default for the Photo Sensor (TAP-31). Mid Range is the default for both the Open Loop CCT Sensor (FLS-41) and the CCT Photo Sensor (TAP-41). High Range is the default for the RAYN Photo Sensor (RPS-902).*

To change the sensor setting:

1. Turn the light ON.
2. Tap the photo sensor **[Teach]** button three times to change the setting. The light ramps up to full ON and then dims to OFF.
3. Tap the **[Teach]** button the number of times indicated in the table below to set the open loop set points. The light responds by flashing a number of times to confirm the change. After five seconds it returns to normal operation.

Taps	Light Response	Controller Configuration
3 taps	• Relay toggles • Relay toggles again when controller receives photo sensor reading to use for CLOSED Loop set point (within 150 seconds)	CLOSED Loop
	Note: *During wait time, the current scene is locked so rocker switches and other manual controls can not change settings.*	
4 taps	• Relay toggles 2x after eight seconds	OPEN Loop. *Setting 1* for the sensor range
5 taps	• Relay toggles 3x after eight seconds	OPEN Loop. *Setting 2* for the sensor range
6 taps	• Relay toggles 4x after eight seconds	OPEN Loop. *Setting 3* for the sensor range
7 taps	• Relay toggles 5x after eight seconds	OPEN Loop. *Setting 4* for the sensor range
8 taps	• Relay toggles 6x after eight seconds	OPEN Loop. *Setting 5* for the sensor range

Open Loop Set Points for Sensor Ranges

The following five set point settings provide maxmum and minimum options. The number of taps entered to change the setting is interpreted according to the range of the photo sensor: Low, Mid, or High.

Sensor Set Point	Low Range	Mid Range	High Range
Setting 1	20% and 100%	5% and 30%	0% and 20%
Setting 2	30% and 100%	10% and 35%	10% and 40%
Setting 3	40% and 100%	15% and 40%	20% and 60%
Setting 4	50% and 100%	20% and 50%	30% and 80%
Setting 5	60% and 100%	25% and 55%	40% and 100%

Controller Presets

Preset values are used to determine the dimming intensity and color temperature of different lighting scenes that are part of a designed solution made up of connected devices. A scene is a coordinated combination of controllers configured and grouped to light a space according to specific requirements. Groups, scenes, and event masking can be created in a Wireless TimeClock, and activated from a Wireless TimeClock or a scene station.

Echoflex controllers have 15 configurable presets (plus one reserved for OFF). Preset values can be configured and saved to a controller using Garibaldi Pro software. Presets 1 through 8 cover a graduated range of values from full ON (100%) to OFF (0%). Presets 9 through 15 are a repetition of the values 1–7 and provide the opportunity to create custom values. A default ramp time of two seconds is given for the lighting to reach the preset value.

User Interface

Two buttons on the controller activate features and set specific configurations directly on the device. Two related status LEDs provide feedback about stored information and activities.

Power LED and Learn LED

The Power and Learn LEDs provide visual feedback as red, green, or blue. LED color combinations and blink codes indicate the controller's device count information for each channel or the status of other activities.

- Red: Channel 1 (Intensity)
- Green: Channel 2 (Color Temperature)
- Blue: Channel 3 (CCT Set Point)

Learn Button

The [Learn] button initiates Link mode for manually linking compatible Echoflex devices to the controller's channels. See the relevant switch or sensor documentation for information on linking. Link mode times out after 60 seconds of inactivity.

Note: *The manual linking process can be used both to link a device to a controller and to unlink a linked device from a controller.*

Devices can be linked to a controller manually, using Garibaldi Pro, or during the Echoflex pre-commissioning process.

To link a device:

1. Press the [Learn] button to activate Link mode. The Learn LED turns ON and the Power LED blinks. Do one of the following:
   - To link a wall switch, press the switch paddle ON three times.
   - To link a sensor, press the sensor's [Teach] button. Refer to the sensor's documentation for more information.

The Power LED remains lit for four seconds while it links the new device, and then resumes toggling. You can link up to 20 devices to the controller.

Remote Linking Solution

Use the following method to link the first switch if you cannot access the **[Learn]** button on a controller that has not been pre-commissioned and you do not have Garibaldi Pro software.

This method only works if there are no switches linked to the controller. You cannot link a scene station using this method.

1. Ensure you are within wireless range of the controller and have a wireless paddle switch or a button station.
    a. If the controller has a linked sensor, you must press the **[Teach]** button on the sensor and complete step 2 within 60 seconds.
2. Click the switch paddle ON three times, OFF three times, and ON three times quickly, for a total of nine consecutive clicks. The relay will toggle and the Power LED will indicate the switch is linked.

Clear Button

Use the **[Clear]** button to reset the controller either to its pre-commissioned state or to its factory default state.

To reset to pre-commissioned state:

1. Press and hold the **[Clear]** button until the red Power and green Learn LEDs start blinking.
2. Release the **[Clear]** button. The LEDs repeat a blink code by color to indicate the type and number of devices linked to each channel at pre-commissioning.

To reset to factory default state:

1. Press and hold the **[Clear]** button until the red Power and green Learn LEDs start blinking, and continue to hold for 15 seconds until the LEDs stay on solid.
2. Release the **[Clear]** button. The Power LED displays solid red to indicates factory default state.

LED Display

The LEDs are enabled by default. They can be disabled by adjusting the configuration parameter using Garibaldi Pro software. If disabled, the LEDs are only lit for the configured time when a controller button is pressed, when in Link mode, or if the remote management *Action* command is used to toggle the light.

Blink Indications

The following tables describe the LED codes that identify linked devices and the LED indications that describe linking activities.

Red: Linking Channel 1 (Intensity)

Device Type	Power LED	Learn LED
Switches	**1 long blink** followed by short blinks that count the switches	Off
Occupancy sensors	**2 long blinks** followed by short blinks that count the sensors	Off
Photo sensor or Multisensors	**3 long blinks** followed by short blink that counts the sensor	Off
Gateways and TimeClocks	**4 long blinks** followed by short blinks that count the devices	Off
Demand response	**5 long blinks** followed by short blinks that count the devices	Off
Entry door sensors	**6 long blinks** followed by short blinks that count the sensors	Off
Window sensors	**7 long blinks** followed by short blinks that count the sensors	Off
Keycard switches	**8 long blinks** followed by short blinks that count the switches	Off

Green: Linking Channel 2 (Color Temperature)

Device Type	Power LED	Learn LED
Switches	**1 long blink** followed by short blinks that count the switches	Off
CCT sensor linked (maximum of 1)	**2 long blinks** followed by short blink that counts the sensor	Off
Central command	**3 long blinks** followed by short blinks that count the devices	Off

Blue: Linking Channel 3 (CCT Set Point)

Device Type	Power LED	Learn LED
CCT sensor linked (maximum of 1)	**1 long blink** followed by short blink that counts the sensor	Off
Central command	**2 long blinks** followed by short blinks that count the devices	Off

Linking Activities

Activity	Power LED	Learn LED	Light Response
Link mode	Blinking	On solid	Cycles ON and OFF
Store link ID	On for 4 seconds, and then blinking	On solid	ON for 4 seconds, and then cycles
Clear link ID	Off for 4 seconds, and then blinking	On solid	OFF for 4 seconds, and then cycles

Compliance

For complete regulatory compliance information, see the Echoflex Tunable White Dimming Controller datasheet at echoflexsolutions.com.

FCC Compliance

Echoflex Tunable White Dimming Controller
(For any FCC matters):
Echoflex Solutions, Inc.
3031 Pleasant View Road
Middleton, WI 53562
+1 (608) 831-4116
echoflexsolutions.com

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received; including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Any modifications or changes to this product not expressly approved by Electronic Theatre Controls, Inc. could void the user's authority to operate the product. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.

Contains FCC ID: SZV-STM300U

ISED Compliance

This device contains a license-exempt transmitter/receiver that complies with Innovation, Science, and Economic Development Canada's license-exempt RSSs. Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Contains IC ID: RSS 210

Conformité ISDE

Cet appareil contient un émetteur/récepteur conforme aux CNR d'Innovation, Sciences et Développement économique Canada (ISDE) applicables aux appareils radio exempt de licence. Son fonctionnement est soumis aux deux conditions suivantes:

1. L'appareil ne doit pas produire d'interférences.
2. L'utilisateur de l'appareil doit accepter toute interférence, même si l'interférence est susceptible d'en compromettre le fonctionnement.

Contient ID IC: RSS 210