

Power Load Controller

Models: ELEDR and ELEDRH

Configuration Guide

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Introduction

The Power Load Controller is a wireless lighting controller for electronic ballasts and LED drivers. It also provides a motor load specification to deliver process control for circuit or fan/curtain control applications, eliminating long wire runs. With the ELEDR or ELEDRH, high-voltage model, you can integrate lighting and automation control into one distributed wireless device.

Echoflex systems communicate by radio frequency in a pointto-point network and conform to an open standard. Echoflex controllers include functionality to allow the presetting of lighting scenes based on values for intensity and color temperature. Presets can be activated from scene stations, timeclocks, or gateways. The lockout feature allows timeclocks to schedule a controller's response to specific sensors or stations.

This guide describes the features of the Echoflex Power Load Controller models and how to use and configure them.



Features

- Single relay control output, 20 A at 120–277 VAC and 16 A at 347 VAC
- Motor load rating: 1.5 hp at 120 V and 3 hp at 277 VAC
- Occupancy control with Auto-ON/OFF, or vacancy control with Manual-ON/Auto-OFF
- Use with wireless battery-free wall switches, photo sensors, occupancy sensors, and gateways
- Integrated daylight harvesting control with Photo Inhibit feature
- Pre-linking and pre-commissioning available when sold as a system through Echoflex
- Central command support for Building Energy Management System (BEMS) gateways or timeclock control
- Easy installation on electrical junction boxes with 1/2 inch mounting nipple
- Supports up to 20 wireless wall switches or sensor devices
- Doubles as a message repeater
- Energy code compliant

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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

3031 Pleasant View Road Middleton, WI 53562 800-775-4382 (USA, toll-free) +1-608 831-4116 service@echoflexsolutions.com The controller provides lighting control using input received from compatible Echoflex devices. It operates based on:

- Ambient light levels monitored by a wireless photo sensor
- Occupancy state monitored by a wireless occupancy sensor
- Switch action from a wireless wall or keycard switch
- Gateway control implementing scheduled or other events

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 ELEDR(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 ELEDR(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.

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.

The controller operates ON and OFF 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.

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.



Note: The ELEDR(H) controller is only ever ON or OFF so some button functions do not apply. It does not support dimming intensity or color temperature control.

- [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.

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.

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. For information about coordinated control of a space, see *Open-Plan Shared Occupancy on page 8*.

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.

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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 turns ON and 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 after a power cycle. 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 occupied state 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.

Photo Inhibit

The photo inhibit feature is not controlled by enabling a setting, rather, it is naturally enabled when an occupancy sensor is being used for Auto-On functionality and a photo sensor is added to the system. The photo sensor inhibits the Auto-On behavior when the natural light level is above a specified threshold, the lights ON set point. Photo inhibit does not turn lights OFF if the light is already ON. Garibaldi Pro software is required to configure the set points.



Photo Reading < ON set point

Photo inhibit operation:

- Light level is below the *lights ON set point* lights turn ON when motion is detected.
- Light level is above the *lights ON set point* lights do not turn ON when motion is detected.
- Lights are ON and light level increases past the *lights ON set point* lights stay ON.
- Lights are OFF and light level decreases past the *lights ON set point* lights turn ON when motion is detected.

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 Only

If only occupancy sensors are linked to the controller, the sensors automate the lights both ON and OFF.



Note: If the linked sensors all fail or are taken out of range, the controller's relay will close and the light will stay ON.

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 (Auto-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).

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.



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Note: The ELEDR(H) does not support dimming or Partial-OFF, so if it is part of shared occupancy control, the controller's load will stay ON until vacancy is confirmed by all controllers in the zone.

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 precommissioning, 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 15.

- 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.

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.

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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 create 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.

The controller turns the lights ON or OFF based on a set point and the ambient light level in the room when a photo sensor is linked to the controller. When the controller is configured for daylight harvesting, the set point is where the light turns ON. The default set point to turn the light OFF is 20% of the sensor's full range greater than the light ON set point. Garibaldi Pro software is required to set custom set point values.



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. See *Photo Inhibit on page 7*.

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.

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

Relay Control Set Points

For daylighting control, a photo sensor monitors the natural light contribution. The sensor must be mounted so it is not affected by the controlled fixture's light output.

The photo sensor operation depends on the application and devices linked to the controllers.

- If only a photo sensor is linked to the controller, when the light level monitored by the photo sensor is below the *Photo Relay ON set point*, the relay will close (lights turn ON). When the light level is above the *Photo Relay OFF set point*, the relay will open (lights turn OFF).
- If a photo sensor and a rocker switch are linked to the controller, the photo sensor is only used open the relay once the light level reading is above the *Photo Relay OFF set point*. The photo sensor never closes the relay.
- If a photo sensor and an occupancy sensor are linked to the controller, the photo sensor is only used to enable/disable the Auto-On functionality. Both set points are used:
 - When the light level is below the *Photo Relay ON set point*, Auto-On is enabled.
 - When the light level is above the *Photo Relay OFF set point*, Auto-On is disabled.



Change Sensor Settings

To set the photo relay ON and relay OFF set points using Simple Tap, a photo sensor must be linked to the controller. You can use the photo sensor's current light level reading to set the values, or select values from the table.

To use the current sensor reading:

- 1. Turn the light ON.
- 2. Tap the photo sensor [Teach] button three times to change the setting.

The light toggles ON and OFF and the photo sensor reads the light value to send to the controller. The controller records the value as the Photo Relay ON set point and makes the Photo Relay OFF 20% higher.

Taps	Photo Relay ON	Photo Relay OFF	Light Response
3 taps	Current light level	20% higher	1 blink

- 3. Continue to step 4 below to select set values.
- 4. Tap the **[Teach]** button the number of times indicated in the table below to select ON and OFF set points. The light responds by flashing a number of times to confirm the change. After five seconds it returns to normal operation.

Additional Taps	Photo Relay ON	Photo Relay OFF	Light Response
1 tap	20%	40%	2 blinks
2 taps	40%	60%	3 blinks
3 taps	60%	80%	4 blinks
4 taps	80%	100%	5 blinks

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.



Note: The ELEDR(H) controller is only ever ON (preset values 1–100) or OFF (value 0). It does not support dimming.

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

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

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 LED (red) and Learn LED (green) indicate the controller's device count information via blink codes or the status for other activities.

Learn Button

The **[Learn]** button initiates Link mode for manually linking compatible Echoflex devices to the controller. 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 precommissioning 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 Power LED blink codes indicate the type and count of devices linked 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.

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

Device Count Codes

The following codes provide a visible report of the supported devices that are linked to the controller. The Power LED repeats a code of blinks that represent the type and number of linked devices. Long blinks = type. Short blinks = count. If the controller does not have any linked devices, the Power LED remains on solid.

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 (maximum of 1)	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

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 Power Load Controller datasheet at **echoflexsolutions.com**.

FCC Compliance

Echoflex Power Load 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



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