

# UNIVERSAL INPUT/OUTPUT INTERFACE INSTALLATION GUIDE



## Overview

This guide covers all models of the UIO-A.

UIO-AU Universal Input/Output Interface, 902 MHz radio

UIO-AY Universal Input/Output Interface, 868 MHz radio

UIO-AJ Universal Input/Output Interface, 928 MHz radio

The Echoflex Universal Input/Output Interface (UIO) allows integration of Echoflex wireless devices into existing panels, wired control systems, or building energy management systems.

The UIO interface installs on standard DIN rail and is intended for indoor use only.

## Interface Operation

**Inputs:** The UIO has two hardware input channels that support 0-10V or 4-20mA signals. The inputs have wireless outputs assigned to them so analog or digital signals present on the input can be translated into a number of wireless message types. Connected HVAC, building automation or lighting sensors can be connected and have the sensors value broadcast wirelessly. Receivers could include gateways or controllers but also another UIO interface which can then reproduce the sensors analog or digital value.

**Outputs:** The UIO has two output channels delivering either 0-10V or 4-20mA signals driven by wireless devices linked to the channel. The output channel interprets a wireless message and outputs an analog value on the selected channel.

## Preparing to Install the Interface

The Interface can be mounted to a DIN rail or junction box (see the *Accessories* section in this guide). To ensure the interface can receive the linked devices messages, it is recommended to complete a site audit before installing.



**Note:** *Installation inside a metal back box will reduce radio range. Use the external antenna accessory and mount the antenna externally from the metal box.*

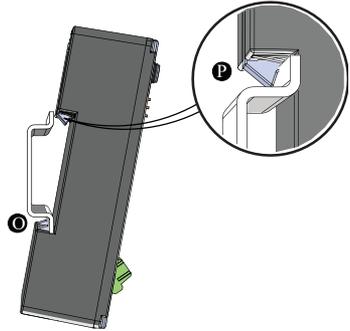
The remote transmitters and the interface should be within 80' of each other laterally. Do not locate the interface where there are concrete or brick walls or any large metal obstructions between the remote transmitters and the interface.



**Note:** *Installation must follow all national and local codes for electrical equipment. NEC Class 2 product are to be wired in accordance with NEC Article 725 and local jurisdiction requirements. All power and control wiring should be installed and terminated by a qualified installer and should follow standard wiring installation practices.*

## Installation on DIN Rail

1. Ensure the section of DIN rail to be used is mounted securely according to the manufacturer's requirements. (DIN rail is provided by others.)
2. Hook the bottom of the UIO-A Interface under the lower DIN rail edge as shown.
3. Pivot the interface up and depress until the top clip on the unit seats completely onto the DIN rail



## Antenna Jumper

The UIO has an antenna visibly mounted to the interfaces top cover (orange on 902 MHz models and blue on 868 MHz models). The antenna selection jumper should be in the lower two poles for the internal antenna.

\*The structural support for the DIN rail has been removed from this graphic for clarity of the installation procedure.

There is a SMA connector for an external antenna (purchased separately, see *Accessories* section). After installing on the SMA connector, the external antenna is selected by moving the antenna selection jumper to the top two poles.

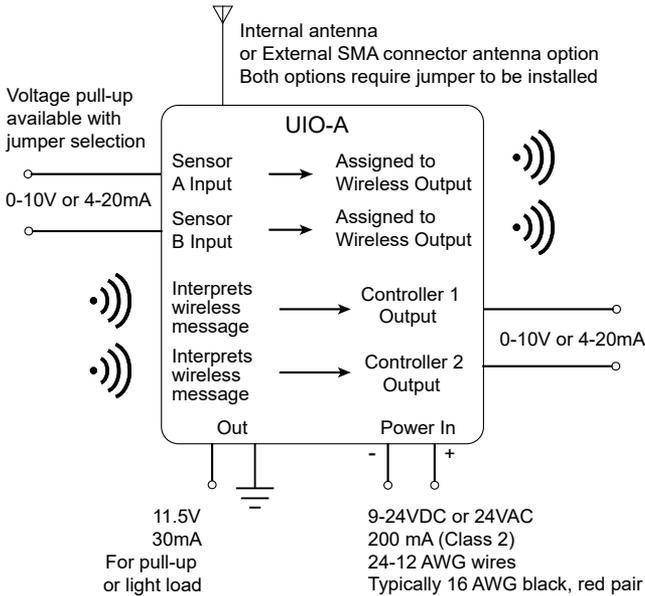


**Note:** *The antenna selection jumper must be installed for radio operation. Do not discard.*

## Power Input

The UIO Interface requires 24VAC or 9-24VDC (Class 2) 200 mA external power. Termination for this connection is provided on a two position terminal, labeled Power In, accepting 24–12 AWG (0.2–4 mm<sup>2</sup>) wires, typically a 16 AWG (1.5 mm<sup>2</sup>) black and red wire pair.

## Connection diagram



Examples of applications with wiring diagrams can be found on our website (see URL on page 8)

## Button Interface

**Channel Select** – Tapping the CH Select button will allow you to scroll through the four channels, left to right. Press and hold this button for five seconds with any channel selected to unlock all channels. Unlocking the channels allows you to configure the input channels based on the application or link devices to the output channels. Refer to the section on the Inputs and Outputs operation for more information.

**Input Type Select / Clear** – This multi-purpose button is used to select a sensor transmitter type on the input channels or clear linked devices from both output channels.

Refer to the sections later in this document for *Setting the Message Type* and *Clearing the Output Channels*.

**Teach / Link** - This button is used to *Teach* the wireless message selected for the input channel to a remote receiver or to *Link* wireless devices to the two output channels.

## Voltage Pull Up Jumpers

If the sensor connected to a voltage input requires a pull-up, move the jumper to the two top posts to enable a 11.5V pull-up. The pull-up will be required when the connected sensor sinks current to ground or if a dry contact is used to trigger the input by pulling it to ground.

## Accessories

A low voltage DIN rail cover kit is available which allows installation of the UIO Interface to a 4" (10.16 cm) square junction box (provided by others).

An external antenna kit is available as a separate order item for use with the UIO.

DIN rail enclosures offer a convenient location to house the UIO. Wall-mountable versions are available in mini (14 in x 8 in), small (14 in x 14 in), and large (14 in x 28 in) formats. The mini enclosure features a single piece of DIN rail, while the small and large enclosures include two aligned rails. All three variants include a re-positionable voltage divider allowing re-configuration to meet the needs of the installation. All wall-mountable versions are ETL listed. See the UIO data sheet for ordering information.

## Input Operation

With the button interface unlocked, you can select a wireless profile message type that will represent the input channels value. Profile types include: switch station with ON/OFF and fade control, occupancy sensor (occupied, vacant), analog value, demand response (active, inactive) and temperature set point.

### Setting the message type

1. Press and hold the *Channel Select* button for 5 seconds. The selected channel's state LED will change color from red to blue when the button interface becomes unlocked
2. Use the *Channel Select button* again to scroll through the channels until you have the desired input channel selected
3. Tap the *Input Type Select* button until the green LED is blinking the desired number corresponding to the profile value, referring to the table below
4. Press and hold the *Channel Select* button again for 5 seconds to exit the unlock state

LED Blinks	Input Profile Type	Profile
Solid	None selected	
1	Switch Station (B paddle)	F6-02-02
2	Occupancy Sensor	A5-07-01
4	Gateway (analog, dimming - type 2)	A5-38-08
6	Demand Response (or Custom)	A5-37-01
7	Temperature Set Point	A5-10-19

## Defining a Custom Wireless Command

The input channels can be used to send staged central command messages. Staged messages allow you to combine central command messages which are useful for custom applications.

In order to configure the central command types for custom applications you must use Garibaldi, Echoflex's in-field commissioning tool. Garibaldi allows you to configure each input event (active and inactive) and combine channels.

## Linking an Input Channel to a Receiver

Follow these instructions to link the input channel to a receiving device

1. Press and hold the *Channel Select* button for 5 seconds. The selected channel's state LED will change color when the button interface becomes unlocked
2. Use the *Channel Select* button again to scroll through the channels until you have the desired input channel selected
3. Put the receiving device into Link or Learn mode. Refer to the manufacturers documentation
4. With the receiver in link mode tap the interface's *Teach/Learn* button once, the mode LED will blink once
5. Press and hold the *Channel Select* button again for 5 seconds to exit the unlock state

## Output Operation

Each of the two outputs can be configured to behave like a lighting controllers dimming channel. Linked switches and sensors will drive the output value based on output configuration settings. Linked photo sensor will drive the output up or down for daylighting control. Occupancy sensors can drive the output to off (0V) when vacancy is detected after a period of time. Linked switches can drive the output value up and down.

Additionally the output channel be used to accept a wireless analog command and output this value. This is useful in HVAC or Building Automation applications where the wireless signal is being used to transmit a value from one location to another when there is no easy method to run wire. In this application, the transmitting UIO interface would use a gateway command to transmit the analog value present on the input. This command would be linked to a receiving UIO interface's output channel which would reproduce the analog signal.

LED Blinks	Output Profile Type	Profile
Solid	No devices linked	
1 blink	Switch Station	F6-02-(01/02)
2 blinks	Occupancy Sensor	A5-06-(01-05)
3 blinks	Light Sensor	A5-07-(01-03)
4 blinks	Central Command	A5-37-01
5 blinks	Energy Management - Demand Response	A5-38-08

## Linking Devices to the Output Channels

Follow these instructions to link devices to the two output channels

1. Press and hold the *Channel Select* button for 5 seconds. The selected channel's state LED will change color from red to blue when the button interface becomes unlocked
2. Use the *Channel Select* button again to scroll through the channels until you have the desired output channel selected

3. Tap the interface's *Teach/Learn* button. The mode LED will be blinking about once per second. The channel is now in link mode
4. Linking a switch requires you to triple click the ON paddle or button. When linking a sensor, tap the sensors Teach button once
5. To exit Link mode, tap the interface's *Teach/Learn* button again once or wait 30 seconds
6. Press and hold the *Channel Select* button again for 5 seconds to exit the unlock state.

## Channel 2 as an External Relay Drive Output

Channel two output can be remapped to be the relay signal of controller channel one thereby giving simultaneous access to both the dimming and relay signals of channel one. When used to drive an external relay, this permits the UIO to function as a dimming lighting controller where the load may be switched ON/OFF. This feature can be enabled through the Garibaldi software tool. Contact Echoflex for more information on the Garibaldi software tool and support for selecting a suitable relay.

## Clearing the Output Channels

Using the *Input Type Select / CLR* button can reload the interfaces output channels to the factory pre-commissioned settings including linked devices OR it can load the factory default parameters and remove all linked devices from both channels.



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**Note:** *Selecting either of the two output channels and clearing will effect both channels*

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Clearing is a two stage process; stage 1 reloads the pre-commissioned values. Stage 2 loads factory defaults and clears all linked devices from the outputs.

1. Press and hold the *Channel Select* button for 5 seconds. The selected channel's state LED will change color from red to blue when the button interface becomes unlocked
2. Use the *Channel Select* button again to scroll through the channels until you have an output channel selected
3. **Stage 1 Clear:** To return the controller to the factory pre-commissioned state, press the *Input Type Select / CLR* button until the amber Mode LEDs start blinking, approximately 5 seconds. Release the button and the amber Mode LED will begin blinking indicating the factory commissioned pre-linked devices.

**Stage 2 Clear:** To completely clear the outputs returning it to factory default settings removing all linked devices, press the *Input Type Select / CLR* button until the amber Mode LEDs come on solid, about 15 seconds, then release. The amber Mode LED will stay ON solid indicating the factory default state.

## Status Messages and Repeater Mode

The interface will transmit a status message (when enabled) that includes channel voltage level. Each channel has its own status message, which can be enabled/disabled per channel.

When the button interface is unlocked the following multi-button actions are supported:

To enable channel status messages:

1. Select a channel
2. Press and hold the *Teach/Learn* button, tap the *Input Type Select / CLR* button twice, release the *Teach/Learn* button: enables status transmit for the channel. Tapping the *Input Type Select / CLR* button once will disable this message



**Note:**

You can find out what the unique ID for each channel is by monitoring telegrams using Garibaldi or DolphinView and pressing the teach button with the channel selected

To enable or disable repeater mode:

1. To disable repeater mode, press and hold the *Input Type Select / CLR* button, tap the *Teach/Learn* button once, release the *Input Type Select / CLR* button.
2. To enable single-hop repeater, press and hold the *Input Type Select / CLR* button, tap the *Teach/Learn* button twice, release the *Input Type Select / CLR* button.
3. To enable dual-hop repeater, press and hold the *Input Type Select / CLR* button, tap the *Teach/Learn* button three times, release the *Input Type Select / CLR* button.

## LED Blink Codes and Operation

Normal Operating Mode - Inputs and Outputs Locked		
	Input	Output
State	Red = 0V Blue = 10V Violet = 5V	No LED = virtual OFF Red = minimum output Blue = maximum output Violet = intermediate output
Mode	Green = blinks indicate EEP type	Amber = blinks count linked devices
Channel Select Mode - Inputs and Outputs Locked		
State	Blue Solid	
Mode	Same as normal operating mode	
Channel Select Mode - Inputs and Outputs Unlocked		
State	Red Solid	
Mode	Same as normal operating mode	

**This concludes the configuration directions for the interface.**

## Default Settings for Controller

Repeater	Disabled
Status	Disabled

### Time-outs

Motion Sensor	15 minutes
Switch	No Time Out
Auto-ON	Enabled with no linked switch, disabled with linked wall switch
Grace timer	30 seconds

## Agency Listings and Compliance

FCC Part 15.231 (902 MHz model only)

Contains FCC ID: STM300U

The enclosed device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions:

(i.) this device may not cause harmful interference and

(ii.) this device must accept any interference received, including interference that may cause undesired operation.

IC RSS-210 (902 MHz models only)

Contains IC: 5713A-STM300U

CE (868 MHz model only)

CE Marking

ARIB STDT108 (928MHz models only)

Complies with the Japanese radio law and is certified according to ARIB STDT108. This device should not be modified (otherwise the granted designation number will become invalid)

ROHS compliant

WEEE marked - Energy Management Equipment



R 206-000372

Examples of applications with wiring diagrams can be found on our website:



<https://www.echoflexsolutions.com/files/8DC-6038-UIO-Application-with-wiring-diagrams-Guide.pdf>

Scan the QR code to see the guide

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