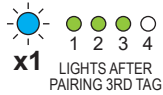


# RFID cont'd

## Pairing and Testing RFID Tags

RFID Tags must be paired with the system before they will be recognized. Each tag will be assigned a sequential number from 1 to 8 as they are paired. You should decide beforehand which tag will get what number as you have to pair them in ascending order. You have the option of pairing a backup tag for one or more of your primary tags. Backup tags can be used as immediate replacements for lost or stolen tags until someone has a chance to re-pair.



### Pairing Primary RFID Tags, Enabling Antennas

Hold SET until the Status LED starts repeating a single blue blink. All existing tags will be cleared. Hold each RFID tag up to any antenna one at a time. As each new tag is paired you'll see an input light turn on, that light is the tag number. Make sure ALL installed antennas see a tag during this process, even if you have to touch the same tag. Only antennas that detected a tag here will be enabled afterwards. Once you've finished pairing tap SET to save, or if you pair 8 tags it will save and exit automatically.

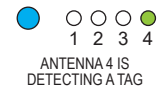


### Pairing Backup RFID Tags

You can pair one backup tag for each primary tag. All backup tags are cleared when you re-pair primary tags. To pair a backup tag start by making sure no antennas detect tags. Hold SET until the Status LED blinks blue twice. Let go of SET, Status will blink purple.

**x1 Primary Tag** Tap the primary tag you would like to have a backup for.

**x2 Backup Tag** Tap the backup tag. The Status LED will flash green and you will return to x1 Purple where you can optionally pair backups for other primary tags. Tap SET to exit and save.



### Testing RFID Antennas / Range

Tap SET to enter antenna test mode, the Status LED will turn blue. As you hold paired tags near antennas you'll see the corresponding input LED turn on. This mode is useful to test your antennas and their range before or after installation. Tap SET again to exit.



### Tag Detected Indication

In normal operation the input LEDs will represent the state of the inputs and the Status LED will be green or red depending on the DMX state. When a tag is detected on an antenna the Status LED will momentarily turn blue and the tag's number will be shown on the input LEDs.

## Mounting the Antennas

The antennas are fragile so you must take great care when mounting them. Do not put them under any mechanical strain by tightening screws too tight or sandwiching them tightly between two materials. Mount them with double-sided tape or by gently tightening the screws.



**X** ANTENNA SCREWED TOO TIGHT TO A WARPED PIECE OF WOOD.



**✓** ANTENNA FIXED WITH DOUBLE-SIDED TAPE. THE PANEL ABOVE IS NOT SQUEEZING THE ANTENNA.



**✓** ANTENNA FIXED WITH VERY GENTLY TIGHTENED SCREWS.

## Setting up the Show using Behaviors

You need to use the IF THIS THEN THAT Behaviors to program a Flex or Flexmax to react to changes on the RFID system. You can create Behaviors that trigger when a specific antenna sees a tag, when the number of tags detected changes, or when a specific tag is detected. Based on that you can play scenes, modify variables, control outputs, etc. Some examples are shown below.

IF RFID Antenna 1 detects Tag 1 AND RFID Antenna 2 detects Tag 2 THEN ...

IF Number of Tags Detected = 0 THEN ...

IF Clue Reader detects Blue Object THEN ...

IF RFID Antenna 2 detects Tag 1 AND Button 1 is Pressed THEN ...

### Error Codes



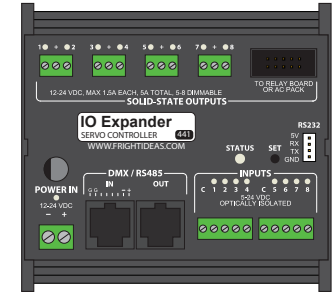
- 1: Update IO Expander firmware
- 2: No RFID board detected
- 3: RFID comms error
- 4: RFID board needs firm update

### Factory Reset

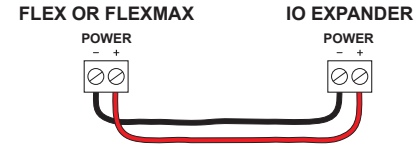
Power up holding SET for 5s. Status will turn purple. Power cycle the unit.



## Quick-Start Guide IO Expander PN: 441



## Power Supply and Output Specs



### Powering the IO Expander

In most cases the IO Expander's Power In terminals will be connected to the Flex or FlexMax that it's connected to. If that is not convenient, or you would like it to output a different voltage, you can power it from a 12 or 24VDC power supply.

### Sizing Your Power Supply

To size a supply you must add up the wattage for the most outputs that will be on at any one time. Choose a power supply that can output at least that many watts.

### About Solid-State Outputs

Solid-state outputs are great for reliably controlling small to medium DC loads. They output the voltage that is connected to Power In. They cannot be used as contact closures, or to control high current or high voltage loads. Use external relays for these.

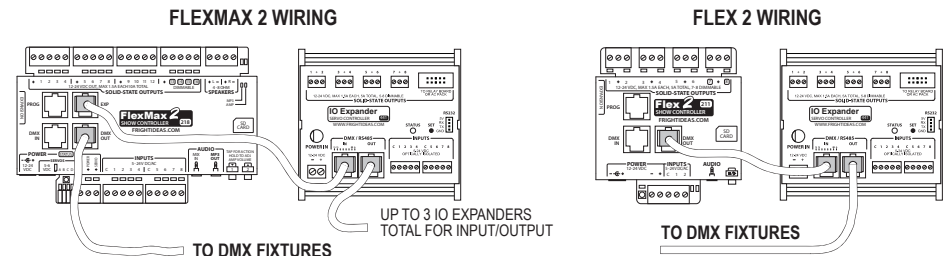
### Dimmable / PWM Outputs

Outputs 5 thru 8 are PWM outputs that can be used as signals to PWM input devices, or to directly control the brightness of LEDs or small DC bulbs.

### Output Specs

Each output can output up to 1.5 amps. The total amperage going to ALL outputs should not exceed 5 amps.

## DMX Wiring and Adding to your Show



### Adding the IO Expander to your Show in Director

Click the + button at the bottom left corner of Director then choose the IO Expander from the list. Make sure you set the DMX address to what Director wants. See the next page for details.

# Reading and Setting the DMX Address

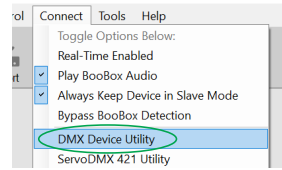
- Status LED**
- AT STARTUP**
    - Yellow: Firmware Version
    - Blue: DMX Address
  - DURING OPERATION**
    - Green: Good DMX Signal
    - Red: No DMX Signal
    - Blue: RFID Antenna Check
    - Light Blue: RFID Programming

## Reading the Current Address

At power-up the IO Expander blinks the digits of the current DMX address on the Input LEDs when the STATUS LED is Blue. The digit 9 is represented by LEDs 8 & 1, the digit 0 by 8 & 2.

## Changing the Address

The address can be changed with the SET button or the Director Connect. First add the IO Expander to your show, Director will tell you the DMX address to use.



## Using the Director Connect

Open the DMX Device Utility in the Connect menu. The IO Expander should show up if it's connected and powered on. Then click Set DMX Address.

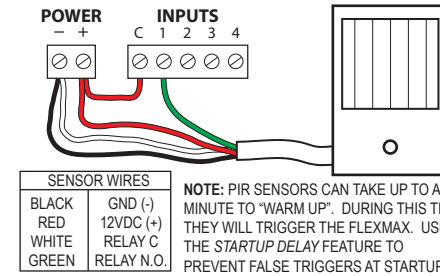
## Changing the Address with the SET Button

- Power up the IO Expander while holding the SET button.
- The STATUS light will turn BLUE. Let go of the SET button.
- You must now tap out the digits of the address on the SET button. See examples below.

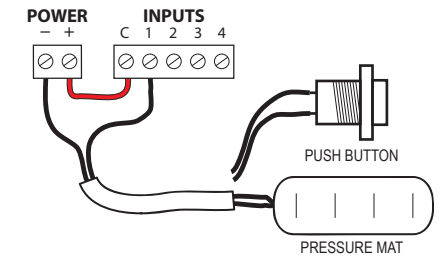
As you tap out each digit on the SET button you'll see the digit's value represented on the input LEDs. After you are done tapping out all your digits the address will be played back to you as it is at startup.

Address	How to Tap SET Button
9	Tap SET 9x, wait for STATUS to turn blue and then turn off.
17	Tap SET 1x, wait for STATUS to turn blue, tap SET 7x, wait for STATUS to turn off.
30	Tap SET 3x, wait for STATUS to turn blue, tap SET 10x, wait for STATUS to turn off.
236	Tap SET 2x, wait for STATUS to turn blue, tap SET 3x, wait for blue, tap SET 6x.
305	Tap SET 3x, wait for STATUS to turn blue, tap SET 10x, wait for blue, tap SET 5x.

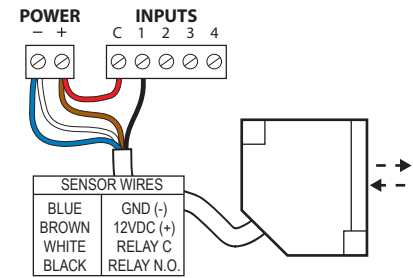
# Trigger Input Wiring



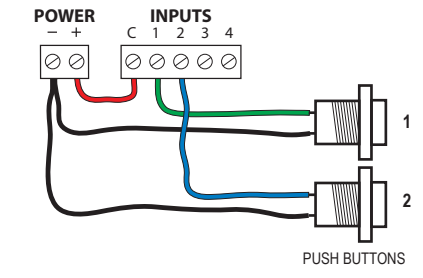
PIR MOTION SENSOR



PRESSURE MAT OR PUSH BUTTON

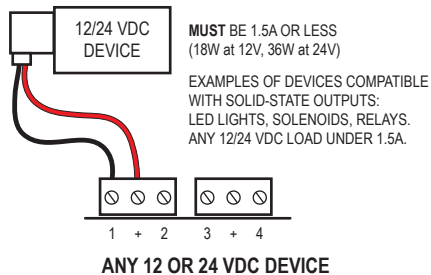


BEAM SENSOR

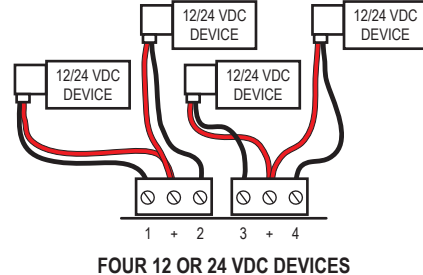


TWO TRIGGERS

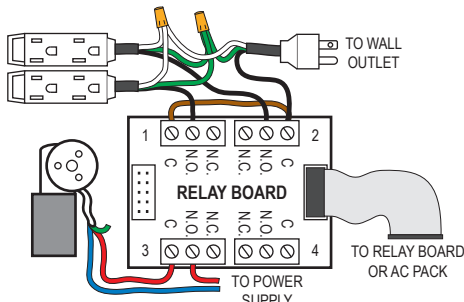
# Solid-State Output Wiring Diagrams



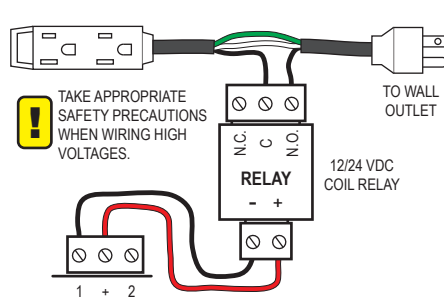
ANY 12 OR 24 VDC DEVICE



FOUR 12 OR 24 VDC DEVICES



USING A QUAD RELAY BOARD



ANY 110 VOLT LOAD

# Adding the RFID Hub

An RFID expansion board can be connected to the RS232 port. The board supports up to 8 RFID antennas. Most RFID setups will only notify the controller if the paired tag is present or not. You cannot detect the difference between tags, or if an unpaired tag is present or there is no tag. Using our setup the Flex or FlexMax can make decisions based on which tag, if any, is detected at which antenna. This functionality opens up a tremendous amount of game options. For example, you can require RFID objects to be activated on one antenna before your show will respond to them being placed on another antenna.

## Limitations

The antennas are pre-wired at 31.5 inches. These wires cannot be extended so the system must be designed so that all the antennas can reach the Hub. If you need RFID tags in another location you can use another IO Expander and Hub in that location.

