BooBox Flex

OPERATING MANUAL
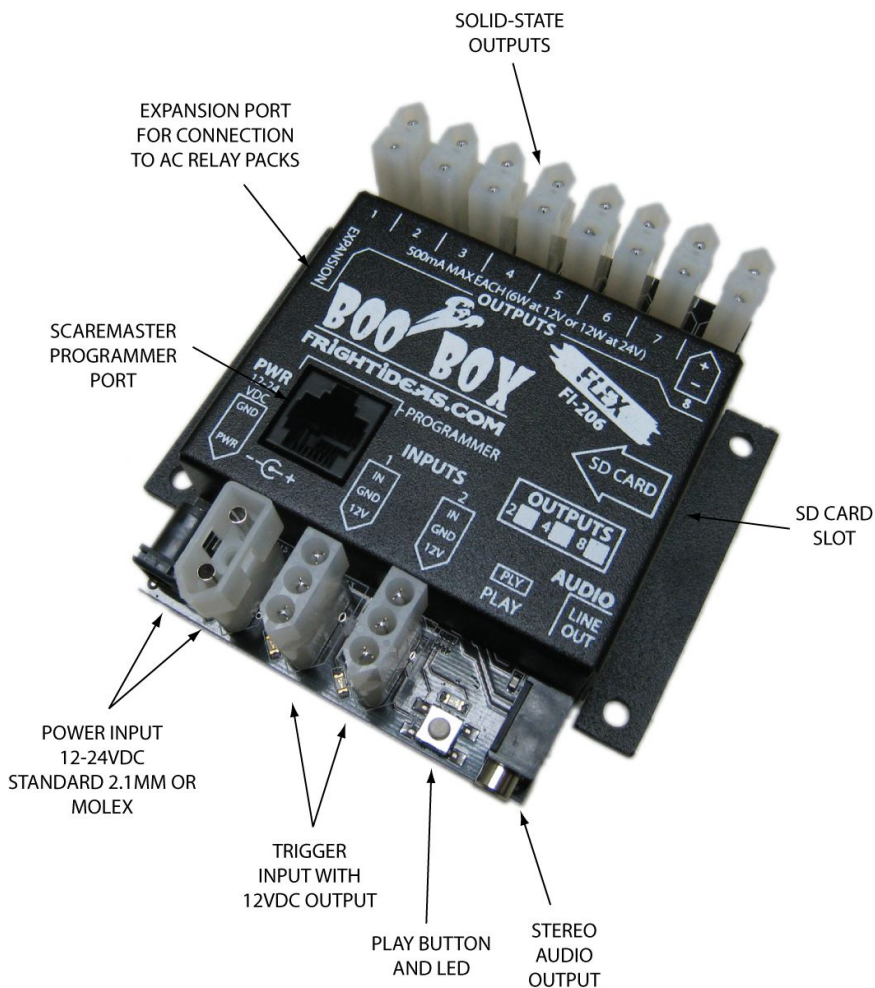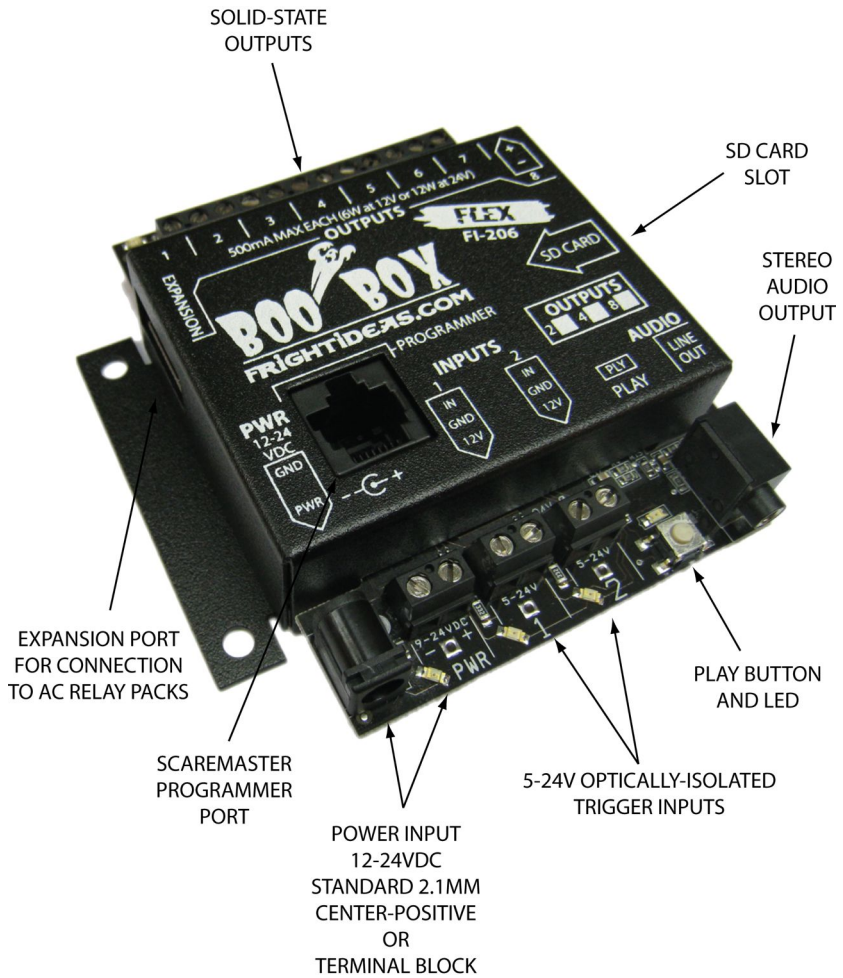### V1.1 (Feb 24, 2010)

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Connections

The BooBox Flex is available with Terminal Blocks or Molex Connectors. The wiring labels for the Molex connectors are located on the metal enclosure. The labels for the terminal block wiring are located on the circuit board. Wiring examples for each version are available in the following pages.

Molex Connector Version

SOLID-STATE OUTPUTS

EXPANSION PORT FOR CONNECTION TO AC RELAY PACKS

SCAREMASTER PROGRAMMER PORT

SD CARD SLOT

POWER INPUT 12-24VDC STANDARD 2.1MM OR MOLEX

TRIGGER INPUT WITH 12VDC OUTPUT

PLAY BUTTON AND LED

STEREO AUDIO OUTPUT

Terminal Block Version

SOLID-STATE OUTPUTS

SD CARD SLOT

STEREO AUDIO OUTPUT

EXPANSION PORT FOR CONNECTION TO AC RELAY PACKS

PLAY BUTTON AND LED

SCAREMASTER PROGRAMMER PORT

5-24V OPTICALLY-ISOLATED TRIGGER INPUTS

POWER INPUT 12-24VDC STANDARD 2.1MM CENTER-POSITIVE OR TERMINAL BLOCK
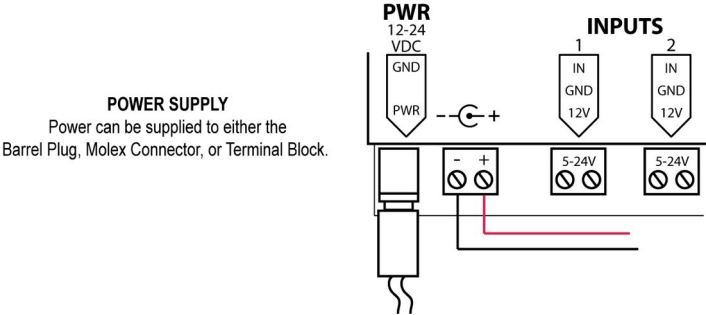
Power Input

The Flex can be powered by 12 or 24VDC via a standard 2.1mm power or the molex connector or terminal block depending on the version you have. The Flex does not ship with a power supply, you must purchase your own supply based on the supply voltage and current of your outputs. It is **highly** recommended to use 24VDC solenoids, this will enable you to use larger solenoids without exceeding the maximum current capacity of the outputs.

To size a supply, add up the wattage of all your valves, then add 5 watts for the Flex. So for example, if you are using five 6 watt 24VDC valves, that's 6 x 5 = 30 + 5 for the Flex. So you'd want a 24VDC supply with minimum of 35 watt capacity. You can cheat a bit here, if you know for sure that a maximum of only two of those valves will be turned on at any given time you can just calculate for that. If that were the case you'd only need a minimum 17 watt supply in this example.

POWER SUPPLY
Power can be supplied to either the
Barrel Plug, Molex Connector, or Terminal Block.

Solid-State Outputs

Each output can handle 500mA of current regardless of the supply voltage, this calculates to 6 watts at 12 volts, or 12 watts at 24 volts. This is why we recommend 24 volt supplies, you will be able to use much larger solenoids without exceeding the 500mA limit.

In addition to the 500mA per output limit, there is also an internal fuse that will temporarily open if the sum of currents on all active outputs exceeds 1.1A for too long. The fuse will automatically reset once the excessive draw has been removed. This may sound like a limitation, but not really. Most solenoids draw about 5 watts on average, at 24 volts that's 210mA per solenoid. So four valves could be left on continuously without fear of overloading.

There is an LED next to each output connector to indicate it's current on/off status.
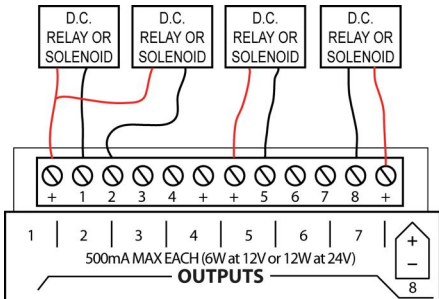
ALL THE + PINS ARE INTERNALLY CONNECTED, THEY ARE NOT ASSIGNED TO ANY PARTICULAR OUTPUT. PUTTING WIRES FROM MULTIPLE OUTPUTS INTO THE SAME + PIN IS OK.
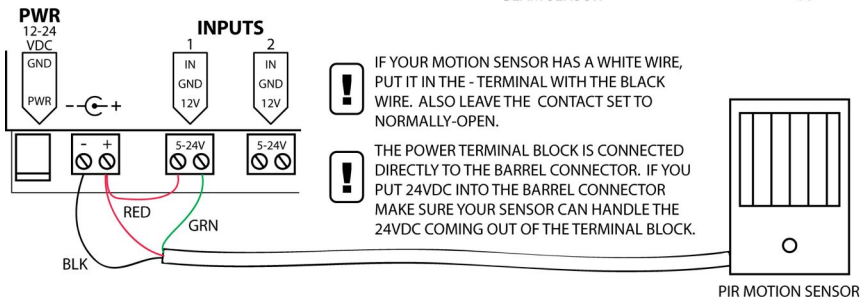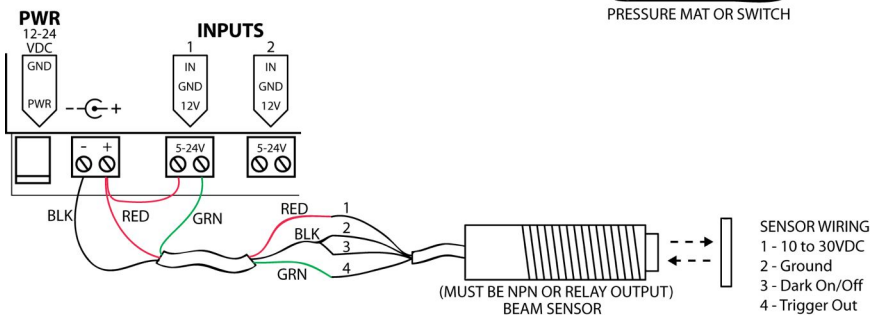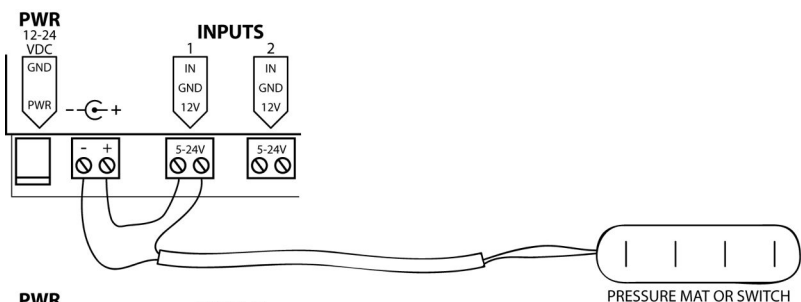
Terminal Block Output Wiring

Molex Connector Output Wiring

D.C. RELAY OR SOLENOID

Trigger Inputs (Terminal Blocks)

Trigger Inputs are activated when 5 to 24 volts AC or DC is applied to the input terminals. The inputs are optically-isolated which means they are electrically isolated from the sensitive electronics inside. You'll need to supply power to the inputs in order to trigger them, in most cases this power can be "borrowed" from the PWR terminal block as shown below.

PWR
12-24 VDC
GND
PWR
− +

INPUTS
1
IN GND 12V
2
IN GND 12V
− + 5-24V 5-24V

PRESSURE MAT OR SWITCH

PWR
12-24 VDC
GND
PWR
− +

INPUTS
1
IN GND 12V
2
IN GND 12V
− + 5-24V 5-24V

BLK   RED   GRN
RED   1
BLK   2
3
GRN   4

(MUST BE NPN OR RELAY OUTPUT)
BEAM SENSOR

SENSOR WIRING
1 - 10 to 30VDC
2 - Ground
3 - Dark On/Off
4 - Trigger Out

PWR
12-24 VDC
GND
PWR
− +

INPUTS
1
IN GND 12V
2
IN GND 12V
− + 5-24V 5-24V

RED
GRN
BLK

! IF YOUR MOTION SENSOR HAS A WHITE WIRE, PUT IT IN THE - TERMINAL WITH THE BLACK WIRE. ALSO LEAVE THE CONTACT SET TO NORMALLY-OPEN.

! THE POWER TERMINAL BLOCK IS CONNECTED DIRECTLY TO THE BARREL CONNECTOR. IF YOU PUT 24VDC INTO THE BARREL CONNECTOR MAKE SURE YOUR SENSOR CAN HANDLE THE 24VDC COMING OUT OF THE TERMINAL BLOCK.

PIR MOTION SENSOR
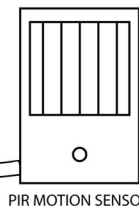
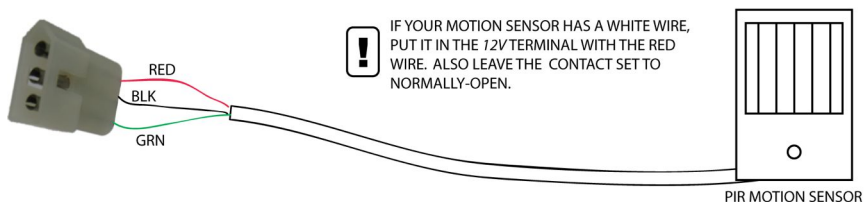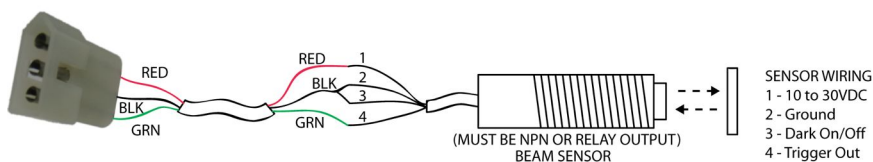**Optically Isolated Trigger (Terminal Blocks)**

In situations where the Flex is being triggered by another controller on a separate power supply, or by a pushbutton that's located a significant distance from the controller, it's best to take advantage of the optical-isolation.
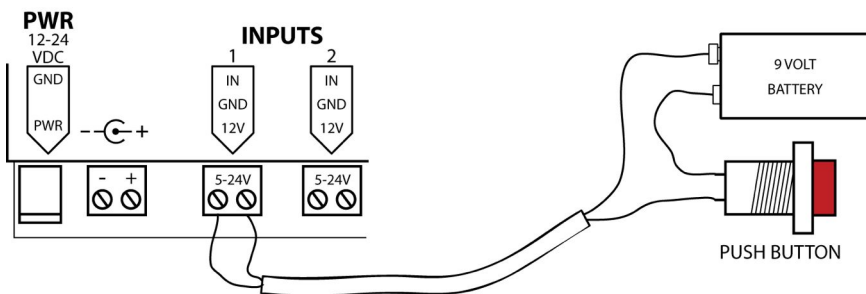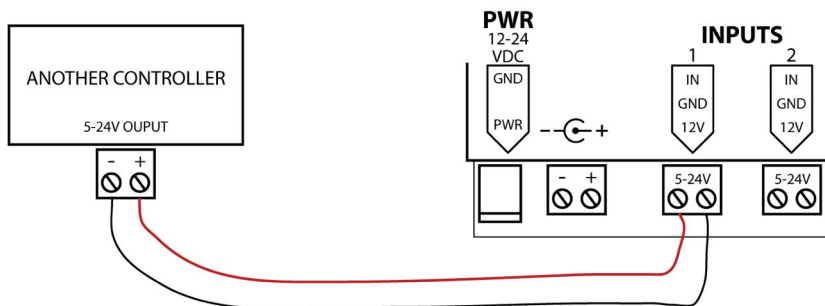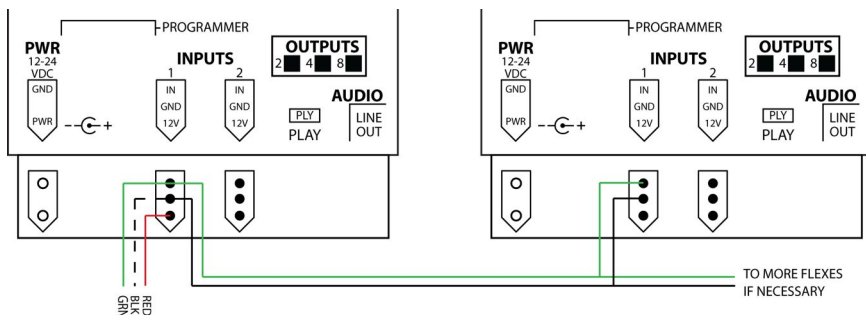
Trigger Inputs (Molex Connectors)

Trigger Inputs are activated when the 12V terminal is connected to the IN terminal (two outer pins). The 12V pin outputs exactly 12 volts when a 24 volt power supply is used, and slightly less than 12 volts when a 12 volt supply is used. This shouldn't present a problem as most PIR sensors work down to 9 volts.

Each trigger input is optically-isolated from the sensitive circuitry inside for extra protection, and as with the outputs, there is an LED next to each trigger connector to indicate it's current status.

PRESSURE MAT OR SWITCH

RED
RED   1
BLK
BLK   2
        3
GRN
GRN   4
(MUST BE NPN OR RELAY OUTPUT)
BEAM SENSOR

SENSOR WIRING
1 - 10 to 30VDC
2 - Ground
3 - Dark On/Off
4 - Trigger Out

RED
BLK
GRN

IF YOUR MOTION SENSOR HAS A WHITE WIRE, PUT IT IN THE *12V* TERMINAL WITH THE RED WIRE. ALSO LEAVE THE CONTACT SET TO NORMALLY-OPEN.

PIR MOTION SENSOR

Connecting Two Flexes with One Trigger

PROGRAMMER
PWR
12-24
VDC
GND
PWR
INPUTS
1   2
IN   IN
GND   GND
12V   12V
OUTPUTS
2   4   8
AUDIO
PLY
PLAY
LINE
OUT

PROGRAMMER
PWR
12-24
VDC
GND
PWR
INPUTS
1   2
IN   IN
GND   GND
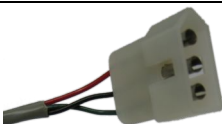12V   12V
OUTPUTS
2   4   8
AUDIO
PLY
PLAY
LINE
OUT

RED
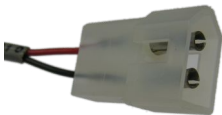BLK
GRN

TO MORE FLEXES
IF NECESSARY

Molex Connectors
Here are some pictures and part numbers for the connector housings and pins. They are readily available at Digi-Key, Mouser, and many more electronic part distributors.

Power Connector (Not necessary to use if your supply has a standard 2.1mm positive-centre connector)		
	Part	**Molex Part Number**
	Housing	03-09-1032
	Pin (18-22AWG)	02-09-2118

Trigger Connector		
	Part	**Molex Part Number**
	Housing	03-09-2032
	Pin (18-22AWG)	02-09-1119

Output Connector		
	Part	**Molex Part Number**
	Housing	03-09-2022
	Pin (18-22AWG)	02-09-1119

Tools		
The crimp tool shown below requires two crimps for each pin, not bad for crimping once in a while but too slow for production. The official crimp tool from Molex costs about $400.		
	Part	**Molex Part Number**
	Official Crimp Tool (One Step)	63819-1200
	Official Crimp Tool (Two Step)	63811-1000
	Pin Removal Tool	W-HT-2054

Shows

Understanding a Show

The BooBox Flex is essentially a show controller. In the case of the BooBox Flex, a show consists of scenes, sequences and sounds. The available scenes are Ambient, Input 1, and Input 2. Currently each scene can have only one animation sequence. In the near future a firmware update will be released that will allow you to add up to 8 sequences to each scene.

SHOW					
AMBIENT		**INPUT 1**		**INPUT 2**	
Sequence 0	Sound 0	Sequence 0	Sound 0	Sequence 0	Sound 0

The Ambient scene loops continuously while the controller waits to be triggered. The Input 1 scene plays when input 1 is triggered, the input 2 scene when input 2 is triggered. It is not necessary to have a sequence programmed for every scene, a very simple show may have only one sequence in the Input 1 or Ambient scene.

Creating a New Show

On the ScareMaster's SD card is a folder named FI-SHOWS which contains all the show files. To create a new show it's best to duplicate one of the existing show folders and just rename it to the name of your new show. Right-click on one of the existing show folders, select Copy, then right click anywhere else in the window and click Paste. You should now see a duplicate of the show folder you copied. Click on the name to rename it. NOTE: When renaming, use a name of 8 characters or less.

Open your new show folder, inside you'll see three folders, one for each scene. Inside the scene folder is where you put the sound file. The sound file must be in MP3 format, and must be named "000.MP3". You'll notice there are also eight 00x.BIN files in each scene folder, leave these files untouched, they are used by the ScareMaster to store the animation.

Have a look in the other scene folders and delete and sound files that were from the previous show. For example, if the show you originally copied had an Ambient sound, and this one doesn't, make sure you go into the Ambient folder and delete the 000.MP3 file.

FI-SHOWS FOLDER SOUND FILES		
FOLDER	**FILENAME**	**DESCRIPTION**
\FI-SHOWS\SHOW\AMBIENT\	000.MP3	Sound file for Ambient Mode
\FI-SHOWS\SHOW\INPUT1\	000.MP3	Sound file for Input 1 Scare
\FI-SHOWS\SHOW\NPUT2\	000.MP3	Sound file for Input 2 Scare

Cloning the Show to the Flex

Connect the BooBox Flex to any 12-24VDC power supply, then use the included patch cable to connect the ScareMaster's "To Controller" port to the BooBox Flex. The ScareMaster does not need a power supply, it will get power from the BooBox Flex.

Hold the ENABLE button and tap PLAY, you are now in the ScareMaster's menu. Scroll down to Clone Show, then press ENTER. You now have two options, SD Card (Fast) or Upload (Slow). The SD Card option tells the Flex to copy the show using the SD Card, the Upload option copies the show via the cable. The SD Card option is about twice as fast, for shows with lots of sound it's probably best to use that option.

Select one of the two options and press ENTER. Once the cloning is complete, press the 1 button a few times until you're back at the screen above.

Cloning a show copies all the animation and sound from the show folder to the BooBox Flex. Right now we're just concerned with copying the sounds. We'll re-record new animation in the next section. Once you've animated a show and saved the animation to the SD Card, Clone Show can be used to make identical copies of the animation and sound.

Animation

```
┌─────────────────────────┐
│ FI-206          IDLE    │
│ IN1-0     2CH   0:08    │
└─────────────────────────┘
```
ScareMaster's LCD

Animating a Show
Refer to the screen above. The top-left shows the current show name, if a show isn't open then it will show the device's model number. The bottom-left shows the current scene and sequence. In this case we're editing the Input 1 scene, sequence 0. Next to that is the number of DMX channels in use, ignore this when working with the Flex. The bottom-right shows the length of the current sequence in seconds.

Selecting a Scene
On the screen you should see the current scene you are editing in the top-left corner. "In1-0" is input 1's scene, to select another scene hold the PLAY button for a few seconds then use the A slider to scroll through the available scenes. The current length of the scene is shown in the bottom-right corner as you scroll through. Let go of PLAY when you see the scene you'd like to edit.

Recording a Scene
Press REC to start recording, whatever you do on the outputs will be recorded. Press REC again to stop recording.

Playing a Scene
Press PLAY to view the scene.

Erasing a Scene
Make sure all 8 outputs and both sliders are enabled, then just tap REC twice. Essentially all you are doing is recording a very short empty scene.

Recording Complicated Scenes
You can hold ENABLE and tap the output buttons to disable various outputs from recording. This way you don't have to program all the outputs at once. Once you are finished recording an output, disable it, then on the next recording pass it will play back rather than record.

Saving Your Scenes
As you animate the show, the animation data is only stored in the ScareMaster's internal memory. To save the animation you can either save it to the BooBox Flex's memory, or onto the SD Card. Saving to the SD card is good if you'd like to make copies of this show in the future.

To save the show only to the BooBox Flex, enter the ScareMaster's menu and select Save To Device, or use the shortcut of holding the ENABLE button and tapping RECORD.

To save the show to the SD card, enter the ScareMaster's menu, then scroll down to Save As Show. You will be asked which show to save the animation under, scroll down until you see the one you want, then press ENTER. This option will also save the animation to the BooBox Flex's memory.

Device Options

There are some other features on the BooBox Flex that can be accessed in it's Device Menu. To access them, connect the ScareMaster, enter the ScareMaster's menu, scroll down to Device Menu and press Enter. Inside this menu you'll find general options, as well as options for each scene. Some of these are detailed below:

General Options
Timer – Use this to trigger the prop on a schedule. The time you set here is the time between shows.
Reset Settings – Resets all the device settings back to factory defaults.

Scene Options
Pre-Delay – Delay from when trigger is tripped to when the scene will start playing
Post-Delay – Time that the Flex will ignore the trigger input once the scene has finished playing. Use this to prevent the prop from triggering too often.
Volume L – Volume of the left channel for this scene
Volume R – Volume of the right channel for this scene
N.C. Input – If the input is N.C. set this to YES
Interruptible – Set to YES if you want this scene to be interrupted if the other trigger is tripped during playback.
Momentary - Set to YES if you want this scene to only playback for as long as the trigger is activated, looping if necessary. This is great for actor-controlled props such as electric chairs where you want the actor to have control of exactly how long the prop is activated.