

Operating Manual

E3+



By HauntBots LLC

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NOTICE

It is the user’s responsibility to determine the suitability of this product for any given application. Do not use this device in any life-critical system or hazardous areas. An understanding of electronic terminology and practices are required to use this device. Mount the unit in a way that prevents exposure to moisture and within the parameters of any applicable codes.

1. Introduction

System Overview

The E3+ is a self-contained, 3-channel prop controller with relay outputs. The unit contains an integrated MP3 playback system and a 40-Watt Class D mono amplifier. The E3+ requires a low voltage power supply (12vdc – 24vdc). The controller has a sturdy aluminum case with mounting tabs.

Document Overview

The following terminology appears throughout this manual:

Controller or E3+ may be used interchangeably when referring to the E3+.

Ground, negative, or (-) may be used interchangeably when referring to the power supply connections.

The terms “Recording” or “Programming” may be used interchangeably when referring to the real time show creation process.

The terms “Show” “Program” or “Sequence” may be used interchangeably when referring to the animation data.

2. System Description

Specifications

- Programmed from front panel buttons
- Full color 128 x 128 TFT LCD display
- 8 Meg flash memory shared between MP3 and show storage
- 25 frames per second (almost 90 minutes of available show recording time)
- Up to 8-1/2 minutes of audio – Even more at reduced quality
- 40-Watt Class D mono amplifier
- Stereo Line out connection
- 3 Relay outputs rated for 3 amps
- Wire terminals accept wire as large as 14 gauge
- Trigger input- normally open or normally closed. -v(sinking) +v (sourcing) or contact closure
- USB connector to download audio files and backup shows
- Same rugged case as our other pro series controllers with no exposed circuit board
- 3-1/2” x 4-1/2” footprint
- Microcontroller runs 12 million instructions per second

Applications

The E3+ is intended for stand-alone operation of animatronic characters, prop control, interactive exhibits.

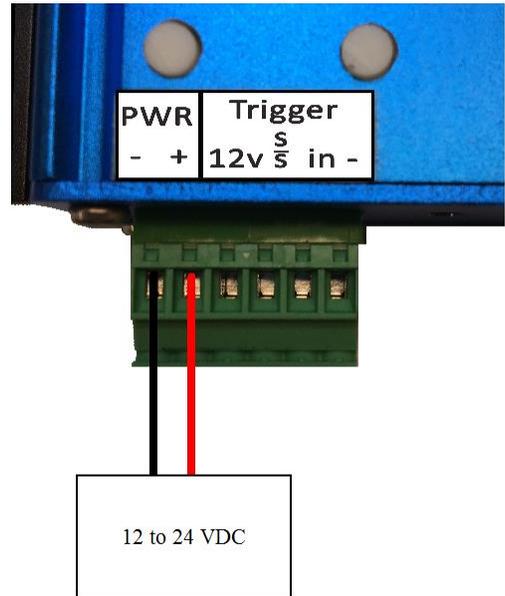
3. Hardware

Power Supply

The E3+ will operate on 12 to 24 volts DC. Connect the power supply to the terminals in the **PWR** section marked: **+ & -**

To produce the full rated 40 Watts of power from the amplifier, A 24-volt 2.5-amp power supply is required. If you intend to use the same supply for powering output devices (valves, relays, etc) additional amperage is required.

There are two extra **+** terminals for convenience on the output connector. The **+** terminals are internally connected. This provides extra terminals to attach other items requiring power.



Warning: The **12v** terminal in the **Triggers** section of the connector **is not** the same as the **+** terminals in the **PWR** section.

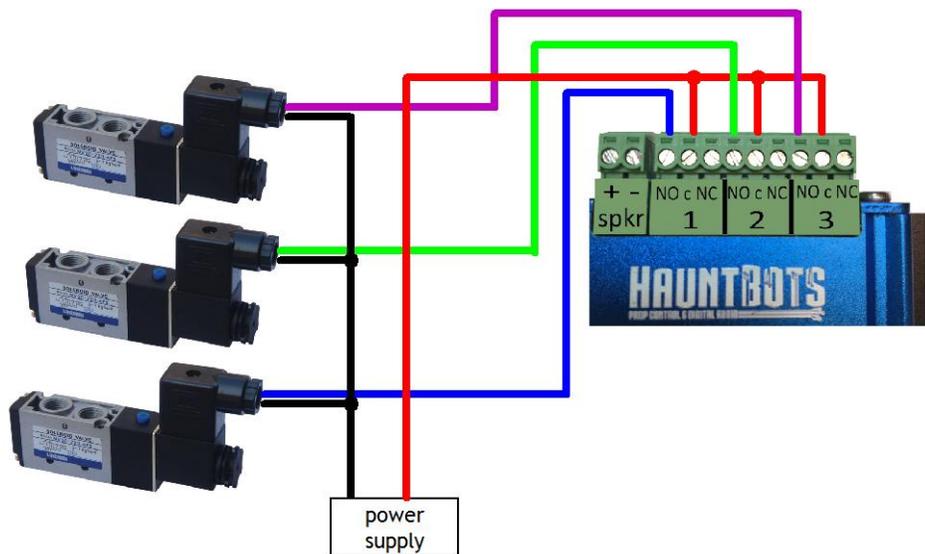
The **12v** terminal in the **Triggers** section is a 12vdc **output** from the E3+'s internal 12v regulator. This can be used to supply triggers that require power.

Outputs

The 3 outputs are driven by individual 5-amp relays.

The normally open and normally closed side of each relay is available

Note: Flyback Diodes should be installed across inductive loads like solenoid valves.



Trigger Input

The trigger input on the E3+ can accept a variety of trigger devices; contact closure & normally open or normally closed, sinking or sourcing

The function of the trigger and whether it expects a normally open or normally closed switch is configurable in the Setup Menu.

The S/S terminal is used to choose either sinking or sourcing trigger. To trigger with a – signal (sinking) connect the **s/s** terminal to the **12v** terminal.

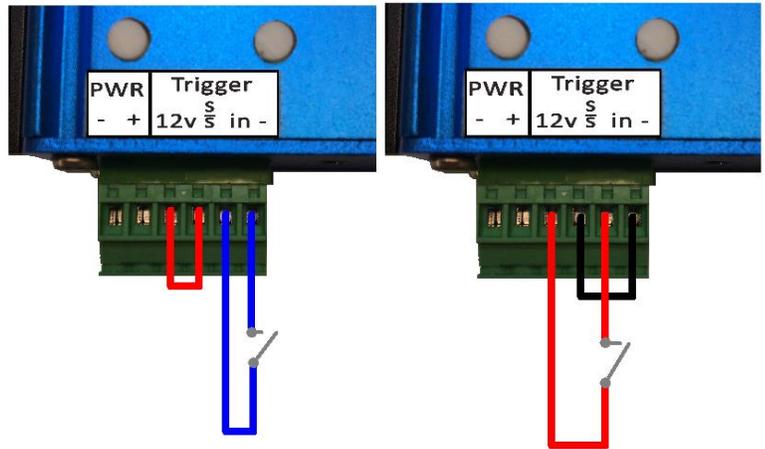
Then connect your switch between **-** & **in**

To trigger with a + signal (sourcing) connect the **s/s** terminal to the **-** terminal.

Then connect your switch between **12v** and **in**

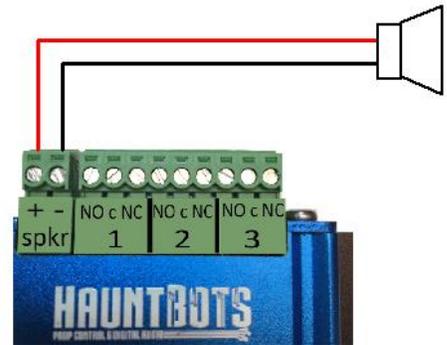
Warning: the + terminal in the Trig section is a special 12v out terminal to provide voltage to trigger devices requiring 12 volts.

Do Not apply external voltage to this terminal.



Speakers

The E3+ has a mono 40-Watt amplifier. This amp is connected to the left channel of the MP3 player. Connect speaker(s) to the + & - terminals with a minimum of 4 ohms total.



LCD Display

The integrated color LCD display provides feedback on all modes and functions.

This includes:

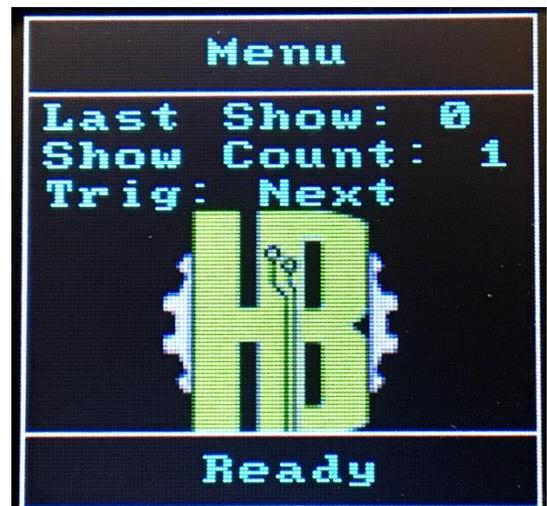
Menu options and values

Current show number

Countdown timers

Heartbeat

Output status



4. Programming

Basic Operation

The E3+ is programmed using the buttons on the front panel in conjunction with the menus on the color LCD display.

The buttons are context sensitive. This means their function will change depending on the current menu or parameter.

The button at the top of the controller is the Menu / Select button.

The bottom row of the LCD display will always display the button function for the current menu or parameter.

To enter programming mode, hold down the **Menu/Select** button for 3 seconds.

The Main Menu will appear on the LCD display.



Main Menu

Run Show: Allows you to run the current show manually.

Control Options: Allows you to edit global settings (these settings apply to all programs). The show count and trigger modes are examples of Control Options.

Edit Shows: Allows you to create new shows and modify existing shows.

Instructions: Displays a QR code that will download this manual.

Exit: This takes you back to the **Ready** system standby screen.



Use the **▲** or **▼** buttons to **highlight** the desired item, and then press the **Select** button.

Setup Options

Five global setup parameters determine the E3+ Behaviour. These settings are Show Count, Ambient Show, Trigger polarity, Trigger function, LCD, and Lock.

Step through the highlighted options with the **▲** or **▼** buttons.

Press the **Select** button to edit the value.

The current value will flash to indicate you are in edit mode.

Button functions will change depending on the parameter.

Press the Select button to accept your new parameter value.



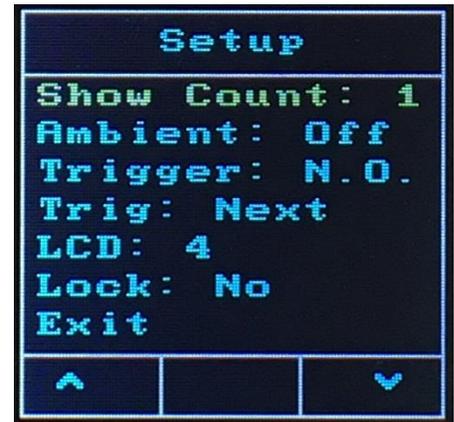
Show Count:

The E3+ can store up to 9 triggered shows. A show count value between 1 and 9 is valid.

Use the **- / +** menu buttons to modify the value. Press **Select** to accept the new value.

Ambient Show:

Determines whether the ambient show is enabled. When enabled, this show will play whenever a triggered show is not playing. This will be either **On** or **Off**.



Trigger Mode:

This setting selects either a normally closed or normally open trigger source. **N.C.** or **N.O.** are the only valid options.

Trig:

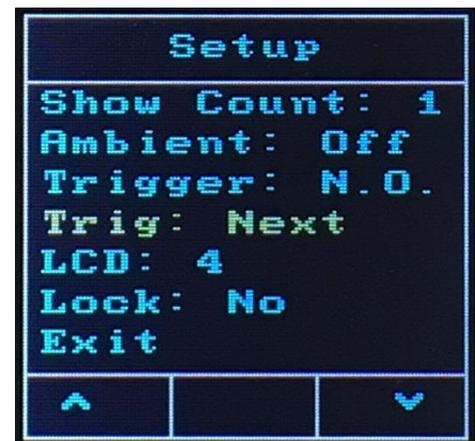
This setting determines what will happen when a trigger is received on the input.

Next: Plays the next show in the list. If there is only one show, it will be played every time a trigger is received.

Prev: Plays the previous show in the list (plays list in reverse order). If there is only one show, it will be played every time a trigger is received.

Show 1 – Show 9: Plays a particular show when triggered.

Note: This setting will only go as high as Show Count.



Edit Shows

Immediately following the **Setup Options** are the menus for configuring and programming the various shows stored in the E3+.

Use the **▲** or **▼** button to cycle through the available shows.

Press **Select** to enter the menu for a specific show.

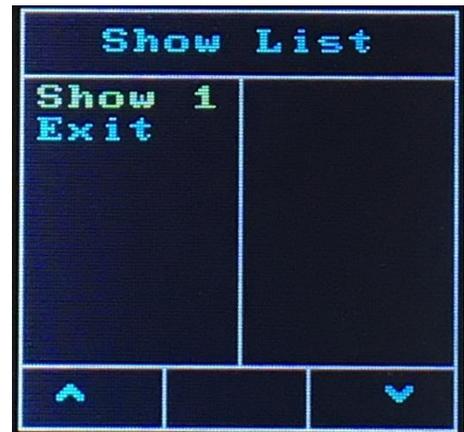
Here you can change parameters associated with the show or create / modify the show itself.



Show Menus

These menus display and allow editing of all show parameters. Each show (or program) has its own unique group of parameters/settings. Therefore, it is possible that show number 1 might have a different audio volume than show number 3, or show 2 shares the same audio clip as show 4. Perhaps show 7 needs a five second pre-show delay while the rest of the shows don't require any delay. All these combinations are possible.

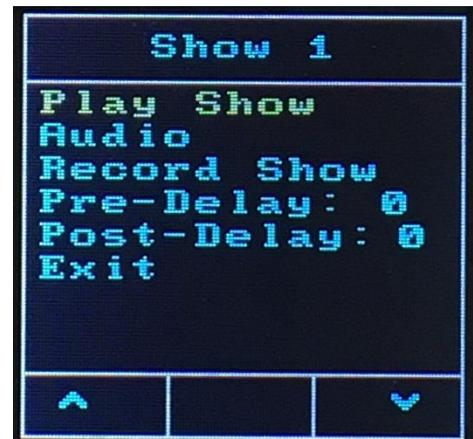
The show creation process is just as flexible. You can program all 3 outputs simultaneously or you can create the show in layers; recording one output sequence at a time. It is just as easy to come back a month later and re-record the sequence for just one or two outputs.



Play Show:

Pressing the **Select** button will cause the current show to play. During playback, the LCD will graphically display the output status. The various parameters associated with the show will also appear.

Pressing the **Menu / Select** button will halt playback.



Audio Menu:

The Audio menu enables you to select the desired Audio Clip, set the Volume, and Fade state.

Press **Select** to enter the Audio menu.



Audio Clip:

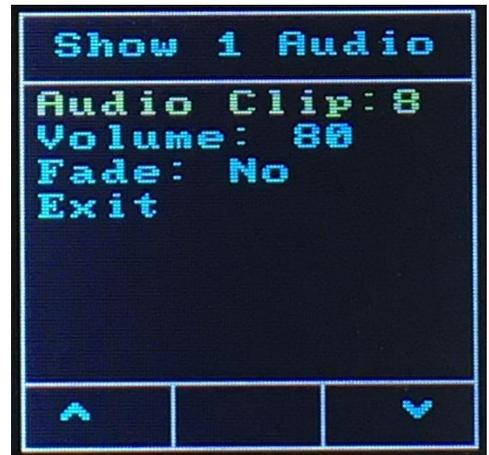
This parameter allows you to select the proper audio clip for your show from the library of audio clips.

Press **Select** to modify the clip number.

Press **A** or **V** to cycle through the available clips. You will hear each clip play as it is selected. Press **Select** to lock in the desired audio clip.

The number of audio clips available depends on their length. It is possible to store roughly 9 minutes of high quality, stereo MP3 audio in the E3+.

Audio Clip 0 will disable sound for this show.



Volume:

This parameter allows you to set the volume for each show.

Press **Select** to modify the volume.

Press **+** or **-** to raise or lower volume. You will hear the selected clip playing making it easy to set the proper volume.

Press **Select** to lock in the desired volume.



Fade:

This parameter works in conjunction with the **Over-ride** setting. Valid settings are **Yes** or **No**. When set to yes, the show audio will fade out rather than abruptly switching to the next show.

Press **Select** to modify the value.

Use the **Yes** or **No** buttons to choose the desired setting, Press **Select** to lock in the value.



Record Show:

This menu allows you to create a show or edit an existing show. Press **Select** to begin.

Shows are created in layers.

Pressing the 3 buttons on the bottom of the control will toggle the on-screen graphic from green to red.

When an output is red, it is armed for recording. When an output is green, it is in playback mode.

You can program all 3 at once or program them individually. It is also possible to program all 3 then go back at a later time edit just one. It is a very flexible system.

After selecting the desired outputs for programming, press the **Select** button.



This will begin a **3,2,1** countdown.

At the completion of the countdown, the controller will be live.

The selected **Audio Clip** will play at the selected **Volume**.

Pressing any of the three buttons will directly control the output assigned to it.

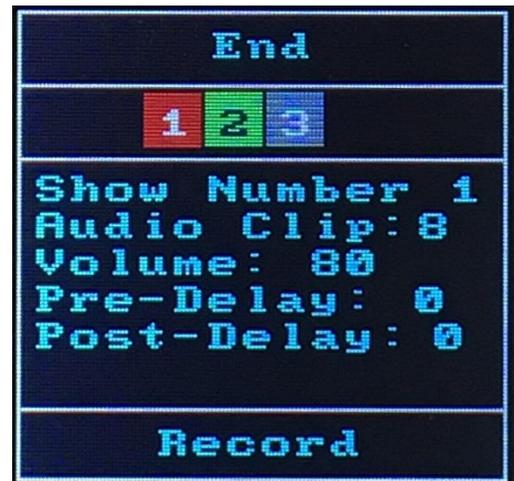
Note: The controller ignores buttons for any output not selected (green) for programming.

Instead, that output will play back any show data that was previously stored for it.

Continue pressing buttons creating the show sequence for as long as required.

Press the **End** button to end the programming sequence and set the show length.

The E3+ will jump back to the **Show Menu** allowing you to play back the show if desired.



Important information regarding show length:

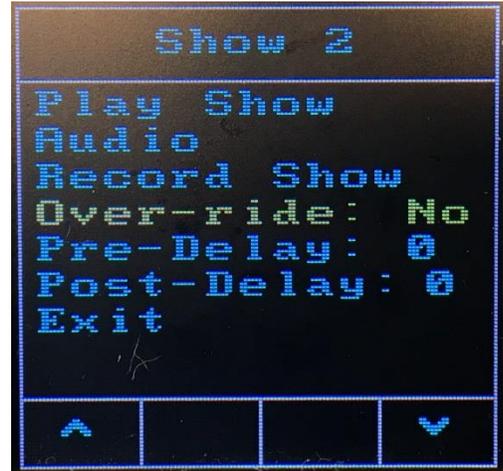
- It is possible for a show to last longer than its audio clip; there will just be silence- the audio will not loop.
- Creating shows shorter than the audio clip is also possible however, the audio clip will be cut off to match the show length.
- Any show will be as long as the last time you programmed it. For example- You create a 20-second show. Sometime later, you redo the sequence for just one of the outputs but you run slightly longer, say 22 seconds- Your show is now 22 seconds long.

Override:

This parameter is only active when the E3+ is in multi-show mode (show count is greater than 1). It determines if the trigger input is active while a show is playing. Valid settings are **Yes** or **No**.

When set to “Yes”, the trigger input is active and the show can be over-ridden or “stepped on”.

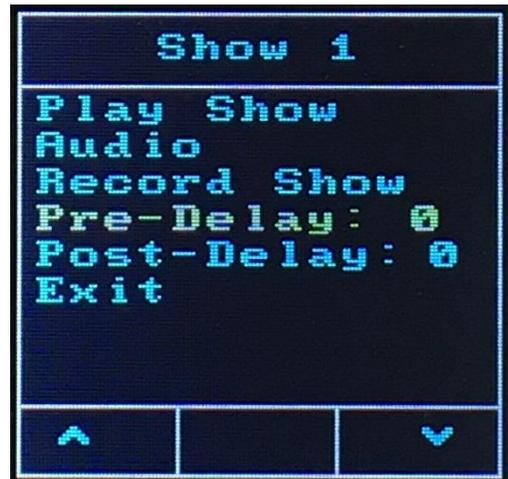
Press **Select** to modify the value. Use the **Yes** or **No** buttons to choose the desired setting, and then press **Select** again to lock in the value.



Pre-Delay:

This is the pre-show delay function of the E3+. A value of 0 to 99 seconds is valid. When triggered, the pre-show delay will count down on the LCD display prior to the show starting.

Press **Select** to modify the value. Use the **Up** or **Down** buttons to choose the desired delay, and then press **Select** again to lock in the value.



Post-Delay:

This is the post-show delay function of the E3+. A value of 0 to 99 seconds is valid. At the completion of the show, the post-show delay will count down on the LCD display. The trigger input will not respond while the countdown is in progress.

Press **Select** to modify the value. Use the **Up** or **Down** buttons to choose the desired delay, and then press **Select** again to lock in the value.

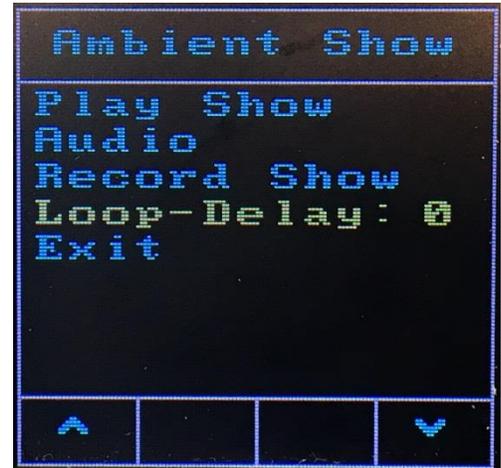


Loop Delay:

This parameter only appears on the ambient show menu.

This option takes the place of the pre and post show delay used with other shows.

A value of 0 to 99 seconds is valid and represents a time delay from the end of the ambient show until restarting it. Press **Select** to modify the value. Use the ▲ or ▼ buttons to choose the desired setting, and then press **Select** to lock in the value.



Instructions

This menu item takes you to a QR code that will be recognized by your smart device as a website address leading to this instruction manual.



Pressing any navigation button will return to the Main Menu.



5. Software Operation

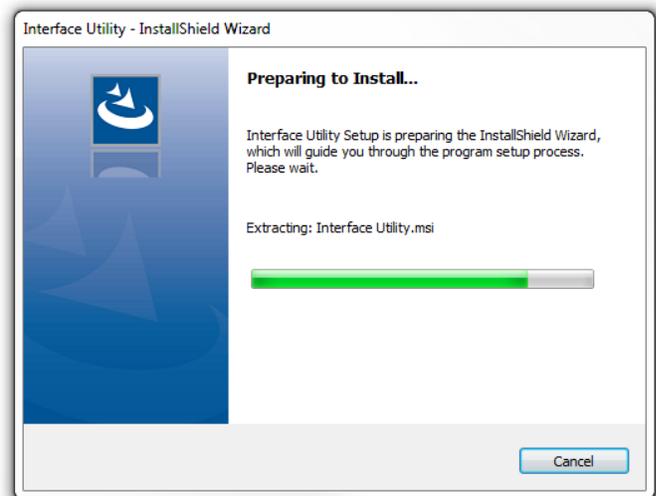
The computer interface provides tools that enable you to create an audio library for the E3+. It also enables you to read previously created shows from a E3+ via USB. These shows can be saved to your computer for backup, or to download to other E3+ controllers. Shows and audio files can be sent to a E3+ either via USB or microSD card. It is not possible to retrieve audio clips back out of the controller.

Software Installation

The installation package consists of a single file

- Interface Utility Setup.exe

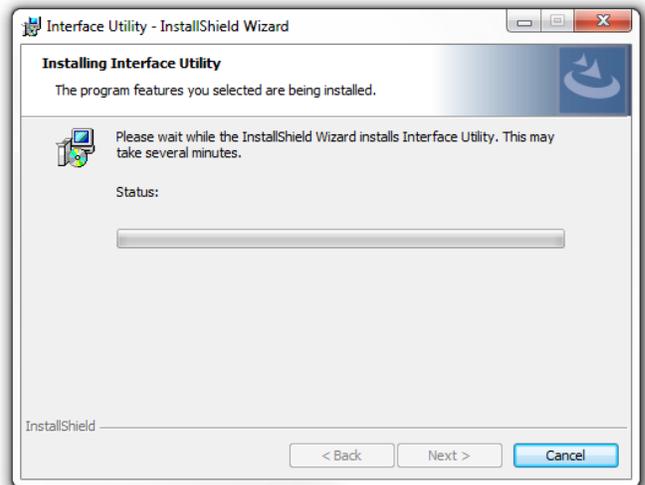
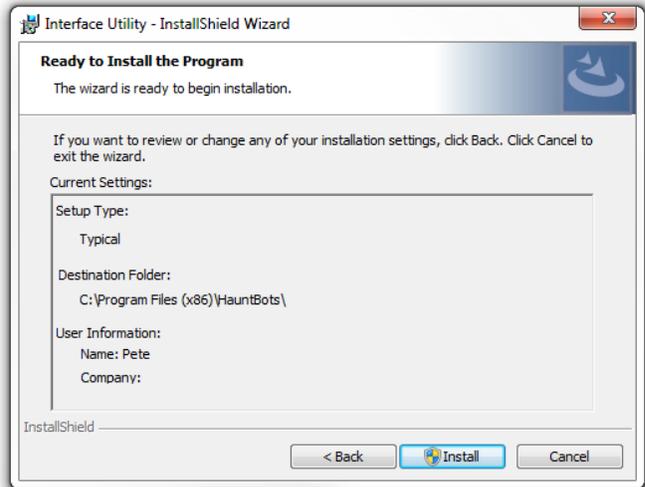
Double Click **setup.exe** to begin the installation.



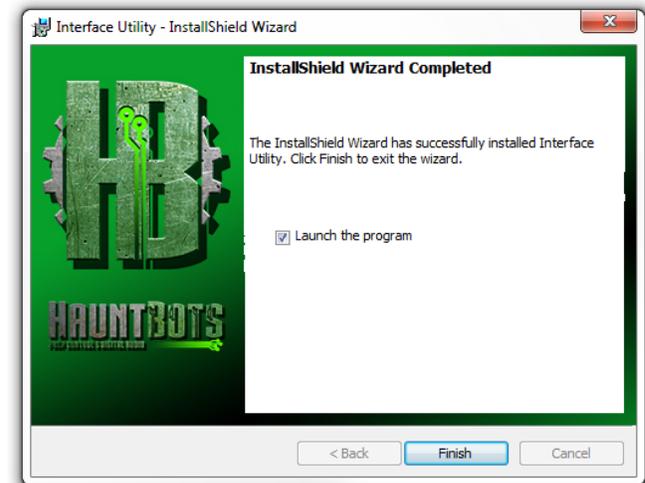
When the Welcome screen appears, click the **Next >** button.



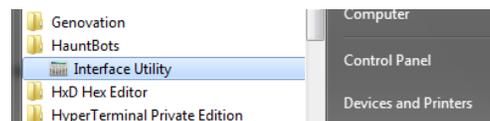
Click Install.



When the setup completes, click **Finish**



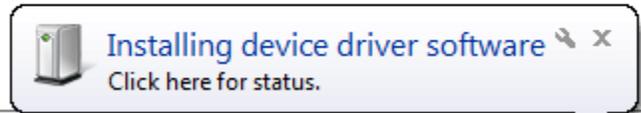
The Interface Utility will appear on your start menu in the HauntBots folder



Driver Installation

When you initially plug the E3+ into your computer, Windows will attempt to load an appropriate driver. If an E3+ or other HauntBots controller has not previously been installed, you will need to manually load the driver.

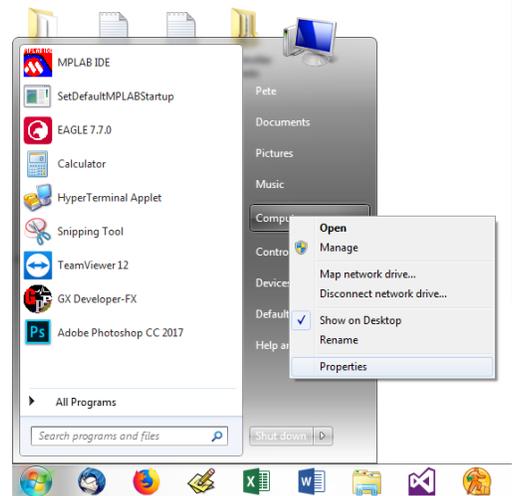
The exact screens will vary a bit between different versions of Windows. The E3+ will be recognized by Windows as **CCS USB to**. These instructions cover an install on Windows 7.



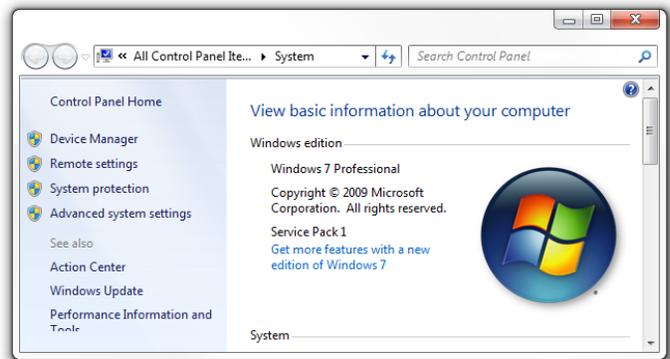
After the computer reports that the driver was not successfully installed, go to device manager to install it manually.



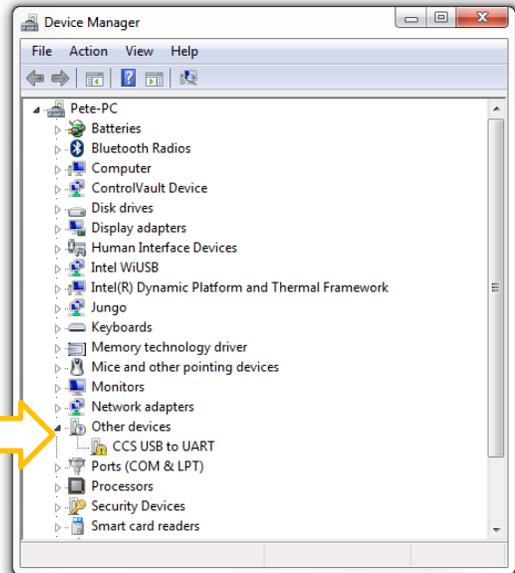
Click the Windows Start Button, right click on **Computer** then scroll down and click **Properties**.



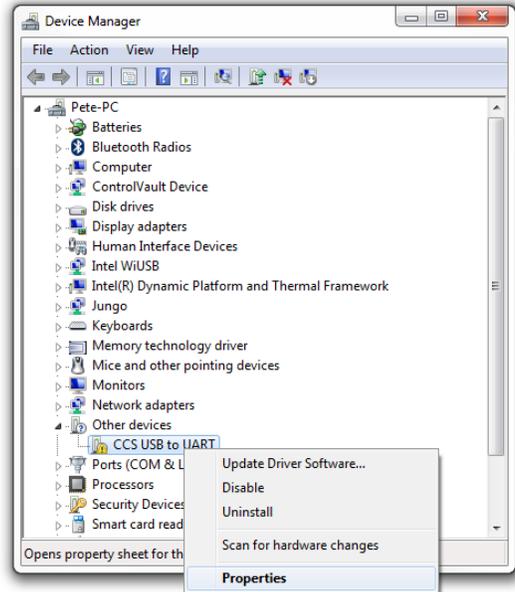
Click **Device Manager** in the top left column.



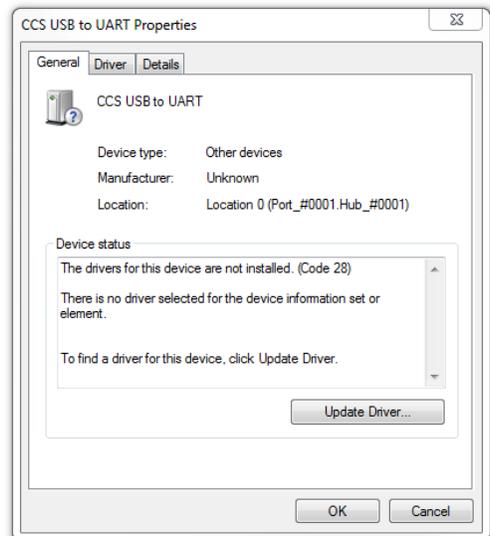
In device manager look in **Other Devices** for the **CCS USB to UART** device with the yellow exclamation point.



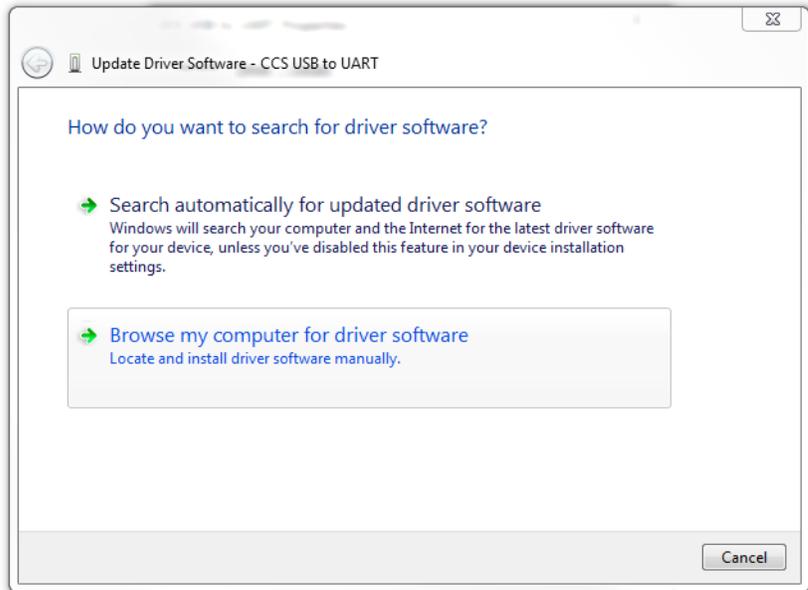
Right click on **CCS USB to UART** and choose **Properties**



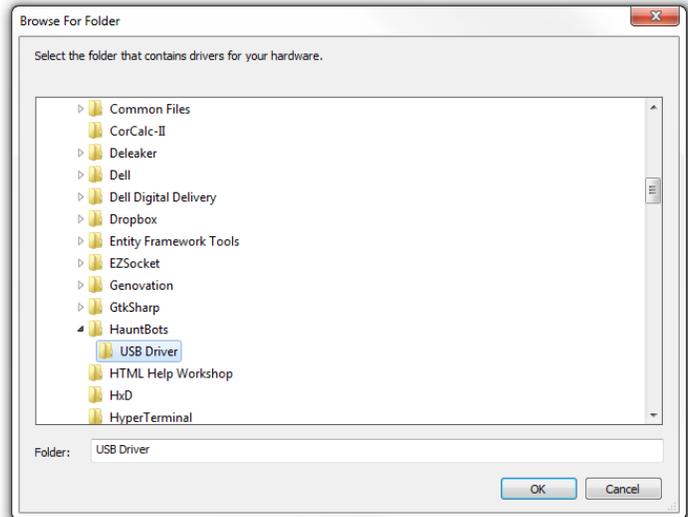
Click the **Update Driver** button



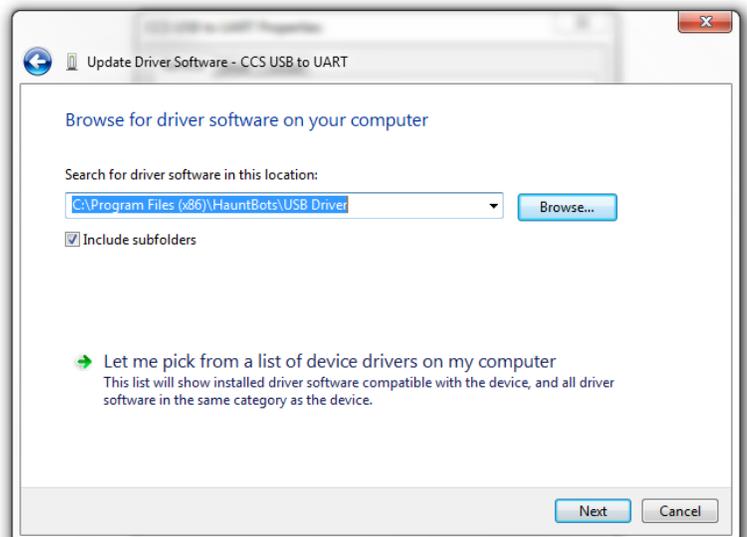
Click **Browse my computer for driver software**.



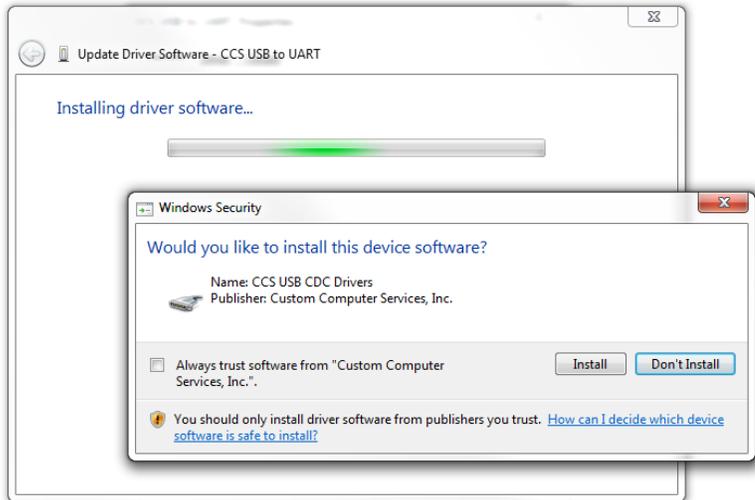
In the **Browse for Folder** window go to `C:\Program Files (x86)\HauntBots`. Select the **USB Driver** folder then click the **OK** button



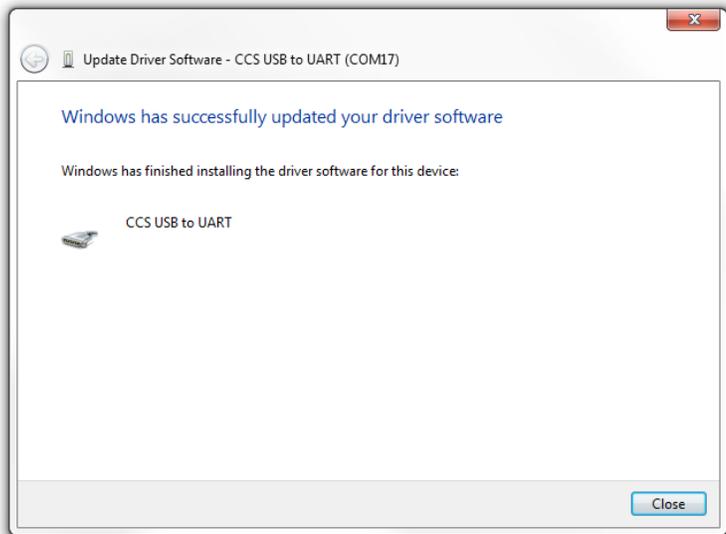
Click the **Next** button.



Click **Install** on the Windows Security screen.



The Driver installation will complete.

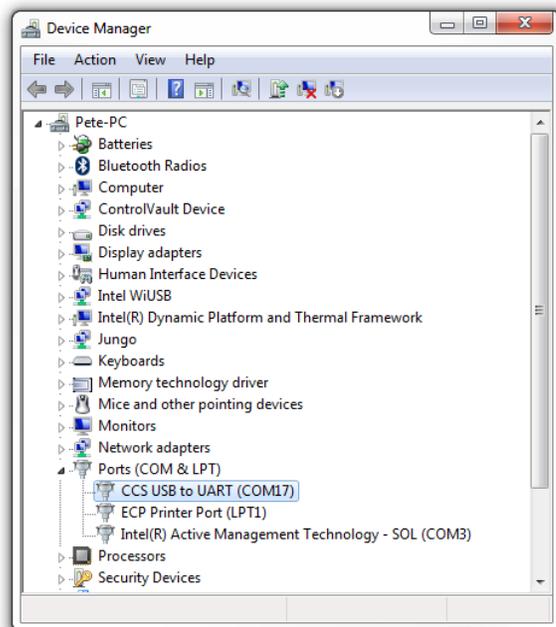


The CCS USB to UART entry will appear under:

Ports (COM & LPT)

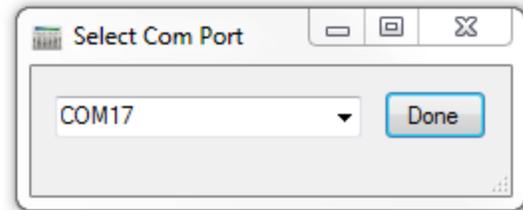
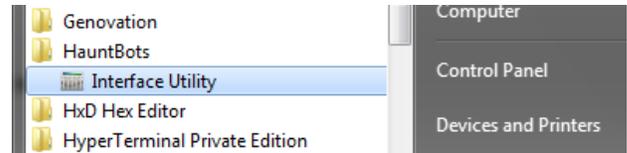
A Com number will be assigned to it. COM17 in this example.

NOTE: Earlier versions of the interface utility could only use com ports up to number 16. This new version does not suffer from this weakness.

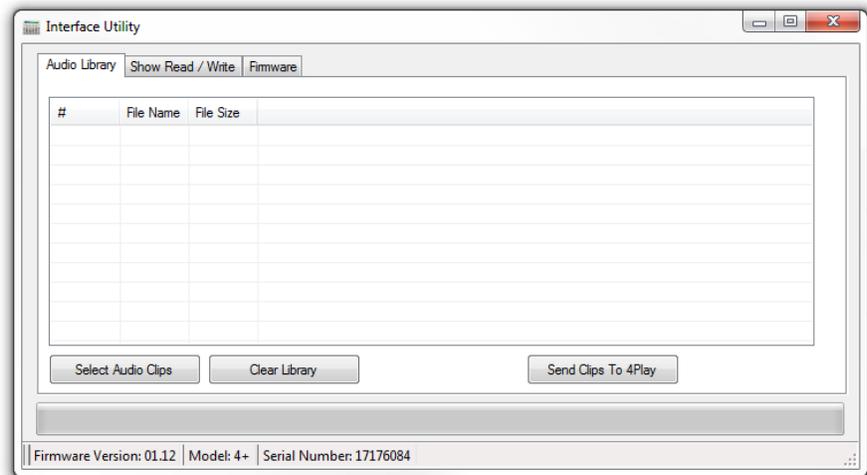


Starting the Software

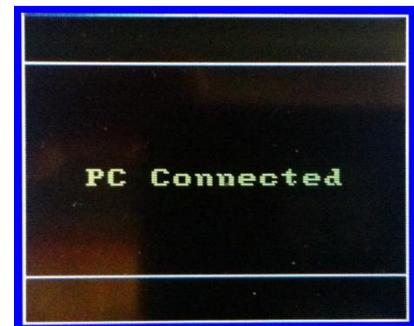
Start the “**Interface Utility**”, this can be found on the windows start menu in the HauntBots folder. A popup window will list all available com ports on your computer. Select the correct com port from the list for your controller then press “**Done**”



The main interface window will open. The screen is divided into three different tabs. The first tab handles audio library creation and downloading. The second tab handles reading and writing of show (animation) data. The third transmits firmware updates to the E3+. When successfully connected, the interface utility will report the Firmware Version, Model and Serial Number of the attached controller along the bottom status bar.



The E3+ LCD will display “PC Connected”



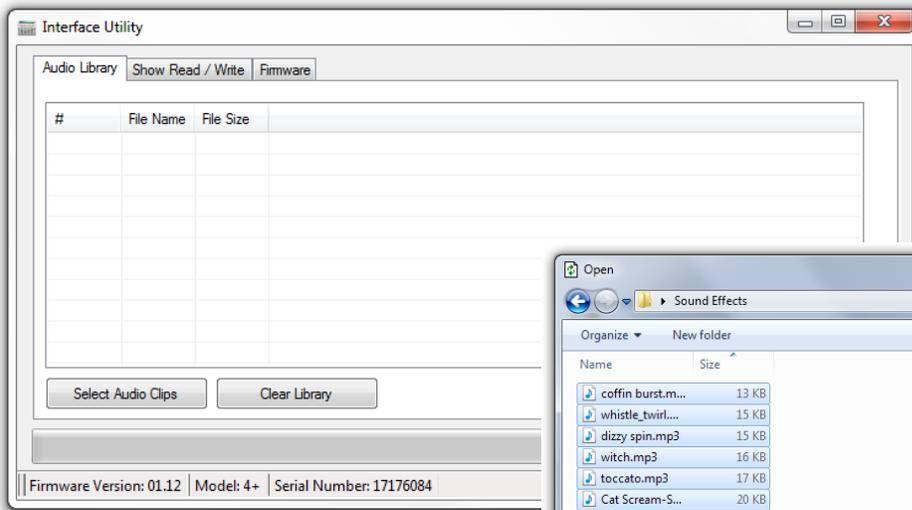
Creating Audio Library

The E3+ uses a library of audio clips. The library can contain a single audio file or as many files as will fit into the roughly 8 Meg of Ram space.

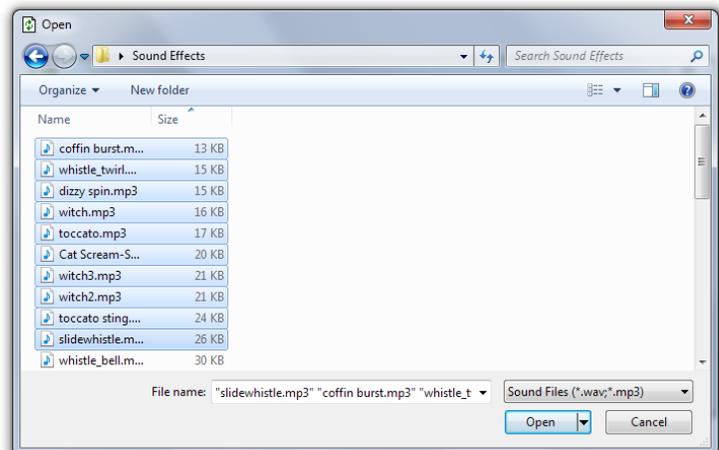
Note: Creating your own library and copying it to the E3+ will over-write the sample library that came with the unit.

To create a library, click the **“Select Audio Clips”** button. A computer browser window will open. Navigate to the folder containing the audio tracks you wish to use. The E3+ is capable of playing WAV or MP3 files; however, WAV files will consume large amounts of memory very quickly.

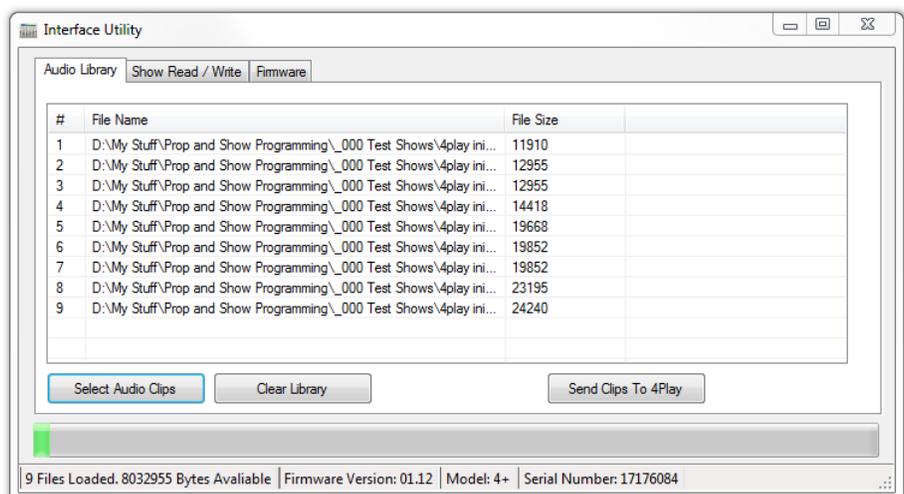
Select the audio file (or files) you wish to use. To select a list of files, click the first file then hold down the shift key while clicking the last file. To pick multiple files not in a row hold down the Ctrl key while selecting. Once all desired files are selected, press the **Open** button.



Alternately, it is possible to drag and drop audio files from your computer directly onto the Audio Library grid.



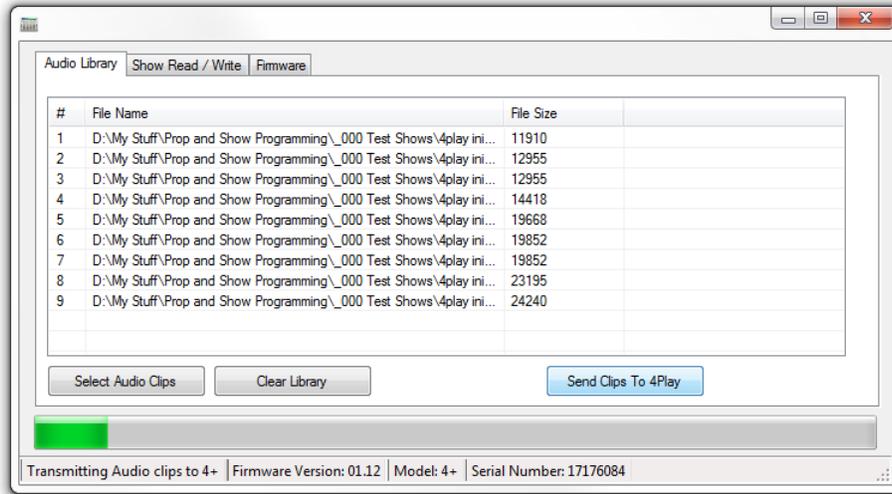
The selected files will appear in the grid. The # column will indicate the number assigned to the clip. The E3+ interface software keeps track of memory usage and only allows you to select files that will fit into the unit's memory.



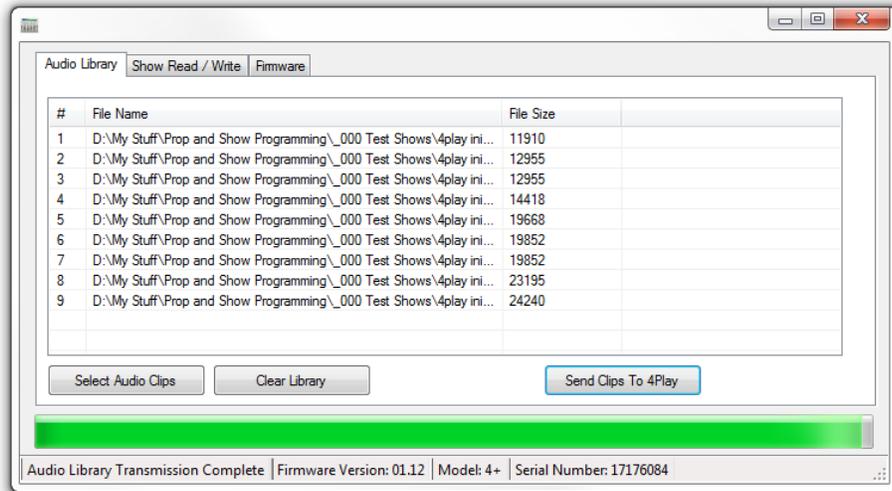
Audio Library Transfer

Click **“Send Clips To E3+”**.

The computer will first open the individual audio clips and create the package.



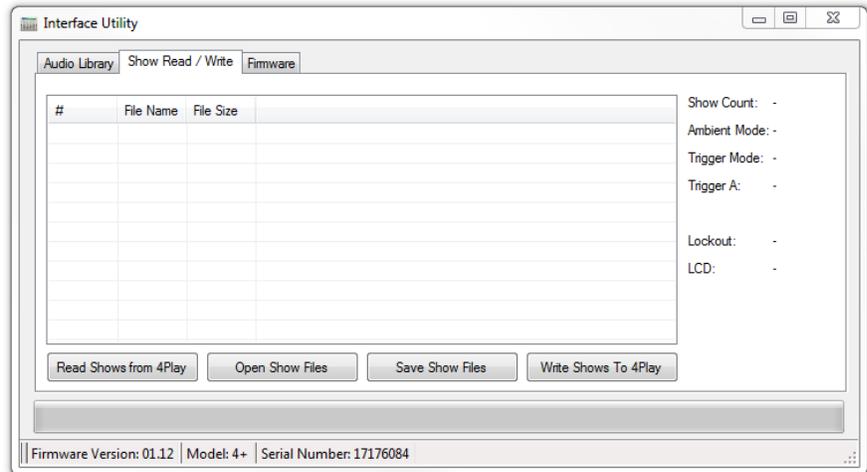
Then the clips will download to the E3+.



Depending on the size of the library, this can take several minutes to complete.

Read / Write shows

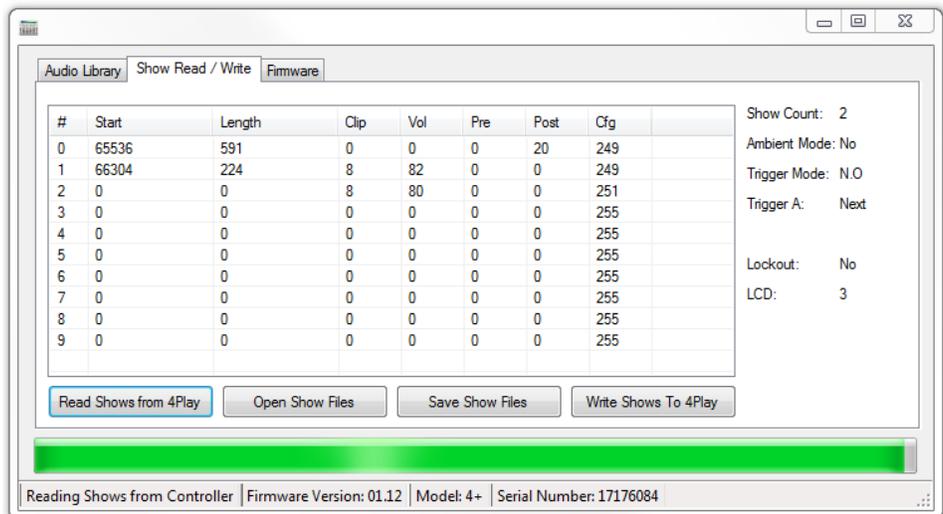
The **Show Read / Write** tab enables you to extract all shows from a E3+ and save them to your computer. Shows saved in this manner can be re-opened and written to another E3+.



Read Shows from E3+

Press **“Read Shows From E3+”**. The E3+ will transmit all data to your computer.

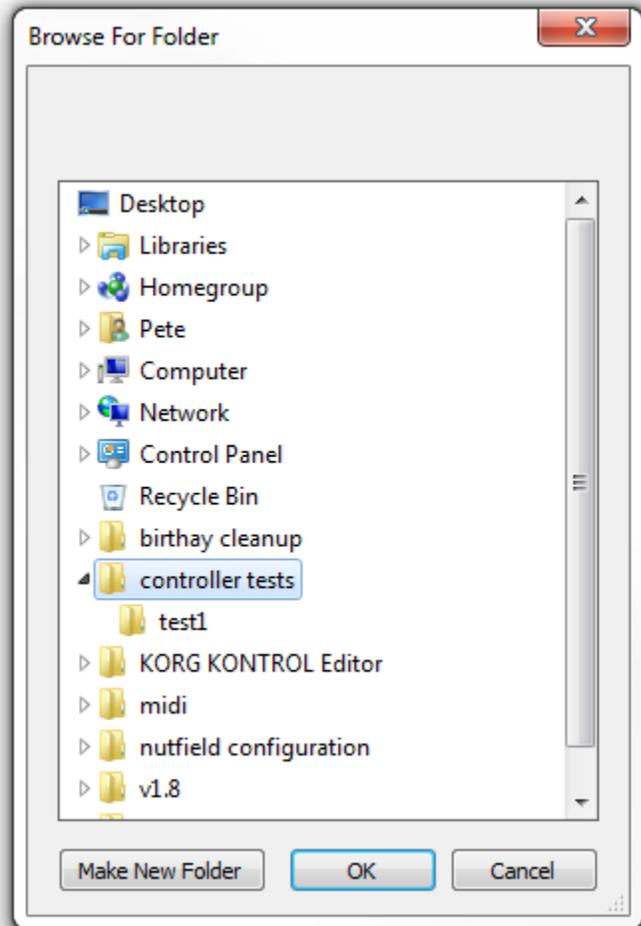
This data includes the animation show data, the pre-show delay, post show delay, and audio clip settings for every show in the controller. It also includes the controller setup options such as show count and ambient mode



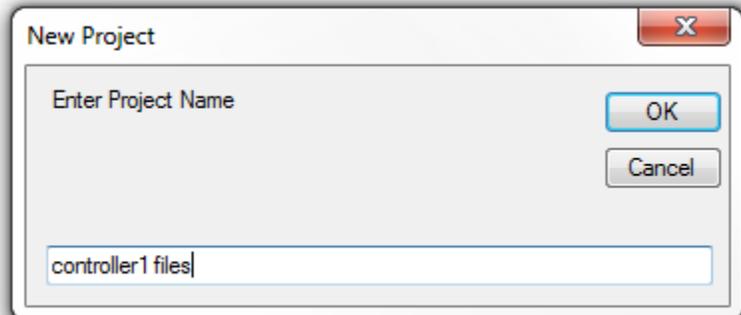
To save the show data on your computer, press the **Save Show Files** button.

The **Browse for Folder** window will open. Select the folder where you wish to save your show data. This should be the folder where you save all your show data from various controllers. In the next step you will be given the opportunity to create a sub folder for this show data. In this example we are choosing the “controller tests” folder.

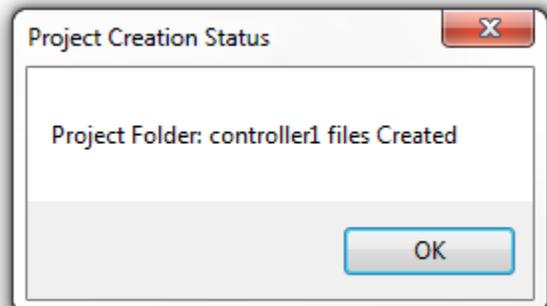
Press **OK** to continue.



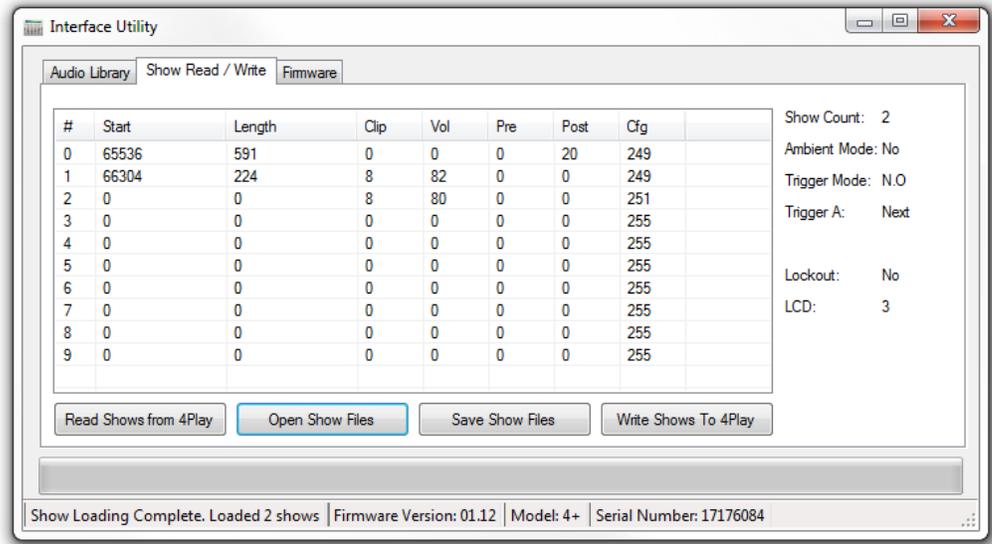
You will be prompted to give this show data a project name. This new project folder will be created in the folder selected above. For this example, we are calling the project “controller 1 files”



Press OK. The show data files are copied to the selected project folder and a popup confirms the status.



All shows and configuration data stored in the project folder will be loaded into the grid.



Write Shows to E3+

To write the shows to a E3+ via USB, load the desired project and press the **Write Shows To E3+**.

