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**ShockWave® 3 PC SW 5.0.2**

**ShockWave 3** Sound Module Application

Windows Software Manual

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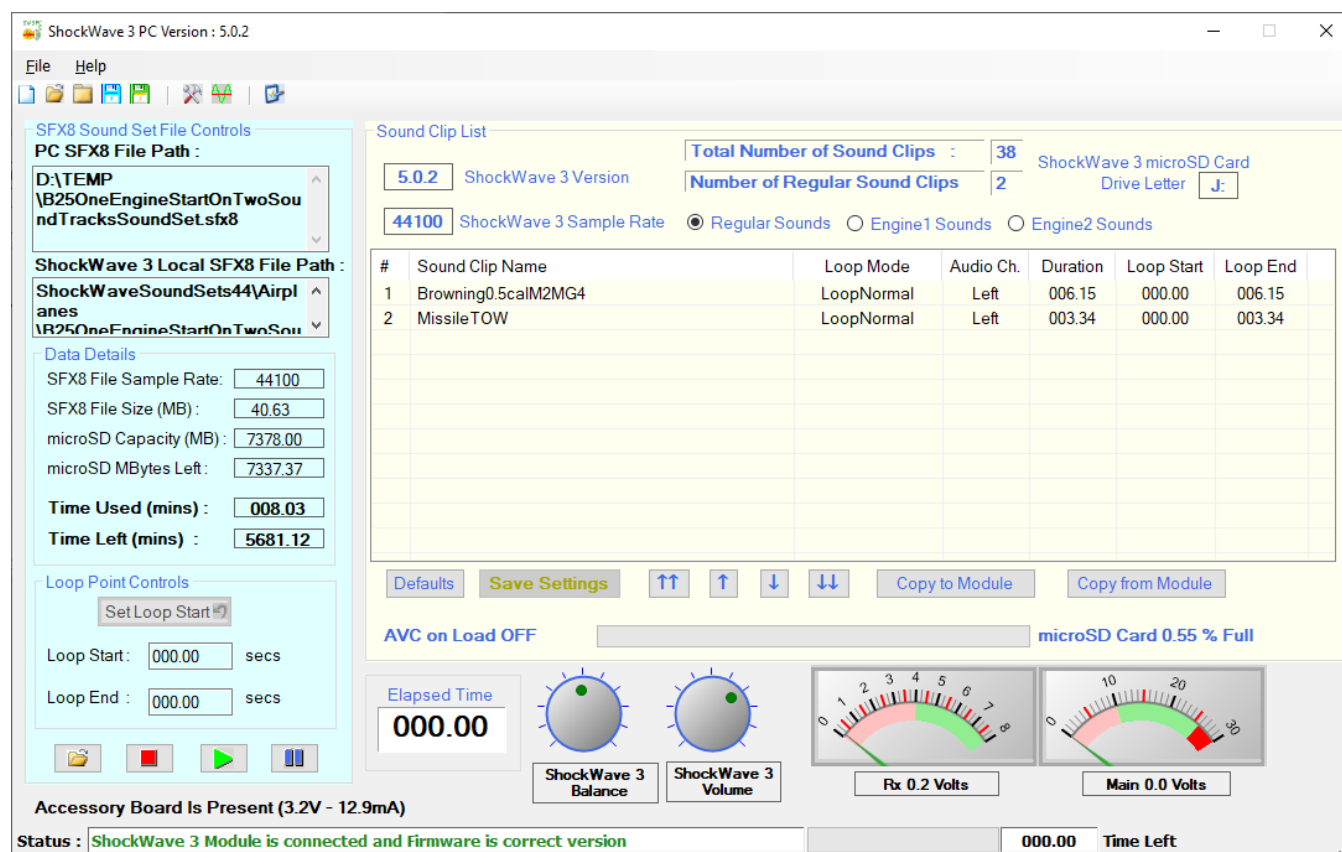
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## CHAPTER 1 – THE BASICS AND GETTING STARTED

### WHAT IS SHOCKWAVE 3 PC?

Figure 1: ShockWave 3 PC Main Window



**ShockWave 3 PC** is a Windows program that interfaces with a **ShockWave 3 Module** via a micro-USB 2.0 full speed (12MBits/s) interface. The micro-USB cable is identical to many mobile device USB cables so it is very likely that you already have a suitable cable. If necessary, one can be purchased from us. The **ShockWave 3 PC** application allows the user to build and edit **.sfx8** composite sound files **on the PC** that can be transferred to the **ShockWave 3** module. It also allows the **.sfx8** file stored in the module's microSD Card to be transferred to the PC where it may be edited and re-saved back to the module.

The microSD Card in the **ShockWave 3** module should be removed and inserted into either the microSD to SD card adapter that comes with the module or an optional USB microSD Card reader. All configuration operations that can be performed on the **ShockWave 3** with its microSD inside can be performed with the card inserted into the SD card adapter or USB card reader, with the exception of playing sounds on the **ShockWave 3** module. The transferring and saving of **.sfx8** files will occur much faster using the microSD Card in the SD card reader or USB card reader.



Individual sounds cannot be removed or added without saving the complete file which is a composite of all the sound clips, together with configuration data. This is done in order to maintain the data integrity of the complete set of sounds and their configuration.

**ShockWave 3 PC** interfaces to the **Audacity** sound file editor for editing at the waveform level.

A URL link to the **Audacity** installer website is included in the **Other Applications** folder on the microSD card.

Once **Audacity** has been downloaded and installed in its default location, you can select one or more sound clips in the Sound Clip List and edit them directly using **Audacity**.

## INSTALLING ON YOUR PC

Follow these steps to install **ShockWave 3 PC** on your PC :

1. Purchase our **ShockWave 3 PC** software application from our web site.  
After payment is received by Model Sounds Inc. they will send you an email with a manually created customized link from where you can download the installer file. This is a manual process, so please be patient.
2. Once downloaded from our web server, save the downloaded **ShockWave3PC5.0.2Setup.zip** file in a safe location that you remember. This is a ZIP file, so open it to retrieve the actual **ShockWave3PC5.0.2Setup.exe** installer file that is inside the ZIP file.
3. Launch the **ShockWave3PC5.0.2Setup.exe** installer file by double-clicking on it.
4. Follow the steps and answer the prompts as the installer program proceeds.

## BEFORE YOU LAUNCH SHOCKWAVE 3 PC APPLICATION

Before launching the ShockWave 3 PC Application, **PLEASE REMOVE THE microSD CARD FROM THE MODULE** and insert it into the provided microSD to standard SD adapter, then insert that into your PC using an available SD card reader slot, or use an optional USB microSD or SD Card reader.

This is essential, since the file transfer rate will be **MUCH** higher and more reliable if the microSD card is plugged into a Card Reader than if you rely on the **ShockWave 3's** built in microSD card reader, which is much slower.

Launch the **ShockWave 3 PC** application **AFTER** the microSD Card has been plugged into your PC. The **ShockWave 3 PC** application will search all "disk" drives for the first one that has the label **SHOCKWAVE3**. You must have **ONLY ONE** drive with the label **SHOCKWAVE3**.





## CONNECTING YOUR SHOCKWAVE 3 MODULE TO THE PC

1. Switch on your radio transmitter and then receiver when it is connected to the **ShockWave 3** module. The red/green LEDs on the sound module will flash rapidly for about six seconds (or a programmable delay – [see later](#)) while it is waiting for the receiver to initialize and produce valid outputs. **This wait period is adjustable down to three seconds or up to 20 seconds using the [Control Panel->Hardware Tab](#).**
2. Connect a micro-B USB cable between the module and your PC. The micro-B USB connector on the **ShockWave 3** module is the same type as used on many mobile devices, so you probably already have a suitable cable. The blue LED will flash about once per second. This shows that the Windows operating system is sending USB queries to the sound module as it is querying the status of the module about once per second.

The **ShockWave 3** module can be USB powered while connected to the PC.

**Note :** The USB port powers the **ShockWave 3** low level circuitry, but not the audio power amplifier which requires its own 4.5 – 26 Volt power supply if you want to hear the sound from the module's loudspeaker while it is connected to the PC.

3. The **ShockWave 3** module does not require any custom USB drivers – the USB drivers it uses are already built into the Windows operating system. When the **ShockWave 3** is plugged in to the computer for the first time, Windows will automatically load the required drivers.

### Power up the Transmitter and Receiver First Before You Connect the USB Cable

Whilst the module will connect to the PC and be powered by the USB connection without the transmitter and receiver being connected and powered on, you will not be able to perform any R/C related activity in the **ShockWave 3 PC** Software application.

If you then connect the receiver to the module with the transmitter switched on, and the USB cable is still connected, one or more sounds may start playing since it has not been initialized properly.

If this happens, remove power to the module and re-start with the transmitter/receiver and sound module powered on first **BEFORE** the USB cable is connected. Wait until the red/green LEDs have stopped flashing and the "Sound System Ready" announcement (if enabled) has been heard **BEFORE** connecting the USB cable.



## SHOCKWAVE 3 PC FILE FORMATS

**ShockWave 3 PC** supports adding individual sound clips as either **.WAV** and **.MP3** files.

WAV files are uncompressed audio format files and are higher quality than MP3 files, although they take up more space. However, with the microSD card supplied with the **ShockWave 3**, storage space is no longer an issue. When adding a **.WAV** or **.MP3** file to **ShockWave 3 PC** it has to be of the required format for the module, so **ShockWave 3 PC** will automatically convert the file to the required format – i.e. 16-bit signed samples, monophonic, sample rate 4100 samples/second. The composite sound file that is saved to the module is a **.sfx8** file type.

## SHOCKWAVE 3 PC 3 PC CAN READ EITHER .SFX7 OR .SFX8 SOUND FILES

The older ShockWave 2 sound module used composite sound files with a **.sfx7** file extension.

The **ShockWave 3 PC** application can read those files as well as its own **.sfx8** format files.

As of the date of this document, the internal format of the **.sfx8** is identical to that of the **.sfx7**, but this may change in the future to support new features.

The **ShockWave 3 PC** application will write files only with a **.sfx8** file extension. This is primarily so that you can have **ShockWave 3 PC** and the older SFXPC4.1.3 applications installed simultaneously. Double clicking on a **.sfx8** file will open that file using **ShockWave 3 PC** and double clicking on a **.sfx7** file will open it using the **SFXPC4.1.3** application.

## THE SHOCKWAVE 3 SOUND MODULE AND ITS MICROSD CARD

The **ShockWave 3** module uses a removable microSD Card to store its digitized sounds, as well as various configuration and hardware settings. Thus it is very easy to add or change the sounds on a **ShockWave 3** module by simply plugging in a different microSD Card containing the new files.

The microSD Card connector on the **ShockWave 3** module is a push-push type. You push the card in to insert it and push it again to remove it. When inserting the microSD Card, make sure it is pushed fully home so that the latching mechanism prevents it from accidentally being removed.

To remove the card, push it in again and it will spring out so that it can be removed fully. **It is recommended to put a piece of adhesive tape over the microSD Card and its connector to prevent accidentally removal of the card.**

When the **ShockWave 3** module has its microSD Card inserted and it is connected to a Windows PC through its USB port, it will appear as a “USB Mass Storage Device”, i.e. a new removable “external drive” will appear in Windows Explorer. The name of this “drive”, or its disk label, is always **SHOCKWAVE3**.



**DO NOT re-label the ShockWave 3 microSD Card as any other name.** The **SHOCKWAVE3** disk label is searched for by the **ShockWave 3 PC** Software to detect the necessary files on the module.

The **ShockWave 3** module can be connected to the PC either with or without its microSD Card. If the microSD Card is missing, you will get a warning dialogue box, but this is for information only. The dialogue box can be closed and the module will still be detected. However, the Red LED will now flash quickly to indicate that the microSD Card is missing.

## HOW TO OPEN .SFX8 SOUND SET FILES

When you want to make changes to any of the **.sfx8** files stored on the **ShockWave 3** microSD Card using **ShockWave 3 PC**, **DO NOT** edit them directly on the microSD card whether it is inserted into the sound module or inserted into a card reader on your PC.

**ALWAYS** make a copy of that file and store it locally on your computer and open the copied file using **ShockWave 3 PC**.

Especially **DO NOT** access the **.sfx8** file on the microSD card using **ShockWave 3 PC** while the card is inserted into the sound module.

## FILE STRUCTURE ON THE SHOCKWAVE 3 MICROSD CARD

The files on the **ShockWave 3** microSD Card must be in a certain format and structure. In the microSD Card Root Folder there is the following file:

1. **SELECT\_YOUR\_SOUNDSET\_HERE.txt**. This file should contain two lines as follows:  
First line naming the **folder** containing the **.sfx8** file you wish to use.  
Second line naming the **.sfx8** file in that folder that you want the **ShockWave 3** module to use.

Example:

ShockWave 3SoundSets44\Airplanes

SpitfireMerlinSoundSet.sfx8

In this example, when powered up, the **ShockWave 3** module will expect there to be a **.sfx8** file named "SpitfireMerlinSoundSet.sfx8" in the ShockWave 3SoundSets44\Airplanes folder on the card.

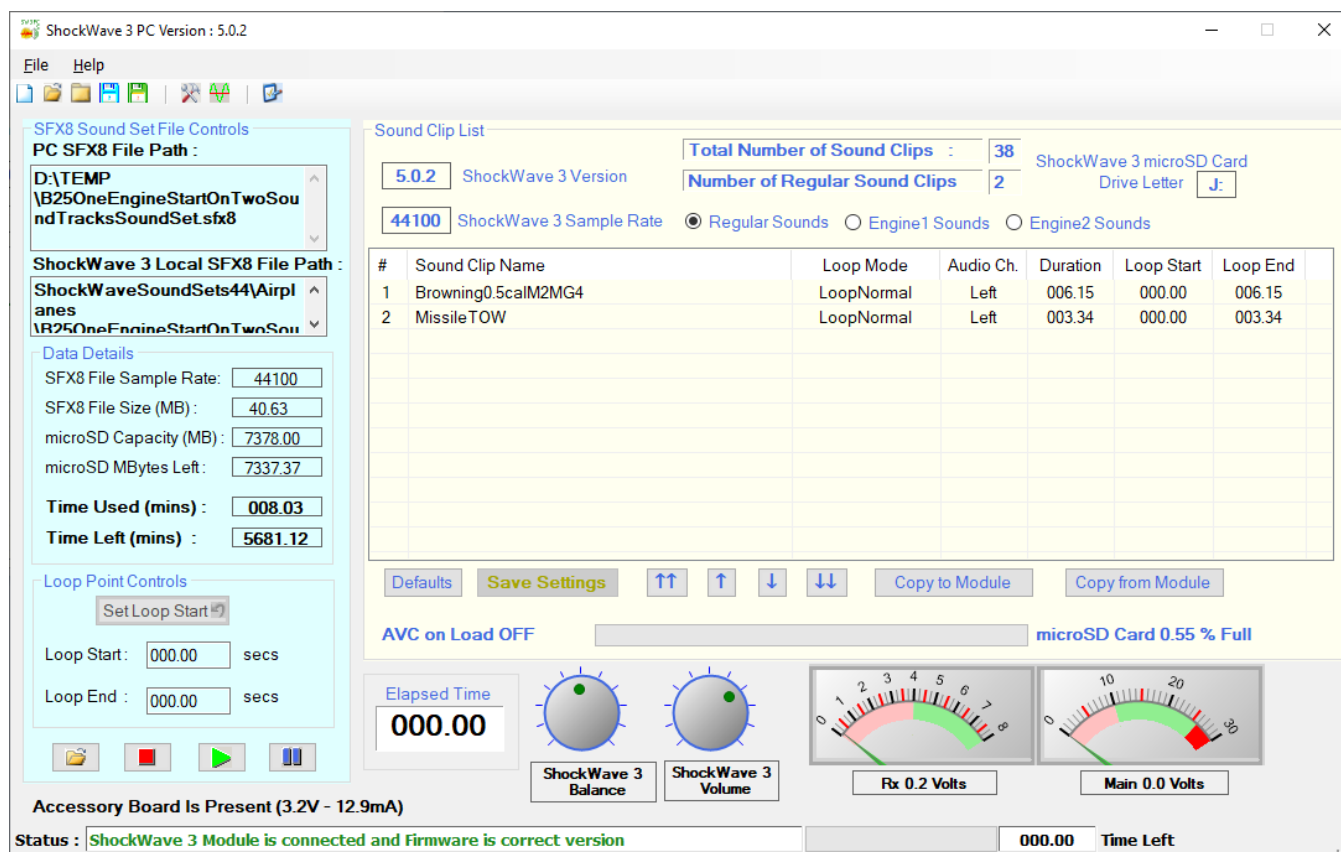
In this way you can have many **.sfx8** sound sets on the microSD Card and they can be changed at will by simply editing the **SELECT\_YOUR\_SOUNDSET\_HERE.txt**. Each time this information is changed the module should be powered down and then powered up again.



## CHAPTER 2 – THE MAIN WINDOW

Open **ShockWave 3 PC** by double clicking on its icon on the desktop, or in the Start Menu. The main window will appear. This window can be minimized, but not maximized. The preferred screen resolution is 1280 x 1024 or higher. This main form can be as large as 1254 x 683 pixels so it will occupy most of your screen. This window is re-sizable – i.e. it can be stretched to show more information, but cannot be shrunk below a certain minimum size.

Figure 2: ShockWave 3 PC Main Window



The main window contains:

1. The [Menu Bar](#).
2. The [Tool Bar](#).
3. The [SFX8 Sound Set File Controls](#) on the left side, colour coded Light Cyan – a light blue.
4. The [Sound Clip List](#) to the right, colour coded Ivory.
5. Various meters and indicators.
6. The [Status Bar](#) at the bottom.



## THE MENU BAR

Figure 3: The Menu Bar



ShockWave 3 PC Version : 5.0.2

The menu bar contains two menus – File and Help. The File menu contains the usual Open, Save, Save As and Exit commands.

File Help

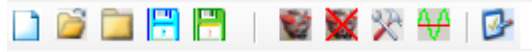
The Help menu gives easy access to the **ShockWave 3** Hardware, Software and DopplerFX reference manuals. These manuals are also on the microSD card in the Manuals-Instructions folder.

## THE TOOL BAR

Figure 4: Tool Bar (Regular Sounds)



Figure 5: Tool Bar (Engine Sounds)



The Tool Bar includes sets of buttons that have identical behaviour to their respective File Menu Item in the **Menu Bar**. Each button in the Tool Bar has **ToolTips** to inform you of its function.

## ELAPSED TIME INDICATOR

An **Elapsed Time Indicator** shows the amount of time elapsed while a Sound Clip is playing on the PC.

Elapsed Time

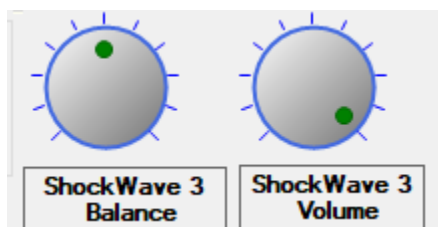
000.00

shows the amount of time elapsed while a Sound

Clip is playing on the PC. If the sound clip has reached the end and is looping, this indicates the total time from the start.

## VOLUME AND BALANCE CONTROLS

Figure 6: Volume and Balance Controls



These knobs indicate the position of the Volume and Balance controls on the **ShockWave 3** module. These indicators are **read only** – they only display the actual settings on the ShockWave 3 module.



## VOLTAGE INDICATORS

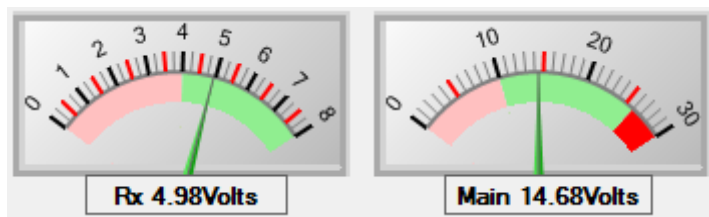


Figure 7: Voltage Indicators

The main form also features two analog/digital voltage meters that give real time voltage readings of the receiver and main battery voltages.

## SFX8 SOUND SET FILE CONTROLS

Figure 8 : SFX8 Sound Set File Controls

**SFX8 Sound Set File Controls**

**PC SFX8 File Path :**

D:\TEMP  
SpitfireMerlinSoundSet.sfx8

**ShockWave 3 Local SFX8 File Path :**

ShockWaveSoundSets44\Aircr  
aft\SpitfireMerlinSoundSet.sfx8

**Data Details**

SFX8 File Sample Rate: 44100

SFX8 File Size (MB) : 51.47

microSD Capacity (MB) : 7378.00

microSD MBytes Left : 7326.53

**Time Used (mins) :** 010.19

**Time Left (mins) :** 5678.96

**Loop Point Controls**

Set Loop Start

Loop Start: 000.00 secs

Loop End : 000.00 secs

Icons: Folder, Stop, Play, Repeat

The **SFX8 Sound Set File Controls** show details about the .sfx8 Download File that has either been opened using the **File->Open** menu item or its **Open Button**, or has been retrieved from the **ShockWave 3** module.

The **PC SFX8 File Path** indicates the file path on the PC of the PC .sfx8 file that is currently open.

The **ShockWave 3 SFX8 Local File Path** indicates the local path on the ShockWave 3 module that is defined in its SELECT\_YOUR\_SOUNDSET\_HERE.txt file.

The **SFX8 File Sample Rate** indicates the sample rate of sound clips in the PC .sfx8 file that is currently open.

The **SFX8 File Size** indicates the size of the PC .sfx8 file that is currently open.

The **microSD Capacity (MBytes)** field indicates the number of megabytes available for data storage on the microSD Card.

The **Total Size (MBytes)** field indicates the total number of bytes used for all the data, including the configuration. The **microSD MBytes Left**, **Time Used** and **Time Left** fields are self-explanatory.





## PLAYING A SOUND CLIP

Once sound clips have been added to the [Sound Clip List](#) they can be played through the PC loudspeakers using the Play, Stop and Pause buttons.



You can also play any sound clip by double clicking on it – if this has been set up in the Preferences dialog. This is the default behaviour.

## SET LOOP POINT FUNCTION

**ShockWave 3 PC** allows you to define a **Loop Point** somewhere during the playback time. The first time the sound clip is played, it will play from start to finish, and then it will start playing from the **Loop Start Point** until the **Loop End Point** and keep doing so as long as that sound clip is switched on.

This **Loop Point** can be set while a sound clip is playing by clicking on the **Set Loop Point Button** when the sound has reached the **Loop Point** you want.

Alternatively, if you want to set the **Loop Point** precisely, you can enter the **Loop Start** and **Loop End Time** to 4 decimal places in the text boxes :

Loop Start :  secs  
Loop End :  secs

You can optionally choose to have the **Loop Start** and **Loop End** points automatically trimmed or adjusted to the nearest positive going zero crossing point. If this is done, there is a much smoother transition in the sound from the Loop End point to the Loop Start point.

This auto-trim option is set in the [Preferences Form](#), shown later. It defaults to **ON**.

There are two possible values for the Looping type – **Play Once** and **Loop Normal**. [These are explained in detail later.](#)

## SETTING THE ENGINE START-UP LOOP POINTS

The Engine Start-Up sound **MUST** have an idle section at its end and its **Loop Start Point** set to the start of this idle sequence. This section of sound is used as the idle sound when the throttle is in the idling position. If you do not set the Loop Start Point this way, the engine sound will loop back to its start, and play the start-up sequence continuously.

The **Throttle Ranges** feature allows the engine sounds to be each assigned a specific range of throttle stick travel based on a percentage of the total throttle stick throw from its off or centre position. This will be explained fully later.



In the Engine 1 and Engine 2 Sound Clip Lists, the Engine Shutdown sound is **ALWAYS** the **first** in the list, and the Engine Start-up sound is **ALWAYS** the **second** Sound Clip in the list. This is because with the **Throttle Ranges** feature, the engine Start-up sound cannot have its range start at 0%, otherwise, the engine sound will start up without any throttle stick movement.

## THE SAVE SETTINGS BUTTON

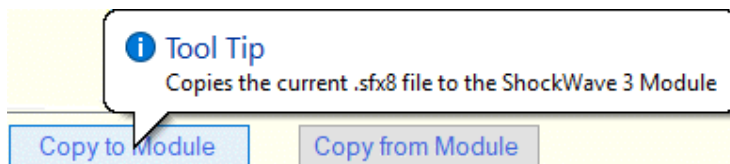


Any time any of the fields (columns) of any sound clip are changed, this button will be enabled and displayed in **BOLD RED** text. If you do not intend to **Save** the entire **.sfx8** file down to the ShockWave 3 module, you must click on this button to save the settings you have just changed. This will store the new settings immediately in the sound module.

If you add/remove or move a Sound Clip, then you have to Copy the whole **.sfx8** file to the module.

## TOOL TIPS/BALLOON HELP

Figure 9: Tool Tip or Balloon Help



Some of the buttons have Icons on them or short text names. To help you understand the function of the button, you can hover the cursor over the button and a **Tool Tip**,

or **Balloon Help** will appear. This will display a short textual explanation of the button's function.

Tool Tips will only appear if the button is enabled (not greyed out). An example Tool Tip for the **Copy from Module** button is shown above.

## STATUS BAR

The **Status Bar** presents messages about the current activity in the application. Play time progress is shown through the **Progress Bar** and the **Time Left to Play** fields.

Figure 10: Main Window Status Bar



The **Time Left Indicator** in the **Status Bar** at the bottom right of the main window shows the amount of time left to play for the currently playing sound clip, and the progress bar indicator gives a visual display of the elapsed time.



## CHAPTER 3 – WORKING WITH REGULAR (NON-ENGINE) SOUNDS

### Figure 11: The Sound Clip List for Regular Sounds

**Sound Clip List**

ShockWave 3 Version: **5.0.2**

ShockWave 3 Sample Rate: **44100**

Total Number of Sound Clips : **38**

Number of Regular Sound Clips : **2**

ShockWave 3 microSD Card Drive Letter: **J:**

☒ Regular Sounds 
 ☐ Engine1 Sounds 
 ☐ Engine2 Sounds

#	Sound Clip Name	Loop Mode	Audio Ch.	Duration	Loop Start	Loop End
1	Browning0.5calM2MG4	LoopNormal	Left	006.15	000.00	006.15
2	MissileTOW	LoopNormal	Left	003.34	000.00	003.34

[Defaults](#) | 
 [Save Settings](#) | 
 [↑↑](#) | 
 [↑](#) | 
 [↓](#) | 
 [↓↓](#) | 
 [Copy to Module](#) | 
 [Copy from Module](#)

AVC on Load OFF microSD Card 0.55 % Full

1. At Top Centre are two fields indicating the total number of sound clips stored in the module and, below it, the number of sound clips in the currently displayed list.
2. At Top Left the Release of the firmware in the USB connected **ShockWave 3** module. This release number should match that at the very top of the main window, i.e. **5.0.2**.  
If these release numbers are different, the behaviour is not defined, and may cause corruption of either the configuration data, or the sounds, in the module.
3. At Top Left, just below the firmware release, is the sample rate that is configured in the **ShockWave 3** module's microSD Card. This sample rate **MUST** match the value that is displayed in the [SFX8 Sound Set File Controls](#). The software performs checks on this and will warn you if either condition is not met.
4. Three radio buttons that select the type of sounds displayed in the Sound Clip List:
  - a. **Regular Sounds** – any sound not appearing in the Engine1 or Engine2 sound clip lists. Generally **Regular Sounds** are used for sounds such as weapons fire, horns, Morse code, alarms, bells, music, speech etc.



- b. **Engine1 Sounds** – these are sounds that are controlled by the **THTTL1** Input on the sound module. That input is connected to a Throttle output of the R/C radio receiver.
  - c. **Engine2 Sounds** – these are sounds that are controlled by the **THTTL2** Input on the sound module. That input is connected to a second Throttle output of the R/C radio receiver.
5. The list of sound clips. These may be [Added](#), [Moved](#) and [Removed](#) as explained in detail later.

These can be up to sixteen **Regular** sound clips. If you are using one or two on/off channels to select the sounds, all of the sixteen sounds can be selected – see the **ShockWave 3 HW Reference Manual** for details on how to achieve this. If you are using a proportional channel to select these sounds, any four of those sixteen sounds can be selected per proportional channel. Any of the sixteen sound clips can be assigned to the four sound select positions of the proportional transmitter stick, corresponding to the SOUND1/2/3 inputs from the receiver, using the [ShockWave 3 PC Control Panel](#).


The sound clip list for **Regular** sounds has the following fields (columns) :

- a. **#** Sound clip number in the list.
- b. **Name** Name of the sound clip file, without its file extension.
- c. **Loop** Looping mode – **LoopNormal** or **Play Once**.  
Indicates what should happen when the sound clip reaches its end.  
[This is explained later.](#)
- d. **Audio** Indicates which output channel the sound should be played on (where supported by **ShockWave 3** hardware).
- e. **Length** Duration of the Sound clip if not looped.
- f. **Loop Start** Loop Start Time – Indicates at what time in the sound clip (from its start) Looping will start if Loop is set to LoopNormal.
- g. **Loop End** Loop End Time – Indicates at what time in the sound clip (from its start) Looping will end if Loop is set to LoopNormal.

6. A set of buttons and indicators as follows :





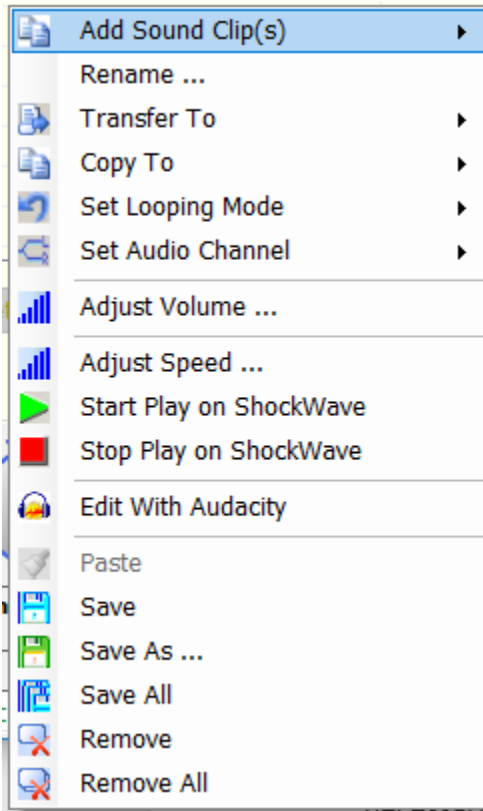
- a. **Defaults** Sets the various fields in the entire list to meaningful default values. Useful if you make many changes and mess things up.
  - b. **Save Settings** Whenever any of the changeable fields are altered, this button will show in **Red Text**. Clicking this button will save the new settings to **ShockWave 3** module without having to download the whole file.
  - c. **Navigation** Four Buttons  can be used to move a selected sound clip up or down in the list, or to the Top or Bottom of the list. You can also drag and drop a sound clip in the list to move it up or down.
  - d. **Copy To Module** Saves the entire PC **.sfx8** file to disk and copies that file to the **ShockWave 3** module's **.sfx8** file on its microSD Card.
  - e. **Copy From Module** Copies the contents of the **ShockWave 3** module's **.sfx8** file on its microSD Card to the PC hard drive and displays the results in the sound clip lists.
  - f. **Percent Full Bar** Bar indicating percentage level of storage memory used if the PC **.sfx8** file were to be saved to the **ShockWave 3** sound module.
7. A Context Sensitive (right click, or pop-up) menu will appear if you right click anywhere inside the list of sounds. One or more sound clips should be selected first and will be highlighted in blue. The appearance of the right click menu will change, depending on which list is displayed and whether there are sounds in the list.



## SOUND CLIP CONTEXT MENU FOR REGULAR SOUNDS

Figure 12: Sound Clip List Context (Right Click) Menu

### ADDING AND REMOVING SOUND CLIPS



The composite **.sfx8** file contains **ALL** the sounds to be stored in the sound module. **Individual sounds cannot be removed or added without saving the complete file which is a composite of all the sound clips, together with configuration data.** This is done in order to maintain the data integrity of the complete set of sounds and their configuration data.

If you want to change any of the sounds, you should copy the **.sfx8** composite sound file that is on the microSD Card that came with the **ShockWave 3** module to your hard drive, and open it from there.

Alternatively, you can **Copy** the sounds from the module to your PC by clicking the **Copy from Module** button.

Before adding any new sound clips make sure you have the correct radio button selected to add them to the correct sound clip list (**Regular, Engine1 or Engine2**). If you add them to the wrong list you can select them and then [Transfer](#) them to another list.

### ADDING SOUND CLIPS

You can add Sound Clips to the Sound Clip List in several ways :

1. By using the **Add Sound Clip(s)** context menu, as above. The sound clips are loaded and, if necessary, re-sampled to the sample rate defined in the [Control Panel->Hardware Tab](#).
2. By **Dragging and Dropping** one or more **.WAV/.MP3** files from Windows Explorer or your desktop to the Sound Clip List.
3. By **Copy and Pasting** one or more **.WAV/.MP3** files from Windows Explorer or your desktop to the Sound Clip List. If there is nothing in the Paste Buffer the Paste menu item is greyed out.
4. By **Dragging and Dropping** or **Copy and Pasting** a **.sfx8** composite file that already contains sound clips that have been previously loaded using **ShockWave 3 PC**.



Any of these methods will result in the **.WAV/.MP3** file being converted, if necessary, to the internal file format for the sound module and have it added to the list.

You can optionally choose to have the sound clip start and end points automatically trimmed, or cut off, to the nearest positive going zero crossing point with a mild slope. This makes the looping behaviour at the end of the sound clip smoother. This is done in the [Preferences Form](#), shown later. It defaults to **ON**.

Each list has its maximum number of sound clips and the application will not allow you to add a sound clip if that list is full or if the total number of bytes for all sound clips would exceed that available in the **microSD** Card.

## MOVING SOUND CLIPS

Once sound clips have been added, they may be re-ordered by simply dragging them with the left mouse button to the desired location in the list. Whilst dragging, the cursor will change to the name of the file in reverse highlight i.e. white text in a blue background as in the next figure :

**Figure 13 Dragging within the Sound Clip List**

#	Name	Loop	Audio	Length		
1	Maschinengewehr 08 Machine Gun	Loop	Auto	003.93	000.00	003.93
2	MorseCodeMessage1	Loop	Auto	023.54	000.00	023.54
3	CrewTalkPreFlightChecks	Loop	Auto	012.51	000.00	012.51
4	TwoToneTugBoat	Loop	Auto	011.85	000.00	011.85
5	Browning0.5calM2MG4	Loop	Auto	006.15	000.00	006.15

Once at the desired location, release the left mouse button. The cursor will resume its normal appearance.

You can also use the up and down buttons



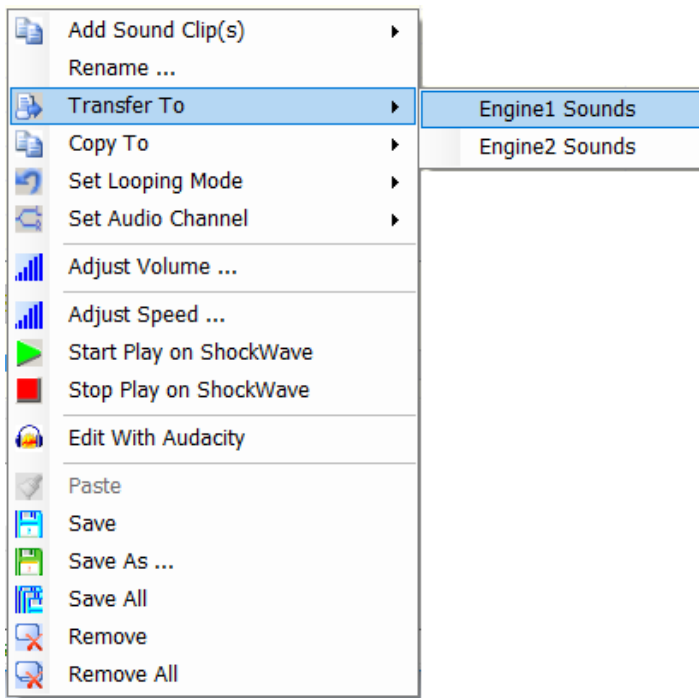
to move a sound clip up and

down in the list, or to the top or bottom of the list.



## TRANSFERRING SOUND CLIPS

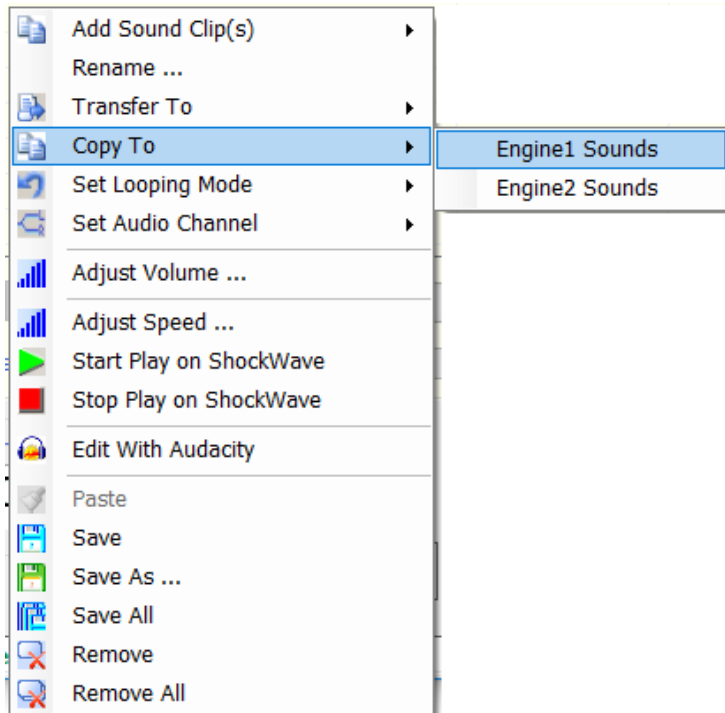
Figure 14: Transferring Sound Clips to another List



You may sometimes add a sound clip(s) to the wrong list. Rather than delete and re-add them to the correct list, you can simple transfer any selected sound clips in a list to another list.

## COPYING SOUND CLIPS

Figure 15: Copying Sound Clips to another List

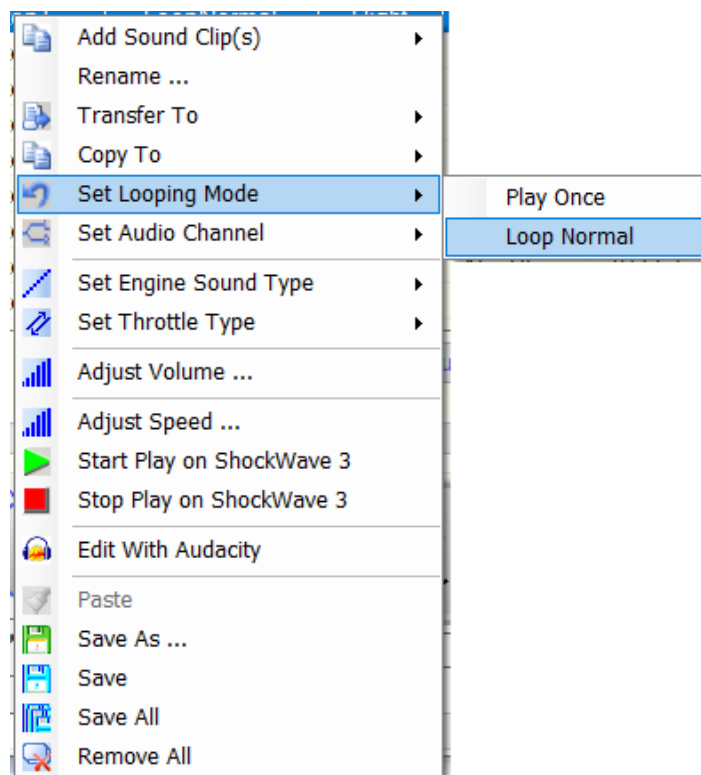


Similarly, if you want to have the same sound clip(s) in more than one list, for example an engine start-up and shutdown sound, you can copy existing sound clips to another list as in this figure.



## SET LOOPING OPTIONS

Figure 16: Setting looping Options



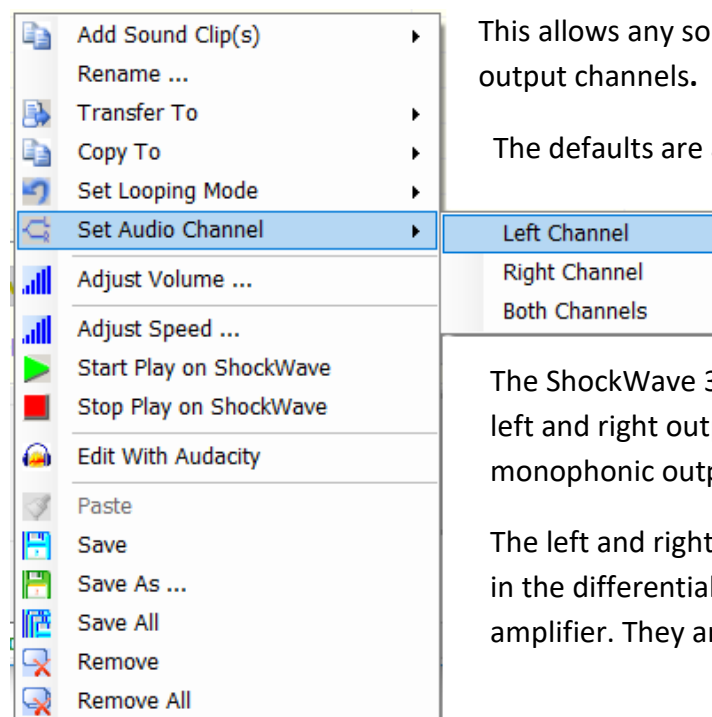
When any sound clip reaches its end it will, by default, loop back and begin playing at its **Loop Start Point**.

There are two possible Looping options.

1. **Play Once** – when the sound clip reaches its end, it will stop playing.
2. **Loop Normal** – when the sound clip reaches its end, it will continuously loop back to its Loop Start Point.

## SETTING THE AUDIO CHANNEL

Figure 17: Setting the Left/Right Audio Playback Channel



This allows any sound to be assigned to the left or right or both output channels.

The defaults are as follows:

1. **Regular Sounds** – Left Channel
2. **Engine1 Sounds** – Right Channel
3. **Engine2 Sounds** – Left Channel

The ShockWave 3 module behaves as above internally, but the left and right outputs are then mixed down to a single monophonic output in the loudspeaker amplifier.

The left and right channels are mixed internally using subtraction in the differential inputs of the single channel audio power amplifier. They are not additive.





This is of no consequence for unrelated sounds such as an engine sound and a weapons firing sound, but if you attempt to use identical sounds on both left and right channels and play them simultaneously they will subtract and null each other out, not add in the on-board amplifier.

The ability to have a single sound played on both left and right channels is only applicable when you are using an external two channel audio power amplifier instead of the internal one. In that case both the left and right line-audio output signals are in phase, not in anti-phase.

## ADJUSTING THE VOLUME OF SOUND CLIPS

Figure 18: Manual Volume Adjust Form

If you want to adjust the volume of some sounds relative to others, you can use the **Adjust Volume ...** menu item.

The sound clip you wish to change the volume of should be selected and then click the **Adjust Volume ...** menu item. The **Manual Volume Adjust** form will appear.

This form displays the maximum positive and negative peaks of the selected sound clip.

In the **Volume Increase (Ratio)** text field you can type in the new desired volume change as a multiplier of the current volume.

Use a value greater than 1.0 to increase the volume, or less than 1.0 to reduce the volume. If you check the Allow Clipping box, you can exceed the maximum 1.0 value if you really want to increase the volume, but this will lead to clipping and therefore increased distortion. **Use this with caution!**

Then click the **Adjust Volume** button. The selected sound clip will now have its new volume level in the list. If you want this to be reflected in the download file on disk you have to click the **Save** Button.

If you have several sound clips that you wish to change the volume of, you can leave this form open. Then when you select any other sound clip, that sound clip will appear in the **Manual Volume Adjust** form and you can proceed as above.





If you want to automatically adjust the volume of the sound to its maximum (1.0) you can click the **Auto Max** button. This button is disabled if the sound clip is already at its maximum volume.

You can also configure **ShockWave 3 PC** to automatically adjust the volume to the maximum whenever a sound clip is loaded into the list – see [Preferences Form](#).

## ADJUSTING THE SPEED OF SOUND CLIPS

Figure 19: Adjust Speed of Sound Clip Form

This form may be used to adjust the speed up or down of any sound clip in any of the sound clip lists.

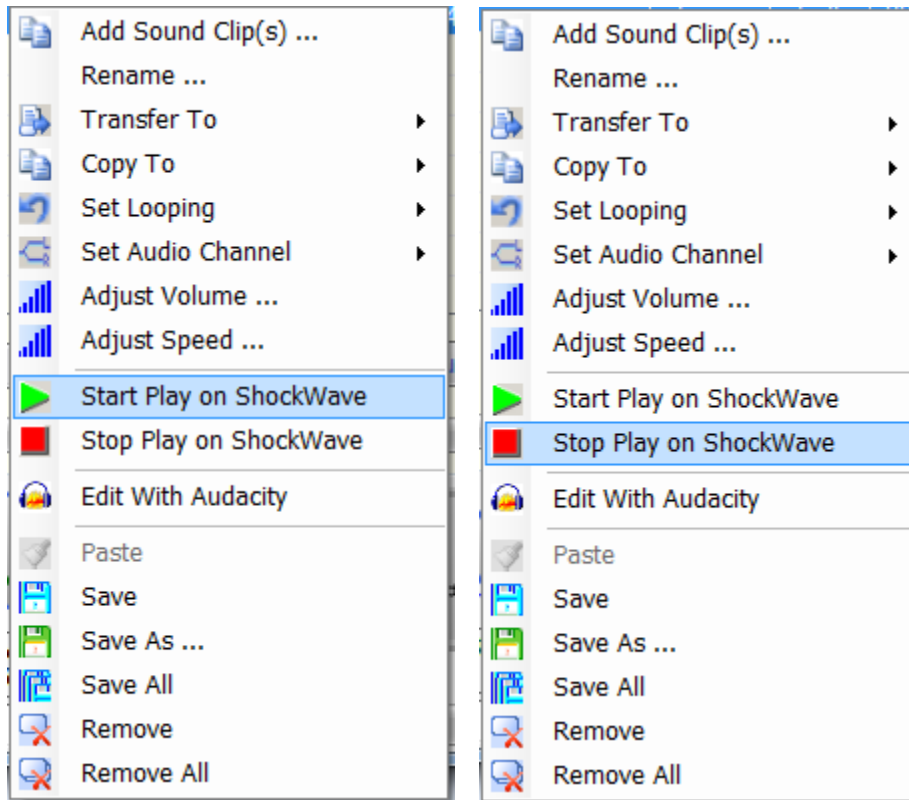
To increase the speed, enter a positive number in the Speed Change % field.

To lower the speed, enter a negative number in the Speed Change % field.



## PLAYING SOUND CLIPS ON THE SHOCKWAVE 3 MODULE

Figure 20 and Figure 21: Playing Sound Clips on the ShockWave 3 module while connected to the PC



The **ShockWave 3** Module can playback sound clips while connected to the **ShockWave 3 PC** application.

To achieve this, **the microSD Card must be inserted into the ShockWave 3 module.**

Unplug the USB cable, power down the sound module if it is receiving power from elsewhere, plug in its microSD Card and plug the USB cable in again.

Power must be applied to the blue terminal block on the module if you want to hear sound from the module's loudspeaker.

This is useful for testing out the sounds before you complete the installation in your model.

## EDITING SOUND CLIPS WITH AUDACITY

**Audacity** is an easy to use waveform level audio editing program and is completely free. A link to its main web page is included on the ShockWave 3 microSD Card in the **Other Applications** folder.

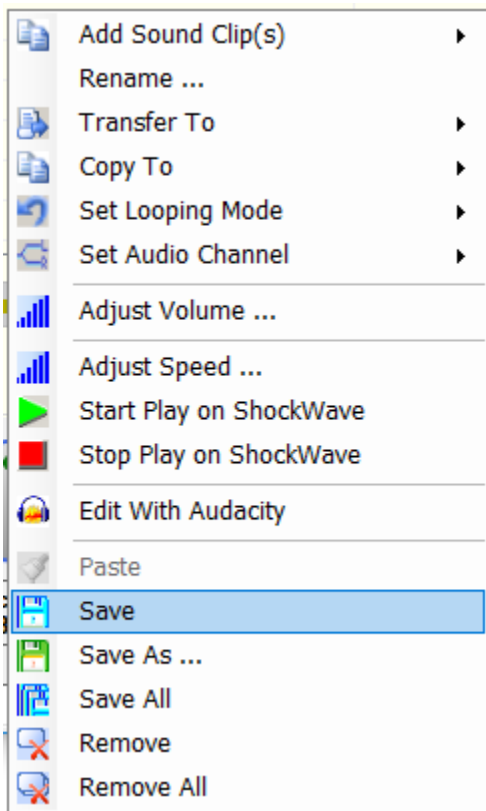
You can select a sound clip in the list and open it in Audacity. You can then perform sound editing at the waveform or sample level and create many special effects.

In Audacity you then need to "**Export as WAV ...**" your changes to disk to the same location and file name that they were opened from (i.e. the folder that contains the **.sfx8** file). When the Audacity application is closed, the changed sound clip will replace the original in the sound clip list.



## SAVING SOUND CLIPS

Figure 22: Saving Sound Clips to Your PC SSD or Hard Drive



You can save individual sound clips in the list to your file system using the **Save** and **Save As** context (right click) menu items.

**Save** will save the currently selected Sound Clips in the list to the **same folder as the currently Open .sfx8 File**.

**Save As** may be used to save **ONE** selected file with a different name to any location in your file system. **Save All** may be used to save all of the Sound Clips in the list to the current **.sfx8** file folder.



## CHAPTER 4 – WORKING WITH ENGINE SOUNDS

Figure 23: Main Form for Engine Sounds – Normal View

ShockWave 3 PC Version : 5.0.2

File Help

SFX8 Sound Set File Controls  
PC SFX8 File Path : D:\TEMP\B25OneEngineStartOnTwoSoundTracksSoundSet.sfx8

ShockWave 3 Local SFX8 File Path : ShockWaveSoundSets44\Aircrafts\B25OneEngineStartOnTwoSoundTracksSoundSet.sfx8

Data Details  
SFX8 File Sample Rate: 44100  
SFX8 File Size (MB): 40.63  
microSD Capacity (MB): 7378.00  
microSD MBytes Left: 7337.37  
Time Used (mins): 008.03  
Time Left (mins): 5681.12

Loop Point Controls  
Set Loop Start  
Loop Start: 000.00 secs  
Loop End: 000.00 secs

Sound Clip List

Total Number of Sound Clips : 38  
Number of Engine1 Sound Clips : 18  
ShockWave 3 Version : 5.0.2  
ShockWave 3 Sample Rate : 44100  
Regular Sounds ☐ Engine1 Sounds ☒ Engine2 Sounds ☐

#	Sound Clip Name	Loop Mode	Audio Ch.	Type	Duration	Loop Start	Loop End	Loop Length
0	B25Shutdown	PlayOnce	Right	ShutDn	008.90	000.00	008.90	008.90
1	B25StartupSingleEngine	LoopNormal	Right	StartUp	039.99	030.00	039.99	009.99
2	B25StartupSingleEngine+MergeFlyStep1	LoopNormal	Right	NrmStep	016.33	000.00	016.33	016.33
3	B25StartupSingleEngine+MergeFlyStep2	LoopNormal	Right	NrmStep	015.59	000.00	015.59	015.59
4	B25StartupSingleEngine+MergeFlyStep3	LoopNormal	Right	NrmStep	014.91	000.00	014.91	014.91
5	B25StartupSingleEngine+MergeFlyStep4	LoopNormal	Right	NrmStep	014.17	000.00	014.17	014.17
6	B25StartupSingleEngine+MergeFlyStep5	LoopNormal	Right	NrmStep	013.50	000.00	013.50	013.50
7	B25StartupSingleEngine+MergeFlyStep6	LoopNormal	Right	NrmStep	012.89	000.00	012.89	012.89
8	B25StartupSingleEngine+MergeFlyStep7	LoopNormal	Right	NrmStep	012.25	000.00	012.25	012.25
9	B25StartupSingleEngine+MergeFlyStep8	LoopNormal	Right	NrmStep	011.67	000.00	011.67	011.67
10	B25StartupSingleEngine+MergeFlyStep9	LoopNormal	Right	NrmStep	011.14	000.00	011.14	011.14

Defaults Save Settings ↑↑ ↑ ↓ ↓↓ Copy to Module Copy from Module

Show Throttle Ranges

microSD Card 0.55 % Full

Elapsed Time 000.00

ShockWave 3 Balance ShockWave 3 Volume

Rx 0.2 Volts Main 0.0 Volts

Accessory Board Is Present (3.2V - 12.9mA)

Status: ShockWave 3 Module is connected and Firmware is correct version 000.00 Time Left

The Engine1 Sounds List displays those sounds that are controlled by the **THRTL1** input of the **ShockWave 3** sound module. The Engine2 Sounds List displays those sounds that are controlled by the **THRTL2** input of the **ShockWave 3** sound module. These can number up to 18 which would normally comprise one engine shutdown sound, one engine start-up/idle sound, and four to sixteen steps of increasing engine pitch to full speed.

These lists are similar to the [Sound Clip List for Regular Sounds](#) with differences as follows:

- There is an additional field (column) in the list – **Type**. This is an **Engine Sound Type** which can one of several values :
  - NrmStep** Normal Step means the sound clip is one of the steps of increasing or decreasing speed linked to the Throttle Position.
  - StartUp** Start Up means the sound clip is the first one played when starting up the engine sound. The exact method of starting up the engine sound will differ, depending on how the **ShockWave 3** hardware is setup.
  - ShutDn** Shut Down means the sound clip is played when shutting down the engine sound and always has its Loop Mode set to Play Once.  
The exact method of shutting down the engine sound will depend on how the **ShockWave 3** hardware is setup.



- An additional **Show Throttle Ranges** button appears instead of the **AVC on Load ON/OFF** value. This button toggles the main form view between **Normal View**, as in the previous figure, and **Throttle Ranges** view as in the next figure:

Figure 24: Main Form for Engine Sounds – Throttle Ranges View

ShockWave 3 PC Version : 5.0.2

File Help

**Throttle Range**

Lower Limit Upper Limit

Forward Forward

Reverse Reverse

Forwards/Reverse % of Max. Forwards/Reverse % of Max.

95.6 100.0

☒ Fwd & Rev ☐ Fwd. Only ☐ Rev. Only

☒ Incr & Decr ☐ Incr. Only ☐ Decr. Only

Throttle Range Defaults

**Sound Clip List**

5.0.2 ShockWave 3 Version Total Number of Sound Clips : 21 ShockWave 3 microSD Card Drive Letter E:

44100 ShockWave 3 Sample Rate Number of Engine1 Sound Clips 18

☐ Regular Sounds ☒ Engine1 Sounds ☐ Engine2 Sounds

#	Sound Clip Name	Type	Throttle	Fwd/Rev	Lower %	Upper %
0	SpitfireMerlinShutdown2	ShutDn	Decr	Fwd/Rev	0.00	25.00
1	MerlinEngineStartAndIdle	StartUp	Inc/Dec	Fwd/Rev	20.00	25.00
2	MerlinEngineStep1	NrmStep	Inc/Dec	Fwd/Rev	25.10	29.70
3	MerlinEngineStep2	NrmStep	Inc/Dec	Fwd/Rev	29.80	34.40
4	MerlinEngineStep3	NrmStep	Inc/Dec	Fwd/Rev	34.50	39.10
5	MerlinEngineStep4	NrmStep	Inc/Dec	Fwd/Rev	39.20	43.80
6	MerlinEngineStep5	NrmStep	Inc/Dec	Fwd/Rev	43.90	48.50
7	MerlinEngineStep6	NrmStep	Inc/Dec	Fwd/Rev	48.60	53.20
8	MerlinEngineStep7	NrmStep	Inc/Dec	Fwd/Rev	53.30	57.90
9	MerlinEngineStep8	NrmStep	Inc/Dec	Fwd/Rev	58.00	62.60
10	MerlinEngineStep9	NrmStep	Inc/Dec	Fwd/Rev	62.70	67.30

Defaults Save Settings ↑↑ ↑ ↓ ↓↓ Copy to Module Copy from Module

Show Normal View Auto Set microSD Card 0.70 % Full

Elapsed Time 000.00

ShockWave 3 Balance ShockWave 3 Volume

Rx 0.1 Volts Main 0.0 Volts

Accessory Board Is Present (3.2V - 15.8mA)

Status : ShockWave 3 Module is connected and Firmware is correct version 000.00 Time Left

In this view the entire [SFX8 Sound Set File Controls](#) section has been replaced by a new **Throttle Range** section. This view is where you can set each engine sound's throttle range Lower % and Upper % limits. You can also set whether the sound clip should be played when the Throttle is in Forwards or Reverse, or both, and also whether the Throttle is Increasing, Decreasing, or both.

- In this view, the fields displayed in the list have changed and are now as follows:

Continued over ...



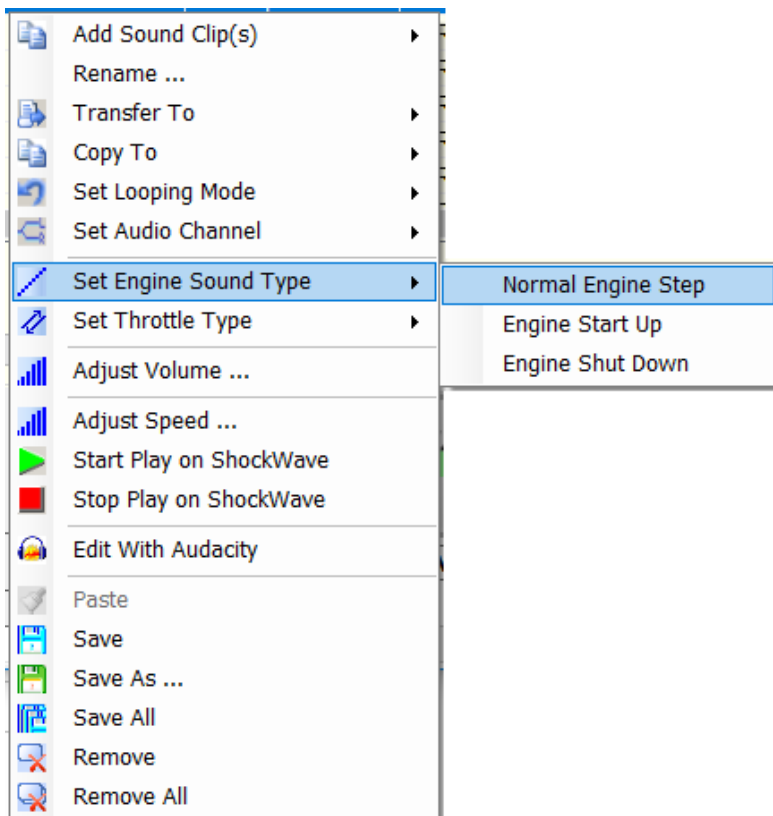
The sound clip list for Engine1 or Engine2 sounds has the following fields (columns) :

- a. **#** Sound clip number in the list.
- b. **Sound Clip Name** Name of the sound clip file, without its file extension.  
**Name**
- c. **Type** Engine Sound Type, set its function, as above.
- d. **Throttle** Throttle Type sets whether the sound is played when the Throttle is Increasing, Decreasing, or Both.
- e. **Fwd/Rev** Fwd/ Rev Mode sets whether the sound is played **ONLY** when the Throttle is in Forwards, in Reverse, or Both.
- f. **Lower %** Lower % is the lower limit of throttle position (as a percentage of its full throw) for which the sound clip will be played.
- g. **Upper %** Upper % is the upper limit of throttle position (as a percentage of its full throw) for which the sound clip will be played.

How to use the **Throttle Ranges** feature is explained in detail later.

4. The Context menu (right click, or pop-up) has additional items as follows:

**Figure 25: Set Sound Type Menu**

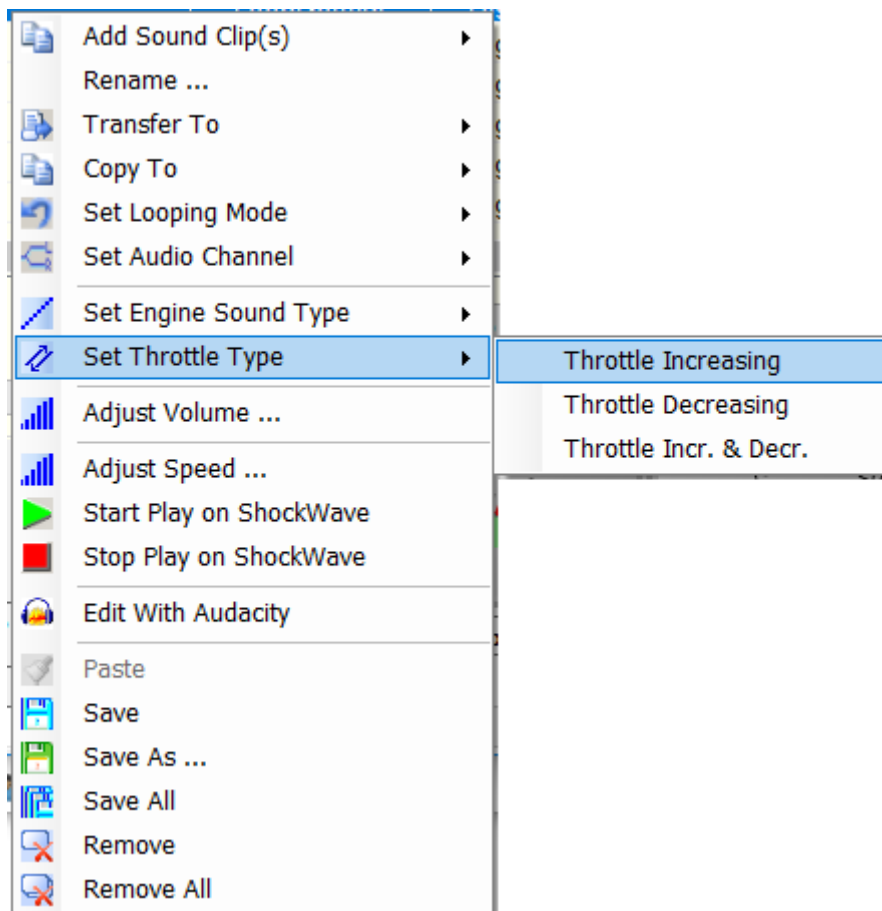


This menu allows you to set the type of the sound in the engine list. The terms are self-explanatory.

**For the engine sound clip list there must be ONE sound clip marked as “Engine Start-up” and ONE sound clip marked as “Engine Shut Down”.**



Figure 26: Set Throttle Type Menu



This menu allows you to set if the sound clip is played only when the throttle is Increasing, Decreasing, or Both.

The other menu items have the same functionality as for the Regular sound clip list





## USING THE THROTTLE RANGES FEATURE

Figure 27: Throttle Range Controls

In the Throttle Ranges View, the entire [SFX8 Sound Set Files Controls](#) section has been replaced by a **Throttle Range Controls** section.

For any **ONE** selected sound clip, this set of controls displays values for **Lower %** and **Upper % Throttle Range**, The **Forward/Reverse Type** and the **Increasing/Decreasing Throttle Type**.

As you select different sound clips, the value in these controls will change to reflect the current settings of that sound clip.

The **Lower Limit** and **Upper Limit** throttle position indicators are read only i.e. they display the value but cannot be used to change the value. They are intended to give a graphical visualization of the Throttle position Ranges.

There are two numeric Up/Down boxes which are used to set the actual value for the lower and upper limits. As these boxes are changed the Throttle Bars will change position, as will the values displayed in the actual sound clip list for the selected sound clip.

You can use the two sets of radio buttons to set the **Forward/Reverse Type** and the **Increasing/Decreasing Throttle Types**.

There is a Throttle Range Defaults button which is used to reset everything to the normal operating values if you get the values messed up. This button will also reset the order of the Special engine sounds such as Start-Up, Shutdown etc. This button will assign a throttle range to each sound clip based on the total number of sound clips divided into 100%. This will give a linear progression from one sound clip step to the next.

However, once the defaults have been set, you now have the option to change the throttle range for any or all of the sound clips.





## USING THE AUTO SET BUTTON

Setting the upper and lower throttle range limits for all the engine sound clips is a tedious process and can be error prone. To assist with this, there is an **Auto Set** button to automate some of this work.

You can set the throttle range lower and upper limits for the Engine Shutdown and Startup sounds only since these are the most important ones to get proper synchronization of those sounds with the motor rotation. Once those are set manually using the form fields described above, you can click the **Auto Set** button to automatically set the correct values for the remaining engine steps above the startup and idle sound. The remaining % of throttle travel between the Engine startup upper limit and 100% is divided linearly between the remaining steps to set their own upper and lower limits.

This has similar end results to the E-Z-Sync™ hardware feature implemented on the ShockWave 3 sound module itself.

## RULES FOR SETTING THROTTLE RANGE VALUES

In order to achieve smooth operation over the whole range of Throttle travel there are some basic ground rules which must be observed:

1. **NO TWO THROTTLE RANGES CAN OVERLAP** - I.E. For any given **Lower Limit %**, the **Upper Limit %** of that sound clip cannot be higher than the **Lower Limit%** for **ANY OTHER** sound clip in the list. Similarly, for any given **Upper Limit %**, the **Lower Limit %** of that sound clip cannot be lower than the **Upper Limit %** for **ANY OTHER** sound clip in the list.

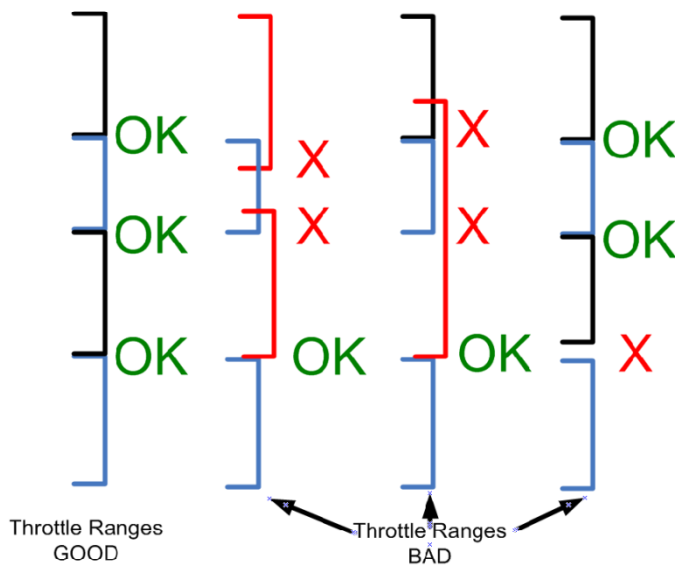
This is because if throttle ranges overlap and the throttle should be in the overlapped region, the firmware cannot know which of the two ranges is intended and the matching sound clip is therefore unresolvable.

2. Throttle Ranges must be contiguous with no gaps. A gap would not cause a blip in the sound, but the throttle would have to be moved by an unusually large amount in order for the next sound step to start playing.
3. Do NOT set the Lower Limit % of the engine Start-up sound to 0% or less than about 5%, otherwise the engine sound will start up with no throttle movement as soon as you switch the module on.

These rules are best illustrated (overleaf) ...



Figure 28: Overlapping and Non-Overlapping Throttle Ranges



Throttle Ranges can overlap if the overlapping sounds have different **Throttle Types** or **Fwd/Rev Types**. This is because when the ShockWave 3 module is first powered up, the initialization code sorts the available sound clips into four separate sub-lists:

1. Forward and Increasing.
2. Forwards and Decreasing.
3. Reverse and Increasing.
4. Reverse and Decreasing.

The non-overlapping rule applies to all sounds in any given sub-list.

## GUIDELINES FOR USING THROTTLE RANGES FEATURE

The easiest way to ensure success with this complex feature is as follows:

1. Start with an empty Engine Sound List.
2. Add the Engine Start-Up sound with its idle loop at the end. It will automatically have its **Sound Type** set as **StartUp**, its **Fwd/Rev Type** set as Both and its **Throttle Type** set as Increasing And Decreasing.
3. Use the [Engine Sound Control](#) Form (explained later) to generate 16 steps of increasing speed.
4. Add a shutdown sound and mark it with Engine Sound Type of **ShutDn**.
5. Click the **Show Throttle Ranges** Button to display the Throttle Ranges View.  
Click the **Throttle Range Defaults** button. This will set the Throttle Ranges of all the sound clips in compliance with the above rules.
6. Now you can remove or add sounds, and re-adjust the throttle ranges, as long as the above rules are complied with.

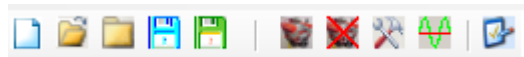



## CHAPTER 5 – GENERATING INCREASING SPEEDS FOR ENGINE SOUNDS

The **Engine Sound Control Form** is used for controlling and/or generating Engine sounds for the proportional Engine Sound feature of a **ShockWave 3** module.

When the Engine Sound Clip Lists are showing, the tool bar changes to add two additional buttons :

**Figure 29: Tool Bar when Engine Sound Clip Lists are Showing**



To launch the Engine Sound Control, click on the Engine button -  The Engine Sound Control Form is shown here :

**Figure 30: Engine Sound Control Form**

**Engine Sound Control for Engine1**

StartUp/Idle Sound Clip  
 Start-Up/Idle Sound Clip No.   
 Start-Up/Idle Sound Clip Name

Loop Start  End   
 Length  secs (Read Only)

Max/Base Sound Pitch Ratio

☒ Increasing Pitch    Num Steps     Step Ratio   
☐ Decreasing Pitch

Delete Existing Steps  
☒ Delete All Existing Steps    ☐ Keep All Existing Steps  
☐ Delete Existing Steps After Current Base Sound  
☐ Change Sound At Loop End

Startup/Shutdown Throttle Range Upper Limit Defaults  
 Shut Down  %    Start-Up  %

Throttle Playback Emulator  
 Forward

Auto Ramp Up/Down  
 Time Per Ramp-Up Step  ms  
 Time Per Ramp-Down Step  ms

**Stopped Playing Sound Clip No. 0**

The sounds for Engine1 and Engine2 can be set up completely independently of each other. The Engine Sound Control Form will switch its context and contents automatically depending on which of Engine1 or Engine2 Sound clip lists are displayed in the main form.

The **ShockWave 3** module Engine Sound feature works by changing to steps of increasing pitch that follow the throttle control by matching the throttle position with the sound step that has a matching **Throttle Range**. The number of steps can be selected from 4 , 8 or 16.

The sounds can be captured from a real engine and edited into short sound clips of 10-20 seconds each. You can also create them artificially from a base engine sound using a sound editor program such as Audacity.

## GENERATING ENGINE SPEED STEPS

The **ShockWave 3 PC Engine Sound Control** automates this process. The steps are as follows :

1. Add at least one sound clip to the Engine1 or Engine2 sound clip List. This first sound clip should have a start-up sequence followed by an idle sequence of 10 seconds or more. When added to an empty sound clip list it will automatically be set to a **Sound Type** of **StartUp**. Be sure to set its Loop Start Point so that it loops into an idle sound.
2. Once you have a base (lowest pitch) Engine sound loaded in the Engine1 or Engine2 Sound Clip List, you can launch the **Engine Sound Control Form**. The **Engine Sound Control** feature works best on base engine sounds that are repetitive and rhythmic and that have a loop point for the idle portion set to 10 seconds or more before its end – the longer the idle loop the better.
3. You can select the **Maximum/Base Sound Pitch Ratio** of the highest speed to the base sound speed with the numeric up/down control. The Loop duration is read only and is determined by the Length and Loop Position of the base sound. The Loop Point must have been previously set very carefully to give a smooth transition from the end of the sound clip to its Loop Start Point, otherwise the steps generated will have a blip in the sound as it transitions from end to start.
4. When you click the **Generate Button**, additional sounds are created, each one having a speed of the previous one multiplied by the **Nth** root of the ratio selected, where **N** is the number of steps selected. The new sound clips will be displayed in the respective Engine1 or Engine2 Sound Clip List. The sound clips generated automatically can then be used as any other sound clip.

The **Throttle Playback Emulator** emulates the behaviour of the throttle on the module by playing the engine steps present in the Engine Sound Clip List.



The default behaviour is to generate steps of **increasing** pitch e.g. from an idling engine sound upwards. However, sometimes you can obtain better engine sound realism if you use an engine sound that is at cruising speed as the base sound and generate steps of **decreasing** pitch to get an idling sound. You can click the **Decreasing Pitch Steps** radio button to select this behaviour.

You can always use the **Save** and **Save As** pop-up menu items in the **Engine 1** or **Engine 2 Sound Clip Lists** to save any or all of the generated steps. You could then remove all the engine sounds, load one particular sound into the list and use it as the base sound for another pass at generating steps up or down.

## DELETING EXISTING STEPS

You can now control how any existing engine steps are deleted before new ones are added. There are three options:

1. **Delete All Existing Steps**

This deletes all sound clips except the ones that are marked **StartUp** or **ShutDn**.

2. **Keep All Existing Steps**

This keeps all existing sound clips.

3. **Delete Existing Steps After Current Base Sound**

The Base Sound from which the steps are generated can now be any sound in the list – it no longer has to be the first one. This option allows some steps to be generated from one base sound, perhaps some of them deleted manually, then a new base sound chosen and a new set of steps generated from it.

## STARTUP/SHUTDOWN THROTTLE RANGE UPPER LIMIT DEFAULTS

The “Startup/Shutdown Throttle Range Upper Limit Defaults” box allows you to set the default throttle range upper limits for the start-up and shutdown sounds when you generate the steps.

## USING AUTO RAMP-UP/RAMP-DOWN

If the engine sound is that of a large diesel or steam engine, these engines cannot change their speed very quickly due to the mass and inertia of their moving parts. Therefore, if the throttle stick is moved quickly, the engine sound should not increase in a step fashion to the final value. The Auto-Ramp Up and Ramp Down feature allows the steps of increasing engine sound speed to be gradually switched in and ramped up or down. The value in the ramp-up/down fields is in milliseconds and is the time between each engine speed step kicking in. If you do not want this feature, just make these values 0.



## CHAPTER 6 – HOW TO CONFIGURE YOUR SHOCKWAVE 3 SOUND MODULE

The **ShockWave 3 Control Panel** can be launched by clicking on the **Control Panel** button – 

Figure 31: ShockWave 3 Control Panel

ShockWave 3 Control Panel

Throttle(s) Sound Select Hardware Switched Outputs Multi-Engine Sync DopplerFX

**THRTL1 Pulse Widths -  $\mu$ s**

Throttle1 Pulse	Neutral Pulse	Deviation	Frame Interval	Throttle Position
1109	1500	-391	16043	125
Min. Pulse	Max. Pulse	Matching Throttle Range		Throttle1 Signal
1107	1700	6 36.3 - 25.6 %		GOOD SIGNAL
Max. Fwd. Deviation	Max. Rev. Deviation	Throttle1 Mode	Throttle1 Forward Sense : +ve	
400	400	Forwards/Reverse	Max. Fwd Is Set: False Max. Rev is Set: False	

**THRTL2 Pulse Widths -  $\mu$ s**

Throttle2 Pulse	Neutral Pulse	Deviation	Frame Interval	Throttle Position
0	1500	0	0	0
Min. Pulse	Max. Pulse	Matching Throttle Range		Throttle2 Signal
1300	1700	0 0.0 - 0.0 %		BAD SIGNAL
Max. Fwd. Deviation	Max. Rev. Deviation	Throttle2 Mode	Throttle2 Forward Sense : +ve	
400	400	Forwards/Reverse	Max. Fwd Is Set: False Max. Rev is Set: False	

Successfully retrieved Throttle Pulse Info

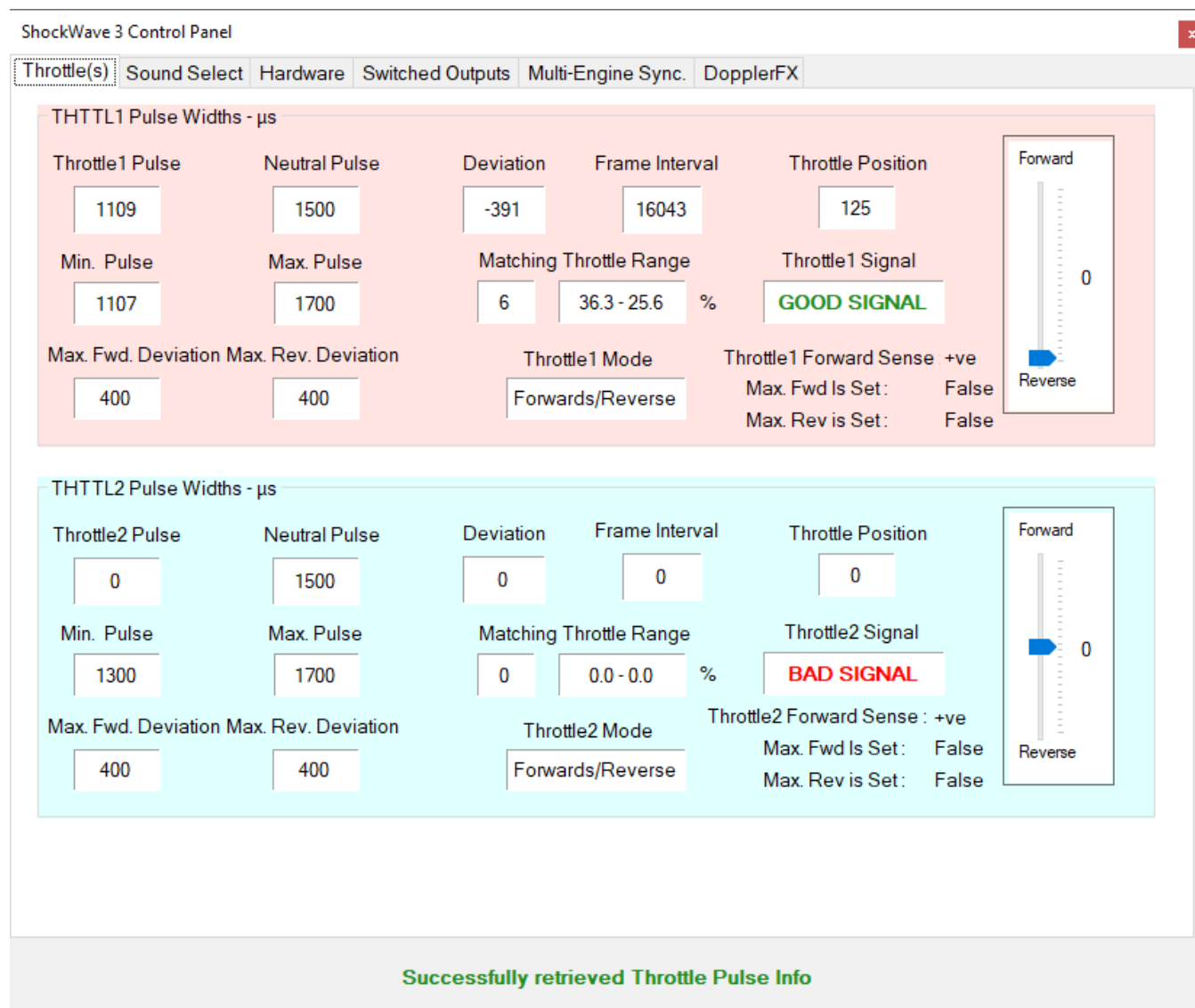
This Form can only be launched if the **ShockWave 3** module is connected and powered up. You will receive a warning message box if it is not.

This Form has been split over several tabs – **Throttles**, **Sound Select**, **Hardware**, **Switched Outputs**, **Multi-Engine Sync** and **DopplerFX**.



## THROTTLES TAB

Figure 32: Throttles Tab



This tab allows you to see, in real time, the **THHTL1** and **THHTL2** input pulse widths and various data about the throttle settings. Before this tab will function, your R/C transmitter must be switched on **FIRST**. Then you can power up your R/C receiver and the **ShockWave 3** Module.

**This is a read only display** - there are no user settable options in this tab.

Note the different colours for **THHTL1** and **THHTL2** fields.

The two **Throttle Lever** sliders in this panel will move to represent the actual transmitter **THHTL1** and **THHTL2** stick positions. If either **THHTL1** or **THHTL2** cables are disconnected or are not receiving valid R/C signals, you will see a warning message in red at the bottom of the control panel and their respective Signal State fields will show **BAD SIGNAL**.





## R/C PULSE TERMINOLOGY

For the non-technically minded, here is an explanation of the terms used in this form.

R/C throttle and non-throttle signals sent from the transmitter are output by the receiver as pulses of variable widths. The pulse width varies between about 1 millisecond (1000 microseconds or  $\mu\text{s}$ ) and 2 milliseconds (2000 microseconds or  $\mu\text{s}$ ).

The pulses repeat rapidly – the time between the start of a pulse and the start of the next one on the same channel is called the **Frame Interval**. The pulse for each throttle channel is called the **Throttle Pulse**.

When the throttle stick is in its centre position (forwards and reverse throttle for model boats or tanks) the pulse width is about 1500  $\mu\text{s}$ . This is called the **Neutral Pulse**. For forwards only throttles, such as those for model aircraft, the Neutral pulse is the pulse width when the throttle stick is in the off or downwards most position. **Deviation** is the difference between the throttle's current pulse width and the neutral pulse width.





## SOUND SELECT TAB

Figure 33: Sound Select Tab

ShockWave 3 Control Panel

Throttle(s) **Sound Select** Hardware Switched Outputs Multi-Engine Sync. DopplerFX

**SOUND1 Pulse Widths -  $\mu$ s**

Current Pulse	Neutral1 Pulse	Curr Deviation	Sound Select1 Signal	Frame Interval	Sel1 Num
966	1500	-534	GOOD SIGNAL	16043	Counting
Max. Deviation			Sound Select1 Mode		
536			1 by N		

**SOUND2 Pulse Widths -  $\mu$ s**

Current Pulse	Neutral2 Pulse	Curr Deviation	Sound Select2 Signal	Frame Interval	Sel2 Num
0	1500	0	BAD SIGNAL	0	Unknown
Max. Deviation			Sound Select2 Mode		Selected Sound/Function
500			Unknown		

**SOUND3 Pulse Widths -  $\mu$ s**

Current Pulse	Neutral3 Pulse	Curr Deviation	Sound Select3 Signal	Frame Interval	Sel3 Num
0	1500	0	BAD SIGNAL	0	Unknown
Max. Deviation			Sound Select3 Mode		Selected Sound/Function
500			Unknown		

Successfully retrievedChannel Pulse Info

In a similar fashion to the Throttles Tab, this tab displays (in read only mode) the R/C pulse widths and various data about the **SOUND1/SOUND2/SOUND3** Inputs. The Sel1/2/3 Num/State fields shows the Sound Clip number (from the Regular Sound Clip List) selected by the **ShockWave 3** module. Note the different colours for SOUND1, SOUND2 and SOUND3 fields.



## HARDWARE TAB

Figure 34: Hardware Tab

ShockWave 3 Control Panel

Throttle(s) Sound Select **Hardware** Switched Outputs Multi-Engine Sync. DopplerFX

**THTTL1/SOUND4 Input Mode**

☒ Proportional R/C    ☐ Analog    Idle Off Delay (s)

☐ Switched R/C 1xN    ☐ Switched R/C 1x1   

☐ Logic Level 1xN    ☐ Logic Level 1x1    ☐ -ve

☐ 3-Pos R/C Switch

**Engine1 Sound Mode**

☒ Auto With Throttle    ☐ Force Forwards Only

☐ Switched As Sound Clip #

**Low Battery Voltage Alarms**

Rx Battery Low Voltage Limit  Volts

Num Times To Play Alarm Sound

Main Battery Low Voltage Limit  Volts

Num Times To Play Alarm Sound

Clear Battery Alarms

**THTTL2/SOUND5 Input Mode**

☒ Proportional R/C    ☐ Analog    Idle Off Delay (s)

☐ Switched R/C 1xN    ☐ Switched R/C 1x1   

☐ Logic Level 1xN    ☐ Logic Level 1x1    ☐ -ve

☐ 3-Pos R/C Switch    ☐ DopplerFX Use Altitude

**Engine2 Sound Mode**

☒ Auto With Throttle    ☐ Force Forwards Only

☐ Switched As Sound Clip #

**Miscellaneous**

Startup Delay (s)

☐ Single Sound Mode

☐ Use On-Board Non-Volatile Memory (NVM) for other data as well

☐ Engine Speed Change Uses Freq. Mult

Data Indicated in Red are stored in the ShockWave 3 Non-Volatile Memory, not the ShockWave 3 Sound Set .sf3 file.

Save Settings in .sf3 File/ShockWave 3

Defaults    Retrieve Settings

**SOUND1 Input Mode**

☐ Proportional R/C    ☐ 3-Pos R/C Switch    Timeout (ms)

☒ Switched R/C 1xN    ☐ Switched R/C 1x1    # Offset

☐ Logic Level 1xN    ☐ Logic Level 1x1    ☒ -ve

☐ R/C Remote Volume

**Proportional R/C Position/Sound Clip Assignment**

Half Fwd Sound #  Full Fwd Sound #

Half Back Sound #  Full Back Sound #

Which is Fwd and Back (or Left and Right) depends on your transmitter servo settings

**SOUND2 Input Mode**

☐ Proportional R/C    ☐ 3-Pos R/C Switch    Timeout (ms)

☒ Switched R/C 1xN    ☐ Switched R/C 1x1    # Offset

☐ Logic Level 1xN    ☐ Logic Level 1x1    ☒ -ve

☐ Wired Remote Volume    ☐ DopplerFX Speed Multiplier

**Proportional R/C Position/Sound Clip Assignment**

Half Fwd Sound #  Full Fwd Sound #

Half Back Sound #  Full Back Sound #

Which is Fwd and Back (or Left and Right) depends on your transmitter servo settings

**SOUND3 Input Mode**

☐ Proportional R/C    ☐ 3-Pos R/C Switch    Timeout (ms)

☐ Switched R/C 1xN    ☐ Switched R/C 1x1    # Offset

☐ Logic Level 1xN    ☐ Logic Level 1x1    ☒ -ve

☐ DopplerFX Control

**Proportional R/C Position/Sound Clip Assignment**

Half Fwd Sound #  Full Fwd Sound #

Half Back Sound #  Full Back Sound #

Which is Fwd and Back (or Left and Right) depends on your transmitter servo settings

The sections in this Tab are colour coded to represent the five same signals displayed in the Throttle(s) and Sound Select Tabs.



## Throttle and Engine Sound Modes

**THHTL1/THHTL2 Input Modes** allows you to set the type of input the module expects for the **THHTL1/2** inputs. When their respective **Proportional R/C** radio button is selected, the module expects that input to be a standard R/C 1-2ms wide pulse.

**Engine1** and **Engine2 Sound Modes** default to **Auto With Throttle**. This means that the Engine sound will switch on and off automatically with the transmitter throttle stick. If this behaviour is not required, the **Engine1 sound** can be configured to switch on and off with the **SOUND1/2/3** inputs. In this case the **SOUND1/2/3** Input mode should be either **Switched R/C 1xN** or **Switched R/C 1x1**. Similarly for the **Engine2** sound.

If the **Logic Level 1xN** or **Logic Level 1x1** radio buttons are pressed, that input expects a switch connected to the **receiver +VE voltage or a logic voltage swing between 0V and +12V**. The Logic Sense can also be set to either +ve (default) or -ve. This is useful for various R/C and non-R/C static display applications.

The **THHTL1** input can also be used as a fourth **SOUND4** Select input if it is not needed for an engine sound and the **THHTL2** input can also be used as a fifth **SOUND5** Select input if it is not needed for an engine sound. The **Switched R/C 1xN**, **Switched R/C 1x1**, and **Logic Level 1xN** and **Logic Level 1x1** buttons will cause the layout of this section to change to be similar to the **SOUND1/2/3** input sections. In this way you can get a fourth or fifth control input for non-engine sounds.

If the **"Idle Off Delay (s)"** field is set to any non-zero value, when the throttle stick is brought back to its neutral position (or off position for model airplanes) the engine sound will idle for the set time delay and then the engine shutdown sound will play.

The **Force Forwards Only** checkbox is used to force the respective Engine sound to act as though it were a forwards only control, even if it is a centre spring loaded control. This means that when the throttle stick is returned to its centre position the engine shutdown sound will play once and then stop instead of the idle sound looping indefinitely.

The **THHTL2** input can also be configured as a remote **"DopplerFX Use Altitude"** switch. In this mode, the **THHTL2** input should come from a 2-position switched channel on your radio. After each power on, of the **ShockWave 3** sound module, if this option is selected, the **Use Altitude** option is **ON** by default, whichever position the 2-position switch is in.

If the 2-position switch is toggled to its opposite position, the **DopplerFX Use Altitude** function is **OFF**. The **DopplerFX Use Altitude** function will return to **ON** when the 2-position switch is returned to its initial position. If this mode is set, it overrides the **Use Altitude** function on the 6-position DIP switch on the **ShockWave 3** module. That switch position is then ignored.



## SOUND1/SOUND2/SOUND3 Input Modes

**SOUND1/2/3 Inputs** have several possible modes for selecting the Regular (non-engine) sounds.

1. **Switched R/C 1 xN.** This is selected when you want to use ONE on/off transmitter channel to switch N regular sounds. In this case a Timeout (in milliseconds) is used to set the time that must elapse to trigger the sounds. The smaller this value, the lower the latency, but the faster the switch must be changed. The default value of 1000ms (1 second) works well in most cases.
2. **Switched R/C 1x1.** This is selected when you want to use an on/off transmitter channel to switch just one sound. When the Tx switch is moved from its OFF position to its ON (opposite) position, the sound will play. When it is returned to its OFF position the sound will stop. Which sound is played by that switch is determined by the Offset # field I.E. if the Offset is 0 then Sound Clip 1 will play. If the Offset is 4, then Sound Clip 5 will play.
3. **Logic Level 1xN and Logic Level 1x1.** This is selected when you want to use a logic level or mechanical switch input, such as might be used in static displays. The **Logic Level 1xN** behaves identically to the **Switched R/C 1xN** mode except that a logic level is used instead of an R/C pulse to trigger the sound(s).  
The **Logic Level 1x1** behaves identically to the **Switched R/C 1x1** mode except that a logic level input is used instead of an R/C pulse to trigger the sound(s).
4. **Proportional R/C.** This is selected when you want to use a spare fully proportional channel. This works by using the half forward/back and full forward/back (or left/right) positions of the proportional control to select four of the regular sounds. Which is forward/back or left/right depends on your transmitter servo settings and can usually be reversed on the transmitter.
5. **R/C Remote Vol.** This acts as a remote volume control controlled by a rotary knob or slider on your radio transmitter. Minimum volume is when the R/C input is 1000 microseconds wide, maximum volume is when the R/C input is 2000 microseconds wide.
6. **3-Pos R/C Switch.** This refers to a 3 position R/C switch where the centre position is used as an OFF Position and the upper or lower positions can be used to switch two different sounds on and off.
7. **Wired Remote Volume.** This allows a locally attached potentiometer to control the volume. The potentiometer must be wired to provide a variable voltage from 0 to +3.3 Volts, where 0 volts is zero volume and +3.3 Volts is maximum volume.



8. **DopplerFX Speed Multiplier.** This is available on the SOUND2 input only. It is for a proportional R/C control that can be used to remotely adjust the amount of enhanced Doppler shift generated using the DopplerFX feature.
9. **DopplerFX Control.** This is available on the SOUND3 input only. It is for a 3-position switch with specific functions relating to the DopplerFX feature. The exact meaning of this switch is explained in the separate DopplerFX manual.

The SOUND1/SOUND2/SOUND3 inputs behave almost identically. The main difference is that the Offset # for SOUND2/3 defaults to 4 instead of 0, as for SOUND1. This Offset # is added to the number of toggles when selecting the sounds in **Switched R/C 1xN** or **Logic Level 1xN** modes. So for SOUND2/3, if the switch is toggled once, sound clip #5 will play instead of sound clip 1. This is useful for triggering the higher numbered sounds with a lower number of switch toggles.

Remember if you run out of control inputs for SOUND1/2/3, you can use the THTTL1 input as a fourth SOUND input or THTTL2 input as a fifth SOUND input if they are not required for engine sounds.

## Explaining Latched and Momentary Action

**Latched** action means that once a sound has been triggered, it will stay on after the trigger action has been removed. Then, when the trigger action is next performed, the sound will switch off. This is useful for long playing sound clips such as music, songs or anthems.

**Momentary** action means that the sound plays only for as long as the trigger action is held. Once the trigger action is released, the sound will stop. This is useful for short sounds such as gunfire, horns etc.

If you want to play more than one non-engine sound simultaneously, then the first one must be switched for **Latched** operation. Then it will remain on while you trigger the second one. The exact mechanism and method for triggering non-engine sounds will differ, depending on which mode has been selected.

## How to Select Regular (Non-Engine) Sounds

1. **Switched R/C 1xN Mode : One transmitter ON/OFF channel is used to switch 1 or N sounds.** Toggle SOUND1/2/3 input from **OFF** to **ON** and back to **OFF** N times to select sound N. After a timeout of about 1 second (adjustable), Sound N will start playing. This is **Latched** action. Repeat to switch Sound N Off.



For **Momentary Action** - Toggle SOUND1/2/3 input from **OFF** to **ON** and back to **OFF N-1** times then move to **ON and hold it there** – Sound **N** will play for as long as the switch is in the **ON** position. Release the switch to the **OFF** position to switch that Sound **OFF**.

2. **Logic Level 1xN Mode** : This behaves the same as Switched R/C1xN Mode except that a logic level is used instead of an R/C pulse.
3. **Proportional R/C Mode** : **One proportional channel is used to switch four sounds.**
  - a. Move Tx stick half-forward (or left/right, as appropriate) for more than 1 second - Sound 1 Turns **ON**;
  - b. Move stick quickly full forward - Sound 2 turns **ON**;
  - c. Move Tx stick half-backwards for more than 1 second - Sound 3 turns **ON**;
  - d. Move stick quickly full backwards - Sound 4 turns **ON**;

**Proportional R/C Mode** can be either **Latched** or **Momentary** action, depending on how long you hold the proportional stick in any of the four positions.

## Low Battery Voltage Alarms

This section allows you to set battery low voltage alarms that trigger when the battery voltage for either the receiver or main battery voltage or both fall below set threshold values.

When a low battery alarm is triggered by a low battery voltage, a corresponding System Sounds voice announcement will be played.

You can set the number of times the alarm sound will play when first triggered by the low voltage condition. This allows a possibly annoying alarm sound to be played only a small number of times and then allows you to bring in the model to home quietly. If you set this field to 0, the alarm sound will play indefinitely while the low voltage condition lasts.

## Miscellaneous settings

**Startup Delay** sets the number of seconds that the module waits for the receiver to initialize and start producing valid R/C signals. It can be anything from 3 to 20 seconds.

**Single Sound Mode** is where one sound is playing and another sound is triggered, the second sound replaces the first one. This is sometimes preferable when gunfire is played – the engine sound will stop momentarily so the gun sound can be heard clearer.

Once any settings anywhere in this tab have been changed, click the **Store Settings in Module** button to store these settings in the module.





## Where Are Hardware Settings Stored?

Hardware settings are those configurable settings that control how the **ShockWave 3** board itself behaves, rather than settings relating to the sounds.

There are some hardware settings that are always stored in the non-volatile Flash memory on the **ShockWave 3** Module. These are :

1. Startup Delay.
2. Single/Multi Sound Mode.

By default, hardware mode settings, except those above, are stored in a special section of the **.sfx8** file that the **ShockWave 3** module opened when it was powered up. That is convenient if you want the hardware settings to travel along with the sounds.

However, there are some hardware settings that have nothing to do with sounds at all and are really settings or attributes of the module itself. These are :

1. Input modes for THTTL1, THTTL2, SOUND1, SOUND2 and SOUND3 inputs
2. Idle Off Delay for THTTL1, THTTL2 inputs.
3. Offset # and Timeout for SOUND1/SOUND2/SOUND3 inputs

Using the optional Windows **ShockWave 3 PC** application, you can choose to store these settings in non-volatile FLASH memory inside the **ShockWave 3** Module by checking the **On-Board Non Volatile Memory** checkbox. Then you can experiment with different **.sfx8** files without having to reset the hardware settings all over again each time you change the file.





Figure 35: Switched Outputs Tab

ShockWave 3 Control Panel

Throttle(s) Sound Select Hardware Switched Outputs Multi-Engine Sync. DopplerFX

**Switch 1**  
 Mode: Flash Synchronized To Sound Clip  
☐ Output Active High  
 Sound 1 Flash Threshold: 50 %  
 Timing From Sound Clip Start:  
 Start Time: 0.00 secs Repeat Period: 6.00 secs  
 Stop Time: 4.00 secs Timeout: 10.0 secs

**Switch 2**  
 Mode: Flash Synchronized To Sound Clip  
☐ Output Active High  
 Sound 2 Flash Threshold: 50 %  
 Timing From Sound Clip Start:  
 Start Time: 0.00 secs Repeat Period: 6.00 secs  
 Stop Time: 4.00 secs Timeout: 10.0 secs

**Switch 3**  
 Mode: Flash Synchronized To Sound Clip  
☐ Output Active High  
 Sound 3 Flash Threshold: 50 %  
 Timing From Sound Clip Start:  
 Start Time: 0.00 secs Repeat Period: 6.00 secs  
 Stop Time: 4.00 secs Timeout: 10.0 secs

**Switch 4**  
 Mode: Flash Synchronized To Sound Clip  
☐ Output Active High  
 Sound 4 Flash Threshold: 50 %  
 Timing From Sound Clip Start:  
 Start Time: 0.00 secs Repeat Period: 6.00 secs  
 Stop Time: 4.00 secs Timeout: 10.0 secs

Save Settings in .sfx8 File Defaults Smoker Fan Defaults Retrieve Settings

Successfully Retrieved Switch Settings

The **ShockWave 3** module includes four Switched Outputs for switching LEDs or other low power loads. You can configure any of these outputs to operate in several modes selected by their respective **Switch1-4 Mode** drop down lists.

1. **Flash Synchronized To Sound Clip** – this mode sets the output to flash an LED in synchronization with its selected sound. This mode can be used to flash ultra-bright LEDs in gun muzzles in sync. with gunfire sounds or to flash a Morse code lamp in sync. with a Morse sound clip. You can set the Flash Threshold level to adjust the flash effect. A lower value will cause the LED to be brighter, because it is on for a greater period of time. If it is set too low, the LED may be on for too long, thus detracting from the flashing effect.



2. **Flash Synchronized To Sound Clip-Timed** – is the same as (1) but can be subject to timing constraints as in (4). This is useful for flashing LEDs in exhaust ports at engine Start-up for a few seconds while the engine sound is sputtering.
3. **On/Off With Sound Clip** – this mode sets the output on when its associated sound clip starts and off when the sound clip stops.
4. **Timed On/Off With Sound Clip Once** – in this mode you can set the output to switch on at a certain time after the start of a sound clip and switch off and stay off at a certain time after the start of the sound clip. You can set up a Start Time and Stop Time for the LED ON.
5. **Timed On/Off With Sound Clip Repeat** – in this mode you can set the output to switch on at a certain time after the start of a sound clip, switch off at a certain time after the start of the sound clip and then repeat with a specified repeat period. You can set up a Start Time, Stop Time, Repeat Period and End Time for the LED ON.
6. **Timed On/Off With Sound Clip Repeat With Timeout** – in this mode it behaves as in (5) above, but you can set a Timeout after which the switch will turn off.
7. **Proportional Smoker Fan With Engine1/2** – in this mode you can set the output to provide a Pulse Width Modulated (PWM) power drive for a smoker unit fan that increases and decreases with the throttle position for THCTL1/2 inputs. You can also set up a Burst of higher value fan speed at engine start-up to give a "belch" of smoke when the engine sound starts up.

The default Switch Mode settings are:-

**Switch1 will flash with Sound Clip 1, Switch2 will flash with Sound Clip 2, Switch3 will flash with Sound Clip 3, Switch4 will flash with Sound Clip 4,** and the threshold level is 50% of the maximum. These settings may be changed to any sound clip and any threshold between 0% and 100%.

If you want to use these outputs to switch circuits, but not have any sound playing, you can install a **NULL (empty) sound clip** as one of the sounds. A **NULL sound clip** is provided in the Sample Sound Files folder on the microSD Card.



## Active High/Active Low Output Mode

Each switched output has a check box named “Output Active High”. By default, these checkboxes are unchecked meaning the switched output is Active Low.

What “Active Low” means is that when the switched output is designated as **ON**, the switched output transistor is conducting causing the output pin voltage to be very close to 0 Volts (i.e. the -VE battery line).

If this checkbox is checked, when the switched output is designated as **ON**, the switched output transistor is not conducting causing the output pin voltage to be close to the battery voltage used to supply whatever load is switched by that output.

This feature is useful if these switched outputs are used to drive logic circuitry or some other processor chip instead of driving LEDS directly.

## Proportional Smoker Fan With Engine1/2 Mode

In this mode, the control panel section will change appearance as follows :

Switch 1	
Mode	Proportional Smoker Fan With Engine1
<input type="checkbox"/> Output Active High	
Fan Idle. Level	10 %
Fan Max. Level	100 %
Engine Smoker Burst	
Start Time	0.00 secs
Fan Burst Level	100.00 %
Stop Time	4.00 secs
Timeout	10.0 secs

The **Fan Idle Level %** is the percentage of full fan speed when the throttle stick is at its idle or off position.

The **Fan Max. Level %** is the percentage of full fan speed when the throttle stick is at its full on position.

The **Fan Burst Level %** is the percentage of full fan speed for the duration of the Engine Startup (Engine1 or Engine2, as appropriate) as indicated by the Start Time and Stop Time fields. If you do not want any Engine Start-up burst of Fan speed, make the Start and Stop Times 0.



Figure 36 : Multi-Engine Sync. Tab

ShockWave 3 Control Panel

Throttle(s) Sound Select Hardware Switched Outputs **Multi-Engine Sync.** DopplerFX

**Throttle Output 1**

Throttle Output 1 Sync. Mode:

Engine 1 or 2 Startup Time Point To Start Tracking THRTL1/2 Input:  Seconds

Engine 1 or 2 Shutdown Time Point To Stop Tracking THRTL1/2 Input:  Seconds

**Throttle Output 2**

Throttle Output 1 Sync. Mode:

Engine 1 or 2 Startup Time Point To Start Tracking THRTL1/2 Input:  Seconds

Engine 1 or 2 Shutdown Time Point To Stop Tracking THRTL1/2 Input:  Seconds

**Throttle Output 3**

Throttle Output 1 Sync. Mode:

Engine 1 or 2 Startup Time Point To Start Tracking THRTL1/2 Input:  Seconds

Engine 1 or 2 Shutdown Time Point To Stop Tracking THRTL1/2 Input:  Seconds

**Throttle Output 4**

Throttle Output 1 Sync. Mode:

Engine 1 or 2 Startup Time Point To Start Tracking THRTL1/2 Input:  Seconds

Engine 1 or 2 Shutdown Time Point To Stop Tracking THRTL1/2 Input:  Seconds

**PlayBack Controls**

☒ Startup Sound ☒ Play Engine 1

☐ Shutdown Sound ☐ Play Engine 2

Elapsed Time: **000.00**

**Successfully Retrieved Multi-Engine Sync. Settings**

**Default Values Displayed**

This feature is currently not supported. It is planned for a future release.



## DOPPLERFX TAB

Figure 37 - DopplerFX Tab

ShockWave 3 Control Panel

Throttle(s) Sound Select Hardware Switched Outputs Multi-Engine Sync. **DopplerFX**

### DopplerFX Doppler Shift Calculator

Speed Of Sound  m/sec  km/hr  mph  ft/sec

Actual Model Speed  m/sec  km/hr  mph  ft/sec

Model Speed Multiplier for Doppler Shift  Mach

Approaching Freq. Shift Ratio  Receding Freq. Shift Ratio

Max. Model Speed For 2x Frequency Shift (at 44100 samples/sec)  m/sec

The above model speed takes into account the Speed Multiplier factor set in this panel which should correspond to the Speed Multiplier set on the ShockWave 3 sound module.

Maximum approaching Frequency Shift Ratio on ShockWave 3 (at 44100 samples/sec) = 2.0  
Minimum receding Frequency Shift Ratio on ShockWave 3 = 0.67

### ShockWave 3 DopplerFX Status Indicators

#### Satellite Fix Indicators

Use LED Switched Output 1 ☒ Use LED Switched Output 2 ☒  
 Use LED Switched Output 3 ☐ Use LED Switched Output 4 ☐  
 Flash LEDs Continuously ☒ Play Fix Lost Sound ☒  
 Play Fix Acquired Sound ☒ Play Fix Lost Once Only ☐  
 Play Fix Acq. Once Only ☐

#### Observer Position Set Indicators

Use LED Switched Output 1 ☐ Use LED Switched Output 2 ☐  
 Use LED Switched Output 3 ☒ Use LED Switched Output 4 ☒  
 Play Observer Position Set Sound ☒   
 Play Obs. Position Set Once Only ☐

#### DopplerFX Use Altitude Indicator

Play Use Altitude ON Sound ☒ Play Use Altitude OFF Sound ☒

#### DopplerFX Enabled/Disabled Indicator

Play DopplerFX Enabled Sound ☒ Play DopplerFX Disabled Sound ☒

**Successfully Retrieved DopplerFX Settings**

The top part of this window is a Doppler Shift calculator that shows what the approaching and receding Doppler Shift ratio is for various model speeds. This can be informative when experimenting with the **DopplerFX** accessory board.

You can type into any of the Actual Model Speed fields (in different units) to calculate the corresponding Doppler shift when taking into account any model speed multiplier that may be set.



## ShockWave 3 DopplerFX Status Indicators

The lower section of this window contains controls that allow you to set up various indicators for the **Satellite Fix Acquired/Lost Events** and the **Set Observer Position, DopplerFX Enabled/Disabled, and Use Altitude ON/OFF Events**. Any or all of the LED switched outputs can flash LEDs and a System Sound can also be played.

Once any changes have been made in this section, click the **“Save Settings in ShockWave 3 NVM”** button to save them in the **ShockWave 3** module's non-volatile memory.

The switched output indicators for both these events are hard coded to flash on for 500ms and off for 500ms for a total of four flashes lasting four seconds when that event occurs.

The **Satellite Fix Event** LED indicators can also optionally be set to flash continuously. This will therefore indicate if a satellite fix has been lost subsequently due to those outputs NOT flashing when they should have been.

The **Set Observer Position Event** LED Indicators will only flash each time the Observer Position is set, or reset and cannot be set to flash continuously, as that would be both annoying and meaningless.

## System Sounds

These DopplerFX event indicators can also optionally be set to play a “System Sound”.

If the **Play System Sound** checkbox is checked, then the corresponding System Sound voice announcement will be played for each event.

You can use the **Test** buttons to artificially create **Satellite Fix Acquired/Lost** and **Set Observer Position Events** to test the effectiveness of the various visual and audible indicators that you set.



## CHAPTER 7 – SPECIAL PROVISIONS USING THE SECOND ENGINE SOUND

### PROPORTIONAL TANK/BOAT GUN TURRET TURNING SOUNDS

Most model tanks have gun turrets that can rotate via servo control, or other motorized mechanism, under control of a stick or knob on the R/C transmitter. In this case, instead of being an engine sound, the second "throttle" controlled sound can be turret turning sounds. What would normally be the engine 2 startup and idle sound, would be a turret start rotation sound and the engine 2 shutdown sound would be a turret stop rotation sound.

Furthermore, if you set the loop start and loop stop times appropriately so as to exclude the turret start rotation segment, but include the remainder of the first turret sound, you can use the Engine Sound Control to generate 8 steps of increasing turret rotation pitch so that the further you move the turret control stick/knob, the faster the turret rotation sound will be. 8 steps is quite sufficient for this purpose and going higher than this may cause problems.

Also, because the turret turning motor on real tanks does not vary much in speed, the maximum/base ratio for turret turning sounds is usually very low i.e. about 1.25 compared to the normal 2.0 – 3.0 used for proportional engine sounds.

If you want to use the second engine channel in this way you should set it up as a "Force Forwards Only" in the [Control Panel->Hardware Tab](#).

If this channel were a forwards and reverse channel, then when the turret control stick was returned to the centre (off position), the turret turning sound would continue playing as the sound module would think that it is an engine idling sound. By making it a forwards only channel, when the turret control stick is returned to the centre position, the turret stop rotation sound will be played once and then stop.





## SPECIAL PROVISIONS FOR MODEL HELICOPTERS

Helicopters (either real or model ones) do not generally change their engine speed much once they are in flight. Instead, other flight controls determine the speed of the aircraft. Therefore, when used in model helicopters, the engine sound set is usually setup such that the maximum speed to the idle speed ratio is relatively low e.g. 1.5 – 1.75. Also, since turbine helicopters have a very long engine spin-up time to full speed, the engine sounds are usually started up using a spare switch on the Transmitter instead of nudging the throttle stick forward a notch or two.

The **ShockWave 3 PC** [Control Panel->Hardware Tab](#) is used to set the Engine1 Sound Mode to “Switched with Sound Clip # 1”. We set this up before we ship the sound module out to a model helicopter customer. Then, a NULL sound clip should be used as regular sound clip # 1. Then the radio channel switch used for the regular sounds would operate as follows :

1. Flip the switch from its **OFF** position to **ON**, and leave it there. The engine start-up sound will begin and will spin up to idle power and continue looping at idle power. The throttle stick can then be used independently of the engine sound to start the rotors turning at any suitable time during the engine spin-up time.
2. Flip the switch from its **ON** position back to **OFF** again. The engine shutdown sound will play once only, and then stop. Again, the throttle stick can be moved independently to shut down the model's rotors.

## ADDITIONAL HELICOPTER ROTOR WASH SOUNDS USING THE SECOND ENGINE SOUND

It is also **potentially** possible to add rotor wash sounds separately as the Engine2 sounds and use the collective radio channel to feed the THTTL2 input. In this way you would get extra rotor wash sound only when the helicopter is taking off, in flight and landing.

However, this depends upon the availability of obtaining a suitable rotor wash sound that is loud enough to mask the underlying engine sound so that the engine sound is not also added as well.

Such suitable rotor wash sound clips are very rarely obtainable so, in practice, this effect is not easily achievable.



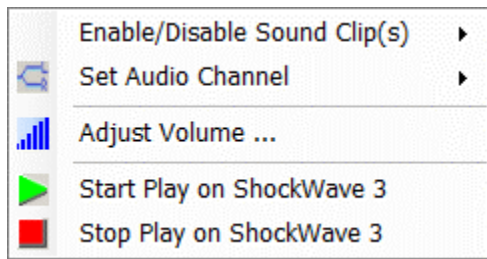
## CHAPTER 8 – SYSTEM SOUNDS

System sounds are provided by Model Sounds Inc. in a special .sfx8 file contained in the System folder on the **ShockWave 3** microSD card. These sound clips are used to make voice announcements for certain system events or to provide voice-guided assistance while performing certain setup functions on the board.

### ENABLING/DISABLING INDIVIDUAL SYSTEM SOUNDS

These sounds cannot be added, removed or renamed by the end consumer, but there are a limited number of functions available on those sounds. If you want to enable and disable any individual system sounds, or alter their relative volume or their audio channel, the following procedure should be followed.

1. Copy the SystemSounds44.sfx8 file from the microSD card to a backup location on your computer.
2. Copy that file to a different location on your computer to work on it.
3. Open the copied file using the **ShockWave 3 PC** application.
4. Use the limited right click context menu in the regular sound clip list here



to perform the above mentioned functions,  
e.g. disable or enable individual system sounds.

5. Save that .sfx8 file to your local disk from within the **ShockWave 3 PC** application.
6. Copy that saved file back to the System folder on the microSD card.

You can also enable or disable **ALL** System Sounds using **BUTTON1** on the sound module.

To switch them all off, once the red/green LEDs have stopped flashing, press and release **BUTTON1** quickly within 1.5 seconds. To switch them on again (this is a good idea if you are using the DopplerFX feature), press and hold down **BUTTON1** for longer than 1.5 seconds.



## CHAPTER 9 – SETTING YOUR PROGRAM PREFERENCES

Figure 38: Preferences Form

Click the **Preferences**



button

in the main Window Tool Bar.

The **Default Folder for .sfx8 Files** is the folder that **ShockWave 3 PC** opens when you click the Open Button in the Download File Controls

This folder is created for you when **ShockWave 3 PC** first runs. You can use the **Browse** button, or type a new folder name directly into the text field.

The **Load Last .sfx8 File at StartUp** check-box, when checked, will load the download file that was last open in **ShockWave 3 PC** the next time the application is launched.

The **Auto Volume Control on Load** check-box, when checked, will

automatically adjust the amplitude of the sound clip to its maximum level when loading it into the download file.

The **Auto Trim Sound Clip Start and End Points to Zero Crossings** checkbox can be checked to cause any sound clip to have its start and end points automatically trimmed, or cut off to the nearest positive going zero crossing point with a mild slope. This makes the looping behaviour at the end of the sound clip sound much smoother.

Similarly, the **Auto Trim Loop Start and Loop End Points to Zero Crossings** checkbox can be checked to cause the Loop Point start and end to be trimmed or adjusted to the nearest positive going zero crossing point with a mild slope. This makes the looping behaviour at the end loop point sound much smoother. Once your changes have been made, you can click on **OK** to save them and close the form.



## CHAPTER 10 – COPYING .SFX8 FILES TO/FROM THE PC AND SHOCKWAVE 3

In this application, **Copy to Module** refers to the process of **Copying** the **.sfx8 File**, as composed in the Sound Clip List(s), to the **ShockWave 3** module's **.sfx8** file on its microSD card. When the content of the Sound Clip List is correct, you can **Copy** the **.sfx8** File to the **ShockWave 3** module by clicking the **Copy to Module** button below the Sound Clip List.

You can also use the Save button on the Tool Bar or the **File->Save/Save As** menu items to save the current configuration to the currently open **.sfx8** file on your PC. This saves only to the PC Disk, not to the **ShockWave 3** module.

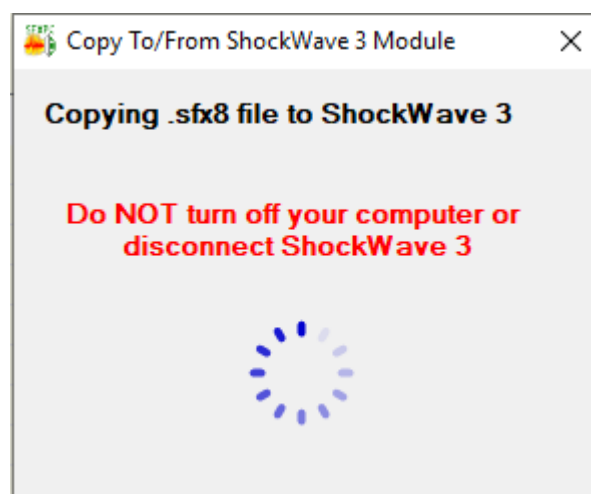
For faster **.sfx8** file copy performance you should **ALWAYS** remove the microSD Card from the **ShockWave 3** module and insert it into your computer using the microSD to SD card adapter or an optional USB microSD Card reader before you launch **ShockWave 3 PC**.

**Copy from Module** refers to the process of **Copying** the contents of the **ShockWave 3** module's **.sfx8** file on its microSD card to the PC.

You can **Copy** the contents of a **ShockWave 3** module's microSD card by clicking the **Copy from Module** Button. These functions check whether there is a **ShockWave 3** module connected before attempting any data transfers. You will be prompted to select or enter a file name that you want to hold the uploaded content. If you choose a file that already exists, you will be asked if you want to overwrite it.

**Take care you do not overwrite a .sfx8 file you want to keep, either on the PC or on the ShockWave 3 sound module!**

The copying process will be indicated by a Message box as follows:





This Message Box will automatically close when the copying has finished.

## CHAPTER 11 - MISCELLANEOUS

### INSTALLING AND USING AUDACITY

The Audacity audio editor program is a very good sound editing program and is absolutely free.

It is an Open Source Project and its [web site is here](#). You can download the current release of Audacity from its web site and install it on your PC.

Audacity is not produced by Model Sounds Inc., however, we highly recommend it.

### SOFTWARE LICENSE

The original purchaser of the **ShockWave 3 PC** Windows Software has purchased a licence to use the software on any personal computer or computers the purchaser owns.

Files in the downloaded ZIP file may be copied for personal backup purposes only.

The **ShockWave 3 PC** program remains the property of Model Sounds Inc.

**Note :** This licence does not permit the copying, distribution or resale of the downloaded ZIP file or **ShockWave 3 PC** software or files to any other party.



## MINIMUM SYSTEM REQUIREMENTS

### Operating System Requirements :

- Microsoft Windows 10/8/7 or later (32 Bit or 64 Bit).
- SXGA (1280 x 1024) minimum graphics controller and monitor.
- A PDF file viewer such as Adobe Acrobat Reader or Foxit PDF Reader (to view the manuals).  
If you do not already have a PDF file viewer, the **ShockWave 3** microSD Card contains links to the Adobe Acrobat reader and to the excellent Foxit PDF reader.

### Disk Space Required :

**ShockWave 3 PC** – 12MB

## COMMERCIAL SOUND CLIP LIBRARIES

Below is a list of some commercial sound clip libraries.

**Please Note :** All Sound Clips are subject to copyright and their respective owners licensing agreements. If you purchase or download any sound clips from anywhere for use in any of our Sound Modules, you alone are responsible for complying with the terms of the respective licensing agreements.

**Model Sounds Inc. bears no legal responsibility for any damages sought from our customers by copyrighted works owners.**

- [GOOGLE SEARCH ON SOUND EFFECTS LIBRARY](#)
- [AUDIOSPARX](#)
- [THE SOUND EFFECTS LIBRARY](#)
- [SOUND DOGS](#)

Many sounds can also be found on YouTube, but are generally of low quality. Listen for wind noise and background noise such as people talking and/or vehicle or airplane noise.



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R/C Models Like You've Never Heard Them Before!

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