



Model Sounds Inc.

SFXPC 4.0.1

SFX7 Sound Module Application

Windows Software Reference Manual

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ABOUT THIS DOCUMENT

This document is a user manual for the **SFXPC4.0.0** Windows application that accompanies the **SFX7.0** Sound Modules. The document has been formatted so that it may be printed on North American Letter or Metric A4 paper sizes.

The manual covers the SFXPC4 series of releases and is not to be confused with SFXPC3 releases used with the SFX6 modules, SFXPC2 releases used with the SFX5 modules, or SFXPC1 releases used with the SFX4 modules. SFXPC4 is **NOT** compatible with SFX6, SFX5 or SFX4 sound modules.

The SFXPC4 application installs in its own separate **C:\Program Files (x86)\Model Sounds Inc\SFXPC4.0.0** folder, so you can have different versions installed on the same machine.

Also described briefly, is the included free audio editor application, [Audacity](#). The latter is distributed under its own free license.

SOFTWARE LICENSE

The original purchaser of the **SFX7** Sound Module has purchased the micro-SD Card that is part of the SFX7 sound module and a licence to use the software on any personal computer or computers the purchaser owns. Files on the micro-SD Card may be copied for personal backup purposes only. The SFXPC4 program remains the property of Model Sounds Inc.

Other free programs on the micro-SD Card remain the properties of their respective owners.

Note : This licence does not permit the copying, distribution or resale of this micro-SD Card or SFXPC4 software to any other party. Licensing and copying/distribution rights of other free software on the micro-SD Card are as per their respective license agreements.

BACKUP YOUR SFX7 MICRO-SD CARD!!

As soon as you have received the SFX7 sound module, remove its micro-SD Card, insert it into the supplied USB card reader and copy all of the files and folders on the micro-SD card to some place on your computer's hard drive for backup purposes.

TERMINOLOGY

Throughout this document, the term **SFXPC4** means the Software Program that runs on a Windows PC. The term **SFX7** refers to the Sound Effects Module board.

SFXPC4 SUMMARY

SFXPC4 is a Windows program that interfaces with a **SFX7** Sound Effects Module via a USB 2.0 full speed (12Mbits/s) interface. The USB cable is available as an extra component as it is identical to most digital camera USB cables so it is very likely that you already have a suitable cable. The SFXPC4 application allows the user to build and edit **.sfx7** Sound Effects files that can be downloaded to the **SFX7** module. It also allows the **.sfx7** file stored in the module's micro-SD Card to be uploaded to the PC where it may be edited and re-downloaded.

The micro-SD Card in the SFX7 module may be removed and inserted into the USB micro-SD Card reader that is provided free with each SFX7 module. All configuration operations that can be performed on the SFX7 with its micro-SD inserted can be performed with the card inserted into the USB card reader, with the exception of playing sounds on the SFX7 module. The downloading and uploading of **.sfx7** files will occur much faster using the micro-SD Card in the USB card reader.

Individual sounds cannot be removed or added without downloading 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.

SFXPC4 interfaces to the Audacity sound file editor for editing at the waveform level. If you chose to install the **Audacity** sound editor that is included on the micro-SD Card and you installed it in its default location, you can select one or more sound clips in the Sound Clip List and edit them directly using **Audacity**.

MINIMUM SYSTEM REQUIREMENTS

Operating System Requirements :

- Microsoft Windows 7, Vista, Windows XP Service Pack 2 or later (32Bit or 64 Bit).
- Microsoft Internet Explorer 6.01 or later.
- XGA (1024 x 768) minimum graphics controller and monitor.
- **It is best viewed at a screen resolution of 1280 x 1024 or higher.**
- A PDF file viewer such as Adobe Acrobat Reader 7.00 or later (to view the manuals).
If you do not already have a PDF file viewer, the SFXPC4.0.0 micro-SD Card contains the excellent free Foxit PDF reader which is much lighter weight than the Adobe Acrobat reader.

Disk Space Required :

SFXPC4 – 8MB, MS .NET 4.0 runtime – 100MB, Audacity – 41MB

INSTALLING ON YOUR PC

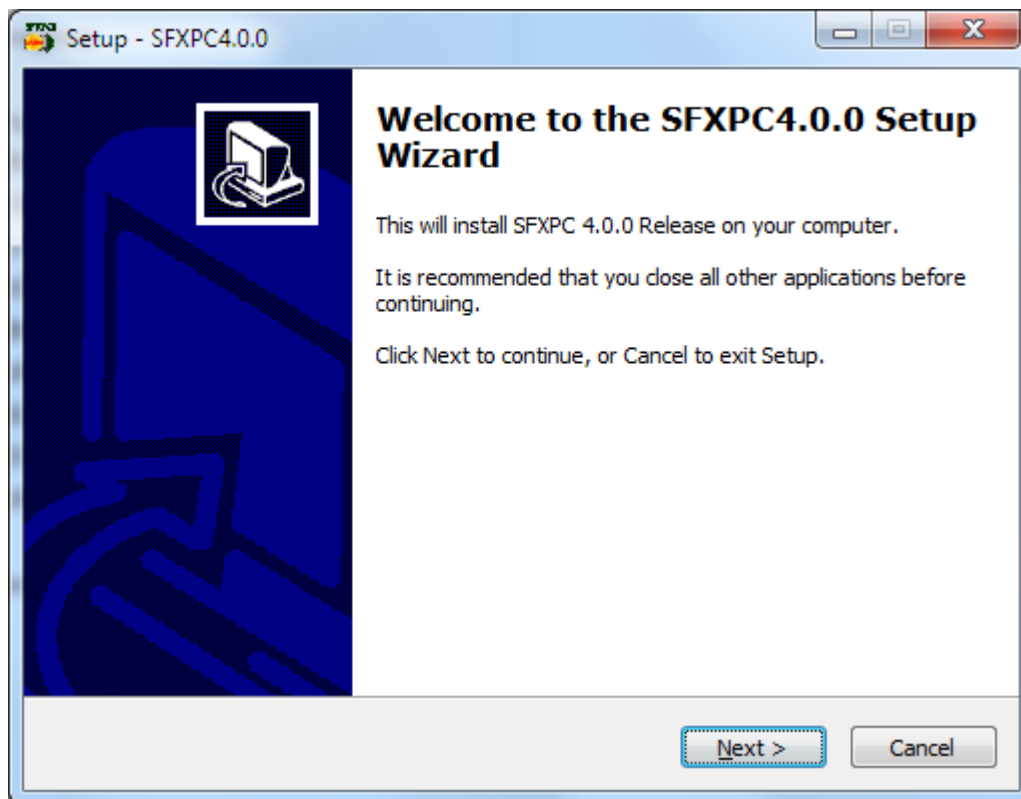
SFXPC4 is a .NET Windows application which requires the .NET 4.0 runtime engine. The .NET 4.0 runtime engine **is included as part of Windows 7 operating systems, but should be installed if you are running Windows Vista or XP and it has not been installed already.**

The .NET 4.0 runtime engine is included on the micro-SD Card and is installed along with SFXPC4 if you check its checkbox in the installer. **You must have Administrator privileges to install .NET.**

Follow these steps to install SFXPC4 and optional components on your PC :

1. Insert the micro-SD Card into the free micro-SD Card reader provided with the SFX7 sound module and plug the card reader into a spare USB port.
2. If, after several seconds, you **DO NOT** get a pop-up window asking you to install, then open the SFXPC4 micro-SD Card using Windows Explorer and double click on the **SFXPC4.0.0Setup.exe** program in the SFXPC4.0.0 folder.
3. Follow the steps and answer the prompts as the setup Installer program proceeds.

Figure 1: SFXPC4.0.0 Installer Window



4. If you select any Optional components, such as Audacity, they will be installed after all the SFXPC4 and .NET files have been installed.

CONNECTING YOUR SFX7 MODULE

1. Connect a mini-B USB cable between the module and your PC or USB Hub. The mini-B USB connector on the SFX7 module is the same type as used on many digital cameras and other mobile equipment, so you probably already have a suitable cable. The red LED should flash slowly.

Note : The USB port powers the **SFX7** low level circuitry, but not the audio power amplifier which requires its own 10 – 26Volt power supply if you want to hear the sound from the module's loudspeaker while it is connected to the PC.

2. Unlike its predecessors, the SFX7 module does not require any custom USB drivers – the USB drivers it uses are already built into the computer's operating system (OS). When the SFX7 is plugged in to the computer for the first time, the OS will automatically load the required drivers.
3. You can now use SFXPC4 to communicate with your **SFX7** module.
4. Note: If you are using the Auto Setup mode (the default), you should not connect the USB cable right away since the Auto setup procedure will not run if the USB cable is connected.

In this case, supply power to the module from the receiver through the male-male servo cables, wait for the Auto-setup to complete (the red/green LEDs flashing alternately for 6 seconds) and then plug in the USB cable.

SFXPC4 FILE FORMATS

SFXPC4 supports **.WAV** and **.MP3** files. WAV files are uncompressed audio format files and are much higher quality than MP3 files, although they take up more space. However, with the 1GB micro-SD card supplied with the SFX7, storage space is no longer an issue. When adding a .WAV or .MP3 file to SFXPC4 it has to be of the required format for the **SFX7** Module so SFXPC4 will automatically convert the file to the required format. – i.e. 16 bit signed samples, monophonic, sample rate 4100 or 22050 samples/second. The composite sound file that is downloaded to the SFX7 module is a **.sfx7** file type.

The SFX7 module can have its playback sample rate set to one of two audio sample rates - 44100, or 22050 samples/second. This is set in the [Control Panel->Hardware Tab](#). The sounds are loaded in 16 bit format, and 16 bits at 44100 samples/second is CD sound quality.

THE SFX7 SOUND MODULE AND ITS MICRO-SD CARD

The SFX7 sound module uses a removable micro-SD 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 SFX7 sound module by simply plugging in a different micro-SD Card containing the new files.

The micro-SD Card connector on the SFX7 sound module is a push-push type. You push the card in to insert it and push it again to remove it. When inserting the micro-SD 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 micro-SD Card and its connector to prevent accidental removal of the card.**

When the SFX7 sound module has its micro-SD 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 “hard drive” will appear in Windows Explorer. The name of this “drive”, or its disk label, is **ALWAYS “MSISFX7SD”**.

DO NOT re-label the SFX7 micro-SD Card as any other name. This specific disk label is searched for by the SFXPC4 Software to detect the necessary files on the module.

In order to use the SFXPC4, a SFX7 sound module must be connected to the PC through its USB port. The SFXPC4 application will not launch if a SFX7 module is not connected. This is a security measure to ensure the SFXPC4 application is not being used by unauthorized persons such as our competitors.

However, the SFX7 sound module can be connected to the PC either with or without its micro-SD Card. If the micro-SD Card is missing, you will get a warning dialogue box, but this is for information only. The dialogue box can be closed and the SFX7 sound module will still be detected. However, the Red and Green LEDs will now flash together slowly to indicate that it is in USB MODE, but with the micro-SD Card missing.

If the micro-SD Card is in the SFX7 module when the SFX7 module is connected, then the Red LED alone will flash slowly to indicate that it is in USB MODE, and with the micro-SD Card present.

TRANSFERRING FILES BETWEEN THE PC AND THE SFX7 SOUND MODULE

If you want to transfer files and configuration data between the PC and the SFX7 module, it is recommended to remove the micro-SD Card from the module and insert it into the USB micro-SD Card reader that comes with the SFX7 sound module. **Be careful not to lose the micro-SD Card!** Then plug in the micro-SD Card reader into any spare USB port. The operating system may install USB drivers the first time it is plugged into that port.

This is recommended since the file transfer rate will be much higher if the micro-SD Card is plugged into the USB Card reader than if you rely on the SFX7 USB Mass Storage Device.

Launch the SFXPC4 application **AFTER** the USB micro-SD Card reader has been plugged in. The SFXPC4 application will search all “hard” drives for one that has the disk label “**MSISFX7SD**”.

You must have **ONLY ONE** drive with the label “**MSISFX7SD**”.

FILE STRUCTURE ON THE SFX7 MICRO-SD CARD

The files on the SFX7 micro-SD Card must be in a certain format and structure. In the micro-SD Card Root Folder (the top level folder) there must be a file called “**SFX7ROOTFOLDER.txt**”. This file must contain one lines as follows:

1. One line naming the **.sfx7** file in the root folder you want the SFX7 sound module to use.

Example:

NewDownloadFile44100.sfx7

E.G. When powered up, the SFX7 module will expect there to be a **.sfx7** file named “NewDownloadFile44100.sfx7” in the top level (root folder).

In this way you can have many **.sfx7** sound sets on the micro-SD Card and they can be changed at will by simply editing the **SFX7ROOTFOLDER.txt**. Each time this information is changed the module should be powered down and then powered up again.

Also in the root folder there is a binary file called “**HardwareSettings7.bin**”. **This file should NOT be edited in any application.** This file is managed by the SFXPC4 application and the firmware in the SFX7 sound module.

This file stores the many configurable Hardware Settings of the SFX7 sound module. Some configuration settings are stored within the **.sfx7** composite sound file. Those settings are stored there because they are dependent on the specific sounds in the **.sfx7** file.

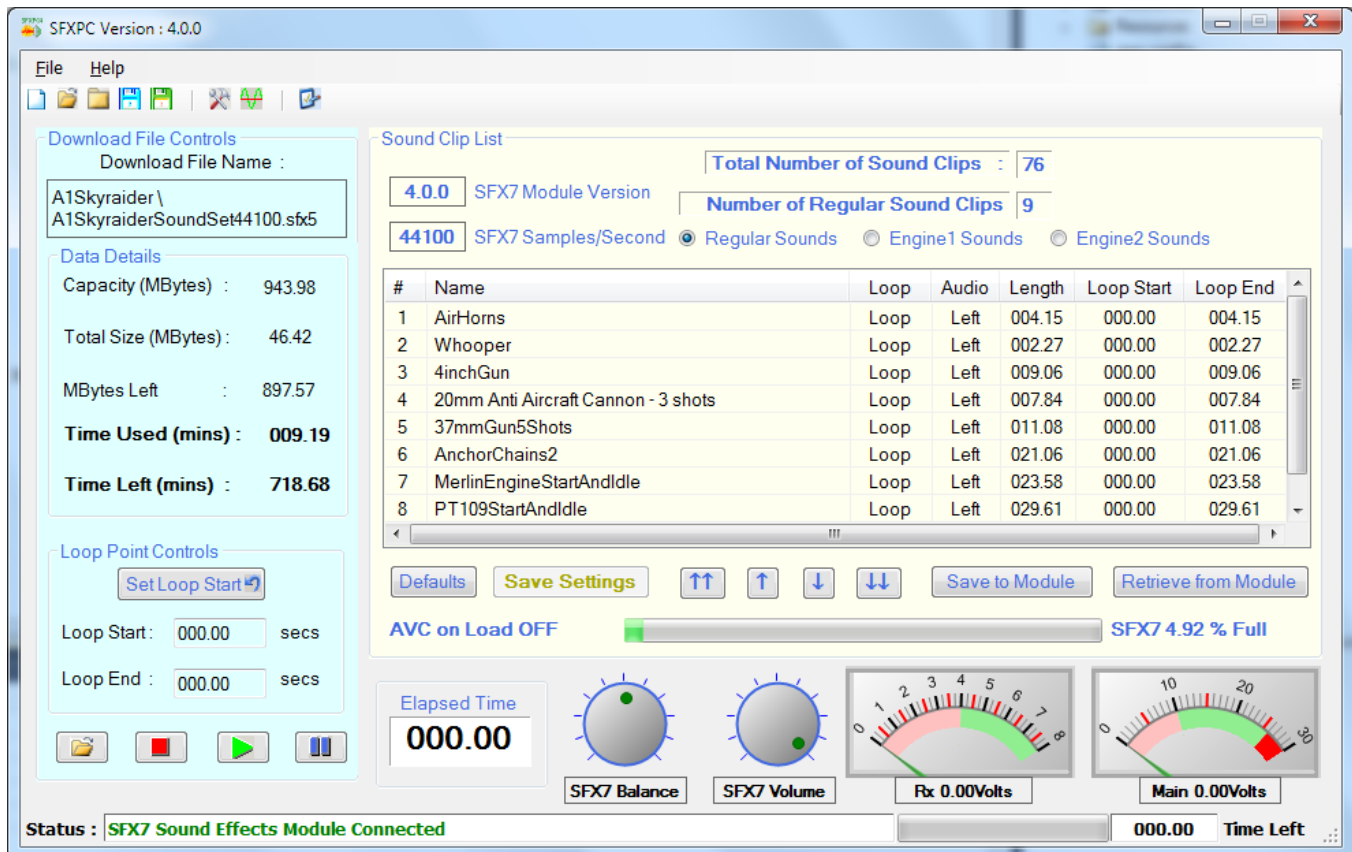
Figure 2: Hardware and Configuration Settings – Storage Locations

Hardware Settings7.bin File	Configuration section in .sfx7 File
Throttle and Sound Select Input modes	Engine Mode (“Auto with Throttle” or “Switched As Sound Clip #”)
Throttle Neutral Off Delay	Proportional R/C Position/Sound Clip Assignment
Throttle Forwards Mode	All settings relating to the four optional Switched Outputs which are tied to various sounds
Throttle neutral, maximum forward and reverse pulse widths (when using Button setup mode)	
Sound Select Channel Number Offset for both Sound Select inputs	
Keypad Calibration Settings (where available)	
GPS Feature Settings (where available)	

SFXPC4 MAIN WINDOW

Open SFXPC4 by double clicking on its icon on the desktop, or in the Start Menu. The main window will appear. **Figure 3** shows a screen shot of this window. This window can be minimized, but not maximized. The preferred screen resolution is 1280 x 1024 or higher. This main form is 977 x 614 pixels so it will occupy most of your screen if your screen resolution is only 1024 x 768 pixels.

Figure 3: SFXPC4.0.0 Main Window



The main window contains a **Menu Bar**, a **Tool Strip**, and four other sections :

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

Before using SFXPC4, make sure your **SFX7** sound module is connected to your PC through its USB port.

DOWNLOAD FILE CONTROLS

Figure 4 : Download File Controls

Download File Controls

Download File Name :

SFXPC3 \
NewDownloadFile44100.sfx5

Data Details

Capacity (MBytes) : 952.500

Total Size (MBytes) : 10.494

MBytes Left : 942.006





Time Used (secs) : 124.02

Time Left (secs) : 43941.6

Loop Point Controls

Loop Start : secs

Loop End : secs

The **Download File Controls** show details about the **.sfx7** Download File that has either been opened using the **File->Open** menu item or its **Open Button**, or has been uploaded from the **SFX7** module.

The **Capacity (MBytes)** field indicates the number of megabytes available for data storage on the **SFX7** micro-SD Card.

The **Total Size (MBytes)** field indicates the total number of bytes used for all the data, including the configuration.

The **MBytes Left**, **Time Used** and **Time Left** fields are self-explanatory.

PLAYING A SOUND CLIP AND LOOPING

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.



Once a Sound Clip is playing, and it reaches its end, it will loop continuously from its **Loop Start Point** to its **Loop End Point** if its Looping Type has been set to **Loop Normal** (the default value) – see [Set Loop/PlayOnce](#) – later.

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.

ELAPSED TIME INDICATOR

An **Elapsed Time Indicator** Clip is playing on the PC.

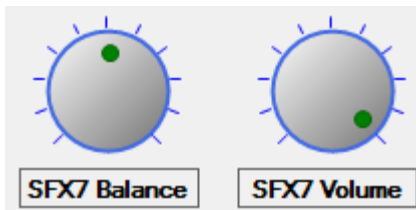


shows the amount of time elapsed while a Sound

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

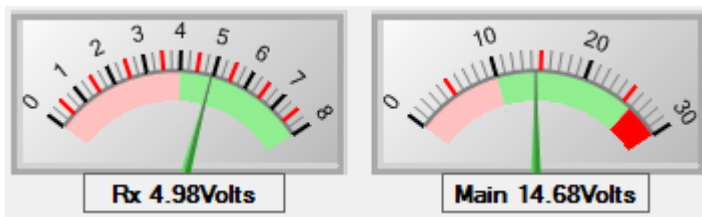
Figure 5: Volume and Balance Controls



These knobs indicate the position of the Volume and Balance controls on the SFX7 module. These indicators are read only – you can only change their position using the actual controls on the SFX7 module.

VOLTAGE INDICATORS

Figure 6: 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.

SET LOOP POINT FUNCTION

SFXPC4 allows you to define a **Loop Point** somewhere else 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 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.

Loop End : secs

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

There are four possible values for the Looping type – **Looping, Play Once, Play Through Next and Play Through Previous**. [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 engine sounds are controlled using the **Throttle Ranges** feature.

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.

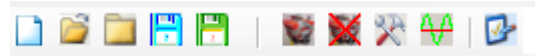
In the Engine 1 and Engine 2 Sound Clip Lists, the engine start-up sound is always the **second** Sound Clip in the list and the Engine Shutdown sound is always the first in the list. This is because with the **Throttle Ranges** feature, the engine sound cannot have its range start at 0%, otherwise,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

TOOL BAR

Figure 7: Tool Bar (Regular Sounds)



Figure 8: 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.

THE SAVE SETTINGS BUTTON

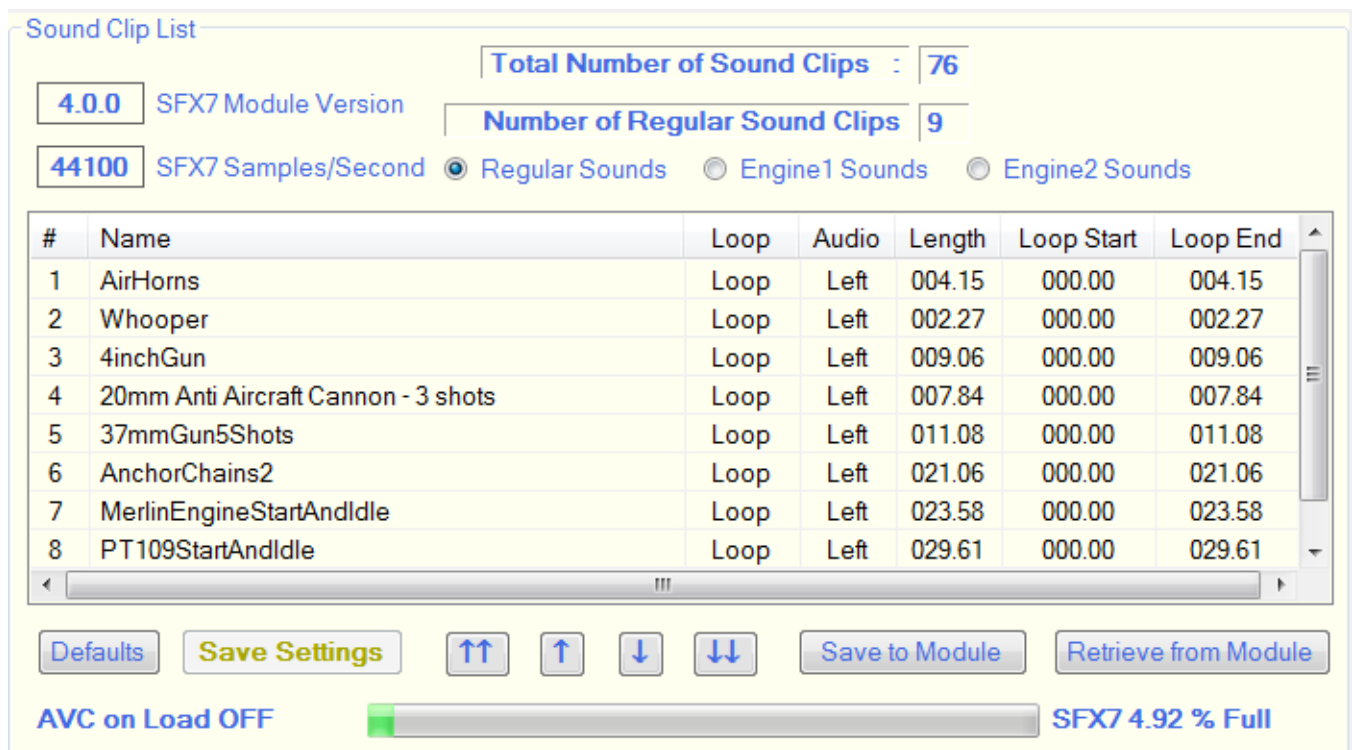
Save Settings

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 **.sfx7** file down to the SFX7 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. This means that you no longer have to download the entire **.sfx7** file whenever you change any of the Sound Clip's settings.

If you add/remove or move a Sound Clip, then you have to Save the whole **.sfx7** file down to the module.

THE SOUND CLIP LIST FOR REGULAR SOUNDS

Figure 9: The Sound Clip List for Regular Sounds



Sound Clip List

Total Number of Sound Clips : 76

4.0.0 SFX7 Module Version

Number of Regular Sound Clips 9

44100 SFX7 Samples/Second

Regular Sounds Engine1 Sounds Engine2 Sounds

#	Name	Loop	Audio	Length	Loop Start	Loop End
1	AirHorns	Loop	Left	004.15	000.00	004.15
2	Whooper	Loop	Left	002.27	000.00	002.27
3	4inchGun	Loop	Left	009.06	000.00	009.06
4	20mm Anti Aircraft Cannon - 3 shots	Loop	Left	007.84	000.00	007.84
5	37mmGun5Shots	Loop	Left	011.08	000.00	011.08
6	AnchorChains2	Loop	Left	021.06	000.00	021.06
7	MerlinEngineStartAndIdle	Loop	Left	023.58	000.00	023.58
8	PT109StartAndIdle	Loop	Left	029.61	000.00	029.61

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

AVC on Load OFF SFX7 4.92 % Full

Important Items in this section are :-

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 SFX7 module. This release number should match that at the very top of the main window, i.e. 4.0.0.
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 SFX7 sound module. This sample rate **MUST** match the value that is displayed and set in the [Control Panel-> Hardware Tab](#) and **MUST** match the sample rate of all the sounds in the **.sfx7** download file. The SW performs check 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. Engine sounds can still be added to this list, however they will not have their on/off or speed controlled by either Throttle input.
 - b. **Engine1 Sounds** – these are sounds that are controlled by the Throttle1 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 Throttle2 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 **SFX7 HW Operations 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. Any of the sixteen sound clips can be assigned to the four sound select positions of the transmitter stick, corresponding to the Sound1/2 inputs from the receiver, using the [SFXPC4 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**, **PlayOnce**, **PlayThruP** or **PlayThruN**.
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 SFX7 hardware).
- e. **Length** Duration of the Sound clip if not looped.

- f. **Loop->** 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** Loop End Time – Indicates at what time in the sound clip (from its start) Looping will end if Loop is set to LoopNormal.

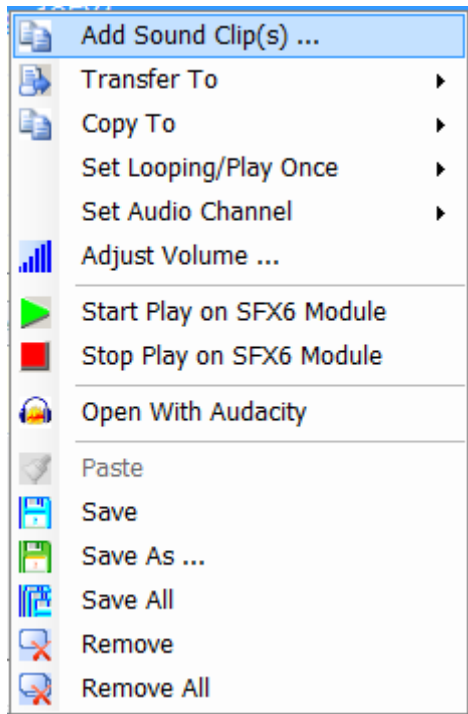
6. A set of buttons and indicators as follows :



- a. **Defaults** Sets the various fields in the entire list to meaningful values. Useful if you make many changes and mess things up. This will restore the settings to default values.
 - 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 SFX7 module without having to download the whole file again.**
 - 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. **Save To Module** Saves the entire download file to disk and saves (downloads) the file to the SFX7 module.
 - e. **Retrieve From Module** Retrieves (uploads) the contents of the SFX7 module's micro-SD Card to the hard disk and displays the results in the sound clip lists.
 - f. **AVC on LOAD OFF** AVC – Automatic Volume Control, indicates if sound clips will automatically be amplified to their maximum possible level when they are loaded into SFXPC4. This is set in the Preferences Form.
 - g. **Percent Full Bar** Bar indicating percentage level of storage memory used if the **.sfx7** were to be downloaded to the SFX7 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 10: Download File Context (Right Click) Menu



ADDING AND REMOVING SOUND CLIPS

The composite **.sfx7** file contains **ALL** the sounds to be stored in the sound module. **Individual sounds cannot be removed or added without downloading 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.

You cannot download just one or two.

If you want to change any of the sounds, you should copy the **.sfx7** sound file that is on the micro-SD Card that came with the SFX7 sound module to your hard drive, and open it from there.

Alternatively you can **Retrieve** the sounds from the module to your PC by clicking the **Retrieve 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 in **Figure 7**, above. The sound clips are loaded and 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 (Clipboard) the Paste menu item is greyed out.
4. By **Dragging and Dropping** or **Copy and Pasting** a **.sfx7** composite file that already contains sound clips that have been previously loaded using SFXPC4.0.0.

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. Method 4 will work with **.sfx7** files created using **SFXPC4** or previous **.sfx4** files. In the latter case they will be automatically converted to the **.sfx7** file format.



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 sound much 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 **SFX7** module's FLASH memory.





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 black background as in the next figure :

Figure 11 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 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

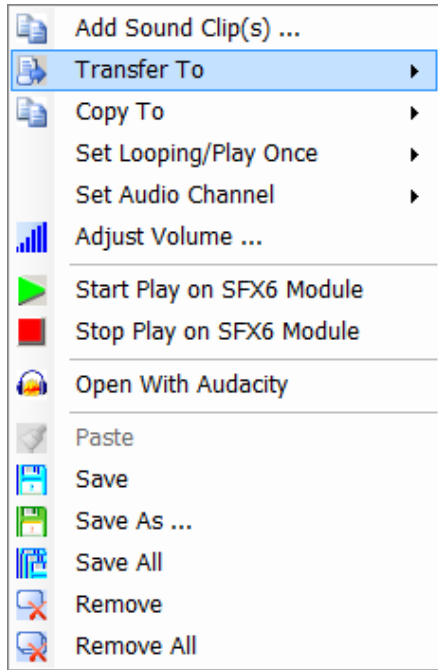
Once at the desired location, release the left mouse button. The cursor will resume its normal appearance.

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 12: 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.

This command is available in the context (right click) menu in the sound clip list as in this figure.

COPYING SOUND CLIPS

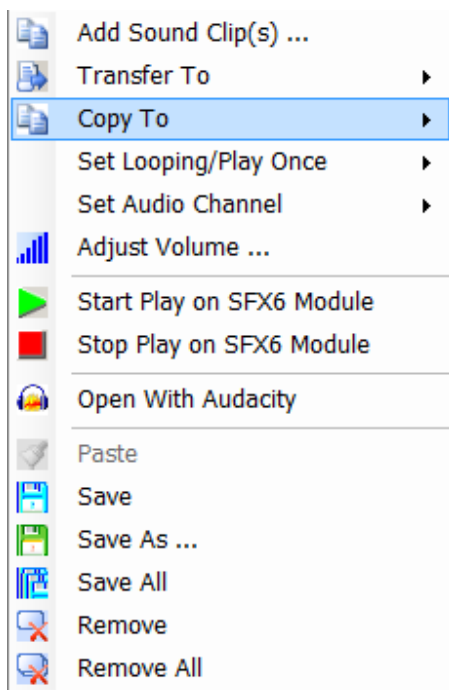
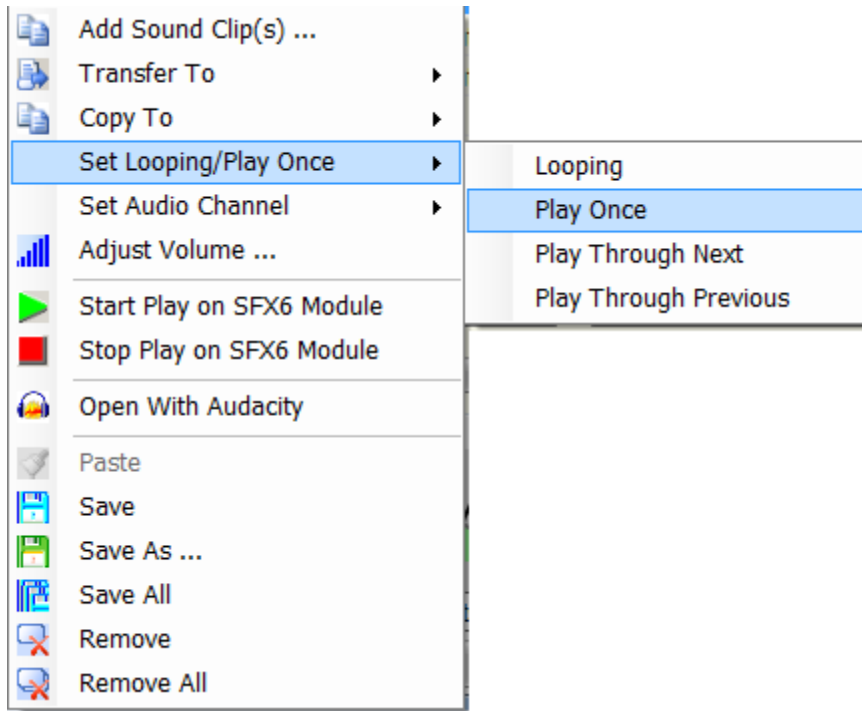


Figure 13: Copying Sound Clips to another List

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

SET LOOPING OPTIONS

Figure 14: 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 four possible Looping options.

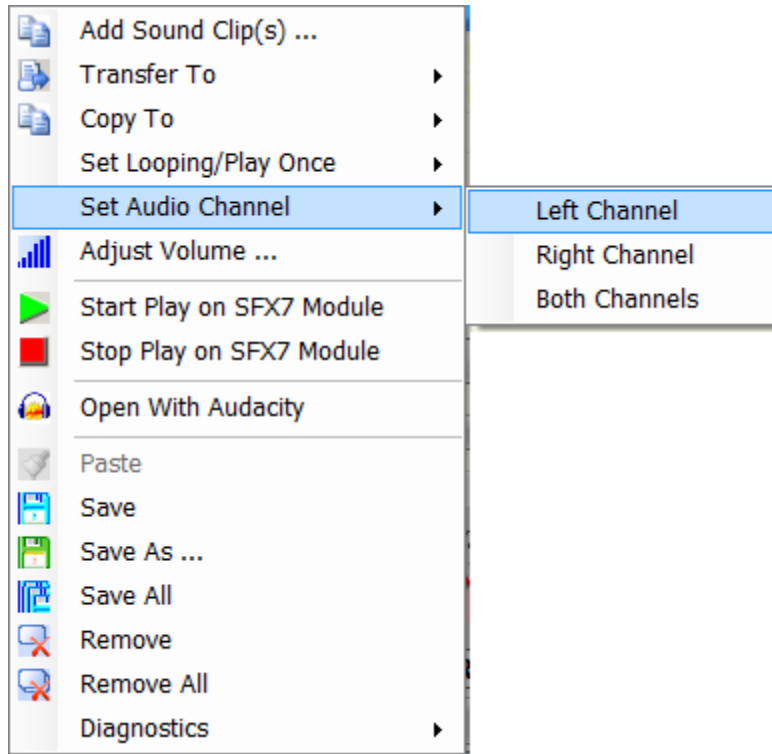
1. **Looping** – when the sound clip reaches its end, it will continuously loop back to its Loop Start Point.
2. **Play Once** – when the sound clip reaches its end, it will stop playing.
3. **Play Through Next** – when the sound clip reaches its end, it will start playing the next highest numbered sound clip in the list.
4. **Play Through Previous** – when the sound clip reaches its end, it will start playing the next lowest numbered sound clip in the list.

Play Through Next is especially useful for engine sounds where you may want to play a brief sound of gears changing, for example, before moving on to the next engine step in the list. A brief burst of turbo charger kicking in is another application.

Play Through Previous is useful when the throttle is decreasing and you may want to play a brief sound of braking, for example, before reaching the idle loop.

SETTING THE AUDIO CHANNEL

Figure 15: Setting the Left/Right Audio Playback Channel



This is intended to allow any sound to be specifically 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 SFX7 module behaves as above, but the left and right outputs are then mixed down to a single monophonic output in the loudspeaker amplifier.

The Audio Line outputs on connector H2 carry the individual Left and Right channels. At maximum volume these signals are about 1.0V R.M.S.

ADJUSTING THE VOLUME OF SOUND CLIPS

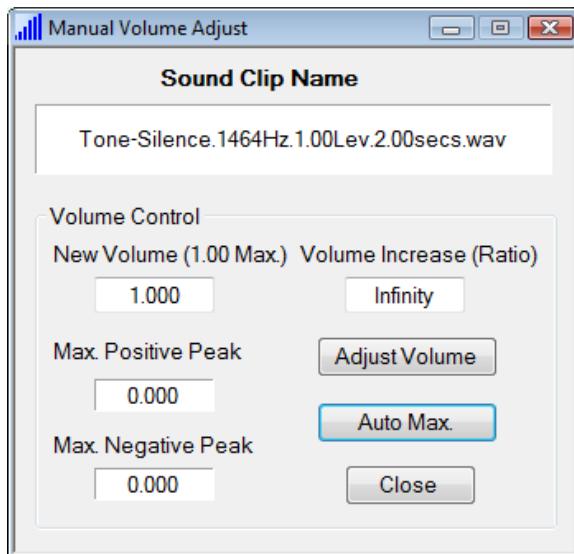


Figure 16: Manual Volume Adjust Form

The **SFX7** sound module rotary volume control adjusts the volume of ALL the sounds.

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.

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.

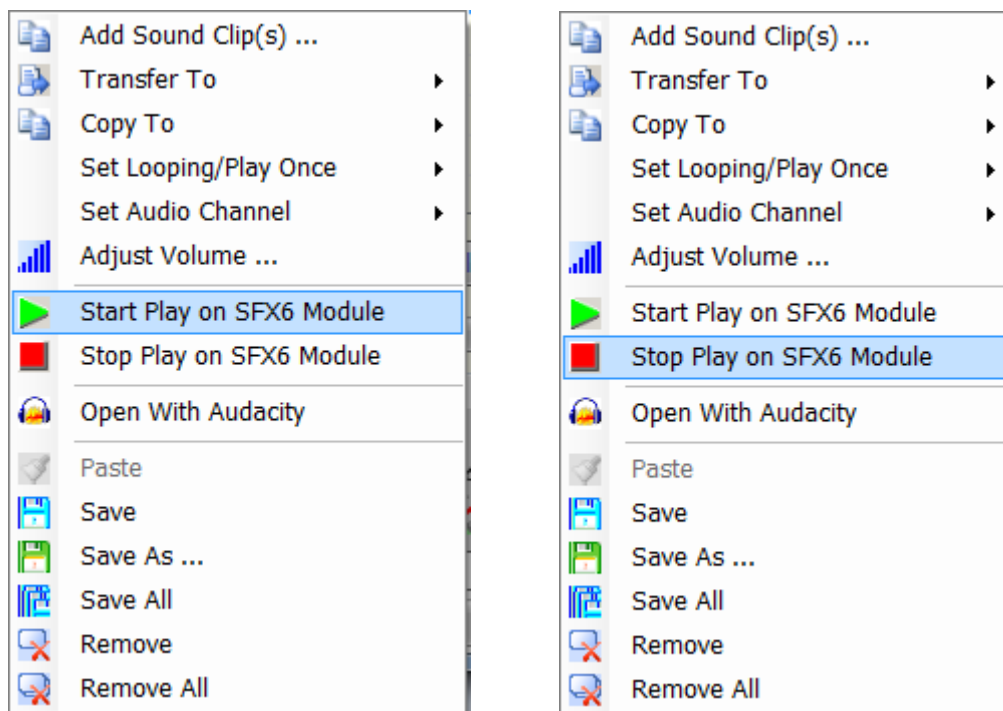
If you have several sound clips that you wish to change the volume of, you can leave this form open. Then when you select any other sound clip, that sound clip will appear in the **Manual Volume Adjust** form and you can proceed as above.

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 SFXPC4 to automatically adjust the volume to the maximum whenever a sound clip is loaded into the list – see [Preferences Form](#).

PLAYING SOUND CLIPS ON THE SFX7 MODULE

Figure 17 and Figure 18: Playing Sound Clips on the SFX7 module while connected to the PC



The **SFX7** Sound Module can playback sound clips while connected to the SFXPC4 application.

To achieve this, the micro-SD Card must be inserted into the **SFX7** module. Unplug the USB cable, power down the sound module if it is receiving power from elsewhere, plug in its micro-SD 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.

You can use the **Start Play on SFX7 Module** and **Stop Play on SFX7 Module** commands, as above, to play sound clips which you have downloaded to the module.

This is very useful for testing out the sounds before you complete the installation in your model. You can play up to two sounds simultaneously if they are sampled at 44100 samples/second or three sounds simultaneously if they are sampled at 22050 samples/second. You can also set a preference in the [Preferences Form](#) to play any sound on the **SFX7** module when you double click it in the sound clip list.

EDITING SOUND CLIPS WITH AUDACITY

Audacity is an easy to use waveform level audio editing program which is included free on the SFX7 micro-SD Card. Audacity is completely free. If you choose to install this program in its default location, the sound clip list context (right-click) menu will have an additional menu item – **Open with Audacity**.

You can select one or more sound clips in the list and open them simultaneously 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 ...** (Audacity) your changes to disk to the same location that they were opened from (i.e. the folder that contains the download file). When the Audacity application is closed, the changed sound clip will replace the original in the list.

SAVING SOUND CLIPS

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

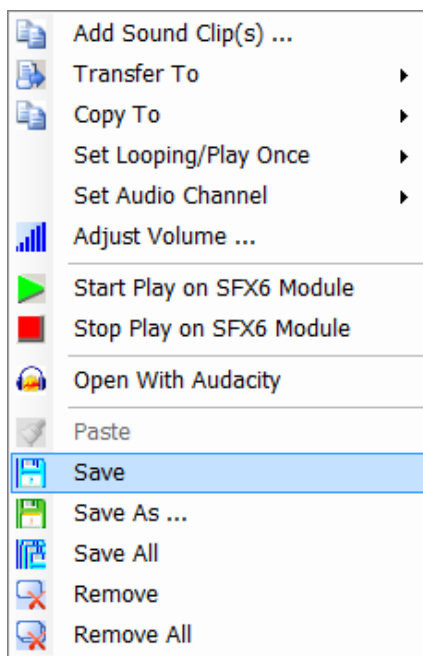


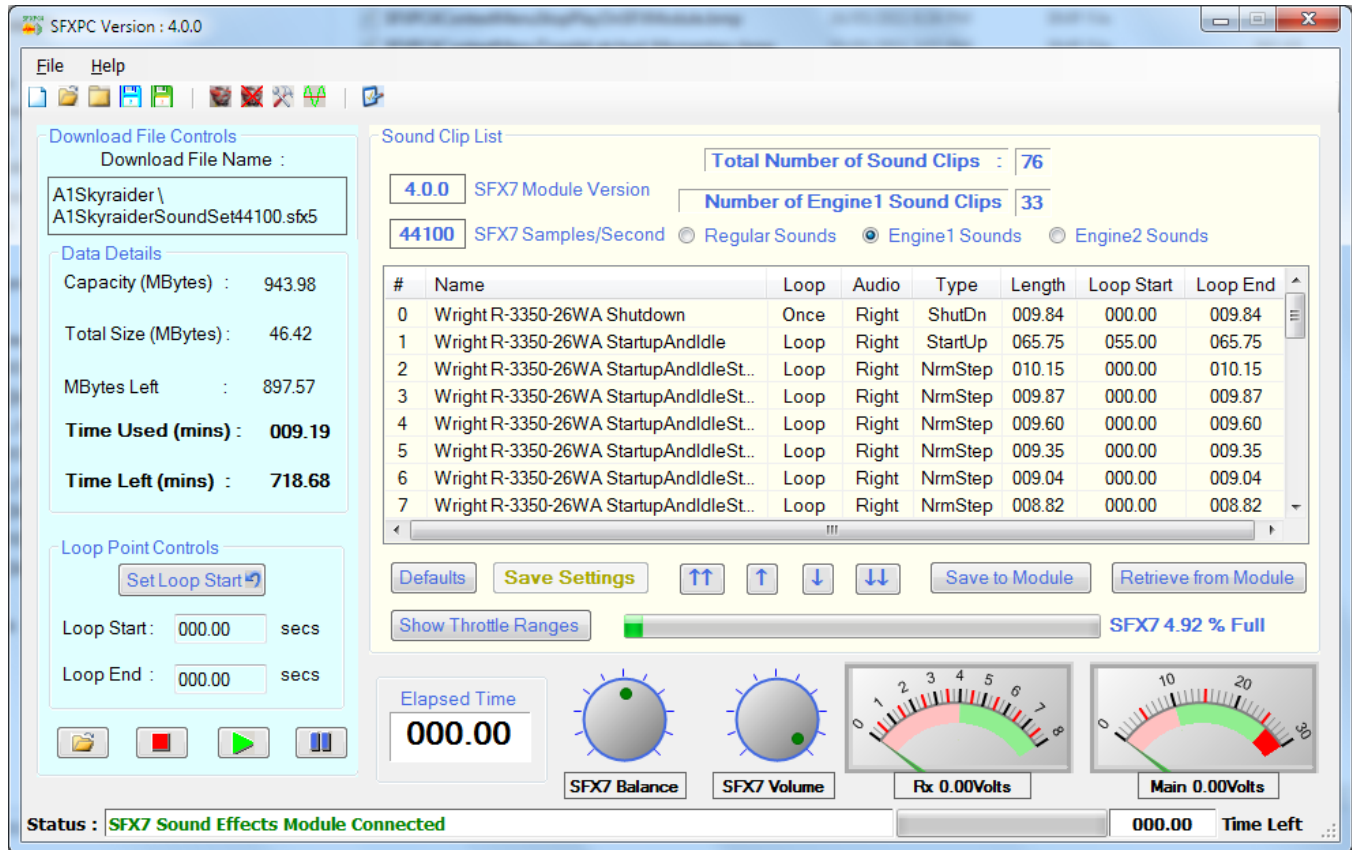
Figure 19: Saving Sound Clips to Disk

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

THE SOUND CLIP LIST FOR ENGINE SOUNDS

Figure 20: Main Form for Engine Sounds – Normal View



SFXPC Version : 4.0.0

File Help

Download File Controls
Download File Name :
A1Skyraider\
A1SkyraiderSoundSet44100.sfx5

Data Details
Capacity (MBytes) : 943.98
Total Size (MBytes) : 46.42
MBytes Left : 897.57
Time Used (mins) : 009.19
Time Left (mins) : 718.68

Loop Point Controls
Set Loop Start

Loop Start : 000.00 secs
Loop End : 000.00 secs

Sound Clip List
Total Number of Sound Clips : 76
Number of Engine1 Sound Clips : 33
44100 SFX7 Samples/Second
 Regular Sounds Engine1 Sounds Engine2 Sounds

#	Name	Loop	Audio	Type	Length	Loop Start	Loop End
0	Wright R-3350-26WA Shutdown	Once	Right	ShutDn	009.84	000.00	009.84
1	Wright R-3350-26WA StartupAndIdle	Loop	Right	StartUp	065.75	055.00	065.75
2	Wright R-3350-26WA StartupAndIdleSt...	Loop	Right	NrmStep	010.15	000.00	010.15
3	Wright R-3350-26WA StartupAndIdleSt...	Loop	Right	NrmStep	009.87	000.00	009.87
4	Wright R-3350-26WA StartupAndIdleSt...	Loop	Right	NrmStep	009.60	000.00	009.60
5	Wright R-3350-26WA StartupAndIdleSt...	Loop	Right	NrmStep	009.35	000.00	009.35
6	Wright R-3350-26WA StartupAndIdleSt...	Loop	Right	NrmStep	009.04	000.00	009.04
7	Wright R-3350-26WA StartupAndIdleSt...	Loop	Right	NrmStep	008.82	000.00	008.82

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

Show Throttle Ranges SFX7 4.92 % Full

Elapsed Time 000.00

SFX7 Balance SFX7 Volume Rx 0.00Volts Main 0.00Volts

Status : SFX7 Sound Effects Module Connected 000.00 Time Left

The Engine1 Sounds List displays those sounds that are controlled by the Throttle1 input of the SFX7 sound module. The Engine2 Sounds List displays those sounds that are controlled by the Throttle2 input of the SFX7 sound module. These can number up to 24 which would normally comprise one engine start-up/idle sound, four to sixteen steps of increasing engine pitch to full speed, and one engine shutdown sound. Other special Engine Sound types may be added later in a future release.

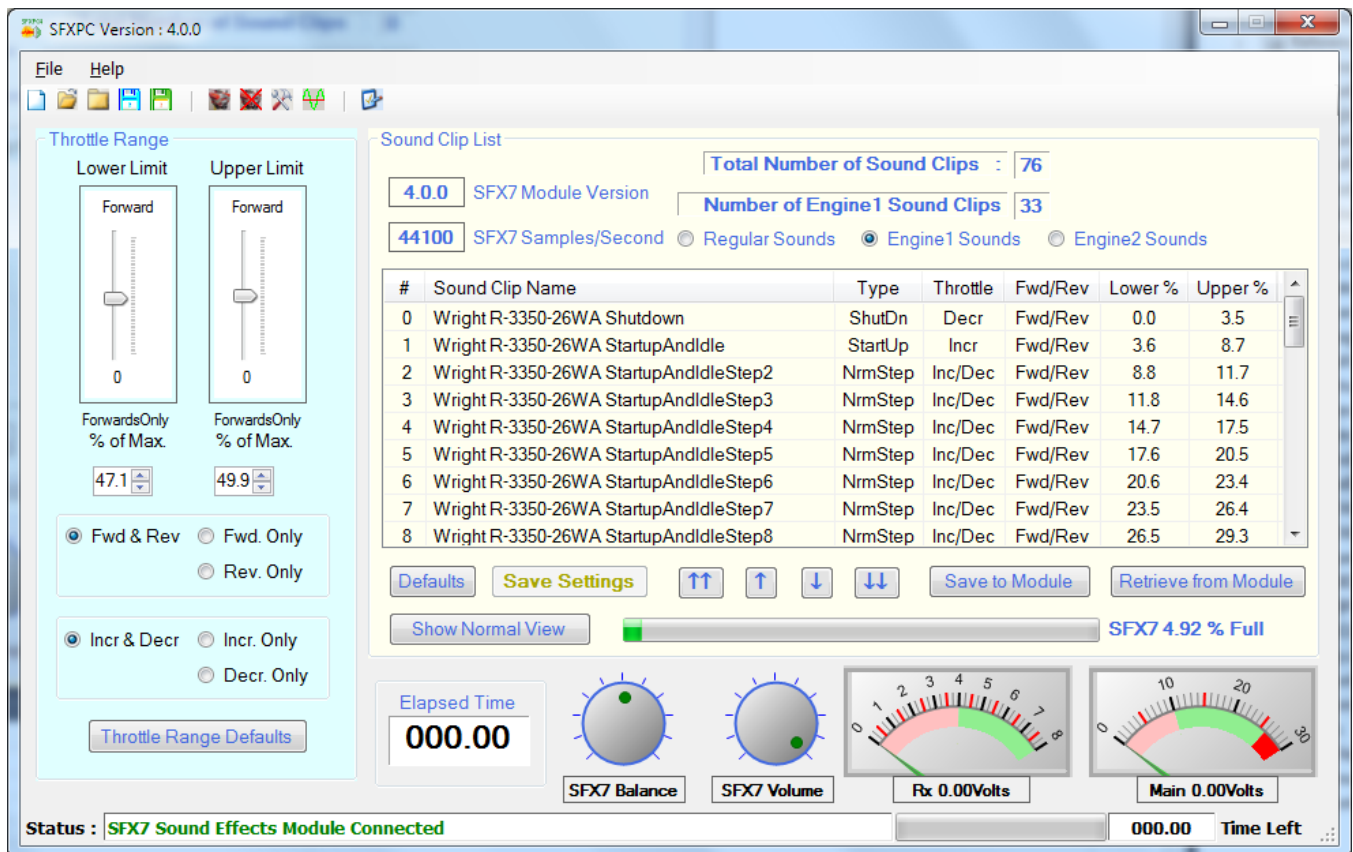
These lists are similar to the [Sound Clip List for Regular Sounds](#) with differences as follows:

1. There is an additional field (column) in the list – **Type**. This is an **Engine Sound Type** which can one of several values :
 - a. **NormStep** Normal Step means the sound clip is one of the steps of increasing or decreasing speed linked to the Throttle Position.
 - b. **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 SFX7 hardware is setup. See the SFX7 Hardware Operations Manual for details.
 - c. **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 starting up the engine sound will differ, depending on how the SFX7 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 21: Main Form for Engine Sounds – Throttle Ranges View



In this view the entire [Download File Controls](#) section has been replaced by a new Throttle Ranges 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.

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

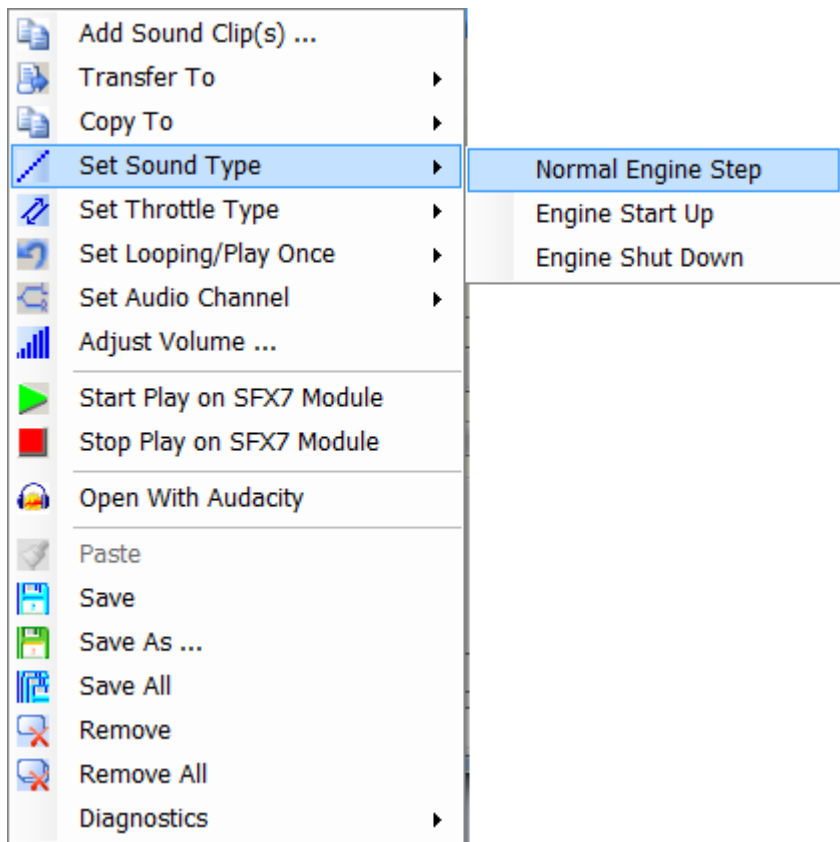
The sound clip list for Regular sounds has the following fields (columns) :

- a. **#** Sound clip number in the list.
- b. **Name** Name of the sound clip file, without its file extension.
- c. **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.

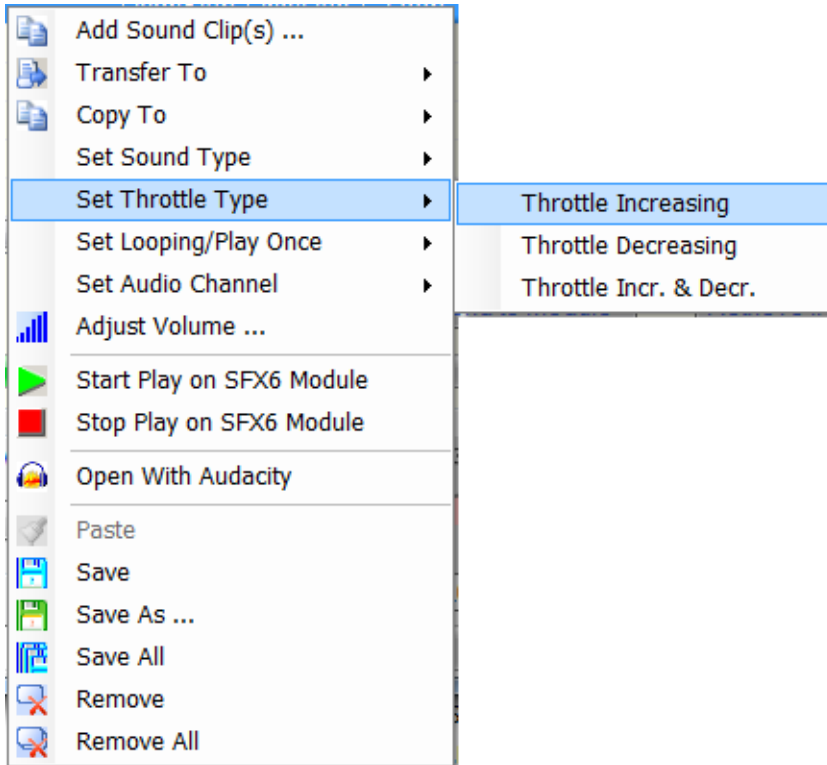
4. The Context menu (right click, or pop-up) has additional items as follows:

Figure 22: Set Sound Type Menu



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

Figure 23: Set Throttle Type Menu



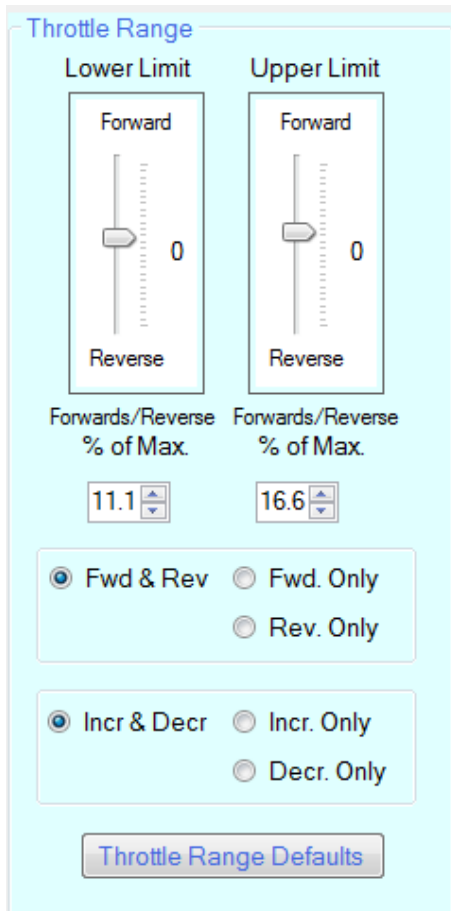
This menu allows you to set if the sound clip is played only when the throttle is Increasing, Decreasing, or Both.

This is useful to separate sounds that are appropriate to each case such as a moving off sound, or a Stopping sound.

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

USING THE THROTTLE RANGES FEATURE

Figure 24: Throttle Range Controls



In the Throttle Ranges View, the entire [Download 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 numbers displayed in the actual sound clip list for the selected sound clip.

The SW will enforce that you not set an Upper Limit higher than the Lower Limit of the sound clip above, or a Lower limit lower than the Upper Limit of the sound clip below.

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, Idle 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 and results in similar behaviour to the older linear throttle step based sound selection.

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.

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:

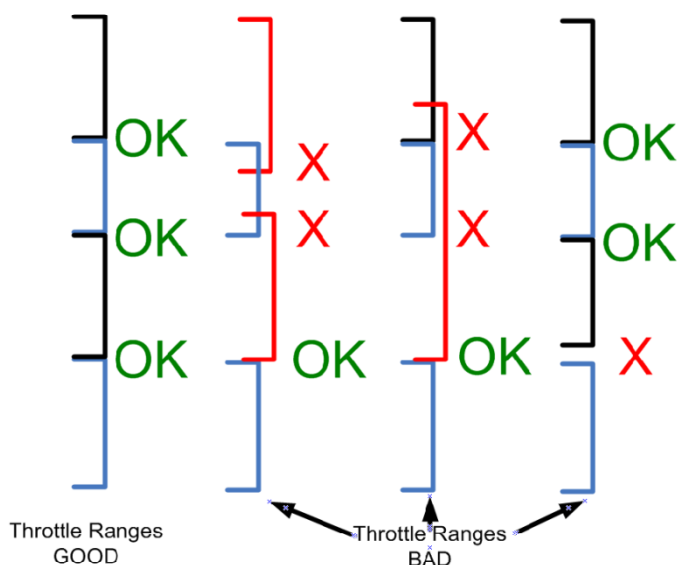
1. **NO TWO THROTTLE RANGES CAN OVERLAP** - I.E. For any given **Lower Limit %**, the **Upper Limit %** of that sound clip cannot be higher than the **Lower Limit%** for **ANY OTHER** sound clip in the list. Similarly, for any given Upper Limit %, the Lower Limit % of that sound clip cannot be lower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

Figure 25: 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 SFX7 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:

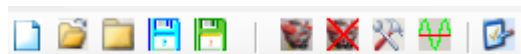
1. Start with an empty Engine Sound List.
2. Add the Engine Start-Up sound with its idle loop at the end. It will automatically have its **Sound Type** set as **StartUp**, its **Fwd/Rev Type** set as Both and its **Throttle Type** set as Increasing Only.
3. Use the [Engine Sound Control](#) Form (explained later) to generate 16-32 steps of increasing speed.
4. Add a shutdown sound, if you have one. 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.

ENGINE SOUND CONTROL FORM

The **Engine Sound Control** is used for controlling and/or generating Engine sounds for the proportional Engine Sound feature of an **SFX7** module.

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

Figure 26: Tool Bar when Engine Sound Clip Lists are Showing




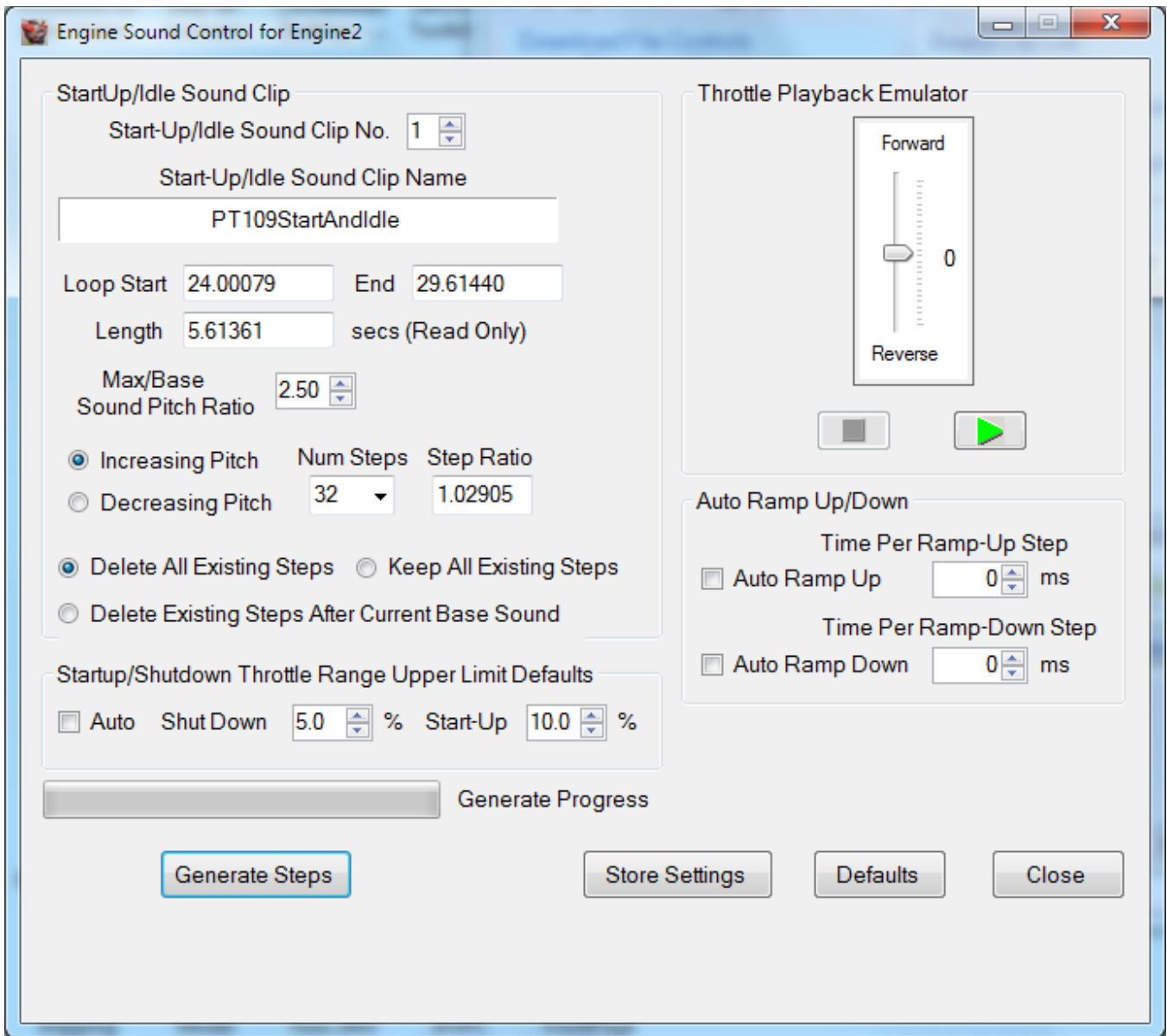
To launch the Engine Sound Control click on the Engine button -  The Engine Sound Control Form will be displayed as on the next page.

Figure 27: Engine Sound Control Form



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 SFX7 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**. This is unlike previous releases that used a simple linear position number to select an engine sound step. The number of steps can be selected from 8 - 32 or any number up to 32 can be typed in.

The sounds can be captured from a real engine and edited into short sound clips of several 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 **SFXPC4 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 very repetitive and rhythmic and that have a loop point for the idle portion set to 10 seconds or more before its end.
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.

It is advisable to not have less than 8 steps since the number of steps also determines the Throttle Ranges, i.e. the amount of travel of the throttle stick from one step to the next. This may become a problem when starting up the engine sound if the amount of travel is too large as the model may already have started moving before the engine sound comes on. This can be countered by setting the Throttle Range for the Engine Start-up sound to be a bit lower.

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

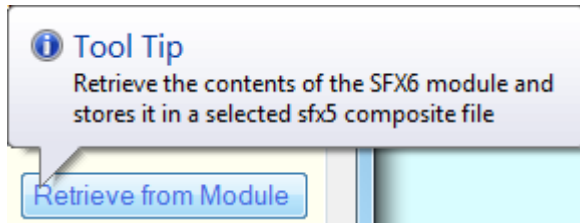
The “Startup/Shutdown Throttle Range Upper Limit Defaults” box allows you to set the default throttle range upper limits for the start-up and shutdown sounds when you generate the steps. This is useful when generating 32 steps as each step is very close to each other and the default values of 1/32 or 3% would make it difficult to control the start-up and shutdown sounds using the throttle stick.

AUTO RAMP UP/DOWN

The Auto Ramp Up/Down feature can be used to slow the change in engine speed when the throttle stick is moved quickly. Real engines cannot change their speed instantaneously due to their mechanical inertia. Therefore it is often more realistic to slow down the ramp up or ramp down of engine speed using this feature. You can set the time delay between each engine sound step being selected.

TOOL TIPS/BALLOON HELP

Figure 28: Tool Tip or Balloon Help



Most of the buttons have Icons on them instead of text. To help you understand the function of the button, you can move 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 **Retrieve from Module** button is shown here.

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 29: 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.

GENERATE TONE DIALOG

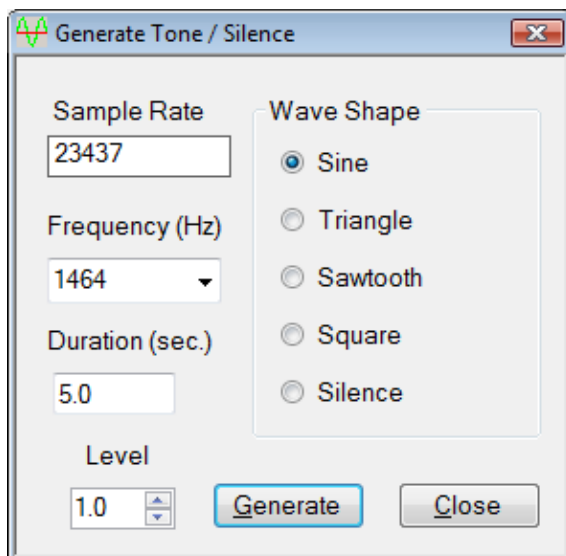



Figure 30: Generate Tone Dialog

The **Generate Tone Dialog**  is useful for generating tones of various wave shapes, frequencies and amplitudes for testing the **SFX7** Module. They could also be used for generating tones for Morse code sound clips, for example.

The Sample Rate field is read only and serves to remind you what the sample rate in the SFX7 module is.

Fixed frequencies can be selected from the Frequency drop-down list. Sine, Triangle, Sawtooth and Square wave shapes can be generated.

Using the **Level** drop down list, you can select amplitude levels up to 1.0 which represents the maximum amplitude of tone that can be stored on the **SFX7** Module.

When you click the **Generate Button**, a new sound clip with a name composed from the Generate Tone settings will be added to the currently displayed Sound Clip List.

It can also be used to generate periods of silence for test purposes.

CONFIGURING YOUR MODULE – SFX7 CONTROL PANEL


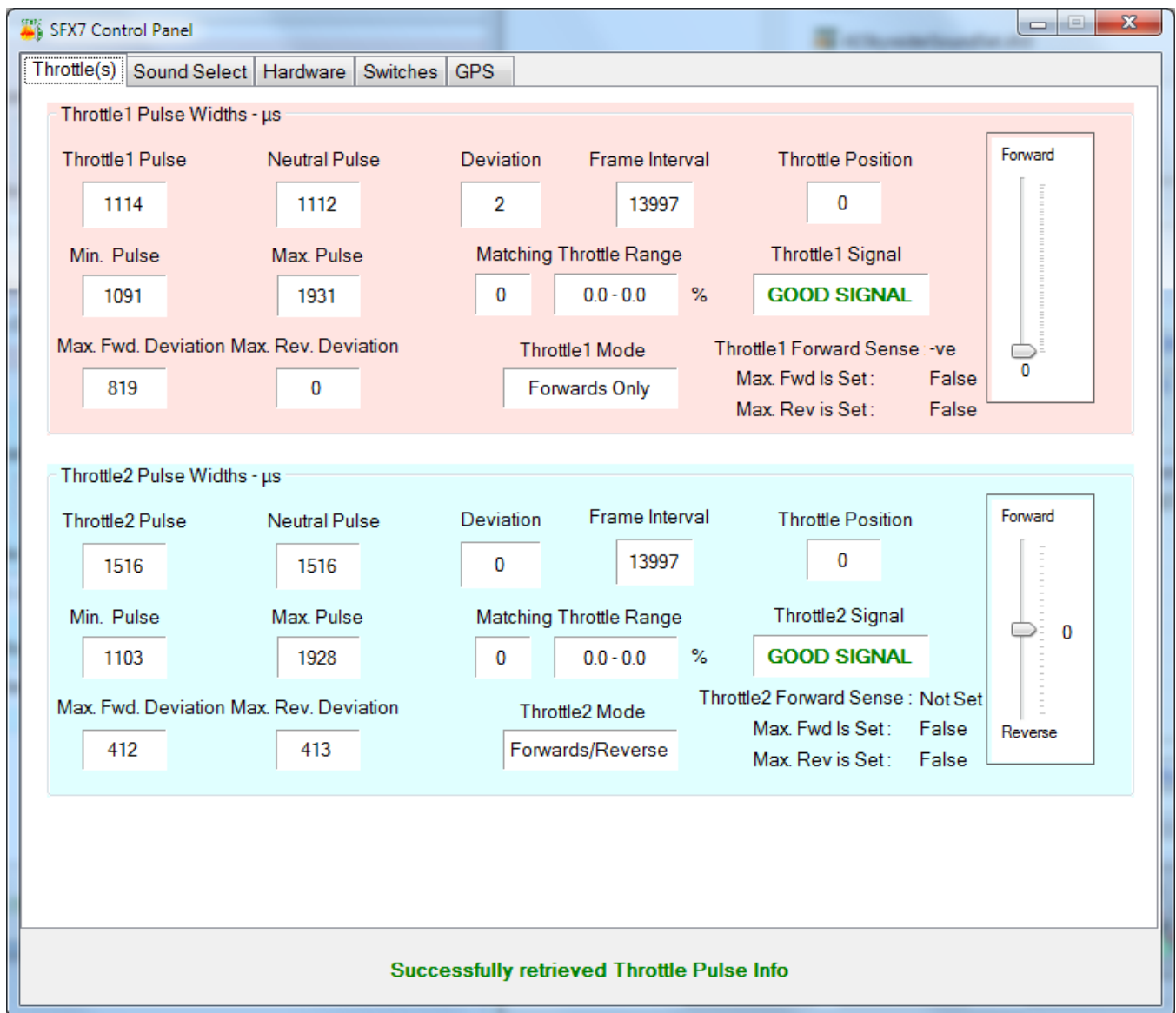
The **SFX7 Control Panel** can be launched by clicking on the **Control Panel** button – 

Figure 31: SFX7 Control Panel



Throttle(s) | Sound Select | Hardware | Switches | GPS

Throttle1 Pulse Widths - μ s

Throttle1 Pulse	Neutral Pulse	Deviation	Frame Interval	Throttle Position
1114	1112	2	13997	0
Min. Pulse	Max. Pulse	Matching Throttle Range		Throttle1 Signal
1091	1931	0	0.0 - 0.0 %	GOOD SIGNAL
Max. Fwd. Deviation	Max. Rev. Deviation	Throttle1 Mode		Throttle1 Forward Sense -ve
819	0	Forwards Only		Max. Fwd Is Set: False
				Max. Rev is Set: False

Throttle2 Pulse Widths - μ s

Throttle2 Pulse	Neutral Pulse	Deviation	Frame Interval	Throttle Position
1516	1516	0	13997	0
Min. Pulse	Max. Pulse	Matching Throttle Range		Throttle2 Signal
1103	1928	0	0.0 - 0.0 %	GOOD SIGNAL
Max. Fwd. Deviation	Max. Rev. Deviation	Throttle2 Mode		Throttle2 Forward Sense : Not Set
412	413	Forwards/Reverse		Max. Fwd Is Set: False
				Max. Rev is Set: False

Successfully retrieved Throttle Pulse Info

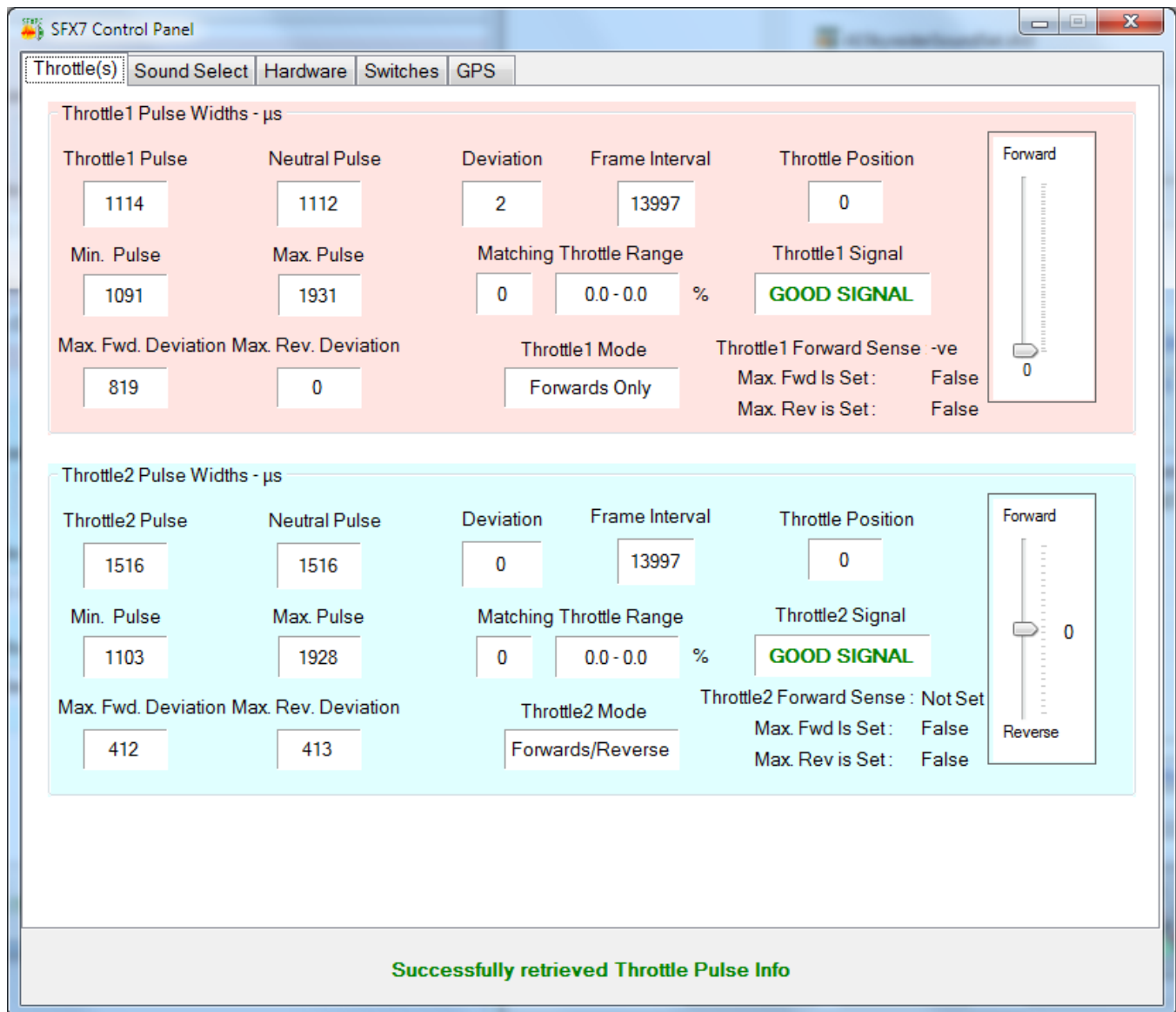
This Dialog can only be launched if the **SFX7** module is connected and powered up. You will receive a warning message box if it is not.

This Dialog has been split over several tabs :

1. **Throttles**
2. **Sound Select**
3. **Hardware**
4. **Switches**

THROTTLES TAB

Figure 32: Throttles Tab



The screenshot shows the 'SFX7 Control Panel' window with the 'Throttles' tab selected. The interface is divided into two main sections: Throttle1 (pink background) and Throttle2 (light blue background). Each section displays various pulse width and timing parameters, a mode selector, and a signal status indicator. Throttle1 is set to 'Forwards Only' mode with a 'GOOD SIGNAL' status. Throttle2 is set to 'Forwards/Reverse' mode with a 'GOOD SIGNAL' status. A status bar at the bottom of the window displays the message 'Successfully retrieved Throttle Pulse Info'.

Throttle1 Pulse Widths - μ s				
Throttle1 Pulse	Neutral Pulse	Deviation	Frame Interval	Throttle Position
1114	1112	2	13997	0
Min. Pulse	Max. Pulse	Matching Throttle Range		Throttle1 Signal
1091	1931	0	0.0 - 0.0 %	GOOD SIGNAL
Max. Fwd. Deviation	Max. Rev. Deviation	Throttle1 Mode		Throttle1 Forward Sense -ve
819	0	Forwards Only		Max. Fwd Is Set: False
				Max. Rev is Set: False

Throttle2 Pulse Widths - μ s				
Throttle2 Pulse	Neutral Pulse	Deviation	Frame Interval	Throttle Position
1516	1516	0	13997	0
Min. Pulse	Max. Pulse	Matching Throttle Range		Throttle2 Signal
1103	1928	0	0.0 - 0.0 %	GOOD SIGNAL
Max. Fwd. Deviation	Max. Rev. Deviation	Throttle2 Mode		Throttle2 Forward Sense : Not Set
412	413	Forwards/Reverse		Max. Fwd Is Set: False
				Max. Rev is Set: False

Successfully retrieved Throttle Pulse Info

This tab allows you to see, in real time, the transmitter **Throttle1** and **Throttle2** 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 **SFX7** Module.

This is a read only display - there are no user settable options in this tab. Note the different colours for Throttle1 and Throttle2 fields.

The two **Throttle Lever** sliders in this panel will move to represent the actual transmitter **Throttle1** and **Throttle2** stick positions. If either **Throttle1** or **Throttle2** 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 μs) and 2 milliseconds (2000 microseconds or μs).

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**.

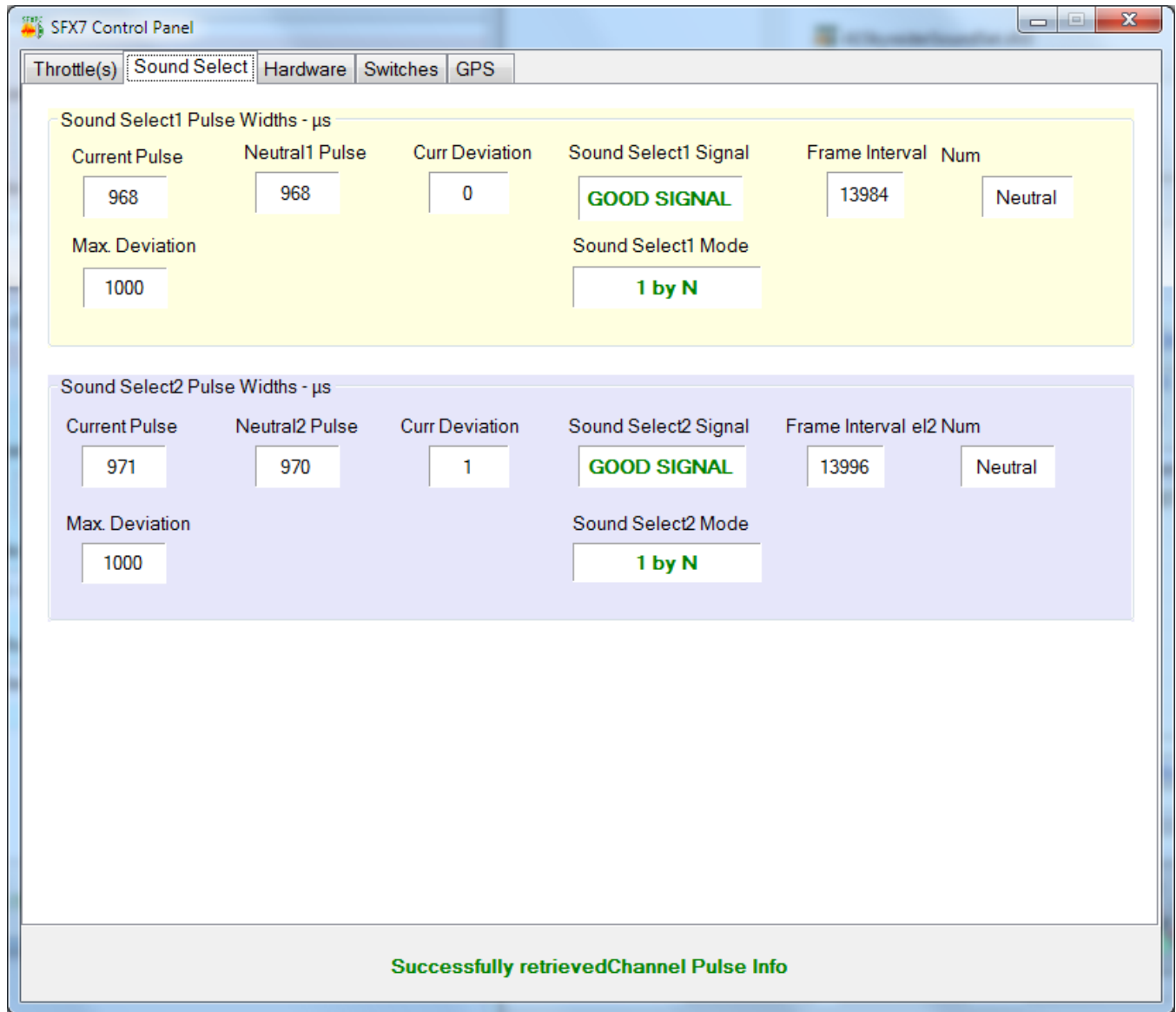
When the throttle stick is in its centre position (forwards and reverse throttle for model boats or tanks) the pulse width is about 1500 μs . This is called the **Neutral Pulse**. For forwards only throttles, such as those for model aircraft, the Neutral pulse is the pulse width when the throttle stick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

The **SFX7** Module's **Throttle1** and **Throttle2** (if any) settings **should have been setup first using either the Auto Setup (default) or in manual mode by using Button 1 or 2 on the SFX7 module** without the USB cable connected – see the printed QuickStart Guide or hardware manual for your **SFX7** module for details on how to perform the throttle setup.

Sound Select Tab is on the next page.

SOUND SELECT TAB

Figure 33: Sound Select Tab

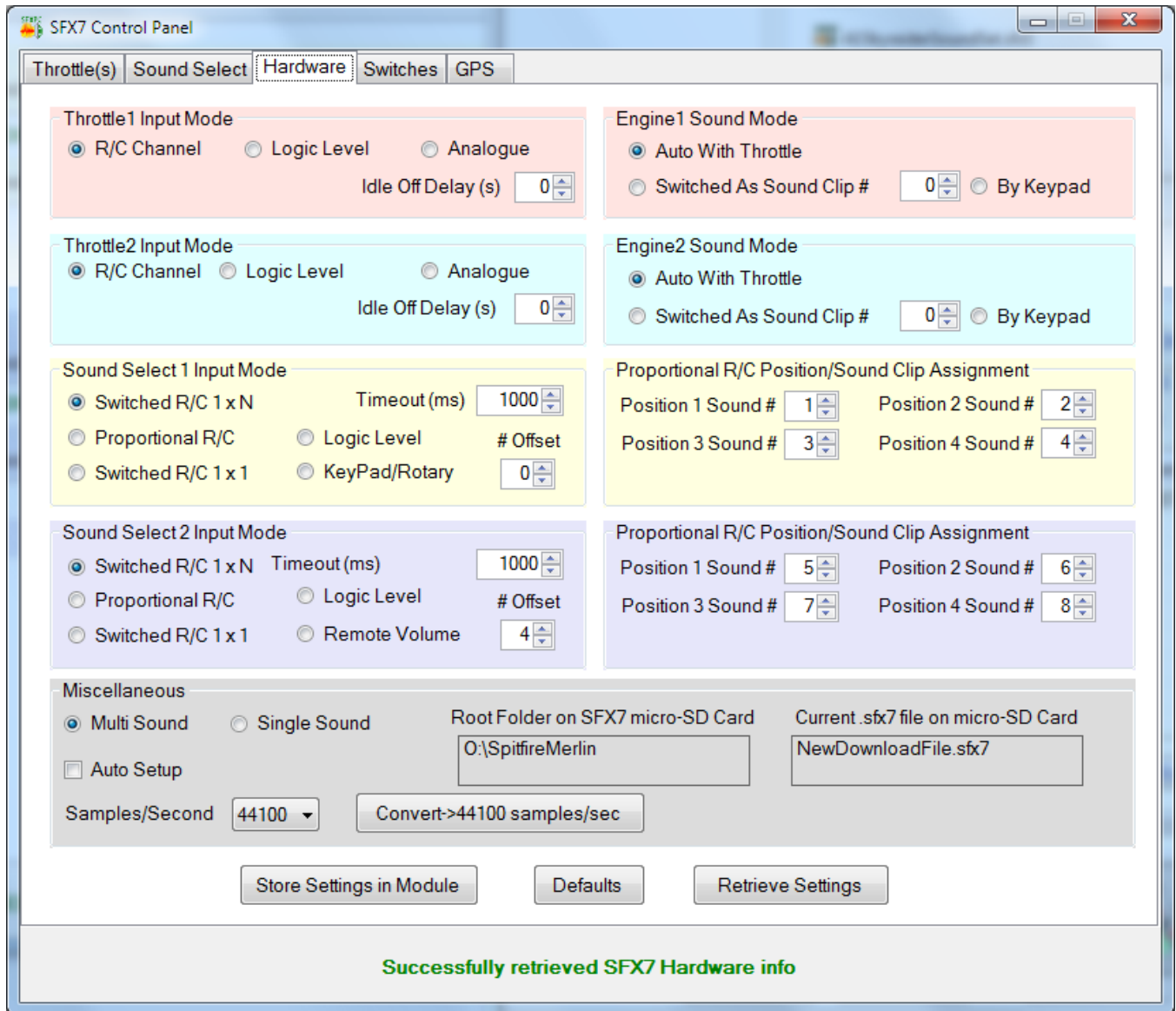


In a similar fashion to the Throttles Tab, this tab displays (in read only mode) the R/C pulse widths and various data about the one or two Sound Select (SOUND1/SOUND2) Inputs. The Sel1/2 Num/State fields shows the Sound Clip number (from the Regular Sound Clip List) selected by the **SFX7** module.

Note the different colours for Sound Select1 and Sound Select2 fields.

HARDWARE TAB

Figure 34: Hardware Tab



The sections in this Tab are colour coded to represent the four same signals displayed in the Throttles and Sound Select Tabs.

THROTTLE AND ENGINE SOUND MODES

Throttle1/2 Input Modes allows you to set the type of input the module expects for the Throttle1/2 inputs. When their respective **R/C Channel** radio button is pressed, the module expects that input to be a standard R/C 1-2ms wide pulse with a **Frame Interval** of between 10 and 22ms.

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 and Engine2 Sounds** can be configured to switch on instead of any of the sound clips selected by the usual methods. If this mode is set, the Engine sound(s) will override the normal sound clip. Normally a NULL (empty) sound clip is used for this purpose so as not to occupy additional space.

If the **Logic Level** radio button is pressed, that input expects a switch connected to the **receiver +VE voltage or a logic voltage swing between 0V (off) and +12V (on)**. This is useful for various R/C and non R/C static display applications.

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.

SOUND SELECT MODES

Sound Select1/2 Inputs have five possible modes for selecting the Regular (non-engine) sounds.

1. **Switched R/C 1 x N.** This is the Default setting. This is selected when you want to use an on/off transmitter channel to switch several regular sounds. In this case a Timeout value (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. **Switch/Logic Level.** This is selected when you want to use a logic level or mechanical switch input, such as might be used in static displays.
3. **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.
4. **Switched R/C 1 x 1.** This is selected when you want to use an on/off transmitter channel to switch only one regular sound.
5. **Keypad/Rotary.** This is selected when you want to use an 8 or 16 button keypad or a 12 position rotary encoder. Selecting this mode will cause an additional Button Calibration tab to appear in the form.

The Sound Select 1 and Sound Select 2 inputs behave almost identically. The difference is that the # Offset for Sound Select2 defaults to 4 instead of 0, as for Sound Select1. This Offset # is added to the number of toggles when selecting the sounds in Switched R/C 1 x N. So for Sound Select2, 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.

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.

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 1 x N Mode : One transmitter ON/OFF channel is used to switch N sounds.**

Toggle Sound1 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 CHSEL1 input from **OFF** to **ON** and back to **OFF** N-1 times and then move to **ON and hold it there** – Sound N will play for as long as the switch is in that **ON** position. Release the switch to the **OFF** position to switch Sound N **OFF**. This is **Momentary** action.

2. **Switch/Logic Level:** A logic level (**0-12Volts**) can be applied to the CHSEL1 input pin when this mode is selected. When the logic voltage is at or near 0V the input is considered **OFF**. When it is higher than about **2.5Volts**, the input is considered **ON**. Otherwise the triggering action to select sounds is the same as if it was in **Switched R/C 1 x N Mode**.

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**;

For **Proportional R/C Mode** it is always **Latched** action.

4. **Switched R/C 1 x 1 Mode : One transmitter ON/OFF channel is used to switch 1 sound.**

If you need only one other non-engine sound you can configure the module to simply use one

on/off Switch to switch that one sound. I.E. move the switch from Off to On position to switch sound N On. Move it back to Off to switch sound 1 N Off. In the Switched R/C 1 x 1 Mode, you can also set the related sound clip to **Play Once** in the main form. In that case you can simply toggle the transmitter switch used for this channel and the sound will continue to play when the switch is released back to its off position. When the sound clip reaches its end, it will switch off. This is useful for model tanks where the transmitter switch may be a simple push button and the same radio channel is also used to operate a recoil solenoid for the main gun barrel. The transmitter button may be pushed briefly to both initiate the barrel recoil and play the gun sound, to its end.

5. **Keypad/Rotary Encoder Mode : One proportional radio channel is replaced by a button keypad or a rotary encoder.** When a button is pressed and held for more than the adjustable timeout (default 1 second), the corresponding sound clip will switch on in Momentary Mode. Release that button and the sound will switch off. If the button is pressed and released before the timeout then the corresponding sound clip will switch on in Latched Mode. Press the same button again to switch that sound off.

MISCELLANEOUS SETTINGS

Single Sound Mode allows you to configure the module to play only one sound clip at a time. In this mode, if one sound is playing and another is switched on, the first sound will switch off and then resume where it stopped when the second sound is switched off. This is beneficial when you do not want the sounds to interfere with each other thereby hearing each sound more clearly.

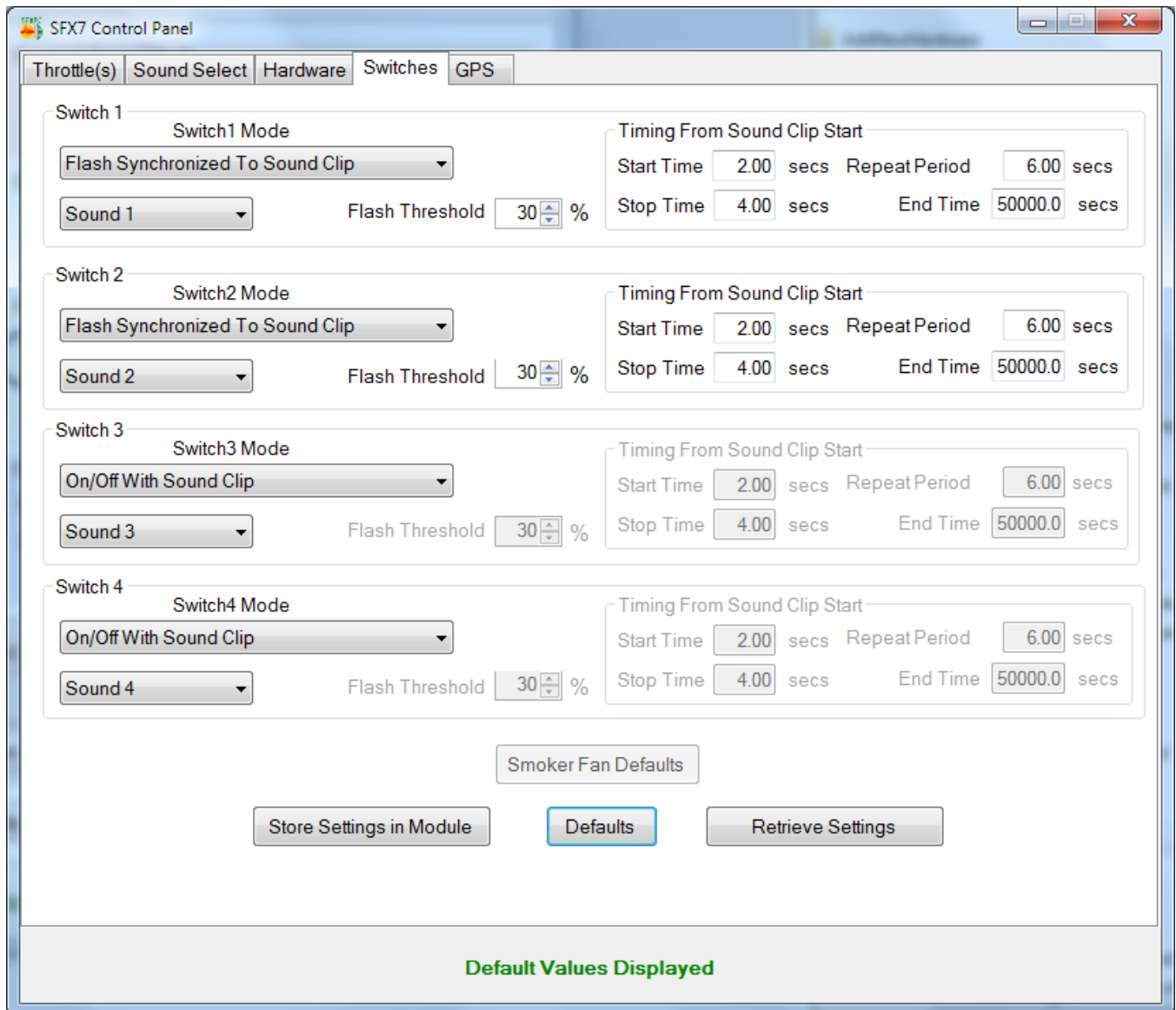
Sample Rate is where you set the desired audio sample rate for when samples are loaded into the SFXPC4 program. A higher sample rate means the sound quality is better since it can reproduce higher frequencies. If you want to choose a different sample rate you can also automatically convert all the sounds in the .sfx7 file to the new sample rate. You must then save the new **.sfx7** file to the SFX7 module.

Auto Setup sets the SFX7 module's start-up behaviour to automatically detect important settings such as the initial throttle stick position and whether it is a forward only or a forward and reverse throttle. This can be automatically detected so that NO throttle setup procedure is required. For specific conditions as mentioned in the hardware manual this may be unchecked in order to revert to manual throttle setup using the setup buttons.

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

SWITCHES TAB

Figure 35: Switches Tab



The **SFX7** module can be ordered with one to four optional Switched Outputs. You can configure any of these outputs to operate in several modes selected by their respective **Switch1-4 Mode** drop down lists.

1. **Flash Sync. To Sound Clip** – this mode sets the output to flash, e.g. 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 up a Start Time, Stop Time, Repeat Period and End Time for the synchronized LED flashing.

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. It can also be set to zero if you specifically want the LED to come on and stay on while that sound clip is playing.

2. **On/Off With Sound Clip** – this mode sets the output on when its associated sound clip starts and off when the sound stops.
3. **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, Stop Time, Repeat Period and End Time for the LED flashing.
4. **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 flashing.

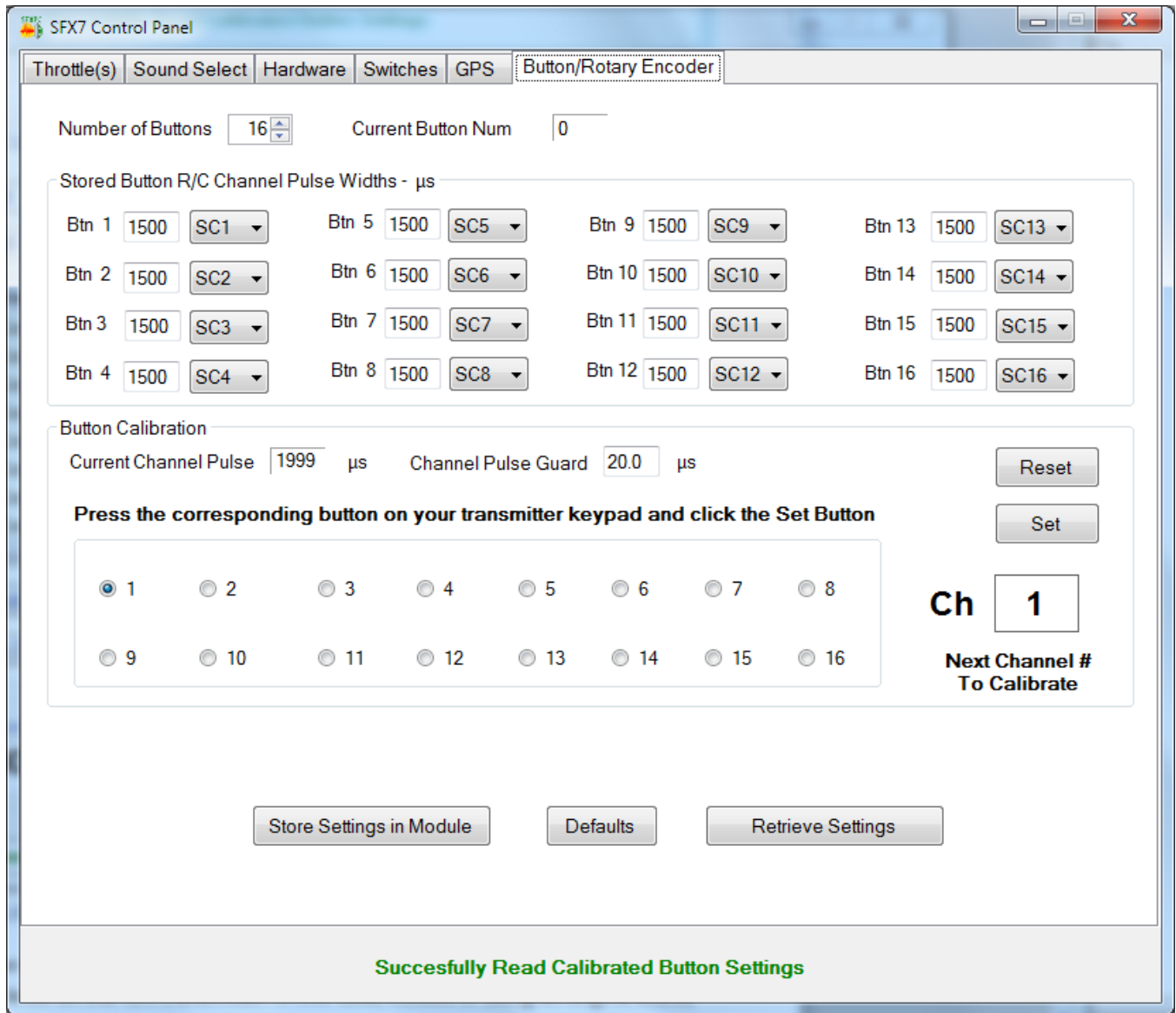
The default Switch Mode settings are:-

Switch1 will flash with Sound Clip 1, Switch2 will flash with Sound Clip 2 and the threshold level is 30% of the maximum. These settings may be changed to any sound clip and any threshold between 0% and 100%. **Switch3 is defaulted to On/Off with Sound 3 and Switch4 is defaulted to On/Off with Sound 4.**

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 CD-ROM.

BUTTON CALIBRATION TAB

Figure 36: Button Calibration Tab



This tab appears if the Keypad/Rotary button is selected in the Hardware tab for Sound Select1 input.

This tab is used to store the pulse widths resulting from the press of all of the buttons on a keypad or positions on a rotary encoder. The buttons are laid out in the same position as an 8 or 16 button keypad. With the transmitter and receiver on, press button # 1 and then click the Set button in this tab. Then move along and do the same for every button in turn. Each button's stored pulse width is displayed above and each **Btn** can be set to play any sound, or switch a switched output.

When all the changes have been made click the "Store Settings in Module" button.

In order for this feature to work reliably, the keypad or rotary encoder must have resistor values to cause the pulse width to extend over the full range from 1000-2000 μ s. The "Channel Pulse Guard" should not be lower than about 20 μ s. This represents half the minimum difference between adjacent pulse widths. It should be as large as possible for reliable button detection.

SPECIAL PROVISIONS FOR MODEL TANKS

PROPORTIONAL 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. In this case, 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 1.30 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 "forwards only" channel when you do the throttle 2 setup procedure. This means that once the setup button 2 has been pressed, you move the turret control stick fully in one direction or the other (it doesn't matter which way) and then let the stick return to its centre position **and let it stay there**. This would ordinarily be the setup for model aircraft (forwards only). If this channel were setup as 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.

Although designed primarily for model tanks, this feature could also be used on large model warships that have naval gun turrets.

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, there is no need to have a throttle controlled proportional speed sound set for the engine. Usually it is sufficient to have just an engine start-up and spin up to full take off power and have that sound clip loop at full power, and an engine shutdown sound. These sounds should be in the Engine1 Sound clip list, and the shutdown sound identified in the list as a Shutdown sound.

The SFXPC4 **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 back to off again. After a short 1 second delay, the engine start-up sound will begin and will spin up to full power and continue looping at full 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 off position to on, and back to off again. After a short 1.5 second delay, 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.

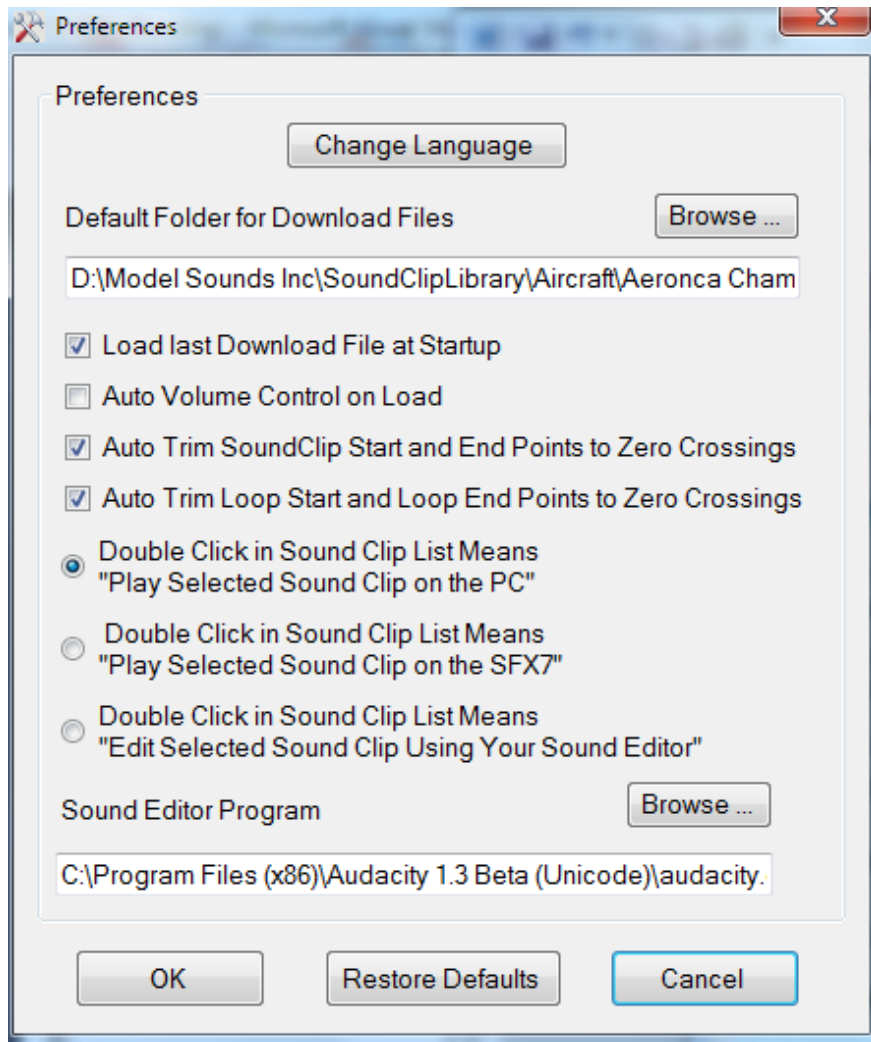
This setup does not prevent you from having throttle proportional engine speed sounds if you wish.

PREFERENCES FORM

Your preferences can be set in the Preferences Form. Click the **Preferences** button 

Any changes made in the Preferences Form are stored on disk and remembered between SFXPC4 sessions.

Figure 37: Preferences Form



The **Default Folder for Download Files** is the folder on the disk that SFXPC4 opens when you click the Open Button in the Download File Controls

It defaults to the My Documents\Model Solutions of Canada\SFXPC4 folder.

This folder is created for you when SFXPC4 first runs. You can use the **Browse** button, or type a new folder name directly into the text field.

The **Load Last Download File at StartUp** check-box, when checked, will load the download file that was last open in SFXPC4 the next time SFXPC4 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.

SAVING AND RETRIEVING SFX5 FILES TO/FROM THE SFX7 MODULE

In this application, **Saving** refers to the process of **Saving** the **Download File**, as composed in the Sound Clip List, **DOWN** to the **SFX7** Sound Module and is therefore a **Download**. **Retrieving** refers to the process of **Retrieving** the contents of the **SFX7** module's FLASH memory chip **UP** to the PC and is therefore an **Upload**.

When the content of the Sound Clip List is correct, you can **Save** the Download File to the **SFX7** Module by clicking the **Save to Module** button below the Sound Clip List.

For faster upload/download performance you can remove the micro-SD Card from the SFX7 sound module and insert it into the provided USB micro-SD Card reader and insert the reader into a spare USB Port. Close and re-open the SFXPC4 application making sure the SFX7 module is still connected.

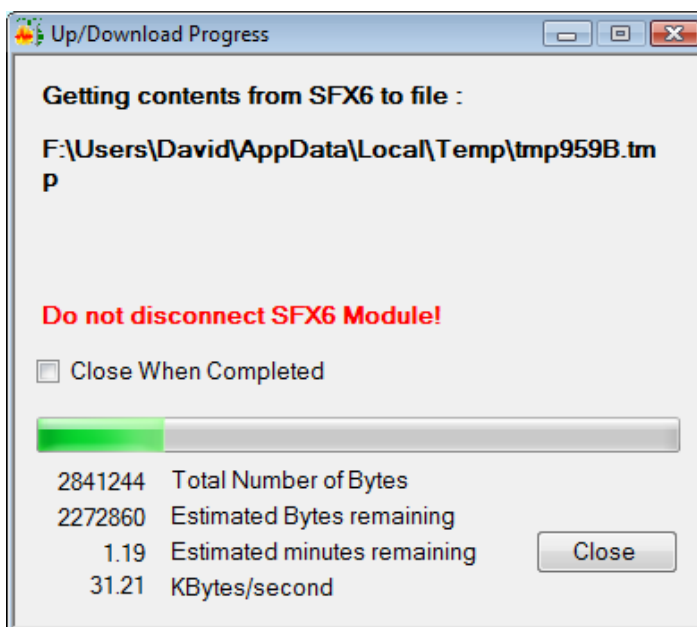
Similarly, you can **Retrieve** the contents of an **SFX7** module by clicking the **Retrieve from Module** button. These functions check whether there is a **SFX7** module connected before attempting any data transfers.

You are 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 .sfx7 file you want to keep!

The Download process occurs in two phases.

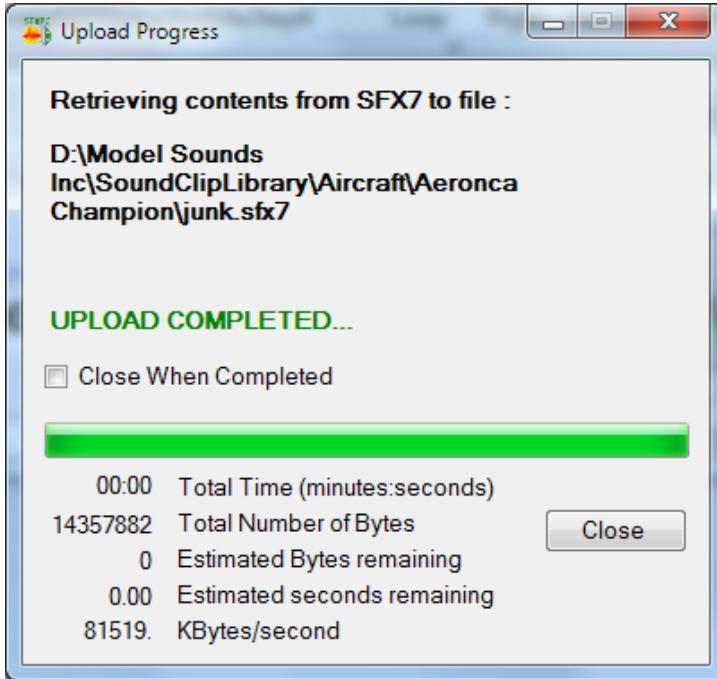
Figure 38: Download Progress Dialog



Once the Download is completed, the data just downloaded is uploaded to a temporary file so that it can be compared to the original download file. The Upload and compare phase may take up to 4 minutes.

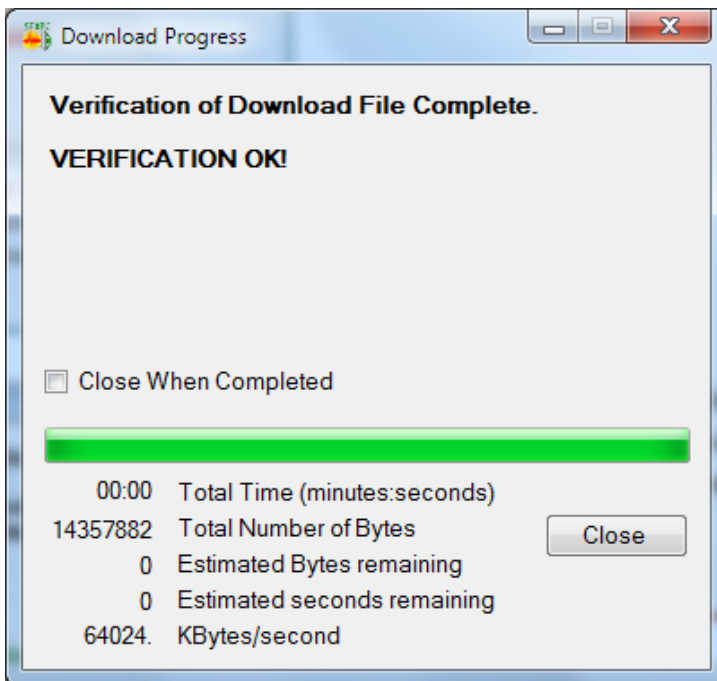
Upload progress is monitored in the Upload Progress Dialog as shown next.

Figure 39: Upload Progress Dialog



After the compare has completed, the result will be indicated in the Verification Dialog as shown next.

Figure 40: Verification Dialog



These Dialogs contains important information and messages while performing critical operations such as downloading or uploading data to/from the **SFX7** Module.

While it is possible to cancel the operation before it is completed, **THIS IS HIGHLY DISCOURAGED!!** as it will result in data corruption on the **SFX7** Module, or the PC, or both.

If you have more than one sound module, you have to manage the file names of any **.sfx7** Sound files that you upload. This is to prevent you overwriting existing files with the contents of the module. Use the **Save As** command to save the current download file with a different file name, e.g.

MySpitfire.sfx7. Then use **Save As** again to save it as another file name, say **MyHurricane.sfx7**.

Then do the upload which will be saved into the new file name **MyHurricane.sfx7**.

UPDATING THE FIRMWARE IN THE SFX7 MODULE

Firmware is the program code that runs in the processor chip on the **SFX7** module. The **SFX7** module features a **USB Bootloader** program that is a separate small program that runs in a protected area of the microcontroller's FLASH program memory. This program is entered when you power up the **SFX7 module while pressing BUTTON2 on the module.**

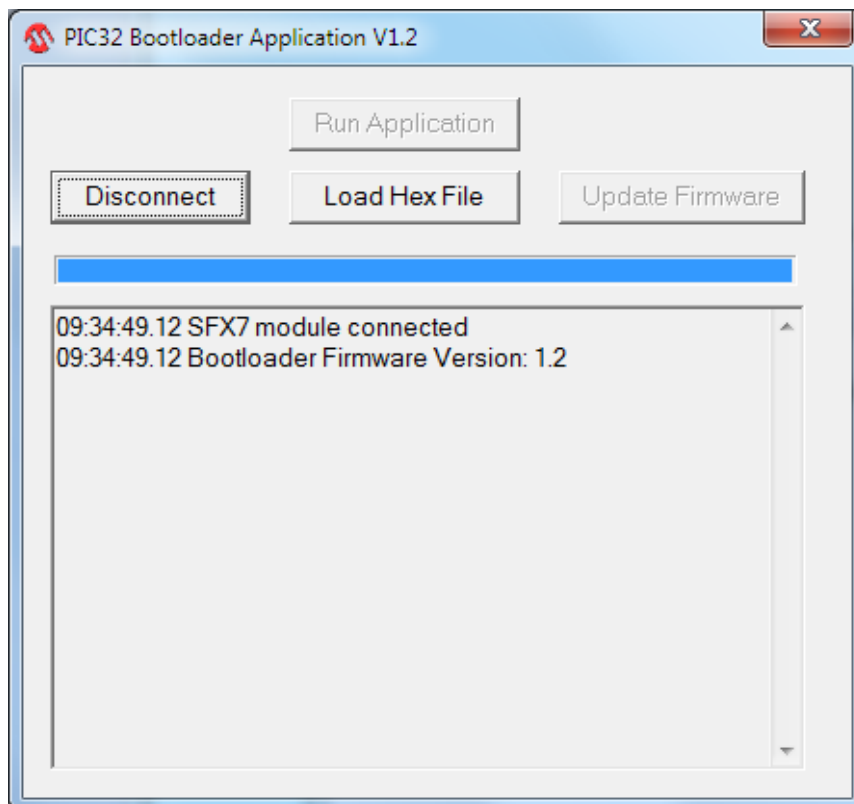
You launch the Firmware Update Form by selecting on the **PIC32HIDBootloader** link in the Windows Start Menu. It should be at : **Start Menu->Model Sounds Inc->SFXPC4.0.0-> PIC32HIDBootloader**

Once in the **PIC32HIDBootloader** Form, follow this procedure to re-program the firmware into the sound module.

1. If you haven't done so already, remove all power from the SFX7 sound module, then press and hold **BUTTON2** while inserting the mini-B USB plug into the sound module's USB connector.
2. Click the **"Connect"** button.
3. Click the **"Load Hex File"** button and select the hex file you wish to update the SFX7 module with.
4. Click the **"Update SFX7 Firmware"** button.

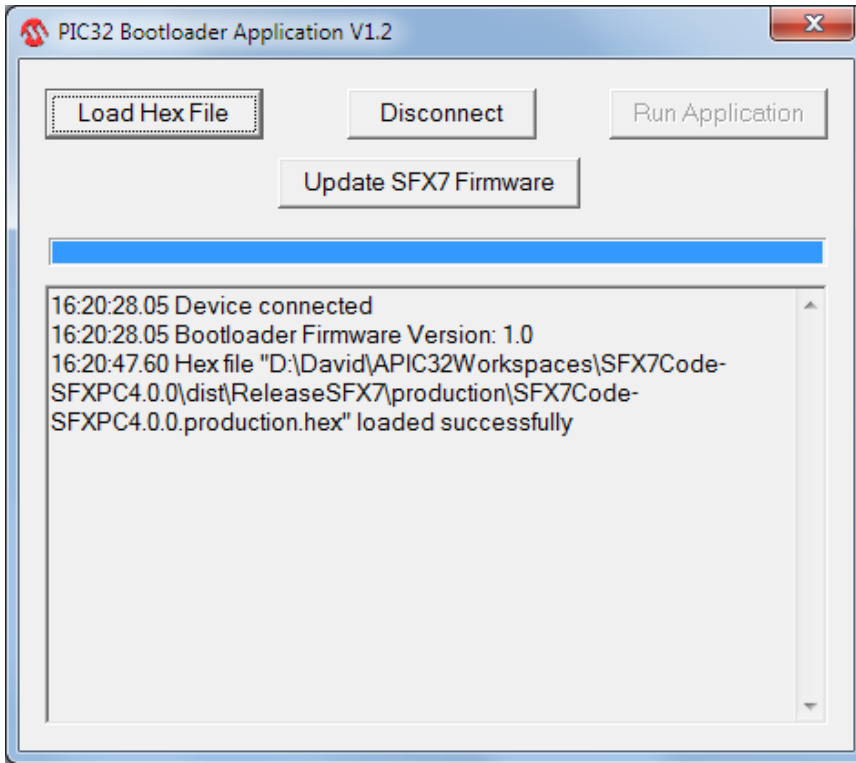
These steps are shown in the following screen shots.

Figure 41: Firmware Update Form - Start Point



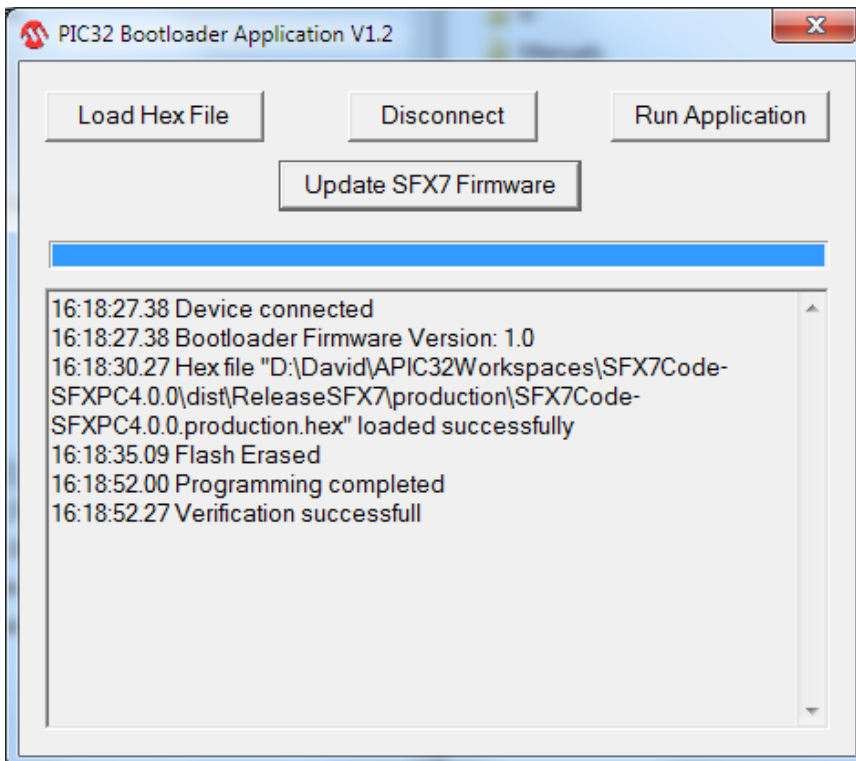
Use the **"Connect"** button to establish a USB connection with the SFX7 module in firmware update mode.

Figure 42: Firmware Update Form – Load Hex File



Click the **“Load Hex File”** button and select the firmware hex file you wish to update the SFX7 module with.

Figure 43: Firmware Update Form – Update SFX7 Firmware



Click the **“Update SFX7 Firmware”** button to complete the process.

After the Firmware Update is Complete, the SFX7 module remains in Bootloader mode.

You can click the **“Run Application”** button to reset the SFX7 and start the firmware execution to resume normal sound module operation.

If you do not see these messages please contact our Technical Support at :-

contactus@modelsoundsinc.com.

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](#).

Audacity can optionally be installed during the SFXPC4 installation. Launch the **SFXPC4.0.0setup.exe** installer on the micro-SD Card and check the Audacity Option. You can also install Audacity at a later time without re-installing SFXPC4.

Audacity is not produced by Model Sounds Inc. and comes with no warranty. It is provided as a convenience only to purchasers of the **SFX7** Sound Module. However, we highly recommend it.

TECHNICAL SUPPORT

If you encounter problems that cannot be solved by reading this manual, contact Technical Support at contactus@modelsoundsinc.com. Please supply as much descriptive information about the problem as possible.

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](#)
- [AUDIO NETWORK PLC](#)
- [SFX SOURCE](#)

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 overhead or parked airplane noise.

KNOWN ISSUES

1. Engine Auto-ramp Up/down is not yet supported.
2. Button Keypad/Rotary Encoder is not yet supported.

APPENDIX A – USB DEVICE CLASSES USED BY SFX7

USB communications are used between a USB **host** (such as your PC) and a USB **device** such as a mouse, keyboard, external hard drive, flash drive or SFX7 sound module. USB Devices fall into a number of different classes such as HID (Human Interface Device), MSD (Mass Storage Device – e.g. a flash drive) etc. The USB device drivers (small software programs that run on the USB host) for many USB classes are already built into most operating systems. Other, device specific, USB drivers have to be installed from software provided with the USB device. This was the case with the previous SFX4, SFX5 and SFX6 sound modules.

However, the SFX7 sound module uses three classes already built into the OS- namely the Composite USB class and the HID class and MSD classes. The Composite device class is a “parent” USB class that “contains” more than one device class. Although the HID (Human Interface Device) class was originally designed for devices such as mice, keyboards and game controller sticks, its communications protocol can also be used to transfer generic data between the USB host and device. Also, the MSD class (Mass Storage Device) is used to present external storage devices to the host as though they are external hard drives, no matter what the actual storage media is.

By using these three USB classes, which are already part of the OS, the SFX7 sound module does not require any custom USB drivers to be installed. You simply plug it into a USB port on the PC and, for the first time, the required drivers are automatically installed by the OS. A short while later you will see a message similar to “Your new hardware has been successfully installed and is ready to use”.

The MSD device class is especially useful as the files on the micro-SD card are visible as files on the PC and can be manipulated almost as though they are files on the local hard drive. It also means that the micro-SD Card can be removed and inserted into a USB micro-SD card reader for much faster access to those files directly by the PC.

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