
SimFx
AUDITORY SIMULATION SOFTWARE
USER MANUAL
PST-100737



For Research Only

SimFx Auditory Simulation Software User Manual

PST-100800

Rev 5

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This manual describes the installation procedure for the SimFx software. Please review the manual completely and thoroughly before beginning the system installation.

The SimFx Auditory Simulation Software (PST-100737) is for research purposes only.

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Chapter 1: Introduction

1.1 Software Overview

Psychology Software Tools' SimFx software creates an auditory simulation of an authentic MRI environment. SimFx not only replicates the active scanner noises and generates ambient sounds, it also has the ability to play up to four different sound files simultaneously. It also is capable of accepting serial input to control sound playback from an external client. Coupled with a simulator, SimFx allows you to recreate an effective, simulated MRI environment.

The following pages guide you through the use and installation of SimFx.

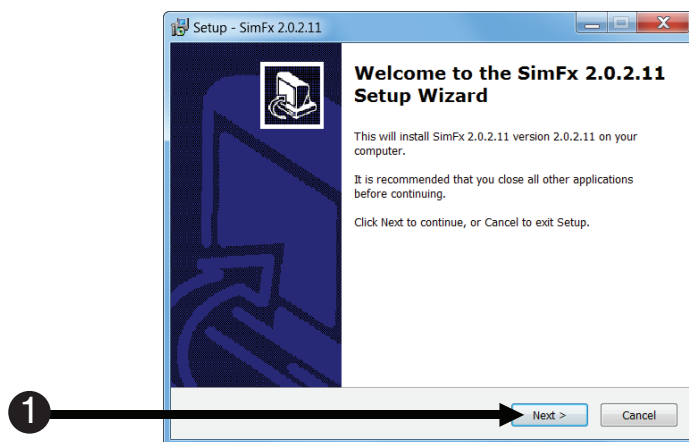
Chapter 1: Introduction

1.2 Software Installation

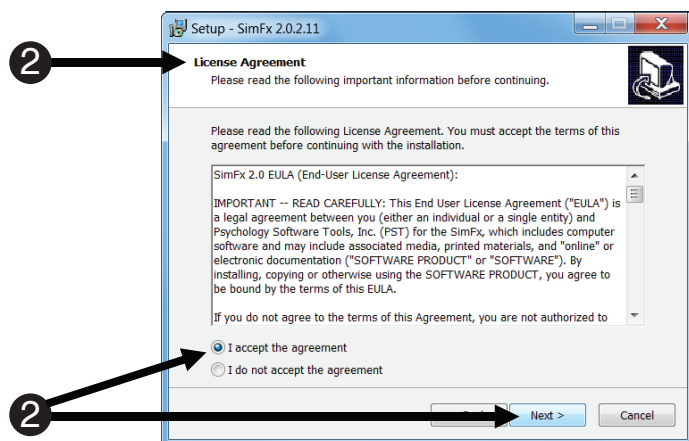
Before continuing, be sure that you have administrative rights to install this software on the computer. If you do not have administrative rights, you will be unable to install SimFx. If you are unsure of your administrative privileges, contact your System Administrator.

NOTE: The version number on the following screen grabs may not correspond to the version number on your software.

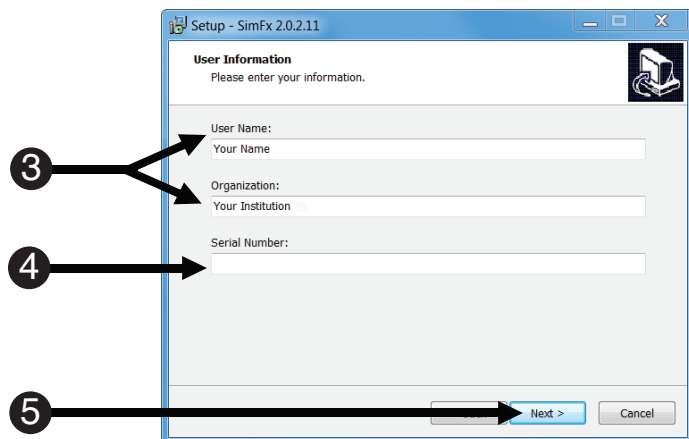
- 1) **Insert** the **SimFx installation CD** into your CD-ROM drive. **Click "Next"** when you see the window.



- 2) **Please read** the **License Agreement** and make sure that you **agree completely** with the terms and conditions described in the **agreement** before proceeding. Once you have read the agreement, **click Next** to proceed with the installation.



- 3) **Specify Your Name** and **Your Institution** or check with your system administrator for appropriate information.



- 4) The **Serial Number** field must be **complete** to obtain access to online **Product Service and Support**.

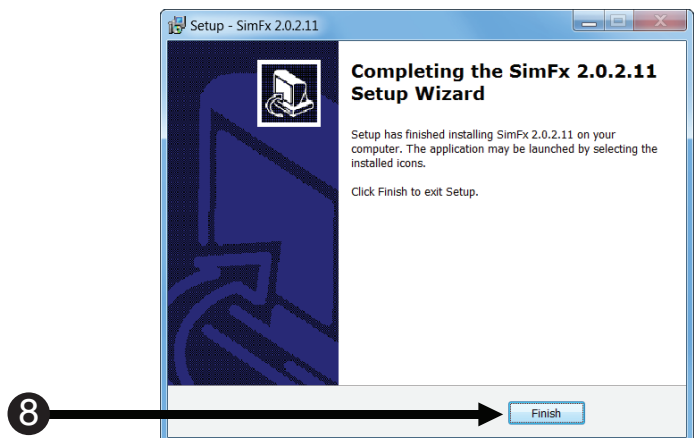
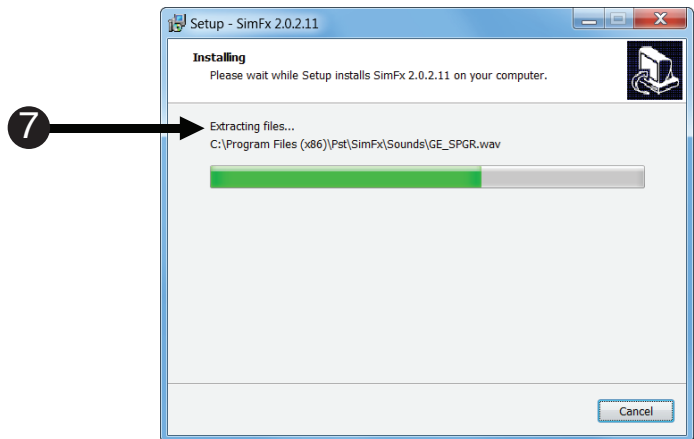
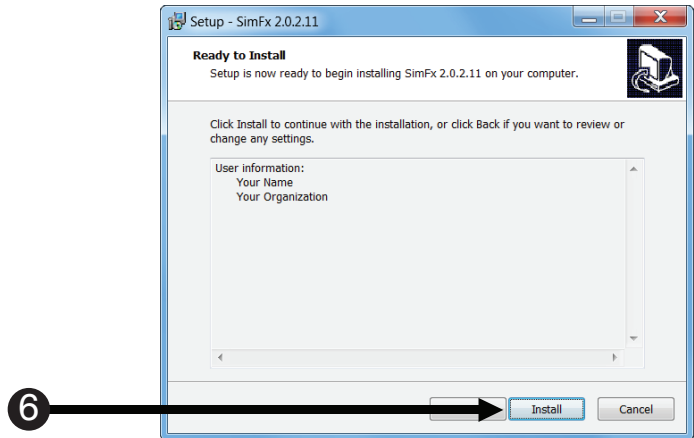
- 5) **Click Next** to begin the installation.

Chapter 1: Introduction

6) **Click Install** to begin the installation.

7) **Wait** for the installation to complete.

8) If SimFx was installed properly, you will see the following window. **Click “Finish”** to complete the installation.



Chapter 1: Introduction

1.2 Software Installation (continued)

Finding the “Documents” Folder

SimFx is compatible with Microsoft Windows XP, Vista, Windows 7 and Windows 8. When using SimFx, you will frequently be working within the “Documents” folder, because you will be able to save configurations and add new sounds to this folder without Administrative permissions.

The table below shows the default paths to your personal documents folder. Note that the path on your particular machine may have been modified by your administrator:

Operating System	Path to your personal documents folder(“My Documents” or “Documents”)
XP	<drive>\Documents and Settings\<user name>\My Documents\
Vista	<drive>\Users\<user name>\Documents\
Windows 7 or 8	<drive>\Users\<user name>\My Documents

When the SimFx documentation directs you to the “Documents” folder, it does not include the full path to the folder. Instead, the documentation refers to “...Documents”, where the “...” indicates the full path up to your personal documents folder. When you see this notation in the documentation, replace the “...” with the path to your personal documents folder.

Play a sound to test the installation is working

- 1) After you have installed the SimFx software, open the application via the start menu or by searching for SimFx in the Start screen.
- 2) Once the application opens, click the browse button next to the Ambient Sound.
- 3) Select a sound from the list to load and click open.
- 4) Confirm the check box next to Ambient Sound is checked.
- 5) Click the Play button to play the loaded sound. You will need to plug in speakers or headphones to hear the sound.

Chapter 2: Getting Started Guide

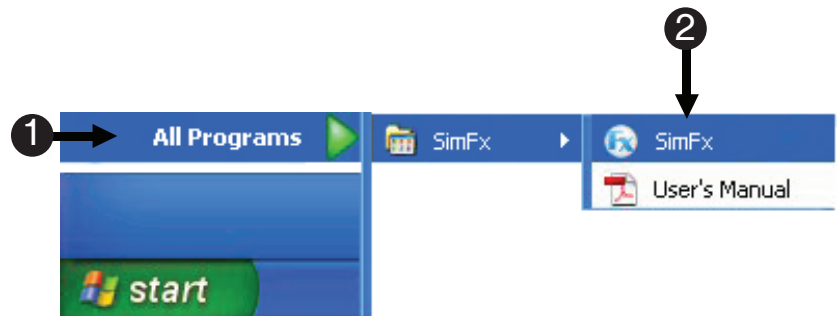
2.1 Opening the Application

Once you have successfully installed the SimFx software you can open the application through either the Windows Start Menu, or typing SimFx in the start screen.

1) **Click** on the **Windows Start** menu, **select All Programs**, and then **select SimFx**.

2) **Click** on **SimFx** to launch the application.

3) **Wait** for the application to load.



Chapter 3: User Interface

3.1 Sound Playback

The SimFx software was designed to be user friendly with an intuitive interface. The sound library includes pre-recorded ambient noises and anatomical and functional scanner sounds. You can also add sound files to your sound library.

3.1.1 Supported file format

The only supported file format is .wav.

3.1.2 Sound library

Background Sounds			
File Name	Scan Type/Description	Length	Sound Type
AmbientNoise.wav	White noise, static	10 seconds	monophonic
CryogenicPump.wav	Noise from cryogenic pumps in scanner room	7.47 seconds	monophonic
AmbientCryogenic.wav	Ambient.wav and CryogenicPump.wav in one .wav file	7 Seconds	monophonic

Scanner Sounds			
File Name	Scan Type/Description	Length	Sound Type
GE_DTI.wav	Diffusion Tensor Imaging sequence	14.29 seconds	monophonic
GE_SE.wav	Spin Echo sequence	9.89 seconds	monophonic
GE_EPI.wav	Echo Planer Image sequence	4.89 seconds	monophonic
GE_GRE.wav	Gradient Echo sequence, 2D low resolution structural (InPlane)	4.77 seconds	monophonic
GE_SPGR.wav	Incoherent Gradient Echo (RF Spoiled), Spoiled GRASS sequence, 3-D high resolution structural sequence	7 minutes	monophonic
Siemens_DTI.wav	Diffusion Tensor Imaging sequence	16.80 seconds	monophonic
Siemens_Echo.wav	Fast Spin Echo sequence	10.35 seconds	monophonic
Siemens_EPI.wav	Echo Planer Image sequence	59.60 seconds	monophonic
Siemens_Localizer.wav	Low resolution structural image sequence	14.29 seconds	monophonic
Siemens_MPRAGE.wav	Gradient Echo 3D high resolution structural sequence	6 minutes 53 seconds	monophonic
Siemens_PD-T2.wav	Proton density T2 weighted Image sequence, low resolution structurals (InPlane)	57.35 seconds	monophonic

⚠ NOTE: You need Administrative rights to add/change/remove any sound file from the default sound location.

Chapter 3: User Interface

3.2 Load Sound

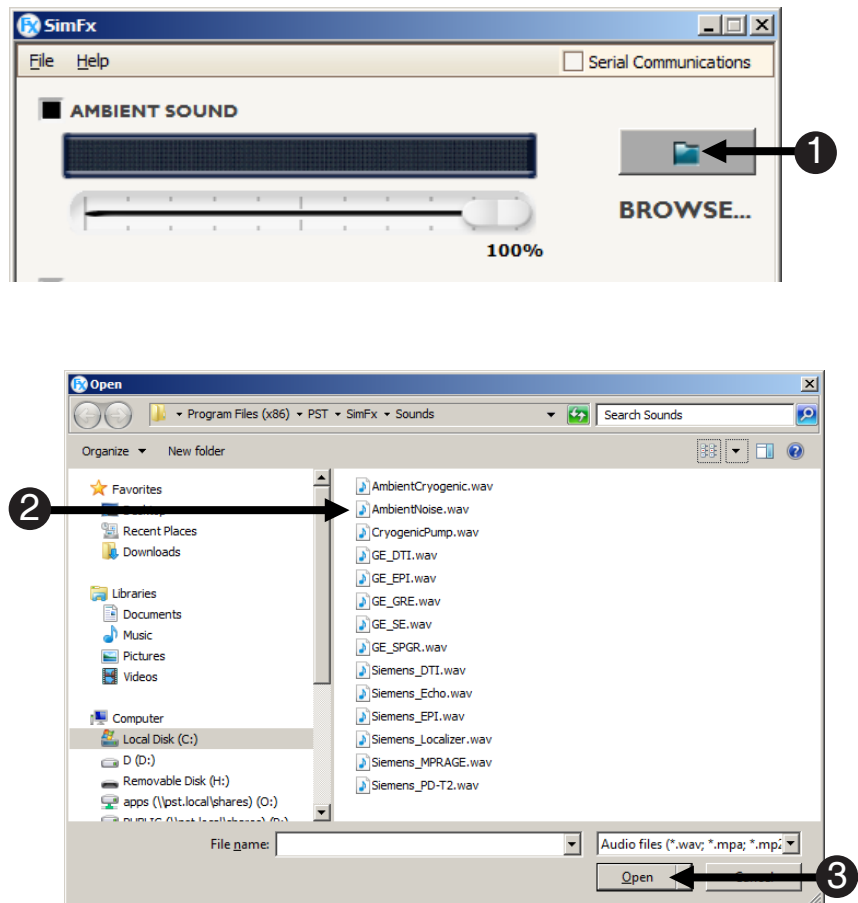
In order to load a sound file, click the browse buttons located on the right side of the application, navigate to the appropriate folder and select a sound file to play. The browse file window automatically opens at the designated location of the installed sound files.

- 1) **Click** on the **Browse** button to select a file.

NOTE: You will be directed to the default Sound Folder location which is: C:\Program Files(x86)\PST\SimFx\Sounds, or C:\Program Files\PST\SimFx\Sounds.

- 2) **Select** a file.

- 3) **Click** Open.



Chapter 3: User Interface

3.3 Play Sound File

The play and stop buttons are disabled until a sound file is loaded in one of the text boxes. The checkbox that corresponds with the loaded sound file must be checked for SimFx to play the file. The sound file playback is controlled by the play and stop buttons located at the bottom of the application.

- 4) **Confirm** the **checkbox** is **checked**. The name of the loaded sound file appears in the digital display.

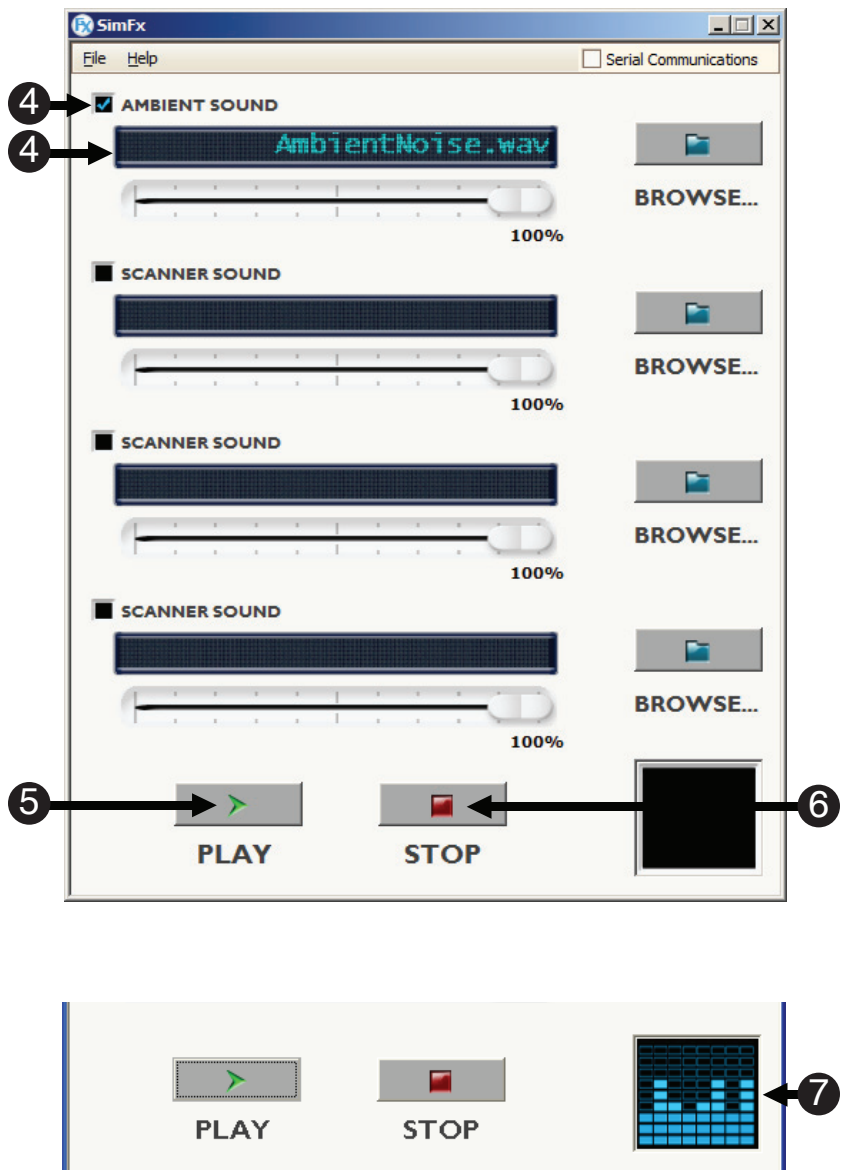
- 5) **Click Play** to begin playback.

- 6) **Click Stop** to terminate playback.

NOTE: Once playback has begun, the loaded sound file cannot be changed before playback is terminated.

- 7) **Check** the **equalizer**.

NOTE: If the equalizer is animated, but you cannot hear the sound, check that the system volume is not muted or turned down and check the speaker connections.



Chapter 3: User Interface

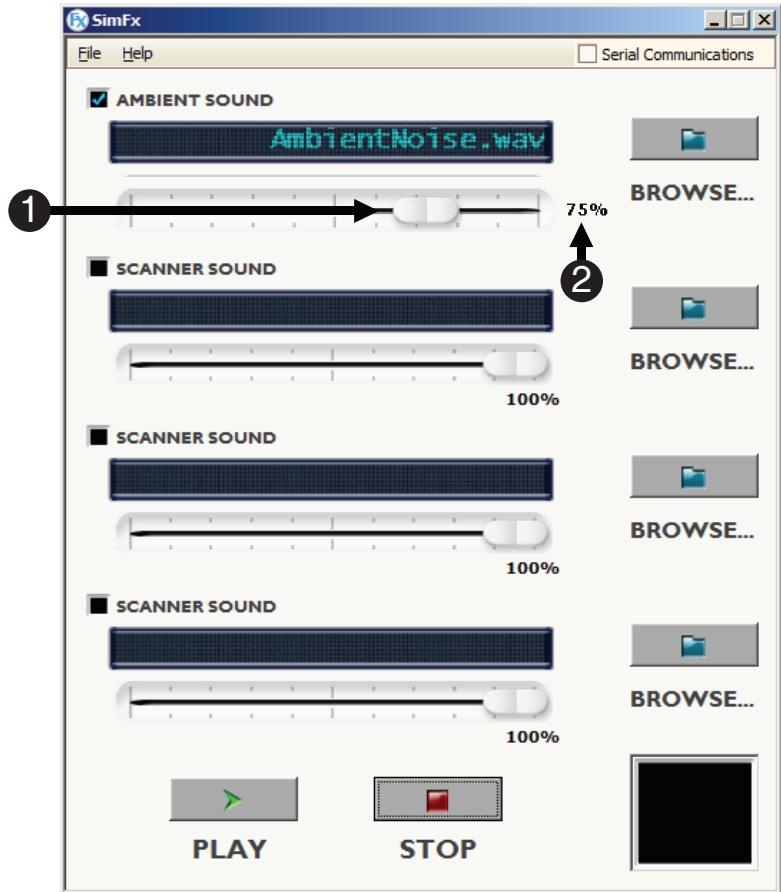
3.4 Volume Control

The volume control for each sound file is located beneath the digital display. The slider is used to control the volume of the associated sound file. To decrease the volume, drag the slider to the left; to increase the volume, drag the slider to the right.

1) **Click** and **drag** the **slider** left and **right** to **increase** or **decrease** the volume.

2) The **text** below the **slider** **indicates** the **volume level** (%).

NOTE: The volume control for each sound file is located beneath the digital display.

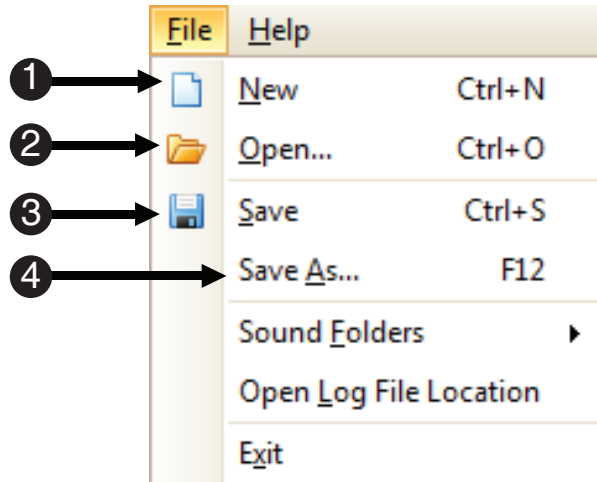


Chapter 4: File Menu

4.1 Basic Features

The menu bar consists of two menus, File and Help. The File menu contains general application functionality such as the save, open, exit operations. The Help menu contains a link to the documentation and information about the SimFx program.

- 1) **New:** This menu option clears all user defined configurations, and returns the application state to the default.
- 2) **Open:** Allows a previously saved configuration to be loaded.
- 3) **Save:** Saves current user configuration into a .ses file. If the configuration does not initially have a name, you will be prompted to name the file. The default save location is the ...Document folder.
- 4) **Save As:** Saves current user configuration into a file. The name of the .ses file and save location can be specified by the user.



Chapter 4: File Menu

4.1 Basic Features (continued)

SimFx installs several sample sound files in a default location on the installation system. The location is C:\Program Files(x86)\PST\SimFx\Sounds, or C:\Program Files\PST\SimFx\Sounds. This location can be accessed via the File Menu for convenience. The default sound folder can also be changed to any folder located on the system, e.g., "...Documents" is a good place if you have limited permissions. Please note, you must have administrative privileges to write to the default sound folder location.

1) **Go to File Menu, Select Sound Folders.**

2) **Click User Defined Folder.**

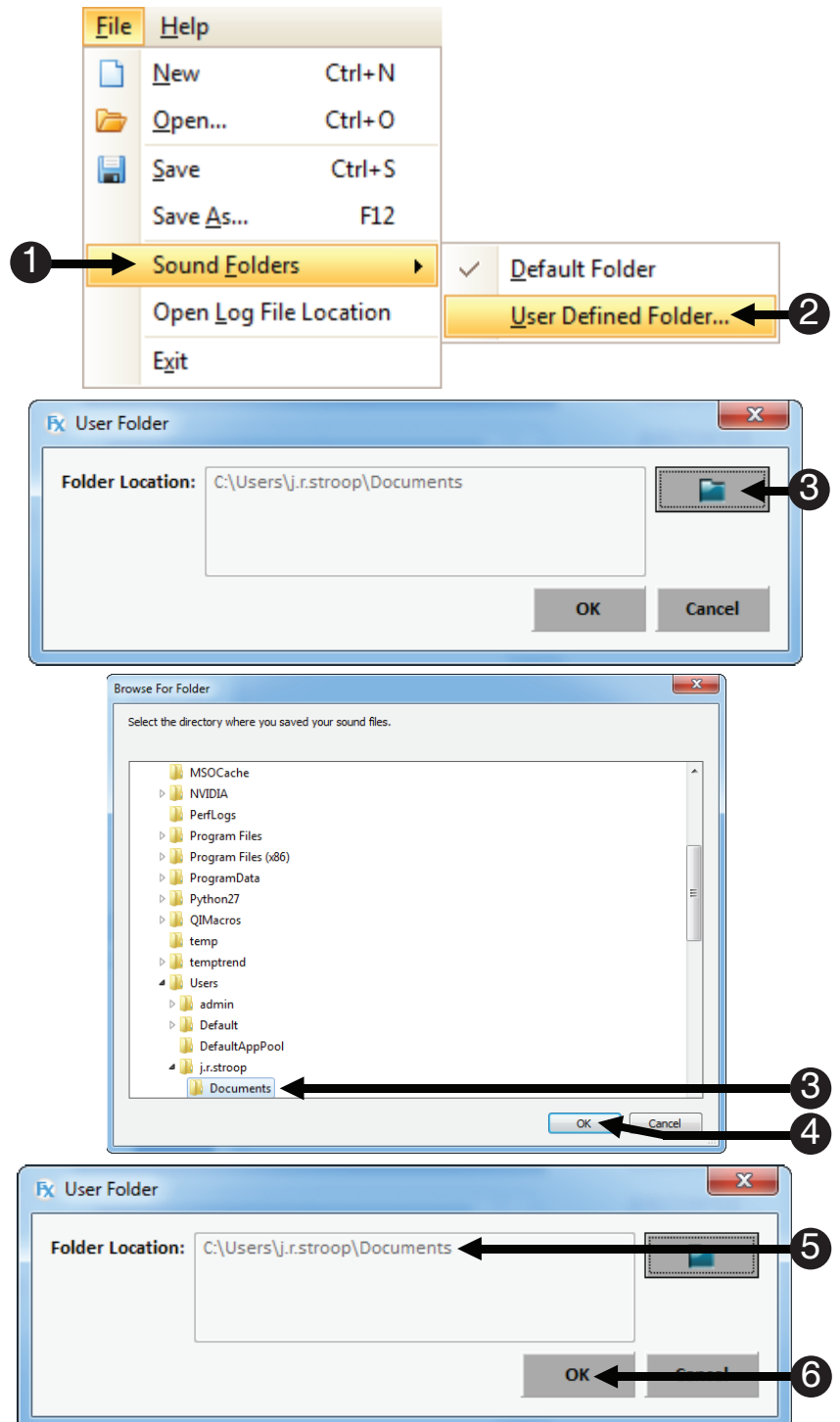
3) **Browse** to desired location you wish to save your sound files.

4) **Confirm** the **Default Folder** is set to the location of the sound files to be played.

5) **Confirm** the **Default Folder**.

NOTE: The location of the sound files can be reset at anytime by selecting the **Default Folder** option via the **File Menu**.

6) **Click OK.**



Chapter 4: File Menu

4.2 Serial Configuration

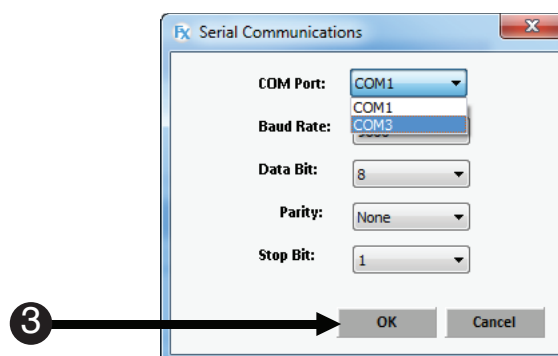
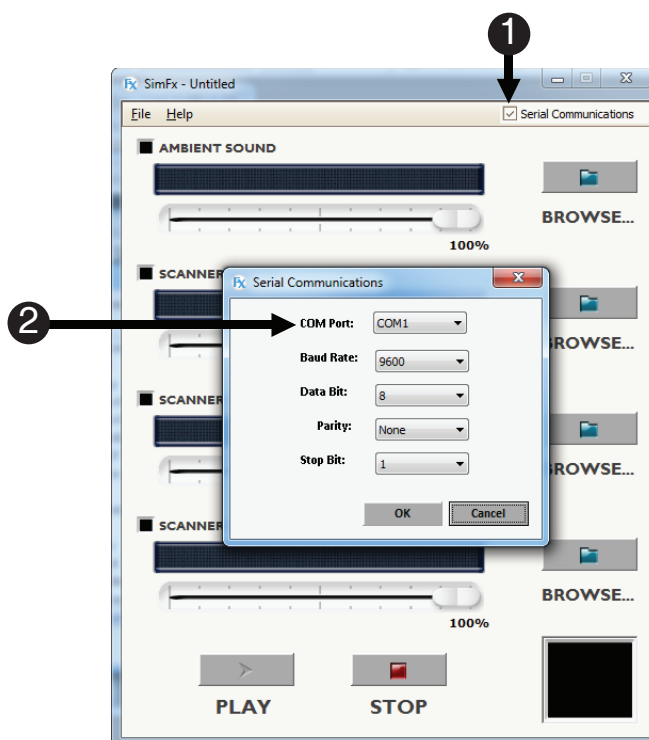
SimFx is able to communicate with other entities via serial connection. You need to determine which COM port is assigned to your serial port and assign that COM port number in the Serial Communications dialog. To open the Serial Communications options, simply check the check box in the upper right of the application labeled, "Serial Communications." Basic information regarding serial ports settings can be found in **Appendix A: COM Port Settings, (Page 23)**. If you have questions about your serial port configurations, please contact your network administrator or other computer support personnel.

- 1) **Check** the **checkbox** next to **Serial Communications** to **open** the **Serial Communications** option dialog.

- 2) **Click** the **COM port** dropdown menu to set the appropriate **COM port**.

NOTE: *If you have not determined what COM Port number is assigned to your serial port please contact your network administrator or other computer support personnel. See **Appendix A, (Page 23)**.*

- 3) **Click OK** to **close** the **Serial Communications** dialog.



Chapter 4: File Menu

4.2 Serial Configuration (continued)

Once you have defined a COM port, SimFx will listen for commands via the serial port. The commands are single-line XML elements that use standard opening/closing tags. These tags instruct the SimFx application to perform an operation. The commands need to be called from within E-Prime 2.0 Professional via a task event or by calling an .xml file that has the corresponding commands saved in it. When using the XML commands in E-Prime, an additional End tag, <E>, is necessary. For more information, see our Knowledge Base article: [KB 5614](#): INFO: SimFx Serial Communication Setup Details.

XML Tags			
Open Tag	Close Tag	Description	Values
<LdAmbient>	</LdAmbient>	Loads sound file from current the Sounds folder to the Ambient Sound slot. If you wish to load a file from another location you must change the default Sounds folder to that location.	String
<SetAmbient>	</SetAmbient>	A Boolean value that turns the Ambient Sound on and off. (on = True, off = False).	True/False
<VolAmbient>	</VolAmbient>	A number that specifies the volume of the Ambient Sound in decibels (dB). 100% is equal to 0 dB.	-10000 dB to 0 dB
<LdScanner>	</LdScanner>	Loads sound file from the current Sounds folder to a Scanner Sound slot. You must specify which Scanner Sound slot using the <Count> tag. If you wish to load a file from another location you must change the default Sounds folder to that location.	String
<SetScanner>	</SetScanner>	A Boolean value that turns the Scanner Sound on and off (on = True, off = False).	True/False
<VolScanner>*	</VolScanner>	A number that specifies the volume of the Scanner Sound in decibels (dB). 100% is equal to 0 dB.	-10000 dB to 0 dB
<Count>**	</Count>	A numeric value that determines which Scanner Sound is set.	1, 2, 3
--	<Play/>	Plays whichever sounds are loaded in the application.	N/A
--	<Pause/>	Pauses whichever sounds are loaded in the application.	N/A
--	<Stop/>	Stops sound playback.	N/A
--	<Exit/>	A numeric value that determines which Scanner Sound is set.	N/A

*All Load and Volume commands need to follow their respective Set commands.

**The count command must follow SetScanner.

Chapter 4: File Menu

4.2 Serial Configuration (continued)

Steps for controlling SimFx with E-Prime Professional

- 1) Go to the Task Events tab on the Object you want to have trigger the scanner sound. For this example, we use the offset time of the directions because that is when the scanner would start in an actual experiment. You may choose to already have the ambient and cryogenic sound running when you bring the participant into the room to train them.
- 2) First, in the Experiment Object Properties Duration/Input Tab, you must change the direction object's Duration to (infinite), and set the PreRelease to 0. Then go to the Task Event Tab and click Add, and double click 'Directions'.OffsetTime.
- 3) Choose Serial for the Task Device Name.
- 4) Select WriteString for the Action.
- 5) Set Source to (custom)
- 6) In Custom type:<SetScanner>True</SetScanner><LdScanner>GE_EPI.wav</LdScanner><Count>1</Count><VolScanner>0</VolScanner><E>
- 7) Set Data Type to String.
- 8) Then click OK.
- 9) Use the OnsetTime task event and the <Stop/> <E> tags to stop the scanner sounds on the "GoodBye" Object in the experiment.

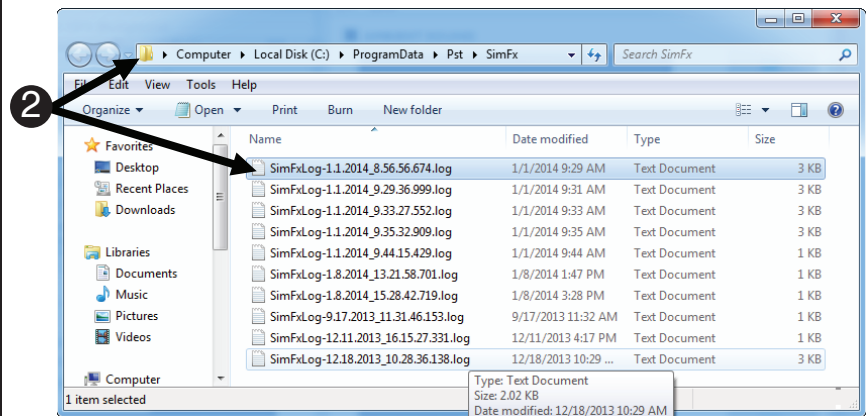
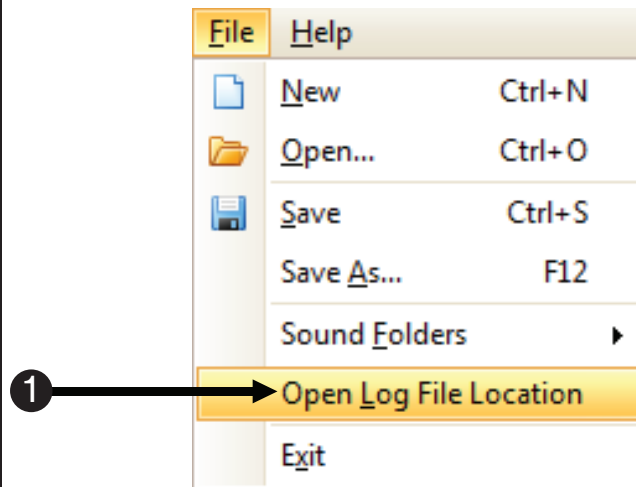
For more information, see [KB 5614](#): INFO: SimFx Serial Communication Setup Details.

Chapter 4: File Menu

4.3 Open Log File Location

SimFx produces a log file that can be used to verify the application is functioning appropriately. The log file is opened via the File Menu. This file contains information and operations performed by the SimFx application.

- 1) **Open** the File Menu, **Select** Open Log File Location.
- 2) The **SimFxLogFiles** dialog **lists** the **location** and **file names** of the available SimFx Log Files.



Chapter 4: File Menu

4.3 Open Log File Location (continued)


This is an example of the SimFx log file. It is a tab-delimited file and can be opened in standard text editors, such as notepad. The log reports the current Serial Communications settings, current sound folder location and a list of the operations performed by the SimFx application.

```

SimFX Log
-----
Event   Details
SimFX Initializing      N/A
sound file C:\Program Files\PST\SimFx\Sounds
Initializing Serial Port ComPort = COM1, BaudRate = 9600, Parity = None,
DataBit = 8, StopBit = One
ConfigureSerialPort()   N/A
Play Ambient Audio      Audio File Location = AmbientSound.wav
Pause Scanner 2 Audio via Checkbox Audio File Location = ECHOSound.wav
All sounds were stopped.
Play Scanner Audio      Audio File Location = EPISound4.wav
Play Scanner 3 Audio     Audio File Location = EPISound1.wav
Pause Ambient Audio via Checkbox Audio File Location = AmbientSound.wav
Pause Scanner Audio via Checkbox Audio File Location = ECHOSound.wav
All sounds were paused.
Play Scanner Audio      Audio File Location = EPISound4.wav
Play Scanner 3 Audio     Audio File Location = EPISound1.wav
  
```

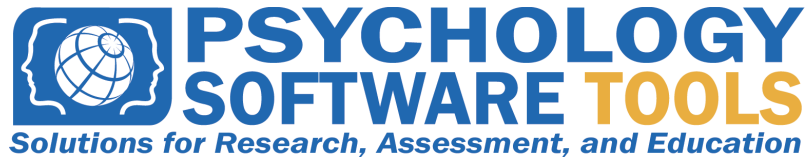
- 1) **Current Sound Folder Location** (sound file)
- 2) **Serial communication settings** (Initializing Serial Port ComPort = COM1)
- 3) **List of Actions performed by application**
- 4) **What sound file is played** (Audio File Location = EPISound4.wav)

Appendix A: COM Port Settings

- COM Port:** This option designates which port you want the program to use to communicate.
Predefined values: COM1, COM2 (available COM port will populate list)
Default value: COM1 usually (you must determine which COM you need to use via device manager)
- Baud Rate:** This option controls the number of data bits per second that are transferred via the selected port.
Predefined values: 9600,14400,19200,28800,38400,56000,128000,256000
Default value: 9600
- Data Bit:** This option changes the number of data bits you want to use for each character that is transmitted and received.
Predefined values: 5,6,7,8
Default value: 8
- Parity:** This controls the type of error checking the device performs. Please be advised that the computer or device you are communicating with must have the same setting as what you chose here.
Predefined values: None, Odd, Even, Mark, Space
Default value: None
- Stop Bit:** Changes the time between each character being transmitted.
Predefined values: 1, 1.5, 2
Default value: 1
-  **NOTE:** *For more information about configuration settings consult the help provided by your OS, or contact your computer support personnel.*

Appendix B: Contact Information

For additional information or support



Contact us at

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For Product Service and Support:
Please visit us at <https://support.pstnet.com>