Getting Started Manual

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Rev. A

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Introduction

The Emulator X2 Software Sampler is a professional software sampler and synthesizer based on the Emulator and Proteus series of hardware instruments. The engineers and designers at E-MU Systems have brought their years of experience and expertise to create the most comprehensive and flexible software instrument ever.

Important!

The complete Emulator X2 manual is available in .pdf format on one of the included CD-ROMs.

- **Install your EMU audio interface BEFORE installing and running Emulator X2.**

Important

Le manuel complet de l'Emulator X2 est disponible au format .pdf, sur des CD-ROM fournis.

- **Installez l'interface audio EMU AVANT d'installer et de lancer l'Emulator X2.**

Wichtig

Das komplette Emulator X2 Handbuch ist im PDF-Forma tauf einer der beiliegenden CD-ROMs verfügbar.

- **Installieren Sie Ihr E-MU Audio-Interface BEVOR Sie Emulator X2 installieren un starten.**

重要！
- Emulator X2 の日本語マニュアルは、
インストールCD-ROMにPDFフォーマットで収録されています。

- Emulator X2 Xソフトウェアをインストールする前に、
E-MUデジタルオーディオシステムのハードウェアと
ソフトウェアをインストールして下さい。

Emulator X2

Emulator X2 allows quick and easy creation of multitimbral setups on up to 64 different MIDI channels. Other features include the following:

- Sound Engine supports RAM and streaming playback
- Integrated effects processors
- Drag and drop sample, voice and preset selection
- Phase Locked Stereo signal path
- Ultra High Precision Pitch Interpolation (user selectable)
- High Voice Polyphony (system dependent)
- Real-time controllers for all important control points
- TwistaLoop analyzes audio and allows editing with multiple loops & regions
- SynthSwipe sampling tool automatically samples any MIDI instrument
- Automated Sampling, pitch detection and preset creation

Emulator X2 allows the serious synthesist and programmer to literally design their own instruments using the renowned Emulator 4 and Proteus synthesis architecture.

- 55 different filter types including multi-pole resonant filters, phasers, flangers, vocal filters and morphing filter designer.
- Extremely powerful, yet easy to use voice and sample zones allow cross-fading by position, velocity or real-time controller up to 128 layers deep.
- Three multi-stage envelopes, three 64-stage function generators, two lag processors and two multi-wave LFO's per voice.
- A complete collection of sample-based DSP functions including: transform multiplication, time compression/expansion, and sample rate conversion.
- Multiple solo modes and assignment groups let you simulate the playing response of physical instruments and classic synthesizers.
- 36 patchcords per voice allow you to get as complex as you want when building instruments.

Before you Begin...

You should have a good working knowledge of your computer's operating system. For example, you should know how to use the mouse, standard menus and commands. You should also know how to cut, copy, paste, open and close files.

System Requirements

To use Emulator X2 you will need at least:

- **Pentium III 1GHz or equivalent CPU (P4, 2 GHz or faster recommended)**
- **512 MB RAM (1 GB DDR or greater recommended)**
- **7200 RPM hard disk, preferably with an 8MB cache**
- **Windows 2000 or XP**

Software Installation

Programs installed

- **Emulator X2 Software Sampler application**
- **Emulator X2 VSTi**
- **Emulator X Converter**
- **Emulator X Factory Sound Banks**

1. Insert the CD labeled "Software/Manual Installation CD-ROM" into your CD-ROM drive. If Windows AutoPlay mode is enabled for your CD-ROM drive, the CD starts running automatically. If not, from your Windows desktop, click **Start ➜ Run** and type **d:\ctrun\ctrun** (replace **d:** with the drive letter of your CD-ROM drive).
2. The installation splash screen appears.
   Follow the instructions on the screen to complete the installation.
3. When prompted, restart your computer.

- **The Emulator X applications have been installed inside "Creative Professional/Emulator X/Program Files."**

4. Look for any "ReadMe" files in the Emulator X folder or in the Start menu and read these before continuing. The readme files may contain important last minute information that didn't make it into this manual.
5. Remove the Emulator X application disk from the CD-ROM drive.

Install the Emulator X Sound Banks

6. Locate "Sound Disk 1"and insert it into the CD-ROM drive. This disk contains four sound banks including the **Proteus Composer X** bank used in the tutorials.
7. If Windows AutoPlay mode is enabled for your CD-ROM drive, the installer begins running automatically. Otherwise, double-click the "Setup" icon to begin extracting the bank files.
8. Follow the onscreen instructions to install the bank on your hard disk. The Factory Sound Banks are installed inside "Creative Professional\ Emulator X\Sound Banks" by default.
9. You can install the other sound bank disks now or at a later time.
10. Launch the Emulator X program by double clicking the Emulator X icon on the desktop or by selecting the Emulator X item from the Start menu.

Register your Software

Please register your software today to guarantee uninterrupted use.

Optimizing Your Computer for Emulator X2

The following suggestions can help you configure your Windows computer for optimal performance. Since systems vary, we recommend that you note the original settings of any system parameters you alter so that you can restore them in the event that unexpected problems occur.

- **Consider dedicating a computer as your audio workstation. This computer can be optimized for best audio performance.**
- **If possible, avoid assigning slower devices to the IDE controller used by your audio drive.**
- **Get the fastest hard disk drive you can afford, as this is the single most important component affecting Emulator X performance. Many drives now offer an 8MB data buffer to improve performance.**
- **Defragment your hard drive often.**

- **Perform a "clean" install of your operating system with only the minimum components and programs installed.**
- **Use the System Restore feature of Windows XP or other restoration program such as Norton Ghost® or Roxio Go Back® to keep your system uncluttered and fast.**

SCSI and IDE Drive Tips and Considerations

When considering the purchase of a new SCSI or IDE drive for use with Emulator X, make sure that the new drive supports a sustained data transfer rate of at least 1.6 megabytes per second. While it is impossible to reliably calculate the needs of your computer's operating system — which must be considered in addition to Emulator X's requirements — you can get an approximate idea of the necessary speed of your hard disk drive based on the bit depth and number of voices you need.

Data Transfer Rate Chart

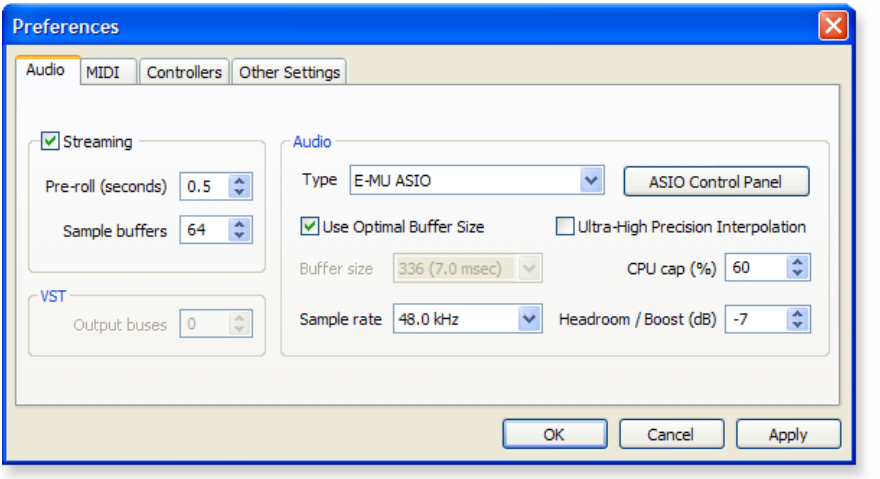
16 bits	44.1 k sample rate	86.2 k per Channel per second
	48 k sample rate	93.8 k per Channel per second
24 bits	44.1 k sample rate	138 k per Channel per second
	48 k sample rate	150 k per Channel per second

- **Regularly check your hard drive for fragmentation and de-fragment the drive when necessary. Your drive will operate most efficiently when it's not fragmented.**
- **If possible, use a two-drive system: one for audio, one for your system.**

Setting up your Audio

Before you can start making music, you have to establish a connection between Emulator X and your audio output hardware. This is done by selecting a software driver that makes this connection between hardware and software.

1. Select the **Preferences** screen from the menu bar.



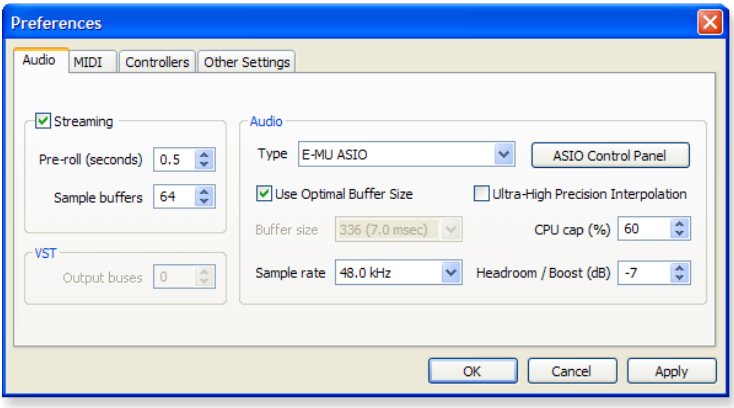
2. In the Audio section of the menu, select **E-MU ASIO** if using an E-MU Digital Audio System. Select **E-MU USB|0202 or USB|0404** if using an E-MU USB interface
3. After running Emulator X, you may want to adjust the Audio Preferences for optimum performance on your computer system. See Audio Preferences on page 8.
4. If for some reason you want to use hardware that doesn't support ASIO, select the DirectSound driver. For Emulator X to communicate with your sound card, you need to have Microsoft DirectSound installed on your computer and there must be a DirectSound driver installed for your audio hardware.

Setting up the Preferences

The preferences menu contains a variety of important controls used to configure Emulator X for your audio hardware and to customize the controls to suit the way you work.

▶ To Access the Preferences Menu

1. Select **Preferences** from the **Options** menu and this screen appears.



2. The preferences menu is divided into four main groups. Click on the tab heading to select one of the four sets of controls.

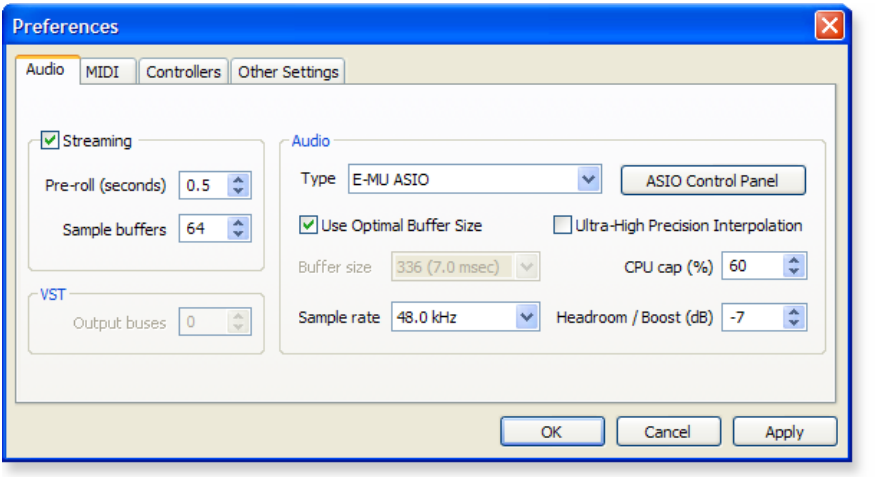
Audio — *Disk Streaming Controls, Audio Hardware Setup & Pitch Shift Algorithm selection, ASIO Control Panel.*

MIDI — *MIDI Inputs Channels 1-16 & 17-32, 33-48, 49-64 IntelliEdit, and Receive/Ignore Program Changes, Internal/External Tempo Source select, Velocity Curve, Volume Curve, Volume Sensitivity, Preset Tempo Channel.*

Controllers — *This section allows you to set up the MIDI Continuous Controllers you want the Emulator X to receive.*

Other — *This group contains several miscellaneous controls: Load last bank at startup, Select preset on active channel when editing in multimode, Clear clip indicators after 10 seconds, Expand tree items when selected, Knob tracking, Recording Directory, External Audio Editor, Undo.*

Audio Preferences



Streaming

When you load an Emulator X bank with streaming on, you are not actually loading the sample files themselves into your computer's RAM. Only the preset information and the first few seconds of the sample are loaded. The rest of the sample data is taken directly from the hard disk when needed.

This streaming technique makes fast loading times possible even when using huge banks that would clog a RAM-based sampler. Multi-layer, minute-long, stereo samples on each key are no problem for Emulator X. Sample streaming is not new. It was originally developed for hard disk audio recorders so that fast punch-ins and punch-outs could be achieved.

You have the option to enable or disable streaming audio. If streaming is turned off, the Emulator X loads (or attempts to load) the entire bank into your computer's RAM.

Tip: *If you get an error message when trying to open a file, the file may be too large to fit into RAM. Turn streaming on.*

If streaming is so great, why would you ever want to turn it off? Well, if you're using your computer as an audio workstation, performing multiple simultaneous functions, sooner or later, you'll exceed your computer's CPU, memory or disk access resources. Sample streaming makes very heavy demands on your hard disk. If you're recording other audio tracks, using

multiple software plug-ins and playing Emulator X with a lot of voices, you may run into a disk access bottleneck. By disabling streaming and loading the bank into your unneeded RAM, your hard disk can be reserved for more critical operations.

Pre-roll

This important control allows you to set **how many seconds of each sample** should be loaded into RAM when the bank is loaded. This setting greatly influences the performance of Emulator X when streaming is on. The setting you choose depends on: the number of samples you want to use and the amount of RAM in you want to dedicate to Emulator X.

Decrease Pre-roll time for fast load times when auditioning sounds and creating new banks.

Increase pre-roll time when you're playing sounds or dense sequences.

The smaller the pre-roll, the more disk access will be required for sustained sounds. Frequent disk access can overtax your computer system depending on it's speed and the number of other disk dependant applications you have running. Large pre-roll times will improve polyphony and performance at the expense of system RAM and slower bank loading. If you set the pre-roll high enough, the entire bank will be loaded into RAM and no disk streaming will occur.

Sample Buffers

This control allocates the amount of RAM that will be set aside for Emulator X (in other words, the number of complete samples that can be kept in the RAM cache). As samples are played, they are loaded from the hard disk into RAM. If you play those samples again, they don't have to be reloaded if they are already in RAM. This control sets the size of the RAM cache relative to the size of the bank. A higher number lowers disk access at the expense of RAM.

▶ To Optimize the Performance and Polyphony of your System:

The polyphony of the Emulator X is dependent on a variety of factors including:

- The **Pre-roll** setting (if streaming is enabled).
- The **Sample Buffers** setting (if streaming is enabled).
- The **CPU Cap** setting.
- The **bit depth** of your samples —16 or 24 bits (24 bits = fewer voices)
- The **sample rate** of the audio hardware—44.1kHz, 48kHz, 96kHz.
- The **speed of your computer**—CPU speed, RAM and hard disk access time.

Begin by choosing 44.1kHz or 48.kHz as your output sample rate.

The software-based filters can eat up CPU cycles and reduce polyphony.

Cost of Filters on Voice Count

No Filter	No additional CPU load.
2nd Order	Additional CPU load comparable to playing another 1/2 sample.
4th Order	Additional CPU load comparable to playing another 3/4 sample.
6th Order	Additional CPU load is comparable to playing 1 more sample. (polyphony is divided by 2)
12th Order	Additional CPU load comparable to playing 2 more samples. (polyphony is divided by 3)

Synthesizer parameters also use CPU cycles. When creating presets, feel free to use modulation cords as needed, but don't leave cords half connected if you aren't using them since these patch settings waste CPU cycles. Turn off both the source and destination of unused cords.

Audio Setup

These are audio parameters related to Emulator X and your sound card.

Type

You have a choice to use either DirectSound or ASIO audio drivers. If you have another high quality sound card installed in your system, it will be shown in this field. ASIO (Audio Stream Input/Output) is a cross-platform, multi-channel audio transfer protocol and supports 16 or 24-bit data width.

To use Emulator X with an E-MU audio interface, you MUST select the proper E-MU ASIO driver.

Selecting DirectSound uses the audio output device specified in the control panel of your computer. In general, using DirectSound is not recommended because of speed and latency issues.

Buffer Size

This control sets the number of sample periods between updates of the synthesizer parameters. The buffer size can adjusted according to speed of your computer's CPU. A faster CPU can handle a lower buffer size. The default setting is 128 sample periods, a good compromise of performance to CPU usage. An asterisk (*) next to a buffer size in the drop-down menu indicates the optimal buffer size for your ASIO Buffer Latency settings.

Use Optimal Buffer Size

When this box is checked, the Emulator X will choose the best buffer size based on the ASIO Buffer Latency setting. You should normally leave this feature enabled for best audio performance.

Sample Rate

This control sets the output sample rate of the Emulator X, and will always match sample rate of your sound card. The default setting is 44.1kHz.

CPU Cap

This control sets percentage of CPU resources that will be used by Emulator X and consequently the maximum number of samples that can be played at the same time. Depending on the design of the preset, a single Emulator X voice may contain multiple samples which play simultaneously. The maximum setting is 80% CPU usage. If you hear notes being "stolen" in your sequence or as you play the keyboard, or if the disk meter readout at the bottom of the window goes into the red, increase the value of this control. If you have other applications running, you may want to reduce the setting of this control to free up more CPU for them.

Headroom/Boost

Headroom is the amount of dynamic range remaining before clipping occurs. The headroom setting can be a bit confusing because **the higher the number, the lower the volume**.

The amount of headroom is adjustable from 12 dB to -30 dB in 1 dB increments. A headroom setting of -15dB provides the hottest output level, (and the highest signal to noise ratio) but may produce "clipping" if too many notes are played at once. The default headroom setting is -7 dB, which maintains an excellent signal to noise ratio while keeping a reasonable amount of headroom in reserve. If you hear the signal clipping or breaking up, increase the amount of headroom. In practice, you can think of this control as adjusting the control range of the Master Volume control.

Ultra-High Precision Interpolation Button

This button allows you to select between E-MU's ultra-high precision pitch shifting algorithm or a lower quality pitch shifting scheme which uses fewer CPU resources.

If you are using presets with a sample placed on every key, you can switch high precision off to free up CPU with no penalty in audio quality. No pitch shifting is occurring anyway. High quality pitch shifting is only needed when you are playing presets which have a few samples mapped across the entire keyboard. In this case, the Emulator X shifts the pitch of the available samples to fill in the keyboard.

ASIO Control Panel

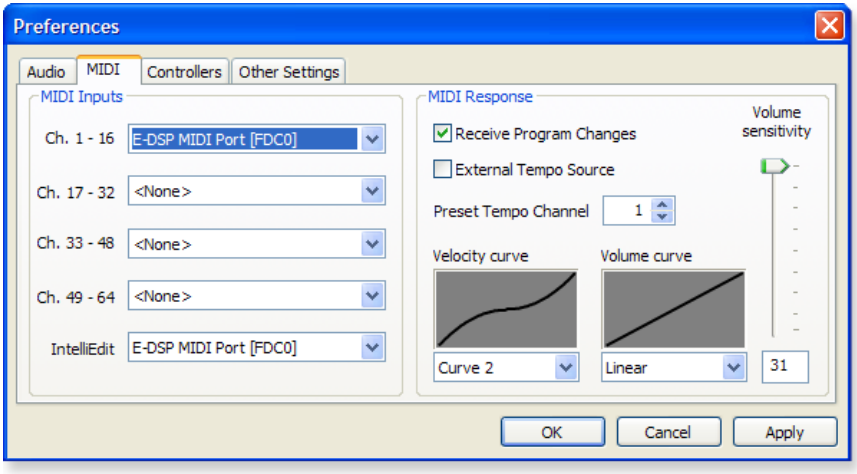
This button brings up the E-MU ASIO control panel which allows you to set the ASIO buffer latency in milliseconds. This important setting determines how fast notes will sound after you play them. If this time is too long, (<10mS) the keyboard response will feel slow and sluggish. If set too fast, however, you will hear the sound break up and crackle when you play too many notes. Experiment to find the setting that gives the best performance on your computer.

VST Output Buses

This control is only active in the Emulator X VSTI application. This setting allows you to add additional VST buses. Emulator X channel outputs can be assigned to VST buses in the Multisetup, Output field. These outputs are sent to the VST Mixer in your recording application. You must restart the VSTI for the changes to take effect.

MIDI

This group of preferences allow you to set up the MIDI inputs, adjust the master MIDI volume and velocity curves and turn the "IntelliEdit" feature on or off.



MIDI Inputs

Channels 1-16, 17-32, 33-48, 49-64

The Emulator X can respond to 64 MIDI channels at once. Since there can be only 16 MIDI channels per MIDI cable (or input) four inputs are provided. Set the MIDI Inputs to match up to four outputs from your MIDI interface or sequencer. If you don't need 64 channels you can turn either input off. **Note:** There are 16 MIDI channels per instantiation of the Emulator X VSTi.

IntelliEdit

This control allows you to set the MIDI device for IntelliEdit. Selecting "None" disables the feature.

When editing sample key ranges or editing voices sit is convenient to select the key position by simply playing your MIDI keyboard. IntelliEdit lets you selectively edit key ranges using the keyboard when you need to, but blocks keyboard editing when you may not want it, such as when your keyboard is playing in the background. Here's how it works.

▶ To Use IntelliEdit:

1. Make sure IntelliEdit is set to the same MIDI port your keyboard is using.
2. In one of the Voices and Sample Zones screens such as "Key Window", **position the cursor inside one of the Key Range fields** (Low or High).

3. Press and hold, **Ctrl+Alt** on your computer keyboard.
4. Play your MIDI keyboard. The key range will be edited.
5. In the Voice Edit window, holding **Ctrl+Alt** lets you select voices for editing. If more than one voice is assign to the key, the voices will cycle around with repeated pressing of the same key.
6. To select multiple voices, you must use the Group feature.

Receive Program Changes

This button selects whether or not MIDI Program Change messages from your MIDI controller or sequencer will be received or ignored by the Emulator X. Depress the button to receive program changes.

External Tempo Source

This button selects between internal tempo clock or MIDI clock as the tempo source. The Emulator X uses a global master tempo for Tempo-based Envelopes, Tempo-based LFOs, clock modulation, and TwistaLoop. When this button is pressed, MIDI clock will be used for the global tempo and the tempo control in the Multisetup window will be disabled.

Important: *If External Tempo Source is set to external, the tempo control in the Voice Editor will be "greyed-out" and non-functional.*

Preset Tempo Channel

The tempo of the Emulator X can be specified in the preset so that selecting a preset on a specific MIDI channel changes the tempo. This option selects the MIDI channel whose preset will be used for Tempo Control. This allows the proper tempo to be set when a Tempo-based or Twistaloop preset is selected.

For example, suppose you have this field set to channel 1 and the preset on MIDI channel 1 has its Tempo Control set to 122.22 BPM. When the bank is loaded, the Tempo will be set to 122.22 BPM. If you change the preset on channel 1, the tempo will change to follow the "Set Global Tempo" setting in the new preset.

If the preset on the Preset Tempo channel has its Tempo Control set to "Off", (or if this option is set to "Off") no tempo change occurs when the preset is selected.

MIDI Response

These controls allow you to customize the MIDI response of the Emulator X to match your MIDI Controller or other instruments.

Velocity Curve

Incoming velocity values can be scaled by one of 24 curves to better adapt to your playing style or MIDI controller. Selecting "linear" leaves the velocity data unaltered. The shape of the selected curve is displayed in the window. Select the curve that works best for you.

Volume Curve

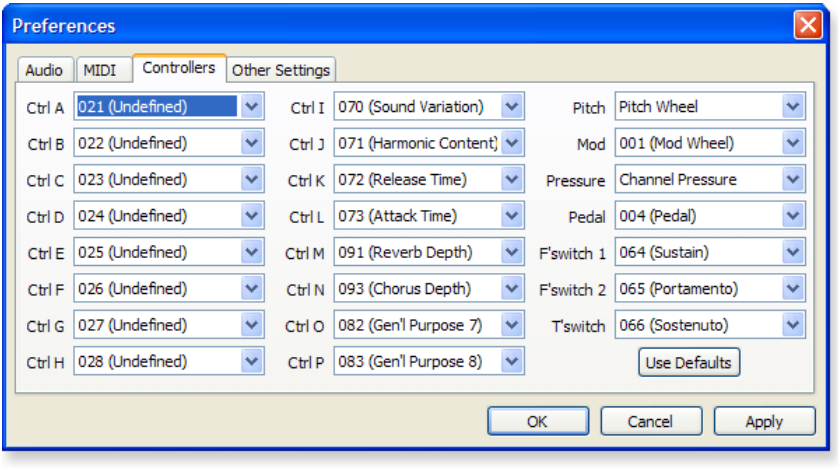
This is an adjustment to help match MIDI controller #7 volume response to other manufacturers' equipment. Three curves are provided: Linear, Inverse Square or Logarithmic. The action of this control is displayed in the window.

Volume Sensitivity

This control allows you to modify the response curve for MIDI continuous controller #7 (Volume). This allows you to match the Emulator's response to other manufacturers' equipment. Low numbers compress the volume control range, raising the volume level at lower controller #7 values.

Controllers

This is where you set up which MIDI Continuous Controllers the Emulator X will receive. Match these controls to the MIDI continuous controller numbers that your keyboard or sequencer transmits. What the controllers actually control, is programmable in each preset.

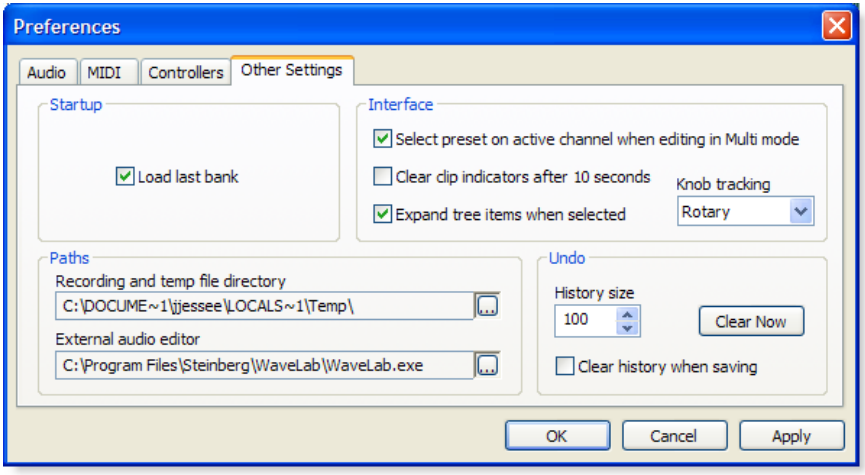


As you can see, MIDI Continuous Controller numbers are assigned to letters (A-P) or labels (Pitch, Mod, Pressure, Pedal, etc.) in this screen. When programming a preset, these letter or name labels can be assigned to control various parameters such as filter frequency or attack time.

The name labels such as pitch and mod wheels are so commonly used that they have their own assigned name, but these can also be freely assigned in any way you choose.

If you're just getting started, it's probably best to use the default settings. Press the "Use Default" button to restore the default settings which are shown above.

Other Settings



Startup

Load last bank

This feature automatically loads the last bank you had loaded whenever you start the Emulator X application.

Interface

Select preset on active channel when editing in Multimode

When checked, selecting a preset for editing in the Tree selects that preset on the active channel in the multisetup. This is what you want if you're editing preset and playing a MIDI keyboard.

If you're playing back a multi-timbral sequence and want to make a quick edit to a preset, you might want this feature Off so as not to alter your multi-setup.

Clear clip indicators after 10 seconds

This feature automatically clears the main output meter clip indicators. If this function is set to Off, the clip indicators will stay on until you manually click on them.

Expand tree items when selected

If this option is checked, selecting presets from the Tree will automatically open the selected preset for editing. When unchecked, selecting presets from the Tree will select the preset for playing, but not open it for editing.

Knob Tracking

This control allows the rotary knobs to be manipulated with either Rotary, Horizontal, or Vertical motion. The setting affects all rotary controls.

Paths

Recording and temp file directory

This option allows you to choose the location where new samples will be stored when sampling.

External audio editor

This option allows you to set the location of an external audio editor. The External Audio Editor is selected from the Sample Edit menu or the toolbar.  When the External Editor is selected, the current sample opens in the editing application you have selected. When you Save the edited sample in the external editing application, it is automatically transferred back to the Emulator X. You even have the option to Undo the external edit.

Undo

History size

The maximum number of stored undo steps.

Clear history when saving

Clears all undo history when you save a bank. If you have this box unchecked, you can undo even when you save and re-open a bank.

Clear now

Clears the undo history immediately.

2 - Emulator Architecture

This chapter contains important background information about the organization of the various modules of the Emulator X. Although this chapter doesn't contain any hands-on tutorials, this information is vital to your understanding of this ultra powerful instrument. Read This!

A Modular System

You can think of the Emulator X as a collection of sound organizing modules, all contained within the current bank. The following is a brief description of the five main elements of the Emulator X hierarchy starting from the largest element, the Bank.

Bank

Before you can play Emulator X, you load a *Bank* of presets. The bank contains all the sounds you wish to use in a particular sequence or performance. If you need additional sounds, they can be added by simply dragging and dropping them into the bank from the system or library. Unneeded sounds can likewise be removed from the bank. When loading a bank, the Emulator X only loads a small portion of the digital samples and so bank load time is greatly reduced.

Saving

The bank retains data only for as long as your computer is plugged in and turned on. Of course, we don't expect you to leave the thing on all the time, which brings us to the subject of saving data.

Saving the bank to a hard disk permanently stores data so that even after turning off your computer, the disk stores a record of your work.

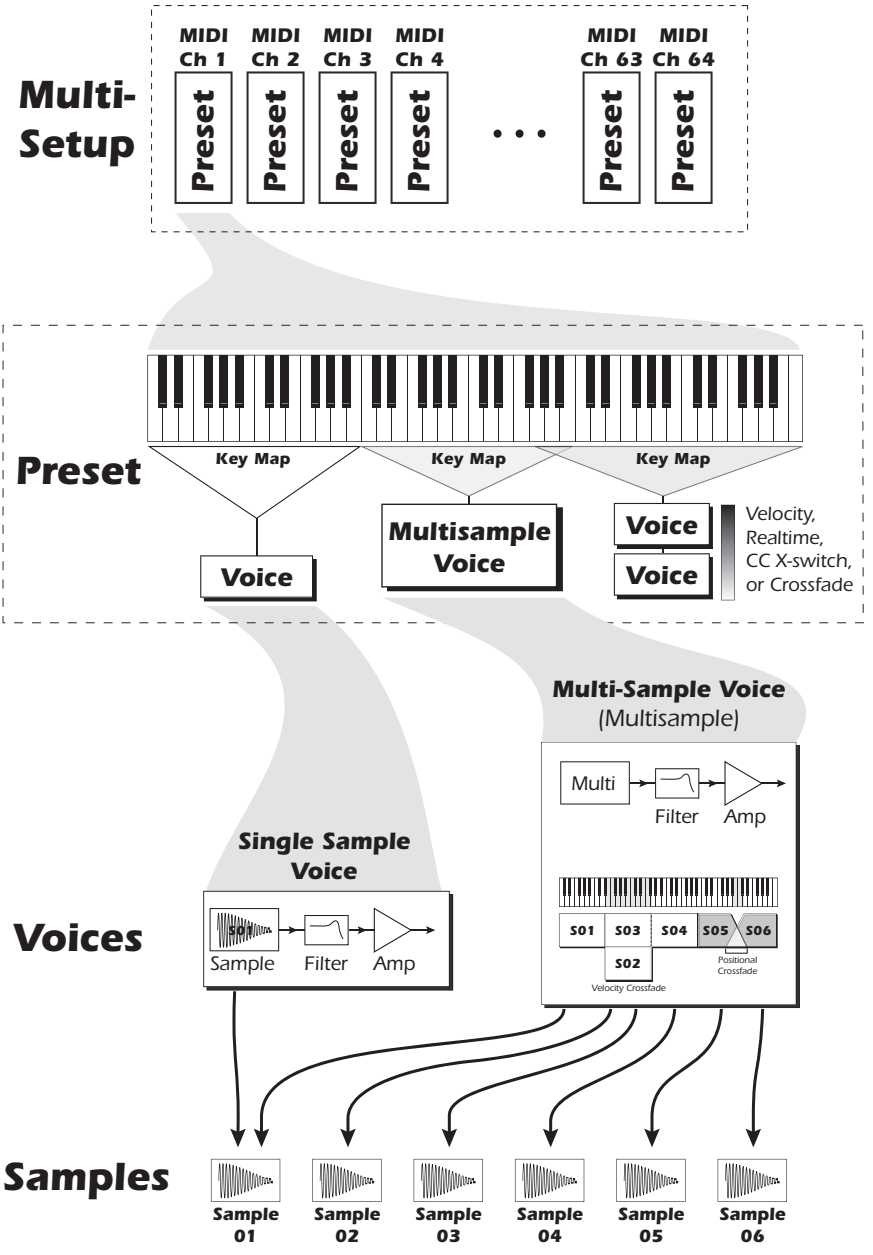
IF YOU DO NOT SAVE A BANK, ANY CHANGES YOU HAVE MADE WILL BE LOST WHEN YOU TURN OFF THE COMPUTER!

Do not wait until the end of a session to save. Save your work periodically in case of power failure or some other unforeseen circumstance that might erase the computer's memory. Hard disks and computers are not infallible.

All hard disk banks should be backed up periodically to another hard disk or other media. Should you improve the preset or sample later, you can always replace the original with the revised version. And if something goes wrong, the original will still be available to save you the ordeal of starting from scratch.

When you choose **Save**, (as opposed to Save As) only the edited presets, voices and samples will be written, saving time and memory.

When you choose "**Save As**" from the file menu, the entire bank—presets, voices and samples—are re-written to the hard disk. This method, although somewhat wasteful of memory, ensures that all your samples remain bound with your bank.


Multi-
Setup
MIDI
Ch 1
MIDI
Ch 2
MIDI
Ch 3
MIDI
Ch 4
MIDI
Ch 63
MIDI
Ch 64
Preset
Preset
Preset
Preset
Preset
Preset
Preset
Key Map
Key Map
Key Map
Voice
Multisample
Voice
Voice
Voice
Velocity,
Realtime,
CC X-switch,
or Crossfade
Multi-Sample Voice
(Multisample)
Multi
Filter
Amp
S01
S03
S04
S05
S06
S02
Positional
Crossfade
Velocity Crossfade
Single Sample
Voice
S01
Sample
Filter
Amp
Voices
Samples
Sample
01
Sample
02
Sample
03
Sample
04
Sample
05
Sample
06

Multisetup

A map that assigns a preset, volume, pan position and output routing to each of the 64 MIDI channels. Multisetups can be saved and recalled for use with a particular song or sequence so that all the MIDI channels play the proper preset. A Preset is the same as a MIDI Program.

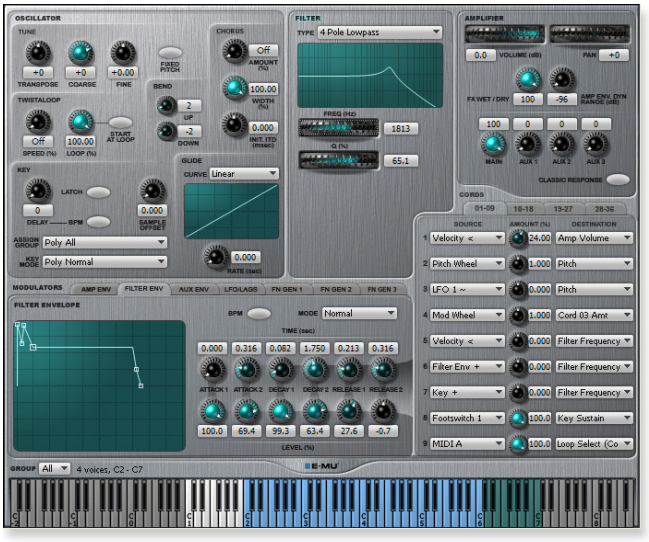
Preset

One complete **keyboard setup** controlled by one MIDI channel. Presets are composed of multiple *voices*. The assignment to voices to keyboard keys is completely flexible.

Voice

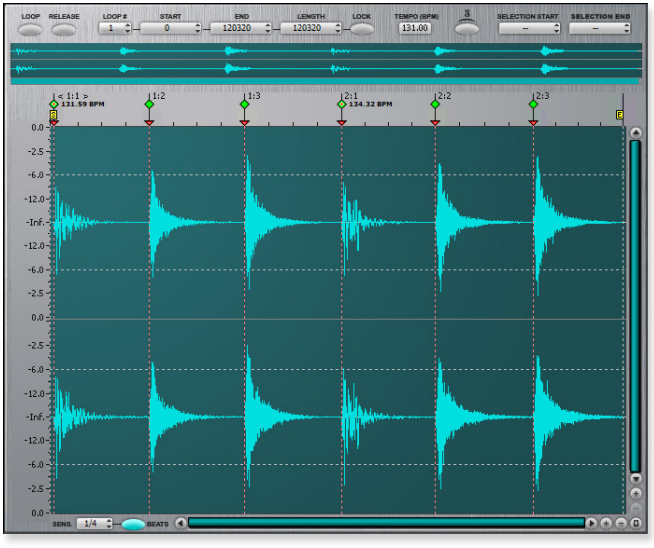
One complete **sound,** containing one or more samples with keyboard and velocity mappings and all programmable synthesizer parameters. Voices can be assigned to a single note on the keyboard, or transposed to cover a wider keyboard range.

Voice



Sample

An individual digital recording with a name, sample rate and loop markers.



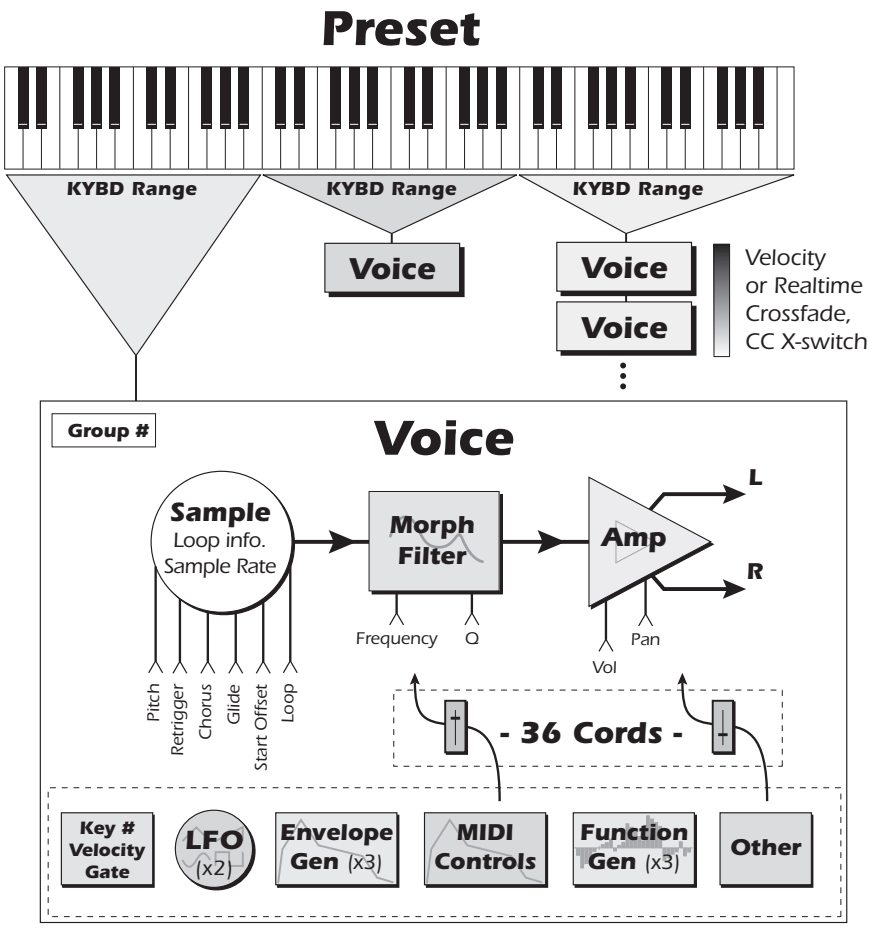
Preset Diagram

The diagram below illustrates the concepts of a preset and voice.

Preset *A complete keyboard layout with unlimited voices.*

Voice *A complete synth sound containing a single sample or a Multisample.*

Sample *An individual digital recording with loop information.*



Flexible Architecture

The EmulatorX allows you great flexibility in the way you construct presets. Consider this — you can assign multiple samples (multisamples) to the keyboard inside the voice or assign single sample voices to the keyboard.

Unless you specify otherwise, only one sample is assigned per voice. In this case you would assign voices (and the single sample each one contains) to the keyboard and create presets. On the other hand, you may want to create finished voices before you start designing presets and treat the voice as your finished sound. In this case, the preset can be used to crossfade, layer or switch multiple complex voices.

Voices

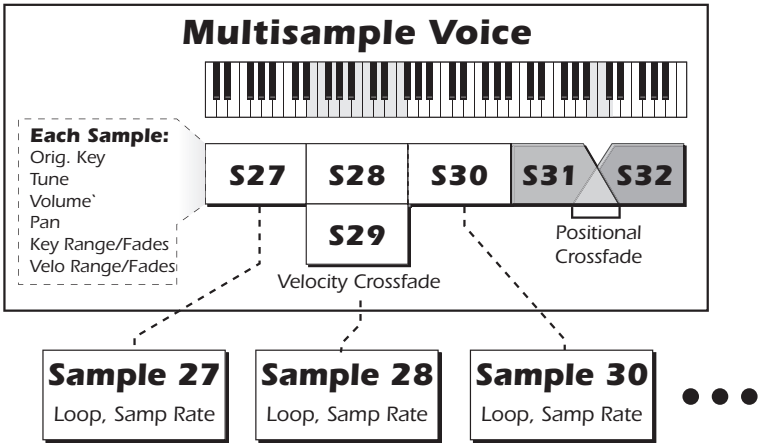
A voice is a complete sound that can be assigned to a range of the keyboard. A sample is the part of a voice that generates the actual sound. You can think of a voice as a complete instrument consisting of one or more samples which can then be used as a building block in constructing more complicated presets. A voice can contain a single sample or multiple samples, whichever you prefer.

A voice consists of one or more samples, a dynamic filter, a dynamic amplifier, up to three 6-stage envelope generators, up to two multi-wave LFOs and up to 36 modulation routings called "Cords" to connect everything together.

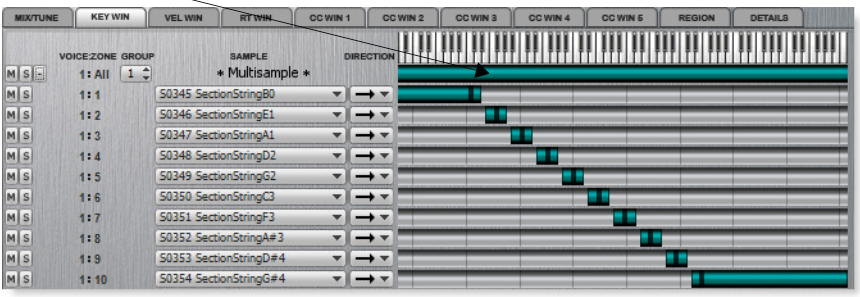
When you record a sample into the Emulator X, a new voice is typically created for each new sample (recording). In this case, each sample will its own complete set of synthesizer parameters.

Multisample Voices

In another scenario, you might record several samples of an instrument (such as a piano), then place them into the same voice in order to share the same set of synthesizer parameters. If a voice contains more than one sample, this multiple sample object is called a "Multisample". A diagram of a multisample voice is shown on the following page.



Multisample voices are designed to arrange groups of samples into one manageable entity. The window below shows an opened multisample. The key mapping of the ***multisample*** *overrides the key mapping of the samples contained within it.*



Normally these samples would be placed side by side on the keyboard as in the diagram above. You assign the sample to a range by setting the original key, (which is usually the original pitch of the sample) a high key and a low key. The number of samples needed for a realistic emulation varies with the instrument, but in general, "more is better."

When a sample is taken, it can be automatically placed into a voice with one sample. You could also manually place the voice (and its sample) on the keyboard if you wish. If more than one voice is assigned to the same range, then pressing a key in that range plays all the voices assigned to that range. Voices assigned to the keyboard can be crossfaded by their position on the keyboard, or the key stroke velocity.

Voices can also be switched or faded depending on the value of a realtime controller such as a modulation wheel, an LFO or an envelope generator.

The Sample

Loading in any sound, in mono or stereo, creates a sample, the raw material with which the Emulator X works.

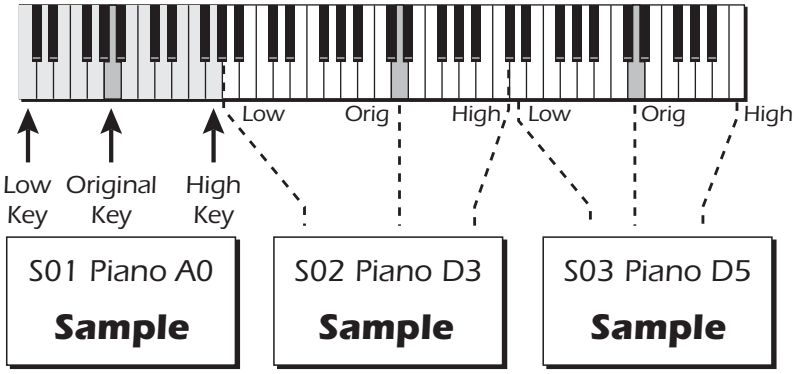
The term sample commonly means two different things:

- **A digital recording of a complete sound, or**
- **Each snapshot of the sound that makes up the complete sample.**

In this manual, we'll assume sample means the complete recorded sound unless indicated otherwise.

You can modify a raw sample in several ways. A sample can be transposed up or down in pitch to cover a particular range of the keyboard making it unnecessary to record a sample for every key. Sample editing might consist of *Looping* a sample (allowing even short samples to play indefinitely), *Truncating* (cutting off unneeded parts of a sample), or any of a number of digital processes that actually change the raw sample data.

The Original Key assignment determines the pitch at which the sample will be played back. Therefore it's important to map your samples to the proper original key.



TwistaLoop™

TwistaLoop is a tool that automatically analyzes any audio by dissecting it into its rhythmic components. This makes it easy to select multiple loop points and regions, and offers total control over tempo with real-time audio time expansion/compression.

You can playback analyzed samples in at a custom speed, or in time with Emulator X2's clock (or an external clock source).

Once you create loops from an analyzed sample, you can use them in a variety of ways:

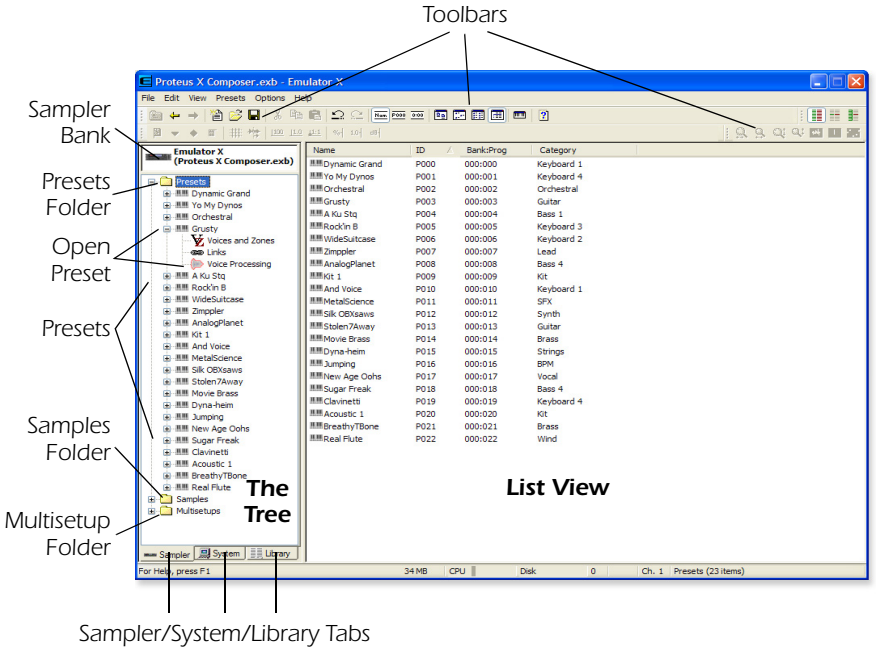
- Change the playback speed of any loop.
- Choose which loops are repeated when played back.
- Set up a continuous controller to change in real time which loop plays.
- Sync your loops to Emulator X2's master tempo, or to an external tempo sources, such as a VST host.
- Play different beats or bars from the same sample.

3 - Getting Started

Exploring the Tree

In this section you'll learn how to navigate around Emulator X using the Tree. Don't worry if you don't what everything does just yet. Everything will be explained later on.

With the Emulator X application running, a bank is loaded by selecting **Open** from the File menu. The screen shown below appears.



The **Tree** is the section shown on the left of the screen. There are three tabs at the bottom of the Tree labeled **Sampler**, **System** and **Library**.

Sampler — Allows you to see the contents of the current Emulator X bank.

System — This tab gives you access to your entire computer system: PC, hard disks, CD-ROM drives, network, etc. Presets, Samples and Multisetups can be browsed, then Merged into the current Bank.

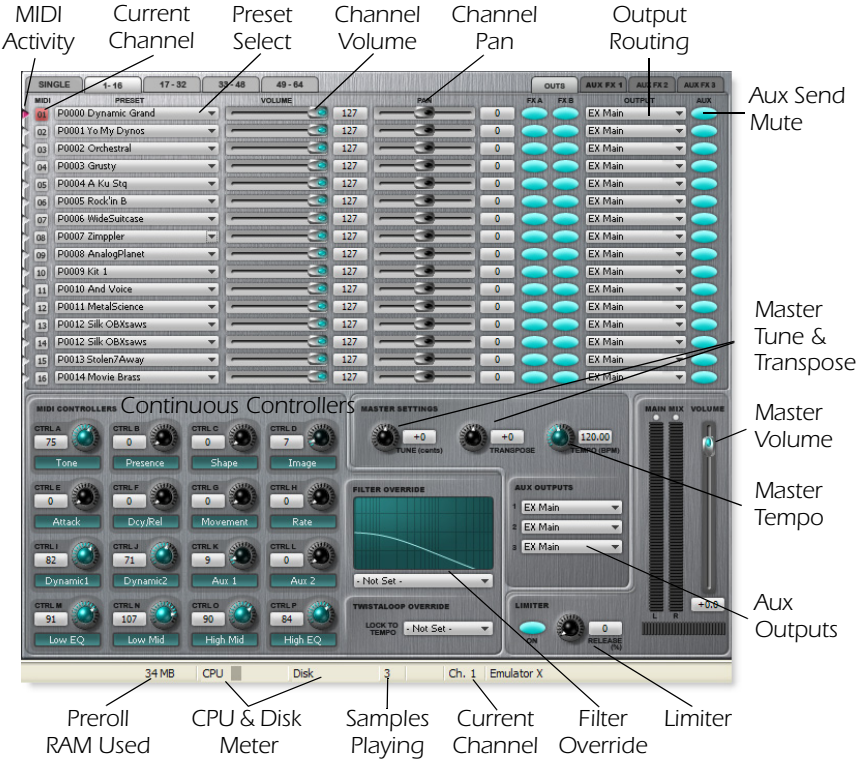
Library *The Library shows you all Emulator X related files, wherever they may be located on hard disks, CD-ROM or network. Presets, Samples and Multisetups can be browsed in the Library, then Merged into the current Bank.*

Multisetup Page

The Multisetup is the top level of the Emulator hierarchy and is the place where you choose and assign presets to each of the MIDI channels.

A multisetup assigns a preset, volume, pan position and output routing to each of the 64 MIDI channels. Multisetups can be saved and recalled for use with a particular song or sequence so that all the MIDI channels play the proper preset.

- **Click on the Emulator X icon to display the Multisetup screen.**



Changing Presets

Play your MIDI keyboard and note that one of the MIDI activity LEDs comes on. This is the channel on which your MIDI keyboard is transmitting. If you don't see MIDI activity, check your MIDI connection and make sure MIDI is set up properly in the Preferences menu.

▶ To Audition and Select Presets

1. Click once on the **Preset Select button** on the channel used by your MIDI keyboard. The complete list of all presets in the bank appears.
2. **Click once on a preset** to audition it. Play your keyboard to hear it.
3. Try out a few more presets. When you find one you like, **double-click** on it to select it and return to the Multisetup screen.
4. Change the Current Preset by clicking on the number to the left of the preset. The number you selected turns red.
5. **Play the small keyboard** at the bottom of the screen. Notice that the MIDI Activity LED of the current preset now plays along with whatever sound is selected for that channel. (Your MIDI keyboard still plays on the channel to which it is set.)
6. **Change the channel on your MIDI keyboard** then play it. The Emulator X now plays the preset on that channel.

▶ Selecting Presets from the Tree

1. When you **click on a preset in the tree**, you have just selected it for the current MIDI channel. This action also calls the Preset Global page.
2. To go back to the Multisetup page and click the back arrow or click on the Emulator X icon at the top of the tree.
3. You can also open a preset by dragging and dropping it from the tree to the single channel view.

▶ Changing the Current MIDI Channel

1. The current MIDI channel is simply the MIDI channel you are currently working with. To change the current MIDI channel, click on the channel number in the Multisetup page. The selected channel number turns red.

   Note also that the channel number at the bottom of the window changes to reflect the current channel.

Adjusting the Controllers

Each preset has a set of 16 continuous controllers which are used to adjust and control the sound as you play. Your MIDI keyboard may have several knobs or sliders that are transmitted over MIDI. These can be used to control the Emulator X if you match the CC numbers your MIDI keyboard transmits to the same CC numbers on the Emulator X. These global settings are located under Options, Preferences, Controllers.

▶ To Modify the Sound using the Controllers

1. Play your MIDI keyboard as you adjust the controllers knobs on the screen. Notice that the sound changes. If the sound doesn't change, make sure the current preset (red number) is the same one that your keyboard is playing.
2. If you have controller knobs on your MIDI keyboard and have set up the Controllers (Options, Preferences, Controllers) to match your keyboard, you can use these knobs to modify the sound. Notice that the screen knob follows the movement of the hardware knob.
3. Try changing the filter type. Click on the selector to the right of the filter name and select one of the 55 different filter types.
4. Adjust the Tone and Presence controls while playing the keyboard to hear your changes.
5. Change the Volume and Pan controls for the MIDI channel you are using. These settings can be adjusted remotely using MIDI controller #7 (volume) and controller #10 (pan).

Create Your Own Custom Bank

It's easy to create your own custom sound banks by simply "dragging and dropping" the presets or samples you want onto the Emulator X icon in the tree.

▶ To Create a New Custom Bank

1. Select **New** from the File menu. This creates a new empty bank. (You can also merge presets or samples into an existing bank if you wish.)
2. Select the **System** Tab. The Desktop icon will appear in the tree.
3. Locate the presets you wish to include in your new bank. These will be located in the "E-MU Systems" folder located in "Program Files" The included CD-ROMs contain several other great banks of sounds. Run the installer application on the library CDs to install these banks on your hard disk.
4. When you have found a preset you want to include, simply **click** (left mouse button) **and drag the preset over the Emulator X icon** at the top of the tree. The cursor changes to a plus sign as you pass over the icon. Release the mouse button and a pop-up progress bar will inform you that the preset is being loaded.
5. Continue to add presets to your new bank.
6. Save the bank when you are satisfied.

▶ Alternate Method using the Librarian to find Presets

1. Select the **Library** Tab instead of the System Tab in step 3 above.
2. If you haven't done so already, **Update** the Library.
3. Choose presets from the Library.

Load a New Bank

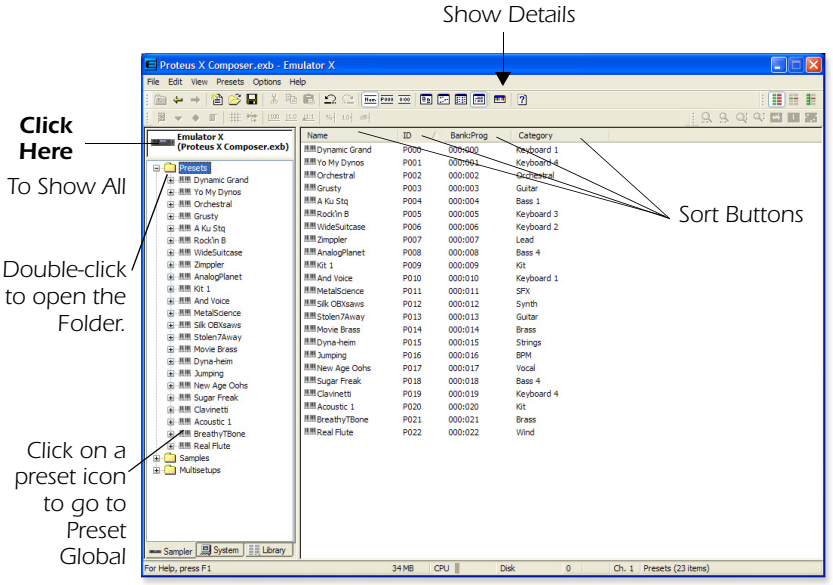
Load up a new bank in preparation for the next few examples. Load the **Proteus Composer X** bank located in your Emulator X folder.

1. Select **Open** from the File menu, then locate **Proteus Composer X** and click **Open**.
2. That's it!

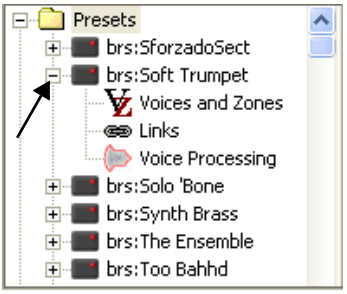
Opening a Preset

A preset is a complete keyboard setup for one MIDI Channel. Think of a preset as one complete sound containing multiple voices and samples.

1. Click on the Preset Folder in the Tree to show all the presets in the bank.



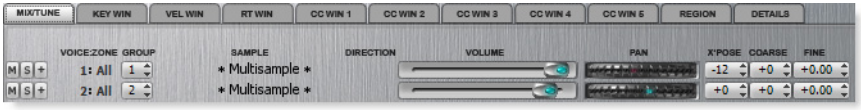
2. Click the Show Details button. The details of the presets are now shown. The sort buttons allow you to sort the presets by name, ID number, bank/program number, or category. Click on the button again to sort in reverse order.
3. Clicking on the plus sign (+) next to the **Preset** folder or double-clicking on the folder itself opens the folder and displays the bank's presets in the tree.
4. Clicking on the plus sign (+) next to one of the preset icons displays the sub-modules of the preset: Voices & Presets, Links, Voice Processing.



Submodule	Function
Voices & Zones	Assign voices and multisamples to the keyboard, which can be switched or crossfaded by key position, velocity or controller setting.
Links	Multiple presets can be layered, switched or crossfaded across the keyboard.
Voice Processing	Synthesizer voice parameters including filters, LFOs, envelopes and cords.

5. Open the preset "**And Voice**" by clicking on the plus (+) sign next to the folder.
6. Next, click on the "Voices & Zones" icon. The Key Window appears. The blue bars show that the two multisamples in this preset are mapped across the entire keyboard.

7. Click on the Mix/Tune tab at the top of the window.



8. There are two multisampled voices in this preset. Adjust the volume slider for each of the voices as you play. Now try playing with the pan position and transpose. Before you leave this window, turn up the volume controls on both voices.

▶ *Exploring the Key and Velocity Windows*

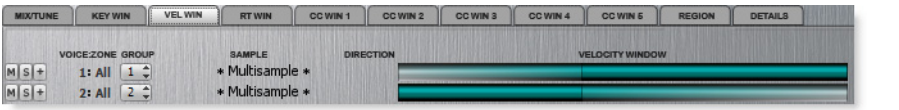
1. Click the Key Win tab again.

2. Click and drag the ends of the blue bars so they look something like the screen shown above. The settings don't have to be exact.
3. Play the keyboard from the lowest key to the highest. Voice 1 plays at the low end of the keyboard and voice 2 plays on the high keys.
4. To return both voices to their original positions, select Edit, Undo from the toolbar. Select Undo again until both voices are assigned to the entire keyboard.

Velocity Switching and Crossfading

5. Click on the Vel Win tab. The following window appears:

6. This screen controls the voices using key velocity or how hard the keys are played. Set the bars something like the screen above.
7. Play the keyboard anywhere, but begin playing softly and gradually play harder. Notice that the choir (voice 2) plays with lower key velocity and switches to piano (voice 1) when you play hard. You've just created a velocity cross-switch.
8. **Ctrl-click** the end point of the bar in voice 1 and drag it to the left. The color intensity of the bar fades. The fade in color is analogous to volume. the darker the color, the louder the volume for a certain velocity.
9. Drag the fade points of the two voices so they look something like the window shown below.



10. Play the keyboard anywhere, but begin playing softly and gradually play harder. Notice that the choir plays with lower key velocity and fades into piano as you play harder. You've just created a velocity crossfade.

▶ *Add a Voice*

1. Select **Preset, New Voice** from the toolbar. A new, empty voice appears below voice two.
2. The label area of the new voice is blank. Click on the selection box to the right of the empty label area to bring up the entire list of samples in the bank.
3. Select sample **0350 SectionStringC3** by double-clicking on it. You've just assigned a sample to the voice you created.
4. Play the keyboard and now you have orchestral strings as well.

▶ *Delete the Voice*

1. Select the voice you just created by clicking once on the sample name or number to the left of the name. The number turns red.
2. Select **Preset, Delete Voice** from the toolbar. The voice has now been deleted.

Much More...

Now you've had a small taste of what you can do with the Voices and Zones section. Read chapter 5 of the pdf manual to learn more about the Preset Editor.

Examine a Voice

Each voice has its own synthesizer section (called Voice Processing) to process the raw samples. You can process each voice separately or select all voices to be processed in the same way.

1. Go to the Tree and click on preset **P0015 Dyna-heim.** Play the keyboard. You should be able to hear the preset.
2. Open the preset by clicking on the plus (+) sign, then click on the Voice Processing icon. The Voice Processing page shown below appears.

3. Near the top of the screen near the keyboard you'll see the Group Selector. Set this to All, to select all voices in the preset.
4. Feel free to explore the synthesizer section. The filter section is probably a good place to begin. Change the filter type, then adjust the frequency

and Q controls as you play the keyboard. Note that the filter response display changes as you change the filter settings.

Cords

The reason synthesizers are able to generate such complex sounds is because most if not all of their processes can be placed under automatic control. Here's an example.

5. Tired of turning the filter frequency by hand? Let's program one of the LFOs to do it. Choose Cord #8 and set the left selection box to **LFO 1 ~**.
6. You've just connected one end of a Cord. Like all cords, you've got to connect both ends for it to do anything. Connect the other end of the cord to **Filter Frequency**.
7. Each Cord has its own attenuator which controls "how much" signal goes through the cord. Turn the knob in the center of the cord all the way to the right (+100%).
8. Now set the filter frequency knob about 1/3 of the way up and play a note on the keyboard. You should hear the filter being turned up and down automatically.
9. Change filter types and adjust the filter frequency if you don't hear the filter being modulated.
10. Adjust the **Frequency** of LFO 1.
11. Change the **Shape** of LFO 1. (You'll have to re-key to hear the new waveform.)

Modulating Cords

In the Emulator X even the Cords themselves can be controlled by other modulation sources or controls. Let's use your keyboard's mod wheel to control the amount of LFO to filter modulation.

12. Cord 0 already has the Mod Wheel assigned as an input. Set the output of **Cord 0** to go to **Cord 8 Amount**.
13. Turn up the amount of **Cord 0** to **100%**.
14. Set the amount of **Cord 8** to **0%** (off). *(You're going to turn it up with the mod wheel.)*
15. Now play a note and move the Mod Wheel of your keyboard up. *(Most keyboards have two wheels or controllers. One bends pitch and the other is the modulation wheel.)*

Experiment

16. Try setting the output of Cord 11 to **Pitch**. Now try changing the LFO Shape. Now it's much easier to hear the different LFO wave shapes.

Wipe the Slate

The preset might be a little messed up after your experiments. It's good to know that as long as you don't Save it, none of the original data is destroyed. If you want to get back to the original preset, simply load the bank again.

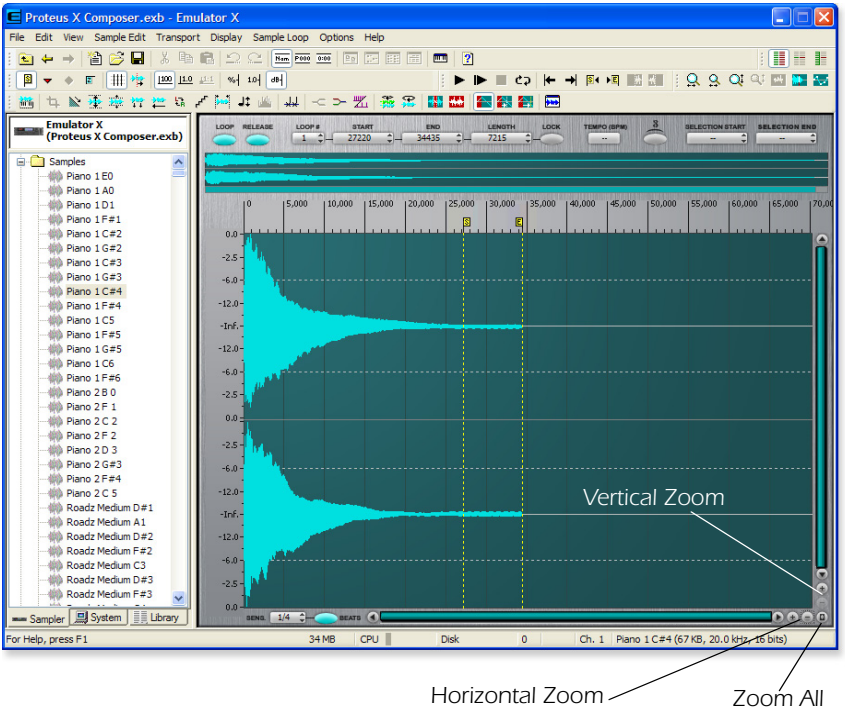
You can also Undo any changes you made by repeatedly clicking the back arrow button (=).

Examine the Samples

Samples are the digital recordings which are the basis of an Emulator X sound. As you've seen, samples can be layered and switched or treated by the Voice Processing functions to create entirely new sounds, but the actual samples can also be modified and sculpted.

A single preset may use over a hundred samples and a bank may contain thousands of individual samples. Let's take a look.

1. Click on the plus sign (+) next to the **Samples** folder to open the folder and display the samples in the bank. (If the Preset folder is already open, you can click on the minus sign (-) next to the folder to close it and clean up the tree.)
2. Click on any sample to display its waveform.



3. The transport controls located in the toolbar display. If you don't see them, right-click an empty area in the toobar and select **Sample Transport**. Click on the **Play** button ▶ to listen to the sample.

4. Press the **Stop** button ■ to stop playing.
5. Click on the larger magnifying glass of the Horizontal Zoom buttons. The time-base of the waveform is magnified allowing you to see more detail. Continue clicking and eventually you'll reach maximum magnification. The individual sample measurements are shown here as dots. If the sample rate is 44.1 kHz, then there will be 44,100 of these dots per second of sound.
6. Click repeatedly on the smaller magnifying glass and the horizontal magnification decreases.
7. Click the **Zoom All** button, and the view zooms to show the entire sample.
8. The Vertical Zoom buttons allow you to zoom in or out on the vertical axis. Neither the vertical or horizontal zoom buttons change the wave in any way. They're just display controls.

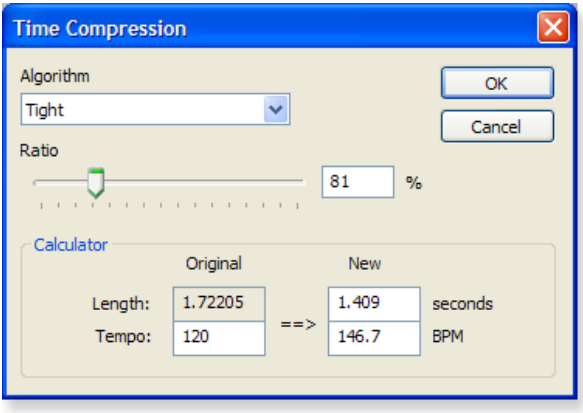
Using DSP

There are a number of DSP or digital signal processing functions that you can perform on the raw samples. Samples can be spliced together, merged, time-stretched, reversed and on and on.

Unlike Voices & Zones or Voice Processing functions, the DSP tools actually change the recorded sample data.

Time Compression/Expansion

1. Select sample **Riff Trip Gb.** Press Play on the transport controls to check it out.
2. Suppose you wanted to change the tempo to fit into your song. The time compression/expansion DSP tool can do this for you. Select **Time Compress** from the DSP toolbar. The following dialog box appears.



Note: *The original tempo shown may not reflect the actual tempo of the sample. You have to set this value manually in order to have the new tempo accurately calculated.*

3. **Change the ratio.** Ratios below 100% compress or shorten the time. Ratios above 100% expand or lengthen the time. Note that the tempo and length fields change to show the new length and tempo.
4. Press **OK** to change the time scaling. Press **Play** again and note the change in tempo of the sample.

Loop Play

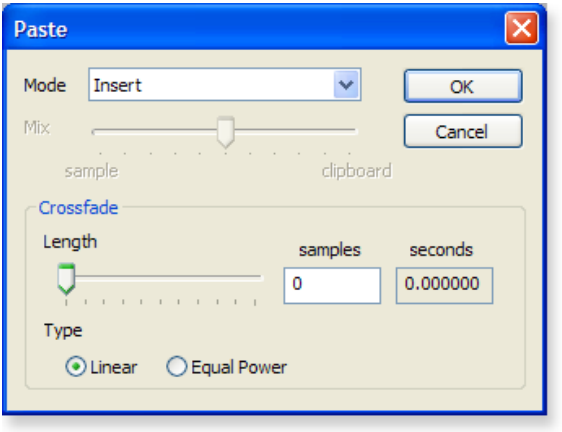
5. Turn on **Loop Play** on the Transport toolbar. Now the sample will continue to loop until you press **Stop**.

Reverse

6. Select **Reverse** from the toolbar. The sample is immediately reversed.
7. Press **Play** and hear the sample played backwards.

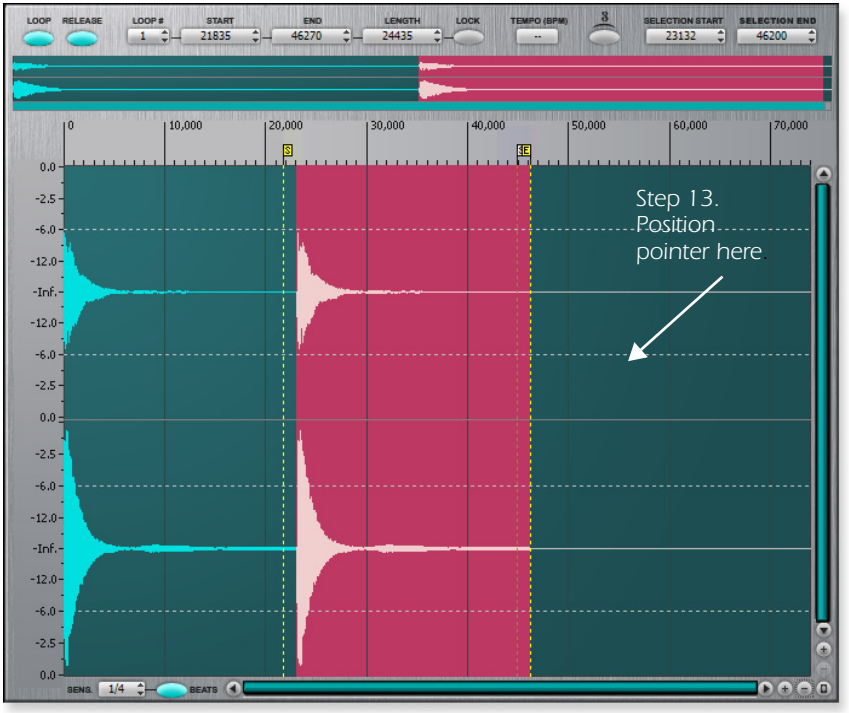
Copy and Paste

8. Select the entire sample by pressing the **Select All** button on the DSP toolbar.
9. Choose **Copy** from the Edit menu. The sample is placed on the clipboard.
10. Click anywhere on the waveform display to deselect the sample, then position the cursor at the very end of the sample by pressing the **Loop End** button in the transport controls. The flashing cursor line is now positioned at the end of the sample.
11. Choose **Paste** from the Edit menu. The following dialog box appears.



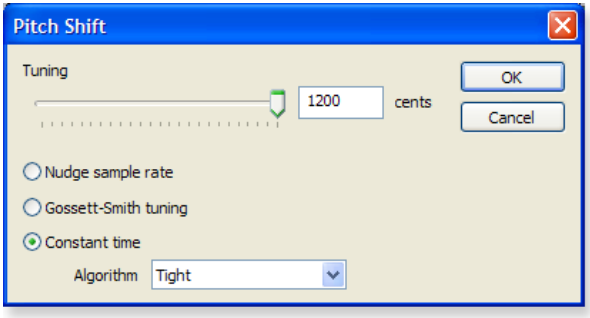
12. Insert mode is already selected and it's the mode we want. The clipboard contents will be inserted at the cursor location, extending the length of the sample. Press **OK**.

13. Now position the mouse pointer at the very end of the sample. Press the shift key down and click the left mouse button. The section of wave you just pasted is selected.



Pitch Shift

14. Select **Pitch Shift** from the DSP toolbar. The following dialog box appears.



15. Set the **Tuning** interval. 100 cents equals one semitone. Try a setting of 700 cents or a perfect fifth.
16. Select **Constant Time**. This setting changes the pitch but will leave the rhythm constant. Don't change the algorithm.
17. Press **OK** to change the pitch.
18. Click on the **Loop Start** button in the Transport Controls to set the cursor to the beginning of the sample and press **Play**.

Experiment!

Please feel free to try out all the other DSP processes. Be sure to read the Sample Edit chapter to learn all about these powerful tools, but you should actually try them out as you read.

Remember that nothing is made permanent until you save the bank, so experiment as much as you like.

Samples can also be exported as WAVE or AIFF files using the **Export** function in the Sample Edit menu. This allows you to use other sound processors in your computer. Externally processed samples can be re-imported using the **Import** option in the File menu.

Save and Save As

When you choose "**Save As**" from the file menu, the entire bank—presets, voices and samples—are re-written to the hard disk. This method, although somewhat wasteful of memory, ensures that all your samples remain bound with your bank.

When you choose **Save**, (instead of Save As) only the edited presets, voices and samples will be written, saving time and memory.

The Librarian

As your sample library grows so does the problem of managing all your banks, presets and samples. As you've probably already discovered, a single bank can contain literally thousands of individual samples.

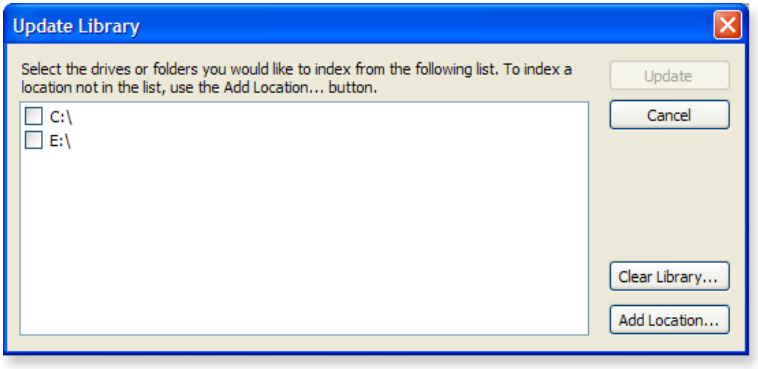
The Library is accessed by clicking the Library tab at the bottom of the Tree. To use the librarian, you first "Update" from the File menu. This creates a searchable database of all your samples, presets, banks and audio files which can be quickly searched. Audio files can be either WAVE or AIFF.

You can select which drives you wish to add to the catalog or manually "Add Locations" to narrow down the selection range to speed the update process. The Add Location button also allows you to specify network drives to catalog. Only the selected targets are overwritten with new data when the update process is performed. Unselected targets remain as they were. The "Clear Library" button erases the entire library so you can start from scratch.

▶ Using the Librarian

Catalog your Disks

1. Select **Update** from the File menu. A popup dialog box appears asking you to select the disks you wish to catalog.



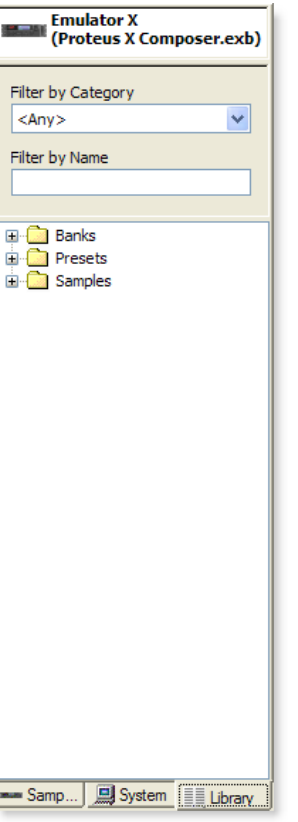
Update	*Updates the Library with the selected items, leaving non-checked targets intact.*
Clear Library	*Erases Library database.*
Add Location	*Allows you to manually select targets to speed update time or select network drives to catalog.*

2. Select any disk drives that contains the banks, presets and samples that were included when you installed the Emulator X application. Using the **Add Location** button, you can select network drives to add to the Library catalog. The Add Location button also allows you to select specific folders or locations for cataloging.
3. Click the **Update** button to begin cataloging. The display will read: "Updating". This process may take a minute or two depending on how many files need to be cataloged.

Find your Files

4. Select the Library tab at the bottom of the Tree. All Emulator X Banks, Presets, or Samples can now be accessed here.

Tip: *You can add Category tags to your own presets and samples by Right-clicking on them.*



5. Select a **Category** of presets from the list. Presets have a three-letter prefix denoting the type of sound. (bs = bass, kb = keyboard, etc.) Select **Any** to select all cataloged files.
6. Browse through the Bank, Preset, and Sample folders to find the sounds you want.
7. Click on the Bank, Preset, or Sample **folder** to view the entire folder contents.

Load your Files

8. To add a file to the bank, **Left-click and Drag** the desired Bank, Preset or Sample in the Library over the Emulator X icon at the top of the tree and release the mouse button. The file is added to the bank.

Much More!

Now that you've had a brief tour of the Emulator X2, read the complete Emulator X2 pdf manual on CD-ROM to learn everything else you need to know. You've just read the first three chapters of the manual, which is probably enough to get you started. Have fun!

Chapter 4 - Multisetup/Global Controls - Multisetups allow you to store a snapshot of the current MIDI channel to Preset setup for 64 channels.

Chapter 5 - Voices and Zones - The Preset Editor is where samples get assigned to the keyboard (keymaps).

Chapter 6 - Voice Processing - The Voice Editor is the synthesizer portion of the instrument.

Chapter 7 - Editing a Sample - The raw samples can be looped and modified using DSP tools.

Chapter 8 - TwistaLoop - This chapter gives you an overview TwistaLoop and shows you how to make multiple synchronized loops.

Chapter 9 - Effects - This chapter gives you an explanation of how to use the effects included with Emulator X2.

Chapter 10 - Controls - This chapter gives you an overview of all the Emulator X controls.

Chapter 11 - From Sample to Preset - Learn how to sample your own sounds and how to use the automatic sampling functions.

Chapter 12 - Synth Basics - Modulation, envelopes, LFOs, filters and much more are covered in this chapter about synthesizer operation.

Chapter 13 - Appendix - This chapter explains how to use the "Emulator File Converter" and the "Emulator X VST" application, as well as all the bits that didn't fit anywhere else.

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