Ivory II • 1

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1 • Welcome to Ivory II

Congratulations on purchasing Ivory II, a comprehensive virtual instrument that reproduces the sounds and expressive capabilities of the world’s finest pianos. Whether you are a first time customer, or a long time owner, Synthogy would like to thank you for choosing Ivory II. Your support has made us the #1 virtual piano in the world, and we are dedicated to keeping Ivory state-of-the-art and the “gold standard” in the industry.

This manual supports all of the Ivory II products, available in the following packages:

- **Ivory II Grand Pianos** contains more than 77 Gigabytes of carefully assembled and extremely detailed, sample recordings of three distinct world-class instruments: a Bösendorfer 290 Imperial Grand, A German Steinway model D nine-foot Concert Grand, and a Yamaha C7 Grand. Each piano can be separately installed, or you can install them all together.

- **Ivory II Italian Grand** samples an exquisite, Italian made, 10 foot Concert Grand. This handcrafted instrument was recorded in one of the world’s great concert halls and brought to life by Ivory II’s powerful virtual instrument technology.

- **Ivory II Upright Pianos** consists of four complete instruments: a brand new Yamaha U5 Upright, a vintage 1914 American made Hume Upright, a 1915 Packard Honky Tonk Barroom Upright, and a Genuine Vintage Tack Piano. Each piano was carefully chosen, and the vintage instruments selected after an exhaustive search among hundreds of vintage uprights. Each of these authentic pianos was recorded with Synthogy’s usual meticulous attention to detail to capture their unique personalities. Each can be installed separately, or you can install them all together.

Ivory II also contains its own custom built playback and DSP engine, which was designed from the ground up to perform the various specialized tasks of reproducing piano performance, as well as those of piano recording production. Ivory II can be played Standalone, or be hosted as a plug-in on every major workstation platform on Macintosh and PC computers.
What’s new in Ivory II?

Ivory II builds on the same award-winning technology as Ivory 1.x, adding a host of groundbreaking new features to achieve even greater levels of realism and musicality. We are particularly excited about the new features Ivory II has to offer, as they represent a combination of requests made by our users over the years as well as things we have long envisioned for the products. Let’s discuss a few of them here.

**Sympathetic String Vibration** is what occurs in real pianos when the harmonics of an un-damped string are excited and resonate with the energy produced by striking another key. Importantly, those harmonics only sound when the struck key is harmonically related in pitch, which is why we say the un-damped string vibrates or resonates in ‘sympathy’. It is a complex phenomenon in acoustic pianos that has long been sought after by digital piano emulation. Realistic recreations of both the sound and the behavior of Sympathetic String Resonance have proved elusive for the virtual world… until now.

Synthogy’s **Harmonic Resonance Modeling** technology represents a true breakthrough for realistic Sympathetic String Resonance in a virtual piano. Harmonic Resonance Modeling is not based on sampling, but rather on a new DSP technology that excites the harmonics of the held, un-damped notes, just as in a real piano. Only notes struck that are harmonically related will cause the notes held to ring “in sympathy”, and because the actual harmonics of the notes held are being excited, the sound and imaging is completely natural. Additionally, the amount of harmonic ringing also varies naturally with the dynamics of your playing: strike a note harder and overtones on the held notes ring louder. Strike a different note that is harmonically related and excite different overtones in the same held note. Ivory II’s **Sympathetic Resonance** feature brings our virtual pianos to life in a whole new way, as expressive and interactive as the real thing.

Another major enhancement to Ivory II is the greatly **Expanded Sound Library**. Starting from the foundation of our world-class sample recordings, each of Ivory’s pianos has been expanded to include up to 18 velocity levels. These new velocity levels are further enhanced through the use of our Advanced Timbre Interpolation technology, for ultra smooth velocity response and unsurpassed playability.
In addition to the primary recordings, Ivory II provides an enhanced set of **Release Samples** for each key. These Release Samples were originally recorded by both velocity and note duration, and Ivory’s engine triggers them in the same way. The result is the most natural and realistic key release according to whether the key was released staccato, or at any time during the note’s decay.

Ivory II’s **Soft Pedal Samples** have also been enhanced for more natural ‘una corda’ playing. Additionally, each Ivory piano now has a set of damper **Pedal Noise Samples**, to further provide the most subtle of details to your virtual playing experience.

Additional new characteristic Piano features also include **Half Pedaling** and **Lid Position**. Half Pedaling supports the use of a continuous control damper pedal, rather than just a switch style pedal, to emulate the continuous behavior of an acoustic piano’s damper pedal. If your MIDI controller supports a continuous damper pedal, you can now explore the expressive capability of this style of pedaling by activating this feature on the Session Page.

**Lid Position** is a new feature to the Program page that emulates various positions that a grand piano’s lid may be set to, from fully open, half stick, to fully closed and other positions as well. For Ivory II Upright Pianos, a different set of lid positions are included to address the various lid or front cover options available on vertical pianos.

The Ivory II engine also includes powerful sound shaping features like **Timbre Shifting**, and **Parametric EQ**. Timbre Shifting opens up a whole new sonic palette by allowing you to ‘borrow’ the timbre of a different note, without actually changing its pitch. The Parametric EQ has been added to the EQ section of our Effects page. With an adjustable center frequency, Q and gain, the Parametric EQ provides greater control and flexibility to tweak your piano sound to your taste, or to your mix.

New Session features have also been added, such as **Tuning Tables**, and **Silent Key Velocity**. Tuning tables gives you the ability to create and save alternative tunings for your pianos. Silent Key Velocity allows you to set a threshold under which a sound will not be triggered by your keyboard controller. This is to emulate the action of a real piano, which will not trigger a hammer strike at the softest velocity. Silent Key Velocity can also be used to explore Sympathetic String Vibration, by holding down silent keys and exciting their harmonics with other key strikes, a technique that began to appear in modern music of the 20th century.
For popular music production, Ivory II offers new enhancements to the Synth Layer feature. Several new Synth pad sounds have been added to layer with your pianos, or to play by themselves. In addition, the Synth Layer section of the Program page now offers new ways to shape the sound of those synth pads with the Synth Decay and Synth Release controls.

All of these features and more in Ivory II are now supported with a New Graphical User Interface. While maintaining the look, feel and familiarity of our original Ivory interface, the new Ivory II interface accommodates all of the new features and makes a few key organization changes to greatly enhance ergonomics. The Session Page replaces the old Velocity Page in the interface. The Session Page now includes all Session parameters, including all of the velocity map parameters that were always a part of the Session presets. You’ll also notice a Preferences Page has been added to include user customizable settings. A Navigation Bar has also been added to the top of the interface to quickly and easily move between pages.

All of these new features and more, including every one of Ivory 1.x features are supported in Ivory II. Dozens of new presets are offered which take full advantage of these powerful new enhancements. In addition, all of the Ivory 1.x presets are included. For your older user presets, Ivory II is fully backwards compatible. All of these improvements have been designed and implemented to make Ivory II more flexible, expressive and realistic than ever before. We hope you enjoy playing and recording our instrument!
2 • Installing Ivory II

System Requirements

Minimum Hardware
- 2.0 GHz Dual Core PowerPC G5 or 1.8 GHz Intel Core Duo CPU
- 1.5 GB RAM
- 22 GB free hard drive space (Ivory II Grands)
- 28 GB free hard drive space (Ivory II Italian Grand)
- 22 GB free hard drive space (Ivory II Upright Pianos)
- Hard drive speed of at least 7200 RPM

Recommended Hardware
- 2.5 GHz Dual Core PowerPC G5 or 2.0 GHz Intel Core 2 Duo CPU
- 2 GB RAM
- 77 GB free hard drive space (Ivory II Grands)
- 28 GB free hard drive space (Ivory II Italian Grand)
- 94 GB free hard drive space (Ivory II Upright Pianos)

Macintosh Requirements
- Any AU, RTAS, or VST 2.0 plug-in host, or the included Ivory Standalone application.
- Mac OS X 10.4.11 (Tiger), 10.5 (Leopard), or 10.6 (Snow Leopard)
- DVD ROM drive for installation
- iLok key (not included)

Windows Requirements
- Any VST 2.0 or RTAS plug-in host, or the included Ivory Cantabile application.
- Windows XP SP2 (32 bit), Windows Vista (32 or 64 bit), Windows 7 (32 or 64 bit)
- DVD ROM drive for installation
- iLok key (not included)
Installing Ivory (Macintosh OS X)

Depending on the product, insert the appropriate disk into your DVD drive:

- Ivory II Grands 1
- Ivory II Italian 1
- Ivory II Uprights 1

Double-click the disk icon on your desktop if the window doesn’t come up automatically. Double-click the appropriate installer package for your product:

- Install Ivory Grands
- Install Italian Grand
- Install Ivory Uprights

Follow the instructions in the installer. If a dialog appears telling you that a program will be run to determine if the software can be installed, click the Continue button.

After an Introduction screen, you’ll be prompted to read an informational screen, and to read and accept our license agreement.

On some systems, you may be asked to “Select a Destination” volume. You should select your main system disk at this step. Note that this is NOT where you select the location where the many gigabytes of Ivory’s piano library will be installed. The library data will be stored in an Ivory Items folder which can be located on a different drive. You’ll have a chance to choose this location further on.
The next step is to select an Installation Type. The default choice is “Standard Install” (or “Easy Install” on some systems), which will install all of the plug-in formats, all of the piano libraries, the Standalone application, the presets, and the documentation. If you want to choose which items to install, press the Customize button and make your selection using the check boxes.

Press the Install button (on some systems it may say “Upgrade” on the button) to continue with the installation. At this point, the Installer requires that you type your password. If you don’t have one, check with your system administrator.

If you already have a copy of Ivory installed, a message will appear confirming its current location. Pressing OK to continue is highly recommended, since changing the Ivory Items location will result in Ivory not seeing presets and library files that you already have installed. However the installer provides a chance to install elsewhere if you have a good reason to do so. Note that library files from older Ivory installations are replaced with the new Ivory II libraries.

If this is your first time installing Ivory, the installer will not find an existing Ivory Items folder, and instead will present you with a Choose a Folder dialog box. This is where the large library files will be stored. Choose a disk that is fast and has enough free space. To install the entire
library you’ll need 77 GB of free space for Ivory Grand Pianos, 28 GB for Ivory Italian Grand, or 94 GB for Ivory Upright Pianos.

After the plug-ins and other program data files are installed, you should see the "Install Succeeded" window, but the installation is not yet complete. The main Ivory installer will launch the Ivory Library Installer, shown below. When the next DVD is needed, the current one will eject, and the installer will prompt you and wait for the next DVD to be inserted. Installing the large library files is resource-intensive, and may take up to a few hours to complete, (or more on slower systems).

You may click on the Pause button to temporarily stop the installation process if you’d like to take care of other tasks without bogging things down. Simply click Continue to continue the installation.

When installation is complete, you must authorize your current copy of Ivory. This procedure is described on page 15.
Installing Ivory (PC)

Depending on the product, insert the appropriate disk into your DVD drive:

- Ivory II Grands 1
- Ivory II Italian 1
- Ivory II Uprights 1

If AutoPlay is enabled on your system, Ivory’s main installer will start running automatically.

In some systems you may be presented with a choice to “Open folder or view files”, or “Explore” this disk. Choose either of these options to view the disk’s contents. Once the disk window is open, double-click the appropriate installer package for your product:

- Install_Ivory_Grands.exe
- Install_Italian_Grand.exe
- Install_Ivory_Uprights.exe

**Note**: On some systems, the .exe extension may not be visible, but the installer package will be easily recognizable by the Install Ivory icon shown above.

If User Account Control is enabled on your system, you may be asked to “Allow” or “Cancel” running this installer. You can safely choose “Allow” to proceed with the installation.

The first thing the installer will ask is to choose a language. Currently, your choices are English and French.

Next you’ll be prompted to read a short welcome message, followed by important notes on this product. You will then be prompted to read and accept our license agreement before proceeding with installation.
Next the installer will present the Select Components screen. For a default installation, press the Next button. Otherwise, you may choose to deselect various components from this installation in order to save drive space.

The installer will now confirm your selections from the previous page. If you would like to make changes, you may press the Back button. Otherwise, press Next to proceed.

If you already have a copy of Ivory installed, a message will appear confirming its current location. Pressing OK to continue is highly recommended, since changing the Ivory Items location will result in Ivory not seeing presets and library files that you already have installed. However the installer provides a chance to install elsewhere if you have a good reason to do so. Note that library files from older Ivory installations are replaced with the new Ivory II libraries.

If this is your first time installing Ivory, the installer will not find an existing Ivory Items folder, and instead will present you with a Choose Libraries Destination dialog box. This is where the large library files will be stored. Use the Browse button to choose a disk that is fast and has enough free space. To install the entire library you’ll need 77 GB of free space for Ivory Grand Pianos, 28 GB for Ivory Italian Grand, or 94 GB for Ivory Upright Pianos.

The installer may ask you to locate specific folders that it needs to find in order to properly install the plug-ins that you’ve specified.
VST host programs only:

VST host programs (such as Cubase, Nuendo, Sonar, and Cantabile) require VST plug-ins to be installed into a special folder. In most cases a VST host program accepts plug-ins installed in the folder `C:\Program Files\Vstplugins`.

If you want to use Ivory in more than one VST application, manually copy the plug-in dll file, which you have installed into the chosen folder, to the appropriate VST-compatible host application folder. For example, Cubase VST hosts VST plug-ins in its Vstplugins folder. Cubase VST 5.0 can also host plug-ins in a shared folder called Shared VST Plug-ins Folder. This folder is usually located at `C:\ProgramFiles\Steinberg\Vstplugins`.

In any case, in order to install the Ivory plug-in in other VST compatible programs, you should refer to the particular program’s user guide.

A note about 64-bit Windows: By default, the installer will install 64-bit Cantabile and Ivory VST into the main `C:\Program Files\Synthogy` directory. You will also have the option to install a copy of the 32-bit version of the Ivory VST plug-in at a location of your choice, or you can accept the default location `C:\Program Files (x86)\Vstplugins`. This is intended for plug-in hosts that do not run natively in 64-bit, and is not recommended if you run everything natively in 64-bit. Generally, these non-native plug-in hosts will be located in `C:\Program Files (x86)`. It’s a good idea to keep all your 32-bit plug-ins and programs in here, separated from the 64-bit plug-ins and programs in the main `C:\Program Files` directory.
After the plug-ins and other program data files are installed, the Ivory Library installation starts. When the next DVD is needed, the installer will prompt you to change disks and press OK to continue the installation. Installing the large library files is resource-intensive, and may take up to a few hours to complete (or more on slower systems).

You may click on the Pause button to temporarily stop the installation process if you’d like to take care of other tasks without bogging things down. Simply click Continue to continue the installation.

When installation is complete, you must authorize your current copy of Ivory. This procedure is described in the next section.
Authorizing Ivory

After you install Ivory, you will need to authorize your current copy before you can use it. Ivory uses the iLok smart key for authorization. Since many products use iLok for storing software licenses, you may already have an iLok key. If not, you will need to purchase one to use with your installation of Ivory.

Once you’ve registered the key and stored your Ivory license on it, you can run Ivory on any compatible computer that has your iLok key plugged into a USB port. This means that you may load Ivory on more than one computer, though you can only use it on the one that currently has your authorized iLok key plugged into it.

Note: A “not authorized” message will be displayed in the Keyset field if you try to load a piano keyset without using the iLok key.

To authorize Ivory II, here’s what you need to do:

1. If you have not done so already, purchase an iLok key. Many music instrument retailers sell them, and they are also available at www.iLok.com.

2. Create an account at www.iLok.com if you don’t already have one. You can do this before you obtain a key.

3. Go to the Synthogy Registration page: www.synthogy.com/register/

Use the Ivory serial number printed on the inside cover of the printed version of this manual to register your product.

Note: If this is an Ivory II Upgrade, you will also be asked for your previous Ivory version 1 serial number for the same product.

4. When you have completed the steps on the Ivory Registration page, click on the link to go to www.iLok.com.

If you are using a new iLok key, you must click the “Add new iLok” button to add your key to your iLok account. (Be sure to install the iLok Client Software and iLok Driver from the Download page on iLok.com.)

5. Log in to your iLok account. If your registration was successful, you should see a message that says “You have a new license available.” Click on the button that says “Download to iLok” and follow the instructions to download your Ivory license to your iLok key.

6. Logout of www.iLok.com. You are now ready to run Ivory II.
3 • Playing Ivory II

Now that you have successfully installed and authorized Ivory II, you can begin to enjoy playing Ivory’s pianos. Ivory II can be played from a variety of host applications as a plug-in from many of the popular DAW applications on the market. Another convenient way to play Ivory is using the Ivory Standalone application.

In fact, the quickest way to launch and play Ivory II is to use the Ivory Standalone application. Ivory Standalone (Mac) or the PC standalone app, Ivory Cantabile, was installed on your computer along with the rest of your Ivory II software and is a simple, but effective, application that allows you to get straight to the business of playing Ivory II. It has all the features you need to configure your audio and MIDI devices to play Ivory, either on a Mac or a PC. Once configured, Ivory Standalone or Ivory Cantabile will be one of the fastest and most CPU-efficient means to launch and play Ivory on your system.

To run Ivory Standalone from your Macintosh computer, see Chapter 4 on page 19.

To run Ivory Cantabile from your PC computer, go to Chapter 5 on page 25.

Alternatively, you may wish to play Ivory as a plug-in from a DAW application such as Apple’s Logic or Garage Band, Avid’s Pro Tools, Steinberg’s Cubase/Nuendo, MOTU’s Digital Performer, Ableton Live, or Cakewalk’s Sonar. Consult your DAW’s user documentation for details on how to instantiate instrument plug-ins.
4 • Ivory Standalone (Macintosh)

Ivory Standalone is an application that allows you to get straight to the business of playing Ivory II! It has just enough features for you to configure your audio and MIDI systems. There is also a handy practice metronome.

Ivory Standalone is installed in your Applications folder, and it uses the Ivory Audio Units plug-in. These were installed into their proper locations by the Ivory II installer. You can feel free to move the Ivory Standalone application to another folder.

Ivory Standalone is a Universal Binary program, and can run on Intel-based Macintosh computers or PowerPC-based Macintosh computers running OS X 10.4 (Tiger) or later.

Running the program for the first time

When Ivory Standalone is launched, the Ivory II plug-in will appear in the main window. The first time Ivory Standalone is run, it does not have any knowledge of your current audio driver or MIDI driver. You will need to use the MIDI > Device… and Audio > Device… menu choices to set up your MIDI and Audio system.

Ivory Standalone menus

The Ivory Standalone menu

<table>
<thead>
<tr>
<th>Ivory Standalone</th>
<th>MIDI</th>
<th>Audio</th>
</tr>
</thead>
<tbody>
<tr>
<td>About Ivory Standalone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Services</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hide Ivory Standalone ⌘H</td>
<td>H</td>
<td></td>
</tr>
<tr>
<td>Hide Others ⌘⌥H</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Show All</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quit Ivory Standalone ⌘Q</td>
<td>Q</td>
<td></td>
</tr>
</tbody>
</table>

This menu has many of the usual choices for an application, including About and Quit.
About displays a dialog box with version and copyright information.

**Note:** The version number refers to the Ivory Standalone version, not the plug-in version.

Quit will exit the program.

**The MIDI menu**

There are 4 choices in the MIDI menu:

Channel: This is a popup menu where you choose which MIDI channel will be seen by Ivory II. You can choose 1 MIDI channel (1-16) or “any”.
Controls: This dialog box enables you to change certain Ivory II parameters using MIDI Continuous Controls. For example, you could “map” the Ambience Wet/Dry parameter to the mod wheel on your keyboard. To do this, select the Ambience tab in the dialog box, then select “1 Mod Wheel” for the Wet/Dry parameter. You cannot map multiple parameters to a single MIDI controller, and if you try, you will get a warning message, and you will have to select a different controller for one of your parameters.

Ignore All Notes Off: Some older MIDI controllers and sequencers, such as those made by Roland, will send a MIDI “All Notes Off” message when no notes are being held, even if the sustain pedal is still held. If you find that Ivory II doesn’t seem to sustain properly, select this menu item.

Device…: The first time that Ivory Standalone is run, you should select this menu item and choose your MIDI input port. After the device has been selected, the information is stored in the preferences, so the next time Ivory Standalone is used, you will not need to select it again (unless your old choice is unavailable).

The Audio menu
There are 2 menu items in the Audio menu:

**Device:** The first time you run Ivory Standalone, select this menu item and pick your audio output device using the dialog box. In the Audio Device dialog box, choose the appropriate Output port. There is also a buffer size control which can be adjusted to control the latency. Choose the lowest setting that works without causing audio distortion, clicks, pops, etc. Note: The buffer size control is “dynamic.” When you select an Audio Device, the Buffer Size menu changes to show only the available sizes. If you are using an audio device with multiple output pairs, the channels option will let you select the output pair you wish to use.

After the device has been selected, the information is stored in the preferences file, so the next time Ivory Standalone is used, you will not need to select it again (unless your old choice is unavailable).

**Control Panel:** Selecting this option will launch the Control Panel for your selected device as supplied by the manufacturer. In the case of "Built-in Audio," this will be the "Audio MIDI Setup" application.
The Metronome menu

There are 3 menu items in the Metronome menu:

Start / Stop: Choose this menu item to Start or Stop the metronome. Command-T also works as a shortcut to start and stop the metronome.

Adjust: This modeless dialog box enables you to set Metronome Parameters. The first parameter is Tempo, of course. The other parameters allow the user to change the metronome sound. Assuming that you have selected a GM compatible synthesizer as your metronome device (such as the built-in DLS Synth), then the default parameters will let you hear a
Sidestick triggered on MIDI channel 10, the drum channel. If you choose a different synth as your metronome device you might want to adjust these parameters to trigger a reasonable click sound.

Device…: This dialog box enables you to select which output port will be used for the metronome. By default the built-in synth is chosen, but you can route the signal to an external MIDI port as well.

The Window menu

The Window menu has the standard Macintosh choices.
Ivory Cantabile (pronounced kahn-TAH-bih-lay), a special version of TopTen Software’s Cantabile application, lets you get straight to the business of playing Ivory! Ivory Cantabile is made specifically for Synthogy, and has many of the same features as Cantabile, but is streamlined enough to serve as a simple stand-alone host for Ivory in Windows. (Note: Ivory Cantabile replaces the old Ivory Standalone application, which is no longer included or supported.)

**Installation**

Ivory Cantabile is installed in the folder C:\Program Files\Synthogy\Ivory and loads the Ivory VST plug-in located in C:\Program Files\Synthogy\Vstplugins. The Ivory Cantabile application and the Ivory VST plug-in will both work natively in either 32-bit or 64-bit Windows.

**Running the program for the first time**

Launch Ivory Cantabile from Windows Start menu:

All Programs > Synthogy Ivory > Ivory Cantabile

Following a splash screen with the Synthogy, Ivory, and Cantabile logos, the Ivory Cantabile application window will open. The first time the program is run, it does not have any knowledge of your current audio driver or MIDI driver. The Quick Configure dialog window will be displayed, where you’ll be able to select an audio driver, one or more MIDI devices, and the location of your VST plug-ins folder.
The Quick Configure dialog

![Quick Configure dialog](image)

**Select Audio Driver**
When selecting the audio driver, you may see various driver options, including ASIO, MME, DirectSound, etc. In general, it is best to choose an ASIO driver, as the other types of drivers do not tend to perform as well as ASIO drivers.

**MIDI Ports**
Check the boxes next to any MIDI input/output devices you wish to use.

**VST Plugins Folder**
You shouldn’t need to make any changes to this setting, but if necessary, you can click the Browse button and select the folder where the Ivory VST.dll can be found. Ivory Cantabile defaults to this folder for the Ivory plug-in: C:\Program Files\Synthogy\Vstplugins.
The Options pages

If you need to change any of the selections you made in the Quick Configure dialog, or if the Quick Configure dialog does not appear, you can make changes within the Options pages of Ivory Cantabile. Click on the Setup tab, and use the Audio Engine Options, MIDI Devices, or Plugin Options buttons to access the desired Options page.

Audio Engine Options

On the Audio Engine Options page, you can select the Audio Driver, assign the Audio Channels, change the Sample Rate, and access the Control Panel for the selected audio driver. If you are hearing a lot of delay between pressing a key and hearing the note (this delay is known as latency) try reducing the buffer size within the Control Panel for your audio driver. The Audio Engine Options page displays the approximate latency you should expect, based on the current settings.
MIDI Devices

On the MIDI Devices page, you can select MIDI input and output devices by checking the box next to the device(s) you wish to use.
Plugin Options

It shouldn't be necessary, but you can change the folder that Ivory Cantabile looks in for the Ivory VST.dll file on the Plugin Options page.

Playing piano with Ivory Cantabile

When Ivory Cantabile has been configured, and is running normally, you will see the Ivory interface in a window within the application. No sound is loaded by default, so to play piano, you'll need to load an Ivory Program from the Program Preset box in the upper right corner of the Program page. If you save the Ivory Cantabile session when you quit the application, it will load automatically the next time you launch Ivory Cantabile. Startup preferences may be found by clicking the Setup tab > Plugin Options > Startup/Shutdown.
Cantabile User Guide and Website

For further information on these and other features in Ivory Cantabile, including Metronome settings, Recording options, MIDI controls, MIDI filtering, etc., refer to the Cantabile 2.0 User Guide, available from the Windows menu:

All Programs > Synthogy Ivory > Ivory Cantabile User Guide

Within Ivory Cantabile, you can view the User Guide by clicking on the question mark icon in the upper-right corner of the window, or by pressing F1.

For more information about Cantabile from Topten Software, visit them online:

http://www.cantablesoftware.com

http://www.toptensoftware.com
6 • Ivory II’s Structure and Controls

The Ivory II interface consists of four screens or pages for accessing and editing performance parameters. These pages are the Program Page, the Session Page, the Effects Page and the Preferences Page. The Ivory II interface also now features a Navigation Bar, which is common to all pages.

The Navigation Bar, or Nav Bar, is located at the top of each page, and allows you to quickly and easily access any of Ivory’s pages with a single mouse click. To access any page, simply click on that page in the Nav Bar. That page will be highlighted in the Nav Bar to indicate that the page is currently selected.

The Program Page is highlighted in gold, because it is the primary page in Ivory II’s interface. It is the first page you will see when you launch Ivory II, and the Program Page is also where you will select your piano sounds and set major performance parameters. It is also where you save and load your Program presets.

A Program Preset in Ivory contains all of the parameters that define the piano you are playing. It consists of a set of samples of a given piano, or “Keyset,” along with settings for Release samples, Soft pedal samples, Pedal noise samples, Resonance parameters, and settings for dynamic range, keynoise, timbre, etc. The Program preset also includes whatever Effects preset you have chosen on the Effects page.

The Session Page is new to Ivory II and contains a host of performance related parameters, such as half pedaling, tuning and transposition, master gain, polyphony limit, tuning tables, and silent key threshold. The Session Page is also where you save and load Session Presets.

Session Presets in Ivory II contain all the aforementioned parameters on the Session Page, as well as storing which Program preset is currently selected. Additionally, Session Presets store the Velocity Map selection. The Velocity Map selection, and all of the parameters for the Velocity Map preset are also located on the Session Page.
The Effects Page is where the Ivory’s Effects parameters are located. It is also where you can save and load your Effects Presets. Effects Presets are a snapshot of the settings on the Effects Page, and their settings include 3 bands of EQ, chorus, and ambience.

The Preferences Page is a page reserved for user customizable settings for the plug-in.

Ivory II Presets

Programs, Sessions, Effects Presets, and Velocity Map Presets are all small files that are stored in the “Ivory Items” folder, located on the same drive and folder where you installed the sample data.

The Preset hierarchy in Ivory is such that Session presets include Program preset selection, and Program presets include Effects preset selection. This hierarchy is represented in the following graphic:
Controls

Ivory contains several types of intuitive controls:

Selectors are drop-down menus, which allow a selection from a list.

On-Off buttons enable or disable functions with a single click.

Toggle switches alternate between two states with a single click.

The Save and More buttons are actually small drop-down menus that handle file management.

Rotary knobs set continuous parameters. There are two ways to move a rotary knob, radially, or linearly, depending on which mode you choose on the Preferences Page.

Radial: Click on the dot where you want to set the control or drag the cursor in a circular motion

Linear: Click on the knob and drag the mouse vertically or horizontally

When you select radial movement, click on the spot on the knob’s travel you would like it to move to, or click and drag the cursor in a circular motion around the knob. Moving the cursor outward from the knob as you move in a circular fashion will give you finer resolution control.

When you select linear movement, click on the knob and drag the mouse up, down, or to either side to change the value.

Rotary knobs all have, as an alternative, an accompanying text box where you can directly type parameter values. The value is entered when you press the Enter key. In some cases, there are a limited number of values that a parameter can have, and if you type in a value that is between two
of these values, it will be rounded up or down. For example, the Key Noise parameter in the main screen is only adjustable in 0.5 dB increments, so if you type in “0.3”, it will be rounded up to 0.5.

Knob tracking can be overridden by VST hosts in the Ivory VST plug-in, including Ivory Cantabile on PC. The current tracking type is always reflected in the Knob Tracking setting on the Preferences page.
7 • The Program Page

Program functions

Programs are the primary objects you will use in Ivory II to call up and play sounds. They have been specially created to take advantage of Ivory II's samples and features in the most musically useful fashion. The Program Preset selector menu is located in the upper right hand corner of the Program Page.

When you first instantiate Ivory II, the Program selector will say “Default,” which is an empty program that makes no sound. To select a Program preset to play, click on the Program selector:

Then make your selection from the displayed browser.
The Ivory II Browser

You will select Programs, Sessions, Effects, and Velocity Map presets from the browser. Once selected, your chosen Program preset name will also appear on the “fallboard” of the piano graphic.

Here’s an example of a Macintosh program browser:

![Macintosh Program Browser](image)

Here’s an example of a Windows effects browser:

![Windows Effects Browser](image)

The Ivory II presets are sorted into categories. Factory presets are separated from user-created presets. Factory programs are further organized by piano model. Also included are the original Ivory 1.x presets in their own folder. Ivory II factory effects are organized by effects type.
Program Options

Once your Program is loaded, you will see a Keyset appear in the Keyset selector, which is located in front of the lid of the 3D piano graphic.

(Note that Keysets can be quite large, and may take 5 or 10 seconds to load.) Keysets are a collection of source piano sample key mappings, such as Bosendorfer 16 Level, a Bosendorfer Imperial Grand sample Keyset with 16 velocity switched dynamic levels.

There are complete lists of Ivory II Grand Piano Keysets in Chapter 14 (page 77), Ivory II Italian Grand in Chapter 15 (page 81), and the Ivory II Upright Keysets in Chapter 16 (page 83).

The buttons to the right of the Keyset selector turn on and off the Release Samples and Soft Pedal Samples that are associated with the selected Keyset. Turning the Release Samples on makes for a more realistic piano performance and is one of the unique features of Ivory II. The Soft Pedal Samples are used for “una corda” playing, and also add significantly to the sense of realism. You must use a separate footswitch sending MIDI Controller 67 to engage the soft pedal samples.

To the left of the Keyset selector are the controls for Pedal Noise. Pedal Noise is a set of damper pedal noise samples that can be selected to add another element of acoustic realism to your piano playing experience. The knob allows you to adjust the gain of the samples and select the amount of pedal noise you want to hear in your mix.

Also, if you are using a continuous damper pedal on your MIDI controller for Half Pedaling, the volume of Pedal Noise samples will be controlled by the “velocity” by which you depress the pedal. Though there is no special MIDI function for this, Ivory II’s software detects the continuous damper information in real time and scales it appropriately to the pedal noise volume. Note: The Half Pedaling feature must also be enabled on the Session Page to control the volume of the Pedal Noise in this manner.
Above the Pedal Noise controls are the Resonance controls. This includes the Sustain Resonance and Sympathetic Resonance features.

**Sustain Resonance**

At the upper left of the screen is the drop-down menu for selecting Sustain Resonance. Sustain Resonance is a DSP function that realistically simulates the resonances in a piano created by the “harp” and the soundboard when the Sustain Pedal is pressed and all of the dampers are raised off the strings. Ivory II offers several Sustain Resonance models to choose from, the character of which varies from dry and clean to highly resonant:

- Clean Soundboard 1
- Clean Soundboard 2
- Medium Resonant 1
- Medium Resonant 2
- Extra Resonant 1
- Extra Resonant 2
- Clean Upright 1
- Clean Upright 2
- Medium Upright
- Resonant Upright 1
- Resonant Upright 2

Each of the factory Program Presets has a particular Sustain Resonance chosen for it, but you can also experiment matching different Sustain Resonances to different Keysets.

**Sympathetic Resonance**

Just below the Sustain Resonance are the controls for Sympathetic Resonance. Engaging this feature activates Synthogy’s exclusive Harmonic Resonance Modeling, a DSP function which emulates the phenomenon of sympathetic string vibration. Sympathetic string vibration is the characteristic of real pianos to produce overtones or harmonics of an undamped string that can be excited and resonate with the energy produced by striking another key. When turned on, each held note in an Ivory II piano will respond dynamically to resonate, or ring, “in sympathy” whenever a harmonically related note is struck.

The knob gives you control of the amount of Sympathetic Resonance you will hear with your piano. The range is +/- 12 dB.
Sound Characteristic Knobs

To the right of the Sustain Resonance feature are six knobs for adjusting the piano sound’s characteristics.

The **Release** knob scales the Release time of the pianos by the displayed factor (from 0.2x to 3.00x), making the release longer or shorter as desired.

**Key Noise** changes the balance between the mechanical noise of the piano keys and hammers, and the sound of the strings. At 0 dB, the Key Noise sounds at the level it was recorded. The range is +/- 24 dB.

The **Timbre** knob controls the overall brightness of the sound by introducing a dynamically-controlled low-pass filter. At 0, the sound has an optimal default velocity to filter response. Negative values make the piano sound duller, while positive values make it brighter. The scale is –99 to +99. At the maximum value +99, the filter is wide open, and the sounds play as originally recorded.

The **Dynamic Range** knob sets the overall dynamic range of the piano from 0 to 60 dB. It works in conjunction with the parameters on the Velocity page (below). The setting here determines the difference in loudness from the minimum key velocity to the maximum key velocity. For classical solo piano, this control would normally be set higher. For rock piano in a complex mix, you may wish to set the control lower.

The **Trim** knob is new to Ivory II and provides a fine gain control of the sound elements on the Program page, before the signal reaches the effects.

The **Stereo Width** control sets the perceived width of the piano’s image in the stereo field, from 0% (mono, centered) to 100%.

Just below the Stereo Width control is the **Stereo Perspective** switch. Formerly part of the Session, Stereo Perspective is now a part of an Ivory Program, and allows you to reverse the stereo image of Ivory II’s piano. When the switch is set to Performer, the lower notes of the piano are on the left side of the stereo image. When it is set to Audience, the lower
notes are on the right side. Used in conjunction with the Stereo Width control, Ivory II offers you many possibilities for your piano’s imaging.

To the left of the Stereo Perspective switch are the **Lid Position** selector and the **Timbre Shift** control.

The **Lid Position** Selector provides the choice of settings that emulate the various positions that a piano’s lid may be set to. For a grand piano, the options are:

- **Full Stick** classic fully open position for a grand piano
- **Half Stick** a shorter stick that opens the lid about half way
- **Short Stick** a very short ‘stiletto’ style stick that props the lid open a small amount
- **Closed Lid** lid completely closed
- **Flap Open** lid closed, but with front flap open and music rack up

For Ivory II Upright Pianos, the Lid Position choices are different, emulating the various lid or cover options available on vertical pianos. The Lid Position options for Uprights are:

- **Open** Front cover off and top lid open
- **Top Only** Top lid only open (front cover on)
- **Front Tilt** Top lid closed, front cover on, but tilted open
- **Closed** Front cover on, closed, and Top lid closed

The **Timbre Shift** control is also new to Ivory II. Timbre Shifting is a powerful sound shaping feature that allows one the ability to ‘borrow’ the timbre of a different note, without actually changing its pitch. That is, by performing pitch shifting and transpose simultaneously, and in opposite directions, one can effectively shift the timbre up or down the keyboard without changing pitch. Positive values will brighten the piano sound, while negative values will dull the sound. The range is +/- 24 semitones. [Note: positive values may increase CPU and other resource loads.]
The Synth Layer

On the right hand side of the Program Page are a series of controls for selecting and modifying Ivory II’s Synth Layer feature.

The **Synth Layer** sound doubles the piano sound, and provides an easy way of creating the layered keyboard textures used in pop music. The Synth Layer selector menu offers a variety of Synth sounds, and Ivory II includes some new Synth sounds to choose from. The layer can be instantly turned on and off with the button just above the selector.

In addition there are some new control options for the Synth Layer in Ivory II. **Synth Transpose** allows you to transpose the Synth Layer in octaves, independently from the Piano. The range is +/- 2 octaves. A classic setting would be having the Synth layer up 1 octave from the piano.

**Synth Decay** and **Synth Release** are two new envelope controls for the Synth Layer in Ivory II. The Synth Decay knob provides a means to adjust the decay of the Synth Layer envelope. The displayed value scales the decay time by a multiplier (from 0.2x to 3.00x). Smaller values shorten the decay, while larger values lengthen it.

Likewise, the Synth Release knob scales the Release time of the Synth Layer envelope by a multiplier (from 0.2x to 3.00x). Smaller values shorten the release time, while larger values lengthen it.

The **Synth Gain** knob adjusts the relative level of the Synth layer. The range is +/-24 dB,
Creaks & Clunks layer  
(Ivory II Upright Pianos only)

Ivory II Upright Pianos lets you add authentic, creaky, old upright noises to your upright piano mix or performance. To add Creaks & Clunks, select a Creaks & Clunks keyset from the Synth Layer menu, as you would any of the synth sounds.

There are 2 Creaks & Clunks keysets, and each works in a different way:

The first keyset in the menu (after the list of Synth keysets) is called Creaks & Clunks. This is a straight-ahead mapping of all of the various noises that were recorded from the pianos. They are laid out on 88 keys, with the following mapping convention. All of the black keys on the keyboard have individual samples (creaks, clunks, thuds, scrapes, squeaks, etc.) assigned at their 'root' or original recorded transposition. The samples may be stretched a semitone higher or lower depending on the space on the keyboard. The lowest 4 notes on the keyboard, A0-C1 (using middle C = C4 as a convention) have 4 additional individual samples assigned to them.

Because there is a sound assigned to each key, this first keyset is not really designed to be played along with a piano like the other Synth layers. You can do it if you wish, but there will probably be too many noises going on to sound realistic. Instead this keyset is better used when you can play it by itself. You can solo it by selecting 'No Piano Keyset' for your piano. Then add the noises you want in the performance by selectively playing them to a separate track in your sequence.

The second Creaks layer, Random Creaks & Clunks, is designed for live performance. This keyset contains a subset of the noises from the first keyset with a different mapping. This mapping is effectively a 'random' mapping, whereby the incoming note message gets randomly triggered to a different noise (or perhaps no noise at all, to leave some 'space' in the mix). In addition, the noises will also be randomly delayed before the noise is triggered, so that not all of the noises will happen on the initial attack of the key. Your piano sound, meanwhile, just continues to play normally, of course.

The intent of the Random Creaks & Clunks layer is to mix it with one of the old Upright pianos and play it live, in real time. The randomizing effect of the noises with the random delays is very much like having the experience of sitting behind a creaky, 100 year-old upright and having it make noises, in a somewhat unpredictable fashion, just as the real instrument would.
MIDI control of Random Creaks & Clunks
(Ivory II Upright Pianos only)

There is one additional, important feature of the Random Creaks & Clunks layer. You actually have a means to control the randomization sequence! That is, while recording a MIDI sequence with your creaky piano and randomly triggered and delayed noises, you may want to have that exact performance repeated, every time you play back that sequence. There is a way to do this using a specific MIDI controller value at the beginning of your sequence track. Here is how it works.

By using MIDI continuous controller (CC) #119, you can simultaneously select a particular sequence of random values and reset the randomizer to the beginning of that sequence. You get a total of 128 sequences to choose from if you really want to explore all of the randomizer sequences. These are selected by choosing to transmit a value between 0 through 127 with MIDI CC #119. So, for example, sending a value of 0 (which is the default value) will set the randomizer to the beginning of sequence 0, a value of 1 sets it to the beginning of sequence 1, all the way up to 127. Resending the same value simply resets the randomizer to the beginning of that sequence.

There is a second way to reset the randomizer as well. Toggling the synth layer off and on will also reset the randomizer to the beginning of the current sequence.

With either of these methods, the same sequence of noises will then be triggered in the same way for a given MIDI track. But remember, this is only if the same note data is played. If different note data is played, of course the randomizer will be triggered in a different way. But for the case of a recorded MIDI track, you can reproduce your results using the MIDI CC #119 control values as described.
Diagnostics

Ivory II’s Diagnostic features can help you determine whether your audio and MIDI connections are working:

In the lower left hand corner of the Program Page (and every page in Ivory II’s interface) is a MIDI indicator light. If you have MIDI being successfully received by Ivory II, then this light will flash accordingly. If you are sending MIDI and this indicator does not light, please check your MIDI connections and settings.

Another helpful diagnostic feature in Ivory II is the ability to play sound directly from the Program Page by clicking on the Keyboard of the Piano Graphic Model. Clicking on the Keys of this graphic will play notes on the currently selected Program or Keyset. Clicking closer to the fallboard of the piano plays the notes softer, while clicking further to the edge of the keys will play them louder. Holding the mouse button down after clicking will sustain the current note played.
8 • The Session Page

Click on the “Session” button in the Ivory II Navigation Bar to bring up the Session Page.

Here you can save and load Session Presets that contain the current Program preset selection and the host of performance related parameters found on the Session Page. Among these parameters are half pedaling, tuning, transposition, master gain, polyphony limit, tuning tables, and silent key velocity threshold. On the Session Page you can also adjust the velocity response of Ivory to suit your MIDI controller and your individual taste, and save your settings as a custom Velocity Map.

The Session Preset selector is located at the top center of the Session page. Clicking on the Session selector brings up the Session browser. There are no Factory Sessions other than “Default”, which is a basic template. The reason for this is that Sessions tend to be tailored to your particular system, or a given song or project. You can save and load your custom settings as User Session presets with the Save and More buttons.
Working down the left hand side of the page, we have the **Memory Use** parameter. This feature was formerly called “Buffer Size” in Ivory 1.x and controls the overall performance of Ivory by adjusting the amount of RAM used by the program to generate notes. The choices of settings are Small, Medium, or Large. Slower computers will usually need to use a larger RAM buffer, while faster computers can use a smaller buffer. When you change this parameter, the Keyset has to re-load so it will take a few seconds. This setting does not affect latency. (For more information on performance issues see Chapter 12 on page 63.)

The **Voices** control sets the number of stereo voices (“polyphony”) available to Ivory II. It is adjustable from 4 to 160, in increments of 4. The more voices assigned, the greater the load on the hard drive and CPU.

Polyphony is assigned using a highly sophisticated algorithm that weighs the start time, duration, and envelope of each note, to be as unobtrusive as possible when it has to “steal” voices. The default value is 24. If you have a fast CPU and hard drive, and you plan to use lots of sustain pedal and big chords, you can increase the number of voices. If you have an SSD (Solid State Drive) running on a fast bus like SATA, USB3, or Thunderbolt, you can probably set your voice count to the maximum.

Beneath the Voices control is the Half Pedaling control. Turning the button to “on” activates the Half Pedaling feature in Ivory II that emulates the continuous behavior of an acoustic piano’s damper pedal. If your MIDI controller supports a continuous damper pedal, you can now explore the expressive capability of this style of pedaling.
Next we have a series of tuning and transposition controls. **Octave** and **Transpose** modify the MIDI data as it comes into Ivory. The Keysets themselves are not altered in pitch. The range of the Octave control is ±4 octaves, and the range of the Transpose control is ±11 semitones.

**Fine Pitch** adjusts the pitch of the pianos and is calibrated in Cents, or 1/100ths of a semitone. The range is ±99 cents.

**A4 Pitch** sets the pitch of the A above middle C. This value defaults to 440.0 Hz, but some recording or performance situations may require a different reference pitch. The range is 420.0 to 460.0 Hz. The A4 pitch and the Fine Pitch controls work in conjunction with each other.

**Silent Key Vel** is a new feature to Ivory II that provides the ability to set a MIDI velocity value below which a note will not sound. This Silent Key Velocity threshold is used to simulate the action of a real acoustic piano, which will not trigger a hammer strike at the very softest velocities. Because MIDI keyboard controllers are all different in their response, you’ll want to set this threshold to your personal taste should you decide to make use of this feature. Setting the value to zero will play a note at all velocities.

Silent Key Velocity can also be used to explore the Sympathetic String Vibration feature. By holding down silent keys and exciting their harmonics with other key strikes, some interesting tones and sounds can be produced, a piano technique that began to appear in modern music of the 20th century.

The **Tuning** switch selects between two methods of tuning a piano: Equal-tempered and Stretch. In Equal temperament, the frequency of each note is a precise ratio higher than the note below it. The ratio between half-steps is the 12th root of 2, or approximately 1.05946:1. This ratio is also commonly referred to as 100 cents. Equal-tempered tuning implies that the intervals within any scale are the same, regardless of the root note of the scale or the key signature. It allows the composer to freely modulate among all key signatures. This type of tuning is also frequently used when layering sounds in an ensemble (acoustic or electronic) context. The
trade-off is that all of the intervals in an equal-tempered scale have a slight built-in dissonance.

Stretch tuning, also referred to as “beat tuning”, is a practice used by professional piano technicians in which the entire scale of the instrument is slightly expanded, causing the overtones in the lower-pitched notes to more closely match the fundamental frequencies of the higher-pitched notes. This adjustment greatly improves the overall consonance of the instrument, since metal strings are by nature not linear in their production of harmonics.

Stretch tuning is the more “natural” method of tuning the piano, and it will result in the most pleasing sound for solo piano playing. The Stretch tunings found in Ivory II are the real-world results of some of the best concert technicians in the business, employed for the sampling sessions, and with great familiarity with each of the respective instruments.

**Tuning Tables** are another new feature to Ivory II. They allow the user to create and save their own custom alternative tunings. The Tuning Table selector shows 3 options, Off, MIDI and Default. The “Off” setting preserves the Factory tuning of the pianos.

When the Tuning Table is set to “MIDI”, you can retune the pianos through the use of the MIDI Tuning Standard “Bulk Tuning Dump” and “Single Note Tuning Change” messages. These messages can be sent by DAW sequencers (such as Logic) to adjust tuning within running plugins. More detailed information about these messages can be found here: www.midi.org/about-midi/tuning.shtml

Custom user Tuning Tables can also be created by editing a simple text file. The ‘Default’ Tuning Table preset is an example of this type of file and while it contains no alternative tuning, it can be used as a template to create your own custom tunings. This file is called “Default.txt” and can be found in your Ivory Items folder at:

Ivory Items/Presets/Tunings/

To create your own custom tuning table, start with Default.txt and save edited copies using your favorite text editor. You will see a series of columns with MIDI note numbers and tuning offsets in cents. The Default.txt file shows the pitch resolution in hundredths of a cent, but the resolution can actually be specified in up to 6 decimal places! A third column shows the pitch in standard note names (middle C = C4), but this third column is just there for reference. It is actually commented out of the file.
Note: the tuning offsets that you input to your tuning text file will affect either the Stretch tuning, or the Equal tuning, depending on which temperament you have selected with the Tuning switch on the Session page. So you can create tunings from either temperament, just make sure you have selected or activated the one that you want to start from with the Tuning switch.

You can use Default.txt as a starter file to create your own tunings and then save your edits as a new tuning text file. It is recommended, when saving, that you make your tuning file names end with the extension .txt. Also, be certain that your tuning files gets saved to the same location in your Ivory Items folder: Ivory Items/Presets/Tunings/

Two other important points: your tuning text file needs to start with the line:

IvoryTuningTableType1

at the beginning of the text file, otherwise Ivory II won’t recognize it. The Default.txt file begins with this line, so if you start with this file as your template, you should be fine.

Lastly, once you create and save your new tuning file, you’ll need to re-select your tuning file from the Tuning Table popup menu in the Ivory interface in order to hear it.
Velocity Maps

The right hand side of the Session Page is dedicated to **Velocity Maps**. Here you can adjust the velocity response of Ivory II to suit your MIDI controller and individual taste.

**Velocity Maps** are important because the various models of MIDI controllers on the market can have widely varying velocity responses. Furthermore, some controllers may not transmit the entire MIDI velocity range of 1 to 127, which means that without some kind of compensation, you can’t take advantage of Ivory’s wide dynamic range with that controller. In other situations, you might want your controller to exhibit more or less “resistance” to suit your playing style.

The collection of parameters in this section of the Session Page constitutes a Velocity Map. Velocity Maps can be saved individually, so they can easily be applied to other Programs and Sessions. The Velocity Map selection (but not the settings) is saved with the Session.
The graph in the middle of this section gives an visual representation of the Velocity Map, showing its high and low limits, and its “slope,” that is, how Ivory responds dynamically to changes in velocity.

The **Arc Type** determines the shape of the velocity curve, varying the degree to which incoming velocities are remapped. There are four “conventional” curves: **Mild, Moderate, Medium, and Maximum**. **Upper Bias** non-uniformly affects louder velocities more than softer ones, and **Power** is provided for circumstances where a very large bend in the curve may be desired.

**Hardness** determines the curvature of the velocity slope. When this is set to zero, the relationship between changes in velocity and changes in Ivory’s levels is linear. When it is set to a positive number, the velocity slope rises quickly, so that the instrument is more sensitive to changes in velocity of relatively soft strokes than it is to differences in velocity of hard strokes. When it is set to a negative number, the opposite is true: the slope rises slowly, so that there is less sensitivity to velocity changes at the soft end, and more sensitivity at the hard end.

**Min Velocity** and **Max Velocity** are useful when you are using Ivory with a MIDI controller that does not send out the full MIDI velocity range of 1–127. It can also be helpful when you want to be able to increase Ivory’s dynamic range without playing very softly or very hard, or when you want to expand the dynamic range of a sequenced track without changing the velocities of the notes on the track. These controls work in conjunction with the **Dynamic Range** control on the Main Screen. Any note with a velocity less than or equal to the Min Velocity setting will cause Ivory to play that note at the lowest end of its Dynamic Range. Any note with a velocity equal to or higher than the Max Velocity setting will cause Ivory to play that note at the highest end of its Dynamic Range.

You can also use your MIDI controller itself to set the minimum and maximum velocities with the **Set** function. When you click on the Set button, Ivory will prompt you to play a note on your controller at your softest dynamic level (ppp). Then it will ask you to play a note at your loudest dynamic level (fff). The velocities of these two keystrokes are then automatically transferred into the Min Velocity and Max Velocity parameters.

The **Velocity Map selector** and the **Save** and **More** buttons behave just like their counterparts for the Program and Session presets. Finally, as stated before, when you save a Session, the current Velocity Map selection is saved with it.
9 • The Effects Page

Click on the “Effects” button in the Ivory II Navigation Bar to bring up the Effects Page.

Here you have access to a three-band equalizer, a flanger/chorus, and reverb/ambience. Each of these effects can be enabled or disabled with individual On-Off buttons.

Clicking on the Effects Preset selector in the upper right hand corner of the page brings up the Effects Preset browser. Factory Effects presets are organized by effects type, such as Choruses, Halls, Small Rooms etc. Custom Effects settings can be saved by themselves as a User Effects Preset.

Note: your effects preset selection (but not the settings themselves) are saved when you save a Program.
The Equalization section is a three-band EQ, with High Shelf, Low Shelf, and a newly added Parametric Band. Each band has a separate gain control (-24 dB to +24 dB) and adjustable frequency control (20 Hz to 20 kHz). The Parametric Band also has a Bandwidth control (0.1 Octaves to 10 Octaves).

The Chorus effect can be used for flanging as well as chorusing effects. The Wet/Dry knob determines the balance between the direct and processed signals. Negative values mean the processed signal is phase-inverted from the direct signal.

Depth (0-100%) controls the amount of pitch modulation. This control changes the LFO amplitude while compensating for the LFO speed, in order to keep the pitch fluctuation constant.

Rate (0-4.0 Hz) controls the speed of the LFO so as to give long, sweeping effects to fast “jittery vibrato” effects, or anything in between.
Delay is the nominal delay time of the process, from zero to 30 milliseconds. Shorter delays give a flanging effect, while longer ones create a chorus effect.

Feedback controls how the delays are fed back into themselves, to create repeating delays. As with most digital delays, setting this control to extreme levels will send the unit into self-oscillation, creating a distinct pitch that will vary with the delay time (and the LFO). Negative values indicate that the signal is phase-inverted when it is fed back into the circuit.

Damping controls a low-pass filter in the feedback path of the delay. Its shelf frequency is adjustable from 20 Hz to 20 kHz, which is the –3 dB point of the filter.

Ambience adds room-type reverb to your Ivory II sounds. The following room models are available from the Room Type selector menu:

- Room
- Studio
- Jazz Club
- Live Venue
- Recital Hall
- Concert Hall
- Curved Space
The **Room Size** parameter allows the virtual room to be expanded or reduced. 1.00x is the nominal value for the room, while lower settings create shorter reverb times, and higher settings create longer ones. The range is 0.50x to 2.00x.

**Wet/Dry** determines the balance between the direct and processed signals. Negative values mean the processed signal is phase-inverted from the direct signal.

**Predelay** inserts a delay before the piano sound is sent to the reverb. Predelay can increase the feeling of space in a reverb, and also can be used when you want a lot of reverb effect, but you don’t want to obscure the direct sound (which is not affected by this control). The Predelay is adjustable from 0 to 100 ms.

**Damping** controls a low-pass filter that is applied to the Ambient sound, effectively shortening the reverb time at frequencies above its shelf frequency. The filter frequency is adjustable from 20 Hz to 20 kHz.

Hint: When attempting to create smaller or larger room sizes, a change in the Room Size parameter should be accompanied by a change in the Predelay setting. Smaller room sizes should have shorter predelays; larger room sizes should have longer predelays, as a general rule.
10 • The Preferences Page

Click on the “Preferences” button in the Ivory II Navigation Bar to bring up the Preferences Page.

Here you have access to parameters that let you further customize and configure your Ivory plug-in.

Note: The settings you make on the Preferences Page are saved and remembered with the plug-in and will automatically be recalled the next time you instantiate Ivory II.
Knob Tracking

The Knob Tracking parameter allows you to choose the manner in which you can move the rotary knobs in the Ivory interface. There are two options for knob movement, Radial or Linear.

Radial: Click on the dot where you want to set the control or drag the cursor in a circular motion

Linear: Click on the knob and drag the mouse vertically or horizontally

Note: Some VST plug-in hosts may override the preference you set in Ivory. If this happens, Ivory will reflect the current knob tracking in use. Refer to your VST host documentation to find out how to set knob tracking from within the host.

MIDI Volume (CC7) Response

This parameter determines whether the Ivory plug-in will respond to incoming MIDI Volume (CC7) messages. The default is ‘On’, to respond to these messages.

However, if you have a controller or other MIDI device that is sending unwanted MIDI Volume messages, you may choose to disable Ivory’s response to MIDI Volume by setting this preference to ‘Off’.

MIDI Expression (CC11) Response

This parameter determines whether the Ivory plug-in will respond to incoming MIDI Expression (CC11) messages. The default is ‘On’, to respond to these messages.

However, if you have a controller or other MIDI device that is sending unwanted MIDI Expression messages, you may choose to disable Ivory’s response to MIDI Expression by setting this preference to ‘Off’.
11 • Saving and Loading Presets

Ivory II lets you create a library of Programs, Sessions, and other Presets so that you can recall settings easily. These files can also easily be moved from one computer to another, so if you are using Ivory II in different locations you don’t have to re-program the instrument from scratch each time you use it.

For the purpose of this chapter, when you see the word “Preset,” it refers to all types of Ivory II files, including Programs, Sessions, Effect Presets, and Velocity Map Presets.

Where are the Presets?

All Presets are stored in a folder called “Presets” inside the “Ivory Items” folder, which is located on the hard disk where you installed the Ivory II library. Inside the Presets folder, each type of Preset has its own folder. This means that you can assign the same name, for example, to a Session and a Program without creating any confusion. Be sure to maintain the integrity of these folders if you are moving files around, since a Preset that’s in the wrong place won’t be recognized by Ivory II.

The preset files of each type are further organized into categories. Factory presets are separated from user presets. Factory Programs are organized by Piano model, and Factory Effects are organized by Effects type. Check out the screen shots on page 36 to see how this looks.

You can also create your own folders in the Ivory Items presets folders (see below for more details). If you choose to organize your presets in this way, you can navigate through your folders in Ivory II. We recommend that you do not put your user presets into the factory-created folders. Folders are shown with a yellow ‘+’ box that allows you to expand each one to view its contents.

You can sort your presets in the browser by clicking on the column headers. Each type of preset will have a few columns with useful information about the presets.

When you open a browser, the currently selected preset or keyset will be highlighted for you. To select a new preset, simply double-click on a preset.

When you save a new preset, it will be stored in the User folder.
As mentioned above, you can organize your User presets into your own customized folders using your operating system’s standard methods. For example, all of your Program presets can be found in “Ivory Items/Presets/Programs”. In the Programs folder you will see the category folders, each containing their Program presets. To create your own custom category folders for your Program presets, simply create a new folder in the Programs folder and move the presets from your User folder into the new folders. The next time you launch Ivory II, you will see your folders appearing as categories that you can navigate in the Ivory II browser.

**Managing Presets**

Whenever you launch or instantiate Ivory II all of the Presets are set to “Default.” The first time you launch Ivory II, the Default Program is empty, with no Keyset loaded, and it makes no sound. If you go to the Program selector, you will see the available Programs in the browser. Select a Program, and it will load: the Keyset associated with that Program is loaded in, the fallboard on the on-screen piano will show the Program’s name, and the other Program parameters will set themselves accordingly.

You load an Effects Preset, a Velocity Map, or a Session the same way. When you load a Session, it loads a Program, the Program’s Keyset and Effects Preset, and a Velocity Map Preset. When you make any changes in a Program or any other Preset, the name of the Preset goes into Italics. This tells you that the Preset has been edited.

Save an edited Preset by clicking on the appropriate Save button. The Save button is actually a small drop-down menu, offering the choice of “Save” (use the same name for the Preset) or “Save As...” (use a different name). If you want to write over an existing Preset, use the “Save” function.

The Presets that are provided with the Ivory II disks, known as “factory” Presets, appear in the Preset Selectors with an asterisk next to their names. Presets that you create (“user” presets) do not have these asterisks. You can overwrite any of the factory or user presets with either the Save or Save As... functions. However, when you try to overwrite a factory Preset, Ivory II will warn you that you are doing so. The Default presets cannot be renamed.
The More button gives you other file-management tools. Revert lets you go back to the saved version of the current Preset, and discards all of your current edits. (Selecting the current Preset in the browser will not reload it automatically.) Delete removes the current Preset from the browser and loads the default. You can Delete the factory presets, but you will be warned, and you cannot delete any of the “Default” presets. Rename lets you rename the current Preset.

**Saving and recalling your edits**

If you leave an edited Session, Program, or Preset without saving it, by selecting another item on the list, the edits you made are not forgotten: the next time you recall that item from the list, it will re-load in the state that you left it in. But the name will be in Italics to remind you that you are not seeing the saved version. To recall the saved version, use the Revert function.

When you save a Preset that has dependent items—that is, a Program or a Session—you are saving the current state of those items, but the dependent items themselves are not specifically saved. For example, if you save a Program in which you’ve changed some Effects parameters, the name of the current Effects preset is stored with the Program. Recalling this Program will recall the Effects preset as if you chose this Effects preset from the popup menu. However, the Effects parameters themselves are not saved as an Effects Preset unless you explicitly do so. If you want those Effects settings to be recalled the next time you instantiate Ivory II, you should save them as an actual Effects Preset. For this reason, when saving a Program Preset, you may sometimes see the message "The current Effects preset [effect name] still has unsaved changes." This indicates that your Effects Preset is still in an edited state, and should either be saved, or saved as a new Effects Preset, if you want those changes to be recalled.
Saving Ivory II parameters in a host sequence

Unless you are running Ivory Standalone or Ivory Cantabile, you will always use Ivory II within a host application. Therefore, when you save a sequence or project in the host, you will save all of Ivory II’s current parameters as well. You do not need to save the Program or Session in Ivory II for this to happen: it’s automatic. When you re-load the host sequence or project, Ivory II will revert to the state where you left it. This isn’t a substitute, however, for creating a library of your favorite setups for Ivory II.

An Ivory II Session saved in a host sequence cannot be used in any other sequence, or in any other application, since there’s no way to call it up without opening the host sequence. If you haven’t saved any of the Ivory II Presets, then every time you use Ivory II in another sequence, you have to start from scratch. But if you have saved any Sessions, Programs, Velocity Maps, or Effect Presets, they will always be available whenever you launch Ivory II.
12 • Tips for Using Ivory II

Once you have Ivory II installed and you have a basic familiarity with how it works, this chapter will show you how to adapt Ivory II to your particular system and how to use it most effectively.

Optimization

Ivory II’s custom software engine has been developed to use your computer’s CPU in the most efficient manner possible. It has also been designed to provide the features that are most important to realizing a true and accurate piano performance, and only those things that are necessary for that job.

Of course, not all computer systems and CPUs are equal, and therefore many of Ivory II’s features have been designed so that they can be custom-configured to meet the needs of individual users and their systems. If your system has an older/slower CPU, or does not have a large amount of RAM, then you might find it helpful to follow these tips:

- Choose a fewer number of Voices. Using less polyphony uses less CPU power and reduces the demand on your hard drive. So if your processor is not fast, or your hard drive is slow, or if you are trying to do many other things in addition to running Ivory II, like running other software synthesizers or processing plug-ins, lowering the number of voices will save on CPU cycles and hard drive bandwidth.

- Turn Release samples off. The Release samples add greatly to Ivory II’s realism when the piano sound is heard alone. But if your Ivory II piano is going to be part of an ensemble with other instruments, perhaps they won’t be as important. Turning them off will greatly reduce the amount of RAM that Ivory II uses.

- Similarly, you can use Piano Keysets that have fewer dynamic levels. The overall dynamic range of Ivory II will be the same, but the timbral range may not be as great, or change as subtly as you play louder and softer as it does in Keysets with more dynamic levels. Using Keysets with fewer dynamic levels reduces the amount of RAM used.

- Turning Soft Pedals off also reduces the amount of RAM used. If you know you will not be using the Soft Pedal in your recording or performance, disabling this feature will improve the performance of your system as it relates to RAM usage.
Tips for Using Ivory II • 64

• Turning off the Effects, Sympathetic Resonance, and / or Sustain Resonance will save CPU power.

• Set Lid Position to “Full Stick” (Ivory II Grand Pianos / Ivory II Italian Grand) or “Open” (Ivory Upright Pianos) to save CPU power.

• Turning the Synth Layer off will save both CPU and RAM, though the synth layer is not very demanding in either case.

• Adjust Memory Use (Session Page) to suit the balance in your computer between CPU speed and RAM. A setting of Large gives better performance with a slower computer, but it uses more RAM. A faster computer can use a setting of Small, which frees up more RAM. This parameter was called Buffer Size in previous versions of Ivory. NOTE: This setting does not affect latency (see below).

• The speed of your hard disk has a large impact on the performance of Ivory II. When disk accesses are slow, you may see a ‘slow disk’ indicator appear to the right of the MIDI light. Individual voices may abruptly stop playing and result in a “click” if the disk accesses are really overloaded. Here are a few suggestions to get the most out of your hard disk system:

  - Reduce the number of voices to prevent too much data from playing at any one time.

  - Install the library files on a faster hard drive. Internal drives are usually faster than external drives. But drives that are used for other significant things, like your system disk, or another disk used for recording / playing audio data are not good choices. See page 73 for more information on hard drives.
MIDI Response

Besides Note-ons and Note-offs, Ivory II responds to these MIDI commands:

<table>
<thead>
<tr>
<th>Controller Number</th>
<th>Function</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>MIDI Volume</td>
<td>Ivory II's volume level can be controlled in your MIDI track or by your MIDI controller via this controller. Can be disabled on Preferences Page.</td>
</tr>
<tr>
<td>11</td>
<td>Expression</td>
<td>Expression is used to make finer adjustments to volume by scaling the current CC7 value. For example, a CC7 set to 100 will effectively be scaled to 50 when sent an Expression value of 64 (64/128 is 50%). Can be disabled on Preferences Page.</td>
</tr>
<tr>
<td>64</td>
<td>Sustain pedal</td>
<td>Engages the Sustain Resonance, if it is active, and holds the sustain segment of the envelopes of sounding notes.</td>
</tr>
<tr>
<td>66</td>
<td>Sostenuto pedal</td>
<td>Functions as on a real acoustic grand piano, sustaining only on those notes that were depressed when the pedal went down.</td>
</tr>
<tr>
<td>67</td>
<td>Soft Pedal</td>
<td>Engages the soft pedal samples for that Keyset, if they are active.</td>
</tr>
<tr>
<td>119</td>
<td>Select Random Sequence</td>
<td>Adjusts Ivory II Upright Piano’s Random Creaks and Clunks. See page 42.</td>
</tr>
</tbody>
</table>

Pitchbend, Modulation Wheel, Channel Pressure (Aftertouch), and Program Change commands do not have any effect.
Rendering Audio

It can be very useful to render your MIDI-controlled Ivory II tracks as audio tracks within your host application. Playing audio tracks is much easier for a host application than interpreting MIDI data and producing instrument sounds “on the fly,” so turning your Ivory II tracks into audio (in AIF, SDII, WAV, or Broadcast WAV formats) is a great way to free up CPU resources in your production environment.

Many host applications offer a way to bounce instrument tracks either in real time or offline. Depending on the host application, the feature may be referred to as “Bounce”, “Freeze”, or “Mix to Disk”. Consult your host application’s user guide for more information.

During offline processing, Ivory II is no longer limited by disk, processor, and memory resources that normally affect its ability to produce continuous sound in real time. As a result, you may take advantage of this by increasing resources in Ivory II. For example, you may choose a keyset with more levels, turn on release samples, or add more effects. Ivory II uses all of its editor settings when processing commences except for the Voices parameter. Ivory II will always use 120 voices unless the Voices parameter is set to value higher than 120.

Updates

Please check our website at www.synthogy.com for updates and additions to Ivory II’s software, programs, effects, velocity maps, demos, and more. News on future upgrades will appear first here as well.
13 • Troubleshooting Ivory II

Diagnostics

Ivory has some diagnostic features and tools that can help you to determine whether your audio and MIDI connections are working.

MIDI Indicator Light

On the bottom of each page in the Ivory interface there is a MIDI indicator light. If Ivory is receiving MIDI information, the light will glow red. If you think you are sending MIDI to Ivory, but this indicator does not light, check your MIDI connections, routing, and device settings. Make sure that all MIDI cables are properly inserted, the correct MIDI device and port is selected, and that the MIDI channel is correct.

Playing the Onscreen Keyboard

If you would like to test your audio connections, regardless of your MIDI setup, you can play notes directly from the picture of the piano on Ivory’s Program page. Clicking on the keyboard of this graphic will play notes using the currently loaded Program or Keyset. Clicking closer to the fallboard of the piano plays the notes softer, while clicking further to the edge of the keys will play them louder.

Ivory Library Tool

This tool has two purposes. First, upon launching it will ask you to confirm the current location of your Ivory Items folder, and provide a way to choose a new location. Second, it will help diagnose problems with your Ivory library files and provide helpful information to our tech support department. On Mac, it is found inside the Tools folder of your Ivory Items folder. On Windows, it is found under:

Start > All Programs > Synthogy Ivory.

To diagnose a problem with your Ivory library files, launch the Library Tool, and it will first ask you to confirm the location of the Ivory library. Locate and choose the correct Ivory Items folder on your hard drive, and the tool window will open.

Mac users: Click the Verify button.

Windows users: Choose “Verify Libraries” and click Run.
The library tool will examine the files in the selected Ivory Items folder. Each library file will be verified and receive a PASS or a FAIL. If any library file gets a FAIL, its sample data is corrupt. Throw away the failed files and perform an installation starting with your Ivory Install DVD #1. Be careful to select the existing Ivory Items folder so you don’t begin a whole new installation.

**Installation Problems**

If the Ivory Library Installer program is stopped before the installation is complete, you can usually continue the installation by manually re-launching it from the Ivory Items/Tools folder.

If you have installed more than one Synthogy Ivory product, but only one is showing up, it’s possible that you installed a product into a new Ivory Items folder rather than the existing Ivory Items folder. You should only have one single Ivory Items folder on your system, in which all Synthogy products should be installed. When you install an Ivory product, the installer will look to see if there is an existing Ivory Items folder on your system, and will present a dialog for you to confirm its location. Under normal conditions, do not change this location during installation. If you have mistakenly chosen a different folder, and created a second Ivory Items folder, locate the new Ivory Items folder, delete it, and perform the installation again, being sure to select the existing Ivory Items folder for the install location for the Ivory library.

For additional help with an installation problem, visit the Support section of our website, at www.synthogy.com/support.

**Registration Problems**

If the Ivory plug-in or Ivory Library Tool indicates that a piano is “Not Authorized,” check the following items:

• Did you register the product on the Synthogy website?

• Did you log in to your iLok account and download the license to an iLok key?

• Is that iLok key inserted in the computer? Is the light in the iLok key on?

If you did not register your product yet, please see the section “Authorizing Ivory II” in Chapter 2.
If you did register, and the key is inserted, visit the Download section of the iLok.com website, and install the iLok Client and Driver installers for Mac or iLok Client and Driver installers for PC.

If that is still not successful, log in to your account at iLok.com, and look for the Found iLoks box to see if the computer is recognizing the iLok key. If it's not seeing the key, try plugging it into a different USB slot directly on the computer, or into a slot on a powered USB hub. If the iLok website still does not recognize your iLok key, there may be a problem with the key. Visit the iLok Support Center at www.ilok.com/ilok-troubleshooter.

If the Registration website won’t accept your Serial Number or other registration information, this is usually due to a typo when entering the Serial Number into the Synthogy website. Make sure that all characters, capitalization, and dashes are correct. When entering your name and email, use only standard alphanumeric characters. Do not use any special characters, accented letters, etc.

For other registration problems, contact Synthogy Registration Support at register@synthogy.com.

**Problems Loading Ivory Plug-in Within A Host Application**

In general, if Ivory is not showing up in your host application, check the Mac or PC Downloads section of our website, and download and install the latest Ivory update(s) for the plug-in format of your host application(s).

Sometimes, it may be necessary to use the plug-in manager within your host application, and tell it to rescan its plug-in files.

In rare cases, it may be helpful to remove any existing Ivory plug-in files before installing the updaters. See the section “Uninstalling Ivory” on page 70 for the locations of the Ivory plug-in files.

As a quick check, run the Ivory Standalone application on Mac, or the Ivory Cantabile program on Windows, to check if Ivory is running properly outside of your host application.

**Windows users:**

Because different host applications may use different locations for their VST plug-in files, there may be duplicate copies of Ivory's plug-in on your computer. Confusion may occur if some copies are older than others. For
this reason, it is recommended to perform a Windows search for the Ivory VST plug-in file “Ivory VST.dll” and delete all copies of that file before installing the update(s).

The VST updater will ask you where to install the VST plug-in file. Be sure to choose the correct folder for your host application. Or, you can choose the default location (C:\Program Files\Vstplugins) and manually copy the plug-in file, called “Ivory VST.dll”, into the correct folder for your host(s).

Moving The Ivory Library Or Updating The Location Of The Ivory Library

The libraries can be dragged to another hard drive without having to reinstall. Just move the Ivory Items folder to the new location. Then, launch the Ivory Library Tool. When it asks you to confirm the Ivory library location, click Change, and choose the new location of the Ivory Items folder.

Uninstalling Ivory

The large data files for Ivory are all kept in a folder called Ivory Items. Simply deleting this folder will remove most of Ivory’s data.

Mac Users:
Remove the Ivory plug-in file from these locations:

AU: /Library/Audio/Plug-Ins/Components/Ivory AU.component
VST: /Library/Audio/Plug-Ins/VST/Ivory.vst
RTAS: /Library/Application Support/Digidesign/Plug-Ins/Ivory.dpm

Then, delete the Ivory Standalone application from the Applications folder.

Finally, delete the Ivory Preferences folder from this folder:

/Users/{Home}/Library/Preferences/

Windows Users:
The simplest way to uninstall Ivory is to run Uninstall Ivory found in Start > Synthogy Ivory and follow the instructions. When asked to search
your system to remove all Ivory plug-in files, clicking Yes or OK is recommended. This removes virtually all of Ivory’s files.

If you prefer to manually uninstall Ivory, perform a search on your computer and delete all copies of the file “Ivory VST.dll”. Pro Tools users should remove the Ivory RTAS plug-in files from these locations:

C:\Program Files\Common Files\Digidesign\DAE\Plug-Ins\Ivory.dpm
C:\Program Files\Common Files\Digidesign\DAE\Plug-Ins\Ivory.dpm.rsr

You may also want to discard the Ivory program folder(s):

C:\Program Files\Synthogy\Ivory
C:\Program Files (x86)\Synthogy\Ivory

Troubleshooting Performance Problems

No Sound from Ivory

• Check to see if Ivory is receiving MIDI from your keyboard by using Ivory’s MIDI Indicator Light. (For more details, see troubleshooting section, DIAGNOSTICS - MIDI Indicator Light.)

• Did you load an Ivory Program or Session? If the Keyset field says, “No Piano Keyset” you have not selected a piano.

• If there are no Programs, Sessions, or Keysets available, you may need to update the location of the Ivory library (see troubleshooting section, MOVING THE IVORY LIBRARY OR UPDATING THE LOCATION OF THE IVORY LIBRARY) or the Ivory library may not be properly installed (see troubleshooting section, IVORY LIBRARY TOOL, for details on how to Verify the library).

• If you have tried to load a Program or Session, and the Keyset field reports “Not Authorized,” there may be a registration issue preventing the piano Keyset from loading. (See troubleshooting section, REGISTRATION PROBLEMS, for details on registering or checking the registration status of your product.)

• If you have loaded a Program, Session, or Keyset and all fields indicate that the load was successful, check for audio using the onscreen keyboard. (See troubleshooting section, DIAGNOSTICS.) Make sure you have selected the correct audio outputs in your host application, that your audio cables are properly connected, and that any routing and/or
channel selections in your host application or external audio hardware is correct.

**Latency (delayed sound) when playing Ivory**

Latency is an often misunderstood topic. “Latency” is the elapsed time between pressing a key and when the note is heard. Ivory itself has no latency of its own. It is primarily related to the buffering done in the audio interface you are using. This is generally controlled with a “buffer size” setting in your host software or in the control panel for the audio device itself.

Buffer size is usually measured in samples, though it is sometimes also expressed in milliseconds (ms). Default settings for buffer size are usually 256 or 512 samples. Selecting a lower value will improve latency at the expense of CPU load. A lower buffer size yields shorter latency, but with a greater chance of audio dropouts or stuttering. A higher buffer size ensures smooth audio, but longer latency. The optimal setting is the lowest buffer size that works on your system without dropouts or stuttering.

In addition to lowering the buffer size, increasing the sample rate of the system will also improve latency.

Some effects plug-ins impose a delay due to the nature of how they process audio. The host may compensate for this during normal session playback, but will be exposed while playing Ivory in real time.

If you are experiencing latency, it is important to carefully read and understand buffer size and sample rate documentation for your audio hardware and host application.

**Pops, Clicks or Dropouts when Playing Ivory**

Problems that involve audio glitches such as pops, clicks, dropouts, or other unusual audio behavior are generally related to one of these factors:

- Hard Drive performance
- Latency Settings in host application or audio hardware/interface
- Processor speed
- System memory (RAM)
- MIDI hardware
- Other Audio hardware (Mixer, Amp, Monitors)

You are more likely to have problems related to the CPU, RAM, or HD on older, slower computers, which might also have less memory, and smaller
or slower hard drives, but it is certainly possible to exceed the capabilities of even the latest and fastest systems, if you push the limits of Ivory and/or your other audio software.

If any audio glitches coincide with the appearance of the “Slow Disk” message along the bottom of the Ivory window, the problem is related to insufficient data transfer from the hard drive used for the Ivory library. Go to the troubleshooting section, Hard Drive Performance.

If problems occur without the appearance of the Slow Disk message, the problem may have to do with the settings in your host application or audio hardware, your processor, system memory, or (occasionally) your MIDI or other audio hardware.

**Ivory reports “Slow Disk”**

While you are playing Ivory, if the number of voices exceeds the amount of data that can be streamed from your drive, the ‘Slow Disk’ message will appear in red. This message is often accompanied by a click as a voice abruptly stops playing. Notes may last only a short time instead of sustaining, even when the keys or sustain pedal are held down.

The quick fix to this problem is to reduce your polyphony or voice count using the Voices parameter in Ivory. Reduce the Voices parameter incrementally until the message no longer appears under normal or heavy usage.

If reducing the number of voices does not alleviate the problem, you may need to consider taking some other steps to optimize your disk performance, or move your Ivory library to a faster hard drive.

**Hard Drive Performance**

Ivory is a streaming application, which means its performance and maximum polyphony are directly related to the speed of the hard drive and its interface being used with the Ivory Items folder. Here are some tips on choosing a hard drive for your Ivory Items folder:

- For desktop computers, try to use a dedicated internal non-system hard drive (usually SATA).

- For laptops with a single internal 5400 RPM drive, use an external drive.
Troubleshooting • 74

- Use Striped RAID (RAID 0) technology, or even better, a Solid State Drive (SSD) if possible. This will increase performance in Ivory dramatically.

- On older computers especially, avoid putting your Ivory Items folder on your system drive.

- When using an external hard drive interface, choose from the following interfaces in order of most preferred to least preferred: eSATA, Firewire 800 (IEEE 1394b), Firewire 400 (IEEE 1394a). USB 2.0 is not recommended.

- It’s preferable to keep Ivory on its own dedicated drive, especially one that isn’t being accessed by other streaming virtual instruments and samplers.

- Watch out for power saving features that spin down hard drives. Playing Ivory after its hard drive spins down will result in a severe Slow Disk message until the drive spins back up.

- Turn off Disk Indexing for your Ivory Items drive when Ivory is being used.

**Processor Speed (CPU/Bus Speed)**

Modern computers employ multi-core processors to help the system manage processing tasks and avoid CPU overloads and interruptions. Though more common on an older, slower, single-core system than on a newer, faster, multi-core system, processing demands from running too many software programs, plug-ins, or background services can cause a system to overload. You may experience audio glitches or dropouts while using Ivory if your computer’s processor is too slow to keep up with your demands.

The best way to determine if your processor is too slow is to call up and watch your host’s CPU usage meter. If the meter runs high, this usually indicates that the CPU is overloading, and cannot run fast enough to keep up with your demands. Within Ivory, there are some adjustments you can make to reduce the CPU load. Here are some suggestions:

- Turn off Sympathetic Resonance.
- Turn off Sustain Resonance.
- Turn off Ambience, Chorus, EQ.
• Reduce the number of Voices.

• Set Key Noise to 0.0dB.

You may also need to reduce the use of other plug-ins to reduce the CPU load. Making an audio track from a virtual instrument track (aka bouncing, freezing, rendering) is a good way to do this.

Mac and Windows operating systems have file indexing features designed to speed up file searches. The increase in hard drive activity during indexing is more likely to affect Ivory performance than the additional load on the CPU, but for both reasons it is advisable to turn off disk indexing.

Pro Tools users:
You may find a setting in Pro Tools where you can select the number of RTAS Processors. For best results, choose one less than the number of processors in your system (e.g., for a quad-core system, use a setting of 3, not 4).

System Memory (RAM)
In some cases, a performance problem may be related to your system memory (RAM). If you are experiencing glitches or dropouts without seeing the Slow Disk message, and you’re sure that the hardware buffer size is set properly (see “Latency (delayed sound)” on page 72) it may be a RAM issue.

You can monitor your computer’s memory usage using some simple built-in tools:

Mac users: Launch Activity Monitor in the /Applications/Utilities/ folder.

Windows users: Run Task Manager and click on the Performance Tab.

If you are getting out-of-memory errors while loading Ivory presets, this suggests a problem related to the RAM in your system. RAM problems may become apparent when other sample-based plug-ins that also use up RAM (e.g., samplers or sampling reverbs) are used alongside Ivory in your audio project. The following methods will reduce Ivory’s RAM usage:

• Decrease the Memory Use parameter on Ivory’s Session page.
Troubleshooting • 76

- Turn off Release Samples.
- Turn off Soft Pedal Samples.
- Turn off the Synth Layer.
- Choose a Keyset with fewer dynamic levels.

If you are running a 32-bit operating system, the maximum amount of RAM available to each application is limited to 4GB shared between the application and the system. The amount of free memory left to load in a plug-in is considerably less. This limitation is independent of the amount of physical RAM that is installed. Unfortunately installing more than 4 GB of RAM in your 32-bit system does not generally increase the amount of RAM available to each plug-in you are running.

In some cases, a bad memory stick may result in unusual problems that are hard to trace to another cause. If you’ve exhausted other options, you may want to look online for instructions on how to perform a RAM test on your system, to determine whether your installed memory is functioning properly.

It is not generally advisable to turn the virtual memory system off.
### 14 • Ivory II Grand Pianos Keysets

**Bosendorfer**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosendorfer 16 Level</td>
<td>97 note Imperial grand with 16 Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer 16 Level 2</td>
<td>16 level keyset w/ alternative velocity switch points*</td>
</tr>
<tr>
<td>Bosendorfer 14 Level</td>
<td>97 note Imperial grand with 14 Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer 14 Level 2</td>
<td>14 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Bosendorfer 12 Level</td>
<td>97 note Imperial grand with 12 Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer 12 Level 2</td>
<td>12 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Bosendorfer Hard Level</td>
<td>97 note Imperial grand w/ the 10 Hardest Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer Soft Levels</td>
<td>10 level keyset w/ the 10 Softest Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer 10 Level</td>
<td>97 note Imperial grand with 10 Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer 10 Level 2</td>
<td>10 level keyset w/ alternative velocity switch points</td>
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<tr>
<td>Bosendorfer 8 Level</td>
<td>97 note Imperial grand with 8 Dynamic Levels</td>
</tr>
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<td>8 level keyset w/ alternative velocity switch points</td>
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<td>Bosendorfer 6 Level</td>
<td>97 note Imperial grand with 6 Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer 6 Level 2</td>
<td>6 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Bosendorfer 4 Level</td>
<td>97 note Imperial grand with 4 Dynamic Levels</td>
</tr>
<tr>
<td>Bosendorfer 4 Level 2</td>
<td>4 level keyset with wider timbral range</td>
</tr>
<tr>
<td>Bosendorfer88 10 Level</td>
<td>88 note version of 10 Level Bosendorfer</td>
</tr>
<tr>
<td>Bosendorfer88 10 Level 2</td>
<td>88 note, 10 Level keyset w/ alternative vel switch</td>
</tr>
<tr>
<td>Bosendorfer88 8 Level</td>
<td>88 note version of 8 Level Bosendorfer</td>
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<td>88 note, 8 Level keyset w/ alternative vel switch</td>
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<td>88 note, 6 Level keyset w/ alternative vel switch</td>
</tr>
<tr>
<td>Bosendorfer88 4 Level</td>
<td>88 note version of 4 Level Bosendorfer</td>
</tr>
<tr>
<td>Bosendorfer88 4 Level 2</td>
<td>88 note 4 Level Bosendorfer w/ wider timbre</td>
</tr>
</tbody>
</table>

Note: 88 note versions of Bosendorfer pianos will save on RAM usage. If you know you will not be using the extended bottom octave, these Keysets will require less memory to load.
<table>
<thead>
<tr>
<th>German D</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>German D 18 Level</td>
<td>Steinway D with 18 Dynamic Levels</td>
</tr>
<tr>
<td>German D 18 Level 2</td>
<td>18 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>German D 16 Level</td>
<td>Steinway D with 16 Dynamic Levels</td>
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<tr>
<td>German D 16 Level 2</td>
<td>16 level keyset w/ alternative velocity switch points</td>
</tr>
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<td>German D 14 Level</td>
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</tr>
<tr>
<td>German D 12 Level 2</td>
<td>12 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>German D Hard Levels</td>
<td>Steinway D with the 10 Hardest Dynamic Levels</td>
</tr>
<tr>
<td>German D Soft Levels</td>
<td>10 level keyset w/ the 10 Softest Dynamic Levels</td>
</tr>
<tr>
<td>German D 10 Level</td>
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<td>German D 4 Level</td>
<td>Steinway D with 4 Dynamic Levels</td>
</tr>
<tr>
<td>German D 4 Level 2</td>
<td>4 level keyset w/ alternative timbral range</td>
</tr>
</tbody>
</table>
**Studio 7ft**

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studio 7ft 16 Level</td>
<td>Yamaha C7 with 16 Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 16 Level 2</td>
<td>16 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Studio 7ft 14 Level</td>
<td>Yamaha C7 with 14 Dynamic Levels</td>
</tr>
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<td>Studio 7ft 14 Level 2</td>
<td>14 level keyset w/ alternative velocity switch points</td>
</tr>
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<td>Studio 7ft 12 Level</td>
<td>Yamaha C7 with 12 Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 12 Level 2</td>
<td>12 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Studio 7ft 10 Level</td>
<td>Yamaha C7 with 10 Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 10 Level 2</td>
<td>10 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Studio 7ft Hard Levels</td>
<td>Yamaha C7 with the 8 Hardest Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft Soft Levels</td>
<td>8 level keyset w/ the 8 Softest Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 8 Level</td>
<td>Yamaha C7 with 8 Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 8 Level 2</td>
<td>8 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Studio 7ft 8 Level 3</td>
<td>8 level keyset w/ alternative mapping†</td>
</tr>
<tr>
<td>Studio 7ft 6 Level</td>
<td>Yamaha C7 with 6 Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 6 Level 2</td>
<td>6 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Studio 7ft 6 Level 3</td>
<td>6 level keyset w/ alternative mapping</td>
</tr>
<tr>
<td>Studio 7ft 5 Level</td>
<td>Yamaha C7 with 5 Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 5 Level 2</td>
<td>5 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Studio 7ft 5 Level 3</td>
<td>5 level keyset w/ alternative mapping</td>
</tr>
<tr>
<td>Studio 7ft 4 Level</td>
<td>Yamaha C7 with 4 Dynamic Levels</td>
</tr>
<tr>
<td>Studio 7ft 4 Level 2</td>
<td>4 level keyset with wider timbral range</td>
</tr>
<tr>
<td>Studio 7ft 4 Level 3</td>
<td>4 level keyset w/ alternative mapping</td>
</tr>
</tbody>
</table>

* "2" keysets have an alternative set of velocity switch points that will favor the softer dynamics through the mp-mf playing range.

† "3" keysets have an alternative mapping for the D4 note (D above middle C)

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Ivory II Grand Pianos Presets • 80
15 • Ivory II Italian Grand Keysets

<table>
<thead>
<tr>
<th>Keyset Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italian Grand 18 Level</td>
<td>Italian Concert Grand with 18 Dynamic Levels</td>
</tr>
<tr>
<td>Italian Grand 18 Level 2</td>
<td>18 level keyset w/ alternative velocity switch points*</td>
</tr>
<tr>
<td>Italian Grand 16 Level</td>
<td>Italian Concert Grand with 16 Dynamic Levels</td>
</tr>
<tr>
<td>Italian Grand 16 Level 2</td>
<td>16 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Italian Grand 14 Level</td>
<td>Italian Concert Grand with 14 Dynamic Levels</td>
</tr>
<tr>
<td>Italian Grand 14 Level 2</td>
<td>14 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Italian Grand 12 Level</td>
<td>Italian Concert Grand with 12 Dynamic Levels</td>
</tr>
<tr>
<td>Italian Grand 12 Level 2</td>
<td>12 level keyset w/ alternative velocity switch points</td>
</tr>
<tr>
<td>Italian Grand 10 Level</td>
<td>Italian Concert Grand with 10 Dynamic Levels</td>
</tr>
<tr>
<td>Italian Grand 10 Level 2</td>
<td>10 level keyset w/ alternative velocity switch points*</td>
</tr>
<tr>
<td>Italian Grand 8 Level</td>
<td>Italian Concert Grand with 8 Dynamic Levels</td>
</tr>
<tr>
<td>Italian Grand 8 Level 2</td>
<td>8 level keyset w/ alternative velocity switch points*</td>
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</tr>
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<td>Italian Grand 4 Level 2</td>
<td>4 level keyset w/ alternative velocity switch points*</td>
</tr>
<tr>
<td>Italian Grand Hard Levels</td>
<td>Italian Grand, 6 Hardest Dynamic Levels only</td>
</tr>
<tr>
<td>Italian Grand Soft Levels</td>
<td>Italian Grand, 6 Softest Dynamic Levels only</td>
</tr>
</tbody>
</table>

* “2” Keysets have an alternative set of velocity switch points that favor the softer dynamics.
# 16 • Ivory II Upright Pianos Keysets

## Modern Yamaha U5 Upright

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern Upright 16 Level</td>
<td>Yamaha U5 Upright with 16 dynamic levels</td>
</tr>
<tr>
<td>Modern Upright 16 Level 2</td>
<td>16 level keyset w/ alternative velocity switch pts*</td>
</tr>
<tr>
<td>Modern Upright 14 Level</td>
<td>Yamaha U5 Upright with 14 dynamic levels</td>
</tr>
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<td>Modern Upright 14 Level 2</td>
<td>14 level keyset w/ alternative velocity switch pts</td>
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<td>Yamaha U5 Upright with 12 dynamic levels</td>
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<td>12 level keyset w/ alternative velocity switch pts</td>
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<td>Yamaha U5 Upright with 10 dynamic levels</td>
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<tr>
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<td>Modern Upright 6 Level 2</td>
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<tr>
<td>Modern Upright 4 Level</td>
<td>Yamaha U5 Upright with 4 dynamic levels</td>
</tr>
<tr>
<td>Modern Upright 4 Level 2</td>
<td>4 level keyset w/ alternative velocity switch pts</td>
</tr>
<tr>
<td>Modern Upright Hard Levels</td>
<td>Yamaha U5 Upright, 5 hardest dynamic levels only</td>
</tr>
<tr>
<td>Modern Upright Soft Levels</td>
<td>Yamaha U5 Upright, 5 softest dynamic levels only</td>
</tr>
</tbody>
</table>

*Level 2 Keysets have an alternative set of velocity switch points that will favor the softer dynamics.
### Vintage Hume Upright

<table>
<thead>
<tr>
<th>Preset Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vintage Upright 16 Level</td>
<td>Vintage Hume Upright with 16 dynamic levels</td>
</tr>
<tr>
<td>Vintage Upright 16 Level 2</td>
<td>16 level keyset w/ alternative velocity switch pts</td>
</tr>
<tr>
<td>Vintage Upright 14 Level</td>
<td>Vintage Upright with 14 dynamic levels</td>
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<tr>
<td>Vintage Upright 14 Level 2</td>
<td>14 level keyset w/ alternative velocity switch pts</td>
</tr>
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<td>Vintage Upright 12 Level</td>
<td>Vintage Upright with 12 dynamic levels</td>
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<td>12 level keyset w/ alternative velocity switch pts</td>
</tr>
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<td>Vintage Upright 10 Level</td>
<td>Vintage Upright with 10 dynamic levels</td>
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<tr>
<td>Vintage Upright 10 Level 2</td>
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</tr>
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<td>Vintage Upright 8 Level</td>
<td>Vintage Upright with 8 dynamic levels</td>
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<td>Vintage Upright 8 Level 2</td>
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</tr>
<tr>
<td>Vintage Upright 6 Level</td>
<td>Vintage Upright with 6 dynamic levels</td>
</tr>
<tr>
<td>Vintage Upright 6 Level 2</td>
<td>6 level keyset w/ alternative velocity switch pts</td>
</tr>
<tr>
<td>Vintage Upright 4 Level</td>
<td>Vintage Upright with 4 dynamic levels</td>
</tr>
<tr>
<td>Vintage Upright 4 Level 2</td>
<td>4 level keyset w/ alternative velocity switch pts</td>
</tr>
<tr>
<td>Vintage Upright Hard Levels</td>
<td>Vintage Upright, 5 hardest dynamic levels only</td>
</tr>
<tr>
<td>Vintage Upright Soft Levels</td>
<td>Vintage Upright, 5 softest dynamic levels only</td>
</tr>
</tbody>
</table>

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## Barroom Upright

<table>
<thead>
<tr>
<th>Barroom Upright 14 Level</th>
<th>Barroom Upright with 14 dynamic levels</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barroom Upright 14 Level 2</td>
<td>14 level keyset w/ alternative velocity switch pts</td>
</tr>
<tr>
<td>Barroom Upright 12 Level</td>
<td>Barroom Upright with 12 dynamic levels</td>
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<table>
<thead>
<tr>
<th>Tack Piano</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tack Piano 10 Level</td>
<td>Tack Piano with 10 dynamic levels</td>
</tr>
<tr>
<td>Tack Piano 10 Level 2</td>
<td>10 level keyset w/ alternative velocity switch pts*</td>
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Acknowledgements and Legal Notices

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Additional Sound Design: Geoff Gee, Chris Martirano
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Additional Tech Support: Jeff Allison, James Windsor, Matthew North, Dave Calabrese
Demos Artists: Volker Rogall, Jordan Rudess, Mike Garson, Patrick Moraz, Michael Bearden, Geoffrey Gee, Steffen Fahl, Jamshied Sharifi, Larry Hopkins, Peter Moore, Manfred, Geoff Stradling, Scott Plunkett, Chris Martirano
Many thanks to our Beta Testers: Steve Aiello, Chris Martirano, Geoff Gee, Pierre-Yves Bessuand, Aaron Niemann, Steffen Fahl, Dan Kalin, Mike Babbitt, Tom Salta, Tony Shepperd
Documentation: Rob Huffman
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All sessions produced by Joe Ierardi

**Bosendorfer 290 “Imperial” Sessions**
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Pianist: Janice Weber
Post Production/Consultation: Mark Donahue & Soundmirror
Bosendorfer 290 “Imperial” prepared by Gerhard Feldmann,
Bosendorfer New York

**Steinway D Sessions**
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Pianist: Janice Weber
Concert Technician: Michel Pedneau

**Yamaha C7 Sessions**
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Pianist: Joe Ierardi
Concert Technician: Keith Albright

**Italian Grand Sessions**
The Performing Arts Center at SUNY Purchase
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Pianist: Joe Ierardi
Post Production Consultation: Mark Donahue
Concert Technician: Philip Calabresi
Additional Piano Tuning/Consultation: Jay Natale

**Yamaha U5 “Modern” Upright Sessions**
Blue Jay Recording, Carlisle, MA
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Concert Technician: Jay Natale
Post Production/Consultation: Mark Donahue & Soundmirror
Assistant Engineer: Giles Christenson
Production Assistant: Hannah Ierardi
Special Thanks To: Yamaha, Ben Israel, Ken Miyaoku, & Rocco Ferrante
Thanks also to Ray Totaro @ Boston Organ & Piano
1914 A.M. Hume “Vintage” Upright Sessions
Blue Leopard Audio, Dracut, MA
Engineering: Jeff Williams
Pianist: Joe Ierardi
Concert Technician: Jay Natale
Additional Engineering: Mark Donahue
Production Assistant: Hannah Ierardi
Piano Prepared by Jay Natale
Special Thanks to Marty Walsh for his piano!
Thanks also to Soundmirror, Mercenary Audio and James Nicoloro

1915 Packard “Barroom” Upright Sessions
Blue Leopard Audio, Dracut, MA
Engineering: Jeff Williams
Pianist: Joe Ierardi
Concert Technician: Jay Natale
Assistant Engineer: Adam Brass
Production Assistants: Hannah Ierardi & Steve Aiello
Special Thanks to Louis Gentile for providing the piano!
Thanks also to Mercenary Audio

Tack Piano Sessions
Blue Leopard Audio, Dracut, MA
Engineering: Jeff Williams
Pianist: Joe Ierardi
Concert Technician: Jay Natale
Piano Prepared by Jay Natale
Assistant Engineer: Gavin Paddock
Production Assistant: Hannah Ierardi
Thanks to Mercenary Audio

North American Distribution Exclusively by ILIO
Thanks to Mark & Shelly Hiskey, Todd Lampe, Aaron Niemann, Martin Tichy, Mike Babbitt, Jeff Allison, Austin Haynes, Mike Mancini, Daniel Hange, and the entire team. ILIO Rocks!
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Thanks to all of our overseas distributors for their fantastic support!

Klaus Kandler, Robert Leuthner, Lilo Steffen, and everyone at best service, GmbH – Germany, Austria
http://www.bestservice.de/

Shion Tamura, Takashi Hatazawa, and Yuichi Okada and all at Media Integration – Japan
http://www.minet.jp/synthogy/

Alex & Zia McKie, Toby Daniels, Joel Heatley, and everyone at Time + Space – UK
http://www.timespace.com

Patrick Larsson, Fredrik Boethius, Mattias Fjallstrom, and all at Luthman Scandinavia
http://www.luthman.se

Roberto Lajolo, Daniella Pfieffer and everyone at Midi Music – Italy
http://www.midimusic.it

Sue Meaney and everybody at Sonic Virtual Media – Australia
http://www.svmedia.com.au

Simon Tan and everyone at Sinamex – Singapore, Malaysia
www.sinamex.com

Junghwa Lee, Taehee Ryu, Hyunjin Cho, and everyone at Gearlounge – Korea
http://www.gearlounge.com

Alexei Dmitriev, Anatoli Evngny and everyone at Art Technology - Russia
http://www.arttechnology.ru

Hubert Chlopicki and everyone at Audio Factory – Poland
www.audiofactory.pl

Bev Bracken and all at Sample Division – South Africa
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Special Thanks
Ray Kurzweil, Brad Robinson at Topten Software, Gerhard & Lisa Feldmann at Bosendorfer, Ed Gray, Jeff Matulich, Rob Majors and all at Avid. Jim Cooper, Jon Foley, Glenn Hughes and all at MOTU. Scott Wilkie, Sascha Kujawa, Panos Kolia, Stefan Gretsch, Niko Gerteis, Thomas Jensen, Rob Baker and the rest of the team at Apple, Andrew Kirk, Allen Cronce, Sergio Flores, John Tobin, and all at PACE, Athan Billias, Ken Miyakoku, and Ben Israel at Yamaha, Michael Ost, Farhan Mohamed, Bryan Lanser, Chris Halaby, Rick Escobar and everyone at Muse Research, Alan Palmer at Kawai, Huston Singletary at Ableton, John Newton, Mark Donahue, Janice Weber, and everyone at Soundmirror, Danielle Amyot, Michel Pedneau and all a Le Domaine Forget, Rick Scott and everybody at Parsons Audio, James W. Walker for his Hybrid CD Kit, also Rick Cohen, Tony Shepperd, Chris Martirano, Bill Gardner, and Chuck Surack… we couldn’t have done it without you! Extra Special Thanks To: All of Our Customers! Your support, kind words and encouragement are greatly appreciated!!

Personal Thanks
George would like to thank his friends and family for their love and continued support, to Kirsten for being awesome, to Molly for frisbee fetch, to Rick and Steve who give “going the extra yard” a whole new meaning, and especially Joe for his unwavering tenacity and talent.

Joe wishes to thank his family and friends for their love and support, and all the extremely bright and talented people that I get to work with on a daily basis, especially Steve Aiello, who is a rock, and George Taylor, who simply continues to amaze me. Also, a special note of dedication to the memory of my teacher, Charlie Banacos, who gave so much to so many… and to our dear friend Max-Pol Albert, who also left us much too soon.

Ivory II is dedicated to all the great players, past, present and future. Thanks for your enduring inspiration.

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