

Welcome to SynclavierX 5.2.3!



5.2.3

What is SynclavierX?

SynclavierX is a Macintosh application program and associated hardware and software modules that provide for Macintosh-native operation of the complete Synclavier® Real Time Software. A PCI-based interface card called the PCI-1 installs in your Macintosh Computer (a third-party PCI expansion system is required on Intel-based and most G5 Macintoshes). This interface cards communicates with your existing Synclavier® voice cards and hardware modules using a high-speed multi-conductor twisted-pair cable and an adapter board. The end result is a seamless integration of the complete Synclavier® software package into an operating environment that runs in native mode on your Macintosh's processor.

This documentation file describes the SynclavierX 5.2.1 initial release as well as the SynclavierX 5.2.2 and SynclavierX 5.2.3 updates. New features in 5.2.1 include support of Intel-based Macintosh computers and a full-featured Core MIDI driver. A new command-line utility called AbleDiskTool is also available to assist transferring Synclavier® files to your Macintosh where they can be processed by other Macintosh applications. The 5.2.2 update introduced the ability to export a Synclavier® sequence to a MIDI file stored on your Macintosh computer. The 5.2.3 update introduced fully-routable virtual MIDI output ports and some enhancements to AbleDiskTool.

This release does not include the ancillary Macintosh applications such as EditView, AutoConform, MIDINet and TransferMation.

AbleDiskTool and the SynclavierX MIDI driver are described in separate documents (AbleDiskTool.pdf and SynclavierX Core MIDI.pdf).

Synclavier Digital
Cameron Jones
August 4, 2009

What's New in this release

Release 5.2.3 - March 1, 2009

- Fully-routable Virtual MIDI output ports

Release 5.2.2 - August 13, 2008

- MIDI file export

Release 5.2.1 - February 1, 2007

- SynclavierX Core MIDI Driver
- MIDI Patching window
- AbleDiskTool command line utility
- Improved support of removable media legacy disk drives from SynclavierX
- User control over the size of simulated poly memory

Release 5.2 - April 17, 2006

- Includes Synclavier® Release 5.2
- Initial port to Mac OS X

Release 5.0 - September 15, 2000

- Includes Synclavier® Release 5.0
- Fixed timing bugs that showed up using Mac O/S 9.0.4
- Numerous other features described in Release 5.0 Release Notes

Release 1.4 - December 1, 1999

- Includes Synclavier® Release 4.4
- Introduced Digital Sample-to-Memory
- Introduced OMS MIDI Interface for SynclavierX
- Provided additional calibration options
- Changed system disk image file name
- Fixed TransferMation update on DTD record
- Numerous other features described in Release 4.4 Release Notes

Release 1.3.1 - August 1, 1999

- Fixed bug causing hang using D66 on L page.

Release 1.3 - June 1, 1999

- Provided change of disk setup on the fly using InterChange 1.3. Provided call up of sound files, timbre files and sequences using InterChangeX 2.0. Use of Synclavier®PCILib.dll for shared communication.

Release 1.2 - April 5, 1999

- Fixed EditView scrub problems on fast Macs. Fixed B/R page scrolling problems. Fixed hang while searching on B/R page; allowed <BREAK> to interrupt B/R page search. Added Option-Quit menu selection to quickly quit RTP. Fixed TransferMation crashing problem.

Release 1.0.9 - February 22, 1999

- Added 'Capture Printer Output to File' menu command to support the Music Printing software option.

Table of Contents

What's New in this release	2
System Requirements	4
Software Installation	5
Software Installation Notes	7
License Code	8
Hardware Installation	9
Hardware Installation Notes	9
Launching Synclavier® PowerPC™	10
Setting the Cable Length and Bus Loading Settings	11
Why set the Cable Length and Bus Loading?	11
Using the Test Software to determine Bus Loading	12
Understanding the Test Program output	13
Using Synclavier® PowerPC™	15
Accessing the 5 1/4" SuperFloppy drive	15
Metronome Calibration	17
Creating M512k Memory	17

System Requirements

SynclavierX is designed to run on Dual Processor PowerMac G4 Macintosh computers or Dual Core Intel-based Macintosh computers.

SynclavierX uses about 20 megabytes of RAM. You will need a minimum of 80 megabytes of hard disk storage for installation. You will likely wish to create several Disk Image Files that are several hundred or more megabytes in size if you wish to store sound files on your Macintosh hard drive.

This release of SynclavierX fully supports Synclavier® Disk Image Files up to 8 GB in size.

The recommended SynclavierX Macintosh operating system for all platforms is Mac O/S X v. 10.4.11 ("Tiger") or later. SynclavierX 5.2.3 is fully compatible with Mac OS X v. 10.5.4 ("Leopard").

To use the PCI-1 Hardware Interface on an Intel-based Macintosh computer (and most G5 systems) you will need a PCI expansion system available from Magma Systems (<http://www.magma.com/products/pci/>). Their CB1H Half Length 1 Slot PCI Expansion System is fully compatible with the PCI-1 interface card. The PCI Expansion System connects with your Macintosh using a host card appropriate for your computer model - either their SUBEC34 ExpressCard/34 (in the case of a MacBook Pro) or their SUBPEHIFX1-CB PCI Express host card (in the case of a Mac Pro desktop unit).

My test platform was a Dual Processor 866 Mhz PowerMac G4 c. 2001. Operation on a single-processor machine is not recommended and has not been tested.
--

Software Installation

SynclavierX is available via download:

<http://www.synclavier.com/SynclavierX.html>



Figure 1 - SynclavierX 5.2.3 Disk Image contents

The Synclavier Installer installs the kernel driver, the MIDI driver and AbleDiskTool. A restart will be required.

Drag the Synclavier Digital SynclavierX folder to your desktop, applications folder or any other convenient place. Due to limitations of the Real Time Software you cannot run SynclavierX directly from the installer image directly.

The Synclavier Remover is provided should you wish to remove the PCI-1 kernel driver, the SynclavierX MIDI Driver and AbleDiskTool from your system.

If you wish to use the SynclavierX Core MIDI driver but do not have the PCI-1 Hardware interface installed, you will need to install the Virtual PCI-1 kernel driver. See The ReadMe file located within the Virtual MIDI Users folder for more information.

Synclavier Digital SynclavierX folder:

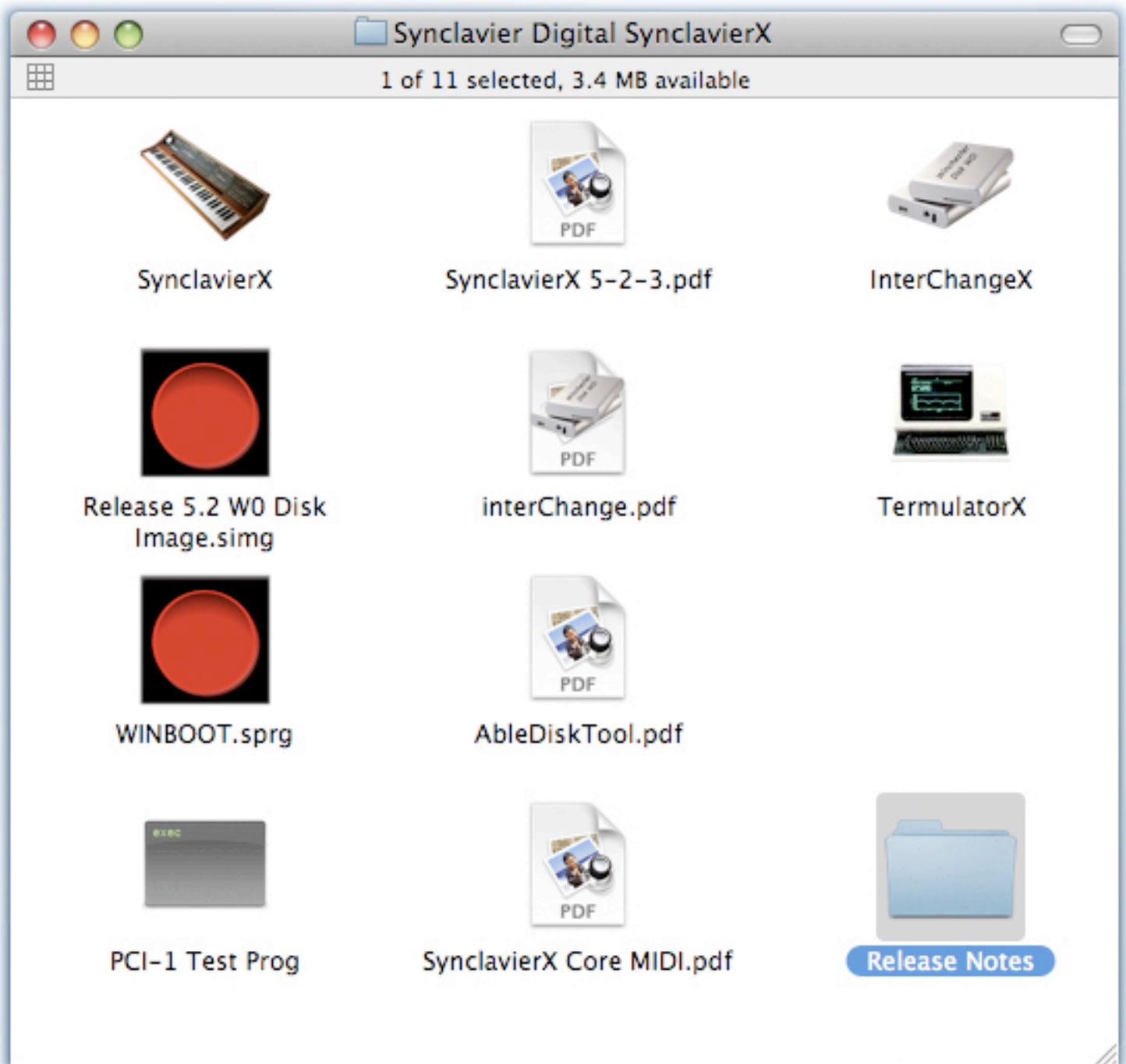


Figure 2 - SynclavierX Folder contents

Documentation on the Synclavier Digital Audio System can be found at:

<http://www.synclavier.com/SynclavierX.html>

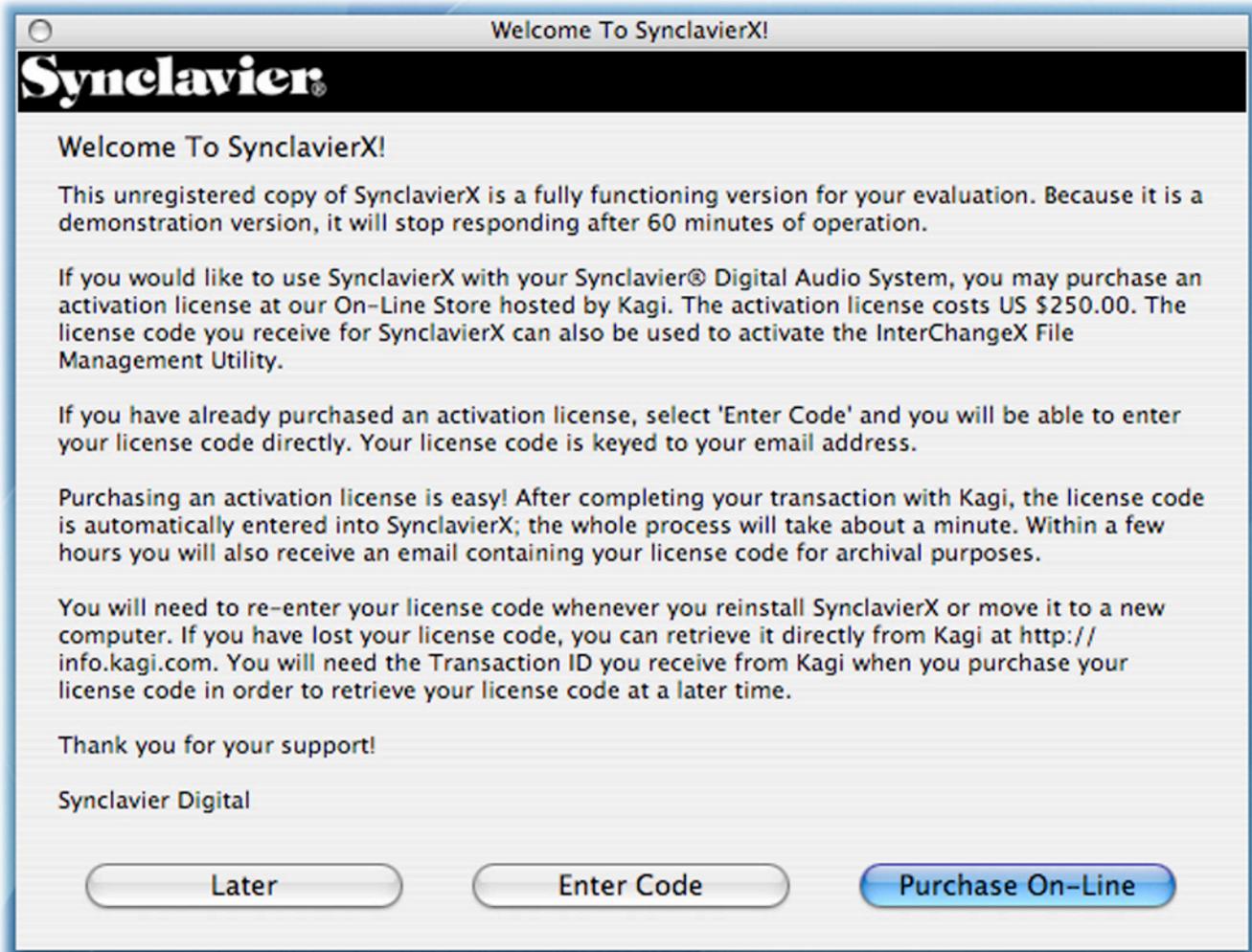
(follow the links at the bottom of the page)

Software Installation Notes

- Default W0: Disk Image File - SynclavierX uses a 30 megabyte Disk Image File located in the SynclavierX folder as W0:. This disk image file will contain the latest Synclavier® Software. You may use InterChangeX to copy the system software from this disk image file to a real SCSI hard drive if you wish. That is, the Synclavier® system software shipped with SynclavierX is fully compatible with the original Synclavier® processor and will run on the original hardware if desired.
- New Disk Image File - You will likely wish to create a new, larger disk image file for use as W0:. Create a new disk image using InterChangeX and then copy all the files (□-A) from W0: to your new disk image. Then assign the new disk image file to W0:. Disk image files up to 8 GB in size are supported in SynclavierX and InterChangeX. Limit your file size to 2 GB (2048 MB) if you wish to interoperate with Mac OS 9. See the InterChangeX documentation for more information.
- Compatibility – The Macintosh software components for SynclavierX 5.2.3 will not interoperate with the software components from earlier SynclavierX releases. Once you run the Synclavier Installer from 5.2.3, earlier releases of SynclavierX will not be able to communicate with your Synclavier® hardware. Should you need to revert to an earlier release of SynclavierX, run the Synclavier Remover from Release 5.2.3 and then re-install the earlier software release.

License Code

SynclavierX requires the purchase of a license code. Follow the on-screen instructions to purchase a license code directly from our on-line store. Activation is immediate.



Hardware Installation

The hardware components for SynclavierX include

- PCI-1 - The PCI-1 interface card can plug into any PCI slot of your Power Macintosh computer. Be sure to turn off your Macintosh and observe careful anti-static precautions when inserting the card. You will typically have to hold the card in place as you connect the 50-conductor cable to the PCI-1 card, so you should connect the cable to the card before closing up your Macintosh.
- Twisted-Pair multi-conductor cable - The cable is specially constructed with 25 high-speed twisted pair conductors. Cable lengths of up to several hundred feet are theoretically possible. Our tests at the factory are conducted with 50-foot cables, although a 25-foot (or shorter) cable will provide somewhat faster operation.
- D0-PCI - The D0-PCI interface card can plug into any slot in your Synclavier® computer interface bin. A short flat cable adapts the flat-cable-connector on the D0-PCI card to the shielded connector at the end of the twisted-pair cable.

Hardware Installation Notes

- Diagnostic Software - Some Macintosh diagnostic Software is installed in the Synclavier® folder in a folder called 'PCI-1 Test Software'. This software is extremely important and verifies the data integrity of your system and cable. Please refer to the documentation on the PCI-1 Test Program later in this manual.

<p>Warning - Always power down your Macintosh before installing or removing the PCI-1 card. Additionally, power down your Synclavier® before installing or removing the D0-PCI card. I strongly recommend that <u>both</u> machines should be powered down whenever you plug or unplug either end of the twisted-pair cable.</p>
--

Launching SynclavierX



SynclavierX

Launch SynclavierX by double-clicking its icon.

SynclavierX includes an 'intelligent' Quit menu item. If you are running an application such as FORMCOPY, selecting Quit will return you to the MONITOR (the Quit menu item will read 'Quit FORMCOPY' in this case). If you are running the Real Time Software, selecting Quit will first return you to the main menu, and a second Quit will return you to the MONITOR. This operation of the Quit menu is similar to the <BREAK> or <CTRL-SPACE> key operation in earlier versions of the Synclavier® Real Time Software.

Quitting SynclavierX will cause your original Synclavier® software to reboot, provided the Winchester Bootload Diskette is installed in the floppy drive.

Note: Do not power down your Synclavier® tower while SynclavierX is running on your Macintosh. The Macintosh will invariably perform a hard crash in this case, and can only be restarted by removing and then reconnecting the AC power to your Macintosh.

If you experience trouble launching SynclavierX, it is likely that you have selected a W0: using the setup portion of InterChangeX, and the selected W0: contains incompatible system software. When in doubt, delete your 'InterChangeX Prefs' from the Preferences Folder (within your user Library folder) and try again. You do not need to restart your Macintosh when you change or delete your 'InterChangeX Prefs' file.

<p>Note: Launching SynclavierX causes the Macintosh to 'take over' your Synclavier®. If you were in the middle of working with your Synclavier® using the conventional software, that work will be lost when you launch SynclavierX!</p>
--

Setting the Cable Length and Bus Loading Settings

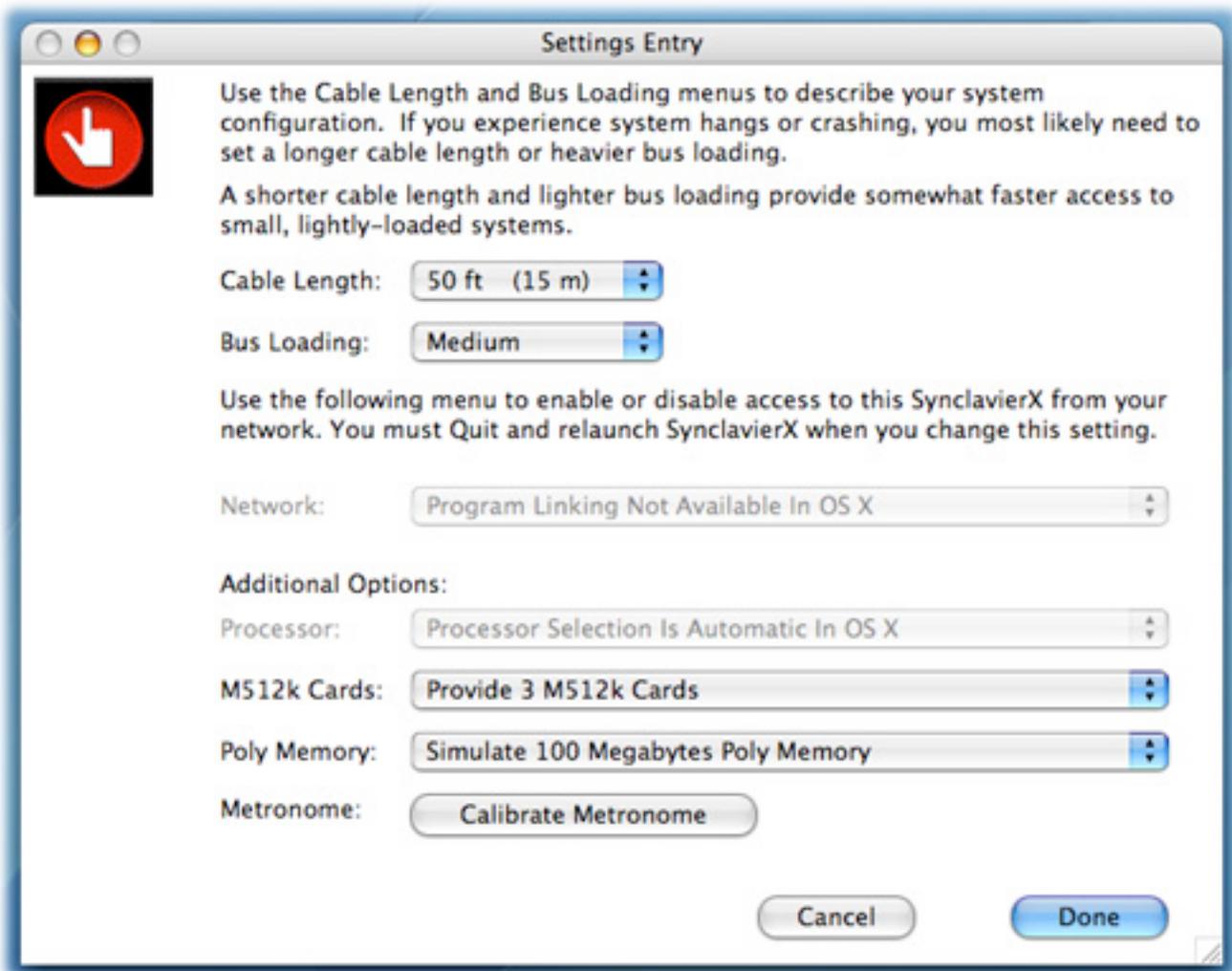


Figure 3

The "Settings..." selection from the Edit Menu activates the dialog shown in figure 3.

Why set the Cable Length and Bus Loading?

The interface cards in the Synclavier® computer bin are interconnected using an asynchronous data bus. When two cards are exchanging data over this bus, a special signal called the SYNC signal is sent by the receiving card to the sending card at the end of each bus transaction.

The PowerPC processor in your Macintosh can respond extremely quickly to SYNC. This may cause the PCI-1 interface card to latch the received data before it has thoroughly settled on the bus and the interconnecting cable. The Cable Length and Bus Loading dialog shown in Figure 3 provides you with the ability to use slower timing signals for

Many different configurations of Synclavier® Systems are in use today. They were manufactured over an extended period of time using different revisions of the processor and interface cards. For this reason, I can't just use one Bus Loading setting in the software. As we gain experience with PCI-1 installations, I hope to offer more specific guidelines in the future.

large, heavily loaded systems, or faster timing signals with short cables or a small, lightly loaded system.

Using the Test Software to determine Bus Loading

Unfortunately, determining the most appropriate setting for Cable Length and Bus Loading involves some guesswork and experimentation. If you are in a hurry, set the Cable Length for a long value (such as 100 ft/30 m) and the Bus Loading to High. This will direct the PCI-1 card to use slower timing signals, which should work with all configurations, albeit with a modest reduction in data rate.

If you wish to optimize your installation for faster data transfers, you can use the "PCI-1 Test Program" to perform a series of data verification tests using different timing signals.

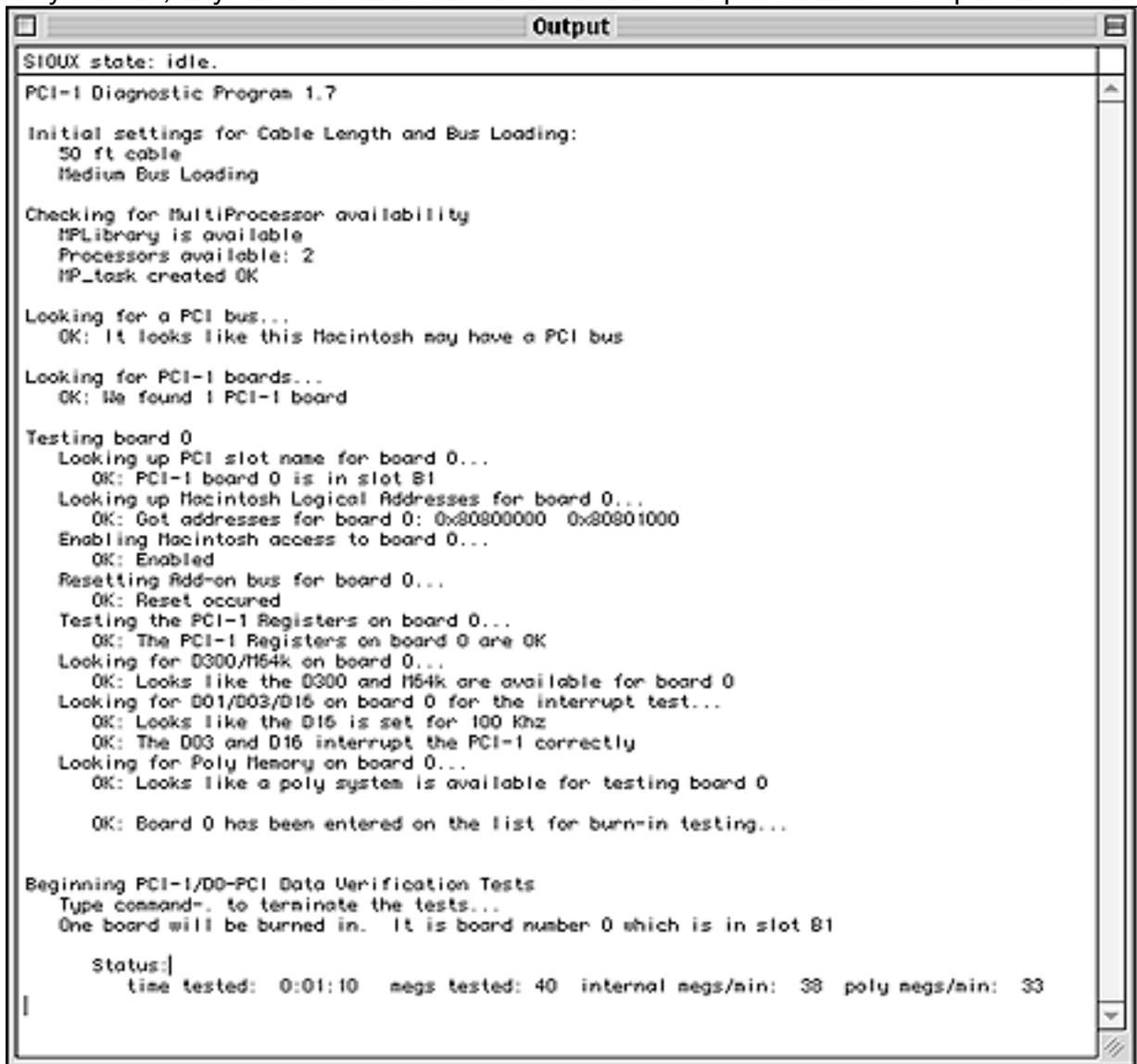


PCI-1 Test Prog

Launch the "PCI-1 Test Prog" application by double clicking on it. You will see a window similar to Figure 4.

Understanding the Test Program output

The PCI-1 Test Program begins by making sure your Macintosh even has a PCI bus, and then looks for a PCI-1 Interface Card installed in it. The software performs numerous error and consistency checks; any errors or unusual conditions will be reported in the "Output" window.



```
Output
STIUX state: idle.
PCI-1 Diagnostic Program 1.7

Initial settings for Cable Length and Bus Loading:
50 ft cable
Medium Bus Loading

Checking for MultiProcessor availability
MPLibrary is available
Processors available: 2
MP_task created OK

Looking for a PCI bus...
OK: It looks like this Macintosh may have a PCI bus

Looking for PCI-1 boards...
OK: We found 1 PCI-1 board

Testing board 0
Looking up PCI slot name for board 0...
OK: PCI-1 board 0 is in slot B1
Looking up Macintosh Logical Addresses for board 0...
OK: Got addresses for board 0: 0x80900000 0x80901000
Enabling Macintosh access to board 0...
OK: Enabled
Resetting Add-on bus for board 0...
OK: Reset occurred
Testing the PCI-1 Registers on board 0...
OK: The PCI-1 Registers on board 0 are OK
Looking for D300/M54k on board 0...
OK: Looks like the D300 and M54k are available for board 0
Looking for D01/D03/D15 on board 0 for the interrupt test...
OK: Looks like the D15 is set for 100 KHz
OK: The D03 and D15 interrupt the PCI-1 correctly
Looking for Poly Memory on board 0...
OK: Looks like a poly system is available for testing board 0

OK: Board 0 has been entered on the list for burn-in testing...

Beginning PCI-1/D0-PCI Data Verification Tests
Type command-. to terminate the tests...
One board will be burned in. It is board number 0 which is in slot B1

Status:|
time tested: 0:01:10  megs tested: 40  internal megs/min: 38  poly megs/min: 33
```

The test program continually transfers megabyte-after-megabyte of data between your Macintosh and your Synclavier® hardware. Every 5 seconds the software updates the status line at the bottom of the Output window to show how long the test has been running, how many megabytes have been transferred, and how many data errors have occurred. The test will run continuously until stopped by command-period or the "Halt Testing" menu selection under the File menu. You can Quit the test program with command-Q.

There is a "Settings..." menu entry on the Edit menu that brings up the same Cable Length and Bus Loading dialog that is available in SynclavierX. You can change the Cable Length and Bus Loading at any time; the changes become effective as soon as the Settings Entry dialog is closed.

The test program prints out the rate of data movement that is achieved between your Macintosh and your Synclavier® interface cards, as well as the data rate that is achieved between

your Macintosh and the Poly Sampling memory. You will see these data rates become slower as the Cable Length setting is increased, and as the Bus Loading setting is increased.

If you set the Cable Length to 20 ft (6 m) and the Bus Loading to Low, you may or may not see errors with your system. If you see any errors at all, you must increase the Cable Length and/or Bus Loading setting until the test runs continuously without errors.

On Mac OS X terminate the test program by typing control-C.

Using SynclavierX

SynclavierX is an operating environment that reproduces a complete Synclavier® as accurately as possible. The few software features of the original Synclavier® that are not available in SynclavierX at this time are:

- The built-in non-synced "Smpte Generator" function
- Full access to the 5 1/4" SuperFloppy

Of course, those software features listed are still active in the software when the system is running on the original "Model D" processor.

Accessing the 5 1/4" SuperFloppy drive



Due to numerous technical problems, SynclavierX cannot reliably access the original 5 1/4" SuperFloppy drive. These problems derive from the inability for Macintosh applications to disable interrupts on the host PowerPC or Intel processor.

The SuperFloppy drive is listed in the device configuration and is available for reading to a limited extent. Any attempt to write to a floppy will fail and report a 'write protect' error.

Accessing the SuperFloppy from SynclavierX will be approximately 5 to 10 times slower than accessing the SuperFloppy from the original "Model D" processor due to numerous retries that must be performed. Frequently, it will take so long to access a SuperFloppy that you will think your Macintosh has crashed.

Performing a simple CAT of the floppy contents (either from the Monitor or Sequence Recall screen) is perhaps the most straightforward and reliable operation and will generally work. Accessing small sequence or patch files (e.g. up to several hundred sectors long) located on a nearly empty floppy also may work to a limited extent, albeit very slowly. Accessing large files on a floppy, or accessing any file on the inner most region of the disk, will likely hang your Macintosh for long enough that you will choose to restart it.

Of course, you can reboot your Synclavier® using the original "Model D" processor at any time simply by Quitting the SynclavierX application and using an original Winchester Bootload diskette. The floppy drive can then be accessed by the Model D processor as before.

Perhaps now is a good time to migrate your entire SuperFloppy collection to a Synclavier® hard drive or to a Macintosh hard drive or network. There are several ways you could approach this situation:

- You could copy the contents of each floppy to a subcatalog on a Synclavier® SCSI hard drive
- You could copy the contents of each floppy to a subcatalog stored in a Disk Image File located on your Macintosh

If you intend to use your 5 1/4" SuperFloppy drive with SynclavierX, please read this section carefully. I strongly recommend you migrate your entire floppy collection to a Macintosh hard drive at this time. Access to the SuperFloppy drive may prove to be so unreliable that I discontinue it in the next release. In any case SAVE ALL YOUR WORK and be prepared for your Macintosh to crash whenever you access your SuperFloppy drive from SynclavierX!

The SuperFloppy drive seems to work somewhat better on multi-processor Macintoshes. Painful, not utterly painful...

or - You could import your entire floppy collection to a series of Macintosh Files and Folders using InterChangeX

Using InterChangeX to import your floppy collection to Macintosh files and folders will allow you to use the Macintosh "Find" capability to quickly locate a particular Floppy or any file thereon by name. Additionally, importing your floppy collection in this way will reduce the actual storage taken up your collection to the smallest amount possible. Further savings in storage space could also be achieved by using an archive utility such as Stuffit, although by doing so you will lose the Macintosh "Find" capability.

Of course, this current version of SynclavierX can only access Macintosh files that are in the Disk Image format; it cannot access individual Patch, Sequence, Sound or Data files stored in the Macintosh format. This means you will generally have to use InterChangeX to re-export the Macintosh-resident copy of a floppy to a Synclavier® hard drive or a Disk Image File before actually using a file from that floppy.

All things considered, here is perhaps the best method to migrate your SuperFloppy library to your Macintosh:

- Boot your Synclavier® from it's Model D processor
- Create a subcatalog 2400 sectors long for each floppy you wish to archive. You could use either W0 or W1 for these subcatalogs. To simplify importing these subcatalogs into your Macintosh, you may wish to first create a very large super-subcatalog that will hold up to 128 of these floppy subcatalogs. 1.2 megabytes of hard drive storage will be required for each floppy subcatalog.
- Use FORMCOPY to copy each floppy into its subcatalog
- Use AbleDiskTool to import either the entire device, the entire super-subcatalog, or each floppy subcatalog to your local Macintosh hard drive or network.

Please refer to the AbleDiskTool User Manual (AbleDiskTool.pdf) for more information on importing Synclavier® files to your Macintosh.

Metronome Calibration

Different models of Apple Macintosh computers use very different internal methods to provide precise timing information to SynclavierX. With certain model Macintoshes using certain Macintosh Operating Systems the timing information that SynclavierX uses to create the Click Track Output is inaccurate.

Metronome:

Calibrate Metronome

The Calibrate Metronome button in the Settings... window provides a mechanism to accurately measure the Macintosh's processor clock against its time-of-day clock. Metronome calibration takes 30 seconds and produces extremely accurate results. The results of the measurement are written to the 'SynclavierX Prefs' file.

You should perform a metronome calibration any time you change computers. SynclavierX will automatically ask for a new calibration during startup whenever the 'SynclavierX Prefs' file is deleted.

Creating M512k Memory

Classic Synclavier® systems used circuit cards called 'M512k Memory' to store recorded sequence information. The amount of this memory available to a classic Synclavier® was determined by the number of M512k cards in the system.

SynclavierX allocates Macintosh memory that is then used to simulate M512k card memory. A menu option in the Settings... window lets you control the amount of Macintosh memory that is allocated for this purpose.

M512k Cards:

Provide 3 M512k Cards
 Provide 4 M512k Cards
 Provide 5 M512k Cards
 Provide 10 M512k Cards

The following table identifies the number of sequencer notes that are available for each setting.

M512k Cards	Notes Available
3 M512k Cards	175,194 Notes
4 M512k Cards	409,098 Notes
5 M512k Cards	661,002 Notes
10 M512k Cards	1,920,522 Notes