

**Release Notes for Synclavier® Release 5.0,
Synclavier® PowerPC™ 5.0
InterChange™ 1.5
and InterChange™ 2.5
September 15, 2000**



A New Name for an Old Friend!

Beginning with this release we are switching to a consistent release numbering across the multiple applications and modules that make up the Synclavier® software base. With the exception of InterChange™, all modules will bear the 5.0 designation for this release. We were unable to make use of that terminology for InterChange™ since InterChange™ is still divided between two independent modules (InterChange™ 1.5 and InterChange™ 2.5). We anticipate that InterChange™ 2.5 will absorb the entire InterChange™ 1.5 feature set within the next 8 months; a renamed InterChange™ 5.0 will be released at that time.

What's New In This Release?

This integrated software release provides a comprehensive update to all Synclavier® software, both for the original "Model D" processor and for the Synclavier® PowerPC™ hardware platform.

Bug fixes and new features in this release include:

- The Frames-Per-Beat metronome displays in the Real Time Software were reworked to provide separate film-frames and SMPTE-frames per beat as well as the desired 80th and 800th of a beat resolution.
- MIDINet's 'Export MIDI File' feature has been improved and made more accurate.
- A "Show Loops" option was added to the Sound File screen (B screen).
- A bug that occasionally corrupted sound files when saving files from poly memory to disk was fixed.
- Numerous changes were made in Synclavier® PowerPC™ to provide accurate timing under Mac O/S 9.0.4. These timing errors showed up as Direct-to-Disk dropouts when chasing SMPTE timecode on Macintoshes using Mac O/S 9.0.4.
- Support for AIFF, SoundDesigner® II and .WAVE soundfile formats was added to InterChange™ 1.5
- Many new features were added to InterChange™ 2.5, including the ability to seamlessly browse and manage multiple disk image files located anywhere on your Macintosh or its Local Area Network.

What's New In InterChange™?

InterChange™ includes some important new features for this release. InterChange™ 1.5 now includes native support for AIFF, SoundDesigner® II, and .WAVE soundfiles located on your Macintosh. Those sound files can be easily exported to a Synclavier® hard drive or disk image file. Additionally, Synclavier® sound files can automatically be converted to AIFF, SoundDesigner® II, or .WAVE format as they are imported to your Macintosh.

InterChange™ 2.5 also has many new features, including its ability to

- easily navigate multiple disk image files located anywhere on your Macintosh or it's Local Area Network.
- rename files, create subcatalogs and copy files and subcatalogs between disk image files and Synclavier® hard drives.
- easily change the InterChange™ setup using Macintosh Drag-and-Drop.
- browse, rename files and delete files from optical image files and media.
- copy sound files from optical media or optical image files to a Synclavier® hard drive or disk image file.
- quickly and easily change the current optical platter using Macintosh Drag-and-Drop.

What's Coming Up?

Our big development push over the next 8 months will be to complete a modern user interface and mechanism for the management of Synclavier® sound files, sequences and timbre libraries. This mechanism will include 32-character soundfile names plus the ability to directly call up Macintosh-resident soundfiles to the keyboard. The **Find...** functions in InterChange™ will be completed. The support for AIFF, SoundDesigner® II and .WAVE soundfiles will be migrated from InterChange™ 1.5 to InterChange™ 2.5.

Synclavier® Release 5.0 5¹/₄" Diskettes

A series of 8 5¹/₄" SuperFloppy diskettes provides a copy of all 5.0 System and Real-Time software for the Model D hardware platform. These diskettes can also be used to install the Release 5.0 operating software on a Synclavier® hard drive that is used with Synclavier® PowerPC, although it is typically easier to use InterChange™ for that purpose.

2 diskettes - System Software

2 diskettes - Real Time Software (SYN-5.0)

2 diskettes - Real Time Software with Guitar (SYN-5.0G)

1 diskette - Music Printing and XPL Compiler

1 diskette - Winchester Bootload Diskette

Synclavier® Release 5.5 Macintosh Diskettes

A series of 2 Macintosh HD Diskettes installs the basic Macintosh applications, including Termulator, EditView®, AutoConform, MIDINet®, TransferMation™ and InterChange™ 1.5. The MixMap™ cue sheet printing software for use with EditView™ is also included on these diskettes.

Synclavier® PowerPC™ 5.0 CD-ROM

The Synclavier® PowerPC™ 5.0 CD-ROM installs all Macintosh and operating software, including Synclavier® PowerPC™ 5.0.

Digital STM™ 5.0 CD-ROM

The software to support the Digital STM™ option is packaged on it's own CD-ROM for Release 5.0.

Documentation

User documentation for the new features follows.

MIDINet's "Export MIDI file" feature

The two remaining known flaws in MIDINet's "Export MIDI file" feature have been fixed.

MIDINet now takes the Synclavier's SPEED parameter into account when translating tempos for export to MIDI files. This means you will be able to accurately export Sequences containing "Frames per Beat" tempos. Since "Frames per Beat" tempos required a SPEED setting of 0.960, such sequences didn't export correctly in the past. (Actually any sequence with a SPEED other than 1.000 didn't export correctly in the past.)

Also prior versions of MIDINet exported incorrect tempos if the sequence had a tempo/meter map with divisions per beat not equal to 480. The divisions per beat is determined by the setting of the CLICK RATE parameter (in milliseconds per beat) at the instant the map was activated. This means that if your CLICK RATE was not set at 480 milliseconds per beat when you activated your map, the tempo(s) in your MIDI file would be wrong. This problem is now fixed.

In short, MIDINet's "Export MIDI file" feature simply works now regardless of any ifs, ands or buts.

A technical hedge regarding tempo precision in MIDI files:

Please be aware that unlike Synclavier sequences, MIDI sequences are not capable of producing all standard "Frames per Beat" tempos with exact precision. This is because MIDI tempos must be an integer number of microseconds per beat, whereas the Synclavier's SPEED parameter allows the actual resulting tempos to include fractions of microseconds.

As a worst case example, consider a CLICK RATE of 520 milliseconds per beat scaled by a SPEED of 1.024. This results in an actual sounding tempo of 507812.5 microseconds per beat. MIDINet has to round off the .5, and consequently the MIDI sequence will drift by half a microsecond for each beat. However that's not so bad, because even with this worst case scenario, it will take 2000 beats just to drift 1 millisecond. Furthermore, when using a SPEED of 0.960 for "Frames per Beat" tempos, it turns out that the most you'll ever drift is one third of a microsecond per beat, which translates into 1 millisecond per 3000 beats.

PowerBook Enter Key

It has been noted that when running Termulator or Synclavier® PowerPC™ on a PowerBook, the Enter key did not function as expected. This was because the PowerBook's Enter key emits a different key code than the Enter key found on the numeric keypad of extended keyboards. To avoid this inconvenience, as of this release Termulator and Synclavier® PowerPC™ will recognize the PowerBook's Enter key as well as the numeric keypad Enter key.

FRAMES PER BEAT TEMPOS

Background:

As explained above in the “technical hedge regarding tempo precision in MIDI files”, MIDI based sequencers are not capable of accurately producing the film industry standard Frames per Beat tempos (often referred to as the “Knudsen Book” tempos.) By contrast, the Synclavier will produce these tempos if the SPEED is set to any multiple of 0.192. For this purpose a SPEED of 0.960 is typically used because it is the multiple of 0.192 closest to 1.000. Because of this, prior to Release 4.4 the CLICK RATE was automatically displayed as Frames per Beat if the SPEED was set to 0.960. While this feature was useful to film composers needing to conform to the Knudsen book standard, it suffered from a few drawbacks. First of all there was no choice. If we happened to have a SPEED of 0.960 we were forced to view the CLICK RATE in Frames per Beat whether we wished to or not. Also there was no way to see the approximate Frames per Beat resulting from any other SPEED setting. Most troublesome of all, when using a tempo or meter map the Frames per Beat display didn’t work at all.

All of these problems were solved with Release 4.4. A new Frames per Beat tempo display mode was added and all tempo display modes worked regardless of the SPEED setting. Unfortunately this implementation suffered from a few drawbacks as well.

- The Film frame rate was used only if the time display mode was set to Feet:Frames. Otherwise the SMPTE frame rate was used. This not only required the user to go to extra effort to view and enter tempos in Film Frames per Beat, but since the frame rate used would revert to the SMPTE frame rate as soon as notes were displayed as Beats or some other format, it was far too easy for us to think we were viewing Film Frames per Beat when in fact we were viewing SMPTE Frames per Beat.

To solve both of these problems, this release features two independent frame tempo display modes “Film Frames per Beat” and “SMPTE Frames per Beat”. Now you can simply select the display mode you want, and it will remain in effect regardless of what time display mode you use to view your notes.

- It is conventional to express Frames per Beat tempos with the digit after the decimal point referring to eighths of a Frame. For example, “12.3” means twelve and three eighths of a Frame per Beat. Prior to Release 4.4, the Synclavier conformed to this convention. Due to an oversight, the Release 4.4 implementation did not. Consequently the user would have to dial in 12.375 to achieve twelve and three eighths. This was a further cause of some confusion and difficulty.

This has been corrected in this release. Note that owing to the microsecond level of precision available when using a tempo or meter map, there are now three digits after the decimal point. You can think of these as 800ths of a frame. Therefore to get a 12.3 tempo (twelve and three eighths), you would dial in 12.300. With mapped sequences you can dial directly to the standard Knudsen book tempos by holding the CLICK RATE button as you dial.

A Note About Accuracy With Mapped Sequences

“Beats per Minute” and “Frames per Beat” are merely modes of display and entry for the convenience of the user. The click rate stored in the sequence is actually always in Microseconds per Beat. When you enter a tempo in any display mode, the nearest equivalent Microseconds per Beat click rate is computed. However, changing the tempo display mode does not alter the underlying click rate. Therefore if you select a different tempo display mode after entering a tempo, the underlying click rate is probably NOT the nearest equivalent to the newly displayed value.

As an example, suppose we have a mapped sequence with the SPEED set to 0.960. We can dial the CLICK RATE to any of the 50 discreet values from 479,975 to 480,024 Microseconds per Beat, and ALL of them will display as 12.000 Frames per Beat. (The CLICK RATE that would result in an exact “12.0” is 480,000 in this case.)

Consequently, if it is important to you that the actual tempo is as close as possible to the value displayed in a given mode, you can assure this by re-entering the tempo while the desired display mode is active.

I know I'm driving this into the ground but...

Please be aware that unless the SPEED is set to 0.960 (or some other multiple of 0.192) any Frames per Beat tempo displayed is likely to be a rounded value. To achieve an exact Knudsen book standard tempo, it is still, as before, necessary to set the SPEED to .960 or a multiple of 0.192.

B-page “SHOW LOOPS” feature

A display mode has been added to the B-page (Sound File Directory) which allows viewing and printing the start times, end times and lengths of sound file loops. The loop times displayed here should not be confused with the “butt-splice patch loops” that can be viewed on the I-page. Rather, these are the SFM or L-page “crossfade loops” embedded in the sound files themselves, which were until now hidden from the user.

This feature has been added primarily to serve the following two purposes:

1. When looped sound files are transferred to another platform via S/link, where the loops may need to be re-created, we will now be able to know what the original loop times were.
2. Consider the common task of pitching a looped rhythm sample such that it matches a particular tempo. The new “show loops” feature enables us to remove the guesswork and perform this task more quickly. We can now simply look up the loop length and calculate the exact tuning needed*, rather than going through the more time-consuming and less accurate method of repeatedly playing the sample against the click track while turning the knob, waiting for the sample to get far enough out of sync with the click, and trying to ascertain whether it's drifting behind or ahead.

* For the algebraically challenged: Following are formulas for determining the tuning needed to make a sound file loop match a `desired_tempo`. Note that `number_of_beats` refers to the number of beats that are actually looped in the sound file.

If you wish to tune using a HERTZ parameter such as PARTIAL TUNING, use the following:

if `desired_tempo` is expressed in seconds per beat...

$$\text{hertz} = 440 * \text{loop_length} / (\text{desired_tempo} * \text{number_of_beats})$$

if `desired_tempo` is expressed in beats per minute...

$$\text{hertz} = 22 * \text{desired_tempo} * \text{loop_length} / (3 * \text{number_of_beats})$$

If you wish to tune using a SEMITONES parameter such as the I-page's tuning field, use the following:

(You will need a calculator that can handle logarithms)

if `desired_tempo` is expressed in seconds per beat...

$$\text{semi_tones} = -12 * \log(\text{desired_tempo} * \text{number_of_beats} / \text{loop_length}) / \log(2)$$

if `desired_tempo` is expressed in beats per minute...

$$\text{semi_tones} = -12 * \log(60 * \text{number_of_beats} / (\text{desired_tempo} * \text{loop_length})) / \log(2)$$

L-Page BUG FIXES

Saving Soundfiles From Polymemory To Winchester: Bug #1

Some soundfiles, when being saved from Polymemory to Winchester, were saved with sections of audio erroneously taken from elsewhere in Polymemory.

Saving Soundfiles From Polymemory To Winchester: Bug #2

When prompted to enter a name for the soundfile to be saved, if you pressed RETURN to use the existing name by default, and the existing name had less than eight characters, the system reported "Error: Invalid Character in Filename".

Displaying Very Short Soundfiles

An infinite loop (i.e., system hang) occurred whenever a soundfile containing only one sample was displayed on the L-page. Also, when displaying soundfiles containing only two samples, spurious and meaningless time tick marks were plotted on the Landscape Display.

Functional Consolidation Of The Sequence Stop Buttons

As you probably know, STOP buttons pertaining to the sequencer can be found in several locations. Probably the three most commonly used are on the Velocity Keyboard, on the S-page and on the Motion Control Panel of the Q-page. While it may appear at first that they are functionally equivalent, more thorough use reveals that they are not the same. For example, when incoming SMPTE is present the VK STOP button would stop the sequencer, but the S-page and Q-page STOP buttons would not. Similarly, if the sequence was not running and Direct To Disk cues were playing, pressing the Motion Control Panel's STOP button on the Q-page would stop the cues from playing, but the VK and S-page STOP buttons would not.

Because it was a little frustrating to press STOP to no avail and then to have to go searching for the right flavor of STOP, we have made the three aforementioned STOP buttons (more nearly) functionally equivalent. That is, all three will now stop the sequence even if incoming SMPTE is present, and all three will stop Direct To Disk cues from playing even if the sequence was not running.

Note: When the sequence is not running, the VK STOP button can be pressed to stop any stuck MIDI notes. This function is still not shared by the S-Page and Q-page STOP buttons.

Barely worth mentioning, BUT...

- A bug was discovered and fixed which allowed long headings on the windows in the B-page and R-page to plot over the buttons.
- Some math routines used extensively by the Synclavier and the Direct to Disk have been replaced by new routines which run three to five times faster on D-processor systems and somewhat faster on PPC systems. It is unknown whether this boost in performance will manifest itself in any way noticeable to us carbon-based life forms.