



















Users Manual

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1 Introduction

If you are familiar with tracker programs, then you can probably skip through most of this document. Unfortunately, these days the term “tracker programs” seems to include programs like Psycle and Fruity Loops¹ which *Schism Tracker* is nothing like, and this document will not help you with.

So, for those of you who are *unfamiliar* with tracker programs, it would probably be best to print out this document in its entirety, and refer to it as you work with *Schism Tracker*.

1.1 What is Schism Tracker



Schism Tracker is a Free² reimplementation of Impulse Tracker, a program used to create high quality music without the requirements of specialised, expensive equipment, and with a unique “finger-feel” that is difficult to replicate in-part. Where Impulse Tracker was limited to i386-based systems running MS-DOS, *Schism Tracker* runs on almost any platform that SDL³ supports, including: AmigaOS, BeOS, FreeBSD, Linux, Macintosh OSX, Windows NT; and just about any architecture that GCC⁴ supports, including: x86 (ia32), amd64 (ia32e), ppc32, ppc64, alpha, m68k, and arm.

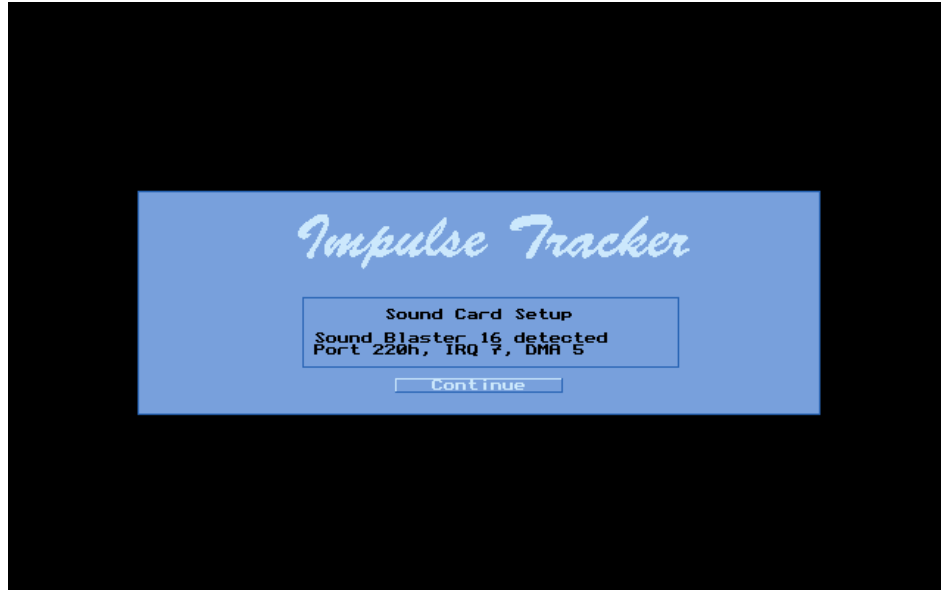
¹Both of which, I’m sure, are fine programs, but they aren’t trackers

²Schism Tracker is redistributable under the terms of the GNU General Public License.

³Simple Directmedia Layer

⁴The GNU Compiler Collection

1.2 What is Impulse Tracker



Impulse Tracker was a program used to create high quality music without the requirements of specialised, expensive equipment. The hardware requirements were easily met: Any IBM 386+ compatible computer (although a 486+ was recommended), and a VGA or higher video card.

Unfortunately, *Schism Tracker* has somewhat less modest hardware requirements. This is partly because *Schism Tracker* is written in portable C, but also partly because of the various abstraction layers (the host operating system, the emulated VGA display). You will need at least a 166Mhz PPC, or a 233Mhz x86 for acceptable performance. Other architectures and other platforms will have other requirements, as will differing definitions of “acceptable performance”. These are guidelines only.

1.3 About Schism Tracker

According to Storlek, *Schism Tracker* began as an experiment with libmodplug and SDL. As a result, *Schism Tracker* grew somewhat more organically than other Impulse Tracker reimplementations. However, *Schism Tracker* is much more feature-complete, stable, and usable than any of the other reimplementations.

Additionally, even though *Schism Tracker* uses libmodplug for playback, Mrs. Brisby had modified libmodplug significantly to remove bugs and certain playback behaviors present in Modplug Tracker, and to add support for behaviors and bugs that are present in Impulse Tracker.

You can refer to the appendix of this document for differences between *Schism Tracker* and Impulse Tracker.

1.4 Where can I get Schism Tracker

Schism Tracker can be downloaded from <http://www.rigelseven.com/schism/> although under periods of aggressive development, source-code snapshots and binaries made directly from the development tree can be found at <http://www.nimh.org/schism/>.

You should introduce yourself on the *Schism Tracker* message board at <http://www.rigelseven.com/sc/>, and let us know how you found out about *Schism Tracker*, and how you're using it. You should also let us know if you find any bugs.

1.5 Compiling Schism Tracker

Mrs. Brisby builds executables for Linux (x86), Macintosh OSX (ppc and intel), and Windows (x86). If you are going to try and run *Schism Tracker* on another platform, familiarity with building other software will be helpful. On almost any UNIX-like system, the procedure will look something like this:

```
$ cat schism-current.tar.bz2 | bunzip2 | tar xf -
$ mkdir schism-build
$ cd schism-build
$ ../schism-current/configure
$ make
$ sudo make install
```

1.6 Running Schism Tracker

Schism Tracker is started like any other program. On Mac OS X this involves double-clicking on the application bundle- **Schism Tracker.app**, on Windows this involves double clicking on **schismtracker.exe**, and on GNOME this will usually involve finding **Schism Tracker** in your Applications menu. Other systems will vary somewhat.

Schism Tracker has a number of options that may be useful on the command-line which are listed using **--help**. You should not need any of these for normal operation⁵, but for your convenience they are listed in the appendix.

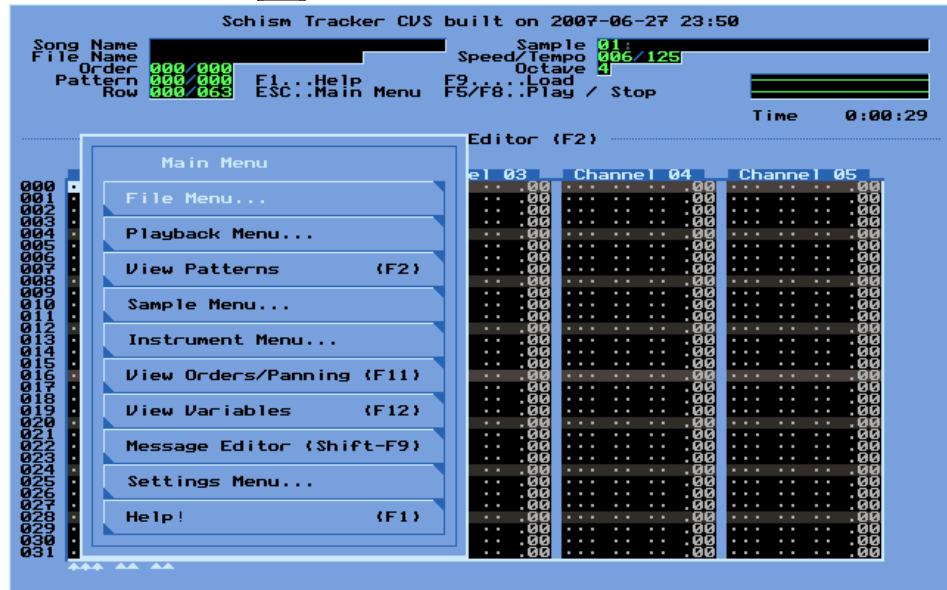
⁵If you do, it is probably a bug

2 Using Schism Tracker

Schism Tracker simulates the VGA⁶ display in a particular VGA text mode⁷ that Impulse Tracker used when it ran under PC-DOS. *Schism Tracker* faithfully reproduces the Impulse Tracker user interface, complete with its pseudo-graphical buttons and “thumb bars”. You *can* use your mouse to manipulate the user interface, but *Schism Tracker*, like Impulse Tracker, is best operated with the keyboard.

2.1 Basic user interface

At any given time, one control has input-focus. You can change which control has input-focus by pressing `[Tab]`⁸, and in many cases, the arrow keys as well.

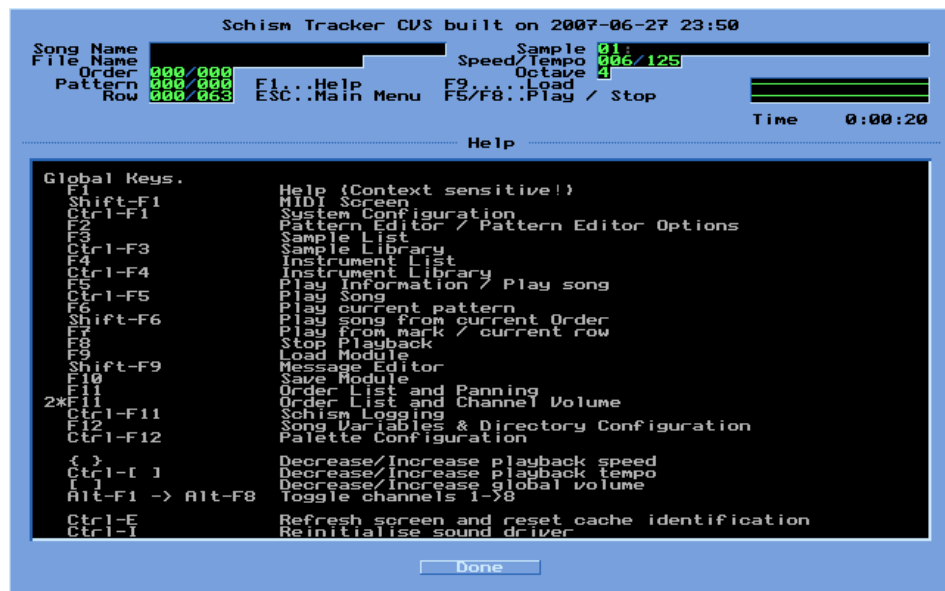


Almost everywhere, pressing `[Esc]` opens the main menu.

⁶Video Graphics Array

⁷80x50; that's 640x400 pixels.

⁸If you hold `[Shift]`, the order of the controls will be reversed, and you'll select through all the controls *backwards*



Almost everywhere, pressing will pull up context-sensitive online help.

Thumb bars: Pressing and arrows will shift the values left/right.



Holding down while pressing those arrows will move by 2, while holding will move by 4 and will move by 8. Typing in a number will get you directly to the desired value!

String (text) entry Nothing special here, but pressing + will clear the entire text. The mouse can also be used to select text directly, which allows interaction with your systems' clipboard.

Numerical entries (of the 7 digit or 3 digit variety) Pressing or will increase/decrease the value by 1.

2.2 Playing songs



Press **[F9]** to open the *Load Module* page. You can then select a song with your mouse, or with the arrow keys. When you found one you want to load, press **[Enter]**. You can also type the first few characters of a filename, and *Schism Tracker* will search through the list of files, jumping you to the first match.

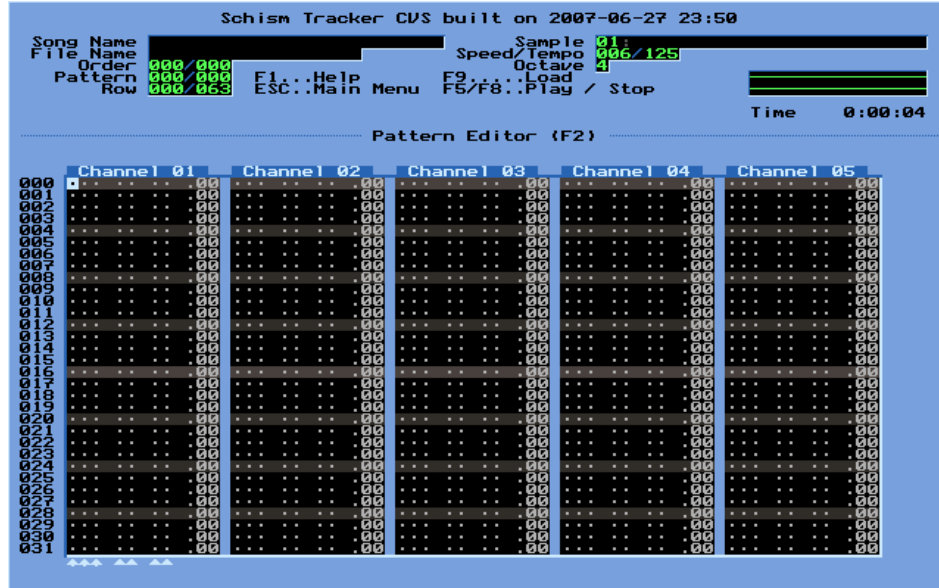
Note: On all the file displays in *Schism Tracker*, you can delete files by pressing **[Del]**.

After loading a song, press **[F5]** to play it, and **[F8]** to stop. The *Info page* should appear, and you can cycle through views with **[Page Up]** and **[Page Down]**. Separate view windows can be created by pressing **[Ins]** (and removed by pressing **[Del]**) and these separate view windows can each display something different.

If you're looking for some songs to play, you can try visiting these sites:

- The Mod Archive: <http://www.modarchive.org/>
- Nectarine Demoscene Internet Radio: <http://www.scenemusic.net/>
- The Hornet Archive: <http://hornet.scene.org/>

2.3 Pattern editor - F2



The pattern editor allows you to edit patterns. For those of you who are familiar with music, patterns can be thought of as “bars”, and the order in which these “bars” are played is determined by order list (accessible via F11). For those of you who are not familiar with music, it is sufficient to consider patterns as a small collection of notes.

You move the cursor around the pattern with the arrow keys. You can also use the mouse to pick a position. You enter notes either with a MIDI keyboard⁹ or with your regular PC-style keyboard.

~	!	@ C#5	# D#5	\$	% F#5	^ G#5	& A#5	*	(C#6) D#6	-	+	←	Backspace
Tab	↔	Q C-5	W D-5	E E-5	R F-5	T G-5	Y A-5	U B-5	I C-6	O D-6	P E-6	{	}	
Caps Lock	⬆	A	S C#4	D D#4	F	G F#4	H G#4	J A#4	K	L	:	"	Enter	⬆
Shift	⬆	Z C-4	X D-4	C E-4	V F-4	B G-4	N A-4	M B-4	<	>	?	/	Shift	⬆
Ctrl		Alt											Alt	Ctrl

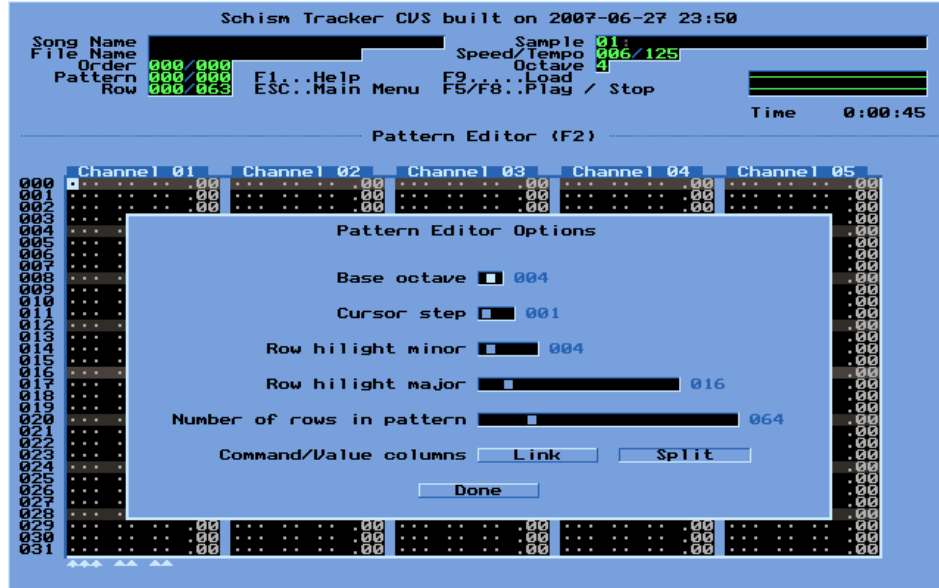
Initially, pressing Q will emit C-5. This can change as you adjust what is called the “Base Octave” (more on that in a moment).

Patterns range in length between 32¹⁰ and 200 rows, with 64 being the default, largely for historic reasons. You can change this value using the *Pattern Editor Configuration* screen by pressing F2 when already on the

⁹see the MIDI configuration appendix for more details

¹⁰You can use effect C00 to simulate a shorter pattern (e.g. for upsteps)

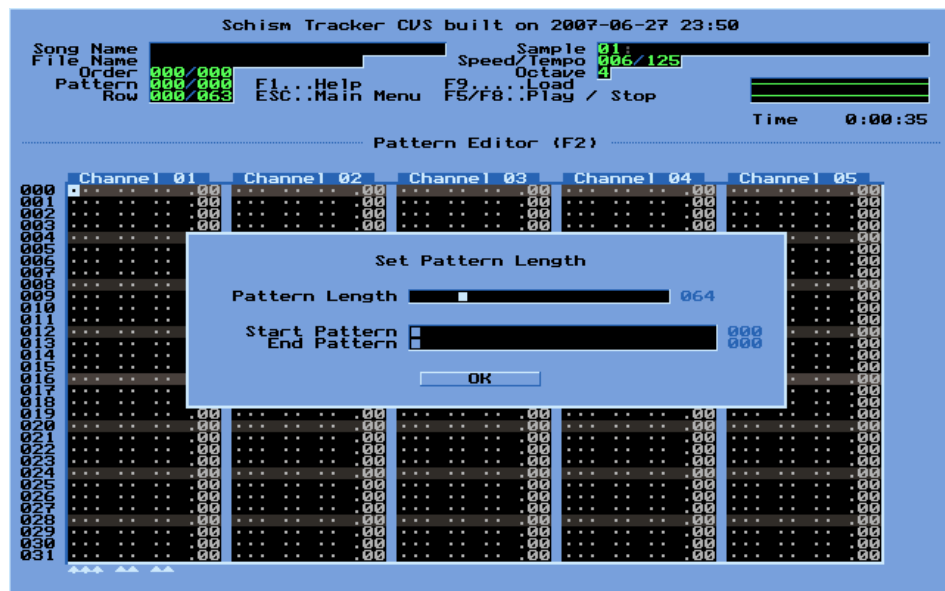
Pattern Editor.



The other options available are:

- Base Octave
- Skip Value
- Row Highlight Major
- Row Highlight Minor *controls the distance between emphasized rows*
- Command/commandvalue link/split

You can change the number of rows of several consecutive patterns with **Ctrl** + **F2** .



The octave of the note is determined by adding the BaseOctave to the Octave of the note played. The BaseOctave can be adjusted by pressing the Grey¹¹ keys or . Laptop users without a numeric keypad can use their mouse to click on the octave display near the top of the screen. Despite what the official Impulse Tracker documentation has to say on the subject, Ctrl-Up Arrow and Ctrl-Down Arrow do *not* change the base octave, but instead the current instrument.



The range of notes is from C-0 to B-9. The “middle” note is considered as C-5. This is in contrast to Scream Tracker, and Modplug Tracker where the “middle” note is C-4.

Pressing on the note column will enter a notecut command. This causes any note in the column to immediately stop.

Pressing ¹² on the note column will enter a noteoff¹³ command. This causes all sustain points to be released (Explained in samples and instruments in more detail.)

Pressing + or ¹⁴ enters a notefade command. This causes the note to fade out immediately similar to a noteoff, but without releasing the sustain points.








There are several ways that you can enter in notes:


¹¹The keys on a PC-101 (or better) numeric keypad are referred to as “Grey” keys

¹²The backtick or grave is the key below

¹³also called a keyoff or key-release

¹⁴Impulse Tracker didn’t do this for some reason, but happily plays songs correctly containing this ”note”

- One at a time, as described above
- You can hold  while entering notes in to enter chords
- You can press  +  or  to enable “playback tracing mode” and play the pattern with the  key. While playing, the cursor will follow the current position and you can enter notes in realtime.
- With a MIDI keyboard (see the MIDI appendix for more information about this)
- With multichannel mode (press  +  twice to specify the channels to use)
- A combination of any or all of the above

At the bottom of the channel is an “edit mask”. This highlights what will be affected when you type anything in. Note that typing a note in can affect more than just a note - by default it’s set to enter an instrument and volume with it! You can easily tell *Schism Tracker* to enter an effect with it also by changing the channel mask with  (comma) on columns 2, 3 and 4.

Volumes 00 is the lowest, softest volume, and is completely silent. 64 is the loudest. If no volume is specified, the default volume of the sample.

If you are familiar with MIDI, this is completely different from *velocity* which specifies the rate of attack.

The volume scale is linear, that is, one note played at a volume of 64 is as loud as three of the same note, one played at 10, another at 30, and another at 24¹⁵

Panning Panning controls occupy the same space as volume controls, but appear in a different colour. For panning in this column, 00 represents far left, and 64 represents far right.

The effects column (described more below) also has a panning command - X. . which takes precedence over the panning controls that may be in the volume column. Unless the sample¹⁶ has a *default* panning, the X. . effect may be preferable as it can be performed on the previous row and still affect the new note¹⁷.

Other Volume Column Effects Starting in Impulse Tracker v2.08, some extra functions became available in the volume column. These allow you to perform some effects and have them occur in addition to the regular effects column. *Schism Tracker* uses some of these to support effects that XM¹⁸ format modules support. These effects cannot be saved to IT files, so they may have limited usefulness if you aren’t interested in writing XM modules with *Schism Tracker*.

¹⁵10 + 30 + 24 = 64

¹⁶or instrument

¹⁷Likewise, the M. . can affect the volume of the channel

¹⁸FastTracker II module format

Ax	fine volume slide up by x
Bx	fine volume slide down by x
Cx	volume slide up by x
Dx	volume slide down by x
Ex	pitch slide down by x
Fx	pitch slide up by x
Gx	tone portamento to note with speed x
Hx	vibrato with depth x
\$x	set vibrato speed to x
<x	panning slide to the left by x
>x	panning slide to the right by x

In all cases, if the value of **x** is zero, the effect memory is used instead. The effect memory for effects **Ax**, **Bx**, **Cx**, and **Dx** are shared. The effect memory for effects **Ex** and **Fx** are shared as well.


The effect column The final effect column specifies controls for special effects. Some effects are specific to a channel, some just the current note, and some affect the entire song. For those of you who are just starting with *Schism Tracker*, you should probably leave this section until later. The subtleties behind how effects are processed are unfortunately complicated. As a result, they have a whole appendix dedicated to them, *and* make up a significant portion of the online help for the pattern editor.

The effect parameter field is the only case where hexadecimal numbers are used¹⁹.





















Hexadecimal is a notation for numbers which operate in base 16. The first 9 numbers in hex are denoted by 1 through 9, but the next six are A through F. To convert a hex number to decimal, simply multiply the “tens” column by 16 and add the second column.


To *count* in hex, you’ll go 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 1A, 1B, 1C, 1D, 1E, 1F, 20, 21, 22, 23, 24, *and so on*.






If that still doesn’t make any sense, remember that FF is the largest number you’re going to see here.

Editing Functions For a complete list of available functions, check the help screen for the pattern editor using .

¹⁹The reason is largely historical, and unfortunately won’t cause you enough trouble that there is any chance it will be switched to decimal.

 + 	Undo. It is listed here first for a reason.
	Advance to the next pattern
	Go to the previous pattern
 + 	Delete the current row
 + 	Insert an empty row into the pattern
	Erase data at the cursor
	Copy data from the “mask” (previously entered data)
	Play the current note on the cursor
	Play the current row
 + 	Store the current pattern ²⁰
 + 	Restore saved pattern
 + 	Toggle play tracking
 + 	Toggle MIDI start trigger

Block functions You can use the mouse to select (mark) blocks. For a complete list of available functions, check the help screen for the pattern editor using .

²⁰Many Impulse Tracker users don't know about this as  +  toggled fullscreen on Windows 95. You can use  +  +  for fullscreen toggle in Schism Tracker

	Anchor the top-left corner of block, and update the selection
	Anchor the bottom-right corner of block, and update the selection
	Mark the entire column (channel)
×2	Mark the entire pattern
	Mark the whatever the minor row highlight (Press ×2 for settings) is. Pressing this repeatedly doubles the length of the block.
	Copy the currently selected block to the clipboard ²¹ .
	Cut the current block.
	Transpose all of the notes in the block a semitone down.
	Transpose all of the notes in the block a semitone up.
	Double the length of the currently selected block. This works by inserting blank rows between each row.
	Halve the length of the currently selected block. This works by deleting every other row.
	Cycle through the various template modes. See below for more information about template modes.
	Amplify or attenuate the volume of the selected notes.
	Fast volume amplify or attenuate
	Vary the volume randomly - <i>not in Impulse Tracker</i>
	Vary the panning randomly - <i>not in Impulse Tracker</i>
	Slide the contents of the volume channel.
×2	Remove the contents of the volume channel.
	Vary the effect value randomly - <i>not in Impulse Tracker</i>
	Slide the contents of the effect parameter.
×2	Remove the contents of the effect parameter.
	Paste the clipboard data at the cursor position.
×2	Paste the clipboard data, resizing the pattern if necessary - <i>not in Impulse Tracker</i> .
	Insert the clipboard data.
	Mix the clipboard data with the current notes where the row would be empty.
×2	Mix the clipboard data with the current notes where the field would be empty.
	Toggle multichannel mode. This advances to the next channel in the multichannel list after every note.
×2	Specify channels to be used in multichannel mode.
	Set the instrument ²² to the current within a block
	Set the volume controls to the current within a block
	Umark the block. If no block is selected, releases the contents of the clipboard.
	Swap the selected block with a similarly sized and shaped block at the cursor position. Blocks cannot overlap

²¹This will copy to your system's clipboard in a plain-text format.

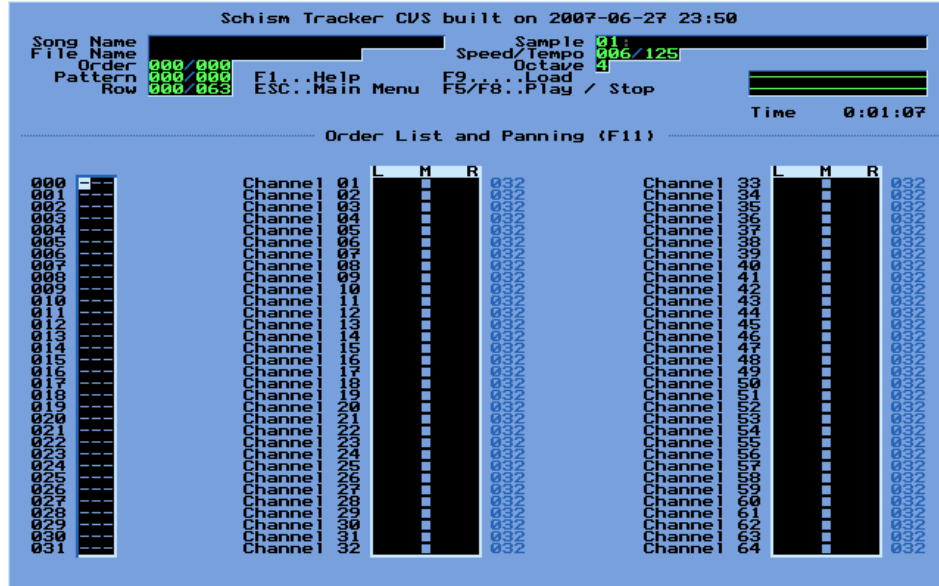
Templates Templates are a useful way to make entering repetitive sequences easier. The idea is that you enter your notes and effects once, then select it and copy it to the clipboard. Pressing Alt-I will select one of the template modes. The notes will be transposed by the distance between your note and C-5.

Overwrite	Replaces the notes
Mix	Mixes the notes like [Alt] + [M]
Mix Clipboard data precedence	Replaces the notes, but any empty fields in the clipboard don't replace existing notes
Notes Only	Replaces the notes only

Track View Modes Track views aren't completely implemented, and their original implementation and usefulness is questioned. Using **[Ctrl]** + **[1]** through **[Ctrl]** + **[6]** change the current channel, and **[Ctrl]** + **[0]** revert to the default. Holding **[↑ Shift]** will set all channels. **[Ctrl]** + **[H]** may make more room as it removes the divisions between channels.

²²or sample

2.4 Order List, Channel settings - F11



After creating patterns, *Schism Tracker* has to know what order to play them back in. The order list is the means by which this is done. Another wording of the Order List which may make it simpler to understand is the Pattern sequence list. ie. the sequence in which the patterns are played back. Simply enter the patterns into the list in the order they should be played, and *voila!* - you have a new piece of music. (as long as you have something in the patterns, of course!). The " - - - " marks the end of a song, and " + + + " is simply a marker which is skipped²³. Pressing N on a row will enter the previous order's pattern+1. eg. Entering 000, then pressing N 5 times will enter 000 (which you typed), then 1, 2, 3, 4 and 5.

You can also press Alt + U to add any unused patterns to the orderlist. This may be a good way to get used to find unfinished or unpolished patterns.

Schism Tracker supports a number of unique features. A pattern can be selected on this page and written to the current sample by pressing Ctrl + O. It can also be bound to that sample by pressing Ctrl + B. If you edit that pattern, *Schism Tracker* will automatically update the sample. This doesn't extend the file format at all, so its already supported by all players.

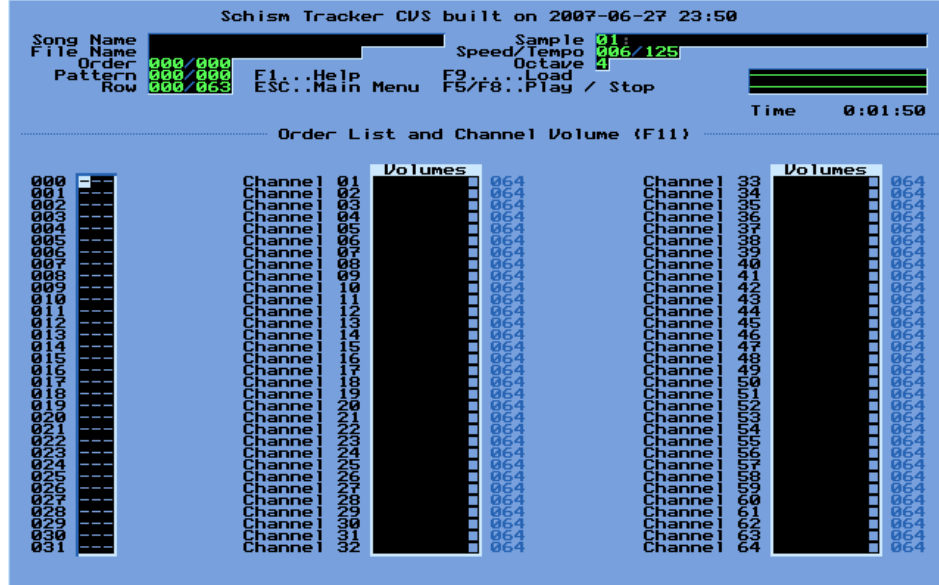
You can enter defaults for your channels as well, as outlined in the next two sections.

Channel Default Panning - F11 The default panning settings are displayed when you press F11. Pressing L on any channel will set it to *leftmost*, while pressing R on any channel will set it to *rightmost*. M can be used to set it to the middle, and Space can mute it.

²³for Scream Tracker III support

Additionally, **[S]** can be used to specify the *surround channel*. Surround processing requires a ProLogic decoder, but will cause the channel to be mixed against the rear channels. Usually panning in the rear is done using two *Schism Tracker* channels- one set to Surround, and the other set to the given position.

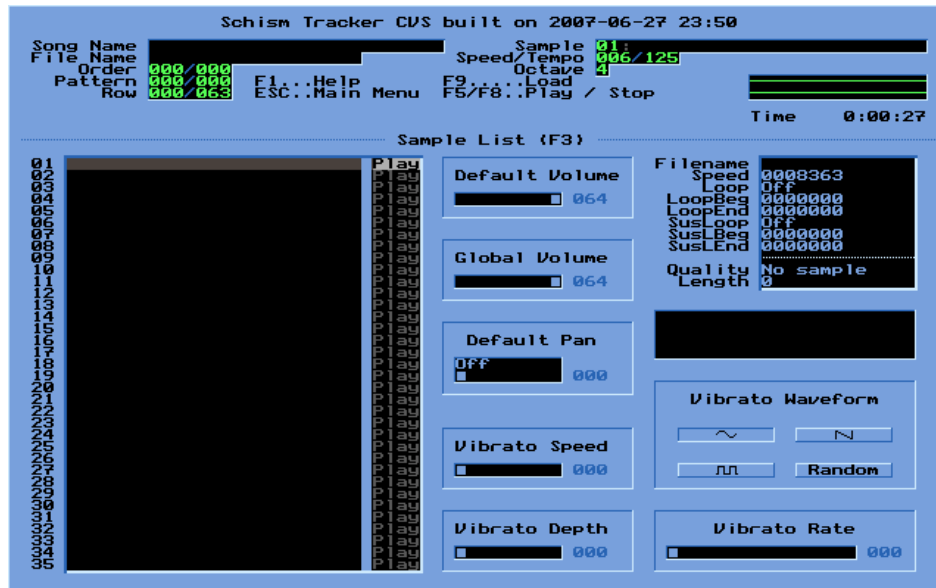
Pressing **[F11]** while the default panning settings are displayed will toggle between default panning and default volume.



Channel Default Volume - **[F11]** The default volume settings are pretty straightforward.

Pressing **[F11]** while the default panning settings are displayed will toggle between default panning and default volume.


2.5 Samples -



Samples contain primitive digital sound data that *Schism Tracker* plays. You can load samples out of other module files²⁴, or from WAV or AIFF files.

Schism Tracker accepts both 8bit and 16bit samples. It can even use *stereo* samples, although Impulse Tracker, and some other players, may only hear the left channel.

Samples consist of the following information: A name, a default volume, a global volume, vibrato information, loop information and a base (C-5) frequency.

The default volume of a sample is the volume at which a sample is played, if no volume is specified. This is the volume the note is played here, on the sample page as well as on  - the instrument page.

The global volume is the modifier by which ALL occurrences of the current sample are scaled by. It is highly recommended that beginners use *global volume* instead of *default volume* to normalize all of your samples. It will make it much easier to control the sounds later, on the pattern editor.



Auto-Vibrato information: The vibrato speed is the speed at which the vibrato oscillates. Although it is possible to enter values $0 \rightarrow 64$, the best effects are obtained by choosing values at or around 24 through 48.

The vibrato depth determines the maximum deviation from the average²⁵ frequency. The vibrato rate determines how quickly the vibrato is applied: Higher

²⁴but be careful: sampling from someone else's work is a violation of their copyright. Get permission first.









²⁵mean

values cause the vibrato to be applied more quickly, where a low value like 1 can take many seconds before the vibrato is noticed.

Loop information Samples can be looped to provide a continuous sound. The loop beginning and the loop end must be specified, and the loop method (either forwards or ping pong) must be set. Toggle by double-clicking or by pressing spacebar. The loop boundaries can also be modified using  or  (even while the sample is playing!)

Sustain loops are the loops used as long as no note off command is encountered. Where it says **Play**²⁶, releasing a key provides a note off command to the player. Once a note off command is issued, the normal loops apply. According to the author of Impulse Tracker:

“The idea behind sustain loops originated after listening to some synthesizers which provided ”after note” sounds - like fingers lifting off guitar strings.”

The higher the frequency of a given sample, the higher the pitch. The frequency can be doubled or halved by pressing  +  and  +  which causes the octave to increase or decrease by one respectively²⁷. You can increase the frequency by one semitone by pressing  +  or decrease it by a semitone with  + .

To load in a sample, go to the entry in which you want to load it then press enter. The sample library should appear. You can test out any sample just by ”playing” notes on the keyboard while you are on top of the sample. Load a sample into the sample list by pressing enter.

²⁶This is often called the sample tester, as in Scream Tracker III the field was marked with a single T

















































²⁷It also shortens and lengthens the *period* of the sample by speeding up the sample, or slowing it down. The implications of all this is best left to experimentation



Occasionally, you will get a *raw* sample. These used to be much more common when Impulse Tracker was written, but now are almost completely unheard of. Nevertheless, commands like **[Alt] + [A]** and **[Alt] + [Q]** can still be used to convert the sign and resolution of the current sample. This may produce an interesting effect with some sounds, so feel free to experiment!

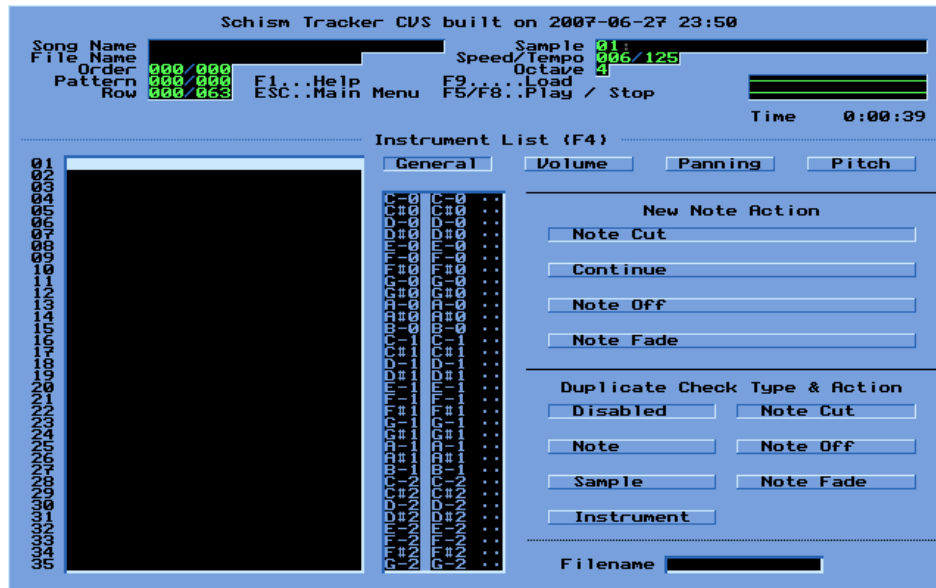
Schism Tracker supports 240 samples, but only 99 are displayed by default. When those get filled it, additional slots become available, so as to discourage the fact that they are inherently non-portable.


Sample Functions

 + 	Delete the sample data prior to the beginning of the loop
 + 	Delete the sample data after to the end of the loop
 + 	Reverse the sample data ²⁸
 + 	Invert the sample data - <i>not in Impulse Tracker</i>
 + 	Resize the sample
 + 	Resize the sample without interpolating (smoothing) values
 + 	Amplify or attenuate the sample data
 + 	Delete the current sample
 + 	Clear sample text and filename
 + 	Swap two samples, updating all pattern data
 + 	Exchange two samples, without updating any pattern data
 + 	Save sample to disk (note the sample filename)
 + 	Save sample to disk in RAW format
 + 	Export sample to disk (presently only supports AIFF)
 + 	Toggle sample sign (unsigned/signed)
 + 	Toggle sample quality (8bit/16bit)
 + 	Toggle multichannel playback
	Increase current play channel
	Decrease current play channel
 + 	Insert empty sample slot
 + 	Delete empty sample slot
 + 	Increase octave by one; double frequency and half play time
 + 	Decrease octave by one; halve frequency and double play time
 + 	Increase frequency by one semitone
 + 	Decrease frequency by one semitone

²⁸Now you can know what it *really* says when you play that song backwards

2.6 Instruments -






Instruments provide a level of indirection to samples. When Instrument mode is enabled (on ) then the pattern editor will refer to Instruments instead of Samples. Instruments can remap samples by note, and can modulate the volume, panning, and pitch with multi-point envelopes. Instruments also provide the bridge to MIDI support, and can even specify resonant filters for sample data.

But when Impulse Tracker was first introduced with Instrument support, Instruments meant **New-Note-Actions**. When a **New-Note-Action** is specified, Impulse Tracker will automatically allocate a new *virtual* channel, thus making it easier to seamlessly blend the sound between notes and rows.

The Author of Impulse Tracker recommended that beginners get good at “using” samples, but I think it is better to get good at making musing without using the **New-Note-Action** feature. The filters and envelopes are much too exciting!

Note Translation A single instrument can span over multiple samples. Because the samples are (theoretically) tuned to a common pitch, the Instrument can translate to a particular semitone at the same time.

You can set “all” the samples to the current sample very quickly by pressing  + .

As on the pattern editor, you can use  to toggle masking the sample column which can make tuning samples a little easier. - *not in Impulse Tracker*

New Note Action (NNA) Setting When a channel is playing a note and a new note is read in, *Schism Tracker* copies that channel to a *new virtual channel* and puts on that channel whatever is specified here. If that setting is **Note Cut**,

then this produces the same behavior that Fast Tracker II, Scream Tracker III, and most every other tracker does- which is *no* new note action.

But when this is set to **Continue**, then the sound continues unimpeded in the new channel. This can make it difficult to control as there are only a few effects that apply to the copied virtual channels.

When using **Note Off** or **Note Fade** it acts as if a note off or note fade "note" were entered into the channel.

Duplicate Check/Type (DCT) and Action (DCA) To further complicate things, Impulse Tracker would check the existing note. If it were the same note, and the Duplicate Check/Type were set to **Note** then it would do whatever the Duplicate Check Action specified.

Impulse Tracker could also match on samples or instruments being the same. The action usually specified **Note cut** to ignore the virtual channel creation, but it could also specify an alternate new note action.

Volume Settings This specifies a envelope to modulate the volume over time. The envelope can have sustain loop points and regular loop points just like samples can. You can also set a global volume here which can be used to normalize the instruments to each other.

Volume swing can introduce some randomness to the volume. Many musicians don't like this as, while it does humanize the result, it makes it difficult to reliably get a good result out of it for various purposes (especially in post-processing). Instead I recommend you use **Ctrl** + **U** on the pattern editor which serves a similar purpose, but is repeatable.



The fadeout specifies an additional volume fadeout that occurs while the sample is fading or otherwise released.



Panning Settings This specifies a envelope to modulate the panning over time. The envelope can have sustain loop points and regular loop points just like samples can. You can also set a default panning here, as well as "pitch-pan separation" which manipulates the panning with respect to the pitch of the note.

Panning swing can introduce some randomness to the volume. Many musicians don't like this as, while it does humanize the result, it makes it difficult to reliably get a good result out of it for various purposes (especially in post-processing). Instead I recommend you use **Ctrl** + **Y** on the pattern editor which serves a similar purpose, but is repeatable.

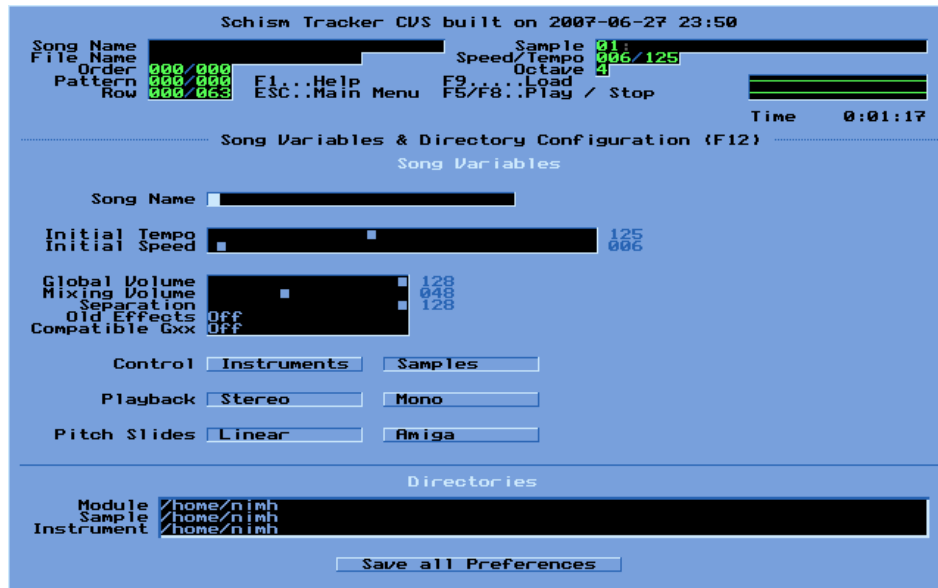
Pitch Settings This specifies a envelope to modulate the pitch over time. The envelope can have sustain loop points and regular loop points just like samples can. You can optionally use the envelope for resonant filters.

You can specify the default cutoff and resonance values for the filter. These can also be turned on using the MIDI pattern commands. The filter was an afterthought to Impulse Tracker, so it has an unusual interface that is better outlined in the appendix.

MIDI Settings You can specify the MIDI settings on the Pitch tab of the Instrument page. These settings cause *Schism Tracker* to emit note and program change commands using these settings to the output ports specified on the MIDI page  + .

These settings also cause keyboard-data to be simulated when this instrument is seen on an *input port*, also specified on the MIDI page  + .

2.7 Song Settings - F12



Most of these settings are obvious: the initial tempo acts as if a T.. occurred before the start of playback, and the initial speed acts as if a A.. occurred before the start of playback. You can enable and disable stereo mixing here, which can be useful if your song doesn't use any stereo channels at all. You can also enable or disable Instrument mode as well.

Global volume and Mixing volume aren't all that useful on modern systems. Global volume affects all of the instruments being produced, but Mixing volume is used *after* the channels have been mixed together.

Separation can amplify the panning effects, and is useful in normalizing different output devices. If you are using headphones, you should consider a value near 40, but if you're using a decent stereo setup, consider 100.

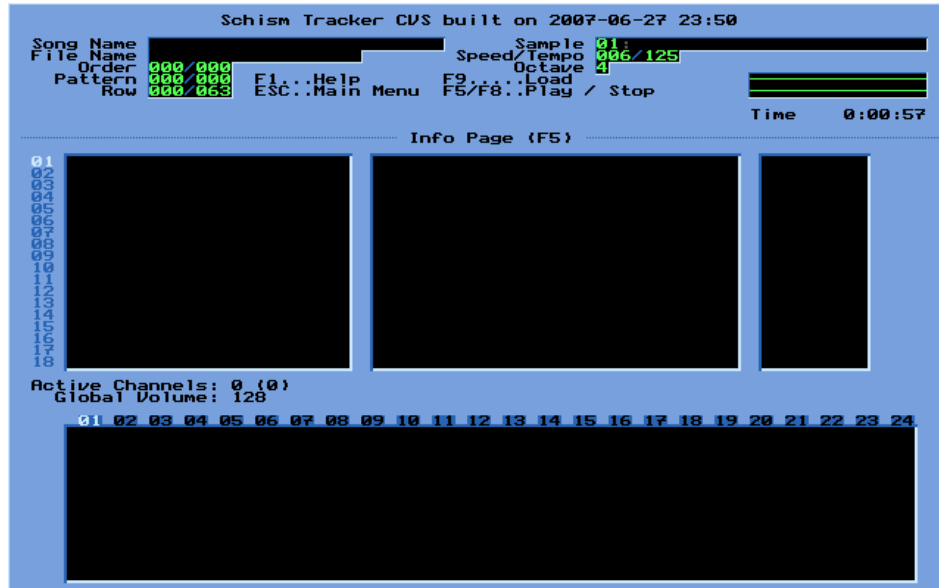
Old Effects When Impulse Tracker was first written, some effects were interpreted differently from other formats, most notably vibrato. When you turn this ON, then effects will be interpreted how they are in other players and trackers including Scream Tracker III and Fast Tracker II.






Pitch Slides Tracking originated on Amiga systems where their hardware was uniquely capable of supporting features of tracked music formats, but unfortunately tracked file formats also took on some of the Amigas limitations.







You should use Linear mode if at all possible. It makes transposing with Alt + Q and Alt + A on the pattern page easier, and most players that support both Linear and Amiga formats have an easier time supporting the Linear format, so it is more likely to be correct.


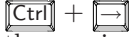

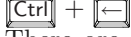
Finally, you can set default search directories for module loading and saving, instrument loading and saving, and sample loading and saving. If you change directories using the file selectors, it also changes these settings which can make *saving* these settings very easy.

2.8 Info Page -



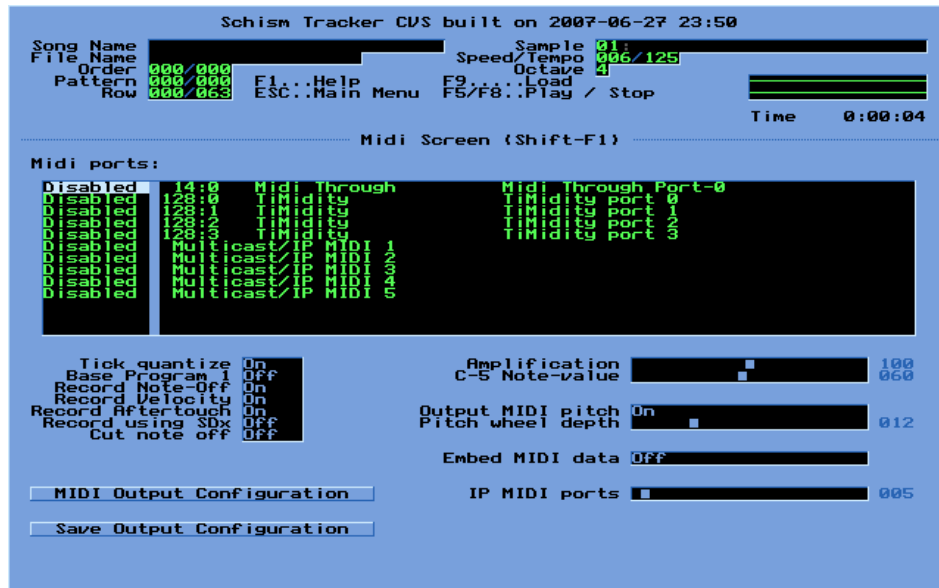
The *Info Page* contains various controls for visualizing playback. It is divided into windows that can be created and deleted with the  and  key.  switches between the window and using  and  change what is presently displayed in that window.

The  and  keys can be used to change the current channel. Pressing  and  will mute the currently selected channel, and  will solo the currently selected channel. If you hear something you want to make changes to, you can press  to *Go to* the pattern that is presently playing. The cursor will also be near the current row.

You can also use  or  to skip ahead to the next order, and  or  to back up to the previous.




There are a number of other keys and controls that are listed in the online help, and in the hotkey appendix.

2.9 MIDI Configuration - +



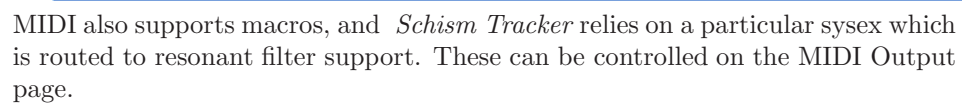
The MIDI configuration page lets you enable and disable various MIDI and realtime-related features. It also (very importantly) lets you connect *Schism Tracker* to your hardware MIDI ports, as well as virtual ports offered by other pieces of software you might be running.

Schism Tracker supports MIDI on a variety of systems, including ALSA, MacOSX, Win32MM²⁹, and OSS³⁰. *Schism Tracker* also can support MIDI over Ethernet by broadcasting MIDI commands over multicast address 225.0.0.37 which is supported by a couple other IP/MIDI software.

Most of these options only otherwise have an affect if you have MIDI gear, with the exception of **Record Note-Off** which is useful whenever you're using realtime playing (Using  or  + ). Turning that off suppresses note-off output when playback tracing.

²⁹although Windows didn't have a realtime timer with enough resolution until Windows XP, so older versions will have trouble syncing with other programs


³⁰OSS has no hardware timer. It is impossible to get sync with OSS. Switch to Linux. Its better than any other UNIX these days



↑ Shift + F9

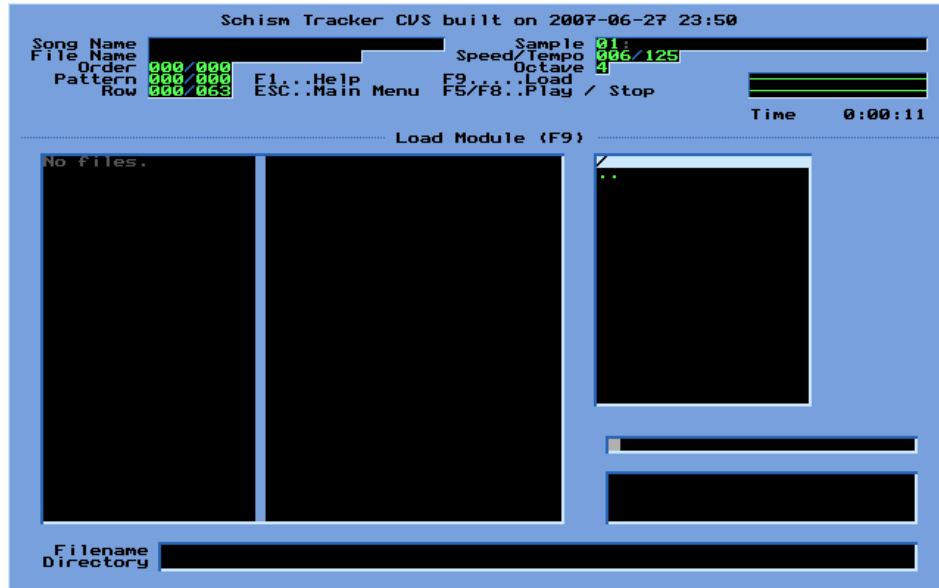



Schism Tracker like Impulse Tracker, allows you to enter a song message. This can be useful if you want to provide credits or notes, or just want to draw fun pictures.

Schism Tracker supports digraph entry (by tapping  twice) and some fake-unicode translation³¹ can be useful for non-US song messages.

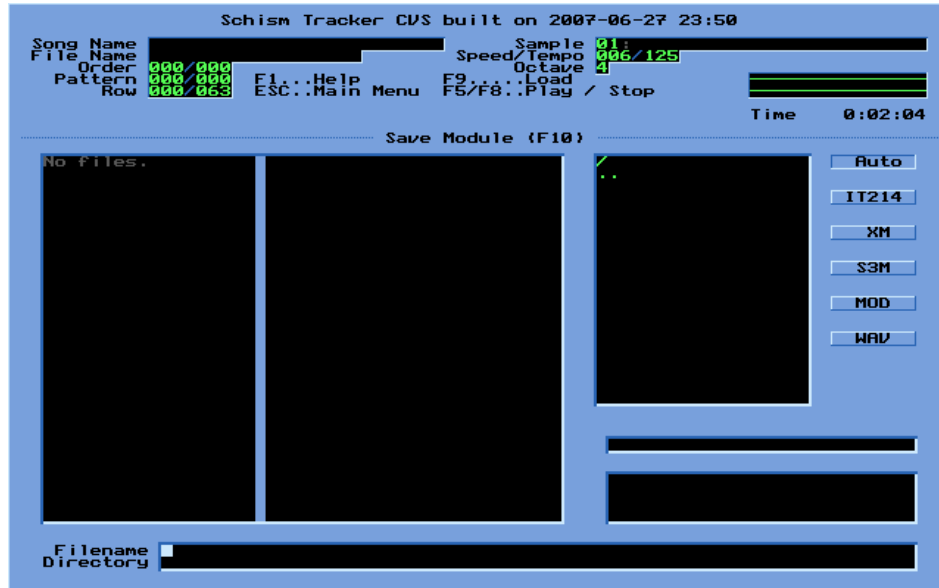
³¹Using **Ctrl** + **⇧ Shift** + HEX, for example, holding **Ctrl** and **⇧ Shift** type **3 C 0** which will print π

2.11 Load Module -



Schism Tracker presently supports 22 different “load” formats. It scans files automatically, and hides files that it can’t load. You can “jump” to a song by typing a few of the characters at the beginning of its name. Pressing  loads a file.

2.12 Save Module -

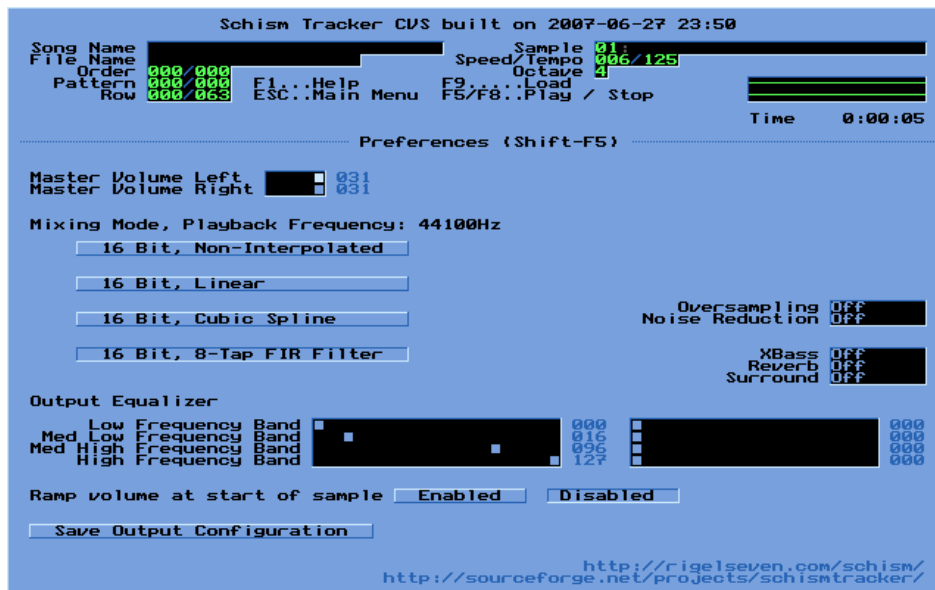


Schism Tracker can save Impulse Tracker (IT) format files, FastTracker II (XM) format files, Scream Tracker III (S3M) format files, and MOD format files.

Schism Tracker can also diskwrite your song to a WAVE format file.

Schism Tracker “remembers” what the last format used was, and can “guess” based on the file extension. It is recommended to work primarily with Impulse Tracker’s IT format, and export a copy to other formats as desired.

2.13 Player Settings - +



On ALSA, OSS, MacOSX, and Windows platforms, *Schism Tracker* can control your system's mixer output. Impulse Tracker also supported various driver settings here, but *Schism Tracker* always uses software mixing, so the options are the same no matter what system you use.

The graphic equalizer may require some explanation: *Schism Tracker* supports four bands, but you can specify exactly where those bands are. The frequencies are relative to your mixing frequency, specifically:

$$band_x = 120 + \frac{128(x)freq_{mixfreq}}{1024}$$

which means that the default bands of 0, 16, 96, 127 are 120hz, 808hz, 8376hz, 16503hz respectively. The gains are linear.

Some sounds lose their characteristics due to aggressive oversampling and filtering, and others are calibrated to someone else's sound system, so while the defaults sounds pretty good, fine tuning here can still provide some significant improvements in audio quality.

2.14 Tracker Settings - -



These are settings for *Schism Tracker* itself. You can specify information about your sound hardware, how many channels your system can mix, as well as some display modes.

Classic mode cases the menus and displays to *even more closely* match Impulse Tracker.

You can also change video drivers. The default should be best (except with regards to fullscreen), and YUV video overlays are *almost always* the fastest. If your video card cannot produce an overlay at least 640x200, then *Schism Tracker* won't be able to support overlay mode at all, and unless your video card supports an overlay at least 1280x400, the image will have artifacts and bad colors.

The OpenGL modes are fast if your video card supports fast GL texture uploads. Not many graphics cards seem to, and graphics card manufacturers don't often have a lot of incentive to accelerate this as games infrequently change textures quickly.

The DirectDraw³² modes are fastest when your video hardware doesn't support overlays, or doesn't support them big enough, *and* it has some accelerated 2D blitting options.

Drawing a single 640x400 window isn't time consuming- even on fast systems, but with LCD displays as commonplace as they are, *Schism Tracker* is expected to scale the window, usually to fullscreen, in order to "complete" the Impulse Tracker experience.

The SDL surface is available on all platforms. Sometimes its faster than the other modes- usually when *Schism Tracker* hasn't been officially ported to your system yet.

³²available only on Windows

3 Practical Schism Tracker

This part of the users guide assumes you already know how to do the things you know how to do. It assumes you can load and save songs, and that you've even written a few songs at this point.

This part of the guide aims to make you a little bit better musician, and a little bit more productive with *Schism Tracker*.



3.1 Finding the perfect loop

Eventually you're going to find a sample on a CD, rip it with your favorite CD ripping tool and you're going to extract a sound that you want to loop.

The trick to looping samples is to do it at a higher frequency (octave) than you intend.

Start by turning off any autovibrato, and making about half as loud as you intend³³.

If the sample has about the same amplitude at the beginning of your intended loop point as it does at the end, you'll want a **Ping-Pong Loop**, otherwise you'll want a regular **Forward Loop**.

Then play the sample at a much higher pitch than you ordinarily would and using  and  on the loop position field one value at a time, trying to find the points where it clicks the least. If this is a ping-pong loop, alternate between the beginning and end of the loop when adjusting. If its a forward loop, this usually isn't necessary.

Playing it at a lower volume and a higher pitch makes it easier to hear the clicking, which makes this otherwise tedious process take much less time.

3.2 Modal theory

Tracking software is extremely accessible to amateurs as it is easy to answer "How did they do that?"-style questions. Unfortunately, it doesn't easily answer "Why did they do that?", which, once you have a basic grasp of the effects and keyboard commands, is a far more useful thing to know.

In music theory, *Modes* are a particularly useful way to group scales together, and are good for finding chords. If you know the mode of a particular piece, its easy to find more sounds that will go good with it. Yes, you can randomly try things, and you will produce some *really* cool things that way, but when you know *why* those things sound cool, it'll be much easier for you.

One more stumbling block to go over is that trackers- traditionally, only display sharps. That is, the note between A-5 and B-5 is always A#5³⁴, s most musicians won't call it that in the *E Locrian* mode, you will remain cut off from a lot of good knowledge on this subject.

That said, the musical "scale" looks like this:

³³By manipulating the *global volume* of the sample

³⁴Actually, you can change how accidentals are presented on the *System Configuration* page. This problem still exists, so you probably don't want to do this, if you're a beginner

	C	D	E	F	G	A	B
--	---	---	---	---	---	---	---

It is often called the Ionian mode, or **Ionian I**. It's also called C-major, and its what songs like *Twinkle, Twinkle, Little Star* are written in³⁵. If you want to raise it one semitone, it looks like this:

	C \sharp	D \sharp	F	F \sharp	G \sharp	A \sharp	C
--	------------	------------	---	------------	------------	------------	---

which is *still* an Ionian mode, but is also called C \sharp -major.

This point is important, and seems to make many modal charts extremely confusing, because the mode doesn't specify the notes that are in it, but instead the *distance* between each note, relative to some fixed point.

So a better way to write out the **Ionian I** mode, might instead be:

Ionian I	0	2	4	5	7	9	10
----------	---	---	---	---	---	---	----

which describes the distance between each note, in semitones.

A **Lydian IV** mode is another major mode. It is often described as having a "raised fourth scale degree" which means that the fourth note will be one semitone higher. Using our chart format, this looks like this:

Lydian IV	0	2	4	6	7	9	10
-----------	---	---	---	----------	---	---	----

If you want to try this in C, the notes would be:

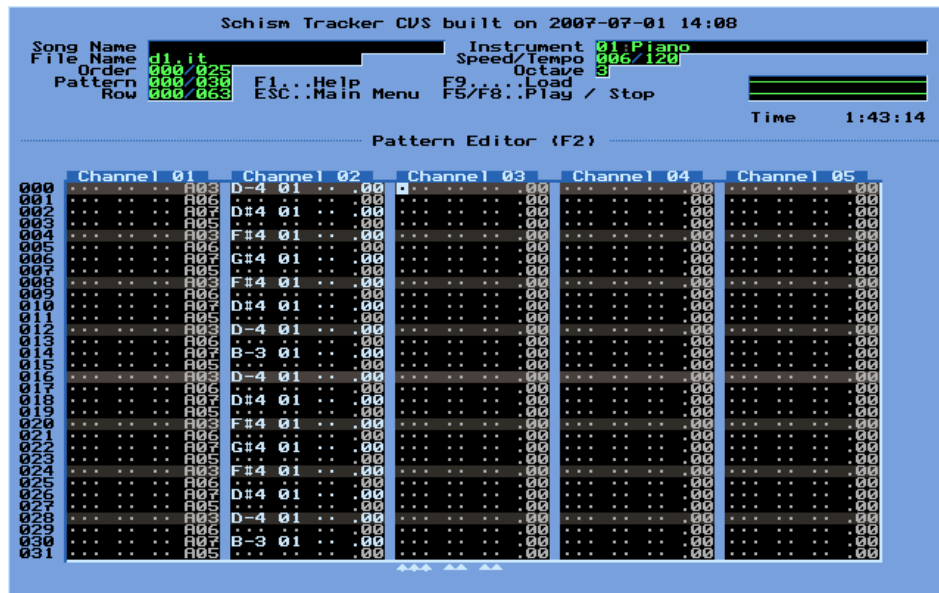
C Lydian IV	C	D	E	F \sharp	G	A	B
-------------	---	---	---	------------	---	---	---

There are 7 "modern diatonic modes", and now that we have a notation and an understanding of them, we can describe them in a chart:

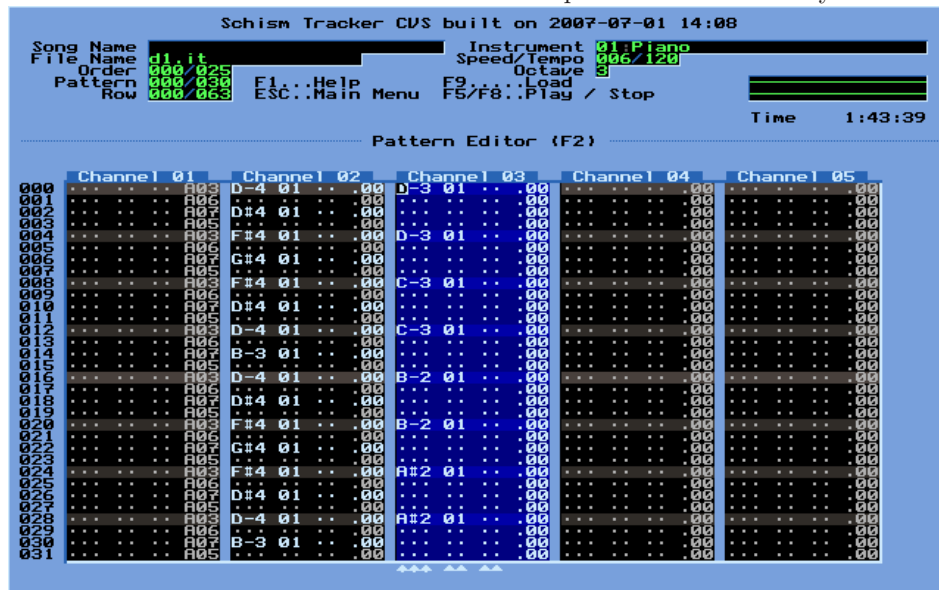
Ionian I	0	2	4	5	7	9	10
Dorian II	0	2	3	5	7	9	10
Phrygian III	0	1	3	5	7	8	10
Lydian IV	0	2	4	6	7	9	10
Mixolydian V	0	2	4	5	7	8	9
Aeolian VI	0	2	3	5	6	8	10
Locrian VII	0	1	3	5	6	8	10

So if you have a baseline that goes:

³⁵I'm told that pointing out that *Twinkle, Twinkle, Little Star* is in C-major makes it sound like C-major is somehow a *childish* key. As a matter of fact, *Great Balls of Fire*, and *It's Not Unusual* and *Like a Rolling Stone* are all in C-major. I just pointed out *Twinkle, Twinkle, Little Star* as I thought it would be the most well known.



you know by looking at the above chart what scale it is, and you know what notes can be added that will keep it in key:



3.3 Chord theory

This assumes you have *my* understanding of modal theory. If you have your own understanding, you should read the previous section quickly to get familiar with

my notation as it was designed for *trackers*³⁶

Major	0	2	4				
-------	---	---	---	--	--	--	--

This is a major chord. To make this chord with a given key, from a particular note, play two notes after it, and four notes after it. That is, given:

C Lydian IV	C	D	E	F \sharp	G	A	B
Major	0		2		4		

your chords are:

- C+E+G
- D+F \sharp +A
- E+G+B
- F \sharp +A+C - *note we wrap around as needed!*
- G+B+D
- A+C+E
- B+D+F \sharp

Here's a list of common and useful chords:

Major	0	2	4				
Add2	0	1	2	4			
Sus2	0	1	4				
Sus4	0	3	4				
Fifth	0	4					
Major7th	0	2	4	6			
Minor	0	2 \flat	4				
Minor7th	0	2 \flat	4	6 \flat			
Diminished	0	2 \flat	4 \flat				

You'll notice the last three chords, the Minor, Minor7th, and the Diminished have \flat s in them. This is because whatever note you take from the chord from there, is dropped one semitone- that is, it is lowered one half note.

As an unlikely example, let's take:

C Lydian IV	C	D	E	F \sharp	G	A	B
Diminished	0		2 \flat		4 \flat		

That produces the following chords:

- C+E \flat +G \flat

³⁶So, an E \flat , a G \flat , and a B \flat walk into a bar, and the bartender says, "I'm sorry, we don't serve minors"

- D+F+A \flat
- E+G \flat +B \flat
- F \sharp +A \flat +C \flat
- G+B \flat +D \flat
- A+C \flat +E \flat
- B+D \flat +F

You'll note that the lowering of a half note turns the F \sharp into an F, but flattens almost all the other notes. This makes it easy (for an experienced musician) to recognize familiar chords and key changes as flats come from the lowering of a note, and a sharp comes from the raising of a note.

If you read the previous section, you'll note I pointed out that *Schism Tracker* doesn't use this notation because Trackers, historically, don't use this notation. It so happens that G \flat is the same *sound* as F \sharp , but it only shows up in C Lydian IV when using one of those minor chords. That means that from a tracker's pattern editor, it's not possible to tell what notes belong together just by looking at the value of the notes.

However with a little bit of practice, and a little bit of listening, you will be able to recognize these patterns, and if you *tune your samples* before you start composing, you'll be able to come up with chords much faster.

3.4 Tuning samples

Tuning your samples means adjusting the "sample speed" of all of your samples in your song so that when you play C-5, it produces the same pitch on all your samples.

It isn't necessary to get all of your samples within the same octave, but its much easier to change octaves on the sample menu using [Alt] + [+] and [Alt] + [-].

First, you should note this is easier when your samples are looping. If they're *meant* to loop, find the perfect loop *first*. If you don't intend to loop them in your song, almost any old loop will do.

Second, find a reference sample. This sample is what you're going to make all of your other samples sound like. It should be long, and relatively clear- sounding.

Then, play the reference sample at C-5 ([Q]), then press [-] to move to the next "play" channel, and play your target sample at C-5. Press [Tab] to move over to the "Speed" setting, and press [+] or [-] to adjust the speed. Every time you play this sample, it will restart the sound so you can get them exactly right.

Then, use [F8] to stop the sound and play both samples at C-6. You may notice some pitch differences at the higher frequency that you didn't notice before. You should repeat this step making sure it sounds okay at every octave.³⁷

³⁷Of course, if you're going to be using an instrument to map multiple samples at different octaves, this is less important.

Once you're done, *save your samples*. Users seem divided on this: Many users will save them to **AIFF** or **ITS** files so they can keep their samples separate, but others save modules with a bunch of samples in them. Because *Schism Tracker* lets you load files from inside modules, I find this is an excellent way to keep samples that sound good together, instead of keeping samples that sound like each other, together.

However this method comes with a warning: If you do this, you will get attached to some of your favorite samples and all of your songs will sound the same. The sheer number of **.MOD** and **.S3M** files all with the same style is an indicator that this happens despite keeping samples separate, so there's a good chance all of your music *will* sound the same until you become more experienced.

3.5 Multi-Sample Instruments

Many instrument sets³⁸ contain multiple copies of the same sound, recorded (sampled) at different pitches.

This is done because playing a sample at a different pitch is done by increasing or decreasing the playback speed: Increasing the octave by one is done by doubling the speed, which halves the amount of time it takes to play the sound.

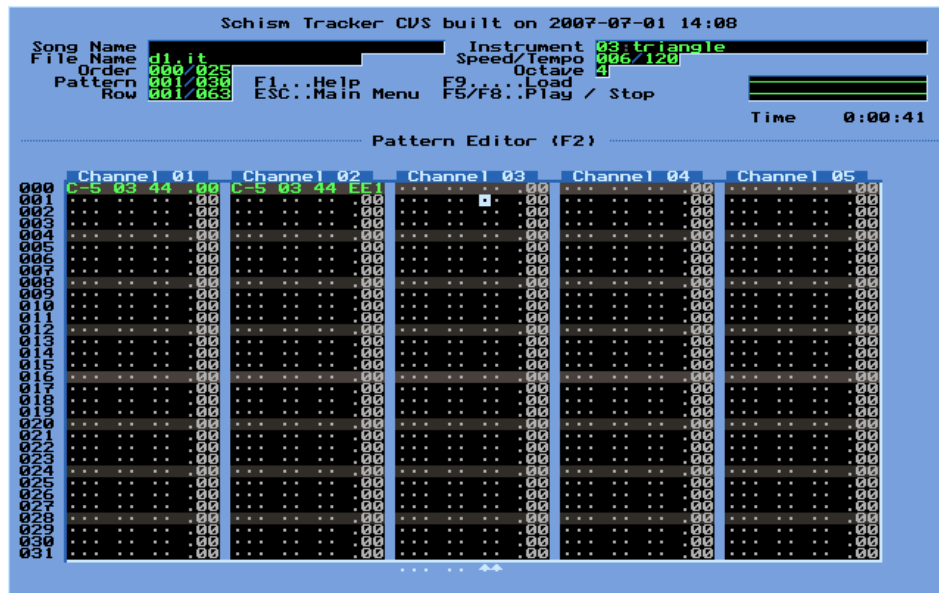
This doesn't sound very good (as you've probably noticed). Assuming you've gotten your samples recorded, *and you have tuned them*, you can add them to an instrument very quickly. Start with the middle sample and press **[Alt] + [A]** to fill all the entries in. Find the point that sounds too low in pitch, and start changing there.

When you get the sample the way you like it, make sure you save a copy.

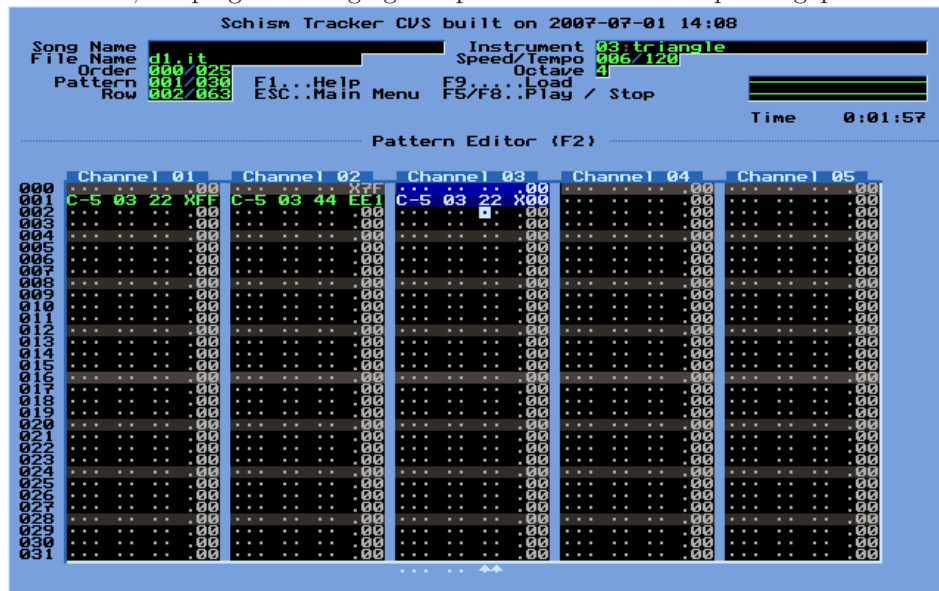
3.6 Easy flanging

If your output is designed for monaural sound, you can simply play the same sound in two channels, where one is slightly lower or higher in pitch, for example:

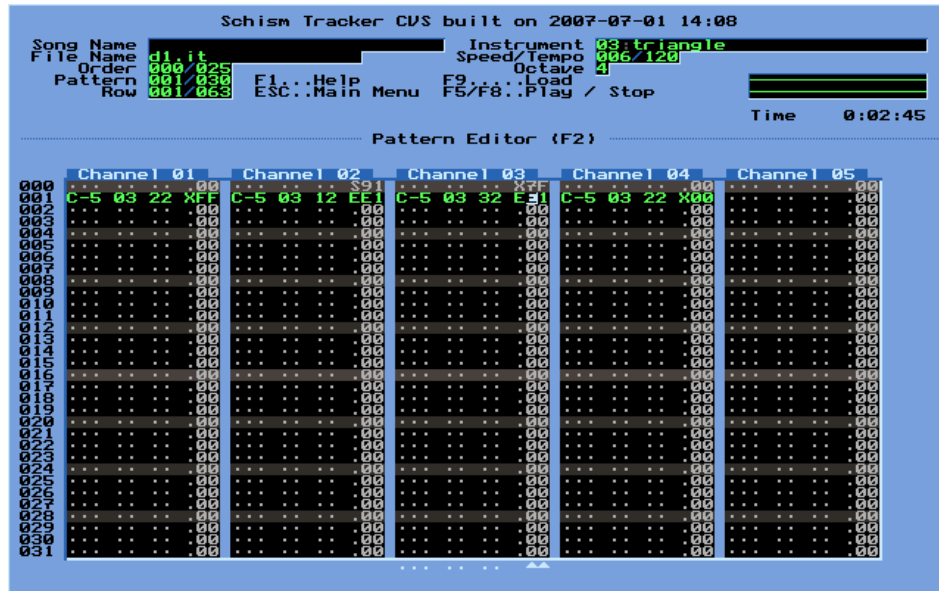
³⁸Often called sound fonts, or patches



If you wanted to control the panning, use *three* channels; and halve the original sound; keeping the flanging sample between the two panning positions:



If you've got a Dolby ProLogic decoder, you can flange the rear channel by using four channels:



On other trackers, this might be considered very wasteful, but *Schism Tracker* supports the ability to automatically render these effects into new samples.

After getting a sound you like- and trimming it using the C00 command, go to the *Orderlist* page with **[F11]**, and put the pattern you were just working on someplace. Then press **[Ctrl] + [↑]** or **[Ctrl] + [↓]** to pick an empty sample slot and press **[Ctrl] + [B]** to *bind* that sample to that pattern.

Now anytime you update that pattern (say you get that Dolby ProLogic decoder), *Schism Tracker* will automatically re-render the sample.

3.7 Reverb-like echoes

Like the flanging effect, this trick uses multiple channels to produce a particular characteristic that might not be obvious looking at the effect listing.

Also, like the flanging effect, you can go to the *Orderlist* page with **F11**, and put the pattern you were just working on someplace. Then press **Ctrl** + **I** or **Ctrl** + **J** to pick an empty sample slot and press **Ctrl** + **B** to *bind* that sample to that pattern.

3.8 ProLogic Surround Sound

Schism Tracker supports a simple ProLogic encoding that allows you to drive the rear channels on a surround system. If you do not have a surround decoder, then this section will not be very useful for you yet.

ProLogic works by recognizing phase-shifting occurring in the right channel against sound on the left channel, and redirecting this sound to the rear channels.

You can simulate the S91 effect by copying a sample (01), and using **Alt** + **I** to invert the copy (02). Play both at the same time- one at panning X00 and the other at panning XFF.

If you change the volume of one of the channels, it will *move* the sound from the rear-left to the rear-right.

The S91 command acts as a shortcut. It plays the same sample data exactly this way. You *still* need two channels to control rear panning, but you don't need to copy the sample.

Play the sample with your desired panning in one channel, and again with S91 and it will come out on the opposite side in the rear channel. e.g X00+S91 plays on the *right rear* channel.

3.9 Low Speed Tracking

The default speed of A06 is pretty slow. A lot of trackers immediately set it to A03 so as to immediately double their resolution.

However, the under-appreciated SDx, SCx and Q0x commands can be used to get some additional resolution and fineness in *parts* of your song, without having to resort to the global Axx command.

At speed A06, SDx has useful values between 1 and 5 inclusive. If you imagine this row on this column was temporarily set to A01, SDx is like playing this note after x rows. SCx would then be like having a note-cut (^ ^).

Q0x, where x is between 1 and 5 (or whatever one less than the song speed is), is like playing the note *now* and again after x ticks.

Look at the chart for the Qxx command. You can imagine using the volume decrease or increase in this way to encode other combinations.

Of course, with *Schism Tracker*, you can also make a pattern that actually *is* run at speed A01 and terminate your set with C00, then render it to a sample on the *Orderlist* page using **Ctrl** + **O** (output once) or **Ctrl** + **B** (bind to sample).






A Appendix: Differences from Impulse Tracker

The author of Impulse Tracker noticed that “In spite of all the limitations of Scream Tracker 3 (in comparison to Fast Tracker 2, which offered Volume/Panning Envelopes, 16-bit samples, Samples \leq 64k, an in built sampler, proper stereo panning on SB16, etc. etc), there were still more .S3M releases than there were .XM releases! And the reason must have been within the way you WRITE music with Scream Tracker 3.” and thusly based Impulse Tracker’s user-interface on Scream Tracker III.

Schism Tracker is based on the idea that the novel user-interface behind Impulse Tracker and Schism Tracker III is still worth emulating. Over ten years after its introduction, it still provides an extremely efficient way to write music.

- *Schism Tracker* is portable and Free⁴⁰ Software
- *Schism Tracker* supports more file formats
- *Schism Tracker* supports multiple colors on sample visualizations
- *Schism Tracker* supports new displays (oscilloscope, VU-meter, memory display)
- Vary commands on pattern editor $\text{Ctrl} + \text{Y}$, $\text{Ctrl} + \text{U}$, $\text{Ctrl} + \text{K}$
- Invert samples on sample editor $\text{Alt} + \text{I}$
- Can actually save XM files; including XM effects
- Go to a given time $\text{Ctrl} + \text{G}$
- Copy text to system clipboard $\text{Ctrl} + \text{C}$
- Paste using system clipboard $\text{Ctrl} + \text{V}$
- *Schism Tracker* can take its own screenshots with PrtSc or $\text{Ctrl} + \text{Alt} + \text{D}$
- Envelope loop cutting can be done with $\text{Alt} + \text{B}$ and $\text{Alt} + \text{L}$
- Patterns can be written to samples with $\text{Ctrl} + \text{O}$
- Patterns can be *bound* to samples with $\text{Ctrl} + \text{B}$
- Order list can be saved/restored like patterns with $\text{Alt} + \text{Enter}$ and $\text{Alt} + \text{←}$
- Samples can be copied with $\text{Alt} + \text{P}$
- $\text{Alt} + \text{O} \times 2$ can resize the pattern if necessary on the pattern editor
- *Schism Tracker* doesn’t support drive letters

⁴⁰Schism Tracker is redistributable under the terms of the GNU General Public License.

- *Schism Tracker* supports *Stereo* samples
- There are more default color schemes on  + 
- *Schism Tracker* is usable on a non IBM-101 keyboard
- *Schism Tracker* is usable on laptops
- *Schism Tracker* supports the mouse meaningfully, including scroll wheels
- *Schism Tracker* supports more samples and instruments
- You can enter note-fades (~~~) on the pattern editor with  + 
or 
- The font editor is built-in
- *Schism Tracker* has an actual config file
- MIDI support is much better

B Appendix: Other popular players and trackers

If you're interested in people playing your modules with *other players* you should be aware of which features are inherently non-portable, that tracker and player authors have had trouble implementing correctly. This chart can be used for exactly that purpose, if you like.

B.1 Violations of the Impulse Tracker file format

Many trackers write invalid Impulse Tracker files and *label them* as if they were legitimate IT files, complete with a .IT file extension. Since the Impulse Tracker file format is so poorly specified, this may make it impossible for you to play the impulse tracker modules written in one of those trackers in the future. Things that are otherwise considered "features" are considered bugs here if they cause the song to be played incorrectly.

I recommend to tracker authors that they restrict incompatible extensions (i.e., information that is needed to play the song as it was written) to a private file format. You can use the Impulse Tracker file format if you like- just *call it* something else so that your users do not think they can take files created in *your program* and use them elsewhere.

- Modplug effect plugins are completely incompatible- even to libmodplug
- Modplug (and libmodplug) Highpass and "extended-range" filters are meaningless
- Impulse Tracker lowpass filters - These seem to be quite problematic as there are *zero*⁴¹ players with correct support for them. *Schism Tracker* is quite close to Impulse Tracker with a Sound Blaster 16 with MMX drivers, but is not quite perfect.
- Chibi Tracker chorus channel effects
- Qxy command appears to be handled incorrectly in most players when the retrig-time *x* is greater than the song speed. The correct behavior is to assume values above song speed are *equal* to song speed.
- Zxx is often limited to filters, and often still limited to the *default MIDI configuration*.
- Channel effects are supposed to affect virtual channels
- If the stereo flags are disabled, the default panning is center, *not* Left, Right, Right, Left (repeating)

⁴¹At the time of this writing, in 2007, and being as how the Impulse Tracker filters do not match their description, they will probably remain incorrect until someone reverse engineers the Impulse Tracker audio drivers.

C Appendix: Commandline Argument Listing

Usage: schismtracker [OPTIONS] [DIRECTORY] [FILE]

-a DRIVER, --audio-driver=DRIVER
SDL audio driver (or "none")

-v DRIVER, --video-driver=DRIVER
SDL video driver

--video-yuvlaout=LAYOUT
Specify YUV layout (if schism doesnt detect)

--video-size=WIDTHxHEIGHT
Specify default window size

--video-stretch=VALUE
Unfix the aspect ratio

--video-gl-path=/path/to/opengl.so
Specify path of OpenGL library

--video-depth=DEPTH
Specify display depth in bits

--video-fb-device=/dev/fb0
Specify path to framebuffer

--classic, --no-classic
Start Schism Tracker in "classic" mode

--display=DISPLAYNAME
X11 display to use (e.g. ":0.0")

-f, +f, --fullscreen, --no-fullscreen
Start in fullscreen mode

-p, +p, --play, --no-play
Start playing after loading song on command line

--font-editor, --no-font-editor
Start in font editor (itf)

--text-editor, --no-text-editor
Start in text editor

--hooks, --no-hooks
Run startup/exit hooks (default: enabled)

--debug=OPS
Enable some debugging flags (separate with comma)

<code>--version</code>	Display version information
<code>-h, --help</code>	print this stuff

D Appendix: Keyboard Hotkey Listing

D.1 Global Keys

F1	Help (Context sensitive!)
Shift-F1	MIDI Screen
Ctrl-F1	System Configuration
F2	Pattern Editor / Pattern Editor Options
F3	Sample List
Ctrl-F3	Sample Library
F4	Instrument List
Ctrl-F4	Instrument Library
F5	Play Information / Play song
Ctrl-F5	Play Song
F6	Play current pattern
Shift-F6	Play song from current Order
F7	Play from mark / current row
F8	Stop Playback
F9	Load Module
Shift-F9	Message Editor
F10	Save Module
F11	Order List and Panning
2*F11	Order List and Channel Volume
Ctrl-F11	Schism Logging
F12	Song Variables & Directory Configuration
Ctrl-F12	Palette Configuration
{ }	Decrease/Increase playback speed
Ctrl-[]	Decrease/Increase playback tempo
[]	Decrease/Increase global volume
Alt-F1 -> Alt-F8	Toggle channels 1->8
Ctrl-D	DOS Shell
Ctrl-E	Refresh screen and reset cache identification
Ctrl-I	Reinitialise sound driver
Ctrl-M	Toggle mouse cursor
Ctrl-N	New Song
Ctrl-Q	Quit to DOS
Ctrl-Q	Quit Schism Tracker
Ctrl-S	Save current song
Ctrl-G	Go to order/pattern/row given time
PrintScreen	Take a screenshot (also Ctrl-Alt-D)

D.2 On text widgets

Ctrl-C	Copy to clipboard (also Ctrl-Insert)
Ctrl-V	Paste from clipboard (also Shift-Insert)

D.3 Info Page

Insert	Add a new window
Delete	Delete current window
Tab/Shift-Tab	Move between windows
Up/Dn/Left/Right	Move highlighted channel
PgUp/PgDn	Change window type
Alt-Up/Down	Move window base up/down
V	Toggle between volume/velocity bars
I	Toggle between sample/instrument names
Q	Mute/Unmute current channel
S	Solo current channel
Grey +, Grey -	Move forwards/backwards one pattern in song
Alt-S	Toggle Stereo playback
Alt-R	Reverse output channels
G	Goto pattern currently playing

D.4 Instrument List

Enter	Load new instrument
Ctrl-PgUp/PgDn	Move instrument up/down (when not on list)
Alt-B	Pre-Loop cut envelope
Alt-C	Clear instrument name & filename
Alt-W	Wipe instrument data
Spacebar	Edit instrument name (ESC to exit)
Alt-D	Delete instrument & all related samples
Alt-L	Post-Loop cut envelope
Alt-N	Toggle Multichannel playback
Alt-O	Save current instrument to disk
Alt-P	Copy instrument
Alt-R	Replace current instrument in song
Alt-S	Swap instruments (in song also)
Alt-U	Update pattern data
Alt-X	Exchange instruments (only in Instrument List)
Alt-Ins	Insert instrument slot (updates pattern data)
Alt-Del	Remove instrument slot (updates pattern data)
< >	Decrease/Increase playback channel

D.5 Instrument List - Note Translation

Enter	Pickup sample number & default play note
< >	Decrease/Increase sample number

Alt-A	Change all samples
Alt-N	Enter next note
Alt-P	Enter previous note
Alt-Up/Down	Transpose all notes a semitone up/down
Alt-Ins/Del	Insert/Delete a row from the table
, (Comma)	Toggle edit mask for current field

D.6 Instrument List - Envelope Keys

Enter	Pick up/Drop current node
Insert	Add node
Delete	Delete node
Alt-Arrow Keys	Move node (fast)
Press Spacebar	Play default note
Release Space	Note off command

D.7 Sample List

Enter	Load new sample
Tab	Move between options
PgUp/PgDn	Move up/down (when not on list)
Alt-A	Convert Signed to/from Unsigned samples
Alt-B	Pre-Loop cut sample
Alt-C	Clear Sample Name & Filename (Used in Sample Name window)
Alt-D	Delete Sample
Alt-E	Resize Sample (with interpolation)
Alt-F	Resize Sample (without interpolation)
Alt-G	Reverse Sample
Alt-H	Centralise Sample
Alt-I	Invert Sample
Alt-L	Post-Loop cut sample
Alt-M	Sample amplifier
Alt-N	Toggle Multichannel playback
Alt-O	Save current sample to disk (IT Format)
Alt-P	Copy sample
Alt-Q	Toggle sample quality
Alt-R	Replace current sample in song
Alt-S	Swap sample (in song also)
Alt-T	Save current sample to disk (Export Format)
Alt-W	Save current sample to disk (RAW Format)
Alt-X	Exchange sample (only in Sample List)
Alt-Ins	Insert sample slot (updates pattern data)
Alt-Del	Remove sample slot (updates pattern data)
< >	Decrease/Increase playback channel

Alt-Grey +	Increase C-5 Frequency by 1 octave
Alt-Grey -	Decrease C-5 Frequency by 1 octave
Ctrl-Grey +	Increase C-5 Frequency by 1 semitone
Ctrl-Grey -	Decrease C-5 Frequency by 1 semitone

D.8 Message Editor

Ctrl-Y	Delete line
Alt-C	Clear message

D.9 Order List - Panning

N	Insert next pattern
Shift-N	Copy current pattern to new pattern, and insert order
-	End of song mark
+	Skip to next Order mark
Ins	Insert a pattern
Del	Delete a pattern
Tab/Shift-Tab	Move to next window
Ctrl-F7	Play this Order next
Alt-F11	Lock/unlock order list
Alt-R	Sort order list
Alt-U	Search for unused patterns
Ctrl-B	Link (diskwriter) this pattern to the current sample
Ctrl-O	Copy (diskwriter) this pattern to the current sample
C	Continue to next entry in order list of current pattern
Alt-Enter	Save order list
Alt-Backspace	Swap order list with saved order list

D.10 Order List - Panning

L/M/R/S	Set panning to Left/Middle/Right/Surround
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D.11 Pattern Editor

Grey +,-	Next/Previous pattern (*)
Shift +,-	Next/Previous 4 pattern (*)
Ctrl +,-	Next/Previous order's pattern (*)
0-9	Change octave/volume/instrument
0-9, A-F	Change effect value
A-Z	Change effect
. (Period)	Clear field(s)
1	Note cut (^^^)
`	Note off (===) / Panning Toggle

Shift-‘	Note fade (~~~)
Spacebar	Use last note/instrument/volume/effect/effect value
Caps Lock+Key	Preview note
Enter	Get default note/instrument/volume/effect
< or Ctrl-Up	Decrease instrument
> or Ctrl-Down	Increase instrument
Grey /,*	Decrease/Increase octave
, (Comma)	Toggle edit mask for current field
Ins/Del	Insert/Delete a row to/from current channel
Alt-Ins/Del	Insert/Delete an entire row to/from pattern (*)
Up/Down	Move up/down by the skipvalue (set with Alt 0-9)
Ctrl-Home/End	Move up/down by 1 row
Alt-Up/Down	Slide pattern up/down by 1 row
Left/Right	Move cursor left/right
Alt-Left/Right	Move forwards/backwards one channel
Tab/Shift-Tab	Move forwards/backwards to note column
PgUp/PgDn	Move up/down n lines (n=Row Hilight Major)
Ctrl-PgUp/PgDn	Move to top/bottom of pattern
Home	Move to start of column/start of line/start of pattern
End	Move to end of column/end of line/end of pattern
Backspace	Move to previous position (accounts for Multichannel)
Alt-N	Toggle Multichannel mode for current channel
2*Alt-N	Multichannel Selection menu
Alt-Enter	Store pattern data
Alt-Backspace	Revert pattern data (*)
Ctrl-Backspace	Undo - any function with (*) can be undone
Ctrl-C	Toggle centralise cursor
Ctrl-H	Toggle current row hilight
Ctrl-V	Toggle default volume display
Ctrl-F2	Set pattern length

D.12 Pattern Editor - Track View

Alt-T	Cycle current track's view
Alt-R	Clear all track views
Alt-H	Toggle track view divisions
Ctrl-0	Deselect current track
Ctrl-1 - Ctrl-5	View current track in scheme 1-5
Ctrl-Left/Right	Move left/right between track view columns
L-Ctrl&Shift 1-4	Quick view scheme setup

Ctrl-T	Toggle View-Channel cursor-tracking
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D.13 Pattern Editor - Block Commands

Alt-B	Mark beginning of block
Alt-E	Mark end of block
Alt-D	Quick mark n/2n/4n/... lines (n=Row Hilight Major)
Alt-L	Mark entire column/pattern
Shift-Arrows	Mark block
Alt-U	Unmark block/Release clipboard memory
Alt-Q	Raise notes by a semitone (*)
Alt-A	Lower notes by a semitone (*)
Alt-S	Set Instrument (*)
Alt-V	Set volume/panning (*)
Alt-W	Wipe vol/pan not associated with a note/instrument (*)
Alt-K	Slide volume/panning column (*)
2*Alt-K	Wipe all volume/panning controls (*)
Alt-J	Volume amplifier (*) / Fast volume attenuate (*)
Alt-Z	Cut block (*)
Alt-X	Slide effect value (*)
2*Alt-X	Wipe all effect data (*)
Alt-C	Copy block into clipboard
Alt-P	Paste data from clipboard (*)
Alt-O	Overwrite with data from clipboard (*)
2*Alt-O	Grow pattern to clipboard length
Alt-M	Mix each row from clipboard with pattern data (*)
2*Alt-M	Mix each field from clipboard with pattern data
Alt-F	Double block length (*)
Alt-G	Halve block length (*)
Alt-I	Select Template mode / Fast volume amplify (*)
Ctrl-J	Toggle fast volume mode
Ctrl-U	Selection volume vary / Fast volume vary (*)
Ctrl-Y	Selection panning vary / Fast panning vary (*)
Ctrl-K	Selection effect vary / Fast effect vary (*)

D.14 Pattern Editor - Playback Commands

4	Play note under cursor
8	Play row
Ctrl-F6	Play from current row
Ctrl-F7	Set/Clear playback mark (for use with F7)
Alt-F9	Toggle current channel

Alt-F10	Solo current channel
Scroll Lock	Toggle playback tracing (also Ctrl-F)
Ctrl-Z	Change MIDI playback trigger
Alt-Scroll Lock	Toggle MIDI input

E Appendix: Effect Listing

E.1 Volume Column effects

Ax Fine volume slide up by x
Bx Fine volume slide down by x
Cx Volume slide up by x
Dx Volume slide down by x
Ex Pitch slide down by x
Fx Pitch slide up by x
Gx Slide to note with speed x
Hx Vibrato with depth x

E.2 General effects

Axx Set song speed (hex)
Bxx Jump to Order (hex)
Cxx Break to row xx (hex) of next pattern
DOx Volume slide down by x
Dx0 Volume slide up by x
DFx Fine volume slide down by x
DxF Fine volume slide up by x
Exx Pitch slide down by xx
EFx Fine pitch slide down by x
EEx Extra fine pitch slide down by x
Fxx Pitch slide up by xx
FFx Fine pitch slide up by x
FEx Extra fine pitch slide up by x
Gxx Slide to note with speed xx
Hxy Vibrato with speed x, depth y
Ixy Tremor with ontime x and offtime y
Jxy Arpeggio with halftones x and y
Kxx Dual Command: H00 & Dxx
Lxx Dual Command: G00 & Dxx
Mxx Set channel volume to xx (0->40h)
NOx Channel volume slide down by x
Nx0 Channel volume slide up by x
NFx Fine channel volume slide down by x
NxF Fine channel volume slide up by x
Oxx Set sample offset to yxx00h, y set with SAy
POx Panning slide to right by x
Px0 Panning slide to left by x
PFx Fine panning slide to right by x
PxF Fine panning slide to left by x
Qxy Retrigger note every y ticks with volume modifier x

Values for x:

0: No volume change	8: Not used
1: -1	9: +1
2: -2	A: +2
3: -4	B: +4

4: -8	C: +8
5: -16	D: +16
6: *2/3	E: *3/2
7: *1/2	F: *2

Rxy Tremolo with speed x, depth y
 S0x Set filter
 S1x Set glissando control
 S2x Set finetune
 S3x Set vibrato waveform to type x
 S4x Set tremolo waveform to type x
 S5x Set panbrello waveform to type x
 Waveforms for commands S3x, S4x and S5x:
 0: Sine wave
 1: Ramp down
 2: Square wave
 3: Random wave
 S6x Pattern delay for x ticks
 S70 Past note cut
 S71 Past note off
 S72 Past note fade
 S73 Set NNA to note cut
 S74 Set NNA to continue
 S75 Set NNA to note off
 S76 Set NNA to note fade
 S77 Turn off volume envelope
 S78 Turn on volume envelope
 S79 Turn off panning envelope
 S7A Turn on panning envelope
 S7B Turn off pitch envelope
 S7C Turn on pitch envelope
 S8x Set panning position
 S91 Set surround sound
 SAy Set high value of sample offset yxx00h
 SB0 Set loopback point
 SBx Loop x times to loopback point
 SCx Note cut after x ticks
 SDx Note delay for x ticks
 SEx Pattern delay for x rows
 SFx Set parameterised MIDI Macro
 TOx Tempo slide down by x
 T1x Tempo slide up by x
 Txx Set Tempo to xx (20h->0FFh)
 Uxy Fine vibrato with speed x, depth y
 Vxx Set global volume to xx (0->80h)
 WOx Global volume slide down by x
 Wx0 Global volume slide up by x
 WFx Fine global volume slide down by x
 WxF Fine global volume slide up by x
 Xxx Set panning position (0->0FFh)
 Yxy Panbrello with speed x, depth y

E.3 Volume column effects - XM modules only

\$x	Set vibrato speed to x	[\$A0-\$AF]
<x	Panning slide to left by x	[\$D0-\$DF]
>x	Panning slide to right by x	[\$E0-\$EF]

E.4 General effects - XM modules only

!xx	Set volume	[Cxx] - ?
#1x	Fine pitch slide up by x	[E1x] - FFx
#2x	Fine pitch slide down by x	[E2x] - EFx
#3x	Set glissando control	[E3x] - S1x
#4x	Set vibrato control	[E4x] - S3x
#5x	Set finetune	[E5x] - S2x
#6x	Set loop begin / loop	[E6x] - SBx
#7x	Set tremolo control	[E7x] - S4x
#9x	Retrigger note every x ticks	[E9x] - Q0x
#Ax	Fine volume slide up by x	[EAx] - Dx F
#Bx	Fine volume slide down by x	[EBx] - DFx
#Cx	Note cut after x ticks	[ECx] - SCx
#Dx	Note delay for x ticks	[EDx] - SDx
#Ex	Pattern delay for x rows	[EEx] - SEx
\$xx	Key off	[Kxx] - ?
%1x	Extra fine pitch slide up by x	[X1x] - FEx
%2x	Extra fine pitch slide down by x	[X2x] - EEx
&xx	Set envelope position	[Lxx] - ?

F Appendix: MIDI Output

MIDI output causes MIDI data to be sent to all enabled output ports on the MIDI configuration page (Shift-F1) whenever the player sees an event.

The data actually sent is the result of a macro configuration on the MIDI Output page.

Each event is described below:

MIDI Start	Player begins
MIDI Stop	Player stops playing
MIDI Tick	Every row(?)
Note On	Every note recorded
Note Off	Every note off (including NNA note-off)
Change Volume	Volume change (more like aftertouch)
Bank Select	Bank change
Program Change	Program change
SF0 - SFF	When a Z00-Z7F is seen in the same IT-channel
Z80 - Z8F	When played

These events are written in UPPERCASE hexadecimal, with LOWERCASE variable substitution. The variables are:

a	Coarse bank/change (only available on Bank Select)
b	Fine bank/change (only available on Bank Select)
c	Selected MIDI channel
n	Selected MIDI note (Note On events only)
p	Program setting (Program Change events only)
v	Velocity (initial volume)
u	Current volume
x	Set Panning
y	Calculated Panning (includes panning envelope)
z	MIDI Macro (Z00-Z7F commands)

MIDI messages are normally three-bytes (except for System Exclusive messages). A new "message" begins with a byte having it's high-bit set. This means that the first byte is going to be between 0x80 and 0xFF.

System Exclusive (SysEx) messages begin with a 0xF0 and end with a 0xF7 byte. Schism/Impulse Tracker the following SysEx messages internally:

F0 F0 00 qq F7	Set the current filter cutoff point to be qq
F0 F0 01 qq F7	Set the current filter resonance to be qq

You'll generally need the programming guide for your MIDI synthesizers to come up with useful values. You do not have to include the F7 as Schism Tracker will automatically terminate SysEx messages.

Other MIDI messages include:

8c n v	Note-off for channel "c", note "n"
9c n v	Note-on for channel "c", note "n", velocity "v"
Ac n v	Aftertouch (adjust velocity)
Bc q z	Set MIDI controller "q" on channel "c", to value "z"

Cc p	Program change channel "c" to "p"
Dc z	Set total key pressure to "z"
Ec q q	Pitch Wheel; q q is a 14-bit value.
F8	MIDI "Clock" operation
FA	Start MIDI
FB	Continue MIDI
FC	Stop MIDI
FF	Reset

There are other MIDI messages, but they are unlikely to be useful with Impulse or Schism Tracker.

Nevertheless, your programming guide will be authoritative.

Controllers (Bc q z) are reasonably common. They generally come in two flavors: a "coarse" or "high byte" setting, and "fine" or "low byte" setting. If a listed controller only comes in one kind, the values will be listed only for coarse adjustment.

The names listed below are likely to be similar to the names on your synthesizer.

Coarse	Fine	Description
00	20	Bank Select
01	21	Modulation Wheel (MOD Wheel)
02	22	Breath Controller
04	24	Foot Pedal
05	25	Portamento Time
06	26	Data Entry/Slider
07	27	Volume
08	28	Balance/Panning
0A	2A	Panning Position
0B	2B	(Volume) Expression
0C	2C	Effect Control 1
0D	2D	Effect Control 2
10		General Purpose Slider 1
11		General Purpose Slider 2
12		General Purpose Slider 3
13		General Purpose Slider 4
40		Hold Pedal
41		Portamento On/Off
42		Sustenuto
43		Soft Pedal
44		Legato Pedal
45		Hold 2 Pedal
46		Sound Variation
47		Sound Timbre
48		Sound Release Time
49		Sound Attack Time
4A		Sound Brightness
4B		Sound Control 6
4C		Sound Control 7
4D		Sound Control 8

4E		Sound Control 9
4F		Sound Control 10
50		General Purpose Button 1
51		General Purpose Button 2
52		General Purpose Button 3
53		General Purpose Button 4
5B		Effects Level
5C		Tremulo Level
5D		Chorus Level
5E		Celeste Level
5F		Phaser Level
60		Data Button Increment
61		Data Button Decrement
63	62	Non-Registered Parameter Number (NRPN)
65	64	Registered Parameter Number (RPN)
78		All Sound Off
79		All Controllers Off
7A		Local Keyboard On/Off
7B		All Notes Off
7C		Omni Mode Off
7D		Omni Mode On
7E		Monophonic Operation
7F		Polyphonic Operation

G Appendix: Technical Information

Formats supported:

- 669
- AMF - *not in Impulse Tracker*
- AMS - *not in Impulse Tracker*
- DBM - *not in Impulse Tracker*
- DMF - *not in Impulse Tracker*
- DSM - *not in Impulse Tracker*
- FAR - *not in Impulse Tracker*
- F2R - *not in Impulse Tracker*
- IT
- LIQ - *not in Impulse Tracker*
- MDL - *not in Impulse Tracker*
- MED - *not in Impulse Tracker*
- MOD
- MT2 - *not in Impulse Tracker*
- MTM
- OKT - *not in Impulse Tracker*
- PSM - *not in Impulse Tracker*
- S3M
- STM
- ULT - *not in Impulse Tracker*
- UMX - *not in Impulse Tracker*
- XM

Instruments:

- ITI

Samples:

- AIFF - *not in Impulse Tracker*
- AU
- ITS
- RAW
- WAV
- *Schism Tracker can also load samples from any supported module format*
- *Schism Tracker can also load samples from any supported instrument format*

Module limits:

- 240 Samples maximum (Impulse Tracker is limited to 99)
- 240 Instruments maximum (Impulse Tracker is limited to 99)
- 200 Patterns maximum (32-200 rows per pattern)
- 256 Orders maximum
- 64 Direct channel limit (64 default maximum)
- 256 Virtual channel limit (64 default maximum)

Sample limits:

- 8/16 bit samples
- Maximum size of all samples around 2GB
- No loop/Forwards/Ping-pong loop
- MONO and Stereo samples
- Default pan setting for samples
- Auto-vibrato parameters

Instrument limits:

- 25-point Volume/Panning/Pitch envelopes
- Default pan setting for instruments
- Pitch pan separation
- Volume / panning swing
- Resonant filters
- Virtual controls (NNA/DCA)

H Appendix: The Config File

Schism Tracker has a plain-text configuration file. Its location is based on your platform:

Mac OS X	/Users/ <i>username</i> /Library/Application Support/Schism Tracker/config
Windows	C:\Documents and Settings\ <i>username</i> \Application Data\Schism Tracker\config
Other platforms	\$HOME/.schism/config

That file is edited by *Schism Tracker* so you should only edit it directly when *Schism Tracker* is not running. Its format should be familiar to anyone who has worked with OS/2-style⁴² INI files, also once popular on Microsoft Windows, and sometimes shows up on UNIX and UNIX-like systems.

Schism Tracker's configuration is divided into *sections*. A section is marked with the section-name surrounded in square-brackets, for example:

```
[Audio]
sample_rate=48000
bits=16
channels=2
buffer_size=512
```

is a fragment from my configuration file. You may recognize some of these values from the *System Configuration* page. However **buffer_size**, which defaults to 1024⁴³, while reasonable, does have a noticeable latency for me. The combination of my audio hardware, my audio drivers, and my operating system⁴⁴ allow me to use a smaller buffer, which means less latency.

In the future, *Schism Tracker* will detect the minimum latency possible, and for now the defaults are good enough for *most people* which is why there isn't any other user-interface for changing this value.

⁴²pre-warp

⁴³Except on Microsoft Windows, where it defaults to 2048

⁴⁴Microsoft Windows has a minimum 50msec latency due to how its software mixer works. Many people use ASIO which is a stack of replacement drivers for Microsoft windows that eliminate this limitation. *Schism Tracker* does not now, and will likely never support ASIO directly, but *Schism Tracker* is known to work fairly well using a program like ASIO4ALL

Also from my configuration file:

```
[Pattern Editor]
link_effect_column=0
draw_divisions=1
centralise_cursor=0
highlight_current_row=0
edit_copy_mask=7
volume_percent=100
fast_volume_percent=67
fast_volume_mode=0
crayola_mode=1
```

Almost all of these options for the pattern editor were available on the `F2` ×2 dialog, but one may stand out as `crayola_mode` which hilights each row with a color representative of the instrument number.

Impulse Tracker certainly never had anything like this, and its usefulness is still under question. It *may* show up on the *System Configuration* page in the future, but for now, its still too experimental.

Whenever a new tunable is needed, it's usually discussed on the *Schism Tracker* message board⁴⁵, and if you're following development, you can try out new features by editing your config file directly. Usually it won't be discussed exactly how to do this, or where your config file is, so you may need to refer back to this section.

Finally, it is entirely possible to make a change- and because of a bug- its not possible to revert. Usually this occurs with some video settings, and while *Schism Tracker* *tries* to make these settings reversable, it is still possible that they may not be.

You may need to edit the **Video** section to turn off fullscreen, or to change your video driver.

```
[Video]
driver=sdl
fullscreen=0
mouse_cursor=1
lazy_redraw=0
```

Usually `sdl` is the slowest but safest, but all of the video modes are discussed in detail on the *System Configuration* page.

⁴⁵Which can be reached at <http://www.rigelseven.com/sc/>

I Appendix: Resonant Filters

You can set some default cutoff point and resonance for instruments on the *Instruments* page. You can then use Z00→Z7F to specify the filter cutoff value, and Z80→ZFF to specify the resonance value.

Schism Tracker knows what to filter by intercepting MIDI messages. This does *not* mean that filters will require any sort of MIDI equipment, just that the mechanism to instruct the driver to filter a particular note within *Schism Tracker* itself is made via the MIDI interface. That means that it isn't *really* Zxx that does filtering; it's Zxx that sends MIDI macros that are described on the *MIDI Output Settings* page.

Because of this, you might want to familiarize yourself with the MIDI Output Appendix.

The instructions that the drivers understand so far are:

```
F0 F0 00 <value> Set filter cutoff frequency to <value>
F0 F0 01 <value> Set Q factor (resonance) of filter to <value>
```

In each of these cases, *value* is between 00 and 7F. Values above 7F are ignored. Note that if filter cutoff is set to 7F and Q is set to 0, then no filters are applied.

The exact algorithm uses is still in flux, and doesn't sound very much like Impulse Tracker at the moment.