VSTrack

tracking software for VST hosts

Chris Nash

Volume 2 – Appendices
(including implementation source code)
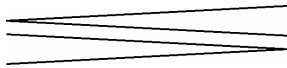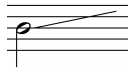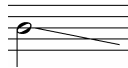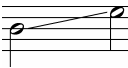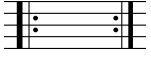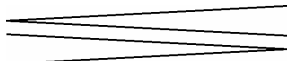
IT2	Meaning	FT2	Renoise	VSTrack	MIDI (brackets imply workaround)	Musical Score[5]
A*xx*	Set speed *xx* (fps).	F*xx* (*xx*<20)	F1*xx*	(see T*xx*)	-	*tempo direction*
B*xx*	Jump to *xx* in order list.	B*xx*	-	-[2]	-	*da* A , B , 𝄋*, etc.*[4]
C*xx*	Jump to *xx* row in the next pattern.	D*xx*	FB00	-[2]	-	(see above)
D*x*0 D0*x* DF*x* D*x*F DE*x* D*x*E	Volume slide up/ down with speed *x* (F denotes fine, E denotes extra fine).	A*x*0 A0*x* EA*x* E*x*A - -	06*xx* 07*xx* - - - -	D*x*0 D0*x* DF*x* D*x*F DE*x* D*x*E	Key aftertouch	*crescendo, diminuendo*
E*xx* EF*x* EE*x*	Portamento down with speed *xx* (F denotes fine, E denotes extra fine).	2*xx* E2*x* X2*x*	02*xx* - -	E*xx* EF*x* EE*x*	Pitch bend up[3]	
F*xx* FF*x* FE*x*	Portamento up with speed *xx* (F denotes fine, E denotes extra fine).	1*xx* E1*x* X1*x*	01*xy* - -	F*xx* FF*x* FE*x*	Pitch bend down[3]	
G*xx*	Portamento from previous note to that specified in the current row with speed *xx*.	3*xx*	05*xx*	G*xx*	-	
H*xy*	Vibrato with speed *x*, depth *y*.	4*xy*	0F*xy*	H*xy*	Pitch bend[3]	*con vibrato*
I*xy*	Mute after *x* frames, for *y* frames.	T*xy*	-	-[2]	Key aftertouch	-
J*xy*	Arpeggio (fast cycle through original pitch, and pitches at *x* and *y* semitones above).	0*xy*	00*xy*	J*xy*	Manual input	
K*xx*	Repeat previous vibrato with volume slide (see D*xx*).	6*xx*	-	K*xx*	Pitch bend[3] with key aftertouch	(see H*xy* and D*xx*)
L*xx*	Repeat previous portamento with volume slide (see D*xx*).	5*xx*	-	L*xx*	-	(see H*xy* and G*xx*)
M*xx*	Set channel volume to *xx*.	C*xx*	0C*xx*	M*xx*	Channel volume	$\boldsymbol{f}$, $\boldsymbol{p}$, $\boldsymbol{mf}$, etc.
N*x*0 N0*x* NF*x* N*x*F	Channel volume slide up/down (F denotes fine).	- - - -	- - - -	N*x*0 N0*x* NF*x* N*x*F	Channel volume	*crescendo, diminuendo*

Oxx (w/ SAy)	Begin sample playback at offset yxx00h.	9xx (-)	09xx (-)	Oxx (w/ SAy)	-	-
Px0 P0x PFx PxF	Panning slide left/ right with speed x (F denotes fine).	P0x Px0 - -	9x Ax - -	Px0 P0x PFx PxF	Pan position	-
Qxy Q0y	Retrigger note every y frames, with volume macro x[1].	Rxy E9y	0Exy 0E0y	Qxy Q0y	Manual input (with key aftertouch)	(for particular instruments only)
Rxy	Tremolo with speed x, depth y.	7xy	-	Rxy	Key aftertouch	
S3x S4x S5x	Set waveform for vibrato, tremolo and panbrello (sine, square, saw or random)	E4x E7x -	- - -	S3x S4x S5x	Manual input (with pitch bend, key aftertouch and panning position)	-
S70 S71 S72	Previous note cut, off or fade.	- - -	- - -	[2] [2] [2]	-	sostenuto, legato, staccato
S6x	Pattern delay for x ticks.	EEx	FDxx	-	Manual input	
S73 S74 S75 S76	Set behaviour at note's termination (cut, continue, off, fade).	- - - -	- - - -	[2] [2] [2] [2]	-	sostenuto, legato, staccato
S77 S78	Enable / disable volume envelope.	- -	- -	[2] [2]	-	-
S8x S91	Set channel panning position (S91 sets to Dolby™ surround channel).	8xx -	08xx 09xx?	S8x -	Pan position (no Dolby™ equivalent)	-
SB0 SBx	Set start/end of repeated section (x times).	E60 E6x	- -	[2] [2]	-	
SCx	Cut note after x frames.	ECx	Fx (vol)	SCx	Note off	staccato
SDx	Delay note for x frames.	EDx	0Dxx	SDx	Note on	n/a
SEx	Delay pattern for x frames.	-	FDxx	-	Manual input	
Txx	Set tempo to xx.	Fxx (xx>1F)	F0xx	Host	Tempo change	♩ = 120
T1x T0x	Tempo slide up/down at speed x.	- -	- -	(see Txx) (see Txx)	Tempo change	accelerando, rallentando, ritardando
Uxy	Fine vibrato with speed x, depth y.	-	-	Uxy	Pitch bend[3]	con vibrato poco
Vxx	Set global volume to xx.	Gxx	FCxx	Vxx	(see Mxx)[3]	f, p, mf, etc.

Wx0 W0x WFx WxF	Global volume slide up/down at speed x (F denotes fine).	Hx0 H0x - -	- - - -	Wx0 W0x WFx WxF	-	*crescendo, diminuendo*
Xxx	Set panning position.	8xx	08xx	Xxx	Panning position[3]	-
Wxy	'Panbrello' (panning oscillation) with speed x, depth y.	-	-	Wxy	Panning position[3]	-
-[1]	Rounds pitch to nearest semitone (glissando) if x is 1.	E3x	-	-[2]	-	-
-	Detunes note by x cents	E5x	-	-[2]	-	-
-	Sets instrument envelope position	Lxx	-	-[2]	-	-
-	'Volume Slicer' - ramps from current volume to x, to 0, after y ticks.	-	04xy	-[2]	Key aftertouch	-
-	Set sample playback direction (backwards if xx = 00; forwards if 01)	-	0Bxx	-[2]	-	-
-	Stop all notes and effects	-	FF00	-[2]	MIDI reset	*silenzio*

[1] Not defined here. See IT2 User manual, listed in bibliography (Volume 1).
[2] Not implemented in current version, but feasible in future release.
[3] MIDI command affects *channel*, not individual notes.
[4] Method of notation permissible, but uncommon in practice.
[5] Approximate equivalences – may not hold in all situations.

Pattern Editing:

Ctrl-Bckspce	Open Undo history dialog
Num-Pad '+'	Advance to next pattern
Num-Pad '-'	Go to previous pattern
Delete	Delete current note from channel
Insert	Insert blank note in channel
Alt-Delete	Delete an entire row from the pattern
Alt-Insert	Insert an entire row in the pattern
'.'	Erase data at cursor.
Space	Enter the previous data for that column.
'4'	Play the note under the cursor.
'8'	Play entire row.
'`' (next to '1')	Switch between volume and panning set modes (only in volume / panning column)

Selection:

Alt-L	Select entire column (channel).
Alt-L*2	Select entire pattern.
Alt-U	Unmark block / release clipboard from memory.
Alt-Q	Transpose selected or current notes(s) down a semitone.
Alt-A	Transpose selected or current notes(s) up a semitone.
Alt-J	Amplify volume (prompts input dialog).
Alt-K	Interpolate volume figures in selection. (between those at the start and end).
Alt-K*2	Erase all volume data in the selected block.
Alt-X	Interpolate effect parameters in selection. (between those at the start and end).
Alt-X*2	Erase all effect data in the selected block.

Clipboard:

Alt-C	Copy selection to the clipboard.
Alt-M	Mix clipboard into pattern at current position.
Alt-P	Paste (insert) clipboard into pattern at current position.
Alt-O	Overwrite data at current position with clipboard.
Alt-Z	Cut selection to the clipboard.

Global Playback:

F5	Play song from beginning (without VST sync).
F6	Play pattern from beginning (looped).
F7	Play pattern from current cursor position.
F8	Stop playback.
Alt-F9	Mute current track.
Alt-F10	Solo current track.

Loading and Saving:

F9	Load module.
F10	Save module.

D.1(i) Online Alpha Testing Programme Application Form

D.1(ii) Online Alpha Testing Programme Download Page

D.2 VSTrack v0.84 alpha – `readme.txt` Documentation

```
==================================================================
VSTrack v0.84 Alpha Release              (c) Chris Nash, 2004
Important Info             Best Viewed: 640x480+, fixed-width font
==================================================================


THIS RELEASE IS PROVIDED FOR THE PURPOSES OF TESTING AND FEEDBACK.
TO THIS END, ALPHA USERS ARE REQUESTED TO PROVIDE FEEDBACK THROUGH
AN ONLINE FORM, WHICH CAN BE VIEWED AT:

     http://www.nashnet.co.uk/english/vstrack/feedback.htm


ABOUT VSTRACK ====================================================

VSTrack is the ultimate union of sequencing and tracking. VSTrack
is a VST Instrument (VSTi) plug-in for VST-hosts (such as
sequencers) that provides a tracker interface, based on Impulse
Tracker II, to the user.
 Unlike normal VSTi's which simply take MIDI input, VSTrack's
editor window is a tracker interface, which takes on the role of
the 'music sequencer' - synthesizing both music and sound.
```

```
ABOUT THIS DOCUMENT ==========================================

This document is best viewed in Notepad, or any text editor using
fixed-width fonts, on screens with a resolution 640x480 or higher.

Its contents are as follows:    ABOUT VSTRACK
                                ABOUT THIS DOCUMENT (this section)
                                COPYRIGHT and DISCLAIMER
                                INSTALLATION INSTRUCTIONS
                                GETTING STARTED
                                KNOWN ISSUES / WORK IN PROGRESS
                                CONTACT INFO


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UNDESIRABLE EFFECTS (SUCH AS DATA LOSS, ETC.) ARISING FROM USE OR
MISUSE OF THESE FILES. ALTHOUGH THE CODE HAS BEEN RIGOUROUSLY
TESTED, THE SOFTWARE IS PROVIDED AS IS.


INSTALLATION INSTRUCTIONS ========================================

The plug-in is provided in .dll binary format, for Windows*, and
must be copied to the user's vstplugins directory, before the VST
host is loaded.
 In the host, VSTrack is listed as one of the VST Instruments
(VSTi's). Simply select it to load the plug-in.

* Other platforms may be supported in subsequent releases.


GETTING STARTED ==================================================

VSTrack boasts an integrated help system, which can be accessed by
pressing F1, inside the program. The pattern editor (F2) is a good
place to start - the first of its help pages gives a quick guide
to the principles of tracking.

KNOWN ISSUES / WORK IN PROGRESS ==================================

The following issues are known in the current version:

* "The first row sometimes doesn't play, when playing from the VST
  host's transport bar, using Cubase SX."
  --> This is not a problem with VSTrack; Some versions of Cubase
      SX, upon rewind, do not return to absolute zero themselves.
      Methods of working around the problem will be investigated
      for future versions of VSTrack.

* "The help system does not work."
  --> The current version of VSTrack only boasts basic help
      content, such as rudimentary pattern editor (F2) support.
      Beta and release versions will comprise a more comprehensive
      help system. Undocumented features include:

      Keyboard Shortcuts - Alt-F9  Mute/Unmute channel
                           Alt-F10 Solo/Unsolo channel(s)
                           Alt-M   Mix clipboard
                           Shift-= Increment current sample
                           Shift-- Decrement current sample
```

* "Sharp changes in parameters produce clicks in the audio."
  --> Technically, this is not a bug, but a phenomena known as
      parameter noise. Sizeable instantaneous changes in volume
      will often lead to apparent audio clips. Nonetheless, future
      versions of VSTrack will employ parameter interpolation to
      solve this problem.

* "IT Import doesn't load samples or instruments."
  --> Some features of Impulse Tracker 2 are not supported in the
      current version of VSTrack - notably, instruments. VSTrack
      will support both IT samples and instruments, in future
      versions.

* "VSTrack doesn't work on <VST Host>."
  --> VSTrack has been tested on Cubase SX only (principally SX2).
      Compatibility with alternative hosts is currently not
      supported, though may be possible. Future release versions
      should run under any VST 2.3 (possibly earlier) host, and
      testing will be extended to Cubase SX, Nuendo and Logic 5*.

      * Subject to change.

* "The sound begins to break up when <X> number of channels are
  playing simultaneously."
  --> Performance ultimately depends on the processing power of
      the host computer. However, improvements in the efficieny of
      current VSTrack code are planned that will significantly
      increase polyphony, etc. As such:

      THIS *ALPHA* RELEASE IS NOT PROVIDED IN ANY CAPACITY AS A
      BENCKMARK OF PERFORMANCE FOR FUTURE RELEASE VERSIONS.

* "Modules saved by VSTrack can be large, in terms of file size."
  --> VSTrack's file architecture stores all logical data in XML
      format (extension: .vstr), and then all sample file data in
      separate WAVE-compatible files (extension: .smpX, where 'X'
      represents the sample number). Later versions of VSTrack
      will compress all the files into a single ZIP-compatible
      archive. The result is a flexible, portable, extensible,
      efficient and accessible format. For example: all files can
      be unzipped and independently edited by appropriate editors
      (eg. text editors for .vstr files; sound editors for .smpX).

CONTACT INFO ==

All questions, comments, criticisms (constructive) and bug reports
are welcome. Users are recommended to use the feedback URL, stated
at the outset, for matters relating to VSTrack.

nashNET Website: http://www.nashnet.co.uk
VSTrack Website: http://www.nashnet.co.uk/english/vstrack
email: vstrack@nashnet.co.uk

==

D.3 Online Alpha Testing Programme Feedback Survey

What improvements / features would you *most* like to see added?
(eg. surround sound support, pitch and panning envelopes, etc.)

further questions (optional)

How much experience do you have with computers?   `<select>` ▼

Do you have a preference for a particular operating system / platform?
○ Win 98   ○ Win XP   ○ Mac OS 9   ○ Mac OSX   ○ `<other>`

Reason:

_____

How much experience do you have with MIDI sequencers?   `<select>` ▼

Do you have a preference for a particular MIDI sequencer?
○ Cubase VST   ○ Cubase SX   ○ Logic   ○ Protools   ○ `<other>`

Reason:

Rank these input devices, for use with music software, in order of preference:
(number as appropriate; leave blank if not applicable)
☐ Mouse   ☐ PC Keyboard   ☐ MIDI Keyboard   ☐ Gfx Tablet   ☐ `<other>`

_____

How much experience do you have with trackers?   `<select>` ▼

If so, which?

Additional comments:

[Submit Feedback]

My Computer

VSTrack

tracking software for VST hosts

Thank you for attending this little soirée and for your interest in VSTrack! It is hoped the experience will be both enjoyable and enlightening. To get started, a brief tutorial is provided below – to help your first steps in VSTrack and realise its potential. However, it is important for VSTrack to develop and improve further – adding both performance and features as time goes on. To affect this, it relies on its users to provide feedback, and attendees to this seminar are thus requested to complete the short survey, at the end of the tutorial.

– Chris Nash

tutorial

to load a sample: press F3 to go to the sample list screen (fig.1), and press enter to open a dialog window (fig.1, inset) that will allow you to select a wave (.WAV) file to load. (note: stereo files can be selected, but the user must select a single channel to be imported)
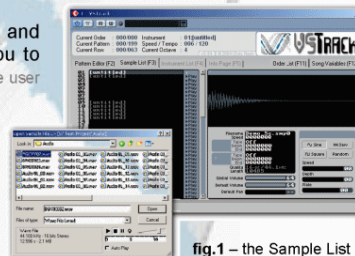
to create a simple pattern: first, load a bass drum sample and a snare drum sample, then press F2 to go to the pattern editor and: (1) input the notes; (2) adjust the volumes; (3) press the ''' key (left of the '1' key) to switch to panning mode and adjust the panning; (4) add a couple of delay effects (SD*x*) and a retrigger effect (Q*xy*) in the effect column: as in fig.2.

fig.1 – the Sample List

fig.2 – the Pattern Editor
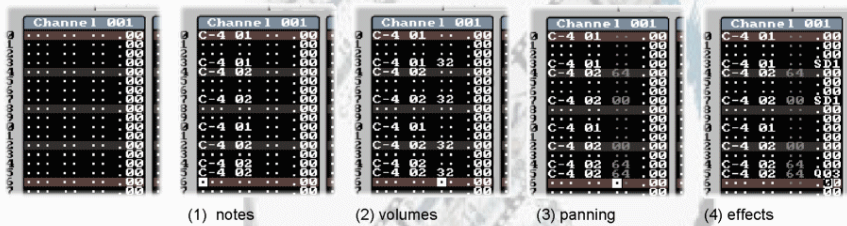
(1) notes   (2) volumes   (3) panning   (4) effects
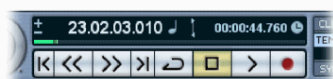
fig.3 – the Cubase SX transport bar

to play back your pattern: either use the transport bar in Cubase (fig.3)* or press: F6 to play the current pattern (looped); F7 to begin playback from the cursor; or F5 to play the song from the beginning*. To stop playback, either press F8 or the stop button on the transport bar. (* before *song* playback, you must specify an order for pattern playback in the order list - F11)

to save your pattern: press F10 and you will be presented with a file dialog, where you can select a location and filename to save your module. You can later retrieve your module by pressing F9.

to get additional help: press F1, to show the online help pages. The current version of VSTrack includes basic (but sufficient) online help – a list of keyboard shortcuts are available for most pages, in addition to a list of effect commands for the pattern editor.

about you

Your name (optional) ....

If you would like to be kept informed of VSTrack's development, please fill in your email address below. Further information can also be found at http://www.nashnet.co.uk.

Email Address (optional) ....

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about computers

	none	-	lots
How much experience do you have with computers? (circle as appropriate) | 1 2 3 4 5

Please indicate any explicit experience (eg. a computing or engineering degree)

....

Do you have a preference for any particular operating system / platform (✓ as appropriate):

☐ Windows 9x/ME   ☐ Windows XP   ☐ MacOS 9   ☐ Mac OSX   ☐ Other..........................

Rank these input devices in order of preference (number as appropriate, leave blank if not applicable):

__ Mouse   __ PC Keyboard   __ MIDI Keyboard   __ Graphics Tablet   __ Other.........................

---

about sequencers

	none	-	lots
How much experience do you have with sequencers? (circle as appropriate) | 1 2 3 4 5

Do you have a preference for any particular sequencer (✓ as appropriate):

☐ Steinberg Cubase VST   ☐ Steinberg Cubase SX   ☐ Emagic Logic   ☐ Digidesign ProTools
☐ Other..

Please briefly comment on any reasons for your preference:

....
....

---

about trackers

	none	-	lots
How much experience do you have with trackers? (circle as appropriate) | 1 2 3 4 5

If so, which?...

Do you see yourself using trackers in the future? (circle as appropriate)   yes / no

Please indicate whether you feel the following aspects of tracking are advantages (+) or disadvantages (-) of the method, adding any extra comments that might occur.

+/-	aspect of tracking	comments
_	control of rhythm	
_	control of melody / harmony	
_	interface: easy of use	
_	interface: power	
_	sonic potential	
_	other	

Can you foresee a useful application of tracking in the following areas (✓ as appropriate):
☐ Academic Music   ☐ Entertainment Music   ☐ Surround Sound   ☐ Film / Video
☐ Other(s)..

		no	-	yes
Do you think the interface is … | … efficient? | 1 2 3 4 5
(circle as appropriate) | … complicated? | 1 2 3 4 5

(continued on next page)

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about VSTrack

Do you think VSTrack's nature as a sequencer plug-in makes tracking more accessible to musicians? (circle as appropriate)

disagree - agree
1 2 3 4 5

Do you see yourself using VSTrack in the future? (circle as appropriate)   yes / no

Please comment on the following aspects of VSTrack:

interface

design

stability

performance

features

What improvements / features would you most like to see added?
(eg. surround sound support, pitch and panning envelopes, etc.)

----

general comments

Your feedback is greatly appreciated – thank you!

Chris Nash   VSTrack: *Advanced Preview* seminar   May 2004