VIC-TRACKER 2.0, Copyright (c) 1994, 2001, 2003, 2004 Daniel Kahlin <daniel@kahlin.net>

Latest version: http://www.kahlin.net/daniel/victracker/

NOTE: (*) marks a feature that is not yet implemented!

VIC-20 SOUND HARDWARE

The Vic-20 has 3 channels of square wave, one channel of noise, and a 4-bit global volume. The frequency is determined by a 7-bit value for each of the 4 channels. The three square wave channels have different frequency ranges, they are one octave apart.

GLOSSARY

Module	- A set of songs.
Position	- A position is the smallest unit of a pattern list. It gets incremented after all steps in the current set of patterns have been played.
Pattern	- A list of notes and effects, one set for each step.
Patternlist	- A list of numbers that adresses Patterns, one for each position.
Song	- A set of positions within a module.
Speed	- The number of ticks-1 that a step takes.
Step	- A step is the smallest unit of a pattern. It gets incremented every speed+1 ticks.
Tick	- This is the smallest time unit. (about 20ms for PAL)

VIC-TRACKER keys!

ALWAYS

Load Module	SHIFT-L
Save Module	SHIFT-S
Directory	SHIFT-D
Init Module	SHIFT-I
Play Song	M
Toggle Play Song	P
Play from this Pattern	F1
Set StartPos	F3
Set RepeatPos	F4
Set EndPos	F5
Toggle RepeatFlags	F6
Inc/Dec StartSpeed	F7/F8
Voice 1-4 Mute Toggle	C= Q,W,E,R
Inc/Dec Current Song	C= A,S
Inc/Dec Number of Songs	C= D,F
Change PlayMode Up/Down	C= G,H

EDIT

Change AdvanceMode	F2
Enter data	0-F
Enter --/00	SPACE
Enter ++/80 (only in note column)	SHIFT-SPACE
Move around	CRSR keys
Go to top	HOME
Editstep	CTRL-1 - CTRL-0
Go to position	SHIFT-1 - SHIFT-9

ARPEDIT

Go to SoundEdit	S
Go to previous Edit	RETURN

PATTERNEDIT

Inc/Dec pattlist row	C= N, C= M	
Inc/Dec current pattern	C= J, C= K	
Up/Down transpose pattern	C= T, C= Y	
Find the first unused pattern	LEFT-ARROW	
Begin	C= B	
Copy	C= C	
Cut	C= X	
Paste	C= V	
Delete	INS/DEL	(*)
Insert	SHIFT-INS/DEL	(*)
Clear Pattern	SHIFT-CLR/HOME	
Go to ArpEdit	R	
Go to SoundEdit	S	
Exit from PatternEdit	RETURN	

PATTLISTEDIT

Find the first unused pattern	LEFT-ARROW	
Begin	C= B	(*)
Copy	C= C	(*)
Cut	C= X	(*)
Paste	C= V	(*)
Delete	INS/DEL	
Insert	SHIFT-INS/DEL	
Clear Voice	SHIFT-CLR/HOME	(*)
Go to ArpEdit	R	
Go to SoundEdit	S	
Edit Patterns under cursor	RETURN	

SOUNDEDIT

Go to ArpEdit	R
Go to previous Edit	RETURN

MAIN SCREEN

```
00   00 00 00 00 01 1F
01   00 00 00 00 01 1F
02   00 00 00 00 01 1F
03   00 00 00 00 01 1F
04   00 00 00 00 01 1F
05   00 00 00 00 01 1F
06   00 00 00 00 01 1F
         PATTERNLIST
+--------+-+-+------+
|        |R|1|1234 .|
+--------+-+-+------+
|FST 00|PAL...|STP 00|
|LST 00|......|POS 00|
|RPT ^^|SNGS 1|SPD 00|
|SPD 07+------+------+
+--^^--+PROGRAMMED BY|
|SONG 0|DANIEL KAHLIN|
+------+-------------+

     VIC-TRACKER 2.0
```

Runtime Flags and Status:

```
          Edit step
Advance mode |     Voice mutes
         \  |   /    Play flag
+---------+|+|+-|----/
|         |R|1|1234 .|
+---------+-+-+------+
|xxx xx|xxxxxx|STP 00|<-- Current Step
|xxx xx|xxxxxx|POS 00|<-- Current Position
|xxx xx|xxxx x|SPD 00|<-- Current Speed
|xxx xx+------+------+
+--^^--+xxxxxxxxxx xx|
```

Global Configuration:

```
  Play Mode
       \
|      \   |x|x|xxxx x|
+-------|-+-+-+------+
|xxx xx|PAL...|xxx xx|
|xxx xx|......|<-------- Flags
|xxx xx|SNGS 1|xxx xx|
|xxx xx+--|---+------+
+--^^--+xxx\xxxxxx xx|
            \
       Number of Songs
```

Per Song Configuration:

```
                 |       |x|x|xxxx x|
                 +--------+-+-+------+
First Position -->|FST 00|xxxxxx|xxx xx|
 Last Position -->|LST 00|xxxxxx|xxx xx|
Repeat Position -->|RPT ^^|xxxx x|xxx xx|
   Start Speed -->|SPD 00+------+------+
                 +--^^--+xxxxxxxxxx xx|
  Current Song -->|SONG 0|xxxxxx xxxxxx|
                 +------+-------------+
```

PATTERNLIST

Patternlist editor: (spaces added for readability)

```
00   00  00  00  00   01   1f <- patternlist position 00
01   00  00  00  00   01   1f <- patternlist position 01
02   00  00  00  00   01   1f              |
03   00  00  00  00   01   1f              |
04   00  00  00  00   01   1f              |
05   00  00  00  00   01   1f              |
06   00  00  00  00   01   1f <- patternlist position 06
     |   |   |   |    |    |
    osc1 |  osc3 |   vol    \
        osc2    noise      length-1
```

The first five columns indicate which patterns are to played during this particular patternlist position. The sixth column tells us which number the last row to be played in those patterns has, i.e the pattern length-1. The default is $1f (=32-1).

Pressing RETURN will switch to the pattern editor show the contents of the patterns corresponding to the patternlist row under the cursor.

PATTERNS

Pattern editor: (spaces added for readability)

```
00 --00 --00 --00 --00 0f00 <- pattern step 00
01 --00 --00 --00 --00 0f00 <- pattern step 01
02 --00 --00 --00 --00 0f00       |
03 --00 --00 --00 --00 0f00       |
04 --00 --00 --00 --00 0f00       |
05 --00 --00 --00 --00 0f00       |
06 --00 --00 --00 --00 0f00 <- pattern step 06
00 ^00  ^00  ^00  ^00  ^01
```

VIC-TRACKER NoteFormat!

Voices 1-3
```
  NOTRIG    NOTE    EFFECT PARAM
     \ /      \      \    \/   /
      00000000     00000000
```

Voice 4 (Noise)
```
  NOTRIG    FREQ    EFFECT PARAM
     \ /      \      \    \/   /
      00000000     00000000
```

Voice 5 (Volume)
```
    SPEED  VOL   EFFECT PARAM
      \    \/ \    \    \/   /
       00000000     00000000
```

Notes
```
  \Note
Oct\  C  C# D  D# E  F  F# G  G# A  A# B
  1   10 11 12 13 14 15 16 17 18 19 1A 1B
  2   20 21 22 23 24 25 26 27 28 29 2A 2B
  3   30 31 32 33 34 35 36 37 38 39 3A 3B
  4   40 41
 (4   3C 3D) <- these are the same as the ones above.
```

Ties
```
  \Note
Oct\  C  C# D  D# E  F  F# G  G# A  A# B
  1   90 91 92 93 94 95 96 97 98 99 9A 9B
  2   A0 A1 A2 A3 A4 A5 A6 A7 A8 A9 AA AB
  3   B0 B1 B2 B3 B4 B5 B6 B7 B8 B9 BA BB
  4   C0 C1
 (4   BC BD) <- these are the same as the ones above.
```

Effects
```
1 - Portamento up          (param = speed)
2 - Portamento down        (param = speed)
3 - Arpeggio               (param = arpnum)
5 - Portamento up (slow)   (param = speed)
6 - Portamento down (slow) (param = speed)
7 - Set flag               (param = flagvalue)
8 - Set sound              (param = sound)
C - Cut note               (param = ticks)
D - Delay note             (param = ticks)
```

1 - Portamento up & 2 - Portamento down
param/2 is added to/subtracted from the frequency value each tick for the duration of this step.

3 - Arpeggio
Arpeggio 'param' is run each tick for the duration of this step. If it was used the previous step it is not retriggered.

5 - Portamento up (slow) & 6 - Portamento down (slow)
param/8 is added to/subtracted from the frequency value each tick for the duration of this step.

7 - Set flag
The global userflag is set to 'param'. It may be read from the packed song by calling pl_ReadFlag. This is intended to be used in demos and games for synchronizing graphics effects with the music.

8 - Set sound
The current sound of this voice is set to 'param'.

C - Cut note
Cut note after 'param' ticks. NOTE: This also works to make a note longer.

D - Delay note
Delay note for 'param' ticks.

ARPEGGIOS

Arpeggio editor: (spaces added for readability)

```
00   00   00 00 00 00 00 00 00 00--Arpeggio 0
--   00   00 00 00 00 00 00 00 00_/
01   00   00 00 00 00 00 00 00 00--Arpeggio 1
--   00   00 00 00 00 00 00 00 00_/
02   00   00 00 00 00 00 00 00 00--Arpeggio 2
--   00   00 00 00 00 00 00 00 00_/
03   00   00 00 00 00 00 00 00 00
```

Each arpeggio: (spaces added for readability)

```
Mode Speed
  \   | Step 0                    Step 7
   \  / /                              /
00  00   00 00 00 00 00 00 00 00
--  00   00 00 00 00 00 00 00 00
  / \  \                             \
 /   | Step 8                    Step F
Repeat Last
```

When an arpeggio is triggered it starts at step 0 and the proceeds.

'Speed'   is the number of ticks between each step minus one. i.e 0 means a new step every tick, and 1 means a new step every other tick.
'Repeat'   This sets the step to go to after we where at 'Last'.
'Last'   This sets the last step that is part of the arpeggio.
'Mode'   selects how each step shall be interpreted. (See below)

Arpeggio Mode '0'

Voices 1-3:
$00-$1f is a positive note offset of 0 to 31 semitones.
$20-$3f is a negative note offset of -32 to -1 semitones.
$40-$7f is an absolute note ($40 is silent)
MSB signals that portamento should not be added.

Voice 4:
$00-$1f is a positive freq. offset of 0 to 31 semitones.
$20-$3f is a negative freq. offset of -32 to -1 semitones.
$40-$7f is an absolute note ($40 is silent)
MSB signals that portamento should not be added.

Arpeggio Mode '1'

Voice 1-4:
$00-$3f is a positive freq. offset of 0 to 63 units.
$40-$7f is a negative freq. offset of -64 to -1 units.
MSB signals that portamento should not be added.

Arpeggio Mode '2' (*)

Voice 1-4:
$00-$3f is a positive freq. offset of 0 to 63 units.
$40-$7f is a negative freq. offset of -64 to -1 units.
$80-$ff is an absolute frequency.

Arpeggio Mode 'F'

This is the compatibility mode for older songs, and may be removed in a future release. Each entry is an offset.

Voices 1-3: note offset +$7f to -$80
Voice 4: frequency offset +$7f to -$80

Note offsets
00 Unison
01 Minor second
02 Major second
03 Minor third
04 Major third
05 Perfect fourth
06 Tritone
07 Perfect fifth
08 Minor sixth
09 Major sixth
0A Minor seventh
0B Major seventh
0C Octave
11 Octave + Perfect fourth
18 Two octaves

Absolute Notes

Oct\	C	C#	D	D#	E	F	F#	G	G#	A	A#	B
1	50	51	52	53	54	55	56	57	58	59	5A	5B
2	60	61	62	63	64	65	66	67	68	69	6A	6B
3	70	71	72	73	74	75	76	77	78	79	7A	7B
4	7C	7D										

SOUNDS

Sound editor: (spaces added for readability)

```
00   00 00 00 00 00 00 00 00 <- sound 0 (default)
01   00 00 00 00 00 00 00 00 <- sound 1
02   00 00 00 00 00 00 00 00      |
03   00 00 00 00 00 00 00 00      |
04   00 00 00 00 00 00 00 00      |
05   00 00 00 00 00 00 00 00      |
06   00 00 00 00 00 00 00 00 <- sound 6
```

Sound format:

```
 Dur      foffs     glide    arpeggio
  00        00        00        00      00      00      00       00
 ticks    value     speed    arpnum      \      |       |        /
                                          ----- not used ------
```

Byte 00: Note length
This sets the duration of the sound in ticks. (length $00 means that the note will continue for the whole step.)

Byte 01: Frequency offset
foffs of $00 means that the frequency registers get loaded with $0080, such that portamento up/portamento down gets evenly distributed. For old songs this is $fc for compatibility.

Byte 02: Freq glide
Glide selects a glide speed equivalent to that of portamento slow.

Byte 03: Arpeggio
If MSB is set, the low part of this byte selects a default arpeggio for this sound.

Byte 04-07: Not Used (reserved for future use)

EXAMPLES

Portamento down:

```
00 2321
01 ++21
02 ++21
03 ++21
04 --00
```

Arpeggio:

```
00 2030
01 ++30
02 ++30
03 ++30
04 --00
```

```
00 2030
01 ++30
02 ++30
03 ++30
04 --00
```