This is a shorter revised version of the SID-Wizard User Manual now in TXT format so all quirks and complexities coming with PDF are excluded now, and it can be read on real C64 as well.

I. Introduction of SID-Wizard and SID SID-Wizard is a music-tracker application for the Commodore 64 computer's audio-chip called SID. It has many advanced features not found in other trackers, hovewer I took many ideas from the best C64 music editors like Goattracker, SDI, X-SID, SID-Factory, JCH Editor, etc.

Main features of SID-Wizard:

-44 Instruments (31 in 2SID version) -6 subtunes (only 2 in 2SID version) -100 of 250-byte patterns (105 in 2SID) -Each instrument has own distinct tables -Each instrument has own Hard-Restart -Calculated vibrato (4 types) & slide -Up to 8x framespeed (400Hz SID-control) -ChordTable, more chords for 1 instrument -Keyboard-tracking (note-dependent filt) -Support for different tempos on tracks -Up to 3 pattern-effects in a patternrow -Gate-off entries in instrument-tables -Scalable player (from 'bare' to extra) -Export formats like .SID and Executable -Goattracker-like concept and keys -Oscilloscope & pulsew./cutoff displays -Selectable pre-set colour-themes -Other keyboard-layout(s) are selectable -NTSC machine-type support (video&audio) -MIDI/XM file-conversion via SWMconvert -Goattracker SNG importer 'sng2swm.exe'

New features in SID-Wizard 1.5:

-MIDI-in (poly/mono,velo-sense), devices: HerMIDI, Sequential, Passport/Syntech, JMS Datel/Siel/CLAB, NameSoft, Maplin, MoogSP. -2SID (stereo) version - format is 'sws' -Introducing smaller "Bare" player-type -Note-entry mode for chord-table -Tunings: Verdi-tuning, Just-intonation -SDI & Janko piano/keyboardlayouts added -Saving editor-settings to a config-file -One-step "Undo" for patt./orderl./ins. -Solo/Unsolo function (with Shift+0) -Some more key-combinations (e.g. C=+K) -Sound-FX support (SFX, Check doc's end) -Title-identation and 4x fast-forward function in .exe.prg SID-Maker exports -Less audible player-initialization pop -Fresh collection of 324 instruments

If you're interested in sound-sythesis and the SID-chip you can read a bit more in SID-Wizard 1.4 User Manual. But let's see the registers of SID in a nutshell: 00-01 07-08 0E-0F :Pitch low&high bytes (low byte; high byte) 02-03 09-0A 10-11 :Pulsewidth registers (low byte; hi-nybble) :Waveform+control reg \$04 \$0B \$12 (test, ring, sync, gate) 05-06 0C-0D 13-14 :ADSR envelope reg. (Att, Decay; Sust, Rel) \$15-\$16 :Filter cutoff frequency (low 3 bits; high 8 bits) \$17 :Filter Resonance & Switch (Reso.nybble, Ch3, Ch2, Ch1) \$18 :Filter Band / Volume reg.

(Band nybble, Vol.nybble)

II. Usage of SID-Wizard

1.Startup-menu:

You can select between these player-routine types at startup:

- Normal: It probably has everything you will need: Calculated vibratos, Detune,Chord,Transpose, instrument octave,WF-ARP speed,Pulse/ Filt.reset OFF, keyboard-track, 11bit filter, tempo-programs, vibrato types, HR-types, frame1 setting, note-off tableindex, subtune-jump, zeropage-restore
- Medium: Smaller player-size but lacks: vibrato-type,hard-restart type, frame1 setting,PW keybrd-track, note-off index, subtune-jump FX and zeropage save/restore
- Light: Even smaller & consumes less rastertime, but lacks also: Calculated vibrato & slide, Detune, Chord-table, Transpose FX, Instrument-octave, WF-arp.speed, PW/Filt.reset OFF, keyboard-trk, 11bit filter, tempo-programs
- Extra: Based on 'Normal', adds extras: (takes more memory & rastertime) program-tables never skipped, FiltSwitch-Reso.FX, Ghost regis- ters, fast tempo (0..2), vibrato is not lost after pitch-slide, note/track Delay pattern-FX

- Bare: Very restricted, significantly smaller size, less than "Light". Lacks: subtune-support,multispeed support, external volume-setting, filter-shift FX, orderlist-FX, portamento in note-column, WF-arpeggio NOP \$80, vibrato-rate FX, filter/detune/WF small effects
- *If none of these pre-set values fit your needs you can refine them in file /sources/settings.cfg and recompile SID-Wizard with your own settings. *2SID version of SID-Wizard uses ghostregisters in all types of players.

For PAL machines you can select an alternative pitch-tuning system in Startup menu: Verdi tuning is equal-tempered but uses A4=432Hz as base-note, while Just-intonation even has note-intervals based on integer ratios to produce pure intervals in key of C. (not other keys)

2.User Interface (and navigation keys)

You have to use key-combinations to do tasks in SID-Wizard. Numbers are given in hexadecimal 1..F format everywhere. CRSR-keys can now go through ins.panel. The top-border part displays the logo with SW version-number and player-type, Octave, Playback-time, Rastertime, Auto advance amount, Pulsewidth- and Filtercutoff bars, and finally Channel3 wave.

Pattern-editor (call with F5 key):

The largest part of the screen where you can put notes & effects for the 3 tracks of SID. A patternrow looks like Column1 Column2 Column3 Column4 Note/Fx Instrument/Fx Effect Fx-Value

The notes can be typed in the selected octave by 2 rows in normal SW-layout: Upper octave: 2 3 5 6 7 9 0 (SDI's layout) Q W E R T Y U I O P @ * Lower octave: S D G H J L Z X C V B N M , .

DMC-layout: WE TYU OP ASDFGHJKL: JANKO-layout: Chromatic/non-diatonic, notes found on F,4,K,8 keys as well.

Orderlist (call with F6 = Shift+F5): In the bottom-border you can organize the sequence how the patterns are to be played after each other on tracks. Some effects can also be given above \$80, see values later in section III. Instrument-panel (call with F7 key): On the right-side of the screen the instruments can be edited. You can select instrument to edit with +/- keys. Each instrument has a number and you can give them a name as well. See the content of the tables in section III.

At the rightmost side of the screen are chord-table (call with C=+F5 or C=+K) and the tempo-program table (C=+F7/F8)

3.Menu: File operations, configuration

Menu and file-operations can be called with F8 key (Shift+F7). Press Esc/STOP to exit the Menu or file-dialog. You can save/load worktunes with SWM extension, while SWI stands for instruments. (You can check the author-information and player-type abbreviation N/M/L/E/B of the loaded tune in orderlist's position-row right after loading or by calling the menu with F8 key.)

Press RETURN on the menupoints to set or adjust parameters. One exception is default pattern-length which can be set with +/- and sets the unused patterns' lengths when you kill/load/save a tune.

To activate a MIDI-device first select its type with RETURN, then select the MIDI-channel you want to receive from. (Press Shift+RETURN to disable MIDI.) If a MIDI-device is set successfully you can see ':' before its name, else a '!' notifies you about the issues. Attention: Most MIDI-devices which use \$DE00..\$DFFF will cause a clash/freeze if you have a cartridge attached on Expansion port. I don't know a workaround except using HerMIDI which doesn't use the Expansion-port kept for cartridges.

The base-address of the 2nd SID can be set to all possible values with +/- but the most commonly used addresses come first. The setting gets performed when you exit from menu or restart tune. (F1) (Clash with cartridges can also happen if you try to set \$DE00...\$DFE0 here.)

From version 1.5 SID-Wizard no longer saves editor-specific settings into the workfile: you can save your settings with 'SAVE CONFIG' menupoint into a file called '@SWCONFIG.PRG'. Then it's loaded at next startup automatically, if succeeds it is seen in startup-menu. Otherwise you'll see a '?' next to this menupoint. (If even saving the config was unsuccessful you'll see a '!' here)

4.Keyboard-layout of SID-Wizard		Instrument-related keys (F7):		
				Select instrument
		CONTROL	(Tab)	Go Instrument-subtables
If you use VICE	If you use VICE emulator some useful		N	Name the instrument
	NTROL=Tab, RUNSTOP=Esc,	RETURN		Toggle param./ go Chord
	key too) is Control-key,	Shift+S		Set Note-OFF table-pos.
<pre>Pound=Insert, UpArrow=PageDn (in Linux)</pre>		C = + Z/2 $C = + P$		Undo/Cut/Copy/Paste Ins Toggle PW/Filter reset
General keys (se	ome were told before):	=		Negate value in table
F1	Play from the beginning	Shift +	S	Go to main Inst.setting
F2 (Shift+F1)	<pre>Play from play-mark(s)</pre>	Shift +	W	Go to WF-ARP table
F3	Play selected patterns	Shift +	P	Go to PulseWidth table
F4 or RUNSTOP	Stop/Continue (toggle)			
C = + F1F4	Same, but Follow-play			ated keys (C=+F5):
	FastForward 6x playback		к / L	Select Chord anywhere
Shift + <-	Toggle follow-playback	+/-		Sel.Chord in ChordTable
C= + <-	Toggle auto-Follow	RETURN		Return to patt./instr.
C= + , / .	Select (inc/dec) Subtune	=		Negate value in table
< > (Sh+ ,/.)	Inc./Dec. subtune-tempo	C= + N		Note-mode / Number-mode
[] (Sh+:/;)	Inc./Dec. 2nd funktempo			ated keys (C=+F7):
C= + T	Toggle SubtuneFunkTempo	Shift +	т / Ү	1 1 2
/ or Up-Arrow	Page Down (4/8 steps)	+ / -	(=0)	Sel.Tempo in TempoTable
Sh+/, RESTORE	Page Up (4/8 steps)	Menu key		
Shift + F / G	Inc./Dec. framespeed	RETURN	(+Sn.)	Adjust/reset settings
Shift + I	Toggle auto-Instrument	+/-		Set default patt.length or SID2 base-address
Dottom oditor	malatad have (RE).	File col	octor le	
CONTROL (Tab)	<u>related keys (F5):</u> Step Track (Shift:back)	File sel F1	ector Ke	<u>eys:</u> Re-read disk-directory
C = + CONTROL	Fast switch SID1/SID2	F3 / Up	-arrow	-
Shift + SPACE		CONTROL		Filename/info/selector
Shift+ 16/0	Mute-UnMute/Solo-Unsolo	RETURN	(100)	Approve / Perform task
•	Select / inc.dec.Octave	F7/STOP	(Esc)	
RETURN (+Sh.)	Put Note-ON / Note-OFF		(,	2
	Go to instr. / chord	5.SDI kev	-lavout	's differences/addons:
C= + RETURN	Select played patterns			
A / 1 / C=+DEL	Empty row in column	SH L	Load m	usic (bring up MENU too)
DEL	Delete / Dec. patt.len.	SH S	Save M	usic (bring up MENU too)
Sh+DEL / Pound	Insert / Inc. patt.len.	F1	Play f	rom orderlist mark(s)
Shift+C= + DEL	Delete whole PatternRow	F2	Set pla	ay-mark in orderlist
C = + Z/X/C/V	Undo/CutCopy/Copy/Paste	F3		ontinue playback
Shift + C	Set end of Copy-marking	Z		attern from current line
Shift + Q / W	Transpose from cursor	Return		attern from top
C= + Q / W	Transpose octave up/dn.	F4		ynth mode (toggle)
Shift + V	Vibrato in Note-column	F7/F8		octave (incr./decr.)
Shift + P	Portamento in Note-col.	STOP, /		instrum./pattern-editor
Shift/C= + R Shift/C= + S	RingMod.ON/OFF in NoteC	SH F		program table
Shift/C= $+$ S Shift + $+/-$	Sync.ON/OFF in Note-col Select pattern on track	SH T		program table revious song (subtune)
Shirt + +/- Sh+D / C= + D	DoveTail/MIDI-Polyphony	CBM +/-		
Shift + A / Z	Inc./Dec. auto-adv.step	S/K , L		on/off (mute/unmute) mp left/right (tracks)
Shift + H / J	Inc./Dec.highlight-step	, / .		o/down 8/4 lines
C = + B	Toggle track-binding	Space		down (in pattern)
C= 1 D	Toggie clack binding	G, SH G		n/off (/++ in pattern)
Orderlist-related keys (F6 / F5):		> / <		ose in pattern / Chord+-
RETURN (+Sh.)	Go to pattern(s) in pos		-	Paste (at cursor-posit.)
Shift+SPACE	Set play-mark (F2 key)	SH M		d of copy-mark/selection
C= + SPACE	Set marks to played pos	CBM F		pattern (From cursorpos)
C = + Z/C/V	Undo/Copy/Paste @cursor	SH Home		rt of song (orderlist)
Shift + C	Set end of Copy-marking	н		ext unused in Orderlist
C = + E	Find 1st Empty pattern	N		ound/instrument
		?		eed calls (framesp.18)
		•	-	- ·

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III. Hexadecimal value reference	Instrument-column effects:		
	\$01\$3E Select Instrument for track		
1.Instrument-parameters	\$3F Legato/tied (set pitch only)		
	\$40\$4F Set Waveform (small Fx)		
Main instrument-settings:	\$50\$5F Set Sustain-level (note-vol)		
ADSR - If Sustain=8, MIDI-velocity=ON	\$60\$6F Set note's Release-time		
ADHR - ADSR value for hard-restart	\$70\$7F Set Chord(overrides default)		
Framel waveform (turn on with RETURN)			
HardRestart timer (02 frames before)	Effect-column SMALL effects:		
HardRestart-type (normal/staccato)	\$20\$2F Set Attack-time of note		
Vibrato amplitude, rate, delay/increase	\$30\$3F Set Decay-time of note		
Vibrato-type (incremental/delayed u/d)	\$4,5,6,7x The same as above (instr.FX)		
Waveform-Arp. table execution speed	\$80\$8F Vibrato Amplitude setting		
<pre>(>\$40:PW-multispeed, >\$80:Filter too)</pre>	\$90\$9F Vibrato Rate setting		
Default Chord's No. for the instrument	\$A0\$AF Set Main Volume (\$d418 nybL)		
Octave-shift (set '+/-' with RETURN)	\$B0\$BF Filter-band nybble		
PW/Filt-reset (inits on ins.selection)	\$C0\$CF Chord-speed setting		
	\$D0\$DF Detune current note		
Waveform-Arpeggio-Detune table:	\$E0\$EF Control-nyb.(test/ring/sync)		
WF-column: \$00\$0F repeat row 116x	\$F0\$FF Filter-resonance setting		
\$10\$FD set waveform/ctrl.	,,		
<pre>\$FE Jump (>\$40:itself)</pre>	Effect-column BIG effects:		
Arp-column: \$00 No pitch-shift	\$01 Pitch-slide Up		
(with Wform) \$01\$5F Pitch-shift up	\$02 Pitch Slide Down		
\$7F Jump to chord	\$03 Tone-portamento (auto-portamento)		
\$80 NOP (prev.val.)	\$04 Waveform-Control register setting		
\$81\$DF Absolute pitch	\$05 ATTACK/DECAY register setting		
\$FF\$E0 PitchShift down	\$06 SUSTAIN/RELEASE register setting		
Detune-column: \$00\$FE Detune upwards	\$07 Select Chord (overrides default)		
\$FF NOP (prev.val)	\$08 Set Vibrato Amplitude & Rate		
PulseWidth-table:	\$09 Go to WF-ARP table-position		
\$8x\$Fx xx Set Pulsewidth xxx	\$0A Go to PulseWidth table-position		
\$00\$7F xx Add xx to PW 007F times	\$0B Go to Filter table-position		
\$FE xx Jump to table-position xx	\$0C Set Chord-speed (or arp.speed)		
*3rd column is keyboard-tracking curve	\$0D Detune current note upwards		
(\$00:off, \$00->downwards:less,\$01->up-	\$0E Set PulseWidth		
wards:more dependence on note-pitch)	\$0F Set Filter Cutoff-freq. hi-byte		
	\$10 Set Main single tempo		
<u>Filter-program table:</u>	\$11 Set Main FunkTempo		
Filters are switched on automatically	\$12 Launch Main Tempo-program		
for channels that use filtered instru-	\$13 Set Track's single tempo		
ments. The leftmost channel has the	\$14 Set Track's individual FunkTempo		
highest priority for filter-control if	\$15 Launch Tempo-program for track		
more tracks try to use filter. Values:	\$16 Select Vibrato-type (0/10/20/30)		
\$8r\$Fr xx Set resonance and cutoff	\$1C Shift Cutoff hi-byte (permanent)		
(9:lowpass,A:band,C:hi)	\$1D Delay track by \$00\$ff frames		
\$00\$7F xx Add xx to Cutoff times	\$1E Delay note by max=tempo-3 frames		
\$FE xx Jump to table-position xx	\$1F Set FiltSw/Reso register (\$d417)		
*3rd column: \$00\$7F,\$ff\$90:kbTrack	(tarr)		
\$8x FilterSwitch-override	3.Orderlist values		
*If you just insert an empty row in			
1st row of the filtertable, instrument	\$01\$7F Pattern-numbers		
is filtered but won't control filter.	\$8F\$80 Transpose key down		
is incered but won a control inter.	\$90\$9F Transpose key up (\$90:orig.)		
2.Pattern-Effects			
2.Pattern-Effects			
	\$B0\$FD Set single track-tempo		
Note-column effects: They appear like	\$FE End of tune, stop playback		
tiny graph. symbols after being typed	\$FF Jump to orderlist-position		
$W_{1} = P \left[V_{0} - Q_{0} - Q_{0} - P_{1} + P_{1} - Q_{0} - Q_{0} + P_{1} - Q_{0} + P_{1} +$	altion by tollowing number		

with key-combinations (Shift+R/S/P/V) Vibrato's amplitude can be set to 1..F

given by following number. (if >= \$80, jump to subtune)

Chord-table values

\$00\$7D	Rel. pitch up (by halfnotes)
\$FF\$80	Rel. pitch-shift downwards
\$7E	Return from chord to Arp-tbl.
\$7F	Loop the chord infinitely

ChordTable now can be edited in 2 ways: default is the new 'Note-mode': You can set the base/root note of a chord outside of the chord-table, then the notes of the chord IN the chordtable. Editing mode (Space) should be selected to type (More convenient method than the number based.Playback also sets the basenote)

5.Tempo-table values

\$00..\$7F Tempo for one pattern-row

IV. SID-Maker and converters

SID-Maker is an important addon for SID-Wizard, it can create various formats from the saved SWM tune: Normal, Raw, Executable and SID. (If you used a ':' in the author-info field it will behave as a separator between author-name and tune-title in the SID export.)

Each format has different settings, you can select a different player-type for all if you want, and relocation-address. SID-export has one more setting, if the SID-type to be set for old/new. (Playertype and SIDtype defaults autodetected.) There is an additional 'SID2 address'

setting in 2SID version, works the same as in the editor: most common addresses come first. All export-formats need it.

SWMconvert.exe is a non-C64 addon, you can convert from/to XM/MID formats with a degree of precision. It's used to convert between .P00/.prg or .S00/.sid format in case you save from VICE-emulator.

sng2swm can convert Goattracker's .sng
workfiles to SID-Wizard's .swm format.
You can find some examples on the disk.

The exported tune (normal/raw/sid) can be included in your programs in the usual way, LoadAddress of the tune is the initialization subroutine, subtune must be set in accumulator before calling it. LoadAddress+3 is the playback-routine to be called in every frame. LoadAddress+6 is the multispeed-call if you have multispeed tune.

And LoadAddress+9 is the external volume setting. (Put volume into accu before you call this short routine.) Now SFX (Sound-FX) can be triggered on channel 3 from your program by calling LoadAddress+12, if you exported the tune with the special SID-Maker-SFX. All FXes are essentially instruments, they override channel3 notes during execution. You have to set the CPU-registers first: X=Note, Y=Instrument, A=Length (frames) (Check '/sources/SFX-example' folder.)

You can see the estimated rastertime during composing and the final measure in the executable export. The memory footprints of the different player-types are displayed in the Startup-menu of editor.

Currently supported MIDI-commands: ProgramChange,Brightness(cutoff),Volume Note,PitchWheel,ModWheel,Aftertouch (in monophonic-mode only on cursor channel)

V. Closing Words

Don't be surprised if you see some short screen-flashing in the top & bottom borders when you use MIDI-devices. That's caused by the IRQ that MIDI-cartridges generate in arbitrary times and so they disturb raster-interrupt of SID-Wizard.

In case you'd have an unfortunate crash due to external issues (drive,etc.) you can restart SID-Wizard safely after a warm reset by 'SYS 2061' command.

I hope You'll enjoy using SID-Wizard...

Thanks to people for their contribution: Witchmaster for the Book about SW1.4 Akaobi for Japanese Manual and support Necropolo & Chabee for tests and tunes Spider,Toggle,Adam,Triton for demotunes Unreal who decorated the original box Leon who drew SW-1.2 & 1.4 splash-logos Soci who brought SW to svn & added stuff Ant1 for an online tutorial for Newbies T.L.R for some tests,reports,ideas Conrad who layed down base of sng2swm Gartenzwerg for help with Namesoft-MIDI Ian Coog for timing & SID-format hints