ReSIDent

Original C64 MIDI software, live in your DAW

Version 1.1.0

CLAP, VST3 and Audio Unit instrument for Linux, Windows and macOS

Part of the Audio Plugins

2026-11-11

ReSIDent — manual

The original C64 MIDI programs as an instrument: a complete Commodore 64 with up to eight SID chips, a MIDI cartridge in its expansion port, and your DAW at the other end of the cable. Linux, Windows and macOS; CLAP and VST3, and an Audio Unit on macOS.

Version 1.1.0

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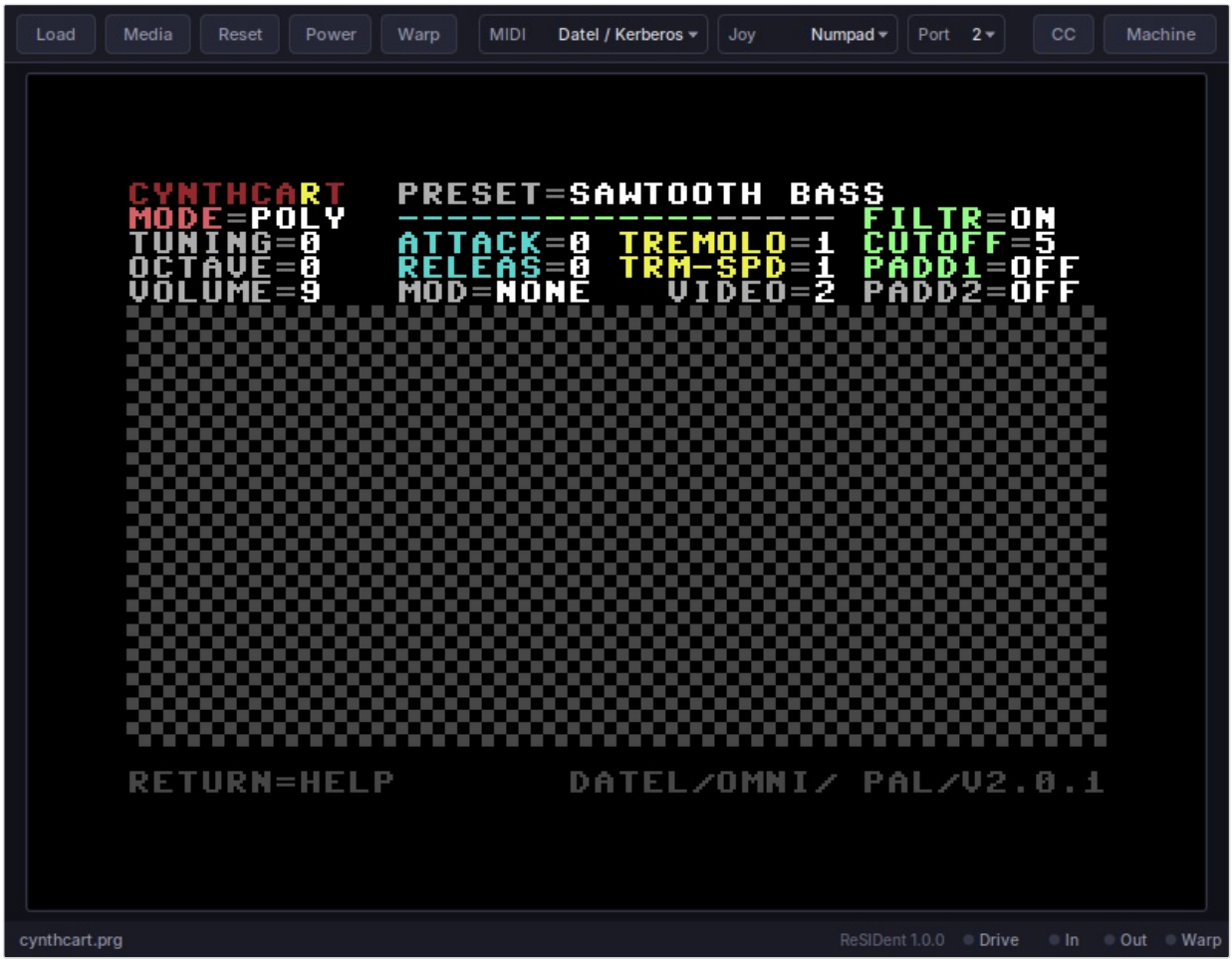
ReSIDent — manual

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1. What it is



ReSIDent running Cynthcart. The buttons at the top load programs and set up the machine; the C64's screen fills the window; the bottom line shows what is loaded and the drive and MIDI lights.

In the 1980s, musicians plugged a MIDI cartridge into a Commodore 64 and turned it into a synthesizer with programs written for the purpose. ReSIDent is that setup inside your DAW. It is not a SID synthesizer of its own: it is a whole C64 — processor, video chip, timers, disk drive and SID sound chips — and it runs the **original C64 programs**, unchanged. You play them from your DAW's notes, and they answer exactly as they did on the real machine, with their own screens, menus, patches and quirks.

What you get:

- A C64, PAL or NTSC, with a **MIDI cartridge** of the common kinds (Datel, Sequential, Passport, Namesoft, Maplin, Moog Song Producer) or the **HerMIDI** interface on the serial port.
- **Up to eight SID chips**, each a 6581 or 8580 of a chosen revision, with its own filter character, level and pan, and its own output — and, if you like, an output for each of its three voices.
- A **disk drive** that loads instantly, or a complete emulated **1541** for programs with their own fast loaders. Whatever a program saves goes into the disk, which is kept in your project.
- The C64's **keyboard** on your computer keyboard, a **joystick**, and a **mouse** or **paddles** on your mouse.
- **CC maps**: the controllers a program listens to, as named, automatable parameters in your DAW (chapter 8).
- Your project keeps the **whole machine**: reopen it and the program is back exactly where you left it, with every patch you edited on the C64.

ReSIDent contains no Commodore software. You need the C64's ROMs (chapter 3) and the programs you want to play (chapter 5).

2. Installing

Copy the plugin into your host's plugin folder — the `ReSIDent` folder with the `.clap` inside, or the `ReSIDent.vst3` bundle (on macOS: `ReSIDent.clap`, `ReSIDent.vst3` or `ReSIDent.component`):

	CLAP	VST3
Linux	`~/.clap/`	`~/.vst3/`
Windows	`C:\Program Files\Common Files\CLAP\`	`C:\Program Files\Common Files\VST3\`
macOS	`~/Library/Audio/Plug-Ins/CLAP/`	`~/Library/Audio/Plug-Ins/VST3/`

On macOS the Audio Unit, `ReSIDent.component`, goes into `~/Library/Audio/Plug-Ins/Components/`; it is what Logic Pro and GarageBand use.

Then let the host rescan its plugins. ReSIDent is an instrument: put it on an instrument track and play it with notes. The CLAP, the VST3 and the Audio Unit are the same plugin; use whichever your host prefers. A `.vst3` (and on macOS every one of the three) is a folder — copy it whole.

On Linux and Windows, ReSIDent needs a processor with **AVX2 and FMA**: any Intel Core from the 4th generation (2013) on and any AMD Ryzen. On processors without them the host refuses to load the plugin. On macOS it runs on any Mac with macOS 10.15 (Catalina) or later, natively on Apple Silicon and on Intel.

ReSIDent keeps its own files in `~/.local/share/ReSIDent` on Linux, `%APPDATA%\ReSIDent` on Windows and `~/Library/Application Support/ReSIDent` on macOS: the ROM folder and your CC maps.

MACOS: LETTING THE PLUGIN LOAD

ReSIDent is free and is not notarized by Apple. macOS therefore blocks plugins downloaded from the internet until their quarantine flag is cleared: the DAW does not load them, or reports them as damaged. After copying, open **Terminal** and run, for the formats you installed:

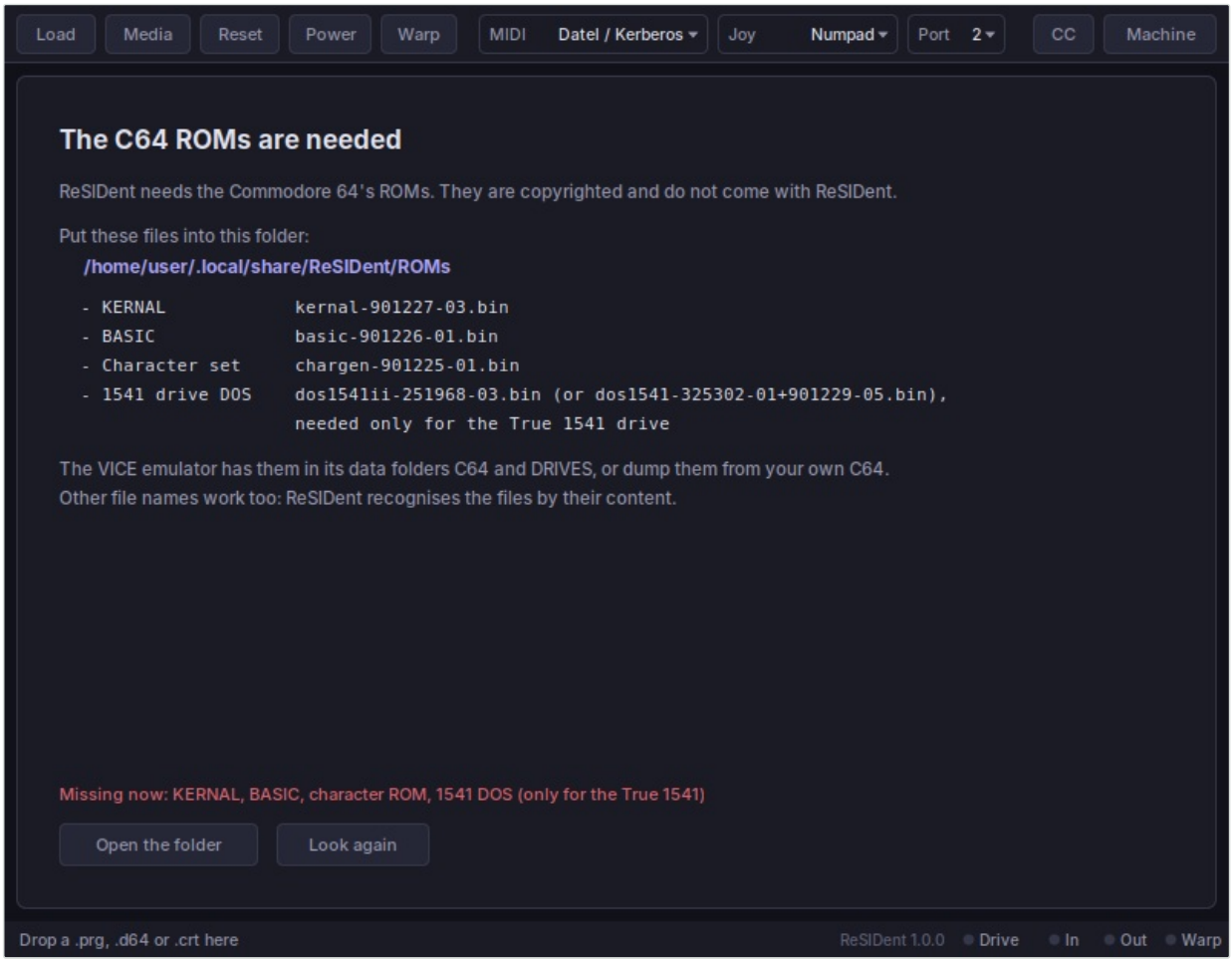
```
xattr -dr com.apple.quarantine ~/Library/Audio/Plug-Ins/CLAP/ReSIDent.clap
xattr -dr com.apple.quarantine ~/Library/Audio/Plug-Ins/VST3/ReSIDent.vst3
xattr -dr com.apple.quarantine ~/Library/Audio/Plug-Ins/Components/ReSIDent.component
```

Then restart the DAW. The `~/Library` folder is hidden in the Finder: use **Go → Go to Folder…** and type the path.

COMING FROM SIDMIDI

ReSIDent was called **SidMidi** up to version 0.8.1. It is the same plugin under a new name, and your projects open in it unchanged. Remove the old `SidMidi` folder and `SidMidi.vst3` bundle from your plugin folders, so the host does not find the plugin twice. On its first start ReSIDent copies your ROMs and CC maps from the old `SidMidi` folder into its own; the old folder is left as it was, and you can delete it once ReSIDent has started.

3. The ROMs



Without the ROMs, the window says what is needed and where it goes.

A C64 cannot start without its operating system, which lives in three ROM chips: the **KERNAL**, **BASIC** and the **character set**. The emulated 1541 drive needs a fourth, its **DOS**. These ROMs are copyrighted and do not come with ReSIDent.

The first time it runs, ReSIDent creates its **ROM folder** and puts a short README into it:

- Linux: `~/.local/share/ReSIDent/ROMs`
- Windows: `%APPDATA%\ReSIDent\ROMs`
- macOS: `~/Library/Application Support/ReSIDent/ROMs`

Copy the ROM files into that folder. The **VICE** emulator includes them in its data folders `C64` and `DRIVES` (`kernal-901227-03.bin`, `basic-901226-01.bin`, `chargen-901225-01.bin`, and `dos1541ii-251968-03.bin` for the drive); you can also read them out of your own C64. The names do not matter: ReSIDent recognises each file by its content, so whatever the files are called, and whether they sit in the folder itself or in subfolders named `C64` and `DRIVES`, they are found.

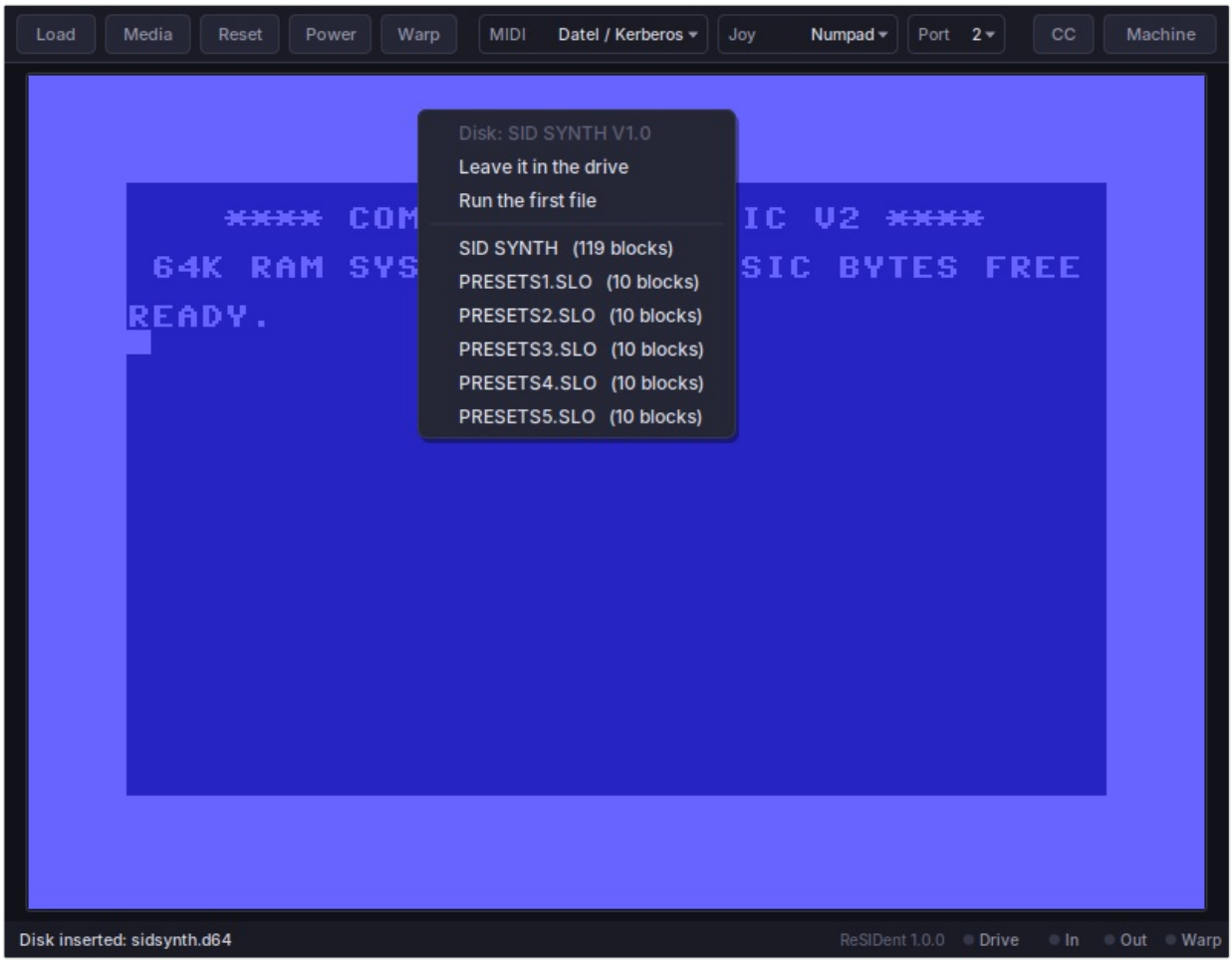
The window shows what is still missing and has a button that opens the folder. ReSIDent looks again every two seconds; once the KERNAL, BASIC and character set are there, the C64 starts by itself. The drive's DOS is only needed for the **True 1541** drive mode (chapter 7).

A project saved on one computer and opened on another without the ROMs waits for them: the machine is kept as it was saved and starts as soon as the ROMs are in place.

4. The window

Load opens a file chooser for a program: a `.prg` (a C64 program file), a `.d64` (a disk image), a `.crt` (a cartridge image) or a `.bin` (a raw cartridge ROM). You can also **drop** a file onto the window. A `.prg` is loaded and run, a cartridge starts as the C64 is switched on. Starting runs in warp, muted, so you do not wait for the C64.

A **disk** goes into the drive first, and ReSIDent shows its files: leave it in the drive, run its first file, or pick the file to run. A disk often holds more than the program — instruments, songs, a second program — and the first file is not always the one to start.



After loading a disk: leave it in the drive, run the first file, or pick one.

Media holds the rest of what a C64 user does with disks and cartridges:

- **Insert disk…** puts a disk into the drive and does nothing else: the program or cartridge that is running goes on. Load from it on the C64 — `LOAD"$",8` and `LIST` show its directory, `LOAD"NAME",8,1` loads a file — or from the running program's own disk menu.
- **Start from disk** runs a file of the inserted disk: the C64 is switched on and the file is loaded and run.
- **Export disk image…** saves the disk — with everything the program saved on it — as a `.d64` file.
- **Freeze** presses the freeze button of an Action Replay or a Final Cartridge (chapter 5).
- **Eject disk**, **Eject cartridge**.

A cartridge and a disk can be in at the same time: load a cartridge, then insert a disk with your sounds or songs, and load them from the cartridge's program. Starting a `.prg` or a file from the disk takes the cartridge out, because a C64 with a cartridge starts the cartridge instead.

Reset presses the C64's reset button: the program restarts its machine, the memory survives. **Power** switches the C64 off and on: the program or cartridge starts again from scratch, a file started from the disk is started again, and a disk that was only inserted leaves the C64 at READY with the disk in the drive.

Warp runs the machine as fast as it can, muted. Some programs unpack themselves for a while after loading; Station64, for example, needs about twelve seconds. The button also lights up when the machine warps on its own (while a program starts, and while the True 1541 loads); click it then to stop that warp and watch the load in real time. The next start warps again; to switch it off for good, see **Auto warp** on the machine page.

MIDI is the interface in the C64's expansion port (chapter 6). **Joy** puts a joystick on your keyboard, **Port** chooses the control port it is plugged into.

CC opens the CC map page (chapter 8), **Machine** the machine page (chapter 7). Click the button again to return to the screen.

The line at the bottom shows what is loaded, messages, and four lights: **Drive** (the disk is being read or written), **In** and **Out** (MIDI going to and coming from the C64), and **Warp**.

The window can be resized; the screen keeps its proportions.

TYPING ON THE C64

Click into the screen to give the C64 your keyboard. From then on, keys go to the C64 until you click outside the screen or the window loses focus.

How keys become C64 keys is set on the machine page, under **Keyboard**:

- **Symbolic** (the default): a key types the character your keyboard prints on it. Type a `;` the way your layout types it — on a German keyboard Shift and the comma — and the C64 gets its `;`. SHIFT is pressed or held back for the C64 as the character needs. Characters a C64 does not have, such as `ä`, do nothing. `^` types the C64's ↑, `_` its ←, `\` its £.
- **Positional**: a key is the C64 key in the same place on a C64's keyboard, whatever your layout prints on it. Programs that use keys for their place rather than their letter — a row of keys as a piano keyboard, say — may be easier this way.

Keys without a character work the same in both, and some C64 keys have no place of their own on a PC keyboard:

YOUR KEY	C64	YOUR KEY	C64
Esc	RUN/STOP	Tab	CTRL
Left Ctrl	C=	Home	CLR/HOME
Insert	INST	Delete, Backspace	DEL
Page Down	↑	Page Up	RESTORE
F1–F8	F1–F8 (even = shifted)	Cursor keys	the C64's cursor keys

A Mac keyboard has no Home, Page Up or Page Down keys: hold **fn** with the cursor keys (fn+← Home, fn+→ End, fn+↑ Page Up, fn+↓ Page Down), and use Shift+Delete for INST, as on a C64. The F-keys may need **fn** too, depending on your keyboard settings. The left Control key is the C64's C=; Command and Option do nothing on the C64.

In **Positional** mode the keys around the letters are, on a US keyboard:

YOUR KEY	C64	YOUR KEY	C64
` (grave)	←	- =	+ -
[ ]	@ *	; '	: ;
\ or #	=	End, <>	£

JOYSTICK, MOUSE AND PADDLES

Joy puts a joystick on the **numpad** (the digits around 5 are the directions, 0 or 5 is fire) or on the **cursor keys** (right Ctrl is fire), plugged into port 1 or 2.

On the machine page, either control port can hold a **1351 mouse** or a pair of **paddles** instead. Your mouse over the C64's screen then moves it: for the mouse as a mouse, for paddles the pointer's X and Y are the two knobs; the left and right buttons are the buttons.

5. Programs to play

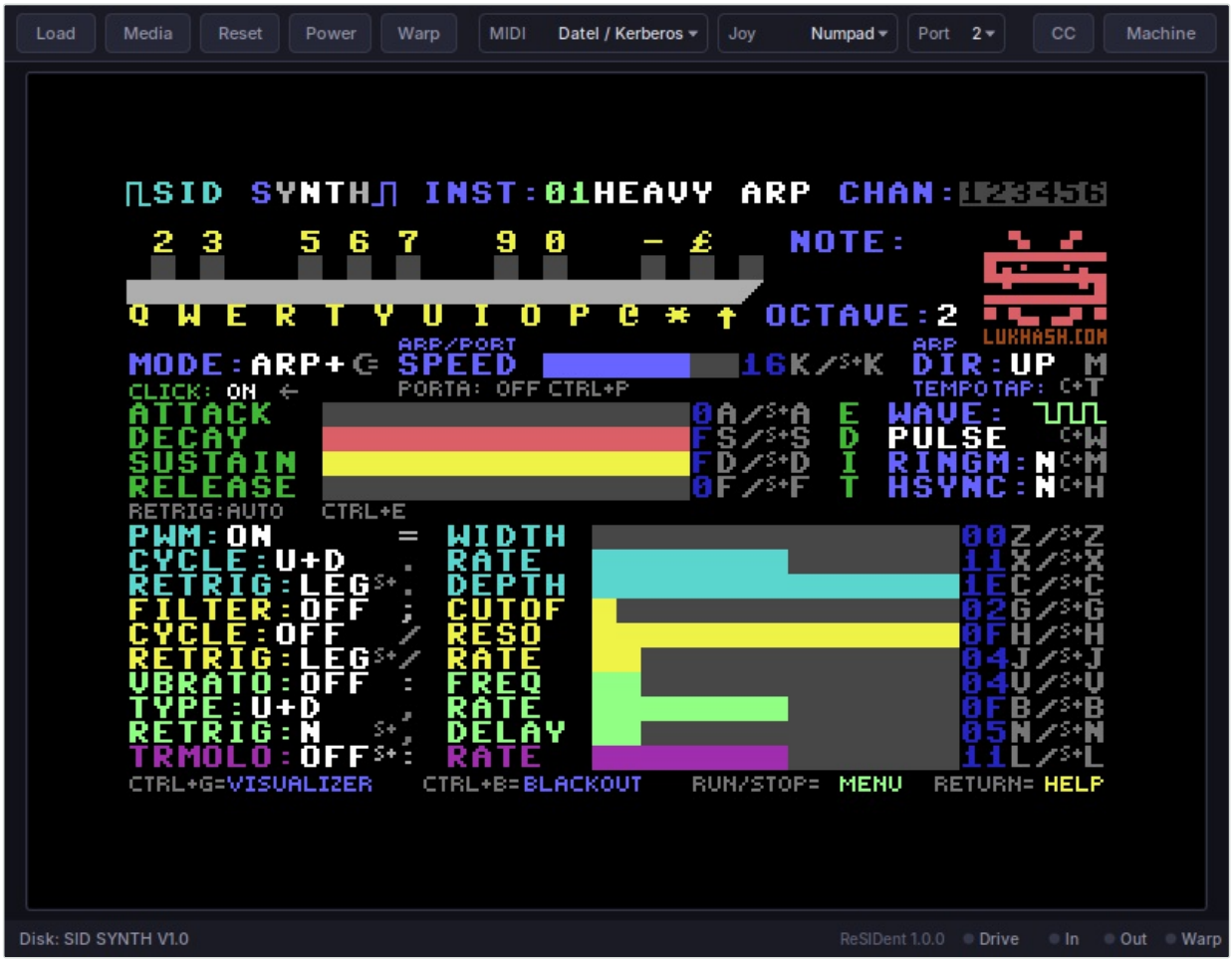
ReSIDent runs any C64 program, but the ones it is made for are the C64's MIDI synthesizers. They are not included; get them from their authors. Four have been tried throughout:

Cynthcart by Paul Slocum — a synthesizer with presets, arpeggios and modulation. It finds the Datel cartridge by itself and answers on every MIDI channel at once. At its default octave, notes sound an octave lower than they are played. Download: https://www.qotile.net/cynthcart.html

Station64 by DJ Indikator — a three-oscillator synthesizer with a deep sound engine. It listens on MIDI channels 1 to 3. It unpacks itself for about twelve seconds after loading; press **Warp** to skip the wait. It finds a Datel, Passport, Sequential or Namesoft interface by itself. Download: https://ultradaw.com/station64/, also on CSDb: https://csdb.dk/release/?id=139033

SID-Wizard by Hermit — a music editor (tracker) that can be played and sequenced over MIDI. Its MIDI input is off when it starts: set it to OMNI or to a channel in its menu. It works with the cartridges and with HerMIDI. Download: https://csdb.dk/release/?id=255544

SID Synth by Lukhash — a polyphonic synthesizer with arpeggiator, a bank of 54 instruments and a full CC setup. **Its MIDI is off when it starts:** press RUN/STOP (Esc) for its menu, choose item 01, and press RETURN until it says **DATEL** (or the interface you chose in ReSIDent). Then RUN/STOP returns to the synthesizer. SID Synth comes with Lukhash's album *Neon Airlines*: buy it at https://lukhash.bandcamp.com/album/neon-airlines, and the download instructions for the synth are inside the album archive.



SID Synth after loading. Its menu (RUN/STOP) switches its MIDI on.

Most C64 MIDI programs need two things to agree: the **MIDI** interface in ReSIDent's top bar, and the interface the program itself is set to. When a program says it cannot find an interface, the two do not match.

FREEZER AND FAST-LOADER CARTRIDGES

Besides program cartridges, ReSIDent takes the utility cartridges C64 users kept plugged in: the **Action Replay** (versions 4.2 to 7.5 and their variants, as `.crt` or as a raw 32K `.bin`), the **Final Cartridge III** and the **Final Cartridge** (I). Load one like any cartridge; it starts with its own menu or screen. Insert a disk beside it (**Media → Insert disk**) and load from the cartridge — that is what their fast loaders are for.

- **Their fast loaders need the True 1541.** They run their own code inside the drive, which the virtual drive does not have.

When you load such a cartridge while Drive 8 is *Virtual*, ReSIDent switches it to *True 1541* and says so (it needs the 1541 DOS ROM, chapter 3). A load on the true drive runs in warp, so you wait for neither the C64 nor the drive.

- **Freeze**: **Media → Freeze** presses the cartridge's freeze button. The running program stops and the cartridge's freeze menu appears — the monitor, pokes, sprite killer and so on; its *restart* entry continues the program where it stopped.
- **Action Replay**: at its start menu, F7 installs the fast loader, F3 starts BASIC without it (then even the virtual drive loads, through the KERNAL).
- **Final Cartridge III** starts in its desktop, worked with the mouse or a joystick; hold **RUN/STOP** (Esc) while it starts to go straight to BASIC with its fast loader.

A cartridge and a MIDI interface share the C64's expansion port. ReSIDent lets both work, as if through an ideal expansion board, including combinations that clash on a real C64: an Action Replay's register sits where the *Sequential*, *Namesoft* and *Moog* interfaces have theirs, and a MIDI program looking for its interface would switch a real Action Replay into its freeze menu. Here the cartridge hears only its own code, so every MIDI interface works beside every freezer cartridge.

6. MIDI

Notes, controllers, pitch bend, program changes, aftertouch and SysEx from your DAW go to the C64 as MIDI bytes through the interface chosen in **MIDI**, at the speed of a real MIDI cable. A program that is too slow to read them loses bytes, as it would on the hardware.

The interfaces:

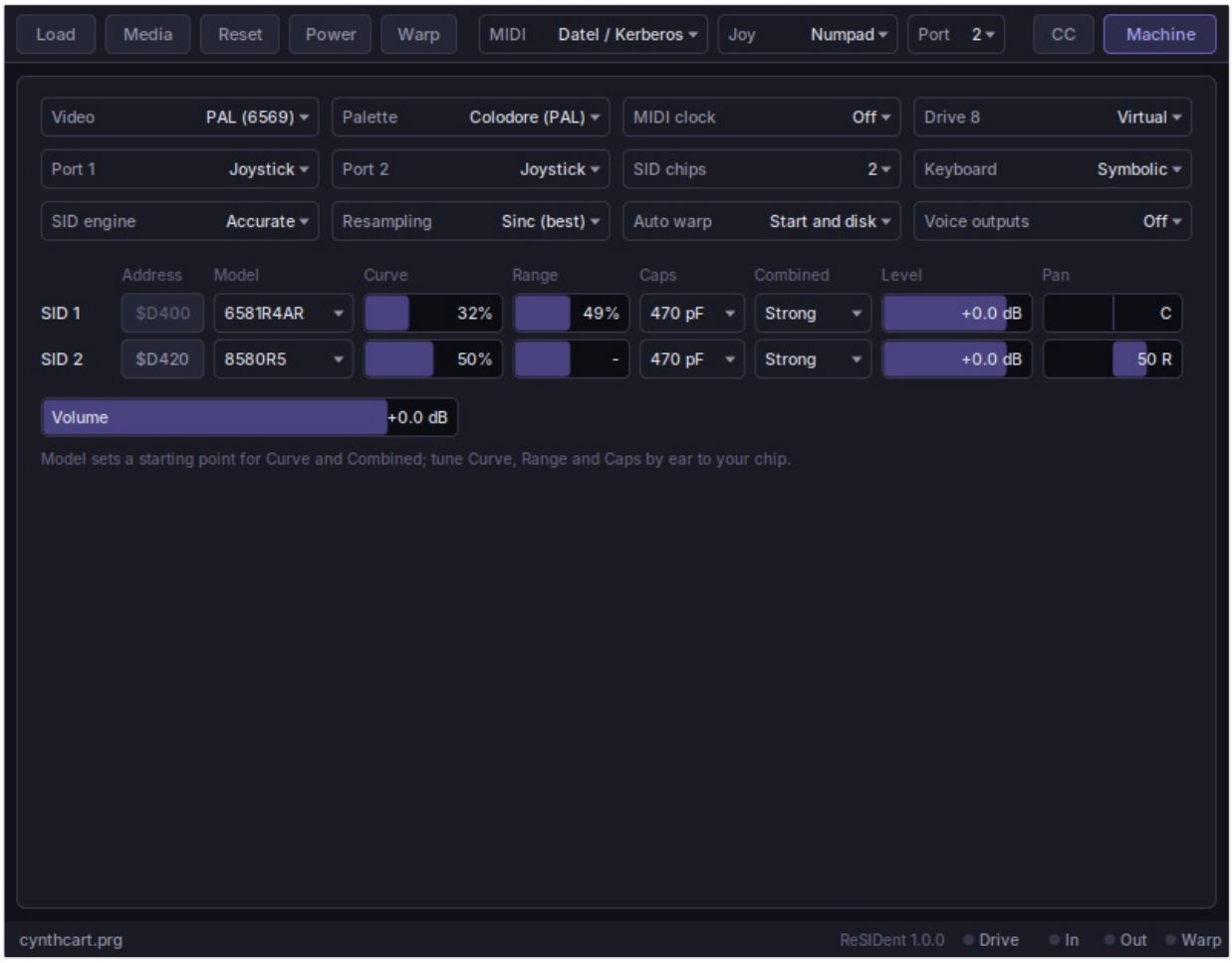
INTERFACE	NOTES
Datel / Kerberos	The most common one, and the one Kerberos and TeensyROM imitate. Start here.
Sequential	Sequential Circuits' cartridge.
Passport / Syntech	
Namesoft	Signals the C64 by NMI rather than IRQ.
Maplin	
Moog Song Producer	
HerMIDI	An interface on the serial port instead of the expansion port, used by SID-Wizard and Station64.
None	No interface.

MIDI out: whatever the program sends — a sequencer's notes, MIDI clock, patch dumps — comes out of ReSIDent as MIDI, so your DAW can record it or send it on.

MIDI clock: on the machine page, *MIDI clock* set to *From the host* sends MIDI clock, start, stop, continue and song position from your DAW's transport to the C64, for programs that follow a sequencer (SID Synth's arpeggiator, SID-Wizard's playback).

A note on controllers: some programs read only part of the controller number. Cynthcart treats controllers 16 to 31 as 0 to 15; Station64 treats 64 to 127 as 0 to 63, so a DAW's "reset all controllers" (CC 121) switches Station64's low-pass filter off, and SID-Wizard stops its tune on it. If a sound changes when you press stop in your DAW, look for a reset message in the DAW's MIDI settings.

7. The machine page



The machine page, with a second SID, an 8580, added.

Video — PAL (6569) or NTSC (6567R8). It also sets the C64's clock, and with it the SID's pitch: a program made for one standard plays slightly out of tune on the other.

Palette — the screen's colours.

Keyboard — Symbolic or Positional (chapter 4).

MIDI clock — off, or from the host's transport (chapter 6).

Drive 8 — **Virtual**: instant loading and saving for every program that uses the C64's normal disk routines. **True 1541**: a complete 1541 drive, for programs with their own fast loaders; it needs the drive's DOS ROM, and loading runs in warp. **None**: no drive.

Auto warp — when the machine warps on its own, muted: while a program starts, while the True 1541's motor runs, both (the default), or never. Turn the disk part off for a game or a demo that loads while it plays: in warp you would neither hear nor really see it.

Port 1, Port 2 — joystick, 1351 mouse or paddles (chapter 4).

SID chips — how many SIDs the C64 has, one to eight. Programs that use more than one find the others at their addresses: click a chip's **Address** to change it.

SID engine — **Accurate** or **Light**. Accurate emulates the SID chips in every detail and is the one to use when your computer can afford it. Light is a much simpler emulation that needs about a thirtieth of the processing time per SID, for slower computers, many SIDs or many ReSIDent instances. It sounds close but not the same: the filter is plainer, digis (samples played through the volume register) come out rougher, and of the chip settings below only the model applies, 6581 or 8580. The other settings keep their values for when you switch back. You can change the engine while a project plays; the notes that are sounding start over.

Resampling — Accurate engine only: how the SIDs' output becomes your project's sample rate. **Sinc (best)** is clean and is the one to use. **Fast** saves roughly a tenth to a fifth of the processing time of each SID that is playing, because it skips the filter that keeps high notes clean; the price is aliasing, a harsh, metallic edge on bright sounds. Try it when many SIDs play at once and your computer struggles.

Voice outputs — Off, or On: every voice of every SID gets its own output as well (chapter 9). A SID with voice outputs takes about four times the processing time, so leave it off unless you route the voices.

EACH SID

Model — 6581 (a generic one), 6581R3, 6581R4, 6581R4AR or 8580R5. The 6581, in the first C64s, has a warm, dirty, very individual filter; the 8580, in later ones, is cleaner and more even. Choosing a model also sets a starting point for Curve and Combined.

Curve — how dark (left) or bright (right) the filter is. Real 6581s differ a lot from chip to chip; this is how you match the one you remember.

Range — 6581 only: the filter's range and offset, from dark to bright. Together with Curve it covers the spread of real chips. Double click for the default.

Caps — 6581 only: the filter capacitors. The earliest C64 boards had 2200 pF capacitors instead of 470 pF, which makes the filter much darker.

Combined — how loud combined waveforms (for example sawtooth and triangle at once) come out: weak, average or strong. Real chips differ here too.

Level and **Pan** — the chip's level and place in the stereo output. **Volume** under the table is the overall level. These are also parameters your DAW can automate.

Each chip is set on its own: two 6581s in one C64, or in two ReSIDent instances, can have different filters.

With the **Light** engine only **Model** applies, as 6581 or 8580 (every 6581 revision is the same 6581 there), together with Level and Pan. Curve, Range, Caps and Combined are shown greyed out.

8. CC maps



The CC page with SID Synth's map: 36 of the 64 slots are its controllers.

C64 MIDI programs listen to MIDI controllers (CC) for their sound: cutoff, resonance, envelope, waveform. Which controller does what is different in every program. A **CC map** says it for one program, and ReSIDent turns it into **parameters**: 64 slots, which your DAW shows by the names in the map — *Cutoff*, *Resonance*, *Attack* — and can automate, map to a hardware controller, or put on a macro.

Moving a slot sends its controller to the C64 at that exact moment. A slot only sends when its value changes, and nothing is sent when a project is opened or a map is chosen. The slots show what was last sent, not what the program currently has: a program's own settings are not read back.

CHOOSING A MAP

Map lists the maps that come with ReSIDent (for Cynthcart, Station64, SID-Wizard and SID Synth, at the end of this manual) and your own. With **Follow program** on, loading a program picks the map made for it by its file name — load SID Synth, and the slots become SID Synth's controllers. A file started from a disk is matched by the disk's file name and by the program's own name on the disk. Your own map for a program is preferred over the built-in one.

When the map changes, the slots are renamed in your DAW. Automation stays on the slot it was recorded on: slot 1 is slot 1 in every map. Most DAWs show the new names at once; a few only after the plugin's window or the track is reopened.

The map in use is saved in your project, so a project keeps its names even on a computer without your map file.

EDITING A MAP

Channel is the MIDI channel the slots send on.

Click a slot's **controller number** to change it. Type the number (`74`), or the number and a channel (`74@2`) for a slot that sends on its own channel. An empty entry clears the slot.

Click a slot's **name** to rename it. Value names go after a `|`, each with the value it starts at: `Vib On | 0 Off, 64 On` shows *Off* from 0 to 63 and *On* from 64 up. Your DAW then shows those names, and you can type them.

Save as stores the map in your CC map folder under a name you choose; **Folder** opens that folder:

- Linux: `~/.local/share/ReSIDent/CC Maps`
- Windows: `%APPDATA%\ReSIDent\CC Maps`
- macOS: `~/Library/Application Support/ReSIDent/CC Maps`

A map is a plain text file, one line per slot:

```
name = My SID Synth
programs = sidsynth
channel = 1
1 = 74 Cutoff
2 = 71 Resonance
3 = 85 Filter Mode | 0 Off, 32 LP, 64 BP, 96 HP
4 = 28@2 Waveform
```

`programs` lists words that, found in a loaded file's name, make *Follow program* pick this map. Lines starting with `#` are comments. Edit maps in any text editor; ReSIDent reads the folder again whenever the CC page opens.

SID Synth lets you reassign its controllers in its own MIDI CC SETUP screen. If you do, change the map to match and save it as your own.

9. Outputs

A stereo **main output** with every SID at its level and pan, and **one mono output per SID**, for a separate mixer channel or effect chain per chip. Which outputs your DAW offers, and how they are routed, is set in the DAW.

Voice outputs. With **Voice outputs** on (machine page), each of the three voices of every SID comes out on its own mono output as well: *SID 1 Voice 1* to *SID 8 Voice 3*, 24 in all. Record them on separate tracks and treat each voice on its own. A voice keeps its share of the SID's sound — it goes through the chip's filter and volume just as in the chip — but each voice through a filter of its own. A SID's filter and mixer saturate a little when several loud voices play at once, the 6581 much more than the 8580: that grit is part of the chip's sound and lives in the sum, so the three voice outputs mixed together sound cleaner than the SID's own output, and a 6581's a little louder too. Digitised sounds played through the volume register reach the voice outputs only in part. The per-SID output stays the real thing.

The per-SID and voice outputs carry the chip's own signal: the machine page's **Level**, **Pan** and **Volume** shape the main output only. With voice outputs off, the 24 voice outputs are silent.

10. Projects

Saving a project saves the whole C64: memory, every chip, the disk with what the program saved on it, the cartridge (both at once, if both are in), the machine page's settings, the CC map and the slots. Reopening the project puts the program back exactly where it was, mid-note, with all your edits — nothing needs to be loaded again.

To keep a disk outside the project, use **Media → Export disk**.

Each ReSIDent in a project is a separate C64: settings in one never change another.

11. Processor load

Measured on a 2021 laptop processor, as a share of one core: the C64 itself costs a few percent, a little more while its window is open (the screen is only drawn then). Each SID that plays adds about 4-6 % on the **Accurate** engine (an 8580 a little less than a 6581) and about 0.2 % on **Light**; SIDs that a program never touches cost nothing. With all eight SIDs playing, expect around a third to a half of a core on Accurate and about a twentieth on Light. Voice outputs (chapter 9) multiply a SID's share by about four. *Fast* resampling (chapter 7) brings Accurate down a little; the **Light** engine is the big step.

When your DAW renders a project offline, ReSIDent runs the C64 at a fixed pace, so two renders of the same project are identical.

12. When something does not work

- **No sound when playing notes.** Is the MIDI light **In** flashing? If it is, the program has not been told about the interface: set its MIDI on in its own menu and check that it matches **MIDI** in the top bar (chapter 5).
- **The program says it finds no MIDI interface.** Choose another interface in **MIDI** — Datel first — and tell the program to look again, or press **Power** to start it fresh.
- **The window shows the ROM page.** The ROMs are missing or incomplete (chapter 3). The page lists what is still needed.
- **The wrong program starts from a disk.** Load the disk again and pick the file, or use **Media → Start from disk**.
- **A program does not load from the disk.** It may use its own fast loader: set **Drive 8** to **True 1541** (this needs the drive's DOS ROM) and load it again.
- **Keys do nothing on the C64.** Click into the screen first; the window has to have the keyboard.
- **macOS: the DAW does not list ReSIDent, or says it is damaged.** The quarantine flag is still set: run the `xattr` commands from chapter 2 and restart the DAW.
- **The sound changes when the DAW stops.** The DAW sends "reset all controllers" on stop, which some programs take as a sound change (chapter 6).
- **Crackles or dropouts with many SIDs or instances.** Your computer is running out of time: switch the **SID engine** to **Light** (chapter 7), turn off voice outputs you do not route, or close ReSIDent's windows.
- **A slot's name did not change in the DAW.** Reopen the plugin's window or the track; some DAWs only read parameter names then.

13. Licence and credits

ReSIDent is free software under the **GNU General Public License, version 2 or later**. Its Accurate SID engine is **reSIDfp** (libresidfp) by Dag Lem, Antti S. Lankila and Leandro Nini, under the same licence, with changes of ReSIDent's own: each SID has its own filter state (range, capacitors and the filter's dither), so chips and instances never affect each other, and a voice can be heard on its own (voice outputs). Its Light engine is **SIDLite** from libsidplayfp by Leandro Nini, based on **cRSID** by Mihaly Horvath (Hermit), under the same licence, changed so that it keeps exact time and pitch at every sample rate, can be saved with a project, and has voice outputs too. The screen palettes come from the VICE project (GPL). The HerMIDI interface runs the original HerMIDI firmware by Mihaly Horvath (Hermit), from the SID-Wizard package.

Commodore 64, C64, SID, 1541 and the names of the MIDI interfaces are names of products of their respective owners. ReSIDent is not affiliated with or endorsed by any of them, and contains no Commodore software.

Appendix A. The CC maps that come with ReSIDent

The values column gives the value names a slot shows; a slot without them sends the number as it is.

CYNTHCART

Picked when the loaded file's name contains *cynthcart*. Channel 1.

SLOT	CC	NAME	VALUES
1	1	Cutoff	
2	0	Resonance	
3	2	Voice Mode	0-7 Poly, 8-15 5ths, 16-23 5Port, 24-31 Port1, 32-39 Port2, 40-47 Port3, 48-55 Mono1, 56-63 Mono2, 64-71 MonP1, 72-79 MonP2, 80-87 Arp1, 88-95 Arp2, 96-103 Arp3, 104-111 Arp4, 112-119 Arp5, 120-127 6Chan
4	3	Modulation	0-15 None, 16-31 Filt1, 32-47 Filt2, 48-63 Filt3, 64-79 Filt4, 80-95 Filt5, 96-111 Puls1, 112-127 Puls2
5	4	Attack	
6	5	Release	
7	6	Pulse Width	
8	7	Volume	

9	13	Waveform	0-7 Tri, 8-15 Saw, 16-23 Pulse, 24-31 Noise, 32-39 Tri, 40-47 Saw, 48-55 Pulse, 56-63 Noise, 64-71 Tri, 72-79 Saw, 80-87 Pulse, 88-95 Noise, 96-103 Tri, 104-111 Saw, 112-119 Pulse, 120-127 Noise
10	14	Wave Voice 2	0-7 Tri, 8-15 Saw, 16-23 Pulse, 24-31 Noise, 32-39 Tri, 40-47 Saw, 48-55 Pulse, 56-63 Noise, 64-71 Tri, 72-79 Saw, 80-87 Pulse, 88-95 Noise, 96-103 Tri, 104-111 Saw, 112-119 Pulse, 120-127 Noise
11	15	Wave Voice 3	0-7 Tri, 8-15 Saw, 16-23 Pulse, 24-31 Noise, 32-39 Tri, 40-47 Saw, 48-55 Pulse, 56-63 Noise, 64-71 Tri, 72-79 Saw, 80-87 Pulse, 88-95 Noise, 96-103 Tri, 104-111 Saw, 112-119 Pulse, 120-127 Noise
12	8	Tremolo Depth	0-15 0, 16-31 1, 32-47 2, 48-63 3, 64-79 0, 80-95 1, 96-111 2, 112-127 3
13	9	Tremolo Speed	0-15 0, 16-31 1, 32-47 2, 48-63 3, 64-79 0, 80-95 1, 96-111 2, 112-127 3

SID SYNTH

Picked when the loaded file's name contains *sidsynth*, *sid synth* or *sid_synth*. Channel 1.

SLOT	CC	NAME	VALUES
1	74	Cutoff	
2	71	Resonance	
3	85	Filter Mode	0-31 Off, 32-63 LP, 64-95 BP, 96-127 HP
4	82	Filter Rate	
5	83	Filter Cycle	0-25 Off, 26-50 D+U, 51-76 U+D, 77-101 Up, 102-127 Down
6	86	Filter Retrig	0-42 Legato, 43-85 Yes, 86-127 No
7	73	Attack	
8	75	Decay	
9	70	Sustain	
10	72	Release	
11	87	Env Retrig	0-42 Auto, 43-85 Always, 86-127 Legato
12	28	Waveform	0-15 Pulse, 16-31 Saw, 32-47 Tri, 48-63 Noise, 64-79 Tri+Saw, 80-95 Tri+Pul, 96-111 Saw+Pul, 112-127 T+S+P
13	1	Vib Wheel	
14	77	Vib Freq	
15	76	Vib Rate	
16	79	Vib Type	0-31 U+D, 32-63 Incr, 64-95 Up, 96-127 Down
17	78	Vib Delay	
18	80	Vib Retrig	0-63 No, 64-127 Yes
19	81	Vib On	0-63 Off, 64-127 On
20	102	PWM Width	
21	103	PWM Rate	
22	104	PWM Depth	
23	105	PWM Cycle	0-31 D+U, 32-63 U+D, 64-95 Up, 96-127 Down
24	106	PWM Retrig	0-42 Legato, 43-85 Yes, 86-127 No
25	107	PWM On	0-63 Off, 64-127 On
26	22	Play Mode	0-18 Arp, 19-37 Poly, 38-56 Mono, 57-75 5ths, 76-94 Oct, 95-113 Oct+, 114-127 Arp+
27	31	Arp Speed	

28	23	Arp Dir	0-42 Down, 43-85 Up, 86-127 Alt
29	30	Portamento	0-63 Off, 64-127 On
30	24	Pitchbend	
31	25	Ring Mod	0-63 Off, 64-127 On
32	26	Hard Sync	0-63 Off, 64-127 On
33	14	Tremolo Rate	
34	15	Tremolo	0-63 Off, 64-127 On
35	27	Click	0-63 Off, 64-127 On
36	29	Preset Select	

SID-WIZARD

Picked when the loaded file's name contains *sid-wizard*, *sidwizard* or *swm*. Channel 1.

SLOT	CC	NAME	VALUES
1	74	Cutoff	
2	1	Vibrato	
3	7	Volume	

STATION64

Picked when the loaded file's name contains *sta64* or *station64*. Channel 1.

SLOT	CC	NAME	VALUES
1	1	Cutoff	
2	20	Resonance	
3	57	Filter LP	0-63 Off, 64-127 On
4	58	Filter BP	0-63 Off, 64-127 On
5	59	Filter HP	0-63 Off, 64-127 On
6	7	Volume	
7	6	Glide	
8	36	ELFO1 Depth	
9	37	ELFO1 Speed	
10	38	ELFO2 Depth	
11	39	ELFO2 Speed	
12	60	Filter Osc1	0-63 Off, 64-127 On
13	61	Filter Osc2	0-63 Off, 64-127 On
14	62	Filter Osc3	0-63 Off, 64-127 On
15	30	Wave Osc1	0-7 Off, 8-15 Tri, 16-23 Saw, 24-31 Tri+Saw, 32-39 Pulse, 40-47 Tri+Pul, 48-55 Saw+Pul, 56-63 T+S+P, 64-71 Noise, 72-79 Noise+Tri, 80-87 Noise+Saw, 88-95 N+T+S, 96-103 Noise+Pul, 104-111 N+T+P, 112-119 N+S+P, 120-127 All
16	8	Attack	

		Osc1	
17	9	Decay Osc1	
18	10	Sustain Osc1	
19	11	Release Osc1	
20	21	PW Osc1	
21	24	Tune Osc1	
22	27	Fine Osc1	
23	33	Predelay Osc1	
24	42	Ring Osc1	0-63 Off, 64-127 On
25	45	Sync Osc1	0-63 Off, 64-127 On
26	48	Vel Osc1	0-63 Off, 64-127 On
27	51	Legato Osc1	0-63 Off, 64-127 On
28	31	Wave Osc2	0-7 Off, 8-15 Tri, 16-23 Saw, 24-31 Tri+Saw, 32-39 Pulse, 40-47 Tri+Pul, 48-55 Saw+Pul, 56-63 T+S+P, 64-71 Noise, 72-79 Noise+Tri, 80-87 Noise+Saw, 88-95 N+T+S, 96-103 Noise+Pul, 104-111 N+T+P, 112-119 N+S+P, 120-127 All
29	12	Attack Osc2	
30	13	Decay Osc2	
31	14	Sustain Osc2	
32	15	Release Osc2	
33	22	PW Osc2	
34	25	Tune Osc2	
35	28	Fine Osc2	
36	34	Predelay Osc2	
37	43	Ring Osc2	0-63 Off, 64-127 On
38	46	Sync Osc2	0-63 Off, 64-127 On
39	49	Vel Osc2	0-63 Off, 64-127 On
40	52	Legato Osc2	0-63 Off, 64-127 On
41	32	Wave Osc3	0-7 Off, 8-15 Tri, 16-23 Saw, 24-31 Tri+Saw, 32-39 Pulse, 40-47 Tri+Pul, 48-55 Saw+Pul, 56-63 T+S+P, 64-71 Noise, 72-79 Noise+Tri, 80-87 Noise+Saw, 88-95 N+T+S, 96-103 Noise+Pul, 104-111 N+T+P, 112-119 N+S+P, 120-127 All
42	16	Attack Osc3	
43	17	Decay Osc3	
44	18	Sustain Osc3	
45	19	Release	

		Osc3	
46	23	PW Osc3	
47	26	Tune Osc3	
48	29	Fine Osc3	
49	35	Predelay Osc3	
50	44	Ring Osc3	0-63 Off, 64-127 On
51	47	Sync Osc3	0-63 Off, 64-127 On
52	50	Vel Osc3	0-63 Off, 64-127 On
53	53	Legato Osc3	0-63 Off, 64-127 On

Appendix B. Every parameter

PARAMETER	RANGE	DEFAULT
Volume	-inf dB to +12.0 dB	+0.0 dB
SID 1 Level … SID 8 Level	-inf dB to +12.0 dB	+0.0 dB
SID 1 Pan … SID 8 Pan	100% L to 100% R	C, 50% R, 50% L, 50% R, 50% L, 50% R, 50% L, 50% R
CC 1 … CC 64 (named by the CC map)	0 to 127	0