

# SID Factory II

## User Manual

Build 20200610

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# Introduction

[SID Factory II](#) is a cross-platform music editor for editing SID music that can be played on a Commodore 64. The project was started by Thomas Egeskov Petersen (also known as Laxity) with the ambition of combining the emulation of MOS6510 code and SID sound with an editing environment that will provide close to full consistency between the work in progress and the final product.

It is the modern successor to the [native C64 editor](#) from 2006.

For now, the editor has only been compiled for Windows, but it has been prepared to also be compiled on other platforms later. Laxity intends to compile it for Mac later.

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*Please note that the editor is in **BETA** and may still be missing essential features.*

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As a cross-platform editor, SID Factory II joins the fierce competition of other cross-platform editors such as [GoatTracker 2](#) and [CheeseCutter](#). SID Factory II works in much the same manner as these editors by using [SDL](#) and a text interface, hitting hotkeys for notes, and typing hexadecimal values for instruments, commands, and support tables.

## Noteworthy features

If you're already quite familiar with the latest C64 editors, you may be wondering what's so special about SID Factory II. Here's what we consider to be unique about it.

- It packs the sequences in real time as you edit them. This means that what you hear is pretty much what you get. Less nasty surprises when packing the tune in the end.
- Because the sequences are packed in real time, they can be extremely long. The cap is currently 1024 rows, as long as the data in it can be packed below 256 bytes.
- The gray order list in the left side gives a strong overview of the sequences, with spaced distances to align everything correctly. Descriptions are planned for the empty void.
- The driver system is modular and there is already a wide selection of drivers available, some of which are designed to take up little memory while missing out on features.
- You can have up to eight different bookmarks, all defined and managed in the small table in the bottom left corner of the window.
- The standard driver 11 (loaded as you start the editor) features both 12-bit pulse and filter control as well as a separate arpeggio table for chords only.

Of course, the editor and its drivers also have all the modern features you would expect these days, such as table index hotkeys, muting channels, both instruments and commands at the same time, adjustable hard restart, pulse and filter programs, inserting the next unused sequence, and a whole lot more.

And if it doesn't, chances are it's on our ToDo. Otherwise, please do let us know.

# The Basics

Let me take you on a brief tour through the editor and show the areas. To make this easier, start out by loading a tune. Hit **F10**, enter the music folder, and open an SF2 file. (This is the file extension SID Factory II uses for its source tunes.)

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***TIP:** When a confirmation dialog box pops up, you can also hit **y** or **n** to select.*

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SF2 files are actually PRG files in disguise. You can open e.g. the VICE emulator and drag-and-drop an SF2 file there. It even has a small interrupt driver. Just type `SYS4093` and your source tune should play, showing the rastertime it uses.

## Status bar

You should now have returned to the editor with data all over the place. In the left side of the status bar, you can see the driver used by the loaded tune. There are also a few option flags in the right side. Some of these have hotkeys, but most of them can be left-clicked too.

You can choose between the 6581 or 8580 SID chip, sharp or flat notes (e.g. D#4 or Eb4 shown in the sequence) and you can toggle **ContextHL** on or off. The latter turns notes and values green in the sequence whenever the instrument or command matches what is currently selected in the tables.

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***TIP:** You can also use **F9** to toggle 6581/8580, and **Shift+F9** to toggle PAL/NTSC.*

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## Tracks

The core of the editor is the three blue tracks for the SID voices. Click any one and you can use the **Enter** key to toggle between the sequence number or its contents. The sequence has the format `XXYY`, where `XX` is transpose and `YY` the sequence number. `XX` is usually `A0` as the default. Type e.g. `94` for one octave lower, or `AC` for one octave higher.

SID Factory II uses the same contiguous sequence stacking system as JCH's original native C64 editor did. CheeseCutter also uses this. It means that all the sequences in each voice can be in various lengths independently from the neighbor tracks. The sequences are simply stacked on top of each other, like a game of perfect Tetris.

Only, the bottom sequences won't magically disappear, of course.

Notes are entered in the right-most column by hitting one of the many standard letter and number keys on the keyboard. They match the keys on a piano like this:

2	3		5	6	7		9	0	
Q	W	E	R	T	Y	U	I	O	P

  

S	D		G	H	J		L		
Z	X	C	V	B	N	M	,	.	

You can replace with --- (gate off) with **Space** or with +++ (gate on) with **Shift+Space**. SID Factory II thus adheres to the same gate on/off system that JCH's C64 editor did. This is different from how GoatTracker and CheeseCutter handles it. The SID chip uses an [ADSR envelope](#) to control the amplitude of each voice. As long as there are +++ below the note, the amplitude is attacked, decayed and sustained. Changing to --- later releases it.

Using this gate system can sometimes be more work than the simpler gate off indicator used by most other modern C64 editors, but it does have its advantages. You have more control over continuous gating on and off during the lifetime of a note, and it's visually logical.

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**TIP:** You can "fill" upwards with **Ctrl+Shift+Up**, downwards with **Ctrl+Shift+Down**.

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SID Factory II is normally silent as you type in notes. However, if you hold down **Shift** while typing the notes, you can hear the currently chosen instrument playing. This also temporarily stops all editing, making it suitable for quickly testing a melody or an instrument. If you want to be able to hear the instrument as you type in the notes, click the **Caps Lock** key first.

Use **F3** to decrease the octave or **F4** to increase the octave of the note you're typing. It's also possible to transpose all of the notes in the entire sequence directly. To transpose it one semitone, use **Shift+F3** and **Shift+F4**; for one octave use **Ctrl+F3** and **Ctrl+F4**.

The first column to the right is the instrument number, and the second is the command. You can also toggle tie note on or off with **Shift+Enter**. A \*\* in the instrument column indicates that the note is tied, which means that the effects of the note will not restart. This can be useful when using portamento.

Deleting and inserting in a sequence moves the notes up or down, but it doesn't change the length of the sequence. If you want to do that too, you need to hold down **Ctrl** as well.

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**TIP:** Hit **F5** to prepare a new sequence with many lines, or **Shift+F5** to insert lines.

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Hit **Enter** again to return to the sequence number. You can also insert and delete here too, and you can hit **Ctrl+F** to insert the next unused sequence.

To mute channels, use **Ctrl+1**, **Ctrl+2** or **Ctrl+3**.

## Gray order list

While inserting and deleting sequence positions or inside the sequences themselves, you may have noticed that things changed in the gray box in the left side of the editor. This is the order list overview. It shows the same sequence numbers as in the tracks, only without the actual transpositions and contents.

This condenses it down for a nice overview of the entire song.

The sequences in the gray order list cannot be edited – they only serve as information as well as quick navigation. You can click anywhere to browse a line up and down, home and end, or use page up/down. Clicking a line (or using **Enter**) will go to that spot in the song. Double-clicking (or using **Ctrl+Enter**) will go to that spot and also play from there.

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***NOTE:** You will also be able to edit descriptions in a future version of SID Factory II.*

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## Bookmarks

The small blue box in the bottom right corner is the list of bookmarks. You can define up to eight different bookmarks in a song. Each bookmark is selected with **Alt+1** to **Alt+8**. To set a bookmark, hit **Ctrl+M** anywhere in the song. Yes, really anywhere – even in the middle of sequences. You can now return to that spot with **Ctrl+G**.

But more importantly, you can now also *play* from that spot with **F2**.

## Tables

The actual values and their meaning are beyond the scope of this document. However, a build archive has a sub folder called *documentation*, and each driver available to SID Factory II has a text file with notes here, explaining all the juicy details.

Actually navigating the tables is as simple as using the cursor keys, tab across the tracks and tables, or clicking a table to enter that position in it. You can also page up/down and even use the mouse wheel to scroll it. **Keypad +** and **Keypad -** changes instrument, **Ctrl+Keypad +** and **Ctrl+Keypad -** the command.

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***TIP:** Hit **End** once to go to the end of the used data. Hit it again for the bottom.*

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Some table bytes may have one or more bits for controlling minor details. For example, the standard driver 11 has a byte with flags in an instrument row. Normally you would have to add the bit values

together in your head, like e.g. 80 and 40 is C0, but you don't have to do that in SID Factory II. It has a bit selector built in. Just hit **Enter** on that value and you can set the bits with the **Space** key as you cursor up and down. Then hit **Enter** to accept, or **Esc** to cancel.

You can use **Ctrl+Enter** to go to a table index pointer. This is used not only in instruments but also in commands. For example, the standard driver 11 has index pointers for pulse, filter and wave tables. Hit **Ctrl+Enter** on any of these to enter that spot in one of those tables. If a command also uses an index pointer to a table, **Ctrl+Enter** works there too.

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***NOTE:** Some of the alternative drivers have yet to be set up to use **Ctrl+Enter**.*

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SID Factory II is normally silent in the tables. However, if you hold down **Shift** while typing notes, you can hear the currently chosen instrument playing. This also temporarily stops all table input, making it suitable for quickly testing a melody or an instrument. You can repeatedly play the latest shifted note in the tables by pressing **Space**. If you use **Ctrl+Space** you will also apply the current command.

## Changing drivers

Starting from scratch with a different driver is as simple as hitting **F10**, browsing to the folder with drivers (you can go back to a parent folder with **Backspace**) and loading it.

Loading a different driver will change the layout of tables in the right side of the window. Different drivers have different capabilities. Some have much fewer tables but make up for it by being tiny.

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***TIP:** To study the rastertime, drag-and-drop an SF2 file into VICE and type `SYS4093`.*

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In each build archive, there's a sub folder called *documentation* where the details of each driver are listed and what the values in each table mean.

Currently, the following drivers are available for SID Factory II:

- **Driver 11** – this is the standard driver loaded as the default. It's the luxury driver with the most features and table data.
- **Driver 12** – this is an extremely simple driver that can only do the most basic effects.
- **Driver 13** – this is a driver that emulates the sound of Rob Hubbard's driver. If you load the demo song for it, you may recognize some of the instruments.
- **Driver 14** – this is an experimental version of the standard driver that allows for a very short duration of gate off, but also has a greater chance of instability.
- **Driver 15** – this tiny driver (mark I) is a slightly expanded version of driver 12 with a few more effects, but it also uses more of the zero page area.
- **Driver 16** – this tiny driver (mark II) is like driver 15 but with no commands at all.

It's also possible to change the driver in an existing source tune. To do this, first load the driver with **F10**, then hit **Ctrl+F10** to import your source tune on top of it. This will probably only be really useful for sub versions of the same major version driver. You could import a driver 11 tune into driver 12, but you would then have to overhaul the tables.

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**NOTE:** *The behavior of importing another driver for a source tune may change later.*

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## Packing

When you're finally done with your song, hit **F6** to open the list of utilities.

You can pack your song immediately using the dedicated menu item, but perhaps you should consider optimizing it first. This will remove unused instruments, commands and sequences while moving things closer together, taking up less memory.

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**NOTE:** *Currently, SID Factory II actually does **not** optimize the song when packing!*

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Although you can optimize if you're running out of both commands or instruments fast, we actually recommend waiting until packing the song, if you can. The reason for this is that the tidying of tables may change a lot of the instrument and command numbers you're used to for that song. The song should of course not break, but it can be a little confusing to learn that the bass drum on 15 is now 11 and the wave command on 1A is now 14.

When selecting the packer option, you're first asked where you would like to place the tune in memory. Both the range and the size will then be reported.

*And now comes the important part.*

If you type a filename without an extension, it will actually save to a PRG file as the default. But if you want to save it as a SID file, you have to specify the `.sid` extension too. Now SID Factory II asks for the title, author and copyright strings, and then saves a SID file.

# Controls

SID Factory II generally respects the logical use of keys such as **Tab** and **Shift+Tab** for next and previous input focus, **Home** and **End** for start or end of input focus, etc.

You can also undo and redo virtually anything with **Ctrl+Z** and **Ctrl+Y** (or **Ctrl+X**) keys.

## Settings

You can left-click most options in the status bar, except PAL/NTSC. Use left- and right-click on the octave field to increase and decrease it (or use **F3** and **F4** directly).

- **F9** toggles between the 6581 or 8580 SID chip models.
- **Shift+F9** toggles between PAL or NTSC.
- **F6** opens the utilities menu.

## Playing

SID Factory II doesn't have a separate stop key for playing, they're all toggle keys. This cut down on function keys for other purposes. However, **Esc** will also stop a tune.

- **F1** plays from the start of the entire song.
- **F2** plays from the currently selected bookmark (see below about these).
- **Shift+F2** plays from the top of the sequence you're currently editing.
- **Ctrl+F2** plays from the current cursor position.
- **Ctrl+P** toggles follow-play on and off.

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***TIP:** When playing, hold the key to the right of **1** to fast forward. Use **Shift** for faster!*

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## Bookmarks

- **Alt+1** to **Alt+8** selects one of the eight bookmark slots.
- **Ctrl+M** stores the current track position in the current bookmark slot.
- **Ctrl+G** goes to the position indicated by the current bookmark slot.
- **F2** plays from the position indicated by the current bookmark slot.
- **Enter** (or left-click) a row jumps to that spot in the song.
- **Ctrl+Enter** (or double-click) a row jumps to that spot in the song and plays from it.
- **Home** or **End** for the start or end of the list.

## Files

- **F10** loads an SF2 file or a different driver.
- **F10**, load a specific driver, then hit **Ctrl+F10** and load an SF2 file to add that driver to it.



- **F11** saves your song as a specific SF2 file.
- **Ctrl+S** quick saves your song to the latest loaded or saved SF2 file.
- **F6** then select **Pack** to save as a PRG file.
- **F6** then select **Pack** and add extension `.sid` to save as a SID file.

## Sequences

Notes are entered in the right-most column by hitting one of the many standard letter and number keys on the keyboard. They match the keys on a piano like this:

2	3		5	6	7		9	0	
Q	W	E	R	T	Y	U	I	O	P

  

S	D		G	H	J		L		
Z	X	C	V	B	N	M	,	.	

If you hold down **Shift** while doing so, editing is temporarily paused and you can play the current instrument. To both edit *and* play it, toggle the **Caps Lock** key.

- **Ctrl+Left** and **Ctrl+Right** moves between the three columns in the sequence.
- **Enter** changes focus to the blue order list entry (see the next page).
- **Ctrl+1**, **Ctrl+2** or **Ctrl+3** turns voice tracks on or off.
- **Insert** and **Delete** to insert and delete without altering the size of the sequence.
- **Ctrl+Insert** and **Ctrl+Delete** to insert and delete while also altering the size.
- **Space** to erase an instrument or command value, or for a --- (gate off) event.
- **Shift+Space** for a +++ (gate on) event.
- **Shift+Enter** toggles a \*\* (tie note) on and off.
- **Ctrl+Space** erases an entire row (i.e. the instrument, command and note).
- **Ctrl+I** adds the value for the current instrument.
- **Ctrl+O** adds the value for the current command.
- **Tab** or **Shift+Tab** for next or previous voice track.
- **Home** or **End** for the absolute start or end of the entire song.
- **Ctrl+C** and **Ctrl+V** will copy and paste the entire sequence.
- **F3** and **F4** to decrease and increase the octave for notes being typed in.
- **Shift+F3** and **Shift+F4** to decrease and increase the sequence itself by one semitone.
- **Ctrl+F3** and **Ctrl+F4** to decrease and increase the sequence itself by one octave.
- **F5** resizes a sequence to a specific number of rows (preserves data unless truncated).
- **Shift+F5** inserts a specific number of rows at the exact cursor position.
- **Alt+Up** and **Alt+Down** to decrease and increase the white intervals.
- **Alt+Shift+Up** and **Alt+Shift+Down** to "roll" the white intervals up or down.
- **Ctrl+B** splits a sequence. The existing upper part is resized while the lower part is new.

## Blue order list

By this is meant where you actually *edit* the transpose value and the sequence number itself, i.e. while still inside a blue track voice.

As soon as you start typing hexadecimal digits, the XXXY word turns white and you have to press **Enter** to accept or **Esc** to cancel (cursor up/down is prohibited until this is done).

- **Enter** changes focus to the actual sequence itself (see the previous page).
- **Ctrl+1**, **Ctrl+2** or **Ctrl+3** to turn voice tracks on or off.
- **Insert** (or **Shift+Backspace**) and **Delete** to insert and delete order list entries.
- **Backspace** deletes the previous order list entry.
- **Tab** or **Shift+Tab** for the order list entry in the next or previous voice track.
- **Ctrl+C** and **Ctrl+V** will copy and paste the contents of a sequence.
- **Ctrl+F** to insert the next unused sequence (whether it *has* data in it is ignored).

## Gray order list

This is the gray overview in the left side of the SID Factory II. It only serves as information and quick navigation; you cannot edit values there.

- **Enter** (or left-click) a row jumps to that spot in the song.
- **Ctrl+Enter** (or double-click) a row jumps to that spot in the song and plays from it.
- **Home** for the top without scrolling the list. Hit it again for the absolute top.
- **End** for the bottom without scrolling the list. Hit it again for the absolute bottom.

## Tables

- **Tab** or **Shift+Tab** for next or previous table.
- **Home** for the absolute top of the table.
- **End** for the end of *actual data* in the table. Hit it again for the absolute bottom.
- **Enter** on a value to edit bits. Use up/down, **Space** to toggle bits, then **Enter** or **Esc**.
- **Ctrl+Enter** on a table index pointer value jumps to that spot in the relevant table.
- **Insert** and **Delete** to insert and delete rows (except in commands and instruments).
- **Space** plays the last instrument you played while holding down **Shift**.
- **Ctrl+Space** works as **Space** but also applies the current command.
- **Keypad +** and **Keypad -** changes the instrument.
- **Ctrl+Keypad +** and **Ctrl+Keypad -** changes the command.

Inserting and deleting rows should automatically update all table index pointer values, but you may want to keep an eye on the local values to make sure they make sense too.