



# TherapSID

## USER MANUAL

Note: All functions apply to MKII and MKIII

Apr 29 2025

# Thanks! Overview

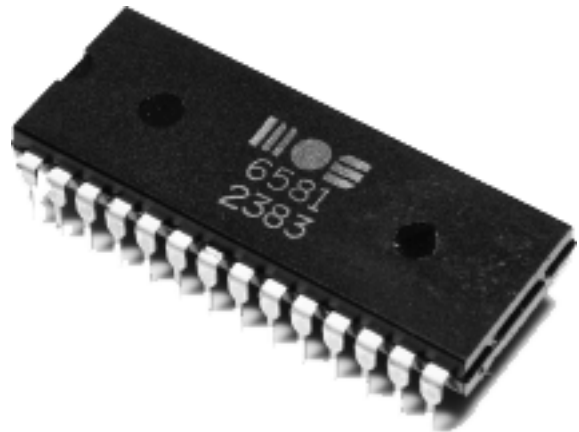
Thank you for adopting TherapSID, the ultimate SID synth!

About the SID chip:

The [MOS Technology 6581/8580 SID \(Sound Interface Device\)](#) is the built-in [Programmable Sound Generator](#) chip of [Commodore's CBM-II](#), [Commodore 64](#), [Commodore 128](#) and [Commodore MAX Machine home computers](#). It was one of the first sound chips of its kind to be included in a [home computer](#) prior to the [digital sound revolution](#).

Read more: [http://en.wikipedia.org/wiki/](http://en.wikipedia.org/wiki/MOS_Technology_SID)

[MOS Technology SID](#)



I want to express my gratitude to several people who have made TherapSID what it is. First and foremost, a special thanks goes out to Windfisch for completely overhauling the code and providing invaluable guidance and mentorship throughout the process.

I would also like to thank Sequence7 and Oemsysadm for their valuable feedback, I also want to extend my thanks to ThomasJ for his exciting ASID contributions to the project. Big thanks to Rio Rattenrudel for also contributing to the ASID engine!

Thanks to Themis for all the testing and concept contributions over the years and on going.

The TherapSID code is now open-source and available on GitHub so please feel free to join the party!

<https://github.com/twistedelectrons/TherapSID>

Please use GitHub if possible to submit feature requests and bug reports!

Enjoy!



## Presets

TherapSID comes preloaded with a total of 99 assorted presets get you started. It is important to note that these presets are fully customisable and can be modified to suit individual preferences.



It is worth mentioning that the presets were developed specifically using the 6581 variant of the SID chip. Consequently, there is a possibility that the presets may sound slightly different when used with other SID variations.

## Load

To change the preset, press the up/down buttons. Additionally, holding down either button will result in accelerated scrolling in the corresponding direction. The preset number will be displayed on the device's screen.

## Save

It is possible to save the current sound to any preset slot by following these steps:

- Activate the save mode by simultaneously pressing both preset up and down buttons. The destination slot number will flash on the display.
- Choose the desired destination slot by pressing the preset up or down button.
- Save the current sound to the selected slot by pressing both preset up and down buttons.

To cancel the save operation, press the reset button.

## Preset Reset

Press reset to quickly load preset 1 - a useful preset to use as a starting point.

## Preset Randomiser

To randomise the preset, simply hold down the reset button for a duration of 2 seconds.



# Voice Section



TherapSID's 3 voices are laid out across the top half of the control panel. The 3 voice strips are identical in functionality, explained from left to right:

## Waveforms



Each voice each consists of 4 waveforms:

**Square, Triangle, Sawtooth and Noise.**

Press the corresponding button to enable or disable a waveform (indicated by LED).

*Note: Multiple waveforms can be active at the same time.*

## Pulsewidth

The **pw** knob adjusts the duty cycle of the square waveform.

*Note: this has no effect on the other waveforms, only square.*

## Tune

The **tune** knob transposes the voice in semitone increments. The tune ranges from -12 to +12 semitones (2 octaves), indicated by the 7 segment LED display.

Twelve 'o clock knob position is zero.

## Fine

The **fine** knob fine tunes the voice (+/-1 semitone range)

Twelve 'o clock knob position is centre.

## Master Volume

Hold filter mode and adjust the scrub knob to set the master volume. Lowering the volume can reduce distortion when playing all voices at once.

## Paraphonic Mode

TherapSID has two voicing modes: unison and paraphonic. In unison mode, you can play a single note at a time. This will trigger the 3 voices at once. Paraphonic mode allows you to play up to three different notes simultaneously by splitting the 3 voices into separate notes.

To activate paraphonic mode, hold a waveform button on voice 1 for two seconds. The LED display will show "PA" to indicate that paraphonic mode is active. Voices 2 and 3 will now mirror the parameters of voice 1. To switch back to monophonic mode, hold a waveform button on voice 1 again for two seconds. The LED display will show "OF" to indicate that monophonic mode is active.

## Fat Modes

TherapSID also supports a second SID chip, and there are several "Fat Modes" available that allow you to take advantage of both chips. To switch between the different Fat Modes, hold down the filter button and press the arp mode button. The corresponding Fat Mode number will be displayed on the screen. Note that some Fat Modes may exhibit different behaviours depending on whether or not paraphonic mode is active.

Here are the available Fat Modes:

- Mirror Mode (F1): Both chips have the exact same data transmitted.
- Octave Mode (F2): Chip #1 is one octave above Chip #2.
- Slightly Detuned Mode (F3): The two chips are slightly out of phase, creating nice panorama effects.
- Heavily Detuned Mode (aka Super Fat Mode) (F4): Six saw oscillators create an incredibly thick and fat sound.
- Polyphonic Modes (F5): When paraphonic mode is active, you can play up to six notes at once, spread across both chips. When paraphonic mode is deactivated, you can play two notes at once, each consisting of three voices in unison.
- Two-Voice/Three-Note Mode (F6, only available in paraphonic mode): This mode enables you to play up to three notes at once, each consisting of two voices (1 and 2). In this mode, you have access to the parameters of both voice 1 and voice 2 to craft your sound.

## Auto Chord

To use the auto chord feature on the TherapSID, please follow these instructions:

1. Hold down a chord on your MIDI keyboard.
2. While still holding the chord, press and hold the arp mode and press the **Retrig** button to engage the auto chord feature.

To free up your hands for pressing buttons, we recommend using the sustain pedal.

If you wish to disengage auto chord, simply repeat the same button presses as before.

Note that if you activate auto chord without holding down any keys, the TherapSID will select a chord from its built-in selection.

## Glide

Adds glide aka portamento to the synth's pitch.

More glide=longer portamentos/slides.

## Sync

When set on voice1, Synchronizes the fundamental frequency of Oscillator 1 with the fundamental frequency of Oscillator 3, producing "Hard Sync" effects. Varying the frequency of Oscillator 1 with respect to Oscillator 3 produces a wide range of complex harmonic structures from Voice 1 at the frequency of Oscillator 3. In order for sync to occur Oscillator 3 must be set to some frequency other than zero but preferably lower than the frequency of Oscillator 3. No other parameters of Voice 3 have any effect on sync.

## Ring Mod

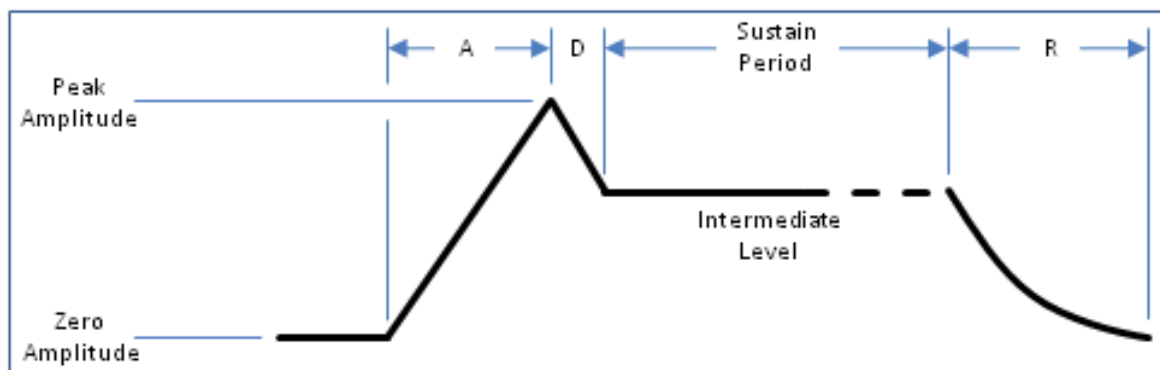
When set to voice 1 or 3, replaces the Triangle waveform output of that voice with a “Ring Modulated” combination of Oscillators 1 and 3.

When set to voice 2, replaces triangle waveform output of voice2 with a “Ring Modulated” combination of Oscillators 2 and 1.

Varying the frequency of Oscillator 1 with respect to Oscillator 3 produces a wide range of non-harmonic overtone structures for creating bell or gong sounds and for special effects. In order for ring modulation to be audible, the Triangle waveform of Oscillator 1 must be selected and Oscillator 3 must be set to some frequency other than zero. No other parameters of Voice 3 have any effect on ring modulation.

## Volume Envelopes - ADSR

The "attack" and "decay" of a sound have a great effect on the instrument's sonic character. ADSR envelope is specified using four parameters:



- **Attack time** is the time taken for initial run-up of level from nil to peak, beginning when the key is first pressed.
- **Decay time** is the time taken for the subsequent run down from the attack level to the designated sustain level.
- **Sustain level** is the level during the main sequence of the sound's duration, until the key is released.
- **Release time** is the time taken for the level to decay from the sustain level to zero after the key is released.



# Filter



The SID chips are equipped with a multimode resonant filter.

The filter is the analog section of the circuit and its warm/dirty sound contributes to the authentic SID character.

## Filter Modes

Press the filter button to toggle through the eight filter states:

**Off, Low Pass, Low+Band Pass, Band Pass, Band+High Pass, High Pass, Low Pass+ High Pass (notch), LP+BP+HP**

## Cutoff

The cut knob adjusts the filter cutoff frequency

## Resonance

The res knob adjusts the filter's resonance

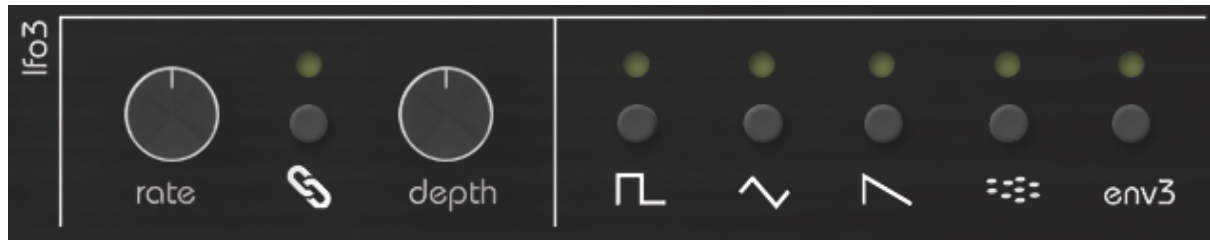
*Note: The resonance is more or less pronounced depending on the type of SID chip.*

## Filter Routing

One can connect or disconnect any of the three voices to and from the filter.

To do so, hold down the filter mode button, which will display the voices that are currently connected to the filter. When a voice is connected, the waveform LEDs will light up. To connect or disconnect a voice from the filter, press any of its waveform buttons.

# Modulation (LFO)



TherapSID has 3 LFOs to bring your synth to life!

*Note: the LFO values can also be transmitted as midi CCs to modulate other MIDI capable instruments.*

## LFO Waveforms

There are 5 LFO types to choose from:

**Square, Triangle, Saw, Noise and Env3 (ADSR envelope of voice 3).**

- Move either of the 3 LFO's **depth** or **rate** knobs to **select** that LFO.
- Press the **lfo shape** buttons to change the **selected** LFO's shape.

You can also assign no shape at all by pressing a readily lit shape.

In this case the LFO's **depth** knob becomes a manual controller.

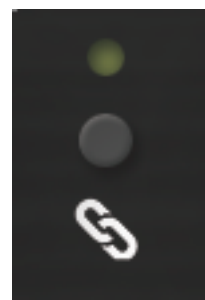
## Assigning LFOs to knobs

You can link any of the three available LFOs to the following knobs:

**Filter Cutoff, Filter Resonance, Tune1, Tune2, Tune3, Fine1, Fine2, Fine3, Width1, Width2, Width3, LFO Depth1, LFO Depth2, LFO Depth3, LFO Rate1, LFO Rate2, LFO Rate3, Arpeggiator Scrub, Arpeggiator Range, Arpeggiator Rate**

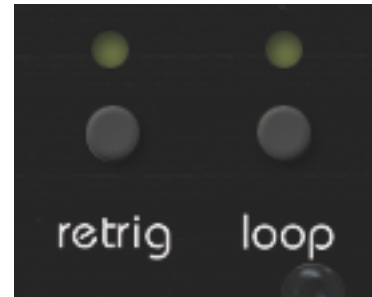
Simply manipulate the desired knob and then press the chain button of the LFO you wish to link to it. The chain LED will light up, indicating that the LFO is now linked to the selected knob.

*Should you need to unlink the LFO, simply press the link button again, and the chain LED will deactivate. It's important to note that you can link a single LFO to multiple knobs!*



## Re-trigger & Loop

The LFOs can be used as "one-shot" envelopes by deactivating the looping feature using the loop button. This is useful for achieving pitch decay on percussive sounds and other effects. Additionally, the LFOs can be re-triggered on every key press by toggling the retrigger button.



## CV Override

Each of the three LFOs can be overridden using the corresponding CV input jack. By plugging a 1/8" mono jack into the desired CV input, you can take control of the LFO with an external source. The expected CV range is 0-5v DC.

# Arpeggiator



TherapSID MKII has a brand new arpeggiator that is easy to use but can become wild when modulated by LFO!

When active, the arpeggiator re-triggers LFOs

The arpeggiated notes are also transmitted via MIDI

## Arp Modes

The arpeggiator has 7 modes that you can access by pressing the mode button. The currently selected mode is displayed on the LED display.

Here's a description of each mode:

- **Up:** The arpeggiator will play all held notes in a loop, starting from the lowest note and moving up. If the range knob is set to a value above zero, the sequence will add an octave to each loop.
- **Down (d0):** This mode is similar to Up mode, but the arpeggiator plays the held notes in a loop starting from the highest note and moving down the scale.
- **Up Down (Ud):** This mode combines the Up and Down modes. The arpeggiator plays the held notes in a loop, starting from the lowest note and moving up the scale, then reverses direction and moves down the scale.
- **Random (rd):** In this mode, the arpeggiator selects notes from the held keys at random.
- **Octave (OC):** The arpeggiator repeats each note at all available octaves before advancing to the next note. The number of octaves played can be adjusted using the range knob.
- **Trill Plus 1 semitone (P1):** The arpeggiator plays each note from the lowest to the highest, followed by the note one semitone above it.
- **Trill Plus 2 semitones (P2):** This mode is similar to P1, but the arpeggiator plays each note followed by the note two semitones above it.



## Scrub

You can use the scrub knob to jog through the arpeggiator notes. This is particularly powerful when linked to an LFO.

Note: The arpeggiator has to be in **OFF** mode for Scrubbing to work.

## Rate & Range

Use the **rate knob** to adjust the speed of the arpeggiator and the **range knob** to set the octave span (1-4).

*Note: the arpeggiator can sync to MIDI clock.*

# MIDI

TherapSID can transmit and receive MIDI. A little dot at the right of the first LED digit indicates incoming MIDI, a dot at the right of the second LED digit indicates outgoing MIDI

## MIDI Master Channel Selection

TherapSID can receive and send MIDI on the channels of your choice.

You can individually change the master input and output channels at any time by following these steps:

### To select MIDI input channel

- Hold **Arp Mode** and press **Preset Up**
- Now the input channel is displayed on the led display.
- Change the MIDI input channel (1-16) with the **Preset Up/Down** buttons
- When done, confirm with a final press of the **Arp Mode** button. Display goes blank and the channel is saved to EEPROM

### To select MIDI output channel

- Hold **Arp Mode** and press **Preset Down**
- Now the output channel is displayed on the led display.
- Change the MIDI output channel (1-16) with the **Preset Up/Down** buttons
- When done, confirm with a final press of the **Arp Mode** button. Display goes blank and the channel is saved to EEPROM

## Triggering Voices Separately

Additionally, you have the ability to trigger the three voices individually on separate MIDI channels.

To specify the MIDI channels for each voice, please use the [settings tool](#).

By default, the MIDI channels assigned to voices 1, 2, and 3 are 2, 3, and 4, respectively.

Note: In paraphonic mode or when the fat mode is set to 5, all voices are allocated to the master channel. Consequently, it becomes impossible to trigger the individual voices in these cases.

## MIDI Preset Management

You can transfer all presets to and from a computer via MIDI System Exclusive (SYSEX) transfers. This is handy to back up or share your presets with fellow TherapSID owners.

To transmit (dump) SYSEX:

Hold **Preset Down** during startup. The SYSEX is automatically sent out of the MIDI port.

To receive SYSEX:

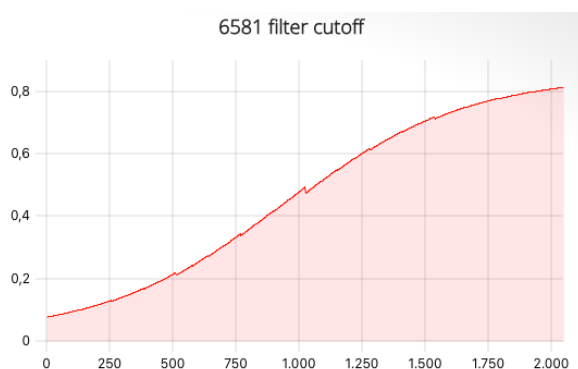
Hold **Preset Up** during startup. TherapSID will enter SYSEX receive mode, indicated **Re** on the LED display panel.

You can now send the SYSEX you previously dumped to TherapSID.

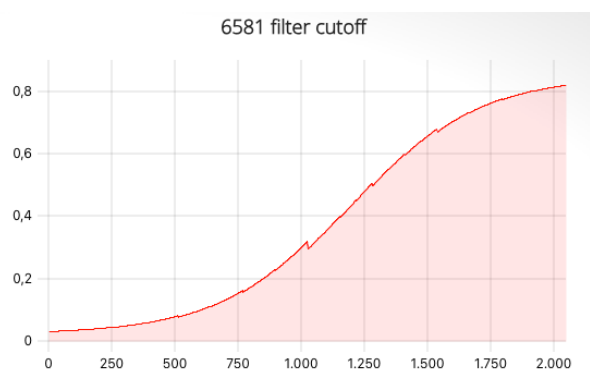
At the end of the transfer, the **Eeprom** will be updated. This takes around 13 seconds. The progress % is indicated 0-99 on the LED Display.

# Filter Calibration

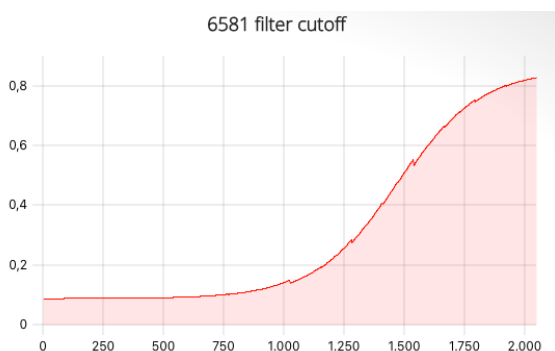
With version 3.0, TherapSID introduces filter calibration to balance out the varying filter behavior — a trait that is common with original chips. These differences are not due to faulty chips, but rather strong non-linearities, particularly noticeable between different revisions of the 6581 model. Whether you use revision R2, R3, or R4 of the 6581, non-linear behavior can appear across all versions, and it is difficult to generalize whether older chips tend more strongly in one direction or another. In contrast, 8580 chips largely conform to the specifications. Therefore, it makes sense to either match your 6581 chips to the behavior of 8580 chips, to other relatively linear 6581 chips, or even to intentionally tune them to a specific curve.



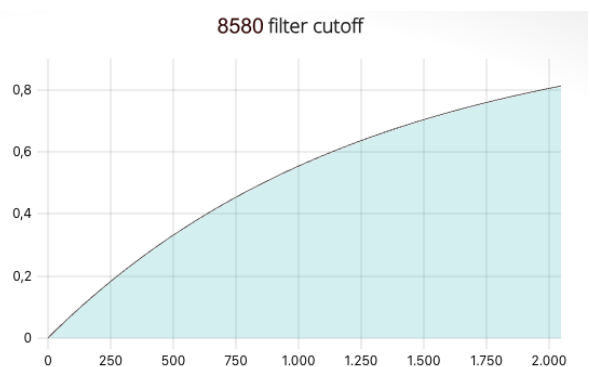
A 6581 can run like this for the LP filter ...



... or another 6581 LP filter curve can look like this



A special 6581 could also turn out like this ...



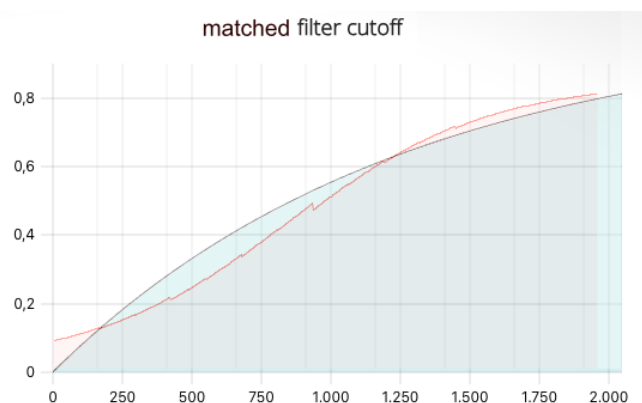
A 8580, on the other hand, runs constantly like this

These filter curves are not unusual for 6581, whereas the 8580 chip usually shows a relatively linear, almost logarithmic curve for the low-pass filter.



If you are using ARMSIDs, the model & filter range can be adjusted directly on the hardware, e.g. with the online “Settings Tool”. The software-side calibration on the TherapSID would then be superfluous for these chips.

However, this method of calibration offers a decisive advantage. The chips can be tuned directly by ear. And it can also be noted that it is not always 100% possible to adjust both chips - this is also not necessary, as they are 2 different chips with different filter curves - which may also sound different, but for our intention to create a suitable stereo sound field - due to the hard separation of the SIDs on the audio channels (left/right) - they are better matched.



The picture shows possible adjusted low-pass filter curves of two different chip models (8580 / 6581)

So if you have 2x 8580 chips or 2x ARMSIDs installed, calibration will probably not be necessary. However, if you want to operate the TherapSID with two different chip models (8580 / 6581) or with 2x 6581 simultaneously, you will quickly notice that for one or the other chip the cutoff frequency starts much later or that the working range differs, which is usually the case for 6581 models. In addition, R2 revisions never close properly, i.e. they are always audible below the cutoff frequency, which also occurs with R3 revisions, but seems to be more pronounced with R2.

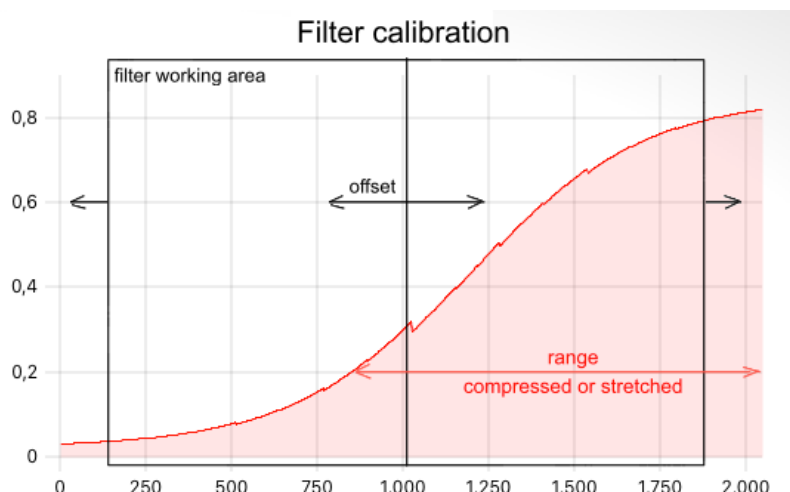
It can be said, for example, that an adjusted 6581 R2 / R3 can sound quite interesting in parallel to the 8580, simply due to the fact that sound for the 6581 does not go silent for the lowest low-pass filter cutoff value.

SID chips are defective if no sound or only minimal sound can be heard when the filter is switched on, or if other strange artifacts appear in the sound or the chip might get extremely hot. It should be noted that it is completely normal for the 6581 models to always sound quieter than an 8580 model when the filter is switched on. Since the chips and especially the filters are not protected against ESD (electrostatic discharge) damage due to their architecture, defects are mainly caused by improper handling of the chip (e.g. by your own static charge). You should definitely familiarize yourself with this topic and protect the MOSFET chip from ESD before changing or inserting it yourself.

## Entering the filter calibration mode

By pressing and holding the **arp mode** button in combination with a pressed **chain button**, the filter calibration mode can be activated while the TherapSID stays in normal operation. The calibration mode initially displays “**FC**” and is signaled by **flashing chain LEDs** for the available chips and can be **exited** immediately by pressing the arp mode button again.

Within the mode, the **RATE** and **DEPTH** area of **LFO1**, **LFO2** and **LFO3** (if applicable) represent their own configuration for the available SID chips 1,2,3), where "rate" **adjusts the “offset”** for the cutoff and "depth" **adjusts the “range”** in which the filter operates. This means that the curve can be compressed (zoom out / turned left) or stretched (zoom in / turned right) using "depth" knob and the cutoff can be shifted to the right or left using "rate" knob.

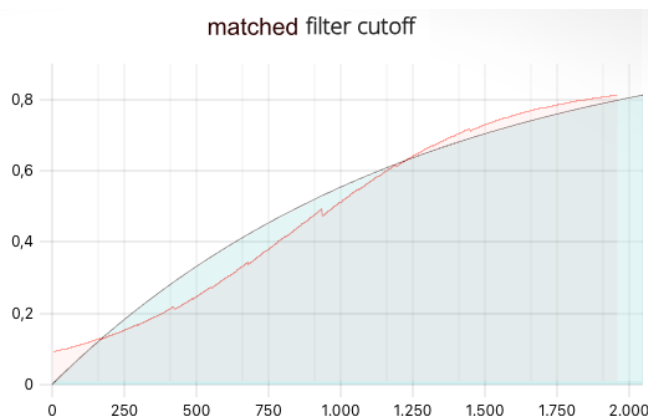


While you are in this mode, you can play notes, switch to low-pass and play around with the cutoff and resonance knob and listen to the result.

A pressed **chain button** shows the **current value** for "offset" parameter or, if pressed again, it shows the current "range" value in the 7-segment display for a short time. **00** represents the **center position** (no adjustment). The direction in which the parameter was changed is not explicitly displayed, but this is correctly stored internally. By pressing and holding one of the chain buttons, all changed parameters are permanently saved in the EEPROM (7segment displays: "**SC**" - as stored calibration).

If you want to **restore the original state**, this can be triggered in the mode by simply pressing the **reset button**, but it is also permanently reset in the EEPROM by holding down the reset button. At the end, the 7-segment display shows "**rC**", which stands for “reset calibration”. During the boot process, the filter calibration can also be deleted by resetting all global settings (take a look at “Settings Reset” chapter).

If you want to make the following adjustment as shown in the picture, look for the most suitable chip (in this case the **8580**) and adjust the **6581** first in the offset and then in the range. To be able to listen to the complete working range of a single chip first, you can also move one of the chips completely to **-7F** (full left) using the offset parameter.



To make the curve steeper or to discover a suitable sweet spot, it is usually helpful to compress the curve using the range parameter. Also note that the filter can only work within its address range. Values that exceed this are simply trimmed to the minimum or maximum.

At the end, the setting can remain permanently in the EEPROM and the TherapSID also adopts this range when the device is rebooted.

Of course, the calibration also has an influence on the **ASID** playback. It can be switched on (by default) and off during playback of SID tunes using the **LFO TRI** button ("**uC**" - use calibration, "**nC**" - not calibrated).

Of course, the ASID playback mode also offers the option of adjusting the filter offset linearly or scaled (and separately for each chip) without having to explicitly perform a calibration, but only as a temporary change that acts as a remix parameter.

However, you can already try out SID tunes without explicitly saving the filter calibration. Through such changes in the operation of the filters (whether temporary or permanent), the conditional behavior of a specific SID chip used by composers can be simulated.

If you exit ASID mode, you are still in filter calibration mode if it was previously active. More details on ASID in the next chapter.

# ASID implementation

ASID is a protocol that runs over MIDI, which enables applications to send direct updates to the registers of the SID chip. It was originally developed for the Elektron Sidstation as a way of playing back Commodore 64 SID-files, but has later seen usage on other SID-based instruments as well.

Since firmware revision 2.3, TherapSID can not only play SID tunes over ASID but also remix them in real time using the knobs and buttons. A massive thanks to Thomas Jansson for making this possible. Check out this [playlist](#) on his YouTube channel for demos on the ASID mode.

There are a number of different playback options for SID files, both online browser based as well as platform specifics. See “ASID Playback applications” below, for details.

While the song is playing, the user can perform a number of real time remix operations, such as:

- Soling or muting of chips or channels
- Changing & combining waveforms, Sync and Ring-modulation
- Setting pulse width & pitch
- Changing ADSR, filter values, filter modes, filter routes etc

During playback, the music can be switched back and forth between a clean (comparison) mode and a remixed mode, and it is also possible to preconfigure the remix parameters within the clean mode. Entire parameter groups can be reset or even each individual potentiometer can be restored. So it's a compromise between the original sound and your own ideas.

TherapSID not only supports original SID chips, but can also be equipped with alternative hardware emulators, some of which also enable the playback of up to three SIDs, as well as supporting an FM (OPL1/2) mode. Since these features require more bandwidth for data transmission, some of the special things mentioned can only be made possible by faster MIDI interfaces supporting Turbo MIDI, such as the TM-1 from Elektron, but it also depends on the complexity of the songs being played.



## Visualisation

When receiving the first ASID message, it will directly put the instrument in ASID mode (indicated by "AS"). The incoming SID data is visualised the following way:

- The relevant Voice LEDs light up to show what waveforms and sync/ring mod states are used
- The LFO LEDs are used to indicate filter status:
  - LINK 1, 2, 3 indicates that the voice is routed to the filter
  - Waveforms indicate the cutoff frequency as a 5-stage amount
  - RETRIG/LOOP indicate the resonance level as a 2-stage amount
- The Filter type LEDs show the currently active filter type

## Controls

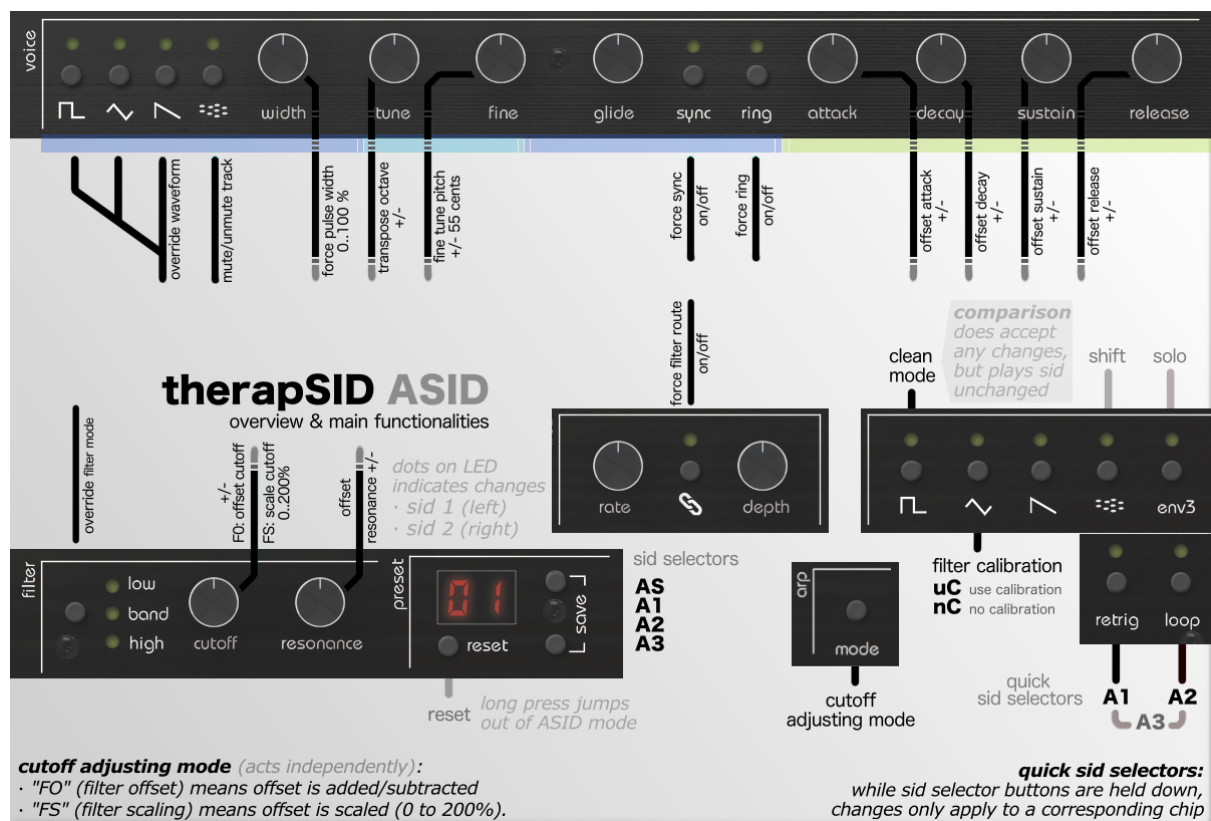
The following quick guides will give you a visual overview of all the functions that are possible. Further details can be found in "Remix controls, reference" below. Here are links to download and print the quick guides:

[https://github.com/twistedelectrons/TherapSID/blob/main/doc/asid\\_quick\\_guide\\_01.png](https://github.com/twistedelectrons/TherapSID/blob/main/doc/asid_quick_guide_01.png)

[https://github.com/twistedelectrons/TherapSID/blob/main/doc/asid\\_quick\\_guide\\_02.png](https://github.com/twistedelectrons/TherapSID/blob/main/doc/asid_quick_guide_02.png)

[https://github.com/twistedelectrons/TherapSID/blob/main/doc/asid\\_quick\\_guide\\_03.png](https://github.com/twistedelectrons/TherapSID/blob/main/doc/asid_quick_guide_03.png)

### Overview & main functionalities:



voice

width tune fine glide sync ring attack decay sustain release

combine waveforms

reset filter mode

therpSID ASID

solo & reset & combine

reset filter route

shift solo

rate depth

env3

filter

low band high cutoff resonance

reset

AS A1 A2 A3

retrig loop

sid selectors

the reset button resets the selected chip first then all of them while it switches to AS mode

while solo is held, the corresponding chip is automatically selected

voice 1

voice 2

voice 3

width 1 2 3 4

tune 2 3

fine 4

glide

sync

ring

attack 1

decay 2 3

sustain 4

release

width 5

tune 6 7

fine 8

glide

sync

ring

attack 5

decay 6 7

sustain 8

release

width 9 (10 .. 11)

tune

fine

glide

sync

ring

attack 9

decay

sustain

release

mute channel

operator 1 level

operator 2 level

rate 1

depth 2

rate 3

depth 4

rate 5

depth 6

fm feedback

mode

scrub 7

rate 8

range 9

therapSID ASID fm

## Supported files

The ASID mode supports several types of SID-files:

- When using standard MIDI interfaces and one or two SID-chips:
  - Single-SID files at 50/60Hz (the most common format). The SID playback is duplicated on the second SID.
- When using Turbo MIDI (Elektron TM-1 interface and similar) also the following:
  - Dual-SID files ("Stereo SIDs")
  - Multi-speed SID files (2x, 3x, 4x etc)
  - Combinations of the above
  - When using ARM2SID:
    - SID+FM files (custom files made for the Sound Expander or FM-YAM, which uses the Yamaha OPL1 or OPL2 chips)
  - When using a special version of the firmware, an ARM2SID and a specific pin patched in (*Note: see section "[Special ARM2SID third chip](#)"*) :
    - Triple-SID files

## ASID Playback applications

There are various playback options that support the ASID protocol, such as the very first ASID X/XP application from Elektron [1] (no longer updated), the DeepSID website [2], Vice [3] or Sidplay[4] variants that have been explicitly adapted for the transmission of ASID data.

The DeepSID is a browser based vast online library of SID tunes (needs Chrome for MIDI), whereas modified players such as Sidplay (Mac) or Vice (Windows) are available as offline variants. While Sidplay offers the possibility to create playlists from High Voltage Sid Collection (HVSC) manually, for Vice you can use a HVSC manager like the Sidtool[5] which can be configured for Vice's player.

[1] <https://cdn.www.elektron.se/media/downloads/sidstation/ASID-Win-OSX.zip>

[2] <https://deepsid.chordian.net/>

[3] <https://sourceforge.net/projects/vice-emu/files/misc/WinVICE-3.2-asid/>

[4] [https://github.com/Alexco500/sidplay5/releases/tag/v5.1.0\\_95](https://github.com/Alexco500/sidplay5/releases/tag/v5.1.0_95)

[5] <https://sidtool.de/>

## Remix controls, reference

- **NOISE** waveform button mutes/unmutes the corresponding track
- **RECT/TRI/SAW/SYNC/RING** waveform buttons force that feature on/off (ignoring incoming changes from the SID file). **RECT/TRI/SAW** combinations are possible with the shift button (**LFO NOISE**) held down. Noise will always be let through.
- **WIDTH** forces the pulse width to that value (ignoring incoming)
- **TUNE** transposes the pitch +/- one octave. Noise will be left untransposed.
- **FINE** fine-tunes the pitch +/-55 cents
- **LFO LINK** buttons force filter routing of the corresponding track on/off (ignoring incoming changes)
- **CUTOFF, RESO, ATTACK, DECAY, SUSTAIN, RELEASE** adds/subtracts offset to the incoming changes. Noon means no change.
  - Note: there is also a way to let the cutoff instead be scaled by using another cutoff adjusting mode (**ARP MODE**, see below)
- **FILTER TYPE** button forces the type (ignoring incoming changes)
- **RETRIG** and **LOOP** means SID1 and SID2 respectively. When held down, only that chip will be affected by the knob moves and button presses. This means that completely different parameters can be used on each chip, including mutes.
- **ARP MODE** will toggle the **CUTOFF** adjusting mode. "FO" (Filter Offset) means offset is added/subtracted, while "FS" (Filter Scaling) means offset is scaled (0 to 200%). Different songs might benefit from one or the other mode. This mode is global and is not affected by SID1/SID2 buttons.
- The dots on the red LED display indicates that something has been remixed. Left dot means SID1 and right dot means SID2.
- Pressing **LFO SQUARE** will put the player in a "clean" mode (indicated by "AC"), accepts any remixed parameters, but plays sid tune unchanged
- Pressing **LFO TRI** will turn the filter calibration on/off (indicated by "nC" - no calibration, "uC" - use filter calibration).
- Brief press on **RESET** restores remix parameters to original. This also works with the SID1/2 separation.
- Long press on **RESET** jumps out of ASID mode
- Holding **ENV3** when pressing on a channel mute button will instead solo it. If holding **ENV3** and pressing **RETRIG** or **LOOP** (i.e the SID1/SID2 selectors), that whole SID chip will be soloed and selected. Note: Switching

a channel to solo also sets the channels of the duplicated SIDs to solo too. This allows you to switch between the chips without losing the solo configuration..

- **PRESET UP/DOWN** will change the default chip for remixing - from affecting both to only one of them (useful for one-handed remixing of one chip, not needing to hold **RETRIG/LOOP**). This will be indicated by A1, A2 - as opposed to AS which means both.
- Holding the shift button (**LFO NOISE**) allows you to restore individual parameter areas like:
  - SH + NOISE restores VOICE parameters (WAVEFORM, PW, TUNE, FINE, RING/SYNC)
  - SH + SYNC restores PITCH (TUNE, FINE)
  - SH + RING restores ADSR
  - SH + LFO LINK restores FILTER ROUTE
  - SH + FILTER MODE restores FILTER MODE
  - SH + POT restores individual values by turning the POT

In the SID+FM mode, the following buttons apply for remixing:

- Voice 1 **SQR** to **NOISE**, Voice 2 **SQR** to **NOISE** and Voice 3 **SQR** to **SAW** works as indication LEDs and mute on/off buttons for the 9 (or 11) FM channels
- **WIDTH1** to **WIDTH3** add/subtracts to the Operator 1 level of the 9 FM channels
- **ATTACK1** to **ATTACK3** add/subtracts to the Operator 2 level of the 9 FM channels
- **RATE1** to **DEPTH3**, **ARP SCRUB** to **ARP RANGE** adds/subtracts to Feedback of the 9 FM channels

# MIDI Controller Implementation

*Note: the knobs and buttons (AND LFOs!) send their corresponding MIDI CCs out too, so you can double TherapSID as a powerful MIDI controller for other synths!*

*Note for MK2 owners: We use TRS MIDI TYPE A*

MIDI Message	Range	Result	Direction
<b>Note On/Off CH1</b>	1-127	<b>Trigger Voices Unison</b>	receive/send
<b>Note On/Off CH2</b>	1-127	Trigger Voice1 only	receive/send
<b>Note On/Off CH3</b>	1-127	Trigger Voice2 only	receive/send
<b>Note On/Off CH4</b>	1-127	Trigger Voice3 only	receive/send
Control CC#6	1-127	Voice1 Attack	receive/send
Control CC#7	1-127	Voice1 Decay	receive/send
Control CC#8	1-127	Voice1 Sustain	receive/send
Control CC#9	1-127	Voice1 Release	receive/send
Control CC#14	1-127	Voice2 Attack	receive/send
Control CC#15	1-127	Voice2 Decay	receive/send
Control CC#16	1-127	Voice2 Sustain	receive/send
Control CC#17	1-127	Voice2 Release	receive/send
Control CC#22	1-127	Voice3 Attack	receive/send
Control CC#23	1-127	Voice3 Decay	receive/send
Control CC#24	0-127	Voice3 Sustain	receive/send
Control CC#25	0-127	Voice3 Release	receive/send
Control CC#32+59	0-127	Filter Cutoff	receive/send
Control CC#33	0-127	Filter Resonance	receive/send
Control CC#3	0-127	Voice1 Tune	receive/send
Control CC#11	0-127	Voice2 Tune	receive/send
Control CC#19	0-127	Voice3 Tune	receive/send



MIDI Message	Range	Result	Direction
Control CC#2	1-127	Voice1 Pulse Width	receive/send
Control CC#10	1-127	Voice2 Pulse Width	receive/send
Control CC#18	1-127	Voice3 Pulse Width	receive/send
Control CC#4	1-127	Voice1 Fine	receive/send
Control CC#12	1-127	Voice2 Fine	receive/send
Control CC#20	1-127	Voice3 Fine	receive/send
Control CC#5	1-127	Voice1 Glide	receive/send
Control CC#13	1-127	Voice2 Glide	receive/send
Control CC#21	1-127	Voice3 Glide	receive/send
Control CC#34	1-127	Arp Scrub	receive/send
Control CC#35	1-127	Arp Rate	receive/send
Control CC#36	1-127	Arp Range	receive/send
Control CC#26	1-127	Lfo1 Rate	receive/send
Control CC#27 & Mod Wheel	0-127	Lfo1 Depth	receive/send
Control CC#28	0-127	Lfo2 Rate	receive/send
Control CC#29	0-127	Lfo2 Depth	receive/send
Control CC#30	0-127	Lfo3 Rate	receive/send
Control CC#31	0-127	Lfo3 Depth	receive/send
Control CC#49	0=off 1=on	Voice1 Sync	receive/send
Control CC#50	0=off 1=on	Voice1 Ring	receive/send
Control CC#51	0=off 1=on	Voice2 Sync	receive/send
Control CC#52	0=off 1=on	Voice2 Ring	receive/send
Control CC#53	0=off 1=on	Voice3 Sync	receive/send
Control CC#54	0=off 1=on	Voice3 Ring	receive/send
Control CC#37	0=off 1=on	Voice1 Rect	receive/send



MIDI Message	Range	Result	Direction
Control CC#38	0=off 1=on	Voice1 Triangle	receive/send
Control CC#39	0=off 1=on	Voice1 Saw	receive/send
Control CC#40	0=off 1=on	Voice1 Noise	receive/send
Control CC#41	0=off 1=on	Voice2 Rect	receive/send
Control CC#42	0=off 1=on	Voice2 Triangle	receive/send
Control CC#43	0=off 1=on	Voice2 Saw	receive/send
Control CC#44	0=off 1=on	Voice2 Noise	receive/send
Control CC#45	0=off 1=on	Voice3 Rect	receive/send
Control CC#46	0=off 1=on	Voice3 Triangle	receive/send
Control CC#47	0=off 1=on	Voice3 Saw	receive/send
Control CC#48	0=off 1=on	Voice3 Noise	receive/send
Control CC#55	0-25=LP 26-50=BP 51-75=HP 76-100=LP+HP(not ch) 101-127=OFF	Filter Mode	receive/send
Control CC#56	0-127	Lfo1 value	send
Control CC#57	0-127	Lfo2 value	send
Control CC#58	0-127	Lfo3 value	send

# Settings Tool

The online tool provides a convenient way to set TherapSIDs parameters within one screen. You can easily adjust the parameters to your liking using the tool's interface.

To use the online tool, your web browser must have MIDI support enabled (like Chrome).

No downloads or drivers are necessary, as the tool runs directly in your browser.

The tool is available at the following web address:

<https://twisted-electrons.com/tool/therapSID/>



The screenshot displays the 'TherapSID Tool V1.2' interface. At the top left, it states 'TherapSID detected! firmware: 2.6'. The interface is divided into several sections: 'OPTIONS' with checkboxes for 'MODWHEEL > LFO1', 'AFTERTOUCH > LFO2', 'VELOCITY > LFO3', 'LFO SENDS CC', 'ARP SENDS NOTES', 'PW LIMITER', and 'NO ARP ON 1 KEY'; 'MIDI INPUT (from device):' with a 'Read' button and a dropdown menu set to 'Elektron TM-1'; 'MIDI OUTPUT (to device):' with a 'Write' button and a dropdown menu set to 'Elektron TM-1'; 'MIDI CHANNELS:' with dropdowns for 'MASTER' (1), 'VOICE1' (2), 'VOICE2' (3), 'VOICE3' (4), and 'OUTPUT' (1); 'MASTER VOL:' with a dropdown set to '100%'; 'PITCH BEND RANGE' with 'UP' and 'DOWN' dropdowns set to '2'; and two 'ARMSID SLOT' sections (1 and 2) each containing sliders for 'Chip Emulation: Auto detect', 'ADSR Bug: Not fixed', '6581 Filter Strength: Average', '6581 Filter Low: 215', '8580 Filter Central: 6000', and '8580 Filter Low: 100'. A decorative circular pattern of dots is visible on the right side of the interface.

*Settings Tool showing default settings*

It is recommended to hard refresh your browser before using the tool to ensure that you are using the latest version. This can be done by pressing Ctrl + F5 (Windows) or Command + Shift + R (Mac).

## Changing settings

### 1. Select MIDI input and output ports:

To use the online tool, you need to select the MIDI input and output ports that are connected to your TherapSID. You can do this by using the drop-down menus located at the top of the screen.

### 2. Download current settings:

After selecting the MIDI input and output ports, press the "Read" button to download the current settings from your TherapSID device. This will allow you to view the current settings and make changes if necessary.

The upper sections covers common settings, whereas the lower section is only applicable if you have equipped your TherapSID with one or more ARMSID or ARM2SID chips.

### 3. Change parameters:

Once you have downloaded the settings, you can change any parameters that you want. The tool provides an intuitive interface for adjusting the settings.

### 4. Update the device settings:

After making any desired changes, press the "Write" button to update the device with the new settings. This will ensure that the TherapSID is configured with your desired settings.

## Settings Reset

If you wish to reset the global settings, simply hold the **Preset Reset** button at startup.

The image above shows a snapshot of the factory global settings for your reference.

## ARMSID optional flash configuration

If the unit is configured with ARMSID chips, the emulation settings for it are stored in the TherapSID and automatically used after power-on.

But these settings can also be transferred to the chip's built-in flash, which thereby enables the TherapSID to be used as a configuration device, not needing a Commodore 64 for this work. To transfer the settings, hold down **Loop** while powering up. The unit will show "FA" during this process.

# Firmware updates

TherapSID can receive firmware updates through MIDI system exclusive messages (sysex). You can check the latest firmware version on the Firmware Updates page online:

<https://www.twistedelectrons.com/downloads-firmware>

The current firmware version is displayed on the 7-segment LED display for 1 second during startup.

To enter the update mode (also known as boot-loader mode):

- Unplug the power cord from the unit (or use the power button on MKIII).
- Press and hold down the **Filter Type** button (located at the bottom left of the control panel).
- Power the unit back on

When you enter the boot-loader mode, all the LEDs on the control panel will light up. This indicates that the TherapSID is ready to receive the sysex data from your computer.

## Windows

If you're using a Windows PC, we recommend using MIDI-OX to update your TherapSID's firmware. MIDI-OX is a free and highly useful app.

**IMPORTANT: It is crucial to ensure that your SYSEX software is specifically configured with a 64-byte buffer setting. Any deviations from this setting may result in update failures.**

Here are the steps to follow:

1. Launch MIDI-OX on your computer.
2. In the Sysex window, click on Command and select Window > Load File. Navigate to the location where you have stored the firmware update file.
3. Click on Command again and select Window > Send Sysex.
4. This will send the firmware update to your TherapSID. Please make sure the TherapSID is in boot-loader mode and connected to your computer via MIDI before sending the sysex file.

## Mac

If you're using a Mac, we recommend using SysEx Librarian to update your TherapSID's firmware. SysEx Librarian is a free and user-friendly app.

**IMPORTANT: It is crucial to ensure that your SYSEX software is specifically configured with a 64-byte buffer setting. Any deviations from this setting may result in update failures.**

1. Launch SysEx Librarian on your Mac.
2. In the top drop-down menu, select your MIDI interface (if it's not already selected).
3. Drag the MIDI SysEx file from the Finder into the frame of SysEx Librarian
4. Select the file by clicking on it with your mouse.
5. Click the Play button to send the firmware update to your TherapSID.

# SID Access and Configuration

Ensure that TherapSID is powered OFF.

Remove the 6 screws from underneath the unit using a 2mm Allen key.

You can now remove the bottom part of the chassis to access the SID chip(s).



**IMPORTANT:** Be careful not to cross thread the screws upon reassembly!

Use the Allen key to recenter the brass posts within the holes if necessary.

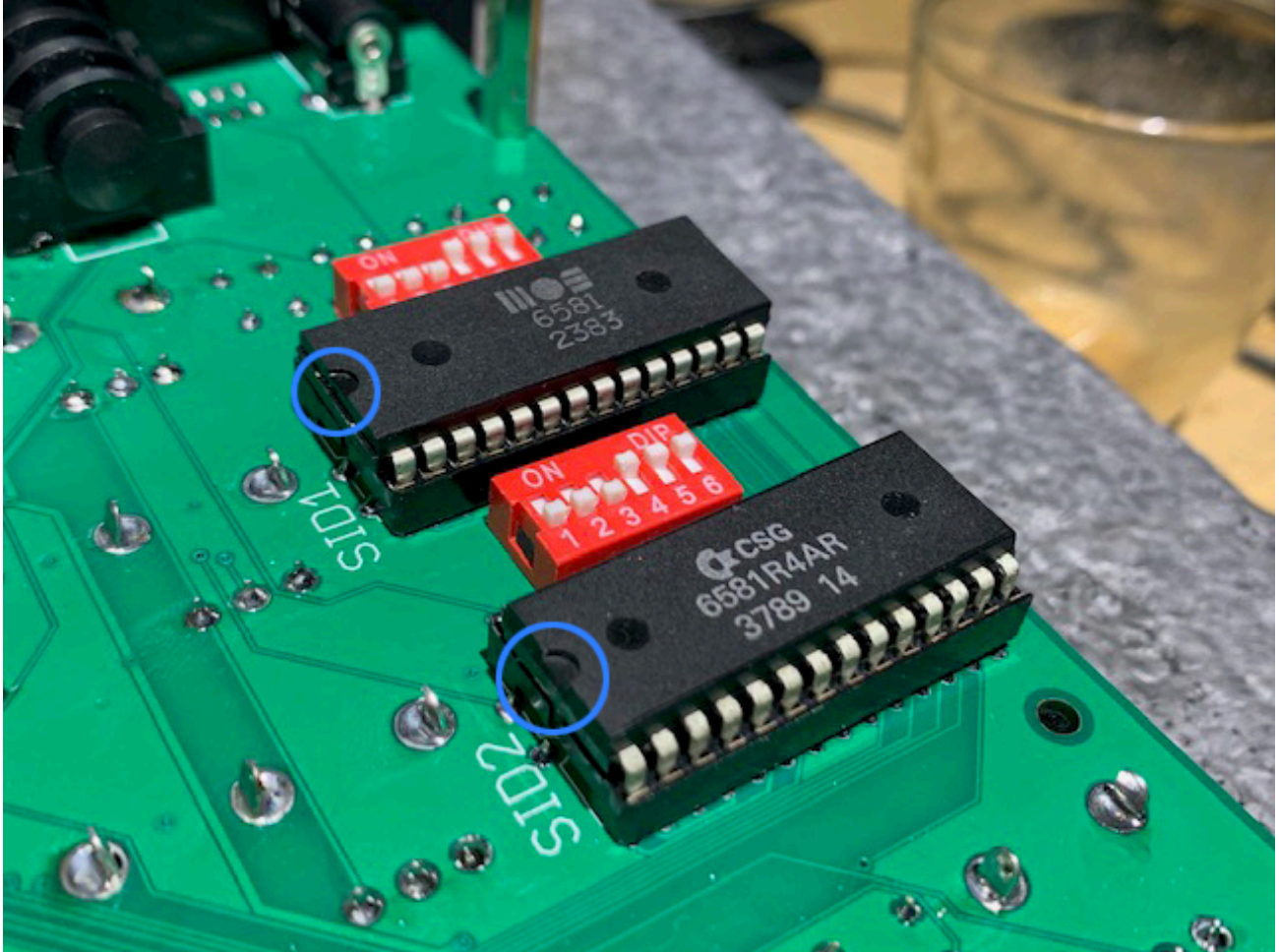
If you are having difficulty removing or replacing the bottom chassis try releasing the 1/4" Jack nuts a little...

When installing SID chips into your TherapSID, make sure to follow these guidelines:

The C-shaped notch on the chip should be pointing to the left.

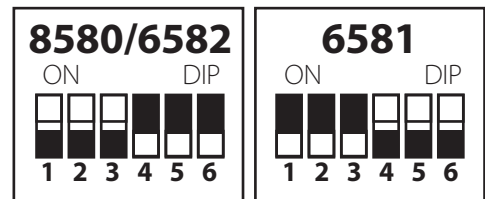
The print on the SID chips should be oriented as shown in the photo above.

Following these guidelines will ensure that the SID chips are correctly installed and will function properly in your TherapSID.



Use the DIP switches to configure the chips as follows

<b>8580/6582:</b>	<b>6581:</b>
123 UP	123 DOWN
456 DOWN	456 UP



PLEASE SET THE SWITCHES TO THE 2 ABOVE SETTINGS ONLY!

## Removing chips

To remove a SID chip from your TherapSID, follow these steps:

Gently lever the chip up on one side, lifting it to about a 30-degree angle.

Slide a flat-blade screwdriver under the chip to help lift it straight from underneath.

Be careful not to bend or damage the pins on the chip or the socket while removing it. With a little patience and gentle force, the chip should come out smoothly.



## Special ARM2SID third chip

The ARM2SID Sid emulation chip integrates a third SID chip allowing up to 9 voices! This upgrade is made possible thanks to the firmware contributions of Thomas Jansson. To benefit from this enhancement, a minor hardware modification and a custom firmware are required. Please click the link provided below for the firmware and hardware modification guide.

<https://twisted-electrons.com/tool/TherapSID/arm2sid.zip>

