SID 6581 / 8580

Employed in: **C64**, **C128**, **C720**, **SX64**

The SID (Sound Interface Device) is a 3-voice synthesizer chip which gives the Commodore 64 its fascinating sound and lead to thousands of cool SID tunes. If you don't have a C64, you might want to install a SID Player on your PC/Amiga/Mac/whatever.

Technical data

- 3 independant oscillators with ADSR control
- 4 waveforms: square, triangle, sawtooth, noise (can be mixed)
- high/low/band pass filters (can be mixed)
- 2 cascadable ring modulators
- synchronisation of two oscillators
- 2 8-bit A/D converters

Links: SID Homepage

Pinout

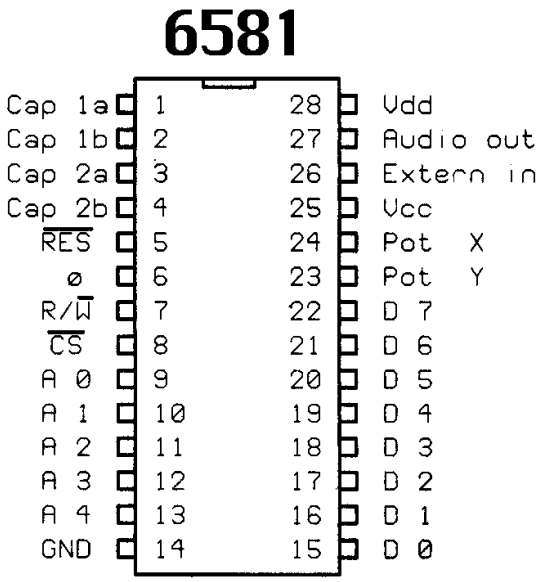

Fig.: SID, old version

Signal Description

(Click here for ASCII version)

Pin(s)	Signal	Dir	Description

1-2	CAP 1A/B	?	**Cap**acitor #1 for the programmable filters. 6581: 470pF, 8580: 22nF*. Note that both capacitors (see pin 3-4) should have the same value. [1] recommends 2200pF for normal operation, which was AFAIK never used in the C64.
3-4	CAP 2A/B	?	**Cap**acitor #2 for the programmable filters. See pin 1-2.
5	/RES	in	**RES**et. If this line remains LOW for at least 10 ø2 cycles, all internal registers reset to zero and the audio output is turned off.
6	ø2	in	Phi2**. System clock cycle. All data bus action takes place only when ø2=1.
7	R/-W	in	**R**ead/**W**rite. 0=write access, 1=read access.
8	/CS	in	**C**hip **s**elect.0=data bus valid, 1=data bus high impedance state (tri-state).
9-13	A0-A4	in	**A**ddress bits 0-4 for selecting one of the 29 registers.
14	GND	-	**G**rou**ND** (0V). To reduce noise, this line should be connected separately to the power supply.
15-22	D0-D7	in / out	**D**ata bits 0-7.
23	POT Y	in	**POT**entiometer Y. Analog input #2 for paddles. (ADC#2)
24	POT X	in	**POT**entiometer X. Analog input #1 for paddles. (ADC#1)
25	V_{cc}	-	Supply voltage. +5V.
26	EXTERN IN	in	**Extern**al **In**put. Max. input 0.6V.
27	AUDIO OUT	out	Audio output of all voices.
28	V_{dd}	-	Secondary voltage. +12V (6581) or +9V (6582, 8580).

* You might find 330pF in some boards, too.
** The 'ø' is used as Greek 'phi' here.

Technical info

The SID **6581** was first used in the Commodore 64. It is a synthesizer with many synthesis controls and filters; additionally, it has two builtin A/D converters (used for the paddles and analog mice in the C-64). It needs both 5V (Vcc) and 12V (Vdd) supply voltage, the latter generated from the 9VAC delivered by the power supply by using a rectifier bridge with a 12V voltage regulator after it.
With the new boards (C64G and late flat case-C64s), Commodore introduced a new

version of the VIC and the SID. The new SID **8580** only needs 5V (V_{cc}) and 9V (V_{dd}) for operation.

The sound of the two SID versions differs, partly due to different filter capacitors, partly due to the greater number of possible waveform combinations with the new SID. Alas, the filters in the new SID have less effect than the ones in the old SID.

The 8580's digital sound output is quite soft, but you can easily increase the digital volume to make it sound like the old 6581.

Programming info

In the Commodore 64, the SID is mapped to `$d400-d7ff`. For more programming information, you should refer to Mr. SID's Technical SID documentation.

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[1] C64 Programmer's Reference Guide (excerpt)

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