H-DAC v1.0A

Digital inputs

Optional. Adds 48kHz/16bit USB input. For high resolution USB, connect external USB-125 converter to P10.

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H-DAC v1.0A
Power Supply

+5VD and +3.3D are digital supplies.

VCC and VEE are used for opamps. +5VA is for DAC analog supply.

DC-supply:
Connect rectified and filtered supplies to V4+, V4-, GND, and
V5 and GND.
V4 supplies must be at least ±13.5 V at all times and V5
at least 6.5 V.
Do not populate P13, F1, R16, P17, D2, D3, C18, and C19. Also do not
populate R25 if you have separate
supplies for V4+ and V5
(recommended).
Populate C22, C23, C27, and C28.
Connect AC-supply to P13. The
circuit must be high enough so
that rectified DC voltage never
drops below ±13.5 V.
Populate P13, F1, R16, R17, D2, D3, C18, C19, C20, C21, C27, and C28.
Also populate R25.
Do not populate P12, D1, D12, and
D13.
C22, C23, C29, C30, R20, and R21
are not needed.
Note: AC-supply functionality is not tested yet.

US, US, and U4 should be attached
to heatsink or chassis.
C35, C36, and C37 should have
ESR between 0.1 and 1 ohms.
Pinheaders P14, P15, P16, P18, P19,
and P22 are for test purposes and
and can be omitted. External supplies
and can be connected to these instead
of on-board regulators (in this case
break ferrite links).
There is a bug in the reset circuit.

The idea of the reset circuit is to disable DAC when no input is selected. This is because if CS0/1/2 becomes unselected while playing signal, it will hold the last sample. This can lead to high DC-level at the output. However, the reset circuit does not work with USB/125.

Briefly:
- Use reset circuit as drawn if USB/125 is not used.
- If CS0/1 and Opt1 are not used (meaning using CS2, Opt2 and USB/125), perform the mod shown with blue dotted line. In that case reset circuit works.
- Otherwise reset circuit cannot be used.

See nhthrila.com for more information.

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Analog stage

Current-to-voltage conversion with 1-pole low-pass filter.

All opamp stages together form a transimpedance amplifier with 3rd order Butterworth low-pass filter at 86 Hz and 2 Vrms output level. (with the shown component values)

If component values are changed, the whole filter chain must be considered.

Either 1-pole or 2-pole (multiple-feedback) low-pass filter can be implemented with the shown component placeholders.

Headers for addon boards. If no addon is used, do not populate.

With 360 kΩ resistor, output voltage is 1Vpp at 200 Hz with DC.

Input offset is 1.5 mV, and the differential gain is 300 V/V.

Differential amplifier has a gain of 1.03 at its output voltage of 2.0 Vrms.

Ven P2 and V4 are isolated on separate planes and are not connected to GND plane.