NON-OVERSAMPLING DIGITAL TO ANALOG CONVERTER

ASSEMBLY INSTRUCTIONS

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FEATURES

- ONE DIGITAL INPUT S/PDIF, AES3
- DIGITAL TRANSFORMER INPUT
- RCA, BNC or XLR input connector
- 16 BIT DEFINITION WITH 16 to 24 BIT input
- 32K TO 192KHz
- NO OVERSAMPLING no digital filter
- OPTIONAL INTERNAL CLOCK synchronous or asynchronous to minimize jitter
- INCLUDE CS8416 DIR RECEIVER with digital de-emphasis
- LOW NOISE REGULATORS LT1763, LT3080
- BOARD SIZE : 198mm X 156mm

DESCRIPTION

The JUNDAC FIVE is a 16bit non-oversampling digital to analog converter. The board incorporates one S/PDIF, AES3 (AES/EBU) digital input and an optional external clock for very low jitter operation.

High speed ICs are of the 74LV family with symmetrical output impedance and balanced propagation delay. To minimize reflection, all digital lines are loaded and PCB is 75ohm compliant. To minimize noise in power supply, critical capacitors are Wima[©] FKP2 polypropylene film and foil. Analog section uses SCR[©] polypropylene capacitors and Elna[©] Silmic II electrolytic capacitor.

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SPECIFICATIONS

PARAMETER	CONDITIONS	MIN	ТҮР	MAX	UNITS
Input sensitivity	RX1	0.15	0.5	5	Vp-р
			_		
	EXT CLOCK		5		Vp-р
Load input ⁽¹⁾	S/PDIF – BNC (RXn)	50	75		Ohm
	S/PDIF – RCA (RXn)		75		Ohm
	AES3 – XLR (RXn)		110		Ohm
	EXT CLOCK – BNC		75		Ohm
Input signal	Resolution	16		24	Bit
	Sample frequency	30		200	KHz
	Number of channels		2		
	Audio format		PCM		
Additional clock	Synchronous mode ⁽²⁾	2.048		147.4	MHz
for low jitter operation		64xfs	128xfs	768xfs	
	Asynchronous mode	12.28	50	150	MHz
		64xts			
Power supply	Digital section		9		V~
requirements		150		260	mA
	44.1kHz		190		mA
	96kHz		220		mA
	192kHz		240		mA
	Analog castion and DAC		24		\ <i>\</i> ~
			24 110		v mA
Analog output	Truu		2110		MA V
	unbalanceu		Ζ		v _{RMS}
Led indicator					
	Power ON				
Ext clock	External clock detected				
Error	PLL unlock				

⁽¹⁾ Load input can be adjusted at any value. However, 75 ohm is recommended since PCB have 75 ohm impedance.

⁽²⁾ In synchronous mode, a single clock is used to slave source (CD or sound card...) and DAC. Working with synchronous clock is the better way to reduce jitter and reach best audio rendering.

BOARD OVERVIEW



MOUNTING AN INPUT CONNECTOR

You can put input connectors directly onto the PCB or on the chassis box linked by wire. You can use RCA, BNC or XLR. S/PDIF input transformer DA101C allows complete isolation from ground. The ground pin of the connector can be isolated from chassis, or directly linked to chassis. See figure 3 & 4 for wiring hot and cold pin.



ANALOG OUTPUT CONNECTOR

The Jundac Five integrates a stereo analog outputs (LEFT and RIGHT). The ground is the top pin, see figure 6. Isolation of the RCA chassis is **not** recommended.



Figure 6

LED INDICATORS AND SWITCHES

The PCB integrates three LED indicators. Each LED are current limited by resistors. There is no risk of short circuit.

ON - yellow LED, is on when power is on.

EXT CLOCK - blue LED, is on when a signal is present on EXT CLOCK input.

ERROR - red LED, is on when CS8416 is unlocked.





Wire number	Function		
1	ON		
2	GND		
3	EXT CLOCK		
4	GND		
5	ERROR		
6	GND		
7	NC		
8	GND		

CONNECTING TRANSFORMERS

The Jundac Five uses two independents transformers for digital section, DAC stage and analog stage. We recommend using toroidal transformers with the following values:

- 1 x 9V, 10VA for digital section,
- 2 x 24V, 200VA to 300VA for analog stage and DAC.

Working with only 50VA for analog stage and DAC results in cramped sound.



Figure 12 – connecting transformers

EARTH

To reach best performance it is recommended to connect chassis and PCB to safety Earth. A special point *Green Earth* is dedicated to connect a (second) strong cable to safety Earth or to virtual ground. Connecting this crucial point cleans residuals low frequencies coming from transformers and dramatically improves sonic performances.

> Green Earth pin 10.00u 00V DC - 10 100V DC -

For more information about Earth see: www.junilabs.com

CHASSIS ENCLOSURE

Managing vibration is very important for audio devices. Chassis box must be assembled with great attention . A simplistic chassis box or no chassis at all will ruin audio qualities. Good managing is the only way to achieve the full music sonic attributes. An ideal box enclosure integrates rigid chassis box and internal damping with various materials.

You can find more information on managing vibration: http://tech.juaneda.com/en/articles/managingvibration.html

DIGITAL INPUT CABLE

If any 75 ohm cable is able to reproduce sound, only high quality cable allow to reach full music potential. Taking care about this component is not a waste of time or money.



TEST POINTS

The Jundac Five integrates many test points to evaluate if it works within normal conditions.





Without input signal, CS8416 generates signal clock. Put an oscilloscope or frequency meter on the following test point.

- OSCLK 175.4KHz 5.70μs
- OLRCK 2.74KHz 365µs
- RMCK 701.2KHz 1.425μs
- MCK 701.2KHz 1.425μs



VREF ADJUST

After changing TDA1545A, you need to adjust reference tension to keep 2V RMS normalized output voltage. There is a big disparity between different TDA1545A, VREF must be adjusted to match with specifications.

To adjust VREF you need a file or CD test able to generate a Odb audio signal. Put an oscilloscope on analog output. Adjust R303 to obtain 2V RMS at analog output. Avoid clipping like shown in figure 13.



Figure 13 – clipping when adjusting VREF

WORKING WITH ADDITIONAL CLOCK

For very low jitter operation, you can use an additional clock. Without additional clock, the CS8416 is used as master clock. With additional clock, digital signal is reclocked before TDA1545A. This additional clock can be synchronous or asynchronous. This clock must be at least 64 x fs. Where fs is the sampling frequency.

Synchronous clock

In synchronous mode, a unique clock is used to salve source (CD or sound card) and DAC. The clock is a multiple of the sampling frequency ($n \ge 5$). Where $n \ge 64$ to any value. Max clock speed must not exceed 150MHz. Synchronous reclocking allow best audio performance.

Asynchronous clock

In asynchronous mode, different clocks are used to master source (CD or sound card) and DAC. The DAC clock is not a multiple of the sampling frequency. The clock frequency value must be between 64 x fs and 150MHz.

Clock detect

Reclocking stage auto switch to external clock when signal is detected on EXT CLOCK input.