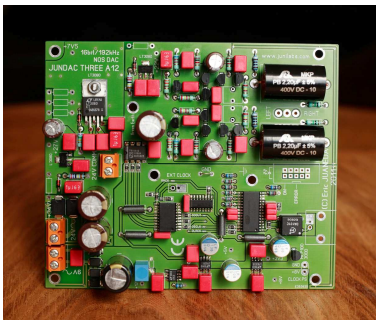
NON-OVERSAMPLING DIGITAL TO ANALOG CONVERTER

ASSEMBLY INSTRUCTIONS



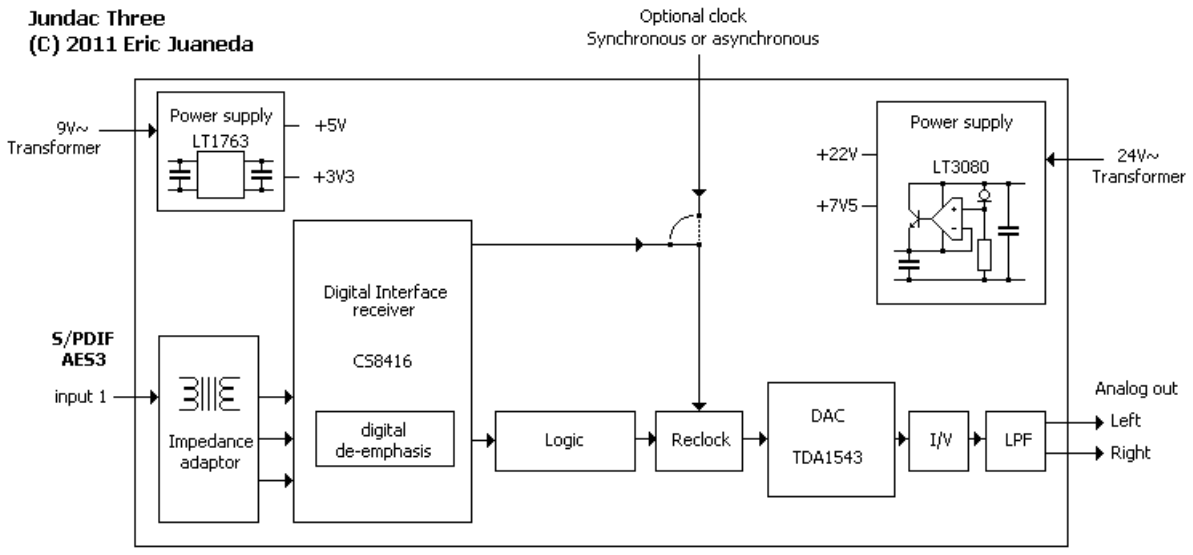
FEATURES

- **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 : 109mm X 130mm**

DESCRIPTION

The JUNDAC THREE 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.



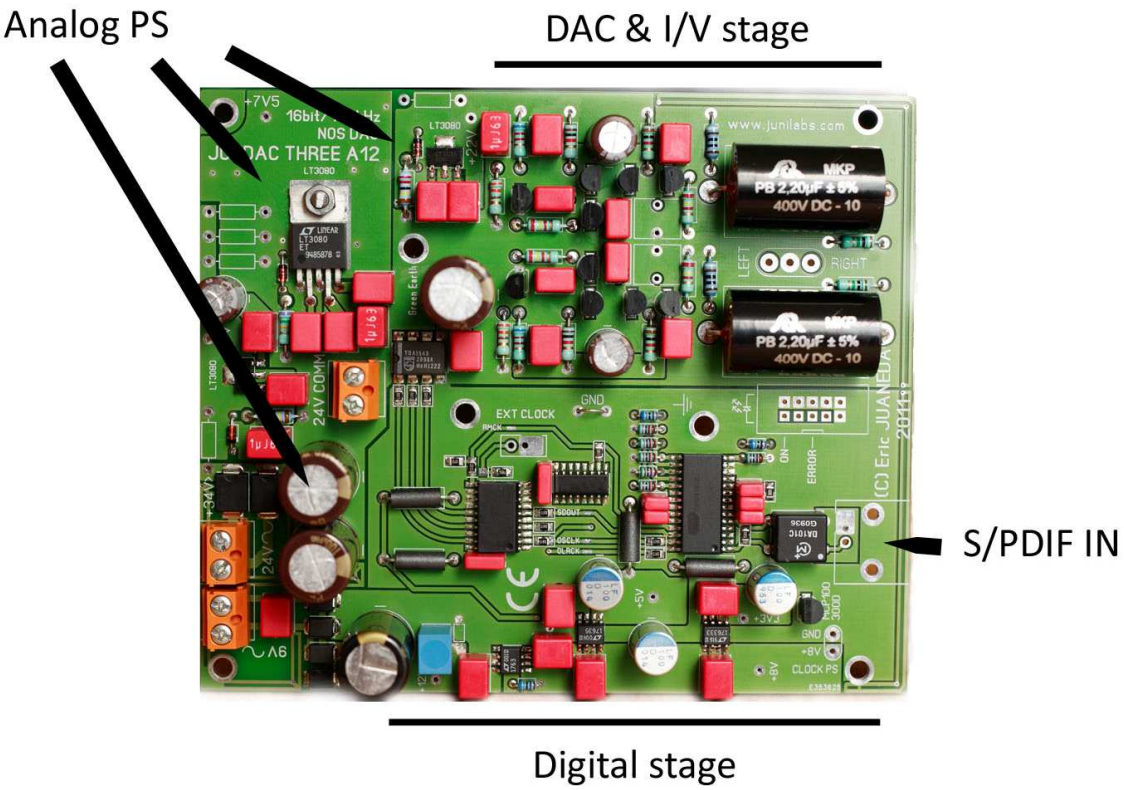
SPECIFICATIONS

PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Input sensitivity	RX1	0.15	0.5	5	Vp-p
	EXT CLOCK		5		Vp-p
Load input [1]	S/PDIF – BNC (RXn)	50	75		Ohm
	S/PDIF – RCA (RXn)		75		Ohm
	AES3 – XLR (RXn)		110		Ohm
	EXT CLOCK		75		Ohm
Input signal	Resolution	16		24	Bit
	Sample frequency	30		200	KHz
	Number of channels		2		
	Audio format		PCM		
Additional clock for low jitter operation	Synchronous mode[2]	2.048 64xfs	 128xfs	147.4 768xfs	MHz
	Asynchronous mode	12.28 64xfs	50	150	MHz
Power supply requirements	Digital section	150	9	200	V~ mA
	44.1kHz		159		mA
	96kHz		172		mA
	192kHz		193		mA
	Analog section and DAC		24		V~
	+Vdd		139		mA
Analog output	unbalanced		2		V_{RMS}
Led indicator					
ON	Power ON				
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. 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.

Wiring RCA or BNC

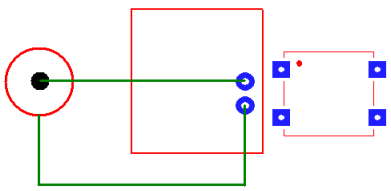


Figure 3

Wiring XLR

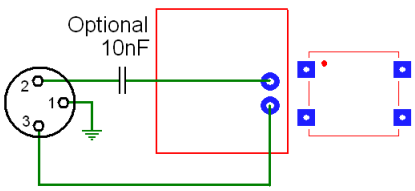


Figure 4

ANALOG OUTPUT CONNECTOR

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

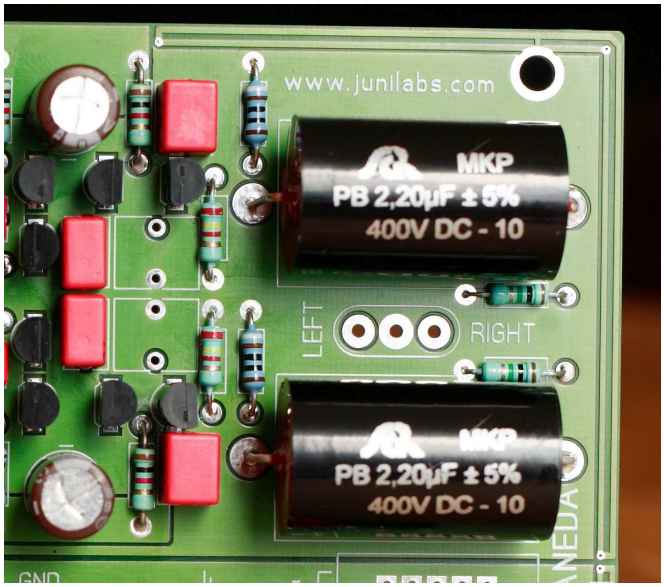


Figure 6

LED INDICATORS AND SWITCHES

The PCB integrates two 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.

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

LED connector wiring

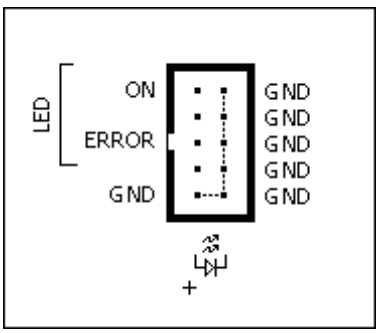


Figure 7

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

CONNECTING TRANSFORMERS

The Jundac Three 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.

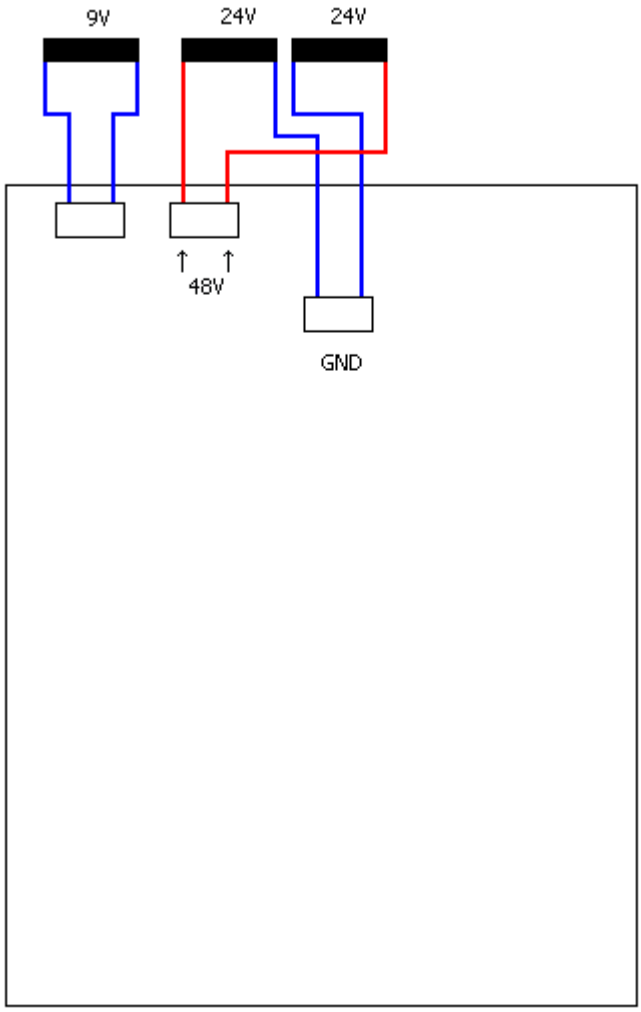
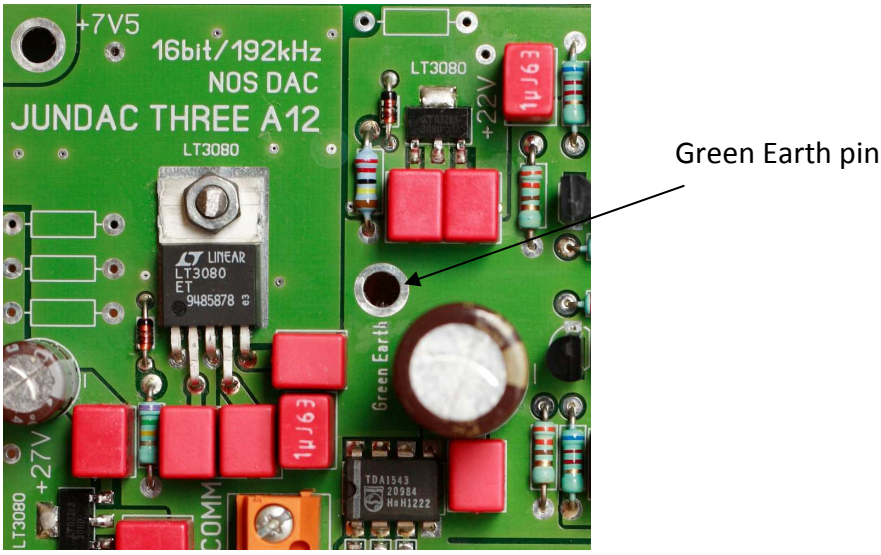


Figure 12 – connecting transformers

EARTH

To reach best performance it is recommended to connect chassis 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.

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.

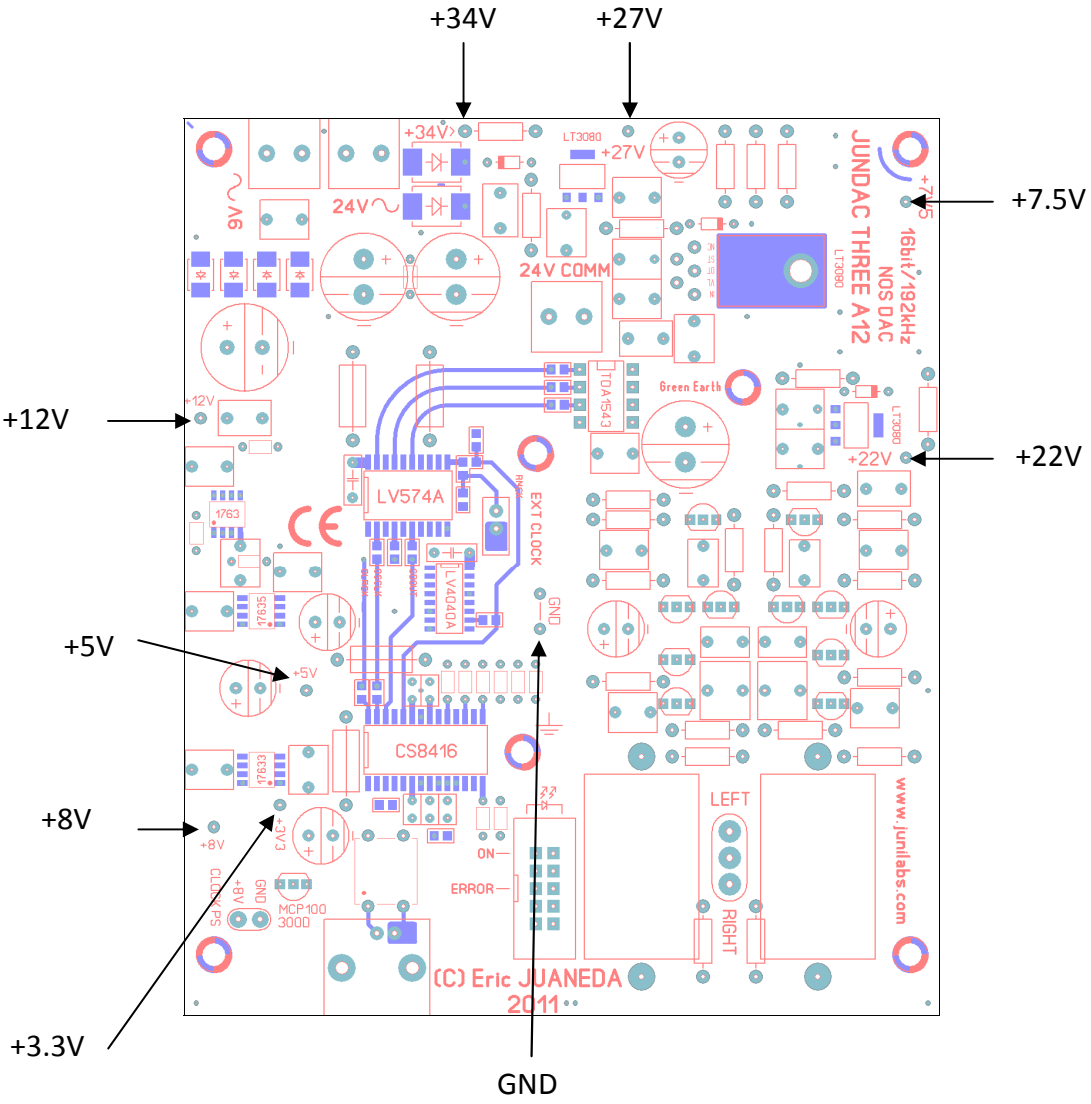
You can find more information on managing vibration:
http://tech.juaneda.com/en/articles/managingvibration.html

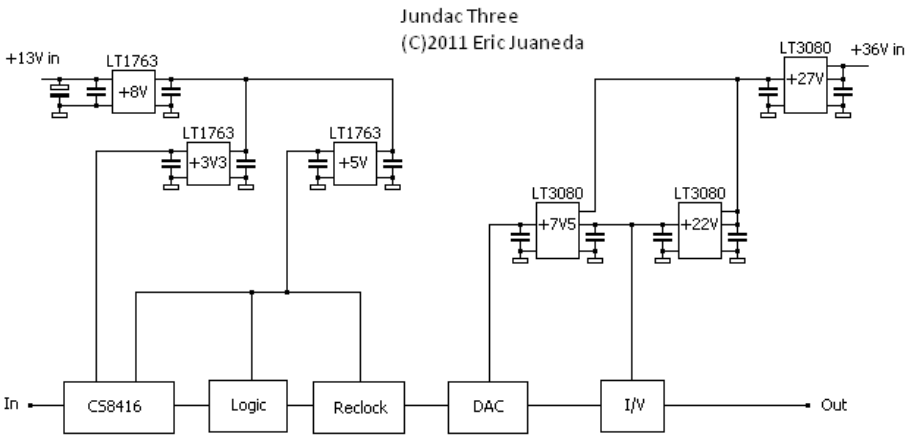
DIGITAL INPUT CABLE

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

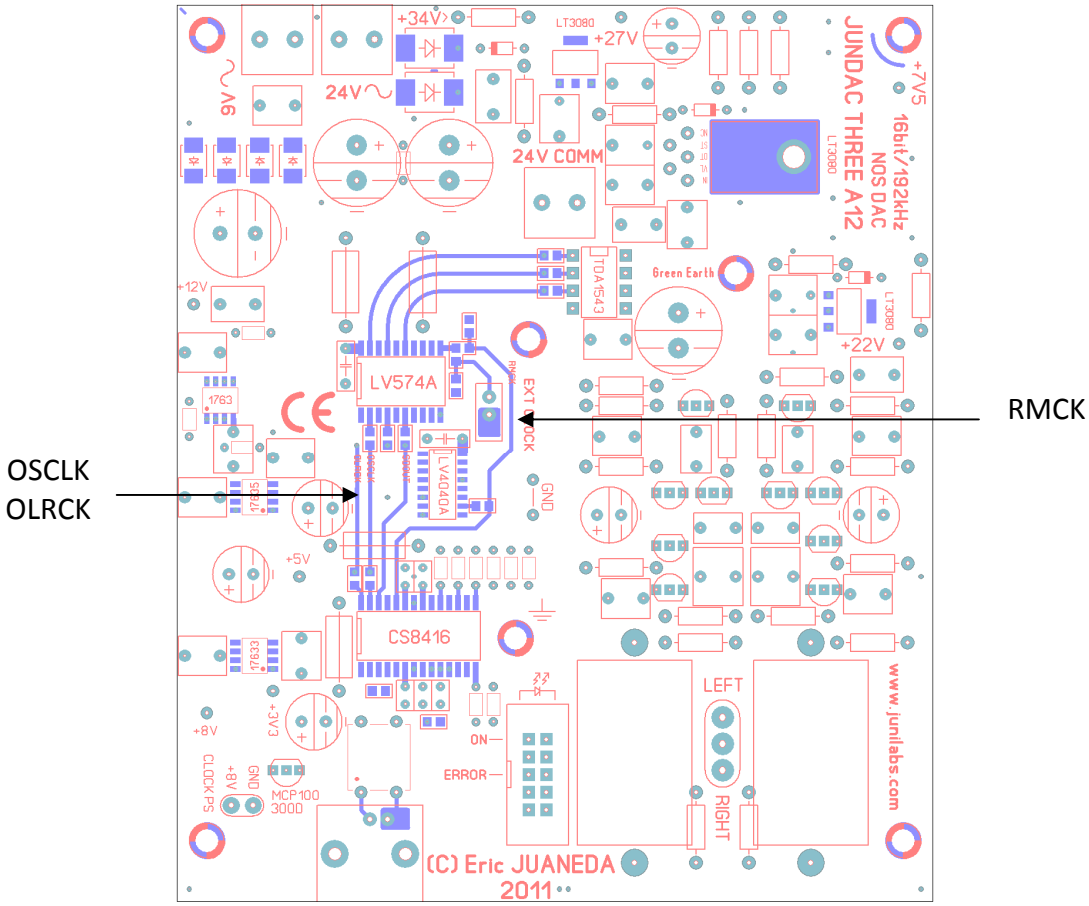
The Jundac Three integrates many test points to evaluate if it works within normal conditions.





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

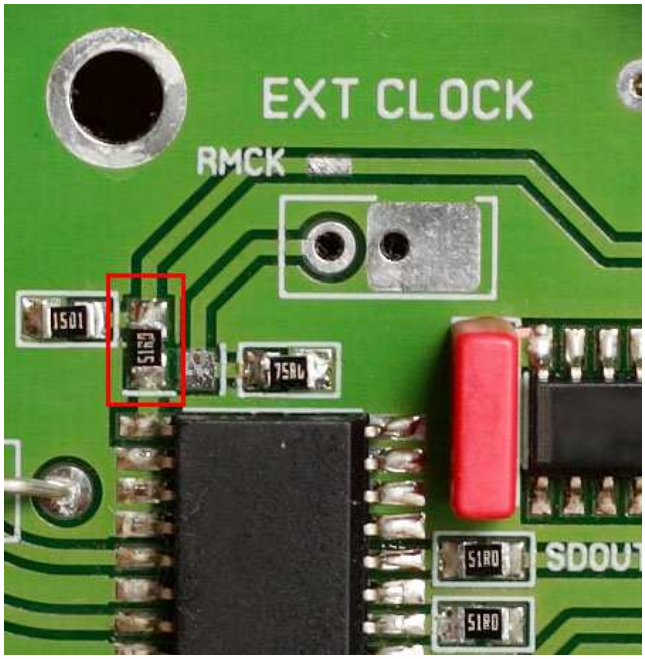


WORKING WITH ADDITIONAL CLOCK

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 TDA1543. This additional clock can be synchronous or asynchronous. This clock must be as least 64 x fs. Where fs is the sampling frequency.

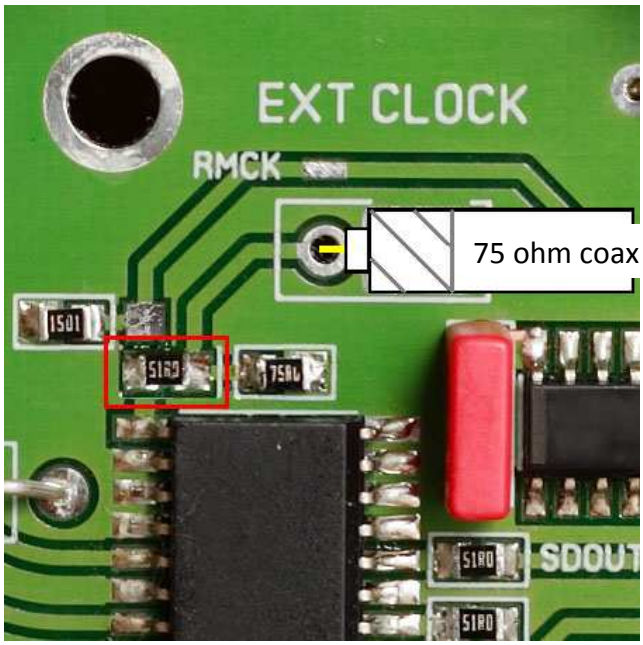
Synchronous clock

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*** x fs). Where ***n*** is 64 to any value. Max clock speed must not exceed 150MHz. Synchronous reclocking allow best audio performance.



Without external clock, 51 ohm resistor is in this position.

In this case, RMCK coming from CS8416 is used as master clock.



With external clock, 51 ohm resistor is in this position. A 75 ohm coaxial cable brings master clock signal. In this case, data are reclocked by master clock before feeding the TDA1543.

EXT CLOCK wait for 5V TTL signal. The **EXT CLOCK** input is loaded by a 75 ohm resistor.