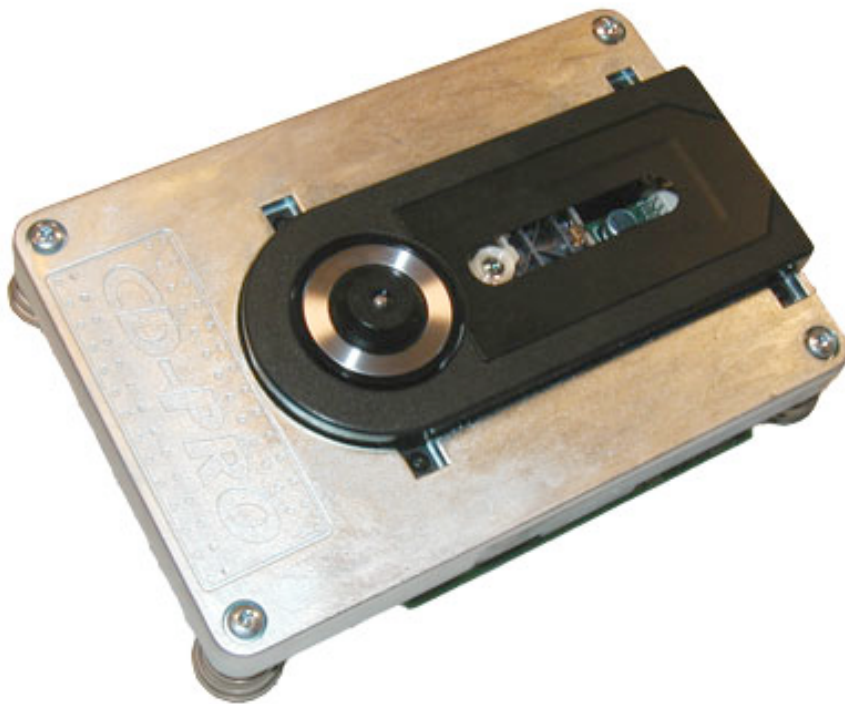DRAFT
Tentlabs Application Note AN.06
Philips CDpro and related Tentlabs modules

Introduction

This Note applies to the Philips Cdpro2M-LF CD drive. It shows how to connect the Cdpro to the following peripheral Tentlabs modules:

- Power supplies (+5V / +9V)
- Display & Controller section
- XO3.2 low jitter clock module
- External I2S high performance DAC & IV converter

An FAQ is added to help trouble shooting, and the specifications are listed for reference.

Purpose

The Philips Cdpro drive enables you to build your own CD transport (SPDIF) or CD player. In this note the following Configurations are discussed:

1. CD transport with CDpro
2. CD transport with CDpro and Tentlabs low jitter clock
3. CD player with CDpro with Tentlabs I2S DAC and IV converter

Electrical safety

Within electronic equipment, during building and surely when finished, AC mains voltages and high DC voltages exist. Care should be taken as long as the cabinet is not closed and the equipment has been connected to the mains. The user remains responsible for his own and others' safety and damage of the equipment. Following the instructions however will avoid hazard and electrical shock.

Liability

Tentlabs accepts no liability at all from any potential damage or injury that may occur when assembling, connecting or using the negative bias supply or any of its sub parts and assemblies.

Warrantee

The warrantee on the Tentlabs module is 5 years, assumed they are applied and used according the instructions in this Application Note. The warrantee on the CDpro drive is restricted by our supplier. They require specific conditions where the CDpro is applied, conditions that are not secured by regular DIY customers. However, all CDpro drives are tested again at our lab prior to shipment.

Introduction

The CD-pro2LF (VAU1254/31LF) is undeniably the reference for high-end audio applications. This high-performance CD-engine, which is designed to deliver an extremely good playability and a very low mechanical playing noise, is used by all the most prestigious audio manufacturers in the high-end market. The CD-Pro2LF (LF stands for "Lead Free") is the latest version of this high-end module and is RoHS compliant. Indeed, several versions of this module have been supplied since 1994: before the CD-Pro2LF, the CD-Pro2M itself was an improved version of the CD-Pro2 module, which had been widely, used in the high-end audio industry, like its predecessor, the CD-Pro module. Thanks to its international success and an increasing demand from our customers, we can guarantee that the CD-Pro2LF is going to be supplied for a very long time.

Compared to the CD-Pro module, the CD-Pro2M had indeed brought many improvements, like the capability to read CD-RW discs. Its playability had also been improved thanks to the recent CD10 servo-decoder and a new active filter switching for start-up and play. In these matters, the CD-Pro2LF shows the same performances as the CD-Pro2M module. Besides, its firmware has been specifically updated to allow playback of most of the current copy-protected discs.

The CD-Pro2LF module remains fully compatible with its predecessors, and it can directly replace the CD-Pro, CD-Pro2 or CD-Pro2M in your existing application. Indeed, it has the same dimensions and fixation points, as well as the same electrical connections as these modules. Last but not least, all these modules are based on the same standard DSA protocol for external communication, which means they are also software compatible.

Required modules & wiring

All the modules discussed in this Note can be obtained through:

http://www.Tentlabsshop.com

General Notes

This Application Note describes how to set up systems using Tentlabs modules. To build your transport or CD player, follow the instructions in this application note. When using the recommended Tentlabs modules, a reliable and proven product will be the result.

Enthousiastic hobbyists may want to fully build their own surrounding electronics, rather than using Tentlabs modules. 2 important documents are available on the Tentlabs website:

- CDpro User manual
- CDpro 2M datasheet

Important notes

The 2 most important notes for the CDpro are:

- Always switch off the 9V supply first, otherwise the actuator becomes damaged

- Contrary to the information in the Philips documents: All ground connections on the Cdpro are interconnected on the PCB

- Never run the CDpro without a clock

- Always respect the ESD instructions as explained in Cdpro 2M datasheet document.

Mechanical installation

The dimensions are shown below. The module can be mounted using the supplied springs. It is also possible to mount the module directly on a heavy support. Make sure suffiecient space is available around the module, to facilitate the wring

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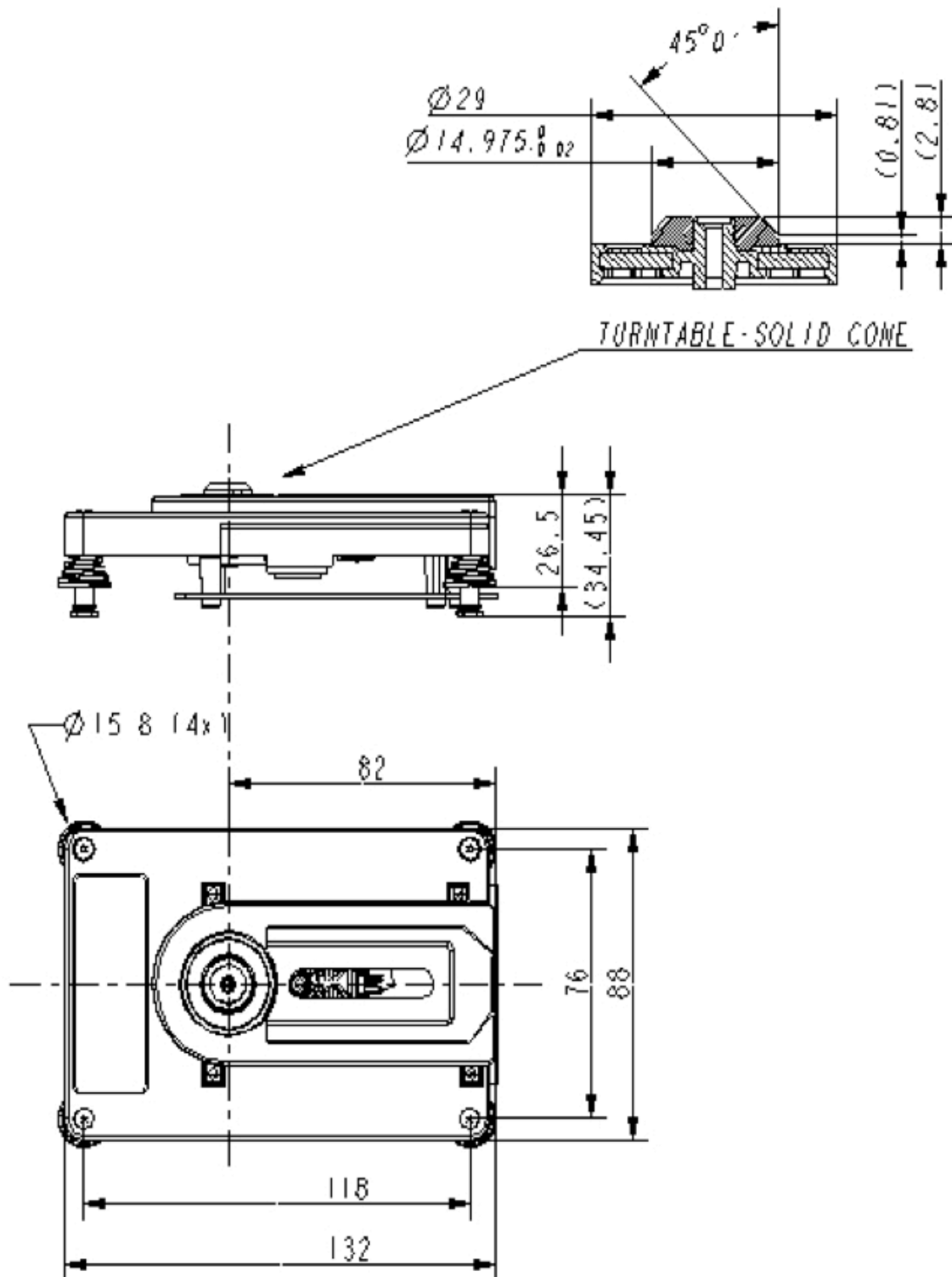
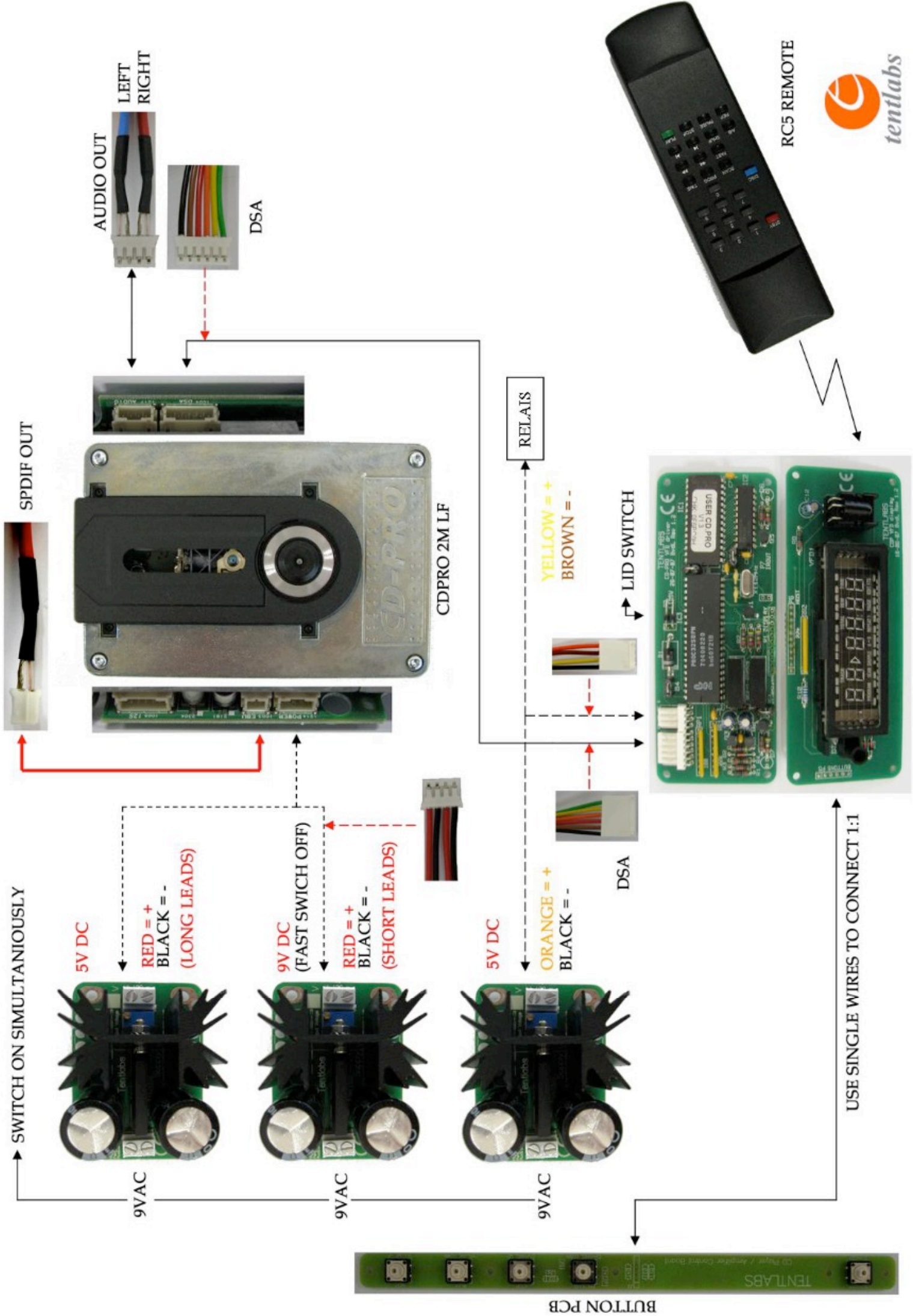## 1.   Building a CD transport

The following modules are required to build a CD transport with industrial quality:

- Philips Cdpro-2LF
- Tentlabs 5V heater supply (2 off)
- Tentlabs 9V heater supply "fast switch off" option
- Tentlabs Display & Controller
- Tentlabs CD button PCB and / or RC5 remote control
- Mains transformer 2*9V / 15VA

The following wiring is required

- Stand-by + supply to display pcb
- Power to CDPro
- DSA interface CdPro Display
- SPDIF output wire (red coax)
- Thin single wires

The circuit diagram on the next page shows the required interconnects. Eventually one may use the analogue outputs from the CDpro but these may lead to disappointing results, when compared with the Tentlabs I2S DAC / IV converter solution.

AUDIO OUT

LEFT
RIGHT

DSA

RC5 REMOTE

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SPDIF OUT

RELAIS

YELLOW = +
BROWN = -

LID SWITCH

CDPRO 2M LF

USER CD.PRO

SWITCH ON SIMULTANIOUSLY

5V DC

RED = +
BLACK = -
(LONG LEADS)

9V DC
(FAST SWICH OFF)

RED = +
BLACK = -
(SHORT LEADS)

5V DC

ORANGE = +
BLACK = -

DSA

9VAC

9VAC

9VAC

USE SINGLE WIRES TO CONNECT 1:1

BUTTON PCB

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2. Building a CD transport with low jitter clock

The following modules are required to build a high-end, low jitter CD transport (Modules in red are those required on top of configuration 1):

- Philips Cdpro-2LF clock modified
- Tentlabs 5V heater supply (2 off)
- Tentlabs 9V heater supply "fast switch off" option
- Tentlabs Display & Controller
- Tentlabs CD button PCB and / or RC5 remote control
- Tentlabs XO3.2 low jitter clock
- Tentlabs XO supply
- Mains transformer 2*9V / 15VA

The following wiring is required

- Stand-by + supply to display pcb
- Power to CDPro
- DSA interface CdPro Display
- SPDIF output wire (red coax)
- Thin single wires

The circuit diagram on the next page shows the required interconnects. Eventually one may use the analogue outputs from the CDpro but these may lead to disappointing results, when compared with the Tentlabs I2S DAC / IV converter solution.

LEFT
RIGHT
AUDIO OUT

SPDIF OUT

XO SUPPLY

230V AC

XO3.2

CLK/2

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TENTLABS MODIFIED CD-PRO

CD-PRO

LID SWITCH

USER CD PRO

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5V DC
(FAST SWICH OFF)

RED = +
BLACK = -
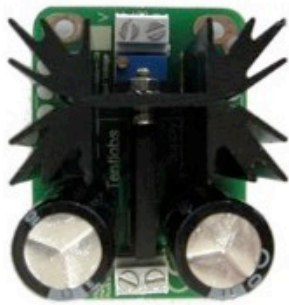(LONG LEADS)

9V DC

RED = +
BLACK = -
(SHORT LEADS)

5V DC

ORANGE = +
BLACK = -

9VAC

9VAC

9VAC

USE SINGLE WIRES TO CONNECT 1:1

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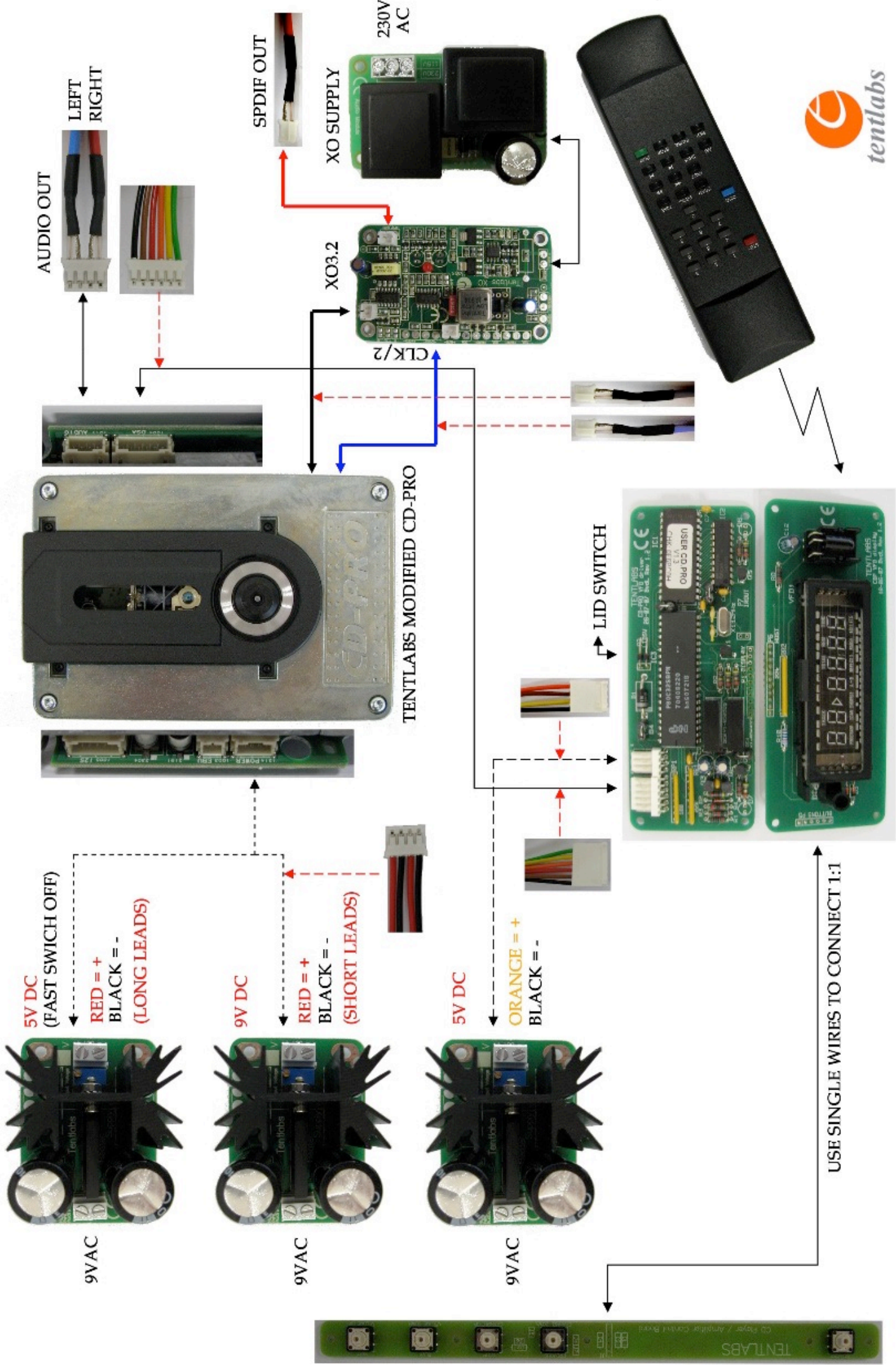
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3.   Building a high end CD integrated player

The following modules are required to build a high-end, CD player with tube output stage transport (Modules in red are those required on top of configuration 1:

- Philips Cdpro-2LF clock modified
- Tentlabs 5V heater supply (2 off)
- Tentlabs 9V heater supply "fast switch off" option
- Tentlabs Display & Controller
- Tentlabs CD button PCB and / or RC5 remote control
- Tentlabs I2S DA converter
- Tentlabs IV tubed converter
- Mains transformer 2*9V / 15VA

The following wiring is required

- Drive to DAC I2S
- Stand-by + supply to display pcb
- Power to CDPro
- DSA interface CdPro Display
- SPDIF output wire (red coax)
- Thin single wires

The circuit diagram on the next page shows the required interconnects. The page thereafter shows the interfacing with the I2S DAC and IV converter.

DSA

SPDIF to TentLabs NOS DAC
Clock from TentLabs NOS DAC

RC5 REMOTE
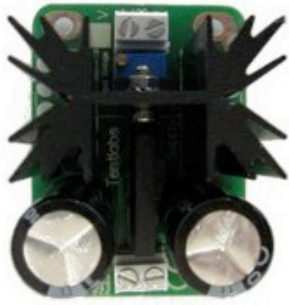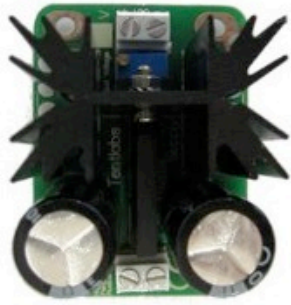
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I2S to TentLabs NOS DAC

TENTLABS MODIFIED CD-PRO 2M LF

RELAIS

YELLOW = +
BROWN = -

LID SWITCH

USER CD PRO
V13

DSA

ORANGE = +
BLACK = -

USE SINGLE WIRES TO CONNECT 1:1

SWITCH ON SIMULTANIOUSLY

5V DC

RED = +
BLACK = -
(LONG LEADS)

9V DC
(FAST SWICH OFF)

RED = +
BLACK = -
(SHORT LEADS)
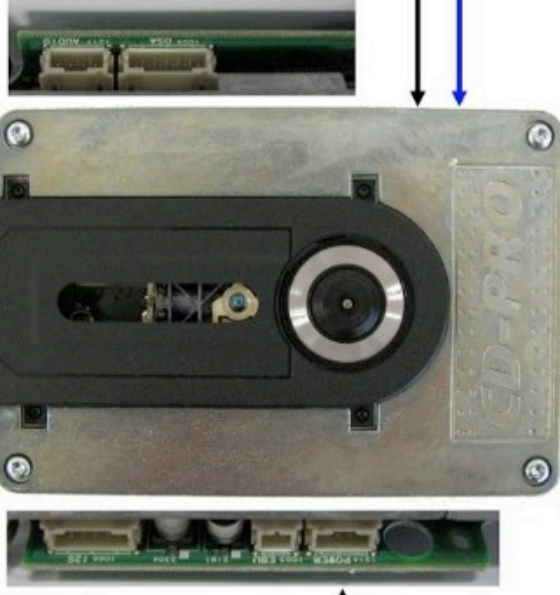
5V DC

9VAC

9VAC

9VAC
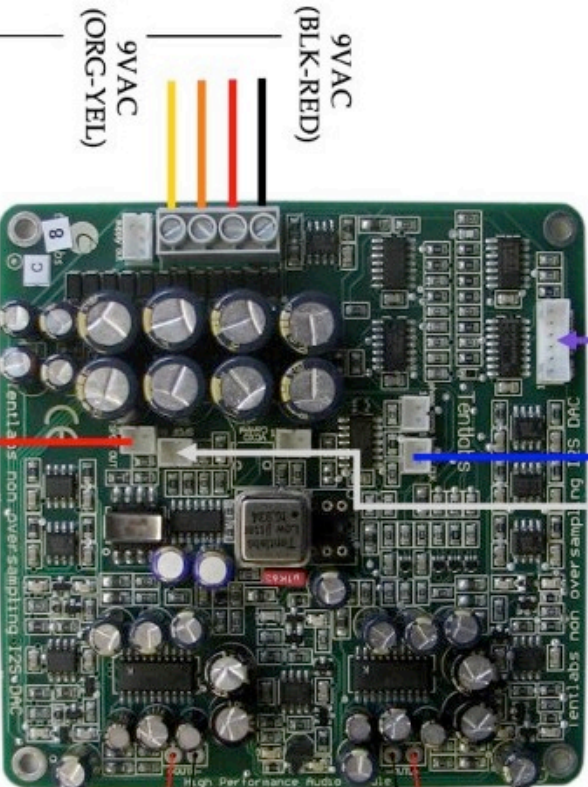
BUTTON PCB
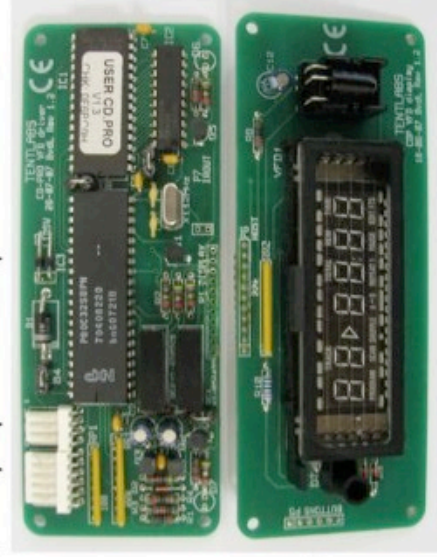
Transformer Type: TTO-16867-00

9VAC (ORG-YEL)

9VAC (BLK-RED)

I2S from CD-PRO 2M LF

Clock to CD-PRO 2M LF

SPDIF from CD-PRO 2M LF

Solder wires to corresponding pads

Right Analogue Output

Left Analogue Output

Measure on + and - of both channels and turn the potentiometer untill the measured value approches zero Volts as close as possible. (value may fluctuate slightly due to temperature drift)

Transformer Type: TTO-16841-00

6,6VAC (GREEN)

143VAC (RED/YEL/RED)

6,3VAC (BLUE)

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Testing time

Prior to powering up the CDpro, the next basic checks shall be carried out

Clock check (only applicable for configuartions 2 and 3)

- Disconnect the power connector from the CDpro
- Disconnect the clock

FAQ

Specifications Electrical

Mechanical

All specs and parameters subject to change without prior notice