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DAC30 Design Brief, 3 pages



The Primare DAC 30 is a fully balanced high performance 24bit /192kHz stereo DAC designed to render the best possible audio quality from computer-based high resolution music files. Equipped with a wide array of inputs including asynchronous USB-B, stereo balanced AES EBU and three pairs of S/PDIF coaxial and TOSLINK connectors, the DAC30 uses the processing engine of the celebrated Primare BD32 universal player to convert and convey very low distortion analogue signals to a high quality music system via a pair of balanced XLR and single-ended RCA outputs. There is also a S/PDIF digital output.

Audiophile Topology

The DAC30 is housed in an alloy heavy gauge steel chassis, which provides strength, rigidity, and screening, while being effective at damping vibrations from external sources.

Input data is fed to a superior SRC4392 sample rate converter running at 192kHz, which incorporates jitter suppression capabilities to ensure that the DAC receives as clean a signal as possible. The DAC30 uses the flagship Crystal DSD DAC CS4398 in conjunction with Primare's signature fully-balanced analogue output stage comprising Burr-Brown OPA2134 OP-Amps, WIMA and EPCOS polypropylene filter capacitors and large MELF resistors; and a single-ended output stage comprising a single MOSFET transistor fed by an active current source rather than passive resistors.

Extremely low inductance Sanyo OS-con capacitors and locally placed voltage regulators are used where required on the DAC board.

The mute circuits are entirely relay-controlled, which is an audiophile approach, unlike the bipolar transistors and MOSFET switches commonly used for muting.

Together these engineering choices result in a very high quality audio stage. Noise and THD are extremely low according to the objectives of Primare design.

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Audiophile Topology: Power supply

According to Primare's design principles, power to different parts of the DAC30 is custom-regulated for low noise and optimum performance. The PSU is entirely linear, and comprises an excellent R-core transformer with separate windings for analogue and digital power supply circuits, which are placed on different PCBs located on opposite sides of the player.

The analogue power supply has a large 74000uF capacitor bank, split between many smaller 2200 and 4700uF capacitors for lower ESR (Equivalent Series Resistance). Power is first pre-regulated by LM317/337 regulators and then fed to a super-fast, entirely discrete regulation circuit placed as close as possible to the analogue side of the DAC board.

The digital supply, designed for high current operation, has a capacitor bank of 48800uF, split between many smaller capacitors for lower ESR, and regulated by a super-fast LDO 5A regulator from Linear Technology.

24/192 USB Interface

For reliable 24/192 operation, Primare has chosen XMOS because it offers an integrated communication hub hosting the MCU. XMOS and Primare's developers in Sweden, have collaborated to optimise XMOS firmware for better performance from Primare's XMOS application.

User interface

The DAC 30 input selection, DIM, power ON/OFF can be controlled by the C23 or C33 when the 'media' button on the remote is selected.

Features

- Crystal CS 4398 24/192 Stereo DAC Advanced multi-bit Delta-Sigma architecture (BD32)
- SRC 4392 2 channel high performance asynchronous sample rate converter with a digital interface receiver
- Fully balanced analogue output stage (BD32)
- OPA 2134 High Performing Audio Operational Amplifiers.
- 3 Analogue power supplies
- 4 Digital power supplies
- 1 Standby power supply
- 4 layer print to the best possible signal to noise.
- An audiophile relay controlled MUTE circuit
- Fully Linear PLS (R-Core)
- Signal to Noise 120dB
- Outputs: 1 pair XLR and 1 pair RCA (both 4,3V)
- Inputs: 1x asynchronous USB-B, 1x AES/EBU, 3x Optical, 3x Coax S/PDIF
- XMOS 24/192 USB 2.0 and MCU (MCU only in this design).
- Input selection, DIM, ON/OFF can be operated by remote C23 or C33. (select MEDIA)
- Dimensions 430 x 370 x 95mm

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DAC30 specification

Analogue outputs	1 pair Stereo XLR and 1 pair RCA both 4,3Vrms
Digital outputs	1 x SPDIF (RCA)
Inputs	USB-B, 3 x SPDIF (RCA) 3 x optical (TOS-link), 1x AES/EBU (XLR)
D/A converter	Crystal DSD DAC CS4398
Output impedance	RCA 100Ohm; XLR 110Ohm
Power consumption	Standby 0,5W, Idle 50W, Operation 60W
Dimensions	430 x 370 x 95 mm
Weight	8.5kg
Colour options	Black or Titanium

Ends