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BD32 Design Brief, 4 pages



The Primare BD32 is a high quality true multi-format/multi-channel Blu-ray, DVD, CD, SACD, DVD-A and media player, equipped with dual HDMI 1.4 (3D) and based on the OPPO BDP-93. The media player can reproduce files (music, video, pictures) from a wired network (and Wi Fi with external USB dongle), USB or eSata, and has the ability to convert any audio format to PCM or play them in their native formats.

Most importantly, the BD32 is not just a re-boxed OPPO player. It differs significantly from the BDP-93 by having a proprietary Primare audio stage, multiple custom-engineered power supplies, a superior user interface, and added input and control functions.

Audiophile Topology: Audio

The Primare audio circuit is capable of decoding all native audio formats including DSD, Dolby True HD and DTS Master audio. It has a fully-balanced stereo (XLR) output, an unbalanced stereo RCA output, and an 8-channel unbalanced RCA (7.1 multi-channel) output.

The stereo output circuitry 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. As in the DVD-30, the SACD (DSD) circuit has its own dedicated relay-controlled-filter signal path.

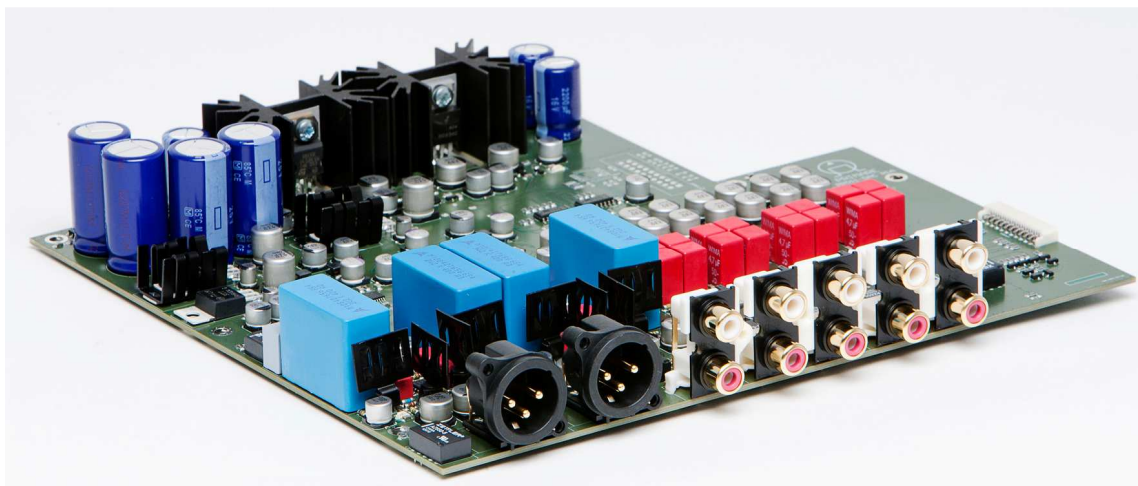
The multi-channel output stage is a scaled-down version of the stereo output stage, driven by a Crystal CS4382A multi-channel DSD DAC in conjunction with an analogue stage comprising Burr Brown OPA2134 OP-Amps, WIMA and NPO SMD capacitors and large MELF resistors.

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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.



Primare's BD32 audio board

Video Section

The video board is similar to that used by OPPO, being of very good quality. But its performance in the BD32 is optimised by replacing a switch-mode power supply with a proprietary Primare linear power circuit, custom engineered for very low video signal distortion (see power supply section).

In addition the BD32's electrical design is improved by superior grounding which keeps the noise level consistently low regardless of the connected video display.

Dual simultaneous 1080P V1.4a HDMI outputs are provided:

HDMI 1 is the primary output, run by the Marvell Qdeo Kyoto-G2 video processor for up-scaling and video adjustment functions, as well as aspect ratio conversion (stretch zoom) to 2.35:1 (with anamorphic lens). If the A/V processor in the main zone is 3D (HDMI 1.4a) compatible then audio and video may be sent via HDMI 1. If the A/V processor is not 3D compatible then HDMI 1 video output can be sent to the display while HDMI 2 carries the HD audio (including DSD, Dolby True HD and DTS Master Audio) simultaneously to the processor.

If HDMI 2 is not needed to carry audio in the main zone, it can be used to feed both 3D video and HD Audio to a compatible TV and/or surround processor to a second zone, but without the adjustment functionality of HDMI 1.

If neither zone is equipped with 3D capability, then the BD32 will deliver FullHD video and HD Audio to two zones simultaneously via its dual HDMI outputs.

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Digital audio

The BD32 has S/PDIF, TOSLINK and professional AES/EBU outputs.

Control functions

The BD32 has RS232, trigger in/out and IR in/out.

User interface

The Primare BD32 incorporates the white OLED display that has proved so popular with I32 and CD32 owners. The colour of the OLED can be changed to Primare green. As with all Primare products, the front panel's display circuitry is isolated from the sensitive audio/video signal circuits by a discrete section of the player's chassis.

Audiophile Topology: Power supply

The Primare-designed power supply for the BD32 is divided into two main parts: a switch-mode 'standby' PSU and an 'operate' PSU. As its name suggests, the standby supply is used only to power the standby circuit in standby mode. In order to minimise interference, the standby PSU is turned off when the BD32 is in 'operate' mode.

According to Primare's design principles, power to different parts of the BD32 is custom-regulated for low noise and optimum performance. The 'operate' mode 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.

As the power supplies are entirely linear, they can generate a lot of heat. In order to avoid the appearance of venting ducts, which would interrupt the clean lines of the BD32 design, we've opted to use the player's entire chassis (including top and bottom plates) as an active heat sink. The underside of the player may therefore feel hot, which is completely normal and expected.

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Software upgrades

Software upgrades for the BD32 software will be available on-line. On initial set-up, the player will automatically seek and download the latest software from the Primare website.



BD32 specification

CD performance	Freq resp -0.19dB @20K; THD+N 1K 0dBFS (22K LPF) 0.0015%; Noise A-weighted. -138dBV
SACD (DSD) performance	Freq resp -0,17dB @20K; THD+N 1K 0dBFS (22K LPF) 0.0055%; Noise A-weighted. -125dBV
Analogue outputs	1 pair Stereo XLR and 1 pair RCA both 4,3Vrms 1 multichannel 7.1 RCA input
Digital outputs	1x SPDIF (RCA); 1x AES/EBU (XLR); 1x optical (TOS-link)
Inputs	USB, LAN, e-Sata, IR in/out 3.5mm; RS232; Trigger in/out 3.5mm
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 375 x 106 mm
Weight	8.5kg
Colour options	Black or Titanium

Ends