

October 2014

DESIGN BRIEF, 6 pages



## BD32 MKII UNIVERSAL PLAYER



### Introduction

The award-winning Primare BD32 received world-wide acclaim by establishing elevated standards of high resolution audio and video replay. The new BD32 MKII builds on this excellent platform with reduced noise through further improved circuit design featuring a larger and better isolated power supply, and by bringing video capabilities up-to-date with 4K upscaling and Netflix support (Netflix account required).

The BD32 MKII is a high quality true multi-format/multi-channel Blu-ray, DVD, CD, SACD, DVD-A and media player, equipped with dual HDMI 1.4a outputs. The media player can reproduce files (music, video, pictures) from disc, USB and DLNA compatible sources via a wired network (and Wi Fi with external USB dongle), and has the ability to convert any audio format to PCM or play them in their native formats, including DSD.

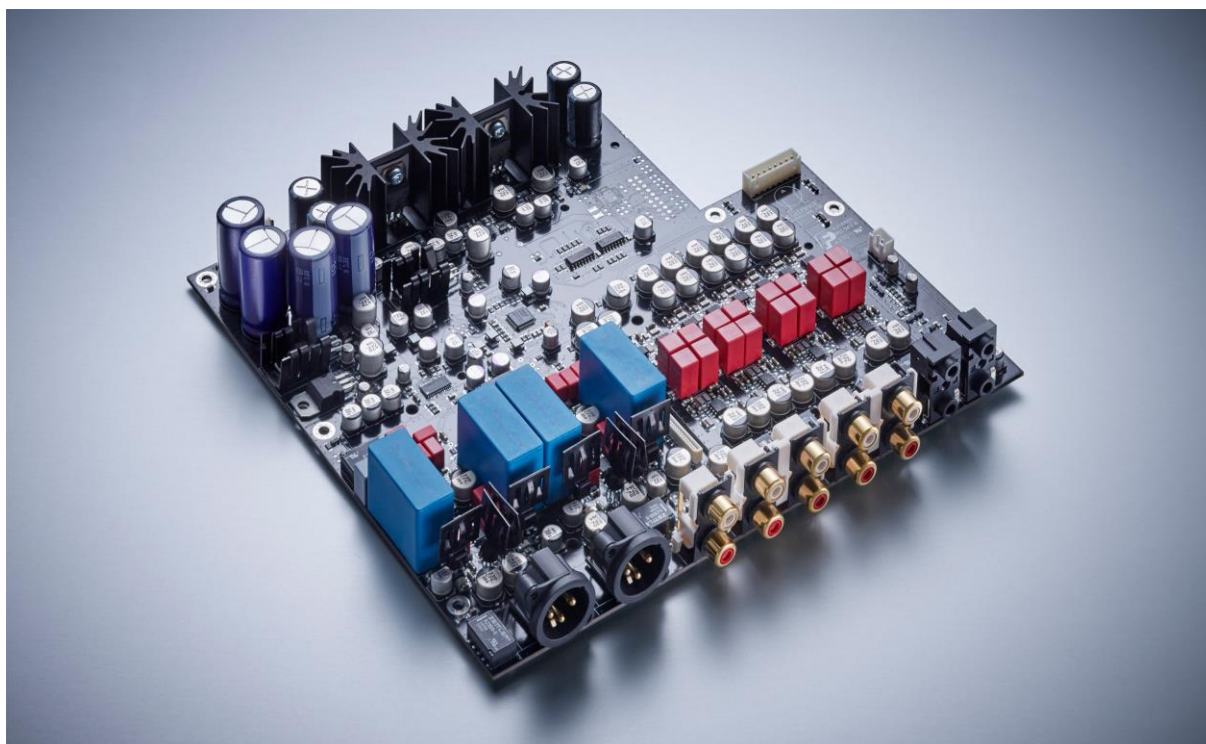
It is equipped with a proprietary Primare audio stage, multiple custom-engineered power supplies, a superior user interface, and comprehensive input and control functions.

### 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.

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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 BD32, 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.

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 – Video**

The BD32 MKII adds 4K (3840 x 2160) up-scaling capabilities to all video sources, transforming picture definition with four times the resolution of Full HD 1080p.

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.

### **Audiophile topology – Power Supply**

In the BD32 MKII Primare has further isolated the power supplies for transport, video board and display from the sensitive audio section by using individual power supplies for each of these sections.

We use a separate master switch mode power supply for the mech/video/display section and a very quiet C-core transformer for the audio section, similar to that deployed by our reference PRE60 preamplifier.

The BD32 MKII's analogue power supply utilises an expanded 82000uF capacitor bank (larger than its predecessor), 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.

### **DSD File Support**

BD32 MKII is capable of playing DSD files via USB hard drives, USB thumb drives, and SMB. The file will need to use either the DFF or DSF file extension, and the supported sampling rate is 2.8224 MHz (DSD64). Both stereo and multi-channel files are supported.

To play DSD files in DFF or DSF format, simply copy the files to a USB hard drive or thumb drive, plug in the drive to one of the USB ports on the BD32MKII player, and browse for the file from the "Music" entry on the player's Home Menu. DSD files shared via SMB can be accessed from the "Network" entry on the player's Home Menu.

**File Formats supported**

Format Name	File Extension	Audio Codec	Audio bitrate limit	Disc playback?	USB playback?	DLNA playback?
<b>AAC</b>	.aac		32 - 320 Kbps No support for AAC LC-SBR	Yes	Yes	Yes
<b>AC3</b>						
<b>AIFF</b>	.aiff, .aif, .aifc		Channels: 2 Sample rates (kHz): 44.1 - 192; Bit depth: 8, 16, 24	Yes	Yes	Yes
<b>ALAC</b>	.m4a		Channels: 2 Sample rates (kHz): 44.1 - 192; Bit depth: 16, 24	Yes	Yes	Yes
<b>APE</b>	.ape	Version: MAC_SDK_406 Compression level: Fast, Normal, High, ext. High	Channels: 2 Sample rates (kHz): 8 - 96 (48 for ext.High) Bit rates (Kbps): 800 - 1000	Yes	Yes	Yes
<b>DSD</b>	.dff, .dsf		Channels: up to 6 Sample rate (MHz): 2.8224 (DSD64)	Yes	Yes	Yes
<b>FLAC</b>	.flac		Channels: up to 6 Sample rates (kHz): 8 - 192	Yes	Yes	Yes

<b>M4A</b>	.m4a	AAC	32 - 320 Kbps	Yes	Yes	Yes
<b>MKA</b>	.mka	AAC, AC3, DTS, MP2, MP3, PCM, WMA		Yes	Yes	Yes
<b>MP3</b>	.mp1, .mp2, .mp3	MP1, MP2, MP3 Support MP3 ID3 info.	8 - 320 Kbps	Yes	Yes	Yes
<b>OGG</b>	.ogg		Channels: 2  Sample rates: 8 - 96 kHz  Max. block size: 4096	Yes	Yes	Yes
<b>PCM</b>	.pcm					
<b>WAV</b>	.wav	PCM, Microsoft ADPCM, IMA ADPCM	Channels: up to 8  Sample rates: 8 - 192 kHz  For ADPCM, supported bit depths are: 4, 8, 16, 20, 24	Yes	Yes	Yes
<b>WMA</b>	.wma	WMA2, WMA3 standard	32 - 192 Kbps	Yes	Yes	Yes

### User interface

The BD32 MKII 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 aluminium chassis.

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**Software upgrades**

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

**BD32 MKII specification**

<b>CD performance</b>	<b>Freq resp -0.19dB @20K; THD+N 1K 0dBFS (22K LPF) 0.0015%; Noise A-weighted. -138dBV</b>
<b>SACD (DSD) performance</b>	<b>Freq resp -0,17dB @20K; THD+N 1K 0dBFS (22K LPF) 0.0055%; Noise A-weighted. -125dBV</b>
<b>Analogue outputs</b>	<b>1 pair Stereo XLR (4,4Vrms) and 1 pair RCA (2,2Vrms)</b>
	<b>1 multichannel 7.1 RCA input</b>
<b>Digital outputs</b>	<b>1x SPDIF (RCA); 1x optical (TOS-link) 2x HDMI</b>
<b>Connections</b>	<b>HDMI input, 2 x USB-A , LAN, IR in/out 3.5mm; RS232; Trigger in/out 3.5mm</b>
<b>D/A converter</b>	<b>Crystal DSD DAC CS4398</b>
<b>Output impedance</b>	<b>RCA 100Ohm; XLR 110Ohm</b>
<b>Power consumption</b>	<b>Standby 0,5W, Idle 37W, Operation 50W</b>
<b>Dimensions</b>	<b>430 x 375 x 106 mm</b>
<b>Weight</b>	<b>10kg</b>
<b>Colour options</b>	<b>Black or Titanium</b>

**Ends October 2014**