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Design Brief - PRE32 pre-amplifier

7 pages

The PRE32 is an upgradable audiophile pre-amplifier designed to match the Primare A34.2 and all Primare power amplifiers. It features the comprehensive OLED display and control parameters established by the EISA award-winning I32 integrated amplifier. The PRE32 is housed in a heavy gauge alloy steel chassis, and incorporates two pairs (L/R) of low-noise balanced XLR inputs and 4 pairs of RCA inputs. In addition there are two pairs of RCA outputs and a single pair of balanced XLR outputs, as well as a record output, RS232, trigger, IR and RF inputs. MEDIA/streaming connections such as USB, iPod, LAN etc are available through the modular MM30 media board, which may be enhanced with a high quality aptX Bluetooth upgrade.

Audiophile Topology

All signal paths are fully balanced and as short as possible. All signal treatments (source selection, volume and channel balance trims) are performed purely in the analogue domain. Unbalanced inputs are converted to balanced signals by a conversion stage buffered by the excellent sounding Burr Brown OPA2134 op-amps and fed to volume and balance controls employing closely matched NJW1195 attenuators in a balanced configuration. Source selection is via high performance signal relays.

Balanced signal transmission means that two identical signal lines are used to carry the same signal with opposite phase. Any noise is common to both lines, is present in equal amounts and with identical phase. At the receiving end a (differential) receiver retains the opposite phase signals (music) and rejects the common phase ones (noise) leaving only the pure original signal. Balanced circuits therefore keep the signal as free as possible from interference.

The four (L/R balanced) single-ended 16dB gain stage modules are fully separated. Each has its own proprietary PCB, incorporating a custom designed copper heat sink, which also acts as a shield. The gain module layout incorporates ultra-short signal paths and only the finest discrete components such as MOSFET transistors, MELF resistors and polypropylene capacitors. Active, well-balanced current sources are used instead of passive resistor networks.

The PRE32 is DC coupled from input to output. There are no capacitors in the signal path. Instead active DC servos are used to compensate for any DC present, ensuring that the outputs are always free from DC components.

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All the front panel control components are kept well separated from the analogue part of the PRE32 by the front panel's intuitive design: the electronics are placed between the front panel and the main steel chassis.

Ultra low-power standby

The PRE32 incorporates a very low eco mode for standby. Power consumption is just 0.2W. In order to minimise high frequency components originating from the standby power supply (high performance switch-mode) when the PRE32 is in operation, the standby supply is switched off when the PRE32 is powered up, and a discrete linear power supply consisting of only the finest discrete power supply components and an R-core mains transformer, takes over.

Analogue and digital power supplies are kept well separated. For the analogue side a discrete ultra-fast voltage regulation circuit using discrete power transistors is used.

The power supply capacitor bank is large (25.000uF) and for lower ESR and best performance, is divided between many smaller capacitors.

These measures have produced extremely good THD+N and S/N ratio figures for the PRE32.

Upgradeable Design

A media upgrade will be available, which offers up to 24 bit/192 kHz streaming of files from Internet, NAS or PCs, as well as Internet radio content and also digital audio input from a range of devices including CD players, smart phones, personal players, sat boxes etc.

MM30 media board

The MM30 multimedia upgrade module adapts the EISA award-winning I32 integrated amplifier and the PRE32 stereo preamplifier for audiophile streaming, internet radio and gapless audio playback, through integration with UPnP devices such as PC/Mac/NAS iPod®, iPad®, iPhone® or USB thumb drive. It's a genuine 24/192 DAC board including coax, TOSLINK, USB-A and USB-B inputs (incorporating an asynchronous master clock for low jitter), and a high resolution (192 kHz) coax output.

In addition there is a high quality easy-to-install aptX Bluetooth upgrade for the PRE32, which takes the form of a small internal circuit board and external antenna (for improved reception), the threaded antenna input replacing the DAB/FM terminal on the MM30 fascia.

Our definitions for File Based Audio:

Streaming: 'live' download for Internet radio and Music services like Spotify
and playing music over a network from NAS or PC

Playback of Audio files: Playing music files directly from laptop or PC over a USB-B connection. This means using programs like iTunes (Amara) and JRIVER as user interface

Recommendations

- Use of a high quality wireless router
- Use of high quality CAT7 Cables
- Use of a switch between the Primare MM30, NP30 or PRE60 and computer or NAS
- Use of good quality files such as WAV, AIFF or FLAC-uncompressed
- Primare App is available for both iOS and Android. (iOS version supports Voice Over for visually impaired users)
- For High Res streaming LAN is needed

- WLAN: 802.11b, g, n; 2.4 GHz band; WPA, WPA2 security – Ethernet: 10/100 MBit/s – DHCP and AutoIP support
- Advantage of an asynchronous USB connection is that the clock, present in the DAC, controls the flow of audio data from the computer to avoid the imprecise clock used in the computer.
- Please use a high quality USB-B cable for connection and make sure to check your audio settings on your computer
- Also try the different USB connections on your laptop as they do sound different.
- Please make sure to download the PC audio driver from the SUPPORT section on our website
- For playing music from PC over USB-B please download the Primare PCaudio driver from the SUPPORT page from www.primare.net
- From MAC it will play automatically over USB-B will give best sound quality from Spotify PREMIUM. (please set audio setting in Spotify to Extreme)
- Firmware updates can be done from the device's MENU or from Primare App

Supported Audio Formats

Codec	Channels	Samplerates in kHz	Sample format	Bitrate	Gapless	Restrictions
WAV	mono/ stereo	8, 11.025, 16, 22.05, 32, 44.1, 48, 88.2, 96, 176.4, 192	Int: 8, 16, 24 Float: 32	n.a.	yes	samplerate > 48kHz not on WLAN
LPCM	mono/ stereo	8, 11.025, 16, 22.05, 32, 44.1, 48, 88.2, 96, 176.4, 192	Int: 8, 16, 24	n.a.	yes	samplerate > 48kHz not on WLAN
AIFF	mono/ stereo	8, 11.025, 16, 22.05, 32, 44.1, 48, 88.2, 96, 176.4, 192	Int: 8, 16, 24 Float: 32	n.a.	yes	samplerate > 48kHz not on WLAN
FLAC	mono/ stereo	8, 11.025, 16, 22.05, 32, 44.1, 48, 88.2, 96, 176.4, 192	16/24	n.a.	yes	samplerate > 48kHz not on WLAN
ALAC	mono/ stereo	44.1, 48, 88.2, 96	16/24	n.a.	yes	
MP3	mono/ stereo	8, 11.025, 16, 22.05, 32, 44.1, 48	n.a.	max 320kBit/s CBR/VBR	yes	gapless support needs LAME extensions in file header
MP4 (AAC)	mono/ stereo	8, 11.025, 16, 22.05, 32, 44.1, 48	n.a.	max 400kBit/s CBR/VBR	yes	gapless support needs LAME extensions in file header
OGG Vorbis	mono/ stereo	16, 22.05, 32, 44.1, 48	n.a.	max 500kBit/s CBR/VBR	no	
WMA	mono/ stereo	8, 11.025, 16, 22.05, 32, 44.1, 48	n.a.	max 320kBit/s CBR/VBR	no	WMA9 only, no lossless or professional codec

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MM30 Audiophile Topology

DAC upgrades from certain brands are known to interfere with the analogue output causing a noticeable deterioration in sound quality. Consistent with Primare design philosophy, the digital and analogue signal paths within the Primare media upgrade have their own dedicated ground planes - a design feature which protects the purity of the analogue signals.

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 optimize XMOS firmware for better performance from Primare's XMOS application. **Please note: 176.4kHz is not supported by XMOS on MM30 (176.4 is supported over network).**

DAC

The MM30 uses a SRC4392 sample rate converter in conjunction with a Burr Brown PCM1792 24/192 DAC, running continually at 24/192. Incoming data at rates other than 24/192 are up-sampled to 24/192 to ensure the optimal operation of the DAC.

Volume Control

The volume will be adjustable from MIN to the configured MAX setting on the I32/PRE32.

Primare Control App available for iPhone/iPad and Android.

The Primare App allows you to choose and play media (including Internet radio) at resolutions up to 24bit/192kHz from network shared music sources and storage through NP30, PRE60 and from I32 and PRE32 with installed MM30 board.

- Switch to the MEDIA input
- Use either the Primare App (for iPhone®/iPad®, or the Android version) or any generic UPnP App.
- Some features, like playing media from USB thumb drive, USB-connected iPhone, iPod®, iPad®, and playing vTuner, require the use of the Primare App.

Primare App will:

- Establish network connections and play from any network shared music source
- Play from USB-A, (stick, iPhone etc)
- Play files up to 24bit/192 kHz resolution
- Play internet radio (vTuner – http://www.vtuner.com)
- Display and save playlists
- Display format, bit rate and sample rate of the song playing
- Provide fast forward and back navigation of the song playing
- Provide volume control including default at start-up (fixed or variable on NP30)
- Allow source selection of devices connected to inputs of the I32, PRE32, PRE60 and NP30
- Allow the renaming of inputs on I32, PRE32 and PRE60
- Give the I32, PRE32, PRE60 or NP30 a name on the network
- Manage software updates on I32, PRE32, PRE60 and NP30
- For playing music from PC over USB-B please download the Primare PCaudio driver from the SUPPORT page from www.primare.net
- From MAC it will play automatically over USB-B will give best sound quality from Spotify PREMIUM. (please set audio setting in Spotify to Extreme)
- Firmware updates can be done from the device's MENU or from Primare App

How to use Spotify with Primare:

Please download the guide here:

http://www.primare.net/assets/_managed/products/files/SpotifywithPrimare_1.pdf

Using a standard UPnP App

Any standard UPnP application on Android or iphone/ipad can be used to access the streaming functionality. However, while UPnP will allow you to browse a media server with playlists, tracks, album-art and transport controls, some features are not available (USB-drive, Ipod, Ipad, Iphone-USB devices). Also no radio is supported with a standard UPnP App.

Firmware upgrade

If a network connection is available, the PRE32 can connect to a Primare server to download new firmware. The Primare App offers an auto-upgrade feature, which automatically notifies the user when an upgrade is available. Simply activate the upgrade from the App. New Firmware can also be upgraded using a USB flash memory.

Inputs selectable from I32 and PRE32

Each input will have its default name, but can be renamed by the user (up to six characters) in the same way as any other input in the I32/PRE32 display architecture.

The inputs are selected using the C24 remote control or the front panel input selector switch.

- Coax input
- Toslink 1-3
- USB-B input (from computer USB interface)
- USB-A input, allowing the device to play audio from USB/Iphone
- MEDIA input – this input must be selected to play streaming media.

MM30 Features and Specifications

Audio formats:	WAV, LPCM, AIFF, FLAC, ALAC, MP3, MP4 (AAC), WMA, OGG,
Sample rates:	32-192kHz
WLAN:	b, g, n mode; WEP (64 and 128Bit), WPA &WPA2 (TKIP & AES)
Connections output	Digital (192 kHz)
Connections input	3x optical (96kHz)
	1x SPDIF (192kHz)
	USB-A
	USB-B (192kHz)
	WLAN (48kHz)
	LAN (192kHz)

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Bluetooth Upgrade

The high quality aptX Bluetooth upgrade takes the form of a small internal circuit board and external antenna (for improved reception), which installs easily, the threaded antenna input replacing the DAB/FM terminal on the MM30 fascia.

For compatibility with Primare's high-performance audio design, the receiver-only module supports high quality Bluetooth via aptX (android), AAC, MP3 but rather than use an integrated DAC (as employed by other BT upgrades) the output is fed to the product's own Sample Rate Converter and up-sampled to 192kHz for optimum performance through the existing high resolution DACs. In this way Primare's Bluetooth Upgrade is among the most audiophile available, adding excellent Bluetooth sound quality to the convenience of wireless Bluetooth connections.

Following an easy software update via the PrimareApp, the BT input is added to the product control menu in a discrete BT section, which allows for the renaming of the input for the product display and the also the BT connection. Other controls are 'Visible', 'Unpair' and 'Autoconnect'.

PRE32 - easy User Interface

An easy set-up menu is available via the PRE32's graphical display, which is dimmable in four steps. The display auto-dims after a few seconds and returns to programmed brightness at the touch of a control. Set-up includes power-up volume, input re-naming (up to 6 characters), input disabling and trim function (volume and balance) for each input in steps of 1dB, as well as a surround processor bypass feature.

Product specification PRE32

Analogue Inputs	2 pair XLR (L & R) 4 pair RCA (L & R)
Other In/outputs	RS232, IR in/out, Trigger in/out, RF.
Optional Media i/o module	
Optional high quality aptX Bluetooth upgrade	
Input Impedance	15k Both RCA and XLR
Analogue Record Output	1 pair RCA (L & R)
Pre Output	2 pair RCA (L & R), 1 pair XLR (L & R)
Output Impedance	110 ohms
Frequency Response	20Hz – 100kHz -3dB
THD + N	< 0.003%, 20Hz – 100kHz, 0dB gain.
Signal to Noise	-115 dBV
Max in /out level	10Vrms
Gain	16dB
Power Consumption	Standby: 0.2W; Operate: 23W
Dimensions (wxdxh)	430 x 385 x 105mm
Weight	10.5 kg
Colour Options	Black and Titanium

Ends September 2014