

Design Brief - CD35 Prisma Digital Music / Compact Disc Player

The CD35 Prisma is an integrated digital music source, combining compact disc and stored or streamed media playback.

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Design philosophy

All of Primare designs are a result of our Practical Design Approach, resulting in a focus on two fundamental design elements:

1. Thoroughly implemented power supply designs – so that all elements of any design to operate effortlessly at their fullest effectiveness. Every product and sub-circuit demands unique power supply solutions - a more conventional linear supply or advanced switch mode main supply may work best dependent upon the application, and carefully crafted individual discrete power supplies are strategically inserted into the circuit to deliver power exactly where and how much is needed.
2. Artfully crafted ultra-short signal paths - so that each individual component and sub circuit operates sympathetically to achieve a cohesive whole. Elegant and simple electrical designs are used in even the most complex product, utilizing



ultra-short signal paths with all gain in one device whenever possible. Ultimately, this results in fewer, higher quality parts for a reduction in associated distortions and an increase in overall electrical efficiency.

To that end, basic technologies have been selected to realize those benefits:

- 2 and 4-layer double-sided circuit board construction allows for the most direct and efficient layout of circuit components not only for the shortest signal path, but also to more easily achieve a sympathetic layout of circuit and sub-circuit components for best performance.
- Surface mount components are used whenever possible as this allows for direct connection of the circuit device or component to the circuit board trace with the solder being used solely to mechanically hold the part in place. The elimination of the small metal lead or wire at each connection point in a more conventional large scale circuit device or component cumulatively shortens the signal path. Additionally, conventional large scale components demand through hole or “eyelet” construction, limiting direct contact of the component’s lead to the circuit board trace and resulting in the solder providing electrical connection as well as mechanical connection for the device. Neither solder nor the metal used in the leads of most large scale devices provide the best signal transmission, therefore limiting potential performance of even the best designed circuits.

Drive Technology

The TEAC CD 5020A-AT is an isolated transport that is adjustable for precise, smooth tray loading, and low clamp noise. An internal interphase I2S and SPDIF digital audio interface combined with buffered memory is utilized for improved performance.

Digital to Analog Conversion (DAC) Technology

In order to allow for playback of virtually any digital source with absolute accuracy and musicality we have selected the state-of-the-art ES9028PRO SABRE digital-to-analog converter (DAC), a 32-bit, 8-channel PRO series DAC based on ESS patented HyperStreamDAC technology for outstanding performance with 129dB dynamic range (DNR), and -120dB total harmonic distortion plus noise (TH+N). The ESS chip is used in a balanced D/A conversion scheme that feeds a discrete analog output stage with a hand selected FET input section.

Power Supply Technology

A customer linear power supply is combined with a switch mode standby supply (turned off when in playback mode to minimize noise) to deliver on demand the precise power needed.



Prisma Connectivity and Control Technology

Prisma provides a full function network player – for stored and streamed media, Wi-Fi and Bluetooth connection, including multi-room/multi-zone connectivity and control. Prisma App – to control every feature of every Prisma product

Prisma App, in addition to the configuration settings control listed above, provides:

- Playback functions: Play, stop, track forward and back, shuffle play, repeat single or all tracks, volume mute, volume adjustment either by tapping the -/+ icons or sliding your finger across the volume bar
- Multi-room multi-zone control between other Prisma enabled devices
- Search by artist, album, track, and title from stored media
- Complete track information, including file format, bit and sample rate
- Playlist and Queue creation from stored media

Connectivity

- Digital - USB-A
 - Sample rates up to PCM 24/192kHz and DSD 128/5.6MHz
 - File formats: WAV, LPCM, AIFF, FLAC, ALAC, MP3, MP4 (AAC), WMA, OGG, DSD
- Network
 - Wired/LAN – two Ethernet connection ports allow Prisma to act as network switch for flexible wired network system connection options
 - Wireless/WLAN - dual band wireless technology (WLAN IEEE 802.11 a/b/g/n and 802.11ac compliant)
- Streaming
 - Bluetooth – connects Apple, Android, and Windows devices directly for playback of either streamed or stored content from the associated device with lossy compression. Given the wide availability of this technology and lower resolution capabilities, Bluetooth is an easy way to stream content for informal listening.
 - AirPlay – connects Apple devices over the WiFi network for playback of either streamed or stored content from the associated device with lossless compression. As a result, AirPlay has the capability of playing over greater distances than Bluetooth, and as the Apple Lossless Audio Codec is used to allow streaming quality up to CD quality (44.1kHz), is appropriate for more critical listening.
 - Spotify Connect – connects any device with the Spotify application over the WiFi network directly to that service, and allows for playback at the highest level offered by the required Premium service (up to 320 kbps).
 - Chromecast built-in - offering the greatest level of connectivity and control options:
 - The Chromecast built-in associated Google Home application connects the Prisma device to your WiFi network for casting hundreds of enabled music streaming services.
 - Because it provides a direct connection between the I35 Prisma and the preferred music service through the network, playback quality is limited only by the quality of resolution provided by that service, meaning the possibility of higher resolution playback from services like TIDAL HiFi and Qobuz (up to 24-bit/96kHz).



- More than one device can be connected at a time, content can be cast to any Chromecast built-in device on the network, and control of all functions can be accomplished from anywhere within the network.
- Automatic Prisma firmware updating through Google Home application.
- Voice control though the Google Home speaker and Google Assistant is anticipated as that system becomes readily available.

For additional details on Prisma see “Design Brief – Prisma”

Optional Configuration

CD35 Compact Disc Player – for those who may not need the connectivity and control features of Prisma.



System Building



The optional configuration of the CD35 is but one example of Primare's practical design approach extending not only to the individual components we make, but also to the system building options designed into each model. For example, if putting together a full-featured digital and analog system based on the I35 integrated amplifier and CD35 platforms, a number of pairing options. Two possible combinations are detailed below:

I35 + CD35 Prisma or CD35

Pairing an I35 Prisma and CD35 Prisma would mean redundant circuitry, with their similar DAC and Prisma components. This is one of the reasons that we offer the I35 analog only option. Not only does pairing the I35 and CD35 Prisma avoid obvious redundancies between the two components and reduces overall system costs, but it also offers certain advantages for improved performance. In part due to the industry standard ESS Sabre chipset employed in its DAC stage, the CD35 Prisma is able to provide subtly superior performance over the AKM chipset based DAC stage in either the I35 Prisma or I35 DAC. Additionally, the separation of the all-analog amplification circuitry in the I35 from the digital circuitry in the CD35 Prisma isolates those sections for lower noise floor and improved power supply delivery.

Note: the lack of Prisma technology in the I35 does mean that control of that unit through the Prisma app and multi-room/multi-zone functionality for I35 input sources is not available.

I35 Prisma or I35 DAC + DD35

For those who wish to have a single control and connectivity center, the I35 Prisma can be paired with the soon to be released DD35 CD disc drive. The DD35 is a transport only device, with digital outputs and no DAC stage, and is perfect to provide the best digital signal for conversion by the I35 Prisma or I35 DAC.



CD35 Prisma Digital Music / Compact Disc Player Specifications



Compact Disc Player

Mechanism: TEAC CD 5020A-AT

D/A converter: ESS Sabre ES9028PRO

Analogue outputs discrete analogue output stage:

- 1 pair RCA, 2.2 Vrms
- 1 pair XLR, 4.4 Vrms

Output impedance:

- RCA 370 Ω
- XLR 100 Ω

Digital outputs:

- 1x RCA
- 1x TOSLINK

Frequency response: 20Hz – 20 kHz -0.3dB

Signal to Noise: -110dB/AES17

THD + N: 20Hz – 20kHz <0.01%

Prisma Connectivity and Control Technology

Audio formats: WAV, LPCM, AIFF, FLAC, ALAC, MP3, MP4 (AAC), WMA, OGG, DSD

Inputs:

- USB-A: up to 192 kHz/24 bit; DSD 128/5.6MHz
- Airplay®
- Bluetooth®



- Chromecast built-in®
- Spotify Connect®
- UPnP/DLNA
- LAN:
 - Up to 192 kHz/24 bit; DSD 128/5.6MHz
 - Data transfer rate: 10/100Mbit
- WLAN:
 - Up to 192 kHz/24 bit; DSD 128/5.6MHz
 - IEEE 802.11 a/b/g/n/ac compliant; 2.4/5GHz; b, g, n mode
 - Data transfer rate: maximum of physical layer rate of 390 Mbps

Frequency Response:

- Analog: 20Hz – 20kHz -0,5dB
- Digital:
 - 44.1kHz 20Hz – 20kHz +0.1/-0,6dB
 - 96kHz 20Hz – 20kHz +0.1 /-0,2dB
 - 192kHz 20Hz – 20kHz +/- 0.1dB

Wireless Inputs:

- Airplay®
- Bluetooth®
- Chromecast built-in®
- Spotify Connect®

General

Control

- C25 system remote control
- RS232
- IR in/out
- Trigger in/out

Power consumption:

- Standby 0.5W
- Operation 25W

Dimensions: (wx dx h)

- 430 x 385 x 106 mm with buttons and connectors
- 430 x 382 x 106 mm without buttons and connectors

Weight: 10.8 kg

Color options: Black or Titanium

